

**COUNTY OF IMPERIAL**

**NILAND COUNTY SANITATION DISTRICT  
WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM  
IMPROVEMENTS**

**January 18, 2024**

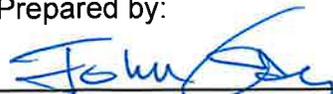
**ADDENDUM NO. 2**

The bidders are advised that the Specifications and Plans for the above-referenced project are hereby amended per the statements in this Addendum.

1. The Special Conditions – Volume 2 of 5 dated September 25, 2023 is no longer valid and is hereby replaced with Special Conditions – Volume 2 of 5 dated January 18<sup>th</sup>, 2024.
2. The Technical Conditions – Volume 3 of 5 dated September 25, 2023 is no longer valid and is hereby replaced with Technical Conditions – Volume 3 of 5 dated January 18<sup>th</sup>, 2024.
3. Improvement Plans 1 through 50 dated September 25, 2023 constituting Volume 4 of 5 is no longer valid and is hereby replaced with revised Volume 4 of 5 - Improvement Plans 1 through 50 dated October 18, 2023.
4. Improvement Plans 1 through 6 dated September 25, 2023 constituting Volume 5 of 5 is no longer valid and is hereby replaced with revised Volume 5 of 5 - Improvement Plans 1 through 8 dated October 18, 2023.

**END OF ADDENDUM NO. 2**

Prepared by:

  
\_\_\_\_\_  
John Gay, P.E.  
Public Works Director  
County of Imperial

Date: January 18, 2024

**Addendum No. 02 Acknowledgement** \_\_\_\_\_

The Bidder is responsible for advising any and all subcontractors and suppliers of this addendum. Each bidder must acknowledge receipt of this addendum in the noted space below and where indicated in the Bid Form. This sheet of the addendum is to be signed by the Bidder and submitted with the Bid.

Print or Type Bidder's Name: \_\_\_\_\_

Print or Type Authorized Name: \_\_\_\_\_

Authorized Signature of Bidder: \_\_\_\_\_

Date Signed: \_\_\_\_\_



## PROJECT MANUAL

**NILAND COUNTY SANITATION DISTRICT -  
WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS  
COUNTY PROJECT NO. 6582NSD**

### **ADDENDUM NUMBER 2 JANUARY 18, 2024**

Funded by:  
**North American Development (NAD) Bank - PDAP  
Contract No. TAA19-002/NADBC19-129**

**California Department of Housing and Community Development (HCD)  
Through Its Community Development Block Grant (CDBG) Program  
HCD Project No. SR49337  
CDBG Grant No. 20-CDBG-12086**

**United States Department of Agriculture (USDA) Rural Development**

Prepared by:  
**The Holt Group, Inc.  
THG Project No. 542.089**

For:  
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**VOLUME 2 OF 5  
SPECIAL CONDITIONS**

## Special Conditions

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## 1. Project Description

The project description is noted below as was as located on plan sheet C-101, the Title Sheet of the Civil Improvement Plans. The project description follows:

The Niland Wastewater Treatment Plant (WWTP) has a long history of effluent discharge violations dating back to 2003. The majority of the violations were the result of National Pollutant Discharge Elimination System (NPDES) permit violations for copper and Thallium. A 2016 preliminary engineering report (PER) prepared by the Holt Group, Inc. reviewed the Niland WWTP effluent violations and alternative improvements to address the violations. The alternative selected to address the discharge violations was to construct evaporation ponds for the ultimate disposal of the treated effluent wastewater. The evaporation ponds will allow for the elimination of the point discharge to the Imperial Irrigation District "R" drain and the NPDES discharge permit wastewater effluent requirements. A waste discharge requirement (WDR) permit will be required for the Niland WWTP and evaporation pond system in lieu of the NPDES discharge permit. In addition to the construction of evaporation ponds, improvements to the gravity sanitary sewer pipeline collection system upstream of the WWTP are to be accomplished. The improvements to the gravity sanitary sewer pipeline collection system will limit infiltration (including copper and thallium) into the collection system and WWTP. The existing WWTP will remain operational to treat the influent raw wastewater to a secondary effluent condition prior to directing the secondary effluent to the evaporation ponds. Capital improvements to the existing WWTP components, as a resultant from aged treatment plant infrastructure will also be accomplished to ensure the existing wastewater treatment plant components are satisfactorily functioning.

The three (3) Niland WWTP and Collection System Project Components consist of the following items:

1. Existing WWTP improvements including:
  - 1.1. Replacement of fiberglass grating at the top of the raw influent pump station wet well with an aluminum access hatch.
  - 1.2. The influent flowmeter precast concrete vault is to be raised to a higher elevation to prevent flooding of the flowmeter.
  - 1.3. The sludge in aeration pond number 1 is to be removed and placed in a new sludge containment basin. The new sludge containment basin is to be constructed south of the Aeration Ponds. The HDPE liner in aeration pond number 1 is in poor condition and is to be replaced with a new HDPE liner.
  - 1.4. Repair of HDPE liner material at aeration pond numbers 2 and 3.
  - 1.5. The existing six (6) aerators in aeration ponds 1 through 6 are to be replaced with new aerators. New Aerator Mooring Posts are to be installed in Aeration

Pond 1. The existing Aeration Field Control Stations are to be removed and replaced with new Aerator Field Control Stations.

- 1.6 Most of the existing resilient wedge gate valves along the piping within the aeration ponds and remaining plant facility are currently non-functional. This includes the valves upstream of the headworks structure. The existing non-functional resilient wedge gate valves are to be replaced with new eccentric plug valves.
- 1.7 The existing chemical containment basin structure has failed and cannot be rehabilitated. The existing chemical containment structure is to be abandoned. New sodium hypochlorite and sodium metabisulfite chemical system facilities are to be constructed. The chemical systems shall include the chemical tanks, pumps, piping, eye wash stations, shade structures, concrete support slabs, electrical circuitry, chemical pump rate of flow controllers and other miscellaneous items.
- 1.8 Re-construct the chlorination/de-chlorination structure's failed concrete walls and floor areas. Demolish existing concrete walls and floor. Construct new concrete walls and floor. A new flash mixer is to be installed. A new flash mixer electrical field control station to be installed. The suspended concrete slab for the flash mixer is to be replaced. New Aluminum handrail sections are to be installed.
- 1.9 Improvements at the effluent flowmeter/sampling vault include the installation of an aluminum grate at the top of the vault.
- 1.10 Improvements at the ground water pump station include the replacement of the plywood cover located at the top of the wet well with an aluminum access hatch.
- 1.11 A new potable water treatment facility with shade structure is to be constructed for the WWTP wash down water and to provide potable water for the laboratory building.
- 1.12 The WWTP entrance road bridge crossing the Imperial Irrigation District "R" canal is to be replaced by the Imperial Irrigation District.
- 1.13 A new automatic entrance gate is to be installed at the Wastewater Treatment Plant Main Entrance accessing Alcott Road.
- 1.14 The capacity of the existing wastewater storage pond is to be increased by excavating the pond bottom to a deeper depth and constructing earth embankments around the perimeter of the Emergency Wastewater Storage Pond.

- 1.15 A new 6 inch force main with piping connection fittings and valves is to be extended to the wastewater storage pond.
  - 1.16 A new PCC pump sump is to be constructed in the wastewater storage pond.
  - 1.17 An All Weather Access Road from the WWTP main entrance gate to the Evaporation / Infiltration Pond Site is to be constructed through the existing Wastewater Treatment Plant Site and continue into the Evaporation / Infiltration Pond Site.
  - 1.18 Installation of (10) monument well enclosures over existing ground water piezometers is to be accomplished at the Wastewater Treatment Plant Site.
  - 1.19 Installation of monument well enclosures over the vertical perforated pipeline cleanouts is to be accomplished at the Wastewater Treatment Plant Site.
  - 1.20 Install a 6" and a 12" insert valve for Aeration Pond isolation and eccentric plug valve –replacement.
  - 1.21 Class 2 Base Access Road installation from the east WWTP entrance gate to the Chlorination / Dechlorination Basin Area.
  - 1.22 Class 2 Base Parking Lot at Laboratory Control Building.
  - 1.23 Class 2 Base parking area and pad at the construction Trailer Site.
  - 1.24 Other minor existing WWTP capital improvements.
2. Construction of evaporation ponds and effluent conveyance system including:
- 2.1 Installation of an effluent pump station downstream of the existing WWTP flowmeter/sampling vault. The effluent pump station will transmit the existing WWTP treated effluent to the Evaporation / Infiltration ponds.
  - 2.2 Installation of an 8-inch diameter gravity pipeline and a 6-inch diameter force main from the Evaporation / Infiltration Pond pump station to the Evaporation / Infiltration ponds.
  - 2.3 Installation of a standpipe along the force main and gravity effluent conveyance piping.
  - 2.4 Construction of three (3) native earth evaporation / infiltration ponds. Each evaporation / infiltration Pond bottom shall consist of approximately ten (10) acres. The total evaporation pond site is comprised of 56 acres.

- 2.5 Installation of monument well enclosures over existing piezometers around the perimeter of the evaporation / infiltration ponds.
  - 2.6 Installation of a 6-foot-high chain link fence around the perimeter of the evaporation / infiltration pond site. Installation of three (3) chain link entrance gates at the Evaporation / Infiltration Pond Site and a new automatically operated chain link fence entrance gate at the WWTP main entrance at Alcott Road.
  - 2.7 Continuation of an all-weather access road from the existing WWTP to the evaporation / infiltration pond site.
  - 2.8 Installation of a 30-inch diameter agricultural lateral pipeline, precast drainage and irrigation structure and 60" eccentric flat top manhole east of Evaporation / Infiltration Pond Number 1.
  - 2.9 Re-Construction of the existing IID "R" Lateral Access Road south native earth slope located near the north Evaporation / Infiltration Pond boundary line.
  - 2.10 Installation of new earth berm near the west and south Evaporation / Infiltration Pond boundary lines.
  - 2.11 Installation of a earth lined retention basin at the southwest corner of the Evaporation / Infiltration Pond Site.
  - 2.12 Installation of seven (7) PCC outlet structures at the outlet points at the 8 " Gravity effluent pipelines and 8" gravity pump station overflow pipeline.
  - 2.13 Cut and Plug existing perforated pipe agricultural pipelines beneath the Evaporation / Infiltration Pond site.
3. Collection system improvements
- 3.1 Rehabilitate the existing 2,459 foot long wastewater collection system 12-inch diameter gravity VCP pipeline along Alcott Road in County of Imperial Right of Way from the existing Niland WWTP to Highway 111 with a cured in place piping (CIPP) method.
  - 3.2 Rehabilitate six (6) existing 4 foot diameter sanitary sewer manholes along the gravity Alcott Road sanitary sewer outfall pipeline from the existing WWTP to Highway 111.
  - 3.3 Rehabilitate the existing 3,025 lineal foot wastewater collection system 12 inch diameter gravity VCP pipeline along Highway 111 in the State of California

Department of Transportation (Caltrans) Right of Way from Alcott Road to Noffsinger Road with a curved in place piping (CIPP) method.

- 3.4 Rehabilitate eleven (11) existing 4 foot diameter sanitary sewer manholes along the Highway 111 gravity sanitary pipeline from Alcott Road to Noffsinger Road.
- 3.5 Remove and replace existing 28.5 foot long, 10 inch diameter sanitary sewer pipeline section 20 feet east of the east pavement edge of Highway 111 within Alcott Road. This sanitary sewer pipeline replacement section is in Caltrans Right of Way.
- 3.6 Implement Traffic Control requirements during the sanitary sewer pipeline and manhole rehabilitation improvements along Alcott Road from the Niland WWTP to Highway 111 in Imperial County Right of Way.
- 3.7 Implement Traffic Control Plan requirements during the sanitary sewer pipeline and manhole rehabilitation improvements along Highway 111 from Alcott Road to Noffsinger Road in Caltrans Right of Way.

**END SPECIAL CONDITION SECTION 1**

## **2. Contract Documents, General Conditions, Special Conditions and Drawings**

The Bidding Documents are defined in the General Conditions as, “The Bidding requirements, the proposed Contract Documents, and all Addenda.” The Contract Documents are defined in the General Conditions as “Those items so designated in the Agreement, and which together comprise the Contract.” The Bidding and Contract Documents for this project have been placed in five (5) volumes as listed below:

### **Volume 1 of 5:**

Volume 1 contains the following Contract Document Sections of the specifications, which contains non-inclusive documents:

1. Advertisement for Bids
2. Instruction for Bidders
3. Wage Requirements
4. Bid Forms and Bid Submission Documents
5. Contract Documents including Agreement
6. Performance and Payment Bonds, Certificate of Owners Attorney, Contractor’s Application for Payment, Certificate of Substantial Completion and Notice of Acceptability of Work documents
7. Standard General Conditions
8. Supplementary Conditions
9. Work Change Directive and Change Order Forms

### **Volume 2 of 5:**

Volume 2 contains the Special Conditions Section of the Specifications, which contains, non-inclusive documents as follows:

1. Project Description
2. Contract Documents, General Conditions, Special Conditions and Drawings
3. Comprehensive Review of Major Project Components and Sequence of Events
4. Project Submittals
5. Permits
6. Project Signs
7. Air Pollution Control District Requirements
8. Survey and Construction Staking
9. Geotechnical Report
10. Project CEQA and NEPA Documents and Environmental Requirements
11. Drainage Study Statement
12. Driveway Improvements for Wastewater Treatment Plant Main Entrance
13. On-Site Potable Water System at Wastewater Treatment Plant
14. Stormwater Pollution Prevention Plan
15. Business License

16. Perforated pipelines (Agricultural Tile Lines) at Evaporation/Infiltration Basin Site
17. Geotechnical Testing – Soil and Concrete Testing

- Appendix A – Monument Preservation Forms**
- Appendix B – Geotechnical Report**
- Appendix C – Conditional Use Permit (CEQA Document)**
- Appendix D – Environmental Assessment (NEPA Document)**
- Appendix E – Storm Water Pollution Prevention Plan (SWPPP)**
- Appendix F – IID Agricultural Perforated Pipeline (Tile Lines) As-Built Drawing**

**Volume 3 of 5:**

*Volume 3 contains the **Technical Specifications**. The Technical Specifications Table of Contents includes a listing of all Technical Specifications for this project.*

**Volume 4 of 5:**

*Volume 4 contains the **Wastewater Treatment Plant and Collection System Improvement Drawings**. The Improvement Drawings include 50 plan sheets. There is a Plan Sheet Index on the first plan sheet (Page 1 of 50), the Title Sheet, listing the title of each plan sheet and plan sheet drawing number.*

**Volume 5 of 5:**

***Volume 5 contains the Sewer Collection System Improvement Drawings within the State of California Department of Transportation (Caltrans) Highway 111 Right of Way** between Alcott Road and Noffsinger Road in Niland, California. The Improvement Drawings include 8 plan sheets prepared in accordance with Caltrans requirements. There is a Plan Sheet Index on the first plan Sheet (Page 1 of 8), the Title Sheet, listing the title of each plan sheet and plan sheet drawing number.*

**END SPECIAL CONDITION SECTION 2**

### **3. Comprehensive Review of Major Project components including Sequence of Events.**

The three (3) Major Project components consist of the construction of the Existing Wastewater Treatment Plant Improvements; Evaporation Ponds and Effluent Conveyance System; and Sanitary Sewer Collection System Improvements. A comprehensive review of the three (3) Major Project components follows:

#### **3.1 Existing Wastewater Treatment Plant Improvements**

##### **3.1.1 Purpose to Refurbish Existing Wastewater Treatment Plant Units**

The existing wastewater treatment plant is to be refurbished to continue to treat the raw wastewater entering the plant from the Niland wastewater sanitary sewer collection system. Wastewater treatment plant improvements do not include expansion of the wastewater treatment plant flow capacity. The raw wastewater is to be treated to a secondary effluent level prior to conveyance to the evaporation/infiltration ponds.

##### **3.1.2 Wastewater Treatment Plant Raw Wastewater Flow**

The Average Daily Wastewater Flow entering the Niland Wastewater Treatment Plant is approximately 64,000 gallons/day or 44 gallons per minute over a 24 hour period. Peak flows are estimated to be 88 gallons per minute and low flows are estimated to be 22 gallons per minute.

##### **3.1.3 High Water Table beneath the Existing Wastewater Treatment Plant**

The water table beneath the existing wastewater treatment plant is relatively high and is located between 4 feet and 8 feet below existing grade. The existing water table was recently measured to be at elevation 817.00, plus or minus ½ foot around the Aeration Ponds. See the piezometer information table on plan sheet 43. Dewatering will likely be required for the replacement of the valves upstream of the existing headworks structure, the replacement of the sanitary sewer pipeline valves throughout the existing wastewater treatment plant site, the removal of sludge from Aeration Pond 1, installation of a new HDPE liner in Aeration Pond 1, and the rehabilitation of the Chlorination/Dechlorination Structure. Dewatering will be required for the construction of the new Evaporation/Infiltration Pond Pump Station. The construction of the new Evaporation/Infiltration Pond Pump Station is part of the Evaporation Ponds and Effluent Conveyance System and will be reviewed in section 3.2.

The existing wastewater treatment plant was constructed in 1993. The State of California Regional Water Quality Control Board NPDES discharge permit required that the water table be maintained five (5) feet below the bottoms of the Aeration Ponds in 1993. This requirement is no longer in effect. In 1993 an underground perforated pipeline system was installed beneath the Aeration Ponds prior to the construction of

the Aeration Ponds. The perforated pipeline system conveyed the groundwater to an existing groundwater pump station. See plan sheet 4 for the location of the groundwater pump station. The groundwater pump station has not been active for over ten years. With the de-activation of the groundwater pump station the groundwater table has increased to the approximate level of the existing Aeration Pond bottoms. During the 1993 wastewater treatment plant construction project piezometers were placed around the exterior perimeter of the Aeration Ponds to monitor the depth of the groundwater table. The piezometer locations are illustrated on plan sheet 4; P#1, P#2, etc. All piezometers are presently functional except of piezometer number 2. As mentioned in the previous paragraph, the water table was recently measured at each piezometer and the water table depth is illustrated on the Piezometer Information Table on plan sheet 43. Prior to the commencement of construction activities at the existing Wastewater Treatment Plant the contractor shall install monument well enclosures over the piezometers per Detail WW on plan sheet 43. The monument enclosures shall be installed to the finish native grade or "All Weather Access Road" class 2 base finish grade, as appropriate. Four (4) foot lath with flagging shall be placed around the piezometer monument enclosures throughout the construction period. It is important that the piezometers be preserved in good condition to monitor the groundwater table during the construction period and be available to monitor the water table in the future. If the piezometers are damaged or destroyed during the project construction then the contractor shall be required to engage a Geotechnical Consultant, approved by the Niland County Sanitation District (NCSD), to install replacement piezometers at the contractor's expense to the satisfaction of the NCSD.

The Niland County Sanitation District intends to start pumping ground water from the existing ground water pump station two (2) months before the commencement of construction activities at the wastewater treatment plant. The water level in the piezometers will be measured during the two (2) month period to determine the effectiveness in lowering the water table around the Aeration Basins. If the lowering of the water table is successful it will likely greatly assist the Aeration Pond Number 1 sludge removal and HDPE liner installation and the valve replacement work in the area of the Aeration Ponds. If successful, the assistance lent in areas further from the aeration ponds such as the sludge containment basin excavation, emergency wastewater pond excavation, chlorination/dechlorination basin rehabilitation, valve replacement upstream of the headworks structure and new evaporation pond pump station is difficult to determine. Addenda will be issued during the bidding process with updated piezometer water elevations.

*The contractor is hereby instructed to include the excavation dewatering costs for the replacement of the valves upstream of the existing headworks structure, chlorination / dechlorination structure and evaporation infiltration pond pump station within the bid schedule, regardless of whether the lowering of the water table is successful in the Aeration Pond area. See Technical Specification Section 02140, "Dewatering" regarding dewatering requirements. The Technical Specification Section requires that dewatering submittals be forwarded for review and approval by the Engineer prior to installing the dewatering system. The groundwater discharge shall be allowed to be directed to the*

Emergency Wastewater Pond or one (1) of the Aeration Ponds, as approved by the Engineer; however, in-situ soil and fine particulate matter shall be removed from the ground water discharge prior to disposal to the Emergency Wastewater Pond or Aeration Pond; all Regional Water Quality Control Board requirements shall be complied with and adherence to all Technical Specification requirements shall be complied with.

The excavation of the sludge containment basin and wastewater emergency pond will likely result in an approximate two (2) foot separation between the design pond bottom elevations and the existing water table. The contractor is instructed to use light excavation equipment in the pond bottom areas close to the water table depth per the plan sections for the ponds. The contractor may have to use a gradeall or hoe equipment to complete the pond bottom excavation if “pumping” of the native soil near the pond bottom occurs due to the use of heavy equipment and the high water table. See Section A-A on plan sheet 34 and Sections C-C and D-D on plan sheet 46.

### 3.1.4 Bypassing Wastewater Flow, Sequence of Construction and Time Constraints for Valve Replacement, Aeration Pond Number 1 sludge removal and new HDPE liner installation and Rehabilitation of Chlorination/Dechlorination Structure.

Raw wastewater flow is continuously directed to the Existing Wastewater Treatment Plant on a 24 hour a day basis. As previously noted in section 3.1.2, the estimated daily low flow is 22 gallons per minute, the estimated average daily flow is 44 gallons per minute and the estimated daily high flow is 88 gallons per minute.

It will be necessary to direct the raw wastewater flow through the existing wastewater treatment process or direct wastewater flow to the Emergency Storage Pond for storage and later conveyance to treatment units prior to discharge during project construction. The Aeration Ponds can also be lowered to allow wastewater flow bypassing to be directed to the Aeration Ponds. The following listed construction items will require the bypassing of upstream wastewater flow. A sequence of events with time constraints for the listed construction items is included with the construction item bypassing description.

1. The replacement of the existing valves and fittings upstream of the existing headworks structure. See construction keynote 1 on plan sheet 4.
2. Removal and replacement of non-functional valve numbers 3, 4, 5, 6, 7, 8 and 20 as illustrated on plan sheet 4 and installation of a 6 inch bypass force main to the wastewater storage pond.
3. Removal and replacement of non-functional valve numbers 11, 12, 13, 14 and 15 in the Aeration Pond area as illustrated on plan sheet 4.

4. The removal of sludge and installation of new HDPE liner material in Aeration Pond Number 1. See note 1 on plan sheet 31.
5. Rehabilitation of Chlorination/Dechlorination Structure. See Construction Keynote 10 on plan sheet 4.

The bypassing of wastewater flow for each of the five (5) above construction items shall be accomplished as follows:

3.1.4.1 Bypass raw wastewater flow upstream of existing headworks structure for valve and piping removal and replacement. Includes sequence of events and time constraints.

The existing valves upstream of the existing headworks structure as called out by keynote 1 on plan sheet 4 and illustrated by Detail A on plan sheet 12 will require the bypassing or blockage of wastewater flow entering the wastewater treatment plant from the Niland County Sanitary Sewer Collection System. The 12 inch valves to be replaced are listed as valves 1 and 2 on plan sheet 4 and are listed on the valve table on plan sheet 4. The following items are to be completed sequentially for the valve and piping removal and replacement and bypassing of wastewater flow:

1. Install dewatering system and reduce the water table depth 3 foot below the excavation depth prior to commencing the valve and piping removal and replacement work.
2. Excavate existing valves, fittings, and piping to be replaced and verify pipe diameter sizes, dimensioning and other items.
3. Pre-assemble new pipeline, valves and fittings at ground level, as appropriate, prior to removing and replacing the piping, valves and fittings.
4. Block the wastewater flow entering upstream manhole number 1 (upstream of the Headworks Structure). Manhole Number 1 is located within Alcott Road. See plan sheet 39 for the 12 inch sanitary sewer pipeline and manholes in Alcott Road from the WWTP to Highway 111. It is estimated the wastewater flow can be stored in the sanitary sewer collection pipeline system in Alcott Road for 5 hours.
5. Remove and replace existing valves, fittings, and piping.
6. Continually observe the wastewater level in either manholes 2 or 3 upstream of manhole 1 as illustrated on plan sheet 39 during the valve and piping removal and replacement work.
7. Provisions are to be made to bypass the wastewater flow from either manhole 2 or 3 to the wastewater influent pump station (see existing keynote 30 on plan sheet 4). If the wastewater level raises to with 1.5 foot of the manhole rim then wastewater flow is to be directed to the access hatch opening at the top of the wastewater influent pump station wet well. The contractor shall have provided a minimum of two (2) 200 gallon per minute pumps, suction hose, discharge hose and all other required items to bypass pump the raw wastewater flow to the wastewater influent pump station wet well. The pumps, suction hoses, discharge hoses and all other items are to be present at the project site for review and

approval by the Engineer 24 hours prior to commencing the valve and piping replacement work. The discharge hose shall be in good condition to prevent wastewater leakage from the discharge hose. The discharge pipeline shall be placed through a 20 foot long continuous section of 12 inch pvc pipeline over the IID "R" Lateral supply canal to prevent the possibility of wastewater entering the IID "R" Lateral. The 20 foot long section of 12 inch pipeline shall be installed such that any wastewater leaking from the discharge pipeline will be directed to Alcott Road or the bermed area within the wastewater treatment plant without the possibility of the wastewater entering the IID "R" Canal.

8. Restore normal gravity collection system wastewater flow into the Headworks Structure after the valve and piping replacement work has been completed and approved by the Engineer.

3.1.4.2 Bypass Flow, Sequence of Events and Time Constraints for removal and replacement of non-functional valve numbers 3, 4, 5, 6, 7, 8 and 20 as illustrated on plan sheet 4 and installation of a 6 inch bypass force main to the wastewater storage pond. Includes installation/realignment of 12 inch sanitary sewer influent pump station gravity overflow pipeline at the wastewater storage pond. See Construction Keynotes 8, 15, 24, 25, 26, 27 and 28 on plan sheet 4 which are related to or included with this item. The sequence of events for this work item are as follows:

1. This work item is a pre-requisite for the next Special Condition Section 3.1.4.3 work item. This work item includes the installation of the 6 inch bypass force main segment and the valves required for the installation of the 6 inch bypass force main. The installation of the 6 inch bypass force main will allow the wastewater influent flow to be directed from the Raw Wastewater Pump Station to the Wastewater Emergency Basin. This will allow for the replacement of the remainder of the non-functional Aeration Pond valves in the next Special Condition Section 3.1.4.3 work item.
2. Prior to the commencement of this item the wastewater emergency pond excavation and grading work per Construction Keynote 15 on plan sheet 4 is to be completed.
3. Prior to the commencement of this item prior Special Conditions Item 3.1.4.1 is to be completed.
4. Prior to the commencement of this item the water table elevation in the Aeration Pond Area is to be lowered by the Niland County Sanitation District (NCSD) per Special Conditions Section 3.1.3 to a level determined by the Engineer to be satisfactory.

5. Prior to the commencement of this item the NCSD is to lower the level of Aeration Pond Numbers 1, 2 and 3 by a vertical distance of 2 feet. This will allow a sufficient volume to be created for the acceptance of bypassed wastewater flow from the wastewater influent pump station during the completion of this work task.
6. Prior to the commencement of this item all piping material, valves, fittings, flapper valves and all other material items required to complete this work task shall have been delivered to the project site, inventoried by the engineer, and be available for installation.
7. Prior to the commencement of this item the installation of the 6 inch insert valve (valve number 8) and the 12 inch insert valve (valve number 20) shall be scheduled.
8. Prior to the commencement of this item install a 150 gallon per minute pump with suction and discharge hose to convey wastewater from the wastewater influent pump station to Aeration Pond Number 1. The discharge hose shall be placed below grade and protected when crossing the access road to allow vehicular traffic to pass along the access road. The contractor shall maintain the pump, suction and discharge hose in service 24 hours per day, 7 days a week until this work item is successfully completed. *As an alternative, the contractor can forward submittal documentation for review and approval by the Engineer to connect to the existing 6 inch force main downstream of the wastewater influent pump station and temporarily extend a 6 inch pipeline to aeration pond number 1.*
9. After above items 1 through 8 are satisfactorily completed this work item, as previously described, shall be completed. Please note that valve 9 is operational. The installation of the 6 inch insert valve in conjunction with the existing operable valve 9 will allow backflow from Ponds 1 and 2 from flowing into the new 6 inch force main connection to the existing 6 inch force main per construction keynote 24 on plan sheet 4. The 12 inch insert valve number 20 installation is included in this item to allow for the insert valve supplier to make a single trip to the project. In addition and more importantly, the installation of the 12 inch insert valve will preclude backflow from Pond Number 1 during the changing of valves associated with the next Special Condition Section Work item 3.1.4.3.
10. Lowering the Aeration Ponds 2 feet prior to the commencement work will provide 20 calendar days of wastewater storage. The contractor shall complete this work task in 20 calendar days. If the contractor anticipates that more than 20 calendar days is required to complete this work item then the contractor shall determine, in his/her opinion, the required time to complete this work item and illustrate it on

the contractor prepared construction schedule forwarded with required submittal documents for review and approval. Additional lowering of the Aeration Ponds will be considered if the contractor is of the opinion that additional time to complete this work item is required. The approved Construction Schedule shall reflect the approved time to complete this construction work item.

3.1.4.3 Bypass Flow, Sequence of Events and Time Constraints for removal and replacement of non-functional valve numbers 10, 11, 12, 13, 14, 15 and 22 and new valve number 21 in the Aeration Pond area as illustrated on plan sheet 4. The sequence of events for this work item are as follows:

1. This work item is a pre-requisite for the next Special Condition Section 3.1.4.4 work item. This work item includes the replacement of seven (7) existing non-functional valves and the installation of one (1) new valve in the Aeration Pond area. The Aeration Pond non-functioning valves do not allow the Aeration Ponds to be isolated and bypassed for maintenance and repair. After this work item is completed and all Aeration Pond valves are functional, each Aeration Pond will be able to be isolated, bypassed and drained for maintenance and repair.
2. Prior to the commencement of this item Special Condition Section 3.1.4.2 is to be completed.
3. Prior to the commencement of this item the water table elevation in the Aeration Pond Area is to be lowered by the Niland County Sanitation District (NCSD) per Special Conditions Section 3.1.3 to a satisfactory level determined by the Engineer. The goal is to lower the water table elevation to the level of the existing perforated pipeline system underlying the Aeration Ponds at approximately elevation 811.00.
4. Prior to the commencement of this item all new valves, fittings, piping, hardware, valve risers and covers, valve extensions and other materials and items necessary to replace the existing non-functional valves with new valves are to be present at the project site, inventoried by the engineer and ready for installation.
5. Prior to the commencement of this item the effluent level in Aeration Ponds 1, 2 and 3 is to be lowered 5 feet from the top effluent surface level as illustrated on plan sheet 4.
6. After the effluent level in Aeration Ponds 1, 2 and 3 is lowered 5 feet, Aeration Pond 1 is to be isolated from Aeration Ponds 2 and 3. To accomplish this close valves 7, 9 and 20 as illustrated on plan sheet 4. Valves 6 and 8 are to remain open. Wastewater flow from the Wastewater Influent Pump Station is to be directed to Aeration Pond 1.

7. It is estimated that Aeration Pond Number 2 will contain 1,025,500 gallons of effluent wastewater and Aeration Pond Number 3 will contain 982,000 gallons of effluent wastewater after both ponds are lowered 5 feet in depth from the maximum effluent wastewater level in both ponds. The total remaining volume in both Aeration Ponds 2 and 3 will be  $1,025,500 + 982,000 = 2,007,500$  gallons after the ponds are lowered 5 feet in depth.

After Aeration Pond Number 1 is isolated and wastewater flow from the wastewater influent pump station is being directed into Aeration Pond Number 1 per item 6, the remaining effluent in Ponds 2 and 3 shall be discharged. Since the valves to be replaced in the Aeration Ponds are “froze” open wastewater in Aeration Ponds 2 and 3 will backflow into the valve replacement pipeline areas unless Ponds 2 and 3 are emptied.

It is recommended to drain Aeration Ponds 2 and 3 over a 14 day period rather than immediately draining the ponds. This will reduce the destabilizing effects to the Aeration Pond saturated side slopes. It will allow saturated side slope material to become less saturated, less likely to slough or fail and to become more stable. The NCSD wastewater treatment plant staff will establish the exact discharge rate from Aeration Ponds 2 and 3 from a wastewater treatment plant operations basis.

Discharging 2,007,500 gallons of effluent wastewater over a 14 day period will result in a discharge rate of  $2,007,500 \text{ gallon}/14 \text{ days} = 143,393 \text{ gallons per day}$  or 100 gallons/minute for the 14 day period.

To be considered in the discharge of the effluent wastewater from Ponds 2 and 3 is the impact on the total discharge from the wastewater treatment plant. The Niland County Sanitation District wastewater treatment plant NPDES permit maximum discharge limit is 500,000 gallons per day or  $500,000 \text{ gallons per day}/1440 \text{ minutes/day} = 347 \text{ gallons/minute}$ .

Since the 44 gallons per minute Niland Collection System flow entering the wastewater plant will be directed to Aeration Pond 1, which will be isolated with no discharge, and since the dewatering pump to be placed in the existing ground water pump station will be sized to convey 150 gallons per minute and directed to Aeration Pond Number 1, the wastewater treatment plant effluent discharge during the emptying of Aeration Ponds 2 and 3 will be solely the wastewater effluent flow from emptying Aeration Ponds 2 and 3. The 100 gallons per minute discharge of the wastewater effluent flow from Aeration Ponds 2 and 3 over a 14 day period will be below the maximum discharge rate of 347 gallons/minute allowed by the Niland Wastewater Treatment Plant NPDES discharge permit. It should be noted that the Aeration Pond Number 1 influent flow from the Wastewater Influent Pump Station and Ground Water Pump Station will be directed to the Emergency Wastewater Storage Pond after Aeration Pond Number 1 is filled to its maximum wastewater effluent

level during the 14 day Pond 2 and 3 drainage period. See item 8 below regarding this issue.

8. After lowering the wastewater in Aeration Pond Number 1 for a vertical distance of 5 feet from its maximum wastewater effluent surface level it is estimated that there will be an available volume of 886,364 gallons for accepting the wastewater flow from the wastewater influent pump station. The 44 gallon per minute wastewater influent pump flow will fill the available Aeration Pond Number 1 volume in 14 days per the following calculations:  $886,364 \text{ gallons} / 44 \text{ gallons/minute} = 20,145 \text{ minutes}$ .  $20,145 \text{ minutes} / 1440 \text{ minutes/day} = 14 \text{ days}$ . After the 14 days the effluent surface level in Aeration Pond 1 will reach the maximum surface level at elevation 827.49 as illustrated on plan sheet 4. When the effluent surface level in Aeration Pond Number 1 reaches the maximum surface level elevation of 827.49 then the wastewater influent pump station flow is to be directed to the Emergency Wastewater Basin. Directing the raw wastewater from the influent pump station for a total of 14 days is important as the raw wastewater can be treated during that time period and will be less offensive than if placed in the emergency storage pond. The other advantage to directing the raw influent pump station wastewater to Aeration Pond number 1 is that it will reduce the quantity of effluent in the emergency wastewater pond which will be required to be pumped into the Aeration Pond System for treatment after the Aeration Pond Valve installation is completed. To accomplish directing the influent pump station wastewater flow to the Emergency Wastewater Basin close valve 5 and open valve 4, as illustrated on plan sheet 4. Valves 7, 9 and 20 are to remain closed to isolate Aeration Pond 1. Valve 6 is also to be closed.

The ground water pumping system flow discharge is to be directed from the Ground Water Pump Station to the Emergency Wastewater Basin by the Contractor after Aeration Ponds 1, 2 and 3 are lowered 5 feet. The contractor shall direct the groundwater pump station flow through a below grade 6 inch AWWA C-900 DR 25 PVC temporary pipeline to the Emergency Storage Basin. Directing the groundwater flow through the temporary underground pipeline will allow the WWTP access roads to be used during this work task. Directing the ground water pumping system flow to the Emergency Wastewater Basin will allow the Aeration Pond Number 1 excess volume to be fully utilized for treating the raw wastewater from the wastewater influent pump station for the maximum time period.

9. After Aeration Ponds 2 and 3 are drained and empty valve numbers 11, 12, 13, 14, 15 and 22 shall be removed and replaced. A new valve, valve number 21, is also to be installed. The replacement details for these valves are "called out" on plan sheet 4. *The valves shall be replaced within 21 calendar days after Aeration Ponds 2 and 3 are empty.* The contractor shall include the

costs for additional personnel and equipment, including overtime costs, to replace the valves within the 21 calendar day period.

The contractor shall assume that dewatering for the valve installation will not be required. If it is necessary for the contractor to dewater excavations for the water valve replacement then the contractor shall be entitled to a positive change order for the dewatering costs.

10. After valves 11, 12, 13, 14, 15, 21 and 22 are successfully installed, insert valve numbers 8 and 20 shall be fully opened and remain open. The insert valves were installed for isolation and backflow purposes to allow the replacement valves to be installed. The insert valves will not be regarded as operational Aeration Pond valves.
11. After valves 11, 12, 13, 14, 15, 21 and 22 are successfully installed the wastewater influent pump station sanitary sewer flow is to be directed to Aeration Pond Number 2. The Aeration Pond Valves are to be arranged to allow wastewater to flow through pond 2 and 3 in series. Aeration Pond 1 is to be drained over a 14 day period to prepare to remove the sludge at the bottom of Pond 1 and install a new HDPE liner in Aeration Pond 1 which is the subject of the next Special Condition section 3.1.4.4.

To route the wastewater flow from the Wastewater Influent Pump Station through Ponds 2 and 3 in series open valves 3, 5, 7, 9, 13, 14 and 15. Close valves 4, 6, 12 and 21.

12. Valve 4, allowing wastewater flow into the Emergency Wastewater Basin, is to be closed. Wastewater flow into the Emergency Wastewater Pond is to cease after valves 11, 12, 13, 14, 15, 21 and 22 are successfully installed and the wastewater is routed in series through Aeration Ponds 2 and 3.
13. The Contractor shall direct the ground water pumping system flow from the Emergency Wastewater Basin to Aeration Pond Number 2 after valves 11, 12, 13, 14, 15, 21 and 22 are successfully installed. The groundwater is to be directed through temporary below grade 6 inch AWWA C-900 DR-25 pvc piping installed by the contractor. The below grade piping shall allow access to the WWTP Aeration Ponds and access roads. The wastewater and ground water previously directed into the Emergency Wastewater Basin is to be pumped from a concrete sump to be constructed in the Emergency Wastewater Basin to the west end of Aeration Pond 2 for treatment. The contractor shall provide a 125 gallon per minute pump (maximum flow) to convey the emergency wastewater pond stored wastewater to the west end of Aeration Pond 2.

14. The Niland Wastewater Treatment Facility NPDES permit discharge limit is 500,000 gallons per day which equals 347 gallons per minute flow over a 24 hour period. The average daily wastewater flow entering the wastewater treatment plant is approximately 64,000 gallons per day which equals 44 gallons per minute. The dewatering pump to be placed in the existing ground water pump station by the Niland County Sanitation District will be sized at 150 gallons per minute. The total flow from the Niland Collection System wastewater, groundwater pumping system and pumping system to direct the wastewater from the Emergency Wastewater Pond to Aeration Pond Number 2 will be  $44 \text{ GPM} + 150 \text{ GPM} + 125 \text{ GPM} = 319 \text{ GPM}$ . The maximum flow which can be discharged from the wastewater treatment plant per the NPDES Permit is 347 GPM. The three (3) mentioned flow contributors will be  $347 - 319 = 28 \text{ GPM}$  or 40,320 gallons less (8 percent) below the maximum allowable discharge. If the effluent discharge flow exceeds the maximum allowable discharge flow per the NPDES permit the flow exceedance must be reported to the California Regional Water Quality Control Board and a fine will be levied against the Niland County Sanitation District. It is therefore important the pump capacity for the Emergency Wastewater Pond does not exceed 125 gallons per minute.

It should be noted that the Niland County Sanitation District Wastewater Treatment Plant Operators will ultimately decide the ground water pumping system and Emergency Wastewater Pond pumping system capacity.

15. For the record, valves 16 and 18 in the vicinity of the Chlorination – Dechlorination Structure are operational and do not require replacement. Valve 17 is to be replaced as a part of the Chlorination – Dechlorination rehabilitation work as described in Special Condition Section Item 3.1.4.5. Valve 19 will be installed as a new valve (not a replacement valve) and is to be installed at the time the Evaporation/Infiltration Pond Pump Station is constructed. Evaporation – Infiltration Pump Station and Basin valves and are not included in this Special Conditions Section.

3.1.4.4 Bypass Flow, Sequence of Events and Time Constraints for removal of sludge from the bottom of Aeration Pond Number 1 and the removal and replacement of the Aeration Pond Number 1 HDPE liner

1. Prior to the commencement of this item Special Condition Section SC 3.1.4.3 is to be completed.
2. Prior to the commencement of this item the water table elevation in the Aeration Pond Area is to be lowered by the Niland County Sanitation District (NCSD) per Special Conditions Section 3.1.3 to a satisfactory level determined by the Engineer. The goal is to lower the water table elevation to the level of the existing

perforated pipeline system underneath the Aeration Ponds at approximately elevation 811.00.

3. The contractor shall assume that it will not be necessary to complete dewatering activities to complete the Aeration Pond number 1 sludge removal and the HDPE liner removal and replacement. If it is necessary for the contractor to complete dewatering activities to accomplish Aeration Pond number 1 work activities then the contractor shall be entitled to a positive change order for the dewatering costs.
4. Refer to Item 11 of previous Special Conditions section 3.1.4.3. Per Special Conditions Section 3.1.4.3, the wastewater influent pump station discharge flow is to be directed to Aeration Pond number 2. The wastewater flow is to be treated and routed through Aeration Ponds 2 and 3 in series prior to the discharging of the wastewater effluent flow from Aeration Pond 3. Aeration Pond number 1 shall remain isolated. The 1,950,000 gallons of wastewater in Aeration Pond 1 is to be drained at a rate of 100 gallons per minute over a 14 day period until all effluent wastewater is drained from Aeration Pond 1. The contractor shall coordinate removing the existing aerators, electrical cables, securement stainless steel cables and all other aerator related items with the wastewater treatment plant operators. The contractor shall locate the aerators, electrical cables, stainless steel securement cables and all other aerator related items to a location designated by the wastewater treatment plant operators. After the completion of Aeration Pond Number 1 improvements, the new aerators to be supplied by the contractor are to be installed in Aeration Pond Number 1.
5. The Sludge Containment Basin, as illustrated on plan sheet 4, is to be constructed prior to commencing the removal of sludge from Aeration Pond Number 1. See Sludge Containment Basin Section A-A on plan sheet 34. The sludge containment basin finish design grade bottom is approximately 2 feet above the water table. Review Keynote 3 of Section A-A on plan sheet 34 regarding the use of light excavation equipment and the use of a hoe or gradall to complete the finish grading of the sludge containment basin bottom prior to the installation of the crusher fines and HDPE liner.
6. After the Sludge Containment Basin is constructed and the wastewater effluent is emptied from Aeration Pond 1 the sludge can be removed from the bottom of the Aeration Pond Number 1. A 57 foot wide section of the north Aeration Pond 1 embankment is to be removed to provide access into Aeration Pond 1. See Aeration Pond Number 1 – “HDPE liner removal and replacement and sludge removal plan” on plan sheet 33, Section BB-BB on plan sheet 33 and Section CC-CC on plan sheet 34 regarding the removal and replacement of the north Aeration Pond 1 embankment to access the Aeration Pond.

The contractor shall use light equipment to remove the sludge from the bottom of Aeration Pond 1. If pumping of the underlying Aeration Pond 1 soil occurs it may be required to use a drag-line, gradall or hoe to remove the sludge from the Aeration Pond bottom to minimize destabilizing the Aeration Pond 1 underlying native soil. The contractor is to remove all the sludge from the bottom of Aeration Pond 1. It may be necessary to hand shovel the sludge from the Aeration Pond Bottom in "hard to get" areas. Sludge left in the bottom of Aeration Pond 1 covered by the new HDPE liner is susceptible to anerobic digestion with associated gas formation. The gases could "float" portions of the new HDPE liner. It is therefore important to remove all the sludge from Aeration Pond Number 1 to prevent gas formation and floating of the new HDPE liner.

The removed sludge is to be deposited into the Sludge Containment Basin. The contractor shall place a protective cover such as granular sand, plywood, etc. at the bottom of the Sludge Containment Basin to protect the HDPE liner at the bottom of the Basin from heavy and light equipment. The sludge may have to be placed in the bottom of the Sludge Containment Basin with a hoe, conveyor, etc. in order to place the sludge without "running over" the HDPE liner. Heavy or light equipment are not to directly run over the HDPE liner in the bottom of the Sludge Containment Basin. If the HDPE liner is damaged, the Contractor shall be responsible to repair the HDPE liner at the contractors expense.

7. After the sludge is removed from the bottom of Aeration Pond Number 1 and placed in the Sludge Containment Basin the contractor shall remove and dispose of the existing liner in Aeration Pond Number 1.
8. After the HDPE liner is removed and disposed of, the Aeration Pond Number 1 north embankment section removed to access Aeration Pond Number 1 shall be reconstructed per Section BB-BB on plan sheet 33.
9. After the section of the north Aeration Pond Number 1 embankment is reconstructed, the interior side slopes and bottom of the Aeration Pond are to be graded. A total of 6 inches of crusher fines were placed under the HDPE liner installed in the 1993 wastewater treatment plant improvement project. A portion of the crusher fines may remain; however the condition and amount of remaining crusher fines is not known. The contractor is to import new crusher fines for placement on the Aeration Pond interior side slopes and bottoms. For the purposes of bidding and constructing this project, the contractor shall import the tonnage of new imported crusher fines to cover a 6 inch compacted depth within the Aeration Pond Number 1 bottom and interior side slopes. During the grading of the Aeration Pond Number 1 bottom and interior side slopes the 6 inches of new crusher fines plus the remaining 1993 crusher fines shall be installed to support the new HDPE liner material. The crusher fines shall be placed, graded and rolled to provide a smooth, firm and unyielding crusher fine surface and

provide adequate support for the new HDPE liner material. Compaction testing of the crusher fine material shall not be required.

10. After the crusher fines have been placed, graded and rolled satisfactorily, the HDPE liner shall be installed in Aeration Pond Number 1 per plan sheets 32, 33 and the Technical Specifications.
11. After the HDPE liner is satisfactorily installed and approved by the Engineer, the wastewater flow from the Wastewater Influent Pump Station shall be directed to Aeration Pond Number 1. The Wastewater Effluent shall be routed from Aeration Pond Number 1 to Aeration Pond Number 2 to Aeration Pond Number 3 in series. The effluent wastewater will be directed from Aeration Pond Number 3 to the Chlorination – Dechlorination Basin and Flowmeter/Sampling vault prior to discharge to the IID “R” Drain.
12. The new aerators, stainless steel support cables, electrical cables, new Aerator Field Control Stations and miscellaneous mechanical work is to be completed in conjunction with completing the HDPE lining and routing of wastewater flow to Aeration Pond Number 1. The new aerators shall be activated and operational at the time Aeration Pond Number 1 is within four (4) feet of the maximum effluent surface elevation of 827.49.

#### 3.1.4.5 Bypass Flow, Sequence of Events and Time Constraints for demolition and rehabilitation of existing Chlorination/Dechlorination Structure

1. Special Conditions Section 3.1.4.4 is to be completed prior to commencing the rehabilitation of the existing Chlorination/Dechlorination Structure. This includes transferring all the stored wastewater from the Emergency Storage Basin to the Aeration Ponds.
2. Dewatering the existing water table 3 foot below the bottom of the Chlorination/Dechlorination Structure footing shall occur prior to commencing the rehabilitation of the existing Chlorination/Dechlorination Structure and prior to bypassing or storing wastewater flow. The groundwater discharge shall be routed to Aeration Pond Number 1 during the lowering of the ground water table. The ground water table shall be lowered, as a minimum, to elevation 813.05. The contractor shall engage a geotechnical consultant to install a piezometer near the location of the Chlorination/Dechlorination Structure demolition and rehabilitation work to monitor and confirm that the water table has been lowered 3 foot below the bottom of the Chlorination/Dechlorination Structure footing to elevation 813.05, or below elevation 813.05, prior to storing or bypassing wastewater and ground water flows.
3. All critical materials to complete the demolition and construction of the Chlorination/Dechlorination Structure shall be present at the project site and inventoried by the Engineer prior to the commencement of

Chlorination/Dechlorination Structure demolition and rehabilitation. This includes the epoxy coated reinforcing bars and all other items critical to the demolition and rehabilitation work.

4. It will be necessary to store the existing wastewater flow in Aeration Pond numbers 1, 2 and 3 during the demolition and rehabilitation of the Chlorination/Dechlorination Basin. The time available to complete the demolition and rehabilitation of the existing Chlorination/Dechlorination Structure is dependent on the available storage volume in Aeration Pond numbers 1, 2 and 3 and the Emergency Storage Pond.

If Aeration Pond numbers 1, 2 and 3 are lowered by 5 feet from the ponds maximum effluent surface level and the Emergency Storage Pond is completely drained the following combined volume is available:

1. Aeration Pond Number 1 -	886,364 Gallons
2. Aeration Pond Number 2 -	854,500 Gallons
3. Aeration Pond Number 3 -	818,000 Gallons
4. Emergency Storage Pond -	<u>4,455,685 Gallons</u>
Total	7,014,549 Gallons

A Niland Sanitary District Collection System wastewater flow of 44 gallons/minute will be required to be stored during the demolition and reconstruction of the Chlorination/Dechlorination Basin. A total of 150 gallons per minute of flow is estimated to be required for the lowering of the ground water table from the Ground Water Pump Station wet well including the dewatering of the Chlorination/Dechlorination Basin. It is estimated that  $44 + 150 = 194$  Gallons/Minute of flow will be required to be stored until the Chlorination/Dechlorination Basin demolition and rehabilitation work is completed and the wastewater can be directed to the Chlorination/Dechlorination Structure for disinfection prior to discharge per the California Regional Water Quality Control Board NPDES discharge requirements.

The time available to complete the Chlorination/Dechlorination Structure Improvements to the point that wastewater can be directed to the rehabilitated basin structure is as follows:

$$7,014,549 \text{ Gallons} / 194 \text{ Gallons/Minute} = 36,157 \text{ Minutes}$$

$$36,157 \text{ Minutes} / 1440 \text{ Minutes/Day} = 25 \text{ Calendar Days}$$

*The contractor shall complete all Chlorination/Dechlorination basin structure demolition and reconstruction work to the point at which wastewater can be directed through the Chlorination/Dechlorination basin for disinfection purposes in a 25 calendar day period.* The contractor shall complete overtime work, work on Saturday's and Sundays or include multiple shifts of construction personnel in

order to complete the construction of the Chlorination/Dechlorination structure within the 25 calendar day period. The contractor shall include the extra costs to complete the work within the 25 calendar day period in the submitted Bid Proposal. No additional compensation for overtime work, work and Saturdays and Sundays or multiple shifts shall be allowed to the contractor for completing the Chlorination/Dechlorination basin structure demolition and reconstruction work within the required 25 calendar day period.

5. Prior to commencing the Chlorination/Dechlorination Structure demolition and reconstruction, the Niland County Sanitation District Operators shall lower the effluent level in Aeration Pond numbers 1, 2 and 3 for a vertical depth of 5 feet below each ponds maximum wastewater surface elevation. The ponds shall be lowered at a rate determined by the operators but not at a flow rate greater than 100 gallons/minute. Per previous sections, this maximum flow rate shall preclude destabilizing the Aeration Pond embankments and not contribute to exceeding the maximum allowable wastewater treatment plant discharge rate.

During the lowering of the Aeration Ponds, the contractor shall assist the Niland County Sanitation District operators in adjusting the aerator stainless steel guy cables and SO rubber cord electrical cables to the proper tension due to the change in the water surface elevation. During the filling of the Aeration Ponds, the contractor shall again assist the wastewater treatment plant operators in adjusting the aerator stainless steel guy cables and SO rubber cord electrical cables to the proper tension.

Per previous item 4, the volume in Aeration Pond numbers 1, 2 and 3 resultant from lowering the effluent level in each pond by 5 feet is 886,364 gallons + 854,500 gallons + 818,000 gallons = 2,558,864 gallons. At a flow rate of 100 gallons per minute it will require  $2,558,864 \text{ gallons} / 100 \text{ gallons/minute} = 25,589 \text{ minutes}$  or 18 days to lower the pond effluent level 5 feet.

- 6, After the vertical depth in Aeration Pond numbers 1, 2 and 3 is lowered 5 feet below the maximum wastewater surface level of each pond, the wastewater flow rate of 44 gallons per minute shall be directed to the east end of Aeration Pond Number 1. The Aeration Pond outlet valves shall be closed. All wastewater flow to the Chlorination/Dechlorination Structure shall be terminated. The ground water dewatering flow, estimated to be 150 gallons/minute, shall be directed to the Emergency Wastewater storage basin.

The wastewater flow directed to the Aeration Ponds will allow the influent wastewater to receive treatment after the wastewater flow to the

Chlorination/Dechlorination Structure is terminated and the Chlorination/Dechlorination Structure demolition and rehabilitation work commences. A wastewater influent rate of 44 gallons/minute will require  $2,558,863 \text{ gallons} / 44 \text{ gallons per minute} = 58,156 \text{ minutes}$  or 40 days to fill the 5 foot volume within the Aeration Ponds.

The ground water flow of 150 gallons per minute is to be directed to the Emergency Wastewater Storage Basin after the Chlorination/Dechlorination Structure demolition and rehabilitation work commences. The 4,455,685 gallon Emergency Wastewater Storage Basin will be capable of accepting the 150 gallon per minute flow for the following time period:

$4,455,685 \text{ gallons} / 150 \text{ gallons/minute} = 29,704 \text{ minutes}$  or 21 days. After 21 days the ground water flow will completely fill the Emergency Storage Basin.

After 21 days the ground water flow of 150 gallons per minute will be required to be directed to the Aeration Pond Number 1. After 21 days the wastewater flow will have required a volume of  $21 \text{ days} \times 1440 \text{ minutes/day} \times 44 \text{ gallons per minute} = 1,330,560 \text{ gallons}$  of the available 2,558,864 gallons of volume created by lowering Aeration Pond numbers 1, 2 and 3 by 5 feet. A total of  $2,558,865 \text{ gallons} - 1,330,560 \text{ gallons} = 1,228,305 \text{ gallons}$  of volume will remain in Aeration Pond numbers 1, 2 and 3. The combined ground water and wastewater  $194 \text{ gallons per minute}$  flow will fill the remaining Aeration Pond numbers 1, 2 and 3 volume in  $1,228,305 \text{ gallons} / 194 \text{ gallons/minute} = 6,331 \text{ minutes}$  or 4 days.

*As previously noted, the Chlorination/Dechlorination Structure demolition and rehabilitation is to be completed in 25 days to the point at which the wastewater effluent from the Aeration Ponds shall be required to be discharged and disinfected through the Chlorination/Dechlorination Structure.*

6. The Niland County Sanitation District Wastewater Plant Operators shall introduce sodium hypochlorite and sodium metabisulfite from the existing facilities or temporary facilities until the new sodium hypochlorite and sodium metabisulfite facilities are constructed. The contractor shall assist the Wastewater Plant Operators in moving tanks, totes, piping, etc. to maintain temporary chemical facilities operational until such time as the new sodium hypochlorite and sodium metabisulfite facilities are constructed.

## **3.2 Evaporation Ponds and Effluent Conveyance System**

### **3.2.1 Purpose of Constructing Evaporation Ponds and Effluent Conveyance System**

The Niland County Sanitation District is constructing the Evaporation Ponds and Effluent Conveyance System to dispose of the effluent wastewater treated by the existing wastewater treatment plant through evaporation/infiltration. The treated wastewater effluent will be directed downstream of the wastewater flowmeter/sampling vault to the Evaporation/Infiltration Pond Pump Station as illustrated on plan sheet 24. The Evaporation/Infiltration Pond Pump Station will convey the treated effluent wastewater to a pcc standpipe followed by an effluent header pipeline located in the north evaporation pond embankment as illustrated on plan sheet 21. A total of two (2) pipe inlets extending from the header pipeline enter each Evaporation/Infiltration Pond. The wastewater operators can select which pipeline inlet to open and allow the treated wastewater effluent to evaporate/percolate within a given Evaporation/Infiltration Pond area. The wastewater effluent will evaporate or percolate at the Evaporation/Infiltration Pond bottom. There will be no effluent point discharge associated with the Evaporation/Infiltration Ponds.

The Evaporation Ponds are to be constructed within a 55.94 acre area. The 55.94 acre area was formerly an agricultural field. The bottom of each Evaporation/Percolation Pond comprises approximately 10.5 acres. The exact Evaporation Pond bottom acreage is illustrated on plan sheets 15 through 17.

A Geotechnical Report for the wastewater treatment plant improvements, including the Evaporation/Infiltration Ponds, was completed by Landmark Consultants, Inc. and dated January 2020. The Geotechnical Report is included in Appendix B of the Special Conditions. The earthwork requirements for the construction of the Evaporation/Infiltration Ponds, as illustrated on the plans, were obtained from the Geotechnical Report and the comments received from the Geotechnical Consultant plan review during the plan preparation.

The Evaporation/Infiltration Pond earthwork requirements, including the Evaporation Pond embankment sequence of construction is included on the Evaporation/Infiltration Pond plan sheets 13 through 20. Horizontal Coordinates for the construction of the Evaporation/Infiltration Ponds, including the embankments, access roads, retention basin and exterior fence are located on plan sheet 13. The existing site topography is illustrated on plan sheet 14. A 50 foot x 50 foot grid of existing and finish Evaporation/Infiltration Pond grades is illustrated on plan sheets 22 and 23.

An all weather access road is to be constructed to the Evaporation/Infiltration Pond site. The all weather access road starts at the Existing Wastewater Treatment Plant front entrance gate along Alcott Road and extends through the Existing Wastewater Treatment Plant to the Evaporation/Infiltration Pond site east boundary line. The access road continues from the east boundary line to the Evaporation/Infiltration Pond Number

1 access road. See plan sheets 4, 13 and 15 regarding the construction of the class 2 base all weather access road.

Piezometers have been placed around the exterior boundary of the Evaporation/Percolation Ponds to determine and monitor the existing ground water table beneath the Evaporation/Percolation Ponds. The location of the Piezometers is illustrated on plan sheet 13. The contractor is to protect the piezometers throughout the project construction period. See the Evaporation/Infiltration Pond Piezometer Keynote 1 on plan sheet 14 regarding the requirements to protect the existing piezometers.

The water table beneath the Evaporation/Infiltration ponds is relatively shallow. A note on plan sheets 15, 16 and 17 cautions the contractor to monitor the potential pumping of the native soil due to heavy equipment and high ground water table. The contractor is instructed to immediately cease excavation activities and notify the engineer if pumping of the native soil occurs. The contractor may be required to complete the evaporation pond finish grading with a large hoe or grade-all in destabilized areas which have "pumped".

The irrigation water lateral previously serving the Evaporation/Infiltration Pond 55.94 Acre site and the 33 acre agricultural field south of the Evaporation/Infiltration Pond site is in a deteriorated condition and is no longer functional. Although the irrigation water lateral will no longer serve the Evaporation/Infiltration Pond site, it is to continue serving the 33 acre agricultural site south of the Evaporation/Infiltration Ponds. Plan sheets 15 and 30 illustrate a new 30 inch diameter underground agricultural lateral pipeline extending from the IID "R" Canal Delivery Gate 14 along the east side of the Evaporation/Infiltration Pond site to the 33 acre agricultural site. The existing water table is illustrated on plan sheet 30 to be above the invert of the new 30 inch lateral pipeline. It shall be necessary for the contractor to dewater the 30 inch lateral pipeline trench area to a depth 3 feet below the pipe trench 21 days prior to completing the pipeline trench excavation. If wastewater bypass flows or ground water – dewatering discharge from the existing wastewater treatment plant improvements is not occurring; the contractor shall be allowed to direct the ground water discharge from the 30 inch lateral pipeline installation to the west side of Aeration Pond Number 1 or to the Emergency Wastewater Basin as determined by the Engineer.

The Evaporation/Infiltration Pond Pump Station shall transmit the treated effluent wastewater from the Existing Wastewater Treatment Plant to the Evaporation Ponds. The Evaporation/Infiltration Pond Pump Station is illustrated on plan sheets 21, 24 and 25. The Evaporation/Infiltration Pond Pump Station is to be constructed after the Chlorination/Dechlorination demolition and rehabilitation work has been completed. The Chlorination/Dechlorination demolition and rehabilitation work will not allow the Evaporation/Infiltration Pond Pump Station dewatering discharge to be routed to either the Emergency Wastewater Basin or the Aeration Ponds until the Chlorination - Dechlorination Structure is completed. It will be necessary to dewater the Evaporation/Infiltration Pond Pump Station excavation area to an elevation of 804.50 for a period of 10 days prior to commencing the Pump Station excavation. The contractor

shall engage and compensate a Geotechnical Consultant to install a piezometer in close proximity to the Pump Station prior to the commencement of dewatering activities to monitor and document the ground water table depth and elevation. The ground water discharge shall be directed to the east end of Aeration Pond Number 1. The contractor shall complete the dewatering of the Evaporation/Infiltration Pond Pump Station in conformance with the notes on plan sheet 25 and Dewatering Technical Specification Section 02140.

Treated wastewater effluent flow from the Existing Wastewater Treatment Plant downstream of the Flowmeter/Sampling Vault to the Evaporation/Infiltration Pond Pump Station shall not be allowed to be directed to the Pump Station until approved by the Niland County Sanitary District Operators and the Engineer. Water from the wastewater treatment plant 2 inch diameter distribution system shall be used for the “start-up” and testing of the Pump Station as required by the Engineer.

The Evaporation/Infiltration Pond property was purchased by the County of Imperial from the Imperial Irrigation District. The Imperial Irrigation District owns the 33 acres to the south of the Evaporation/Infiltration Pond Site. The Imperial Irrigation District reviewed the Evaporation/Infiltration Pond plans. The Imperial Irrigation District required that an irrigation lateral be constructed from the IID “R” Canal to the 33 acre agricultural area south of the Evaporation/Infiltration Ponds, that the native earth slope be reconstructed south of the IID “R” Canal Access Road per Construction Keynote 2 on plan sheets 15, 16 and 17; that the new 6 foot chain link fence be located a minimum of 5 feet from the access road re-constructed native earth toe of slope; that an earth berm be located along the south and west sides of the Evaporation/Infiltration Pond site and that the perforated agricultural pipeline “tile lines” located beneath the Evaporation/Infiltration Ponds be sawcut and plugged per Demolition Keynote 2 on plan sheet 14.

A 6 foot chain link fence is to be constructed along the north, west and south sides of the Evaporation/Percolation Pond site. The existing west Wastewater Treatment Plant 6 foot chain link fence shall act as the Evaporation/Percolation Pond east site fence. A total of three (3) 25 foot wide chain link fence gates shall be placed along the Evaporation/Percolation Pond fencing. See plan sheets 28 and 29 for the Evaporation/Percolation Pond chain link fence requirements. Please note there is a 20 foot wide chain link fence roll gate with automatic operator required for the Existing Wastewater Treatment Plant Improvements at the Alcott Road front entrance per construction keynote 20 on plan sheet 4.

### **3.3 Wastewater Collection System Improvements**

#### **3.3.1 Wastewater Collection System Improvements along Alcott Road**

Wastewater collection system improvements are to be completed along Alcott Road from the Niland Wastewater Treatment Plant to Highway 111. The wastewater collection system improvements along Alcott Road will occur with County of Imperial right of way.

The existing 2,459 lineal foot section of 12 inch diameter VCP sanitary sewer pipeline along Alcott Road is to be rehabilitated with a cured-in-place pipe (CIPP) improvement. See plan sheet 39 and the CIPP Technical Specification 02737 for the CIPP rehabilitation improvement requirements. A total of six (6) sanitary sewer manholes are to be rehabilitated along Alcott Road. See plan sheet 40 for the sanitary sewer manhole rehabilitation requirements. Traffic Control will be required to be implemented to complete the wastewater collection system improvements along Alcott Road per plan sheet 41.

### 3.3.2 Wastewater Collection System Improvements along Highway 111 between Alcott Road and Noffsinger Road

Wastewater collection system improvements are to be completed within State of California Department of Transportation Highway 111 right of way between Alcott Road and Noffsinger Road. The collection system improvements are to occur primarily east of the east Highway 111 shoulder area. A Caltrans Encroachment Permit Application was submitted to the State Department of Transportation District 11 Permit Office during the design period. The Encroachment Permit was not approved at the time this project was advertised for bidding. A separate set of plans title "Highway 111 – Sanitary Sewer Pipeline and Manhole Improvement Plans – Station 346 + 10 to Station 375 + 62" consisting of 8 plan sheets dated 10/18/2023 was prepared for the Wastewater Collection System Improvements along Highway 111 to conform with Caltrans plan requirements. The contractor shall prepare his/her bid for the Wastewater Collection System Improvements along Highway 111 in conformance with the Caltrans prepared plans distributed during the bidding phase. The contractor shall also prepare his/her bid in conformance with the Special and Technical Conditions Sections included with the Bid Set documents. If the approved Caltrans Encroachment Permit requires additional requirements, in addition to the plans distributed during the bidding phase and the Special and Technical Conditions Sections, then the Contractor shall be issued a positive change order for work required in addition to the prior noted bid set or addendum documents.

The existing 3,025 lineal foot section of 12 inch diameter VCP sanitary sewer pipeline along the Highway 111 right of way is to be rehabilitated with a cured-in-place pipe (CIPP) improvement. The CIPP improvement is to be completed in conformance with the prior noted Improvement Plans and Cured-In-Place Pipe (CIPP) Technical Condition Section 02737. The contractor is advised to review the Technical Condition Section 02737 requirements, including Section 3.3B entitled, "By-Pass Sewage or Intercepting and transporting sanitary sewer flow via Vac Trucks to the Niland WWTP" during the preparation of the bid proposal.

A total of eleven (11) manholes are to be rehabilitated within the Highway 111 right of way in conformance with the Manhole Rehabilitation Detail and Specifications on plan sheet 5.

Traffic Control Plans are included on plan sheets 6 and 7 for manhole rehabilitation work within paved cross-streets or shoulder areas along the east side of Highway 111.

A 28.5 foot section of an existing 10 inch diameter VCP pipeline is to be replaced with a new 10 inch SDR 26 PVC pipeline a distance of 20 feet east of the Highway 111 roadway edge as illustrated on plan sheet 3. A traffic control detour plan is illustrated on plan sheet 7 to facilitate the replacement of the 10 inch sanitary sewer pipeline section.

**END SPECIAL CONDITION SECTION 3**

#### **4. Project Submittals**

Submittal Information shall be forward to the Engineer in electronic copy and hard copy form. Technical Specification Section 01300 – Submittals provides details for processing submittals. The following is a list of submittals for the project. The list includes the minimum submittals required for this project. The Engineer reserves the right to request additional submittals documents during the construction period.

##### **General Requirements**

- 1.01 Construction Schedule
- 1.02 Schedule of Values
- 1.03 Letter Designation Project Superintendent
- 1.04 Emergency Contact Number
- 1.05 Operation and Maintenance Manuals
- 1.06 Project Sign(s)
- 1.07 As-Builts Drawings
- 1.08 Health and Safety Plan per Technical Condition Section 01352

##### **Site Work**

- 2.01 SWPPP Plan (updated)
- 2.02 Excavation Plan
- 2.03 Dewatering Plan Submittal Documents per Technical Specifications 02140
- 2.04 Dust Control Plan
- 2.05 Water Disinfection Plan
- 2.06 Class 2 Base Gradation, Maximum Density and Sand Equivalent
- 2.07 Granular Sand Gradation, Maximum Density and Sand Equivalent
- 2.08 3/4" Crushed Rock
- 2.09 1" Gravel
- 2.10 Crusher Fines
- 2.11 Ductile Iron Pipes & Spools
- 2.12 Eccentric Plug Valves
- 2.13 Ductile Iron Fittings
- 2.14 PVC Pipe
- 2.15 PVC Valves
- 2.16 PVC Fittings
- 2.17 Magnetic Detector Tape (Warning Tape)
- 2.18 Pipe Supports
- 2.19 Copper Tubing, Fittings and Pipe
- 2.20 Flange Bolts and Nuts (Hardware)
- 2.21 Chain Link Fence and Entrance Gates per plan Sheets 4, 28, and 29
- 2.22 Chain Link Fence Gate Opener per Detail PP on plan sheet 35.
- 2.23 HDPE Liner including ladder rung, texture and smooth HDPE liner and SS Securement Bars and Hardware.

- 2.24 Fiber Rolls
- 2.25 Geotextile Fabric – Non-Woven Fabric - Keynote 22 on Plan Sheet 10.
- 2.26 3-inch Cobles
- 2.27 ½ inch soft tube clear plastic tube
- 2.28 Monument Well Enclosures to protect existing piezometers - Detail WW on plan sheet 43.
- 2.29 Monument Well Enclosures to protect vertical perforated pipe sections per Detail XX on plan sheet 43.
- 2.30 Job Site Construction Trailer per Technical Specification section 01520
- 2.31 Flanged Coupling Adapter
- 2.31 Ductile Iron Transition Couplings
- 2.33 Flapper Valve
- 2.34 Resilient Wedge Gate Valve
- 2.35 Ductile Iron Wye Fitting
- 2.36 2 Inch SS Ball Valve with Tee Handle
- 2.37 Water Faucets
- 2.38 Shoring (if applicable) in conformance with Technical Specification Section 02150
- 2.39 Dewatering System per Technical Conditions Section 02140.
- 2.40 Filter Fabric per keynote 31 on plan sheet 7 and keynote 39 on plan sheet 25.
- 2.41 Welded Wire Fabric
- 2.42 Ductile Iron Spools and Pipe
- 2.43 Ductile Iron Check Valve
- 2.44 PVC Vent Pipeline per keynote 28 on plan sheet 24
- 2.45 Ductile Iron Restrained Joint Fittings
- 2.46 High Solids Epoxy Coating for Piping - Note Number 3 on Plan- Sheet 25
- 2.47 SS Support Brackets per keynote 15 on Detail AA on plan sheet 26
- 2.48 Two (2) part reservoir grade Polyurethane Elastomeric Sealant per detail H-H on plan sheet 27
- 2.49 30 inch diameter ADS N-12 Dual Wall HDPE Pipe - Plan Sheet 30
- 2.50 Fiber Rolls
- 2.51 PVC Pipe Couplings
- 2.52 Native Soil Testing Results per Technical Specification Section 02200-2.01.A
- 2.53 Pump Station Davits cranes for removing submersible pumps from evaporation / infiltration and raw wastewater influent pump stations

### **Concrete**

- 3.01 Reinforcement Steel
- 3.02 Epoxy Coated Reinforcement Steel
- 30.3 Cast-In-Place Concrete
- 3.04 Grout
- 3.05 Slurry
- 3.06 Concrete Vault per detail C & D on plan sheet 12
- 3.07 Pre-Cast Concrete Structures

- 3.08 60-inch eccentric flat top manhole (IID Lateral, Plan Sheet 30)
- 3.09 Pre-Cast Grade Rings
- 3.10 4-foot precast manhole shafts and cones (SS collection system and pond stand pipe)
- 3.11 5-foot precast manhole shaft (IID Lateral, Plan Sheet 30)
- 3.12 Pre-Cast Drainage and irrigation structure (IID Lateral, Plan Sheet 30)
- 3.13 Elastomeric Coal-Tar Fluid Applied Water proofing membrane – Keynote 7 plan sheet 24. Including green foam backer board

### **Metals**

- 4.01 Steel Dead Front Enclosure (WTP – Plan Sheet 5)
- 4.02 Anchor Bolts
- 4.03 Stainless Steel Hardware
- 4.04 Aluminum Grating (Detail G on plan sheet 12)
- 4.05 Unistrut Assemblies, supports and hardware

### **Finishes**

- 5.01 Pump Station Coating (Keynote 13 on plan sheet 25)
- 5.02 Chlorination / Dechlorination Structure Coating– (Note 2 Demolition and Reconstruction Plan Sheet 7)
- 5.03 Chlorination / Dechlorination Structure Sealants – (Detail S on plan sheet 8)
- 5.04 Manhole Rehabilitation – Coating , High Strength Mortar new manhole frames and covers (Detail QQ on Plan Sheet 40 and Detail B on Plan Sheet 5 of Caltrans Plans)
- 5.05 Cure in place pipe C.I.P.P per Technical Specifications 02737
- 5.06 Standpipe Detail Coating - Keynote 5 of Detail AA on plan sheet 26
- 5.07 Butyl Black Majestic Rope (Cold joints between precast concrete manhole sections)

### **Equipment**

- 6.01 Submersible Pumps, slide rails , lifting cables , aluminum access hatch , S.O. rubber cord cables , PVC float switches and cables, pedestal mounted discharge elbow , etc – Plan Sheet 24 and 25.
- 6.02 Potable Water Pump Skid and Components with electrical Control Panel- Plan Sheet 5
- 6.03 Chemical Pumps – Plan Sheet 9 and 10
- 6.04 Chemical Rate of Flow Controllers (Keynote 9 on plan Sheet 49)
- 6.05 Miscellaneous Steel Fittings

### **Special Construction**

- 7.01 Sodium Hypochlorite Tank
- 7.02 Sodium Metabisulfite Tank

- 7.03 Potable Water Tank
- 7.04 Tank Appurtenances (Ladder, Nozzle Schedules, Manways, Tank Restraint system on plan sheet 11 and plan sheet 47)
- 7.05 Aluminum Access Hatch Door – SS Pump Station – (Detail F on Plan Sheet 12)
- 7.06 Aluminum Access Hatch – GW Pump Station (Detail B on Plan Sheet 12)
- 7.07 Shower/Eye Wash Station Assembly – Detail N on Plan Sheet 35.
- 7.08 Air Conditioners - Keynote 17, Detail K on Plan sheet 5 – Evaporation/ Infiltration Pond Pump Station Control Panel
- 7.08 Flash Mixer - Keynote 2, Detail U on Plan Sheet 8
- 7.09 Floating Aerators and Accessories – SS Cables, Fittings, Mooring Posts – Plan sheet 4 and Technical Specifications
- 7.10 Shade Structures - Plan Sheets 5 and 10
- 7.12 Bladder Tank (Keynote 14, Detail K on Plan Sheet 5)
- 7.13 2 door dead front, 12 gauge, steel enclosure (Detail K on Plan Sheet 5)

### **Mechanical**

- 8.01 Chemical Piping, tubing, fittings and components including double wall chemical piping (Plan Sheets 9, 10 and 43 and Technical Conditions Section 15707)
- 8.02 Stainless Steel Pipe (Plan Sheet 5)
- 8.03 Stainless Steel Fittings & Valves (Plan Sheet 5)
- 8.04 Stainless Steel Air Valve (Keynote 22 on Plan Sheet 25)
- 8.05 Valve Risers and Covers (Detail E on Plan Sheet 35)
- 8.06 Valve extensions (Detail E on Plan Sheet 35)
- 8.07 Aerator pipe mooring post assembly (Detail RR on Plan Sheet 35)
- 8.08 Galvanized steel wire rope and hardware
- 8.09 Aluminum Handrails for Chlorination/Dechlorination Structure (Plan Sheet 7 and Detail P on Plan Sheet 42)
- 8.10 Sanitary Sewer Manhole Frames and Covers (Detail QQ on Plan Sheet 40 and Detail B on plan sheet 5 of the Caltrans Plans)
- 8.11 Insert Valves
- 8.12 Link Seal and Elastomeric Sealant (Detail DD on Plan Sheet 26)

### **Electrical**

- 9.01 Conduit
- 9.02 Conductors
- 9.03 Grounding
- 9.04 Evaporation / Infiltration Pond Pump Station (Plan Sheets 24, 48, 49, and 50)
- 9.05 Aerator Field Control Station Electrical and Mechanical Components (Detail 2 on Plan Sheet 50)
- 9.06 Flash Mixer Control Station Electrical and Mechanical Components (Detail 1 on Plan Sheet 50)

- 9.07 Fourplex Electrical Receptacles and Switches for Chemical Pumps  
(Construction Keynote 17 on Plan Sheet 9 and Keynote 19 on Plan Sheet 48)
- 9.08 Light Assembly and Concrete Support Pedestal (Detail O on Plan Sheet 35)
- 9.09 Junction Boxes including Cast Iron Junction Boxes at Evaporation / Infiltration  
Pond Pump Station
- 9.10 Flex Conduit
- 9.11 Watertight Grommets
- 9.12 Branch Breakers
- 9.13 Motor Starters and Electrical Devices

**Instrumentation**

- 10.01 Float Switches
- 10.02 Chemical Rate of Flow Controllers
- 10.03 Graphical Interface Controller, Pump Microprocessor Controls and  
Instrumentation and Scada Communications for Potable Water Treatment  
Electrical Control Panel and Evaporation / Infiltration Pond Pump Station  
Control Panel - (Plan Sheet 49)

**END SPECIAL CONDITION SECTION 4**

**5. Permits**

The permits required for this project are listed below. The Contractor shall pay for all permit costs. The contractor shall include the below anticipated cost of the permits in the contractors bid. The actual permit cost will not be known until the contractor obtains the permit. If the actual permit cost is more than the amount illustrated under the below anticipated permit column, then the contractor will be compensated for the difference between the actual permit cost and the anticipated permit cost by means of a positive change order. If the actual permit cost is less than the amount under the below anticipated permit cost, then the County of Imperial will be compensated for the difference between the actual permit cost and the anticipated permit cost by means of a negative change order.

Project Permits

<u>Type of Permit</u>	<u>Issuing Agency</u>	<u>Anticipated Cost of Permit</u>
Grading/Encroachment Permit	County of Imperial Public Works Department	\$6,000.00
Dust Control Plan -	County of Imperial Air Pollution Control District	\$1,000.00
Storm Water Pollution Prevention Plan	State Water Resources Control Board	\$2,000.00
Contractor's Construction Trailer Permit	County of Imperial Planning and Development Services Department	\$2,500.00
On-Stie Potable Water Permit	County of Imperial Environmental Health Services Department	\$4,000.00
Encroachment Permit for Sanitary Sewer Improvements in Highway 111 Right of Way	State of California Department of Transportation – District 11 (Caltrans)	\$7,000.00

**END SPECIAL CONDITION SECTION 5**

## 6. Project Signs

The Contractor shall be required to furnish and install signs for the project.

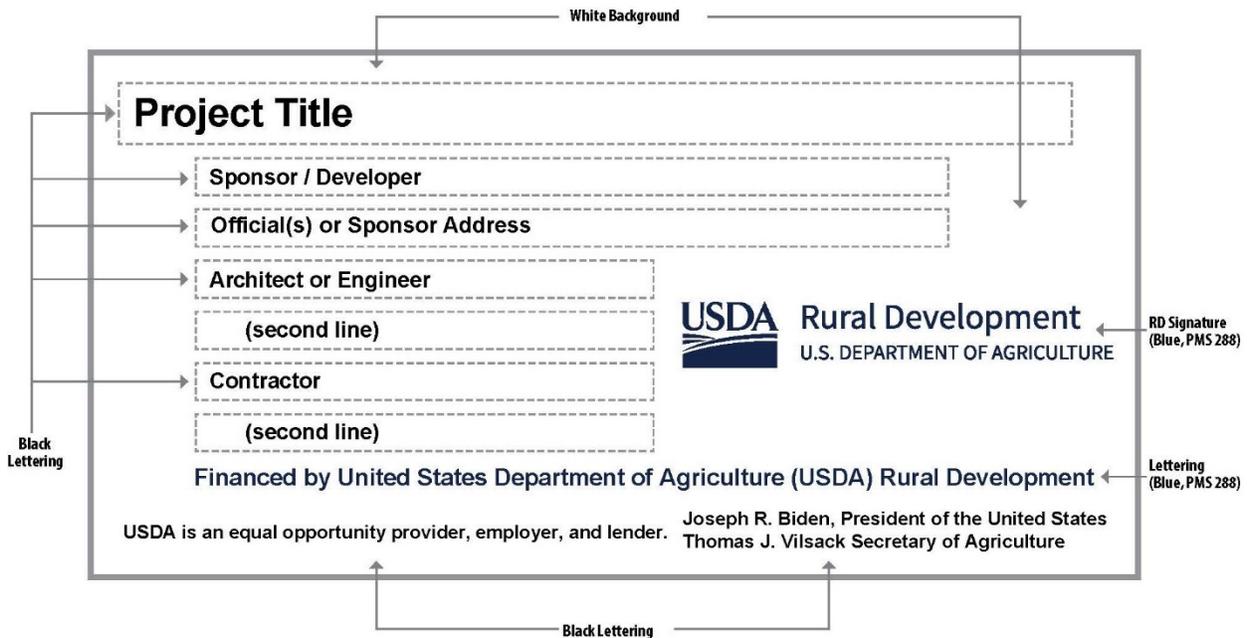
1. Two (2) project signs are required for this project. At a minimum this sign must have the project name, the awarding agencies' information, the funding agencies' information.
2. The project identity sign shall be installed at locations designated by the Engineer.
3. California and Federal labor laws require employee notices and posters be provided at all project sites that employ workers. Federal labor laws for Public Works projects require the current Federal Wage Decisions to be posted and maintained at the project site for the duration of a construction project. California labor laws for Public Works projects require the current State Wage Decisions to be posted and maintained at the project site for the duration of the construction project. In addition there are EEO, OSHA and other required postings to be posted and maintained at the project site for the duration of the construction project.
4. The Contractor is responsible to provide, install and maintain the project signs required by this section. The Project signs shall be forwarded to the Engineer as a submittal document for review and approval by the Engineer. The Project signs are to be erected at the project site prior to commencement of any work activities. The Project signs are to remain posted for the entire duration of the construction project.
5. Project Sign No. 01 - Below is a typical project identity sign that includes the project name, credit to the funding agency(ies), the awarding agency, owner, along with any other pertinent. The project sign shall contain the following lettering:
  - a. Sign shall have a white background with black lettering.
  - b. Sign shall include logos of Owner and Funding Agency(ies).
  - c. Sign to measure 48-inch wide by 96-inch high, minimum.
  - d. See draft of Sign Below.



6. Project Sign No. 02 – Below is a typical project identity sign that includes the project name, credit to the funding agency(ies), the awarding agency, owner, along with any other pertinent. The project sign shall contain the following lettering:
  - a. Sign to measure 48-inch wide by 96-inch high, minimum.
  - b. See a draft of sign below, along with requirements.

### TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS

Recommended Fonts: Helvetica or Arial



**SIGN DIMENSIONS** : 1200 mm x 2400 mm x 19 mm (approx. 4' x 8' x ¾")  
PLYWOOD PANEL (APA RATED A-B GRADE-EXTERIOR)

**END SPECIAL CONDITION SECTION 6**

## **7. Air Pollution Control District Requirements**

The Contractor shall be responsible for complying with the latest edition of Regulation VIII set forth by Imperial County Air Pollution Control District. A copy of Regulation VIII is available from the Imperial County Air Pollution Control District.

The Contractor shall also be responsible for preparation and submission of a Construction Notification Form and Dust Control Plan to the County of Imperial Air Pollution Control District. The Construction Notification Form and Dust Control Plan shall also be posted at the Project Site. A copy of the Construction Notification Form and Dust Control Plan shall follow Regulation VIII requirements.

The Imperial County Air Pollution Control District contact information is as follows:

150 South Ninth Street  
El Centro, CA 92243  
Phone: 442-265-180  
<https://apcd.imperialcounty.org/>

Contacts:

Reyes Romero, Assistant Air Pollution Control Officer  
Monica Soucier, Division Manager Planning

The Contractor is to include the costs associated with the Air Pollution Control District requirements in the Bid.

**END SPECIAL CONDITION SECTION 7**

## **8. Survey and Construction Staking**

The contractor shall be responsible for providing the survey and construction staking required for this project. The contractor shall include all survey costs in his/her bid. The survey and construction staking requirements are included in Technical Specification Section 01722 entitled, "Survey and Construction Staking".

The County of Imperial Surveyor requires that survey monuments (property corners, tract corners, section corners, etc.) be preserved during the construction period. If survey monuments are disturbed or destroyed during the construction project, it is required that the survey monuments be replaced per State of California and County of Imperial Survey Department requirements. The Contractor shall provide a Pre-Construction Monument Preservation Report Form (MPR-01) to the Construction Manager and County of Imperial Surveyor prior to the commencement of construction activities at the project site. The Contractor shall provide a Post-Construction Monument Preservation Report Form (MPR-02) to the Construction Manager and County of Imperial Surveyor at the conclusion of the project, prior to the filing of the Project Notice of Completion.

Pre-Construction and Post-Construction Monument Preservation Report Forms MPR-01 and MPR-02 are included in Attachment "A" of the Special Conditions.

**END SPECIAL CONDITION SECTION 8**

## **9. Geotechnical Report**

A Geotechnical Report for the design and construction of this project was prepared by Landmark Consultants, Inc.; Project Number LE19176, dated January 21, 2020. A copy of the Geotechnical Report is attached to these Special Conditions as **Appendix B**.

The contractor shall be responsible for the geotechnical inspections, observations, and testing required for construction of this project, as included in Technical Specification Section 02200. The inspection, observation, and testing requirements are called out in the Geotechnical Report, Improvement Plans and Technical Specifications. A comprehensive list of required earthwork compaction tests are included in Technical Specifications Sections 02200.310 and 02200.3.11 on pages 16 through 34 of Technical Specifications Section 02200.

**END SPECIAL CONDITION SECTION 9**

## 10. Project CEQA and NEPA Documents and Environmental Requirements

A Condition Use Permit (Permit No. 19-0006) was approved on August 14, 2019. The Condition Use Permit was for the Initial Study and Environmental Analysis – Mitigated Negative Declaration (CEQA Document) for the project. The Contractor is to adhere to the Condition Use Permit requirements. The Condition Use Permit and Initial Study and Environmental Analysis is included in **Appendix C** of the Special Conditions.

An Environmental Assessment Determinations and Compliance Findings for U.S. Department of Housing and Urban Development (HUD) assisted Projects (NEPA Document) was prepared per 24 Code Federal Regulations (CFR) Part 58 for this project. The Environmental Assessment is included in **Appendix D** of the Special Conditions.

It is the responsibility of the Contractor to comply with the CEQA and NEPA documents mitigation requirements during the project construction period.

Following is a list of the mitigation measures to be conducted during construction of the project:

### **MM AIR 1-1:**

Fleet Modernization for On-road Haul Trucks:

- Trucks hauling materials such as debris or fill shall sprinkle to mitigate blowing dust prior to leaving the site.
- Idling shall be restricted to a maximum of 5 minutes when not in use.
- All on-road heavy-duty diesel trucks with a gross vehicle weight rating of 19,500 pounds or greater used on-site or to transport materials to and from the site shall comply with CARB 2010 on-road emission standards, where available.

### **MM AIR 1-2:**

- Fleet Modernization for Off-road Equipment:
  - All off-road equipment used at the site shall meet current requirements of CARB's OFF-ROAD diesel regulations.
  - Idling shall be restricted to a maximum of 5 minutes when not in use.
- All Track-Out or Carry-Out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto adjacent paved roads.

- Movement of Bulk Material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers or by sheltering or enclosing the operation and transfer line.
- The construction of any new unpaved road is prohibited within any area with a population of 500 or more unless the road meets the definition of a Temporary unpaved Road. Any temporary unpaved road shall be effectively stabilized and visible emissions shall be limited to no greater than 20% opacity for dust emission by paving, chemical stabilizers, dust suppressants and/or watering.

**MM AIR - 1-3:**

ICAPCD Measures for Construction Combustion Equipment:

- Use of alternative fueled or catalyst equipped diesel construction equipment, including all off-road and portable diesel-powered equipment.
- Limit, to the extent feasible, the hours of operation of heavy-duty equipment and/or the amount of equipment in use.
- Replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set). Should any transformers/generators be used on-site, an Authority to Construct/Permit to Operate application shall be submitted to the APCD.
- Construction equipment operating on-site should be equipped with two-to-four-degree engine timing retard or pre-combustion chamber engines.
- Construction equipment used for the project should utilize EPA Tier 2 or better engine technology.
- Keep vehicles well maintained to prevent leaks and minimize emissions and encourage employees to do the same.

**MM BIO 1-1:**

Presence/absence surveys per the California Burrowing Owl Consortium (CBOC) protocol (1993) shall be conducted prior to initiation of the project to determine the location and abundance of Burrowing Owls within the project site. The survey protocol requires a focused burrow survey to identify the potential for the area to support burrowing owls. If the survey area contains natural or man-made structures that could potentially support burrowing owls, or owls are observed during the burrow survey, then three subsequent surveys will be required. The CDFW and/or lead agency may require mitigation for impacts on Burrowing Owls or their burrows. Impacts as defined by the CBOC include the following:

- Disturbance or harassment within 50 meters (approx. 169 ft) of occupied

burrows,

- Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to Borrowing Owls, and
- Degradation of foraging habituated adjacent to occupied burrows.

Burrowing Owls and their active burrows shall be avoided, if possible. Occupied burrows shall not be disturbed during the nesting season (February 1 - August 31) unless formally approved by CDFW. If impacts on Burrowing Owls are unavoidable, on-site mitigation in the form of passive relocation of the Burrowing Owls may be required. Passive relocation is deemed as prompting owls to move from occupied burrows within the proposed impact area to a natural or artificial burrow at least 50 meters from the impact area. This relocation can be accomplished by installing one-way doors on the burrow entrances and leaving them in place 48 hours to ensure that owls have left the burrow before the burrow is collapsed. Relocation of Burrowing Owls should only be implemented during the non-breeding season. Detailed information on passive relocation and other Burrowing Owl mitigation information can be found in the CBOC guidelines/mitigation. With implementation of the aforementioned mitigation, impacts on Burrowing Owls would be reduced to below a level of significance.

**MM CUL 1-1:**

In the event archaeological resources potentially eligible for the CRHR are encountered, surface disturbing work in the immediate vicinity of the discovery shall temporarily halt until appropriate treatment of the resource is determined by a qualified archaeologist in accordance with the provisions of CEQA Section 15064.5. The archaeological monitor shall have the authority to re-direct construction equipment in the event archaeological resources potentially eligible for the CRHR are encountered.

**MM CUL 1-2:**

In the event that human remains are encountered during ground-disturbing activities, all ground-disturbing activities in the vicinity of the find would be stopped. The County Coroner would be notified in compliance with all relevant federal regulations and as required by CEQA Guidelines, Section 156064.5(e). All parties involved would ensure that any such remains are treated in a respectful manner and that all applicable state and federal laws are followed. If human remains are found to be of Native American origin, or if associated grave goods or objects of cultural patrimony are discovered, the provisions of the Native American Graves Protection and Repatriation Act [NAGPRA] would be

followed. The Native American Heritage Commission shall be asked to determine the descendants who are to be notified or, if unidentifiable, to establish the procedures for burial.

**MM HM 1-1:**

A geotechnical investigation of the project site shall occur prior to implementation of the project to determine the precise soil and groundwater conditions. Based on the results of this investigation, appropriate design and measures shall be incorporated into final engineering and design of the WWTP improvements.

**MM GS 1-1:**

Based on the results of the geotechnical investigation of the project site, appropriate design and measures shall be incorporated into final engineering and design of the WWTP improvements.

**END SPECIAL CONDITION SECTION 10**

## 11. Drainage Study Statement

The Niland County Sanitation District Wastewater Treatment Plant and Collection System Improvement Project is not located within the FEMA 100 year flood plain. The construction and improvements of the project do not impact a flood plain.

The Niland County Sanitation District – Wastewater Treatment Plant and Collection System Improvement Project consists of three (3) major components as listed below:

1. Improvements to the existing Wastewater Treatment Plant.
2. Construction of new Evaporation/Infiltration Ponds.
3. Improvements to the existing wastewater collection system.

1. Existing Wastewater Treatment Plant Improvements:

The improvements to the existing 17 acre wastewater treatment plant are primarily directed at upgrading existing wastewater treatment units. The existing wastewater treatment plant site is relatively flat and consists of wastewater treatment facility structures and ponds with flat native earth areas located between the ponds and structures. Due to the relatively flat existing wastewater treatment plant site and scattering of facilities and ponds across the site, stormwater is largely contained on-site. It is not possible for stormwater to be channeled on site due to the structures and ponds that comprise over half of the wastewater treatment plant site. The structures and ponds block or impede stormwater flows and the creation of stormwater channels and reduce damage to adjacent land parcels.

Approximately 8.5 acres of the existing wastewater treatment plant consist of ponds. Rainfall precipitation is contained within the ponds and does not contribute to stormwater runoff from the project site. The IID “R” Canal access road is located along the north boundary of the existing wastewater treatment plant. The IID access road is constructed between 1 to 2 feet above the wastewater treatment plant north project boundary and contains stormwater runoff within the existing wastewater treatment plant site. The west side of the existing wastewater treatment plant will be bordered by the new evaporation ponds or an agricultural field. Drainage from the existing wastewater treatment plant towards the adjacent westerly property is largely prohibited from draining to the west due to the location of existing wastewater treatment plant Aeration Ponds and Chlorination/Dechlorination structures which prohibit runoff from flowing to the west. There is a 320-foot length along the south wastewater treatment plant westerly wastewater boundary which allows stormwater runoff to sheet flow to the west, to the new evaporation/infiltration ponds and an existing

agricultural field. The rainfall flow pattern along the westerly boundary will remain unchanged by the proposed improvements. The rainfall runoff effects along the 320-foot westerly boundary are therefore not considered significant. There are large wastewater related ponds constructed along the majority of the south wastewater treatment plant boundary that prohibit rainfall runoff from being transmitted to the agricultural field south of the wastewater treatment plant. The 200-foot section of the south wastewater treatment plant boundary not bordered by wastewater related ponds is not to be improved and the existing sheet flow stormwater flow patterns will remain unchanged. The stormwater flow impacts to the adjoining agricultural field along the existing wastewater treatment plant south boundary will remain unchanged and is not considered significant. The easterly wastewater treatment plant boundary is bordered by a relatively flat agricultural field. The stormwater flow pattern sheet flows from the existing agricultural field to the existing wastewater treatment plant. The existing stormwater flow pattern along the easterly wastewater project boundary will remain unchanged. Stormwater flow impacts as a result of the existing wastewater treatment plant improvements along the east wastewater treatment plant boundary are not considered significant.

2. New Evaporation/Infiltration Ponds: The new Evaporation/Infiltration Ponds are being constructed on 56 acres of property west of and adjacent to the existing wastewater treatment plant. The 56 acres of property consists of agricultural land previously owned by the Imperial Irrigation District and purchased by the County of Imperial. The existing 56 acre agricultural field slopes at approximately 0.40% to the southwest. A total of 30 acres of Evaporation/Percolation Ponds will be constructed at the site. The Evaporation/Infiltration Pond 30 acre area will contain any rainfall which occurs within the Evaporation/Percolation Pond area. The Imperial Irrigation District reviewed the Evaporation/Infiltration Pond plans during the project design phase. Item 2 of the Imperial Irrigation District 90 percent review letter dated May 18, 2021 required an earth berm be constructed along the south and west sides of the project to minimize any cross parcel drainage from the evaporation/infiltration pond site to the south and west. The evaporation/infiltration pond plans were modified to include an earth berm along the south and west sides of the evaporation/infiltration pond project site. A stormwater retention basin was constructed at the southwest corner of the evaporation/infiltration pond project site to collect any stormwater runoff in the area outside of the evaporation ponds along the south and west project boundaries. The north side of the Evaporation/Infiltration Pond site is bordered by an Imperial Irrigation District "R" lateral access road which is positioned 3 to 5 feet above the north

Evaporation/Infiltration boundary. The native earth roadway berm contains stormwater between the evaporation basins and north project boundary within the evaporation pond project site. The east Evaporation/Percolation Pond boundary is located adjacent to the existing wastewater treatment plant Chlorination/Dechlorination structures earth berms and Aeration Pond earth berms which extend 3 to 7 feet above the east Evaporation/Percolation Pond boundary. These earth berms contain stormwater between the evaporation/infiltration ponds and east project boundary line within the Evaporation/Infiltration Pond site. In conclusion, the stormwater within the Evaporation/Infiltration Pond site is contained within the Evaporation/Percolation Pond boundaries and will not flow onto adjoining properties.

3. Existing Sewer Collection System: The sanitary sewer pipeline rehabilitation work includes manhole rehabilitation work and the placement of a cured in place pipe liner within the existing sanitary sewer collection pipelines within public right of ways. The manhole rehabilitation work is conducted within the existing manhole. The cured in place pipe liner is installed within the below grade pipelines. No significant open trench excavations will occur for the sanitary sewer pipeline rehabilitation work. There are no drainage impacts with regard to the sanitary sewer pipeline and rehabilitation work.

A Storm Water Pollution Prevention Plan (SWPPP) was prepared during the project design. The SWPPP included best management practices (BMP's) to be implemented during the construction phase of the project. The BMP's are included with the SWPPP document and also on the Erosion Control Improvement Plan Sheets 36,37 and 38. Permanent BMP's are not required for this project.

**END SPECIAL CONDITION SECTION 11**

## **12. Driveway Improvements for Wastewater Treatment Plant**

The Niland Wastewater Treatment Plant main driveway entrance crosses the Imperial Irrigation District (IID) "R" Lateral Canal from Alcott Road. The prior wood framed bridge which crossed the IID "R" Lateral was over 70 years old and collapsed. The prior collapsed wood frame bridge was removed. There is presently no bridge crossing at the Wastewater Treatment Plant main entrance from Alcott Road. Access to the Wastewater Treatment Plant is currently taking place through the east entrance gate. It is necessary to travel along the 1/2 mile long IID "R" Lateral dirt access roadway from Highway 111 to access the Wastewater Treatment Plant east access gate.

The County of Imperial has entered into an agreement with the IID to install a new Main Entrance driveway crossing at the IID "R" Lateral. IID will design and construct the driveway crossing. The construction of the new "R" Lateral driveway crossing is not a part of this project.

The contractor for the Niland County Sanitary District Wastewater Treatment Plant and Collection System Improvement Project will not be participating in the construction of the IID "R" Lateral main entrance crossing. Until such time that the IID "R" Lateral Main entrance crossing is constructed, the contractor shall use the IID "R" Lateral dirt access road from Highway 111 to the Wastewater Treatment Plant east access gate as the means of egress from and to the Wastewater Treatment Plant. The contractor shall be required to apply water to the IID dirt access roadway two (2) times a week to control dust generation and also grade and compact the existing IID dirt access roadway once a week to maintain the integrity of the access roadway.

**END SPECIAL CONDITION SECTION 12**

### **13. On-site Potable Water System at Wastewater Treatment Plant**

The County of Imperial Public Works is to install an on-site potable water service system for the operation of the wastewater treatment plant.

The County of Imperial Public Health Department, Division of Environmental Health is the Local Primacy Agency (LPA) that oversees and regulates on-site potable water service systems. The improvements for the on-site potable water service system is to be reviewed and inspected by the LPA.

All tanks, piping, fittings, valves, and pumps that come into the contact with the on-site potable water are to be NSF 61 approved.

**END SPECIAL CONDITION SECTION 13**

#### **14. Stormwater Pollution Prevention Plan**

The soil disturbance area resulted by the construction of the project will be more than 1 acre. A Stormwater Pollution Prevention Plan (SWPPP) was prepared during the project design period as required by the Construction Stormwater General Permit for construction activities. A SWPPP was prepared as part of this project. The SWPPP is attached to these Special Conditions as **Appendix E**.

The contractor shall update and implement the SWPPP. The contractor shall engage a Qualified SWPPP Developer (QSD) to update the SWPPP that is attached to this Special Conditions. The contractor shall engage a Qualified SWPPP Practitioner (QSP) for site inspection and reporting services. The QSD / QSP shall assist the County of Imperial (Owner) in obtaining a Waste Discharge Identification Number (WDID). The QSD / QSP shall assist the County of Imperial in filing daily, quarterly, and annual reports, filing the Notice of Termination (NOT) at the project conclusion and all other required SWPPP documents through the Storm Water Multi Application and Report Tracking System (SMARTS). The County of Imperial shall pay for all SWPPP and SMARTS filing fees. The contractor shall pay for all services of the QSD and QSP throughout the project duration.

**END SPECIAL CONDITION SECTION 14**

## **15. Business License**

The Contractor and Subcontractors performing work on this project shall obtain a business license from the County of Imperial. The Contractor and Subcontractors shall contact the County Treasurer – Tax Collector’s office regarding the application process and fees. The Contractor and Subcontractor shall include the business license costs as part of mobilization.

The County of Imperial Treasurer – Tax Collector office can be reached at (442) 265-1250, or the following link:

[Contact US – Treasurer – Tax Collector \(imperialcounty.org\)](http://imperialcounty.org)

**END SPECIAL CONDITION SECTION 15**

## **16. Drain Lines in Evaporation / Infiltration Basin**

There are fifteen (15) existing and underground drain pipelines (tile drain lines) within the Evaporation / Infiltration Pond Site. The tile drain lines are 4-inch diameter perforated pipelines that route and flow from north to south. The tile drain lines are illustrated on improvement plan sheet 14. The tile drain pipelines are to be cut and plugged as “called out” by Demolition Keynote 2 of Plan Sheet 14.

IID tile drain line as-built drawing TD-1354-2 is attached to these Special Conditions as **Appendix F**.

**END SPECIAL CONDITION SECTION 16**

## **17. Geotechnical Testing – Earthwork and Concrete**

### 17.1 Geotechnical Testing – Earthwork

See Technical Specification, Section 02200- Earthwork, Section, 3.10 Compaction Test Schedule and 3.11 Earthwork Compaction Test Summary Chart for the required earthwork related compaction tests required for this project.

### 17.2 Concrete Testing.

Concrete Testing for this project shall be required per Technical Condition Section 03300.1.05.A on page 4 of the cast- in-place concrete Technical Specifications 03300.

**END SPECIAL CONDITION SECTION 17**

**Appendix A – Monument Preservation Forms**



County of Imperial  
 Department of Public Works  
 155 S 11th Street  
 El Centro, CA 92243  
 (442) 265-1818

# Monument Preservation Report

## PRE-CONSTRUCTION

FORM  
 MPR-01  
 April 2021

County of Imperial Permit Number/Project Name \_\_\_\_\_

PRIOR TO PERMIT ISSUANCE, THE PERMITTEE SHALL RETAIN THE SERVICE OF A PROFESSIONAL LAND SURVEYOR (OR CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING) WHO WILL BE RESPONSIBLE FOR MONUMENT PRESERVATION AND WHO SHALL PROVIDE A CORNER RECORD (OR RECORD OF SURVEY) TO THE COUNTY SURVEYOR AS REQUIRED BY THE PROFESSIONAL LAND SURVEYORS' ACT, IF APPLICABLE. THE PERMITTEE IS RESPONSIBLE FOR THE COST OF RESTORING, OR REPLACING ALL SURVEY MONUMENTS THAT ARE DISTURBED, OR DESTROYED BY CONSTRUCTION.

(REFERENCE SECTION 8771 OF THE CALIFORNIA BUSINESS AND PROFESSIONS CODE)

\*\*\*\*\* **THIS FORM TO BE COMPLETED BY A PERSON AUTHORIZED TO PRACTICE LAND SURVEYING** \*\*\*\*\*

THE TYPE OF CONSTRUCTION PROPOSED WILL NOT AFFECT ANY SURVEY MONUMENTS.  
 (This box is checked for projects that are proposing no demolition, trenching, excavation, surfacing, etc.)

NAME	P.L.S./R.C.E.	SIGNATURE	DATE	(SEAL)
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THE TYPE OF CONSTRUCTION MAY AFFECT SURVEY MONUMENTS.  
 (This box is checked for projects that are proposing demolition, trenching, excavation, surfacing, etc.)

I HAVE INSPECTED THE SITE(S) AND: (check all that apply) DATE OF INSPECTION: \_\_\_\_\_

- MONUMENT(S) AND/OR CORNER ACCESSORY(IES) WERE FOUND WITHIN THE LIMITS OF WORK WHICH I DETERMINED MAY BE DISTURBED OR DESTROYED. **(A corner record or record of survey is required.)** The found monument(s) and/or corner accessory(ies) were referenced and pre-construction corner record(s) (or record(s) of survey) showing the references has been filed with the County Surveyor for the project site(s). The filed corner record(s) (or record(s) of survey) is attached hereto. Also attached, (if not documented on the corner record(s) (or record(s) of survey)) is a sketch/diagram showing locations of monuments that were searched for and not found. I have placed "S.N.F." on the sketch/diagram for each monument and/or corner accessory that was not found. Photos may also be included.
- NO MONUMENT(S) AND/OR CORNER ACCESSORY(IES) WERE FOUND WITHIN THE LIMITS OF WORK. **(No corner record or record of survey is required.)** Attached is a sketch/diagram showing the limits of work and its relationship to the locations of any monument and/or corner accessory searched for and not found. I have placed "S.N.F." on the sketch/diagram for each monument and/or corner accessory not found. Photos may also be included.
- MONUMENT(S) AND/OR CORNER ACCESSORY(IES) WERE FOUND OUTSIDE THE LIMITS OF WORK WHICH I DETERMINED WILL REMAIN PROTECTED IN PLACE. **(No corner record or record of survey is required.)** Attached is a sketch/diagram of the work limits and its relationship to the found monuments. Photos may also be included.
- MONUMENT(S) AND/OR CORNER ACCESSORY(IES) WERE FOUND WITHIN THE LIMITS OF WORK WHICH I DETERMINED MAY BE DISTURBED OR DESTROYED, HOWEVER AN EXISTING CORNER RECORD (OR RECORD OF SURVEY) WHICH SHOWS SUFFICIENT REFERENCES HAS ALREADY BEEN FILED AND THERE IS NO DISCREPANCY ON THE FILED CORNER RECORD (OR RECORD OF SURVEY).

SOURCE(S) OF SURVEY DATA CONSULTED: (Final Maps, Parcel Maps, Records of Survey, private field notes, etc.)

FILED CORNER RECORD# \_\_\_\_\_ OR FILED RECORD OF SURVEY# \_\_\_\_\_

NAME	P.L.S./R.C.E.	SIGNATURE	DATE	(SEAL)
------	---------------	-----------	------	--------



County of Imperial  
 Department of Public Works  
 155 S 11th Street  
 El Centro, CA 92243  
 (442) 265-1818

# Monument Preservation Report

## POST-CONSTRUCTION

FORM  
 MPR-02  
 April 2021

County of Imperial Permit Number/Project Name \_\_\_\_\_

PRIOR TO ISSUING A NOTICE OF COMPLETION FOR PERMITTED CONSTRUCTION, THE PERMITTEE SHALL RETAIN THE SERVICE OF A PROFESSIONAL LAND SURVEYOR (OR CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING) WHO WILL BE RESPONSIBLE FOR MONUMENT RESTORATION AND WHO SHALL PROVIDE A CORNER RECORD (OR RECORD OF SURVEY) TO THE COUNTY SURVEYOR AS REQUIRED BY THE PROFESSIONAL LAND SURVEYORS' ACT, IF APPLICABLE. THE PERMITTEE IS RESPONSIBLE FOR THE COST OF RESTORING, OR REPLACING ALL SURVEY MONUMENTS THAT ARE DISTURBED, OR DESTROYED BY CONSTRUCTION.

(REFERENCE SECTION 8771 OF THE CALIFORNIA BUSINESS AND PROFESSIONS CODE)

\*\*\*\*\* **THIS FORM TO BE COMPLETED BY A PERSON AUTHORIZED TO PRACTICE LAND SURVEYING** \*\*\*\*\*

MONUMENTS AND/OR CORNER ACCESSORY(IES) WERE PROTECTED IN PLACE AND THE PERMITTED CONSTRUCTION DID NOT DISTURB OR DESTROY ANY SURVEY MONUMENTS AND/OR CORNER ACCESSORY(IES).

\_\_\_\_\_  
 NAME                      P.L.S./R.C.E.                      SIGNATURE                      DATE                      (SEAL)

MONUMENT(S) AND/OR CORNER ACCESSORY(IES) WERE DISTURBED AND/OR DESTROYED DURING THE PERMITTED CONSTRUCTION. A new monument(s) was set in the surface of the new construction or a witness monument(s) was set to perpetuate the original location of the disturbed or destroyed monument(s) and a post-construction corner record or a record of survey was filed in the office of the County Surveyor. (New corner accessory(ies) may also be required.)

FILED CORNER RECORD# \_\_\_\_\_ OR FILED RECORD OF SURVEY# \_\_\_\_\_

\_\_\_\_\_  
 NAME                      P.L.S./R.C.E.                      SIGNATURE                      DATE                      (SEAL)

**Appendix B – Geotechnical Report**

## Geotechnical Report

# Niland WWTP & Collection System Improvements

## 125 West Alcott Road

### Niland, California 92257

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Prepared for:

**The Holt Group**  
1601 N. Imperial Avenue  
El Centro, CA 92243



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Prepared by:



**Landmark Consultants, Inc.**  
780 N. 4<sup>th</sup> Street  
El Centro, CA 92243  
(760) 337-1100

**January 2020**

January 21, 2020

Mr. Jack Holt, PE  
The Holt Group  
1601 N. Imperial Avenue  
El Centro, CA 92243

**Geotechnical Report**  
**Niland WWTP & Collection System Improvements**  
**125 West Alcott Road**  
**Niland, California 92257**  
**LCI Report No. LE19176**

Dear Mr. Holt:

This draft geotechnical report is provided for design and construction of the Wastewater Treatment Plant & Collection System Improvements in Niland, California. The WWTP will be improved with installation of a lift station which will discharge to three (3) new 10-acre evaporation/infiltration ponds. The wastewater collection system will be improved with new pipelines to be installed Imperial Irrigation District canal and drains and a new crossing below State Hwy 111. Our geotechnical exploration was conducted in response to your request for our services. The enclosed report describes our soil engineering site evaluation and presents our professional opinions regarding geotechnical conditions at the site to be considered in the design and construction of the project.

Based on the geotechnical conditions encountered at the points of exploration, the project site appears suitable for the proposed construction provided the professional opinions contained in this report are considered in the design and construction of this project.

We appreciate the opportunity to provide our findings and professional opinions regarding geotechnical conditions at the site. Please provide our office with a set of the foundation plans and civil plans for review to insure that the geotechnical site constraints have been included in the design documents. If you have any questions or comments regarding our findings, please call our office at (760) 370-3000.

Respectfully Submitted,  
**Landmark Consultants, Inc.**



Jeffrey O. Lyon, PE  
CEO/Principal Engineer

Peter E. LaBrucherie, PE  
Principal Engineer



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APPENDIX C: Laboratory Test Results

APPENDIX D: Groundwater Analysis

APPENDIX E: Pipe Bedding and Trench Backfill Recommendations

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## EXECUTIVE SUMMARY

This executive summary presents *selected* elements of our findings and professional opinions. This summary *may not* present all details needed for the proper application of our findings and professional opinions. Our findings, professional opinions, and application options are *best related through reading the full report*, and are best evaluated with the active participation of the engineer of record who developed them. The findings of this study are summarized below:

- The results of the field exploration conducted at the proposed effluent disposal evaporation/infiltration ponds site indicate that the ponds are underlain by 10 feet of stiff to hard silty clay to fat clay (CL-CH) with interbedded silty sand layers at various depths across the site. The insitu clays at a depth of about 1 to 2 feet below the existing native grade have measured infiltration rates of  $4.66 \times 10^{-5}$  to  $2.12 \times 10^{-6}$  cm/sec (Double-Ring Infiltrometer Test- ASTM D3385).
- The embankment pond bottom and slopes are not planned to be lined with concrete or a HDPE liner. The slopes should be constructed no steeper than 2:1 (interior) and 3:1 (exterior) with a minimum crown width of 20 feet. However, flatter slopes may be considered to retard rain or wave erosion and permit maintenance. Estimated shrinkage during earthwork: 10 to 15%.
- Clay soils (CL) of high to very high expansion (EI = 91 to >130) predominate the near surface soils at the project site.
- Foundation designs for thin slabs on grade should mitigate expansive soil conditions by either the removal and replacement of the upper 4.0 feet of clay soils with non-expansive soil or design of foundations to resist expansive forces such as flat plate structural mats, grade-beam stiffened of floor slabs, or post-tensioned floor slabs. A combination of the methods described above may also be used.
- Design soil bearing pressure = 1,500 psf. Differential movement of 1.0 to 2.0 inches can be expected for slab on grade foundations placed on clay soils.
- The native soils are aggressive to concrete and steel. Concrete mixes for concrete placed in contact with native soils shall have a maximum water cement ratio of 0.45 and a minimum compressive strength of 4,500 psi (minimum of 6 sacks Type V cement per cubic yard).
- All reinforcing bars, anchor bolts and hold down bolts shall have a minimum concrete cover of 4.0 inches unless epoxy coated (ASTM D3963/A934). Hold-down straps at the foundation perimeter and pressurized water lines below or within the foundations are not allowed.

## Section 1

**INTRODUCTION****1.1 Project Description**

This report presents the findings of our geotechnical exploration and soil testing for the proposed sewer lift station and effluent disposal evaporation/infiltration ponds at the Niland Wastewater Treatment Plant located on Alcott Road southwest of Niland, California (See Vicinity Map, Plate A-1). The proposed development will consist of constructing three (3) new 10-acre evaporation ponds and a sewer lift station. A site plan for the proposed improvements was provided by The Holt Group.

The proposed new sewer lift station will consist of approximately 6-foot diameter reinforced concrete pipe (RCP) or precast manhole, founded approximately 15 feet below existing grade elevation. The slab placed to the side of the wet well for pumps and controls will be supported on shallow spread or continuous footings and the wet well will be supported on a mat foundation.

**1.2 Purpose and Scope of Work**

The purpose of this geotechnical study was to investigate the subsurface soil at selected locations within the site for evaluation of physical/engineering properties during seismic events. Professional opinions were developed from field and laboratory test data and are provided in this report regarding geotechnical conditions at this site and the effect on design and construction. The scope of our services consisted of the following:

- ▶ Field exploration and in-situ testing of the site soils at selected locations and depths.
- ▶ Laboratory testing for physical and/or chemical properties of selected samples.
- ▶ Review of the available literature and publications pertaining to local geology, faulting, and seismicity.
- ▶ Engineering analysis and evaluation of the data collected.
- ▶ Preparation of this report presenting our findings and professional opinions regarding the geotechnical aspects of project design and construction.
- ▶ In-situ testing of soil infiltration rates at the three (3) pond locations.

This report addresses the following geotechnical parameters:

- ▶ Subsurface soil and groundwater conditions
- ▶ Site geology, regional faulting and seismicity, near source factors, and site seismic accelerations
- ▶ Expansive soil and methods of mitigation
- ▶ Aggressive soil conditions to metals and concrete
- ▶ Groundwater Analysis (RWQCB Standards)
- ▶ Soil infiltration rates of the native soil for sewage evaporation ponds

Professional opinions with regard to the above parameters are provided for the following:

- ▶ Site grading and earthwork
- ▶ Allowable soil bearing pressures and estimated settlements
- ▶ Concrete slabs-on-grade
- ▶ Evaporation pond earthen embankments
- ▶ Lateral earth pressures
- ▶ Excavation conditions and buried utility installations
- ▶ Mitigation of the potential effects of salt concentrations in native soil to concrete mixes and steel reinforcement
- ▶ Seismic design parameters
- ▶ All weather road structural sections

Our scope of work for this report did not include an evaluation of the site for liquefaction during earthquakes or for the presence of environmentally hazardous materials or conditions, storm water infiltration, groundwater mounding, or landscape suitability of the soil.

### **1.3 Authorization**

James G. Holt, PE of The Holt Group, Inc. provided authorization by written agreement to proceed with our work on October 11, 2019. We conducted our work in general accordance with our written proposal dated October 8, 2019.

## Section 2

**METHODS OF INVESTIGATION****2.1 Field Exploration**

Subsurface exploration was performed on November 7, 2019 by using a backhoe to excavate six (6) test pits to an approximate depth of 10 feet below the existing ground surface. The test pit locations are shown on the Site and Exploration Plan (Plate A-2). Bulk samples were obtained at selected depths in the test pits. A nuclear densometer (ASTM D2922) was used to evaluate in-situ densities and natural moisture content at selected depths in the upper 3 feet of the backhoe pits. The test pits were located by taped or paced measurements and should be considered approximate.

After logging and sampling the soil, the exploratory test pits were backfilled with the excavated material. The backfill was loosely placed and was not compacted to the requirements specified for engineered fill. The backhoe pits shall be located during rough grading of the site to properly recompact the backfill.

A professional engineer maintained logs of the test pits during exploration. The logs were edited in final form after a review of retrieved samples from the field and laboratory data. The test pit logs are presented on Plates B-1 through B-6 in Appendix B. Soils encountered in the test pits were classified according to the Unified Soil Classification System using the visual-manual procedure in accordance with ASTM D2488.

Subsurface exploration was also performed on November 8, 2019 using 2R Drilling of Ontario, California to advance one (1) boring to a depth of 30 feet below existing ground surface at the proposed lift station site. The boring was advanced with a truck-mounted, CME 75 drill rig using 8-inch diameter, hollow-stem, continuous-flight augers. The approximate boring location was established in the field and plotted on the site map by sighting to discernible site features. The boring location is shown on the Site and Exploration Plan (Plate A-2).

A professional engineer observed the drilling operations and maintained logs of the soil encountered with sampling depths. Soils were classified during drilling according to the Unified Soil Classification System using the visual-manual procedure in accordance with ASTM D2488. Relatively undisturbed and bulk samples of the subsurface materials were obtained at selected intervals. The relatively undisturbed soil samples were retrieved using a 3-inch OD Modified

California Split-Barrel (ring) sampler lined with 6-inch stainless-steel sleeves. In addition, Standard Penetration Tests (SPT) were performed in accordance with a 2-inch diameter split-spoon sampler in accordance with ASTM D1586 and ASTM D6066. The samples were obtained by driving the samplers ahead of the auger tip at selected depths using a 140-pound CME automatic hammer with a 30-inch drop. The number of blows required to drive the samplers the last 12 inches of an 18-inch drive depth into the soil is recorded on the boring logs as “blows per foot”. Blow counts (N values) reported on the boring logs represent the field blow counts. No corrections have been applied to the blow counts shown on the boring logs for effects of overburden pressure, automatic hammer drive energy, drill rod lengths, liners, and sampler diameter. Pocket penetrometer readings were also obtained to evaluate the stiffness of cohesive soils retrieved from sampler barrels.

After logging and sampling the soil, the exploratory borings were backfilled with the excavated material. The backfill was loosely placed and was not compacted to the requirements specified for engineered fill.

The subsurface boring log is presented on Plate B-7 in Appendix B. A key to the logs symbols is presented on Plate B-8. The stratification lines shown on the subsurface logs represent the approximate boundaries between the various strata. However, the transition from one stratum to another may be gradual over some range of depth.

## 2.2 Laboratory Testing

Laboratory tests were conducted on selected bulk (auger cuttings or excavated soil) and relatively undisturbed soil samples obtained from the soil borings and test pits to aid in classification and evaluation of selected engineering properties of the site soils. The tests were conducted in general conformance to the procedures of the American Society for Testing and Materials (ASTM) or other standardized methods as referenced below. The laboratory testing program consisted of the following tests:

- ▶ Plasticity Index (ASTM D4318)
- ▶ Particle Size Analyses (ASTM D422)
- ▶ Unit Dry Densities (ASTM D2937)
- ▶ Moisture Contents (ASTM D2216)
- ▶ Moisture-Density Relationship (ASTM D1557)

- ▶ Chemical Analyses (soluble sulfates & chlorides, pH, and resistivity) (Caltrans Methods)

The laboratory test results are presented on the subsurface logs (Appendix B) and in Appendix C.

Engineering parameters of soil strength, compressibility and relative density utilized for developing design criteria provided within this report were obtained from the field and laboratory testing program.

## Section 3

**DISCUSSION****3.1 Site Conditions**

The proposed evaporation ponds site is vacant, sloping about 9 feet to the southwest, with scattered vegetation covering the site. The proposed site for the evaporation ponds was previously in agricultural production but has been fallowed for a number of years.

Adjacent properties are flat-lying and are approximately at the same elevation with this site.

The project site lies at an elevation of approximately 179 feet below sea level (northeast corner) to 189 feet below MSL (southwest corner). These elevations correspond to Elev. 821 to 811 (local IID datum) in the Imperial Valley region of the California low desert. The surrounding properties lie on terrain which is flat (planar), part of a large agricultural valley, which was previously an ancient lake bed covered with fresh water to an elevation of 43± feet above MSL. Annual rainfall in this arid region is less than 3 inches per year with some flash flooding from heavy rainfalls on the alluvial plain of the Chocolate Mountains (east of Niland). This desert region has four months of average summertime temperatures above 100 °F. Winter temperatures are mild, seldom reaching freezing.

**3.2 Geologic Setting**

The project site is located in the Salton Trough region of the Colorado Desert physiographic province of southeastern California. The Salton Trough is a topographic and geologic structural depression resulting extending from the San Geronio Pass to the Gulf of California (Norris & Webb, 1990). The Salton Trough is bounded on the northeast by the San Andreas fault and Chocolate Mountains and the southwest by the Peninsular Range and faults of the San Jacinto Fault Zone. The Salton Trough represents the northward extension of the Gulf of California, containing both marine and non-marine sediments deposited since the Miocene Epoch (Morton, 1977). Tectonic activity that formed the trough continues at a high rate as evidenced by deformed young sedimentary deposits and high levels of seismicity. Figure 1 shows the location of the site in relation to regional faults and physiographic features.

The Imperial Valley is directly underlain by lacustrine deposits, which consist of interbedded lenticular and tabular silt, sand, and clay. The Late Pleistocene to Holocene (present) lake deposits are probably less than 100 feet thick and derived from periodic flooding of the Colorado River which intermittently formed a fresh water lake (Lake Cahuilla). Older deposits consist of Miocene to Pleistocene non-marine and marine sediments deposited during intrusions of the Gulf of California. Basement rock consisting of Mesozoic granite and Paleozoic metamorphic rocks are estimated to exist at depths between 15,000 - 20,000 feet.

### **3.3 Subsurface Soil**

The UC Davis California Soil Resource Lab “SoilWeb Earth” computer application (UC Davis, 2019) for Google Earth indicates that surficial deposits at the project site consist predominantly of silty clay loams overlying fine sands of the Imperial soil group (see Plate A-3). These loams are formed in sediment and alluvium of mixed origin (Colorado River overflows and fresh-water lake-bed sediments).

The subsurface soils encountered during the field exploration conducted on November 7<sup>th</sup> and 8<sup>th</sup> 2019 consist of silty clays and clays with some interbedded silty sand layers. The subsurface logs (Plates B-1 through B-7) depict the stratigraphic relationships of the subsurface soil encountered at the boring and test pit locations. Variations in subsurface stratigraphy may occur between the points of exploration. The stratification lines shown on the subsurface log represent the approximate boundaries between the various strata. However, the transition from one stratum to another may be gradual over some range of depth.

Blocky fractures from atmospheric drying were observed in the clays to a depth of 2 feet below ground surface.

The native surface clays likely exhibit high to very high swell potential (Expansion Index, EI = 91 to >130) when correlated to Plasticity Index tests (ASTM D4318) performed on the native soils.

The clay is expansive when wetted and can shrink with moisture loss (drying). Development of building foundations, concrete flatwork, and asphaltic concrete pavements should include provisions for mitigating potential swelling forces and reduction in soil strength, which can occur from saturation of the soil. Causes for soil saturation include landscape irrigation, broken utility

lines, or capillary rise in moisture upon sealing the ground surface to evaporation. Moisture losses can occur with lack of landscape watering, close proximity of structures to downslopes and root system moisture extraction from deep rooted shrubs and trees placed near the foundations. The design structural engineer (foundations) should consider the effects of non-uniform moisture conditions around the entire foundation when selecting design criteria for the foundations. Typical measures used for similar projects to remediate expansive soil include:

- ▶ Replacement of expansive clays (4 feet) with non-expansive sands or silts.
- ▶ Moisture conditioning subgrade soils to a minimum of 5% above optimum moisture (ASTM D1557) within the drying zone of surface soils.
- ▶ Capping clay soil with a non-expansive sand layer of sufficient thickness (4 feet minimum) to reduce the effects of soil shrink/swell.
- ▶ Design of foundations that are resistant to shrink/swell forces of clay soil.
- ▶ A combination of the methods described above

**3.4 Groundwater Monitoring Well Installation**

Nine (9) 2-inch diameter PVC temporary piezometers were installed at the locations shown on the Site and Exploration Plan (Plate A-2). Piezometers P-1 thru P-8 were installed to depths of about 15 feet around the three proposed evaporation ponds and at about 30 feet below ground surface (B-9 ) at the proposed sewer lift station.

Groundwater was encountered in the test pits at a depth of 7 feet during the time of exploration. Groundwater was also measured in the nine (9) piezometers on December 19, 2019, see table below.

P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8	P-9
7.0 ft.	6.9 ft	6.3 ft.	9.0 ft.	7.0 ft.	11.8 ft.	8.3 ft.	8.5 ft.	6.6 ft.

There is uncertainty in the accuracy of short-term water level measurements, particularly in fine-grained soil. Groundwater levels may fluctuate with precipitation, irrigation of adjacent properties, drainage, and site grading. The referenced groundwater level should not be interpreted to represent an accurate or permanent condition. Our work scope did not include a groundwater surface mounding study.

Subsurface agricultural tile drainage pipelines (4-inch diameter plastic or clay perforated pipelines encapsulated by sand/gravel envelope) exist at estimated depths of 5.5 to 6.5 feet below this site and are used to remove salts accumulating from agricultural irrigation and crop production. Abandoning and plugging the subsurface drainage pipelines can allow groundwater levels to rise variably across the site. Cutting the subsurface tile drain pipelines with utility trenches will likely result in some localized trench flooding. Base line collectors should be crushed in-place and trench backfill compacted (85-90%). The 4-inch lateral pipeline drains are not required to be removed or crushed in-place. The pipelines should be plugged. A copy of the tile drainage system plat will be provided by **The Holt Group from Imperial Irrigation District records and is attached in Appendix A.**

### **3.5 Groundwater Analysis**

**At the request of the Holt Group, groundwater samples were obtained from wells P-2, P-3, P-6 and P-7 for chemical analysis. The samples were collected using a disposable bailer and stored in properly preserved, laboratory-provided containers. After collection, the groundwater samples were stored in an ice-chilled cooler for transport to a Cal-EPA certified analytical laboratory. The groundwater samples were analyzed in the laboratory for this sampling event for the following:**

- **Total Dissolved Solids (TDS) by Standard Method SM 2540C**
- **pH, Chloride, Fluoride, Sulfate by Standard Method SM 4500**
- **Nitrate, Nitrite, Ammonia by Standard Method SM 4500**
- **Calcium, Sodium, Potassium by EPA Method 200.7**
- **Total petroleum hydrocarbons (TPH) by EPA Method 8015B**
- **Oil and Grease by EPA Method 1664A**
- **BOD by Standard Method SM 5210-B**
- **Total Phosphorous by Standard Method SM 4500**
- **Fecal Coliform by Standard Method SM 9221-E**

The groundwater samples were delivered under chain of custody protocol to Enviro—Chem, Inc. in Pomona, California on December 19, 2019 for laboratory analysis of the above constituents. Total Phosphorous (SM4500), BOD, (SM 5210-B) and Fecal Coliform (SM 9221-E) analyses were conducted by Enthalpy Analytical, LLC under sub-agreement with Enviro—Chem. Enviro—Chem is accredited by the State Health Department in California. Enviro—Chem provided a detailed report of the analytical results and Quality Control/Quality Assurance results after completion of the testing procedures. The analytical reports provided by the laboratory are provided in Appendix D.

Analysis of the groundwater at the project site indicated non-detectable levels of petroleum hydrocarbons, nitrite, Oil & Grease and BOD. The groundwater has high total dissolved solids (TDS) concentrations (6,210 to 22,200 mg/L) and is of non-beneficial use (brackish) in the Niland area. pH levels ranged from 6.5 to 6.8. Detectable levels of Fecal Coliform are shown below in MPN/100ml (most probable number).

<u>Monitoring Well</u>	<u>Sample ID</u>	<u>Fecal Coliform</u>
P-6	#1	< 1.8 MPN/100ml
P-7	#2	>1600 MPN/100ml
P-2	#3	3.7 MPN/100ml
P-3	#4	<1.8 MPN/100ml

Detectable levels of nitrate were found in one (1) of the four (4) samples. Detectable levels of Total Phosphorous were found in three (3) of the four (4) samples. Detectable levels of ammonia, chloride, fluoride, sulfate, calcium, sodium and potassium were found in all four (4) samples. A summary of the test results are provided in Appendix D for the four monitoring wells sampled.

### 3.6 Infiltration Testing

Double-Ring Infiltration (DRI) tests were conducted in general accordance to the ASTM D3385 test procedure at two (2) locations within each pond (Plate A-5). The DRI test units were installed at a depth of 2 feet below existing ground surface within the proposed pond areas. Prior to conducting infiltration test readings, the water level in the outer and inner ring were checked and adjusted to maintain a minimum constant head of 6 inches over the bottom ground surface.

The soils below the test locations consisted of predominantly clay at T-1, T-2 and T-3. The measured infiltration rates of the soils at the test locations are tabulated below:

Test No.	Location	Infiltration Rate
T-1	West pond	0.100 in/hr (7.06E-5 cm/sec)
T-2	Middle pond	0.003 in/hr (2.12E-6 cm/sec)
T-3	East pond	0.005 in/hr (3.53E-6 cm/sec)

Infiltration rates were determined in uncompacted native soil. The measured infiltration rate is applicable for clear water sources and appropriate factors of safety should be used in applying the field measured rate to infiltration basin designs.

### 3.7 Faulting

The project site is located in the seismically active Imperial Valley of southern California with numerous mapped faults of the San Andreas Fault System traversing the region. The San Andreas Fault System is comprised of the San Andreas, San Jacinto, and Elsinore Fault Zones in southern California. The Imperial fault represents a transition from the more continuous San Andreas fault to a more nearly echelon pattern characteristic of the faults under the Gulf of California (USGS, 1990). We have performed a computer-aided search of known faults or seismic zones that lie within a 43 mile (69 kilometer) radius of the project site (Table 1).

A fault map illustrating known active faults relative to the site is presented on Figure 1, *Regional Fault Map*. Figure 2 shows the project site in relation to local faults. The criterion for fault classification adopted by the California Geological Survey defines Earthquake Fault Zones along Holocene-active or pre-Holocene faults (CGS, 2019b). Earthquake Fault Zones are regulatory zones that address the hazard of surface fault rupture. A Holocene-active fault is one that has ruptured during Holocene time (within the last 11,700 years). A pre-Holocene fault is a fault that has not ruptured in the last 11,700 years. Pre-Holocene faults may still be capable of surface rupture in the future, but are not regulated by the Alquist-Priolo Act (AP).

Review of the current Earthquake Fault Zone maps (CGS, 2019a) indicates that the nearest zoned fault is the Elmore Ranch fault located approximately 7.7 miles southwest of the project site.

The project site lies within the Brawley Seismic Zone (BSZ), a pull-apart basin between the southern terminus of the San Andreas fault and the northern trace of the Imperial fault. The BSZ is composed of numerous cross-cutting high angle normal faults. The BSZ extends northward beyond the termination of the mapped Imperial/Brawley faults to beneath the Salton Sea, where it terminates upon intersecting the San Andreas fault near Bombay Beach. The Brawley Seismic Zone was the source of the 1981 5.9Mw Westmorland earthquake sequence that involved activity on at least seven distinct fault planes within the zone. The faults in the Brawley Seismic Zone are considered to be short enough that earthquakes much larger than 6-6.5Mw are unlikely. The California Geological Survey considers the Brawley Seismic Zone to have a maximum magnitude of 6.4Mw, with a very short 24-year average return interval, and a geologic slip rate of 25 mm/year (CDMG, 1996).

### 3.8 General Ground Motion Analysis

The project site is considered likely to be subjected to moderate to strong ground motion from earthquakes in the region. Ground motions are dependent primarily on the earthquake magnitude and distance to the seismogenic (rupture) zone. Acceleration magnitudes also are dependent upon attenuation by rock and soil deposits, direction of rupture and type of fault; therefore, ground motions may vary considerably in the same general area.

2019 CBC General Ground Motion Parameters: The 2019 CBC general ground motion parameters (effective January 1, 2020) are based on the Risk-Targeted Maximum Considered Earthquake ( $MCE_R$ ). The Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps Web Application (SEAOC, 2019) was used to obtain the site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters. **The site has been classified as Site Class D (stiff soil profile).**

The granular soils underlying the project site may liquefy during a strong seismic event resulting in a Site Class F. In accordance with ASCE 7-16, Section 20.3.1, Site Class F, for structures having a fundamental period of vibration less than 0.5 seconds, a site-specific response analysis is not required. Rather, a Site Class is permitted to be determined by standard means. It is anticipated that all proposed structures for the project site have a period less than 0.5 seconds; therefore, a *Site Class D is applicable for site design.*

Design spectral response acceleration parameters are defined as the earthquake ground motions that are two-thirds ( $2/3$ ) of the corresponding  $MCE_R$  ground motions. Design earthquake ground motion parameters are provided in Table 2. **A Risk Category III was determined using Table 1604A.5 and the Seismic Design Category is D since  $S_1$  is less than 0.75g.**

The Maximum Considered Earthquake Geometric Mean ( $MCE_G$ ) peak ground acceleration adjusted for soil site class effects ( $PG_{AM}$ ) value was obtained from the SEAOC/OSHPD Seismic Design Maps Web Application (SEAOC, 2019) to be used for liquefaction and seismic settlement analysis in accordance with 2019 CBC Section 1803A.5.12 and CGS Note 48 ( $PG_{AM} = F_{PGA} * PGA$ ). **A  $PG_{AM}$  value of 0.55g was estimated for the project site.**

### 3.9 Seismic and Other Hazards

- ▶ **Groundshaking.** The primary seismic hazard at the project site is the potential for strong groundshaking during earthquakes along the Elmore, Brawley, and San Andreas faults.
- ▶ **Surface Rupture.** The California Geological Survey (2019b) has established Earthquake Fault Zones in accordance with the 1972 Alquist-Priolo Earthquake Fault Zone Act. The Earthquake Fault Zones consists of boundary zones surrounding well defined, active faults or fault segments. The project site does not lie within an A-P Earthquake Fault Zone; therefore, surface fault rupture is considered to be low at the project site.
- ▶ **Liquefaction and lateral spreading.** Liquefaction is a potential design consideration because of underlying saturated sandy substrata. Although the Imperial Valley has not yet been evaluated for seismic hazards by the California Geological Survey seismic hazards zonation program, liquefaction is well documented in the Imperial Valley after strong seismic events (McCrink, et al, 2011 and Rymer et al, 2011). *The potential for liquefaction at the site was not included in the scope of work for this project.*

#### Other Potential Geologic Hazards.

- ▶ **Landsliding.** The hazard of landsliding is unlikely due to the regional planar topography. No ancient landslides are shown on geologic maps, aerial photographs and topographic maps of the region and no indications of landslides were observed during our site investigation.
- ▶ **Volcanic hazards.** The site is not located proximal to any known volcanically active area and the risk of volcanic hazards is considered low. Obsidian Butte and Red Hill, located at the south end of the Salton Sea approximately 4 miles west of the project site, are small remnants of volcanic domes. The domes erupted about 1,800 to 2,500 years ago (Wright et al, 2015). The subsurface brine fluids around the domes have a high heat flow and are currently being utilized to produce geothermal energy.
- ▶ **Tsunamis and seiches.** Tsunamis are giant ocean waves created by strong underwater seismic events, asteroid impact, or large landslides. Seiches are large waves generated in enclosed bodies of water in response to strong ground shaking. The site is not located near any large bodies of water, so the threat of tsunami, seiches, or other seismically-induced flooding is considered unlikely.
- ▶ **Flooding.** Based on our review of FEMA (2008) FIRM Panel 06025C0725C which encompasses the project site, the project site is located in Flood Zone X, an area determined to be outside the 0.2% annual chance (500-year) floodplain.

- ▶ **Collapsible soils.** Collapsible soil generally consists of dry, loose, low-density material that have the potential collapse and compact (decrease in volume) when subjected to the addition of water or excessive loading. Soils found to be most susceptible to collapse include loess (fine grained wind-blown soils), young alluvium fan deposits in semi-arid to arid climates, debris flow deposits and residual soil deposits. Due to the cohesive nature of the subsurface soils and shallow groundwater, the potential for hydro-collapse of the subsurface soils at this project site is considered very low.
- ▶ **Expansive soils.** In general, much of the near surface soils in the Imperial Valley consist of silty clays and clays which are moderate to highly expansive. The expansive soil conditions are discussed in more detail in Section 3.3.

## Section 4

**DESIGN CRITERIA****4.1 Site Preparation**

Clearing and Grubbing: All surface improvements, debris or vegetation including grass, trees, and weeds on the site at the time of construction should be removed from the construction area. Root balls should be completely excavated. Organic strippings should be stockpiled and not used as engineered fill. All trash, construction debris, concrete slabs, old pavement, landfill, contaminated soil, and buried obstructions such as old foundations and utility lines exposed during rough grading should be traced to the limits of the foreign material by the grading contractor and removed under our supervision. Any excavations resulting from site clearing should be sloped to a bowl shape to the lowest depth of disturbance and backfilled under the observation of the geotechnical engineer's representative.

Mass Grading of Ponds: The three ponds are planned to be stepped in elevation from east to west following the natural topography of the site. The east sides of the ponds will require cuts of about 1.5 feet while the west sides may require fill of about 1.5 feet to achieve elevations of each of the ponds. Ponds site surface soils will also be used in construction of the earthen embankments for the three ponds. The ponds will be filled by the effluent line from the new pump station.

Prior to placing any pond embankment fills, the surface 2.0 feet of soil should be prewetted (minimum of 20% moisture content). Subsequent to prewetting, the surface 12 inches of soil *in pond embankment areas planned for fill soil placement* should be removed, the exposed surface uniformly moisture conditioned to a depth of 8 inches by discing and wetting to a minimum of optimum plus 4% and recompact to a minimum of 90% of ASTM D1557 maximum density. Onsite native clays placed as engineered fill should be uniformly moisture conditioned by discing and wetting or drying to optimum plus 4 to 8% and compacted in 6 inch maximum lifts to a minimum of 90% relative compaction. Clods shall be reduced by discing to a maximum dimension of 1.0 inch prior to being placed as fill.

The site is underlain by tile drain lines at a depth of **approximately 5.5 to 6.0 feet** below ground surface (to be included in Appendix A). Tile lines should be cut and plugged. The pipelines are likely full of water and may temporarily flood excavations if not capped promptly. Base lines (6 to 8 inch diameter) should be located and crushed in-place with the backfill compacted to a

minimum 90% of ASTM D1557 maximum density.

Evaporation Pond Embankments: The native clay soils are considered adequate for engineered embankment fill. The embankment fill should be pulverized/disc'd to less than 3/4 inch maximum clod size, uniformly moisture conditioned to 4 to 8% over optimum, and placed in 6 inch maximum lifts at a minimum of 90% of ASTM D1557 maximum density. The embankment tops should have a minimum of 6 inches of aggregate base material for all weather access over the clay that can become slick during rainfall.

The embankment slopes should be reconstructed no steeper than 2:1 (interior) and 3:1 (exterior) with a minimum crown width of 20 feet. However, flatter interior slopes may be considered to retard erosion and permit maintenance. Embankments should be overbuilt by 6 inches and subsequently cut to the plan line and grade to remove loose material along the slope faces.

Wet Well Backfill: Following completion of concrete placement and vertical shaft placement for the wet well, the remaining excavation area against the wet well may be backfilled with native soil in lifts and compacted to a minimum of 90% of ASTM D1557 maximum dry density at a minimum of optimum moisture.

Small Equipment Pad Preparation: The exposed surface soil within the small equipment mat foundation areas for pumping equipment, generator or transformers should be removed to 18 inches below the bottom of the mat foundations (12 inches or greater thickness) to 2 feet beyond the edges of the foundation. Exposed subgrade should be scarified to a depth of 12 inches, uniformly moisture conditioned to a minimum of 4% to 8% above optimum moisture content, and recompacted to a minimum of 90% of the maximum density determined in accordance with ASTM D1557 methods.

An 18 inch layer of Caltrans Class 2 aggregate base, compacted in maximum 6 inch lifts to at least 95% of ASTM D1557 maximum density at 2% below to 4% above optimum moisture shall be placed over the compacted subgrade prior to placing mat foundations.

Following completion of concrete placement for the mat foundation, the remaining excavation area against the foundation may be backfilled with native soil in 6 inch maximum lifts and compacted to a minimum of 90% of ASTM D1557 maximum dry density at a 4% to 8% above optimum moisture.

Observation and Density Testing: All site preparation and fill placement should be continuously observed and tested by a representative of a qualified geotechnical engineering firm. Full-time observation services during the excavation and scarification process is necessary to detect undesirable materials or conditions and soft areas that may be encountered in the construction area. The geotechnical firm that provides observation and testing during construction shall assume the responsibility of "*geotechnical engineer of record*" and, as such, shall perform additional tests and investigation as necessary to satisfy themselves as to the site conditions and the geotechnical parameters for site development.

Auxiliary Structures Foundation Preparation: Auxiliary structures such as free standing or retaining walls should have footings extended to a minimum of 30 inches below grade. The existing soil beneath the structure foundation prepared in the manner described for the building pad except the preparation needed only to extend 18 inches below and beyond the footing.

## **4.2 Utility Trench Backfill**

Utility Trench Backfill: Trench backfill for utilities should conform to the specifications shown on Plate D-1 (Appendix E), using either Type A, B or C backfill.

**Type A** backfill for HDPE pipe (above groundwater) consists of a 4 to 8 inch bed of  $\frac{3}{8}$ -inch crushed rock below the pipe and pipezone backfill (to 12" above top of pipe) consisting of crusher fines (sand). Sewer pipes (SDR-35), water mains, and stormdrain pipes of other than HDPE pipe may use crusher fines for bedding. The crusher fines shall be compacted to a minimum of 95% of ASTM D1557 maximum density. Pipe deflection should be checked to not exceed 2% of pipe diameter. Native clay/silt soils may be used to backfill the remainder of the trench. Soils used for trench backfill shall be compacted to a minimum of 90% of ASTM D1557 maximum density, except the top 12 inches shall be compacted to 95% (if granular trench backfill).

**Type B** backfill for HDPE pipe (shallow cover) requires 6 inches of  $\frac{3}{8}$ -inch crushed rock as bedding and to springline of the pipe. Thereafter, sand/cement slurry (3 sack cement factor) should be used to 12 inches above the top of the pipe. Native clay and silt soils may be used in the remainder of the trench backfill as specified above.

*Type C* backfill for HDPE pipe (below or partially below groundwater) shall consist of a geotextile filter fabric encapsulating ¾-inch crushed rock. The crushed rock thickness shall be 6 inches below and to the sides of the pipe and shall extend to 12 inches above the top of the pipe. The filter fabric shall cover the trench bottom, sidewalls and over the top of the crushed rock. Native clay and silt soils may be used in the remainder of the trench backfill as specified above.

**Type C backfill must be used in wet soils and below groundwater for all buried utility pipelines. Where pipeline excavation are planned below the ground water surface, dewatering (by well points) is required to at least 24 inches below the trench bottom prior to excavation. Type A backfill may be used in the case of a dewatered trench condition in clay soils only.**

On-site soil free of debris, vegetation, and other deleterious matter may be suitable for use as utility trench backfill above pipezone, but may be difficult to uniformly maintain at specified moistures and compact to the specified densities. Native backfill should only be placed and compacted after encapsulating buried pipes with suitable bedding and pipe envelope material.

The native clay soil may be suitable for use as compacted fill and utility trench backfill. The native soil should be placed in maximum 8 inch lifts (loose) and compacted to a minimum of 90% of ASTM D1557 maximum dry density at 2 to 6% above optimum moisture.

Backfill soil of utility trenches within paved areas should be uniformly moisture conditioned to a minimum of 4% above optimum moisture, placed in layers not more than 6 inches in thickness and mechanically compacted to a minimum of 90% of the ASTM D1557 maximum dry density, except that the top 12 inches shall be compacted to 95% (if granular trench backfill).

### **4.3 Foundations and Settlements**

The lift station may be designed for an allowable soil bearing pressure of 2,500 pounds per square foot (psf) at the base of the station (around 15 feet depth). Footings and equipment foundations which are embedded a minimum of 18 inches into native soil or compacted backfill around the pump wet-well may be designed for an allowable bearing pressure of 1,500 psf. It is suggested that a rigid mat be used for structures placed over wet-well backfill. Horizontal sliding can be resisted with passive earth pressure equivalent to 250 pounds per cubic foot (pcf) of fluid pressure

and a coefficient of friction of 0.25. Groundwater buoyant forces and lateral loads should be considered in the wet well design.

Small Equipment Flat Plate Structural Mats: Structural concrete mat foundations may be designed using an allowable soil bearing pressure of 2,500 psf when the foundation is supported on 18 inches of compacted Class 2 aggregate base. The allowable soil pressure may be increased by one-third for short term loads induced by winds or seismic events. The structural mat shall have a double mat of steel and a minimum thickness of 12 inches. Structural mats may be designed for a modulus of subgrade reaction (Ks) of 200 pci when placed on 18 inches of compacted Class 2 aggregate base. An allowable friction coefficient of 0.35 may also be used at the base of the mat to resist lateral sliding.

Resistance to horizontal loads will be developed by passive earth pressure on the sides of footings and frictional resistance developed along the base of footings. Passive resistance to lateral earth pressure may be calculated using an equivalent fluid pressure of 250 pcf to resist lateral loadings. An allowable friction coefficient of 0.35 may also be used at the base of the footings to resist lateral sliding.

Settlements: Foundation movement under the estimated static (non-seismic) loadings and static site conditions are estimated to not exceed 1 inch with differential movement of about two-thirds of total movement for the loading assumptions stated above when the subgrade preparation guidelines given above are followed. Movement during a maximum considered earthquake seismic event has not been evaluated.

#### **4.4 Slabs-On-Grade**

Structural Concrete: Structural concrete slabs are those slabs (foundations) that underlie structures or covered housekeeping slabs (shades). Concrete slabs and flatwork shall be a minimum of 5 inches thick due to expansive soil conditions. Concrete slab and flatwork reinforcement should consist of chaired rebar slab reinforcement (minimum of No. 4 bars at 16-inch centers, both horizontal directions) placed at slab mid-height to resist drying shrinkage cracking. Slab thickness and steel reinforcement are minimums only and should be verified by the structural engineer/designer knowing the actual project loadings.

All steel components of the foundation system should be protected from corrosion by maintaining a 3-inch minimum concrete cover of densely consolidated concrete at footings (by use of a vibrator).

Control joints should be provided in all concrete slabs-on-grade at a maximum spacing (in feet) of 2 to 3 times the slab thickness (in inches) as recommended by American Concrete Institute (ACI) guidelines. All joints should form approximately square patterns to reduce randomly oriented contraction cracks. Contraction joints in the slabs should be tooled at the time of the pour or sawcut ( $\frac{1}{4}$  of slab depth) within 6 to 8 hours of concrete placement. Construction (cold) joints in foundations and area flatwork should either be thickened butt-joints with dowels or a thickened keyed-joint designed to resist vertical deflection at the joint.

All joints in flatwork should be sealed to prevent moisture, vermin, or foreign material intrusion. Precautions should be taken to prevent curling of slabs in this arid desert region (refer to ACI guidelines).

#### **4.5 Concrete Mixes and Corrosivity**

Selected chemical analyses for corrosivity were conducted on bulk samples of the near surface soil from the project site (Plate C-2). The native soils were found to have S2 (severe) levels of sulfate ion concentration (2,400 ppm). Sulfate ions in high concentrations can attack the cementitious material in concrete, causing weakening of the cement matrix and eventual deterioration by raveling. The following table provides American Concrete Institute (ACI) recommended cement types, water-cement ratio and minimum compressive strengths for concrete in contact with soils:

**Table 4. Concrete Mix Design Criteria due to Soluble Sulfate Exposure**

Sulfate Exposure Class	Water-soluble Sulfate (SO <sub>4</sub> ) in soil, ppm	Cement Type	Maximum Water-Cement Ratio by weight	Minimum Strength f'c (psi)
S0	0-1,000	–	–	–
S1	1,000-2,000	II	0.50	4,000
S2	2,000-20,000	V	0.45	4,500
S3	Over 20,000	V (plus Pozzolon)	0.45	4,500

Note: From ACI 318-14 Table 19.3.1.1 and Table 19.3.2.1

A minimum of 6.0 sacks per cubic yard of concrete (4,500 psi) of Type V Portland Cement with a maximum water/cement ratio of 0.45 (by weight) should be used for concrete placed in contact with native soil on this project (sitework including sidewalks, driveways, housekeeping slabs, and foundations). Admixtures may be required to allow placement of this low water/cement ratio concrete. Thorough concrete consolidation and hard trowel finishes should be used due to the aggressive soil exposure.

The native soil has severe levels of chloride ion concentration (1,360 ppm). Chloride ions can cause corrosion of reinforcing steel, anchor bolts and other buried metallic conduits. Resistivity determinations on the soil indicate very severe potential for metal loss because of electrochemical corrosion processes. Mitigation of the corrosion of steel can be achieved by using steel pipes coated with epoxy corrosion inhibitors, asphaltic and epoxy coatings, cathodic protection or by encapsulating the portion of the pipe lying above groundwater with a minimum of 4 inches of densely consolidated concrete. ***No metallic water pipes or conduits should be placed below foundations.***

Foundation designs shall provide a minimum concrete cover of four (4) inches around steel reinforcing or embedded components (anchor bolts, etc.) exposed to native soil or landscape water (to 18 inches above grade). If the 4-inch concrete edge distance cannot be achieved, all embedded steel components (anchor bolts, etc.) shall be epoxy coated for corrosion protection (in accordance with ASTM D3963/A934) or a corrosion inhibitor and a permanent waterproofing membrane shall

be placed along the exterior face of the exterior footings. ***Hold-down straps should not be used at foundation edges due to corrosion of metal at its protrusion from the slab edge.*** Additionally, the concrete should be thoroughly vibrated at footings during placement to decrease the permeability of the concrete.

Exterior foundation faces exposed to native soils (without adjacent mowstrips, sidewalks, or patios) should be coated with a permanent waterproofing membrane to prevent salt migration into concrete.

***Landmark does not practice corrosion engineering. We recommend that a qualified corrosion engineer evaluate the corrosion potential on metal construction materials and concrete at the site to obtain final design recommendations.***

#### **4.6 Excavations**

All site excavations to 4 feet should conform to CalOSHA requirements for Type B soil. The contractor is solely responsible for the safety of workers entering trenches. Temporary excavations with depths of 4 feet or less may be cut nearly vertical for short duration. Excavations deeper than 4 feet will require shoring or slope inclinations in conformance to CAL/OSHA regulations for Type B soil. All permanent slopes should not be steeper than 3:1 to reduce wind and rain erosion. Protected slopes with ground cover may be as steep as 2:1. If excavations are planned below groundwater (about 7.0 feet below ground surface), all excavation slopes should be excavated according to OSHA Standards for Type C soils.

Due to an existing loose silty sand layer encountered between 8 to 19 feet depth, the use of a shoring system should be planned for the pump station wet well installation. Dewatering of the excavation site will be required prior to start of excavation. Dewatering systems should provide adequate filters so that fine silts are not pumped from depth. Pumping of the fine soils can result in area settlement. Dewatering will also be required along the sewer main alignment.

All discussions in this section regarding stable excavation slopes assumes minimal equipment vibration and adequate setback of excavated material and construction equipment from the top of the excavation. We recommended that the minimum setback distance be equal to the depth of excavation and at least 10 feet from the crown of the slope. If excavated materials are stockpiled

adjacent to the excavation, the weight of the material should be considered as a surcharge load for slope stability.

The excavation for the sewer lift station and sewer main will encounter the groundwater table. Therefore, seepage and pumping subgrade conditions should be anticipated. An adequately designed dewatering system (well points) will be required to control groundwater seepage and prevent running ground conditions. The bottom of pump station should be underlain by a minimum of 18 inches of 1.5-inch crushed rock (ASTM C33, size 467) encapsulated in a geotextile filter fabric.

The responsibility for dewatering and the selection and performance of an appropriate system is the contractor's responsibility. The contractor is cautioned to evaluate soil moisture and groundwater conditions at the time of bidding. This report should be made available to dewatering contractors for their initial assessment of the site conditions. However, it is the contractor's own risk to interpret the information contained in this report.

Groundwater was encountered at a depth of 7 feet on November 9, 2019. The contractor is cautioned to evaluate soil moisture and groundwater conditions at the time of bidding.

#### **4.7 Lateral Earth Pressures**

Earth retaining structures, such as retaining walls, should be designed to resist the soil pressure imposed by the retained soil mass. Walls without granular drained backfill may be designed for an assumed static earth pressure equivalent to that exerted by a fluid weighing 60 pcf for clays (45 pcf for sands) for unrestrained (active) conditions (able to rotate 0.1% of wall height), and 100 pcf for clays (60 pcf for sands) for restrained (at-rest) conditions. These values should be verified at the actual wall locations during construction.

When applicable (Seismic Design Category D, E or F), retaining wall structures where the backfill is greater than 6 feet high shall be designed in addition to the static loading (active or at-rest condition) with an additional seismic lateral pressure increasing linearly with depth and the resultant acting as a point load at 0.4H above the base of the wall. The term H is the height of the backfill against a retaining wall in feet. The seismic load increment, shall be determined using the following equations for different wall type and backfill conditions:

Basement (restrained) walls with level backfill:  $\Delta K_{ac} = \frac{1}{2}\gamma H^2(0.68 PGAM/g)$

Cantilever (unrestrained) wall with level backfill:  $\Delta K_{ac} = \frac{1}{2}\gamma H^2(0.42 PGAM/g)$

Cantilever (unrestrained) wall with sloping backfill\*:  $\Delta K_{ac} = \frac{1}{2}\gamma H^2(0.70 PGAM/g)$

\*Applicable for sloping backfill that is no steeper than 2:1 (horizontal:vertical).

Where:

$\Delta K_{ac}$  = Seismic Lateral Force (plf) based on seismic pressure

$\gamma$  = 125 pcf

A  $PGAM$  value of 0.55g has been determined for the project site.

H = Height of retained soil (ft)

Surcharge loads should be considered if loads are applied within a zone between the face of the wall and a plane projected behind the wall 45 degrees upward from the base of the wall. The increase in lateral earth pressure acting uniformly against the back of the wall should be taken as 50% of the surcharge load within this zone. Areas of the retaining wall subjected to traffic loads should be designed for a uniform surcharge load equivalent to two feet of native soil.

Walls should be provided with backdrains to reduce the potential for the buildup of hydrostatic pressure. The drainage system should consist of a composite HDPE drainage panel or a 2-foot wide zone of free draining crushed rock placed adjacent to the wall and extending 2/3 the height of the wall. The gravel should be completely enclosed in an approved filter fabric to separate the gravel and backfill soil. A perforated pipe should be placed perforations down at the base of the permeable material at least six inches below finished floor elevations. The pipe should be sloped to drain to an appropriate outlet that is protected against erosion. Walls should be properly waterproofed. The project geotechnical engineer should approve any alternative drain system.

#### **4.8 Seismic Design**

This site is located in the seismically active southern California area and the site structures are subject to strong ground shaking due to potential fault movements along the Elmore Ranch, Hot Springs and San Andreas faults. Engineered design and earthquake-resistant construction are the common solutions to increase safety and development of seismic areas. Designs should comply with the latest edition of the CBC for Site Class D using the seismic coefficients given in Section 3.6 and Table 2 of this report.

#### **4.9 All-weather Roadway Access**

All-weather accessways should consist of 6 inches of Caltrans Class 2 aggregate base (compacted to 90% minimum of ASTM D1557 maximum density) placed over 12 inches of compacted (90% minimum at minimum of 2% above optimum moisture) native clay soil.

## Section 5

**LIMITATIONS AND ADDITIONAL SERVICES****5.1 Limitations**

The findings and professional opinions within this report are based on current information regarding the proposed improvements to the Niland Wastewater Treatment Plant in Niland, California. The conclusions and professional opinions of this report are invalid if:

- ▶ Structural loads change from those stated or the structures are relocated.
- ▶ The Additional Services section of this report is not followed.
- ▶ This report is used for adjacent or other property.
- ▶ Changes of grade or groundwater occur between the issuance of this report and construction other than those anticipated in this report.
- ▶ Any other change that materially alters the project from that proposed at the time this report was prepared.

This report was prepared according to the generally accepted *geotechnical engineering standards of practice* that existed in Imperial County at the time the report was prepared. No express or implied warranties are made in connection with our services.

Findings and professional opinions in this report are based on selected points of field exploration, geologic literature, limited laboratory testing, and our understanding of the proposed project. Our analysis of data and professional opinions presented herein are based on the assumption that soil conditions do not vary significantly from those found at specific exploratory locations. Variations in soil conditions can exist between and beyond the exploration points or groundwater elevations may change. The nature and extend of such variations may not become evident until, during or after construction. If variations are detected, we should immediately be notified as these conditions may require additional studies, consultation, and possible design revisions.

Environmental or hazardous materials evaluations were not performed by Landmark for this project. Landmark will assume no responsibility or liability whatsoever for any claim, damage, or injury which results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials.

The client has responsibility to see that all parties to the project including designer, contractor, and subcontractor are made aware of this entire report within a reasonable time from its issuance. This report should be considered invalid for periods after two years from the date of report issuance without a review of the validity of the findings and professional opinions by our firm, because of potential changes in the Geotechnical Engineering Standards of Practice. This report is based upon government regulations in effect at the time of preparation of this report. Future changes or modifications to these regulations may require modification of this report. Land or facility use, on and off-site conditions, regulations, design criteria, procedures, or other factors may change over time, which may require additional work. Any party other than the client who wishes to use this report shall notify Landmark of such intended use. Based on the intended use of the report, Landmark may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Landmark from any liability resulting from the use of this report by any unauthorized party and client agrees to defend, indemnify, and hold Landmark harmless from any claim or liability associated with such unauthorized use or non-compliance.

***This report contains information that may be useful in the preparation of contract specifications. However, the report is not worded in such a manner that we recommend its use as a construction specification document without proper modification. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.***

## **5.2 Plan Review**

Landmark Consultants, Inc. should be retained during development of design and construction documents to check that the geotechnical professional opinions are appropriate for the proposed project and that the geotechnical professional opinions are properly interpreted and incorporated into the documents. Landmark should have the opportunity to review the final design plans and specifications for the project prior to the issuance of such for bidding.

Governmental agencies may require review of the plans by the geotechnical engineer of record for compliance to the geotechnical report.

### 5.3 Additional Services

We recommend that Landmark Consultant be retained to provide the tests and observations services during construction. *The geotechnical engineering firm providing such tests and observations shall become the geotechnical engineer of record and assume responsibility for the project.*

*Landmark Consultants, Inc. professional opinions for this site are, to a high degree, dependent upon appropriate quality control of subgrade preparation, fill placement, and embankment construction. Accordingly, the findings and professional opinions in this report are made contingent upon the opportunity for Landmark Consultants to observe grading operations and foundation excavations for the proposed construction.*

*If parties other than Landmark Consultants, Inc. are engaged to provide observation and testing services during construction, such parties must be notified that they will be required to assume complete responsibility as the geotechnical engineer of record for the geotechnical phase of the project by concurring with the professional opinions in this report and/or by providing alternative professional guidance.*

Additional information concerning the scope and cost of these services can be obtained from our office.

## Section 6

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# TABLES

**Table 1**  
**Summary of Characteristics of Closest Known Active Faults**

Fault Name	Approximate Distance (miles)	Approximate Distance (km)	Maximum Moment Magnitude (Mw)	Fault Length (km)	Slip Rate (mm/yr)
Elmore Ranch	7.7	12.3	6.6	29 ± 3	1 ± 0.5
Hot Springs *	12.2	19.6			
San Andreas - Coachella	14.3	22.8	7.2	96 ± 10	25 ± 5
Brawley *	19.4	31.1			
Imperial	19.7	31.6	7	62 ± 6	20 ± 5
Superstition Hills	21.9	35.1	6.6	23 ± 2	4 ± 2
Superstition Mountain	25.2	40.4	6.6	24 ± 2	5 ± 3
Rico *	29.4	47.1			
San Jacinto - Borrego	30.3	48.5	6.6	29 ± 3	4 ± 2
Painted Gorge Wash*	32.8	52.4			
San Jacinto - Anza	34.3	54.9	7.2	91 ± 9	12 ± 6
Unnamed 1*	36.4	58.2			
Yuha Well *	36.7	58.7			
Shell Beds	37.1	59.4			
Yuha*	38.3	61.2			
Vista de Anza*	38.5	61.6			
Unnamed 2*	38.6	61.8			
San Jacinto - Coyote Creek	40.3	64.5	6.8	41 ± 4	4 ± 2
Laguna Salada	40.7	65.1	7	67 ± 7	3.5 ± 1.5
Ocotillo*	40.8	65.3			
Elsinore - Coyote Mountain	42.1	67.3	6.8	39 ± 4	4 ± 2
Algodones *	43.6	69.8			

\* Note: Faults not included in CGS database.

**Table 2**  
**2019 California Building Code (CBC) and ASCE 7-16 Seismic Parameters**

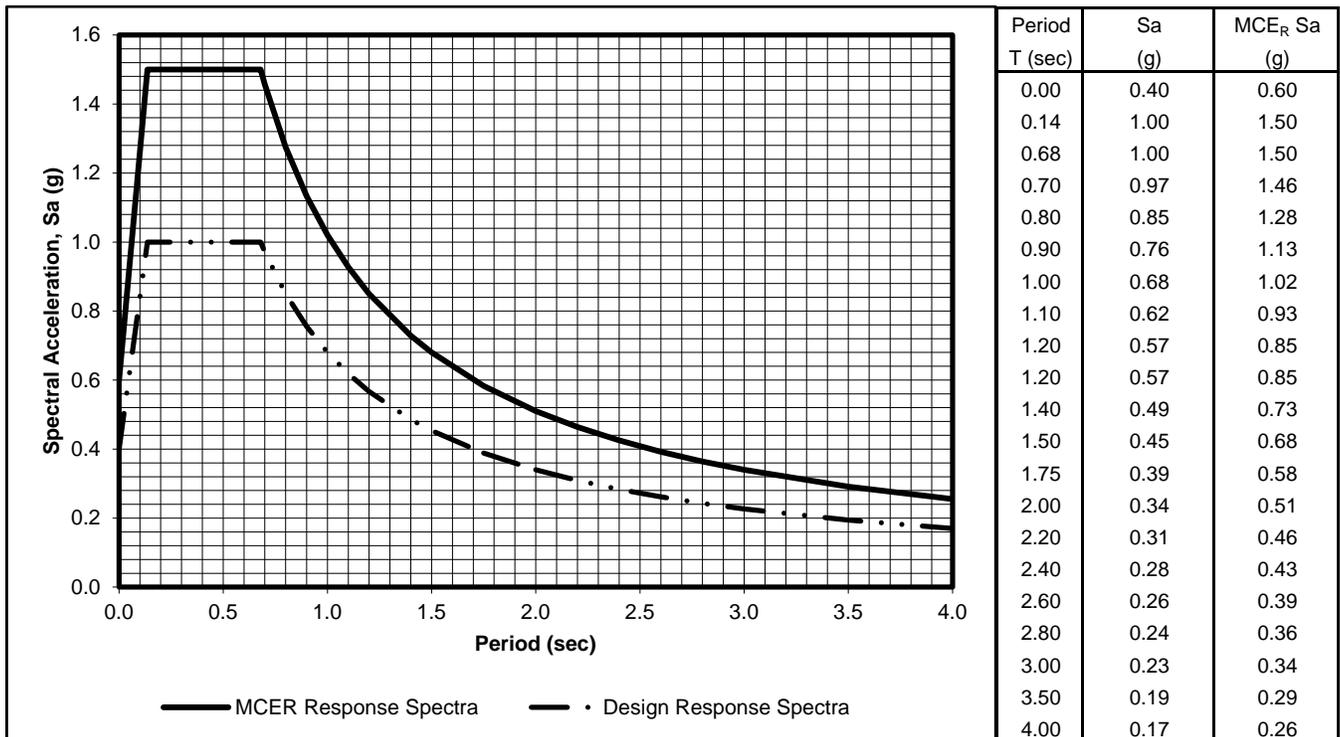
Soil Site Class:	<b>D</b>	<u>ASCE 7-16 Reference</u>
Latitude:	33.2268 N	Table 20.3-1
Longitude:	-115.5272 W	
Risk Category:	III	
Seismic Design Category:	D	

**Maximum Considered Earthquake (MCE) Ground Motion**

Mapped MCE <sub>R</sub> Short Period Spectral Response	<b>S<sub>s</sub></b>	1.500 g	ASCE Figure 22-1
Mapped MCE <sub>R</sub> 1 second Spectral Response	<b>S<sub>1</sub></b>	0.600 g	ASCE Figure 22-2
Short Period (0.2 s) Site Coefficient	<b>F<sub>a</sub></b>	1.00	ASCE Table 11.4-1
Long Period (1.0 s) Site Coefficient	<b>F<sub>v</sub></b>	1.70	ASCE Table 11.4-2
MCE <sub>R</sub> Spectral Response Acceleration Parameter (0.2 s)	<b>S<sub>MS</sub></b>	1.500 g	= F <sub>a</sub> * S <sub>s</sub> ASCE Equation 11.4-1
MCE <sub>R</sub> Spectral Response Acceleration Parameter (1.0 s)	<b>S<sub>M1</sub></b>	1.020 g	= F <sub>v</sub> * S <sub>1</sub> ASCE Equation 11.4-2

**Design Earthquake Ground Motion**

Design Spectral Response Acceleration Parameter (0.2 s)	<b>S<sub>DS</sub></b>	1.000 g	= 2/3*S <sub>MS</sub>	ASCE Equation 11.4-3
Design Spectral Response Acceleration Parameter (1.0 s)	<b>S<sub>D1</sub></b>	0.680 g	= 2/3*S <sub>M1</sub>	ASCE Equation 11.4-4
Risk Coefficient at Short Periods (less than 0.2 s)	<b>C<sub>RS</sub></b>	0.950		ASCE Figure 22-17
Risk Coefficient at Long Periods (greater than 1.0 s)	<b>C<sub>R1</sub></b>	0.922		ASCE Figure 22-18
	<b>T<sub>L</sub></b>	8.00 sec		ASCE Figure 22-12
	<b>T<sub>O</sub></b>	0.14 sec	= 0.2*S <sub>D1</sub> /S <sub>DS</sub>	
	<b>T<sub>S</sub></b>	0.68 sec	= S <sub>D1</sub> /S <sub>DS</sub>	
Peak Ground Acceleration	<b>PGA<sub>M</sub></b>	0.55 g		ASCE Equation 11.8-1



# FIGURES



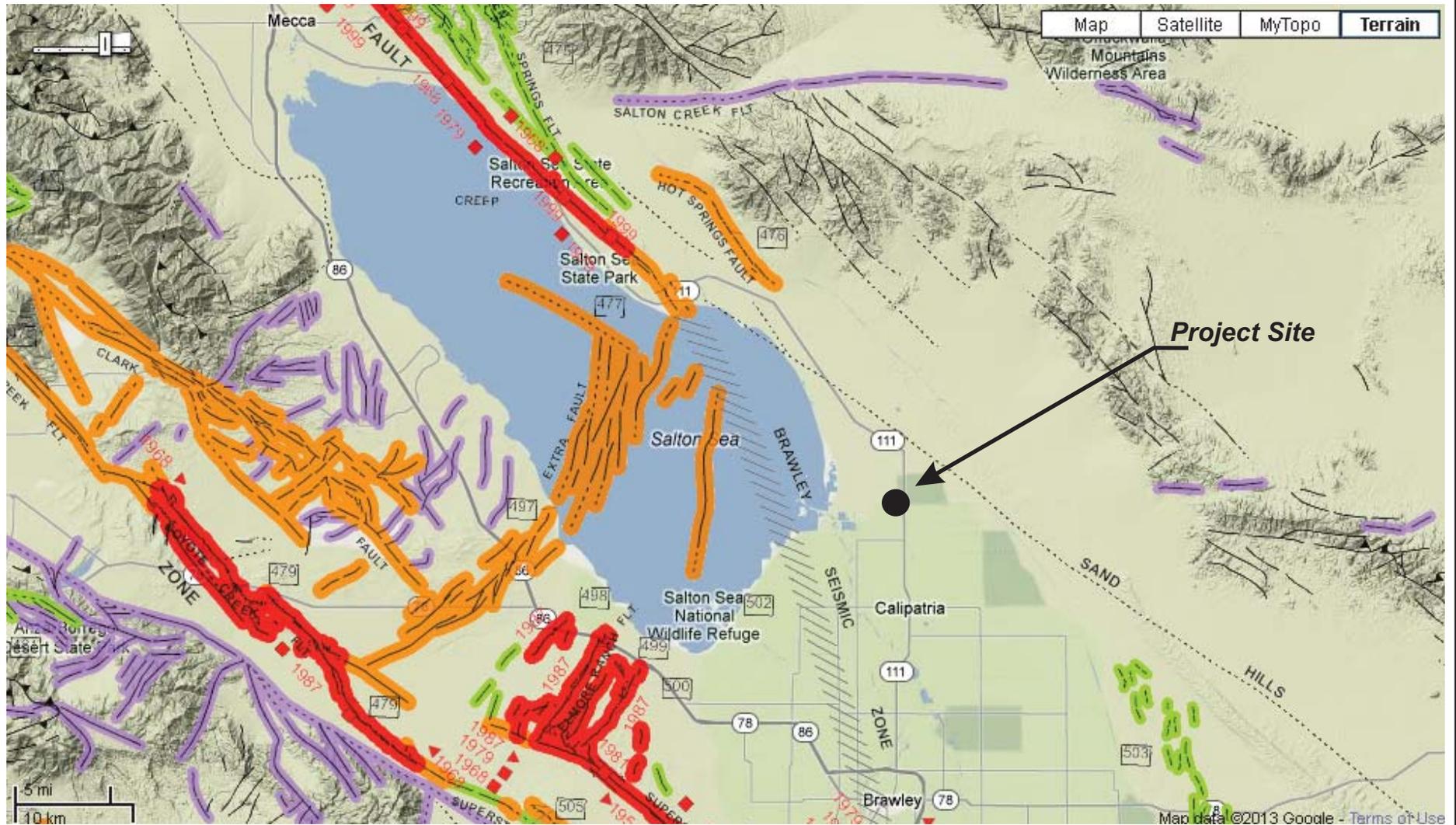
Source: California Geological Survey 2010 Fault Activity Map of California  
<http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html#>

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Regional Fault Map

Figure 1



Source: California Geological Survey 2010 Fault Activity Map of California  
<http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html#>

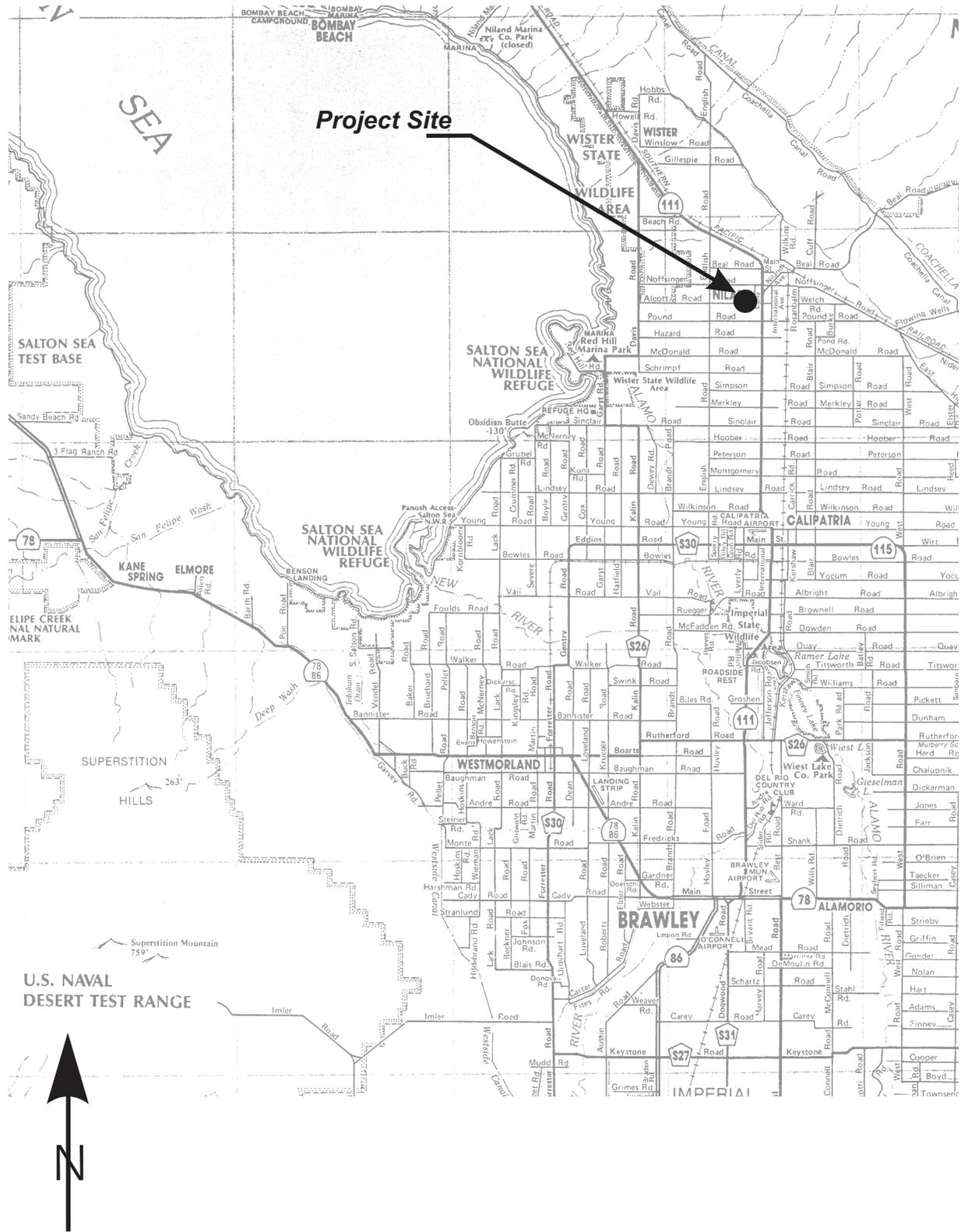
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Map of Local Faults

Figure 2

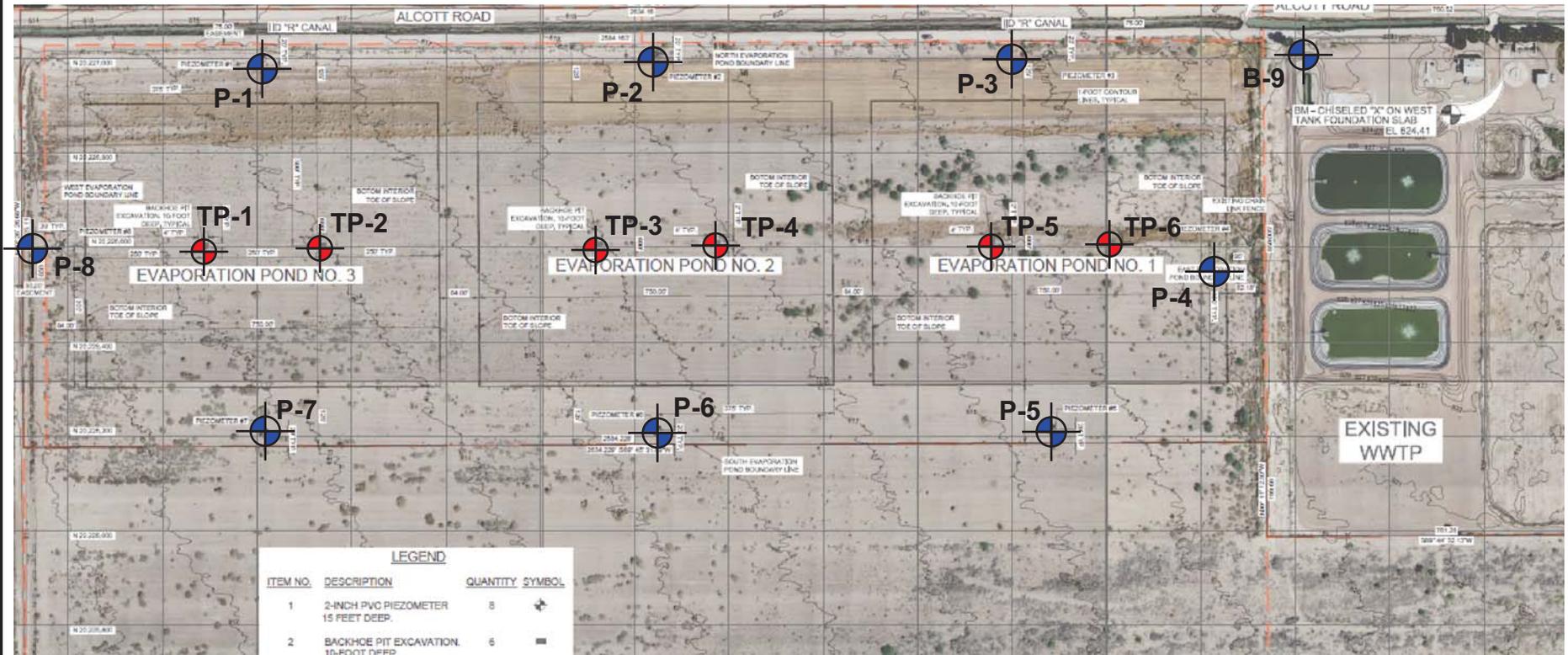
# APPENDIX A



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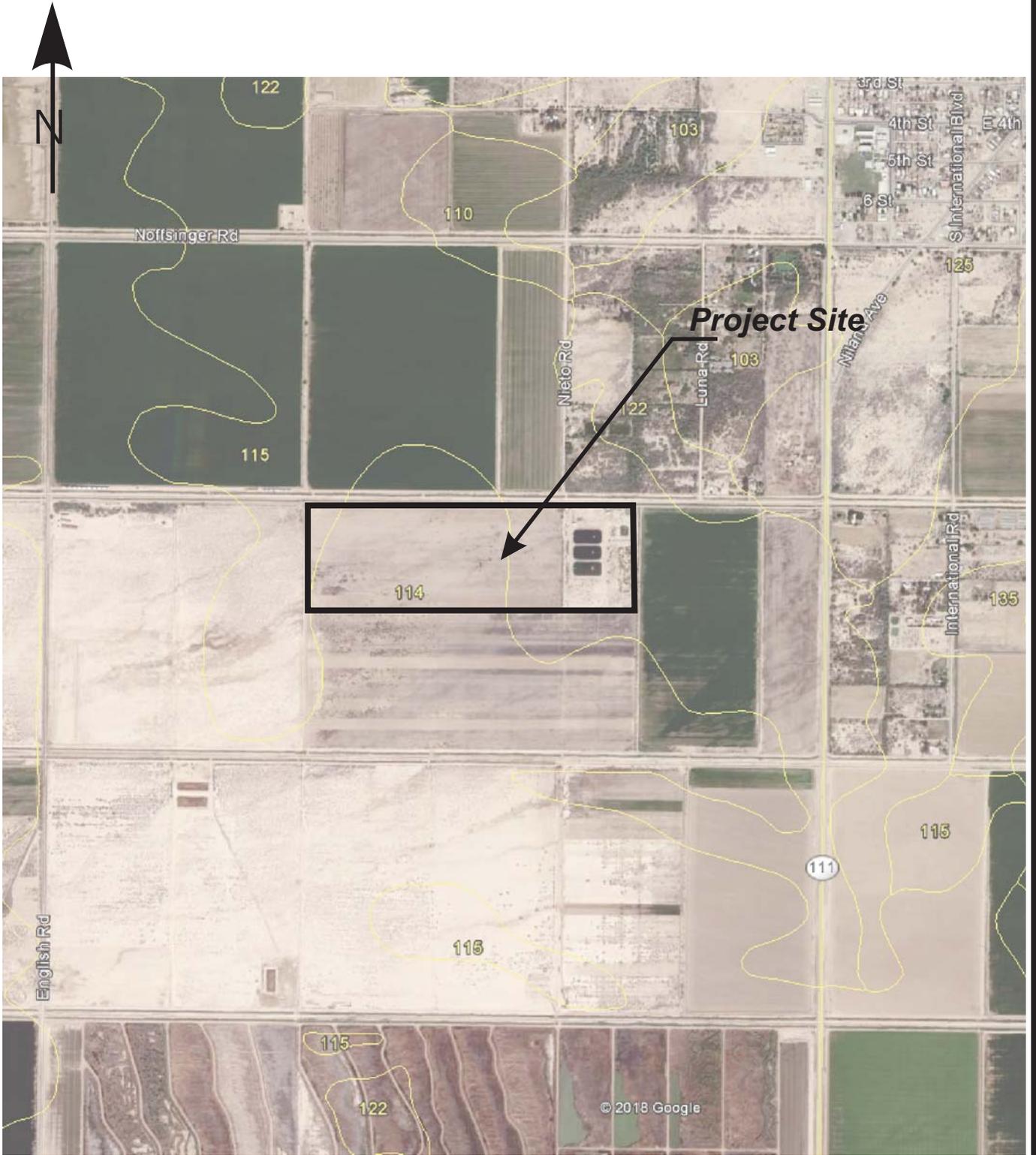
Vicinity Map

Plate  
 A-1



**Legend**

-  Backhoe Pit Location (approximate)
-  Piezometer Location (approximate)



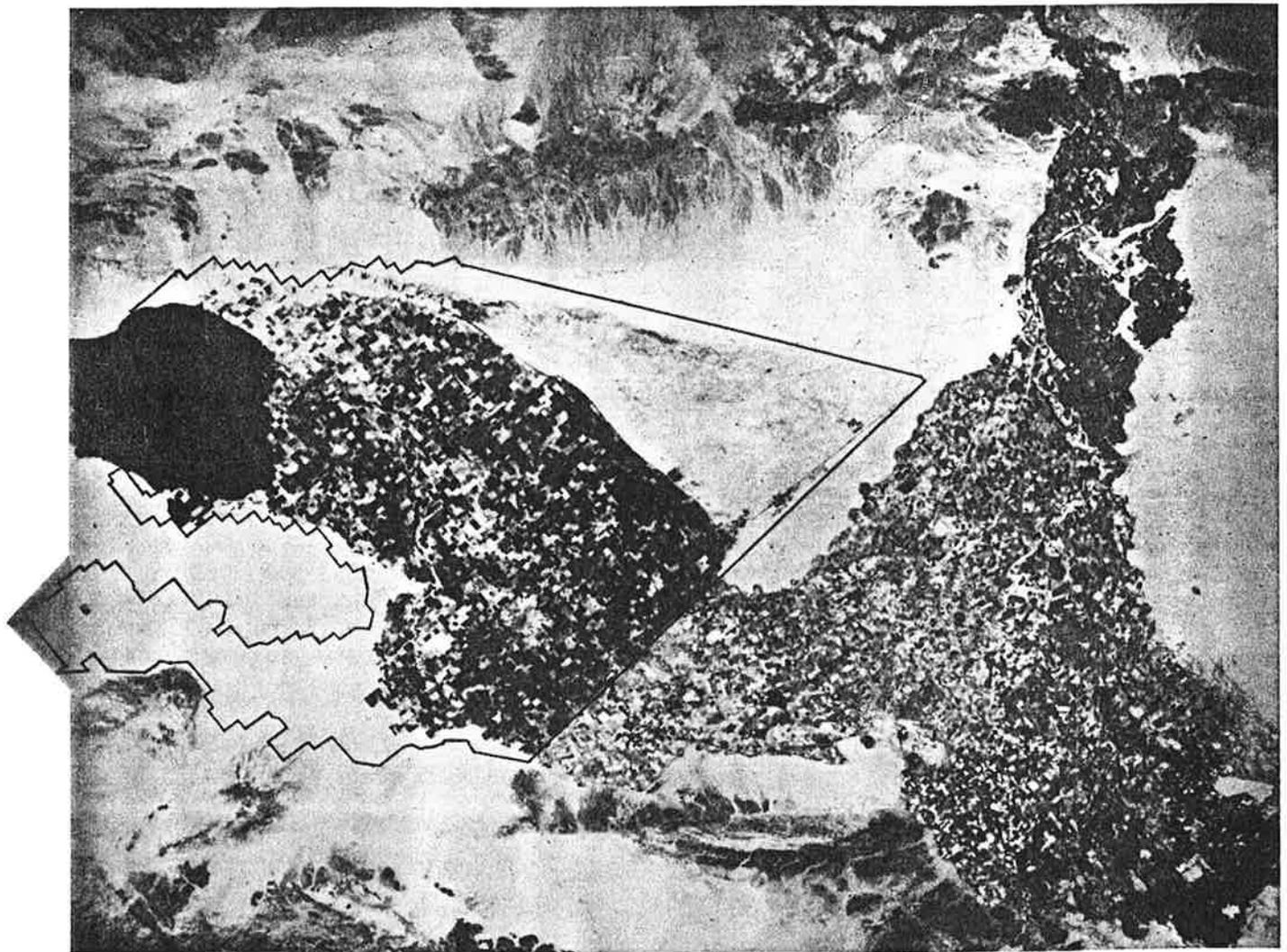
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Project No.: LE19176

Soil Survey Map

Plate  
A-3

Soil Survey of

**IMPERIAL COUNTY  
CALIFORNIA  
IMPERIAL VALLEY AREA**



**United States Department of Agriculture Soil Conservation Service**  
in cooperation with  
**University of California Agricultural Experiment Station**  
and  
**Imperial Irrigation District**

TABLE 11.--ENGINEERING INDEX PROPERTIES

[The symbol > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
100-----	0-13	Loamy fine sand	SM	A-2	0	100	100	75-85	10-30	---	NP
Antho	13-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	90-100	75-95	50-60	15-40	---	NP
101*:											
Antho-----	0-8	Loamy fine sand	SM	A-2	0	100	100	75-85	10-30	---	NP
	8-60	Sandy loam, fine sandy loam.	SM	A-2, A-4	0	90-100	75-95	50-60	15-40	---	NP
Superstition-----	0-6	Fine sand-----	SM	A-2	0	100	95-100	70-85	15-25	---	NP
	6-60	Loamy fine sand, fine sand, sand.	SM	A-2	0	100	95-100	70-85	15-25	---	NP
102*.											
Badland											
103-----	0-10	Gravelly sand---	SP, SP-SM	A-1, A-2	0-5	60-90	50-85	30-55	0-10	---	NP
Carsitas	10-60	Gravelly sand, gravelly coarse sand, sand.	SP, SP-SM	A-1	0-5	60-90	50-85	25-50	0-10	---	NP
104*											
Fluvaquents											
105-----	0-13	Clay loam-----	CL	A-6	0	100	100	90-100	70-95	35-45	15-30
Glenbar	13-60	Clay loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-95	35-45	15-30
106-----	0-13	Clay loam-----	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
Glenbar	13-60	Clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
107*-----	0-13	Loam-----	ML, CL-ML, CL	A-4	0	100	100	100	70-80	20-30	NP-10
Glenbar	13-60	Clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	75-95	35-45	15-30
108-----	0-14	Loam-----	ML	A-4	0	100	100	85-100	55-95	25-35	NP-10
Holtville	14-22	Clay, silty clay	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	22-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	65-85	25-35	NP-10
109-----	0-17	Silty clay-----	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
Holtville	17-24	Clay, silty clay	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	24-35	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	65-85	25-35	NP-10
	35-60	Loamy very fine sand, loamy fine sand.	SM, ML	A-2, A-4	0	100	100	75-100	20-55	---	NP
110-----	0-17	Silty clay-----	CH, CL	A-7	0	100	100	95-100	85-95	40-65	20-35
Holtville	17-24	Clay, silty clay	CH, CL	A-7	0	100	100	95-100	85-95	40-65	20-35
	24-35	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	55-85	25-35	NP-10
	35-60	Loamy very fine sand, loamy fine sand.	SM, ML	A-2, A-4	0	100	100	75-100	20-55	---	NP

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
111*: Holtville-----	0-10	Silty clay loam	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	10-22	Clay, silty clay	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
	22-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	65-85	25-35	NP-10
Imperial-----	0-12	Silty clay loam	CL	A-7	0	100	100	100	85-95	40-50	10-20
	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
112-----	0-12	Silty clay-----	CH	A-7	0	100	100	100	85-95	50-70	25-45
Imperial	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
113-----	0-12	Silty clay-----	CH	A-7	0	100	100	100	85-95	50-70	25-45
Imperial	12-60	Silty clay, clay, silty clay loam.	CH	A-7	0	100	100	100	85-95	50-70	25-45
114-----	0-12	Silty clay-----	CH	A-7	0	100	100	100	85-95	50-70	25-45
Imperial	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
115*: Imperial-----	0-12	Silty clay loam	CL	A-7	0	100	100	100	85-95	40-50	10-20
	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
Glenbar-----	0-13	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
	13-60	Clay loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
116*: Imperial-----	0-13	Silty clay loam	CL	A-7	0	100	100	100	85-95	40-50	10-20
	13-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
Glenbar-----	0-13	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	70-95	35-45	15-25
	13-60	Clay loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-95	35-45	15-30
117, 118-----	0-12	Loam-----	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
Indio	12-72	Stratified loamy very fine sand to silt loam.	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
119*: Indio-----	0-12	Loam-----	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
	12-72	Stratified loamy very fine sand to silt loam.	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
Vint-----	0-10	Loamy fine sand	SM	A-2	0	95-100	95-100	70-80	25-35	---	NP
	10-60	Loamy sand, loamy fine sand.	SM	A-2	0	95-100	95-100	70-80	20-30	---	NP
120*: Laveen-----	0-12	Loam-----	ML, CL-ML	A-4	0	100	95-100	75-85	55-65	20-30	NP-10
	12-60	Loam, very fine sandy loam.	ML, CL-ML	A-4	0	95-100	85-95	70-80	55-65	15-25	NP-10

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

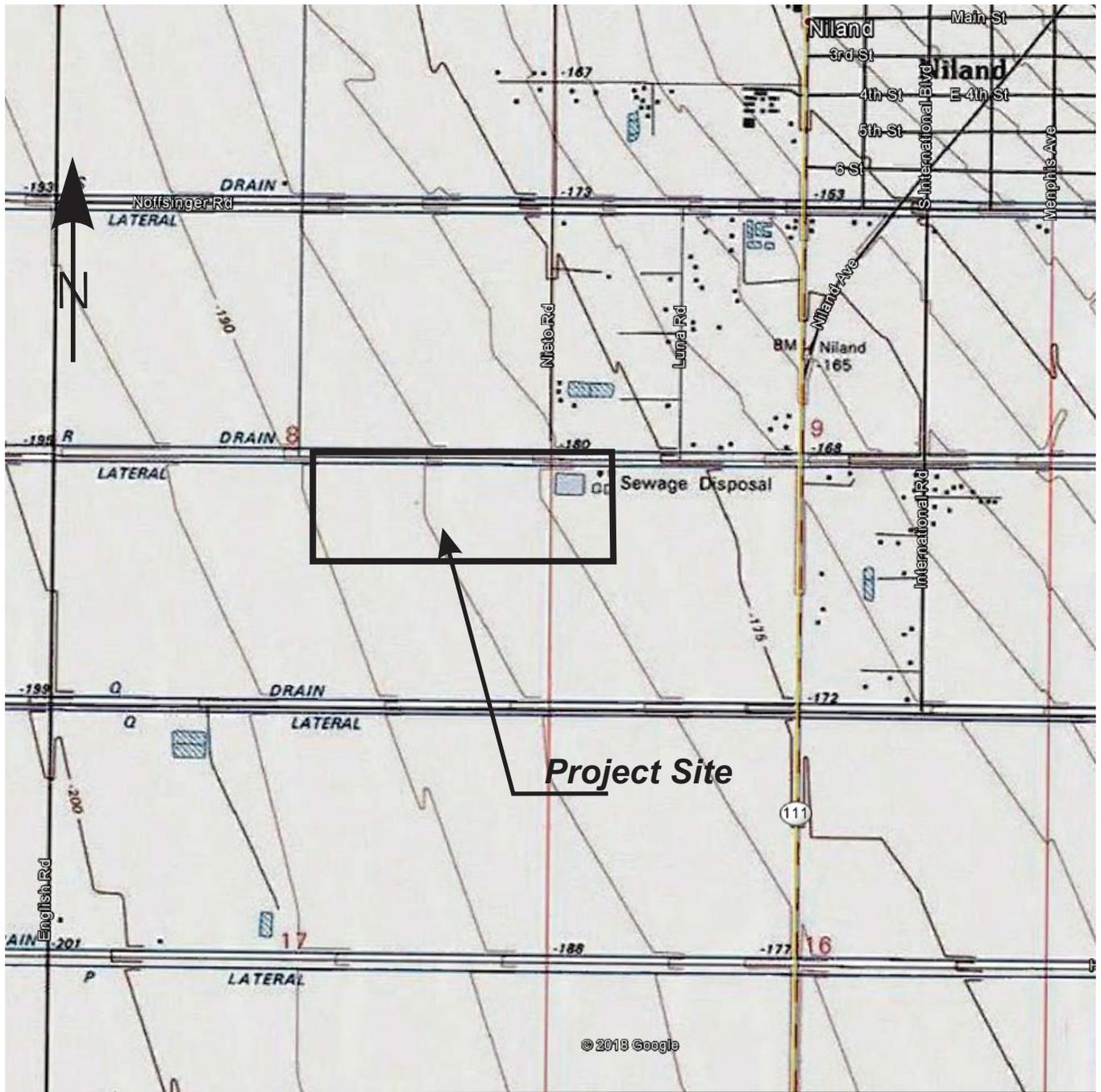
Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pet	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
121----- Meloland	0-12	Fine sand-----	SM, SP-SM	A-2, A-3	0	95-100	90-100	75-100	5-30	---	NP
	12-26	Stratified loamy fine sand to silt loam.	ML	A-4	0	100	100	90-100	50-65	25-35	NP-10
	26-71	Clay, silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-40
122----- Meloland	0-12	Very fine sandy loam.	ML	A-4	0	95-100	95-100	95-100	55-85	25-35	NP-10
	12-26	Stratified loamy fine sand to silt loam.	ML	A-4	0	100	100	90-100	50-70	25-35	NP-10
	26-71	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	85-95	40-65	20-40
123*: Meloland-----	0-12	Loam-----	ML	A-4	0	95-100	95-100	95-100	55-85	25-35	NP-10
	12-26	Stratified loamy fine sand to silt loam.	ML	A-4	0	100	100	90-100	50-70	25-35	NP-10
	26-38	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	85-95	40-65	20-40
	38-60	Stratified silt loam to loamy fine sand.	SM, ML	A-4	0	100	100	75-100	35-55	25-35	NP-10
Holtville-----	0-12	Loam-----	ML	A-4	0	100	100	85-100	55-95	25-35	NP-10
	12-24	Clay, silty clay	CH, CL	A-7	0	100	100	95-100	85-95	40-65	20-35
	24-36	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	55-85	25-35	NP-10
	36-60	Loamy very fine sand, loamy fine sand.	SM, ML	A-2, A-4	0	100	100	75-100	20-55	---	NP
124, 125----- Niland	0-23	Gravelly sand---	SM, SP-SM	A-2, A-3	0	90-100	70-95	50-65	5-25	---	NP
	23-60	Silty clay, clay, clay loam.	CL, CH	A-7	0	100	100	85-100	80-95	40-65	20-40
126----- Niland	0-23	Fine sand-----	SM, SP-SM	A-2, A-3	0	90-100	90-100	50-65	5-25	---	NP
	23-60	Silty clay-----	CL, CH	A-7	0	100	100	85-100	80-95	40-65	20-40
127----- Niland	0-23	Loamy fine sand	SM	A-2	0	90-100	90-100	50-65	15-30	---	NP
	23-60	Silty clay-----	CL, CH	A-7	0	100	100	85-100	80-95	40-65	20-40
128*: Niland-----	0-23	Gravelly sand---	SM, SP-SM	A-2, A-3	0	90-100	70-95	50-65	5-25	---	NP
	23-60	Silty clay, clay, clay loam.	CL, CH	A-7	0	100	100	85-100	80-100	40-65	20-40
Imperial-----	0-12	Silty clay-----	CH	A-7	0	100	100	100	85-95	50-70	25-45
	12-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	85-95	50-70	25-45
129*: Pits											
130, 131----- Rositas	0-27	Sand-----	SP-SM	A-3, A-1, A-2	0	100	80-100	40-70	5-15	---	NP
	27-60	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2, A-1	0	100	80-100	40-85	5-30	---	NP

See footnote at end of table.

TABLE 11.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
132, 133, 134, 135-Rositas	0-9	Fine sand-----	SM	A-3, A-2	0	100	80-100	50-80	10-25	---	NP
	9-60	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2, A-1	0	100	80-100	40-85	5-30	---	NP
136-----Rositas	0-4	Loamy fine sand	SM	A-1, A-2	0	100	80-100	40-85	10-35	---	NP
	4-60	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2, A-1	0	100	80-100	40-85	5-30	---	NP
137-----Rositas	0-12	Silt loam-----	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	12-60	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2, A-1	0	100	80-100	40-85	5-30	---	NP
138*: Rositas-----	0-4	Loamy fine sand	SM	A-1, A-2	0	100	80-100	40-85	10-35	---	NP
	4-60	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2, A-1	0	100	80-100	40-85	5-30	---	NP
Superstition-----	0-6	Loamy fine sand	SM	A-2	0	100	95-100	70-85	15-25	---	NP
	6-60	Loamy fine sand, fine sand, sand.	SM	A-2	0	100	95-100	70-85	15-25	---	NP
139-----Superstition	0-6	Loamy fine sand	SM	A-2	0	100	95-100	70-85	15-25	---	NP
	6-60	Loamy fine sand, fine sand, sand.	SM	A-2	0	100	95-100	70-85	15-25	---	NP
140*: Torriorthents											
Rock outcrop											
141*: Torriorthents											
Orthids											
142-----Vint	0-10	Loamy very fine sand.	SM, ML	A-4	0	100	100	85-95	40-65	15-25	NP-5
	10-60	Loamy fine sand	SM	A-2	0	95-100	95-100	70-80	20-30	---	NP
143-----Vint	0-12	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0	100	100	75-85	45-55	15-25	NP-5
	12-60	Loamy sand, loamy fine sand.	SM	A-2	0	95-100	95-100	70-80	20-30	---	NP
144*: Vint-----	0-10	Very fine sandy loam.	SM, ML	A-4	0	100	100	85-95	40-65	15-25	NP-5
	10-40	Loamy fine sand	SM	A-2	0	95-100	95-100	70-80	20-30	---	NP
	40-60	Silty clay-----	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35
Indio-----	0-12	Very fine sandy loam.	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
	12-40	Stratified loamy very fine sand to silt loam.	ML	A-4	0	95-100	95-100	85-100	75-90	20-30	NP-5
	40-72	Silty clay-----	CL, CH	A-7	0	100	100	95-100	85-95	40-65	20-35

\* See description of the map unit for composition and behavior characteristics of the map unit.



**LANDMARK**

Geo-Engineers and Geologists

Project No.: LE19176

Topographic Map

Plate  
A-4

# APPENDIX B

DEPTH	FIELD				LOG OF TEST PIT TP-1 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)
5					FAT CLAY (CH): Light brown, dry at surface to moist with depth, very stiff, high plasticity.	83.7 96.7 97.5	6.9 10.5 15.0	LL=51, PI=34 Max. 114.5 pcf Opt. MC 15.2%
					SANDY CLAYEY SILT (ML): Brown, damp, med. dense/stiff, med. plasticity.			
10					FAT CLAY (CH): Dark brown, very moist to saturated with depth, very stiff, high plasticity.			
					Groundwater table encountered at 9 ft below surface.			
15								
20								
25								
30								

DATE EXCAVATED: 11/7/19 TOTAL DEPTH: 10 Feet DEPTH TO WATER: 9 Feet  
 LOGGED BY: J. Avalos TYPE OF BIT: NA. DIAMETER: NA.  
 SURFACE ELEVATION: Approximately -187' HAMMER WT.: NA. DROP: NA.

PROJECT No. LE19176



PLATE B-1

DEPTH	FIELD				LOG OF TEST PIT TP-2 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)	OTHER TESTS
5					SILTY CLAY/CLAY (CL-CH): Light brown, dry at surface to moist with depth, very stiff, medium to high plasticity.	95.6	5.2	Passing #200 = 18.2%
					SILTY SAND (SM): Light brown, dry, med. dense, very fine grained sand.	92.1	4.3	
					FAT CLAY (CH): Dark brown, very moist to saturated with depth, very stiff, high plasticity.	85.0	3.6	
10								
15					Groundwater table encountered at 9.5 ft below surface.			
20								
25								
30								

DATE EXCAVATED: 11/7/19 TOTAL DEPTH: 10 Feet DEPTH TO WATER: 9.5 Feet  
 LOGGED BY: J. Avalos TYPE OF BIT: NA. DIAMETER: NA.  
 SURFACE ELEVATION: Approximately -186' HAMMER WT.: NA. DROP: NA.

PROJECT No. LE19176



PLATE B-2

DEPTH	FIELD				LOG OF TEST PIT TP-3 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)
5					FAT CLAY (CH): Light brown, dry, hard, high plasticity.	96.0	6.8	LL=55, PI=36
					Dark brown, very moist, very stiff to hard	96.4	13.8	
						97.7	17.9	
10					Groundwater was not encountered at the time of exploration			
15								
20								
25								
30								

DATE EXCAVATED: 11/7/19 TOTAL DEPTH: 10 Feet DEPTH TO WATER: NA.  
 LOGGED BY: J. Avalos TYPE OF BIT: NA. DIAMETER: NA.  
 SURFACE ELEVATION: Approximately -184' HAMMER WT.: NA. DROP: NA.

PROJECT No. LE19176



PLATE B-3

DEPTH	FIELD				LOG OF TEST PIT TP-4 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)	OTHER TESTS
5					SILTY CLAY/CLAY (CL-CH): Light brown, dry at surface to moist with depth, very stiff, medium to high plasticity.	90.9	8.8	
						92.6	14.5	
					SILTY SAND (SM): Light brown, dry, med. dense, very fine grained sand.	95.4	6.7	
10					FAT CLAY (CH): Dark brown, very moist to saturated with depth, very stiff, high plasticity.			
15					Groundwater was not encountered at the time of exploration			
20								
25								
30								

DATE EXCAVATED: 11/7/19 TOTAL DEPTH: 10 Feet DEPTH TO WATER: 9.5 Feet  
 LOGGED BY: J. Avalos TYPE OF BIT: NA. DIAMETER: NA.  
 SURFACE ELEVATION: Approximately -182' HAMMER WT.: NA. DROP: NA.

PROJECT No. LE19176



PLATE B-4

DEPTH	FIELD				LOG OF TEST PIT TP-5 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)
					SILTY CLAY (CL): Light brown, dry at surface to moist with depth, very stiff, medium plasticity.	93.5	8.4	LL=48, PI=32
					SANDY SILT (ML): Light brown, moist to very moist, medium dense, with very fine grained sand.	96.5	10.8	
5					FAT CLAY (CH): Dark brown, very moist, very stiff, high plasticity.	94.4	18.7	
					SILTY SAND (SM): Brown, saturated, medium dense, fine grained sand.			Passing #200 = 42.3%
10					Groundwater table encountered at 7.5 ft below surface.			
15								
20								
25								
30								

DATE EXCAVATED: 11/7/19 TOTAL DEPTH: 10 Feet DEPTH TO WATER: 7.5 Feet  
 LOGGED BY: J. Avalos TYPE OF BIT: NA. DIAMETER: NA.  
 SURFACE ELEVATION: Approximately -180' HAMMER WT.: NA. DROP: NA.

DEPTH	FIELD				LOG OF TEST PIT TP-6 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)
					SILTY CLAY (CL): Light brown, dry at surface to moist with depth, very stiff, medium plasticity.	97.8	10.3	
					FAT CLAY (CH): Dark brown, very moist, very stiff, high plasticity.	98.5	16.8	
5						91.3	18.2	
					SILTY SAND (SM): Brown, saturated, medium dense, fine to medium coarse grained sand.			Passing #200 = 18.0%
10								
					Groundwater table encountered at 7.0 ft below surface.			
15								
20								
25								
30								

DATE EXCAVATED: 11/7/19 TOTAL DEPTH: 10 Feet DEPTH TO WATER: 7.0 Feet  
 LOGGED BY: J. Avalos TYPE OF BIT: NA. DIAMETER: NA.  
 SURFACE ELEVATION: Approximately -180' HAMMER WT.: NA. DROP: NA.

PROJECT No. LE19176



PLATE B-6

DEPTH	FIELD				LOG OF BORING No. B-9 SHEET 1 OF 1	LABORATORY		
	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)		DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)
5					SILTY CLAY (CL): Brown, moist, stiff	125.6	5.2	LL=44% PI=30%
			25	2.5	CLAY (CH): Brown, very moist, stiff, with 2" sand layer at tip.			
10			18	1.0	SILTY SAND (SM): Light brown, very wet, medium grain sands			
15			5					
20			23		SANDY SILT (ML-SM): Olive gray with yellows, very wet, with few clays.			
25			14		SANDY CLAYEY SILT (SM-ML): Olive brown, very wet.			
30			8	2.0	SILTY CLAY (CL): Olive brown with grays, sat, with few vfg sands.		21.2	Passing #200 = 18.2%
35								
40								
45								
50								
55								
60					Total Depth = 30.0' 30' Piezometer Installed Backfilled with excavated soil			

DATE DRILLED: 11/8/19      TOTAL DEPTH: 30.0 Feet      DEPTH TO WATER: 11.8 ft.  
 LOGGED BY: P. LaBrucherie      TYPE OF BIT: Hollow Stem Auger      DIAMETER: 8 in.  
 SURFACE ELEVATION: Approximately -176'      HAMMER WT.: 140 lbs.      DROP: 30 in.

# APPENDIX C

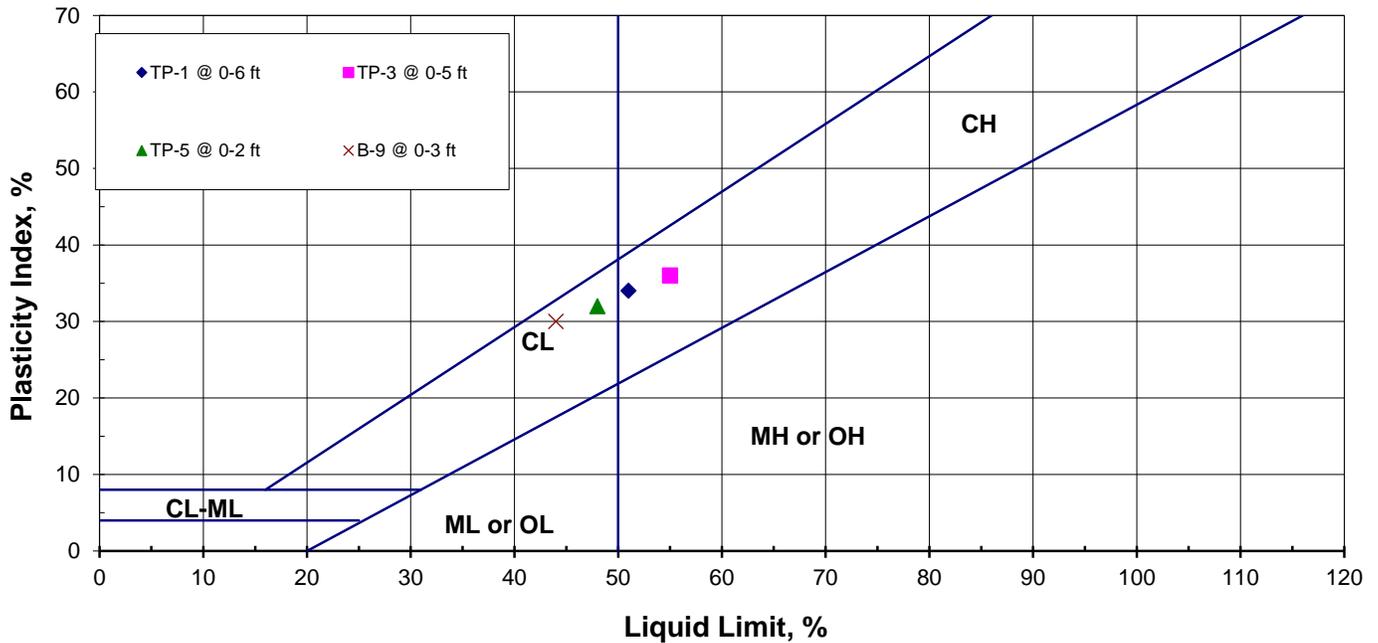
# LANDMARK CONSULTANTS, INC.

**CLIENT:** The Holt Group  
**PROJECT:** Niland WWTP - Niland, CA  
**JOB No.:** LE19176  
**DATE:** 11/14/19

## ATTERBERG LIMITS (ASTM D4318)

Sample Location	Sample Depth (ft)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	USCS Classification
TP-1	0-6	51	17	34	CH
TP-3	0-5	55	19	36	CH
TP-5	0-2	48	16	32	CL
B-9	0-3	44	14	30	CL

### PLASTICITY CHART



Project No.: LE19176

**Atterberg Limits  
Test Results**

**Plate  
C-1**

# LANDMARK CONSULTANTS, INC.

**CLIENT:** The Holt Group  
**PROJECT:** Niland WWTP  
**JOB No.:** LE19176  
**DATE:** 11/13/19

## CHEMICAL ANALYSIS

<b>Boring:</b>	B-9	<b>Caltrans Method</b>
<b>Sample Depth, ft:</b>	0-3	
<b>pH:</b>	7.5	643
<b>Electrical Conductivity (mmhos):</b>	2.44	424
<b>Resistivity (ohm-cm):</b>	410	643
<b>Chloride (Cl), ppm:</b>	1,360	422
<b>Sulfate (SO<sub>4</sub>), ppm:</b>	2,400	417

### General Guidelines for Soil Corrosivity

Material Affected	Chemical Agent	Range of Values	Degree of Corrosivity
Concrete	Soluble Sulfates (ppm)	0 - 1,000	Low
		1,000 - 2,000	Moderate
		2,000 - 20,000	Severe
		> 20,000	Very Severe
Normal Grade Steel	Soluble Chlorides (ppm)	0 - 200	Low
		200 - 700	Moderate
		700 - 1,500	Severe
		> 1,500	Very Severe
Normal Grade Steel	Resistivity (ohm-cm)	1 - 1,000	Very Severe
		1,000 - 2,000	Severe
		2,000 - 10,000	Moderate
		> 10,000	Low

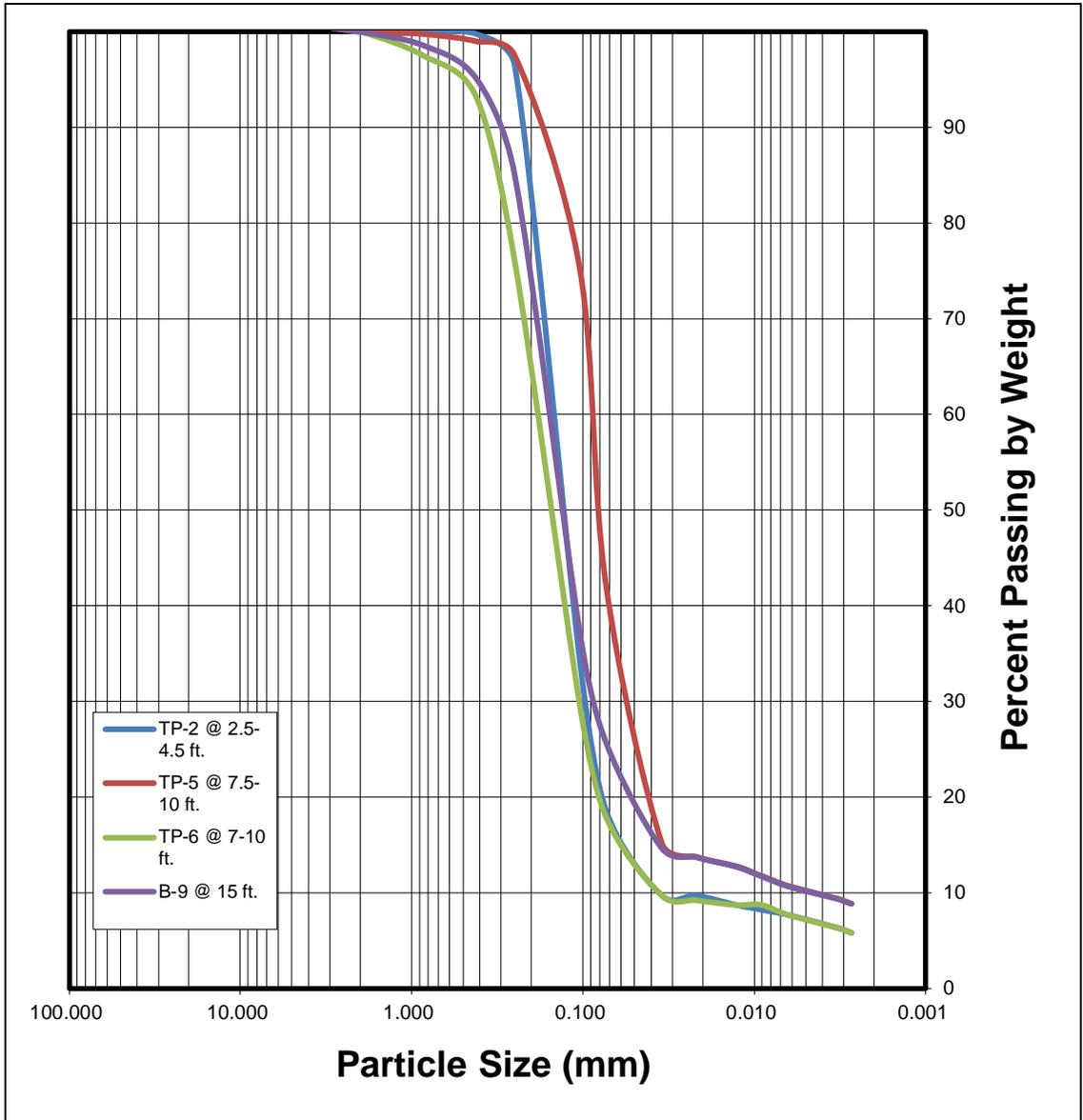
**LANDMARK**  
Geo-Engineers and Geologists

Project No.: LE19176

**Selected Chemical  
Test Results**

**Plate  
C-2**

SIEVE ANALYSIS					HYDROMETER ANALYSIS
Gravel		Sand			Silt and Clay Fraction
Coarse	Fine	Coarse	Medium	Fine	



**LANDMARK**  
Geo-Engineers and Geologists

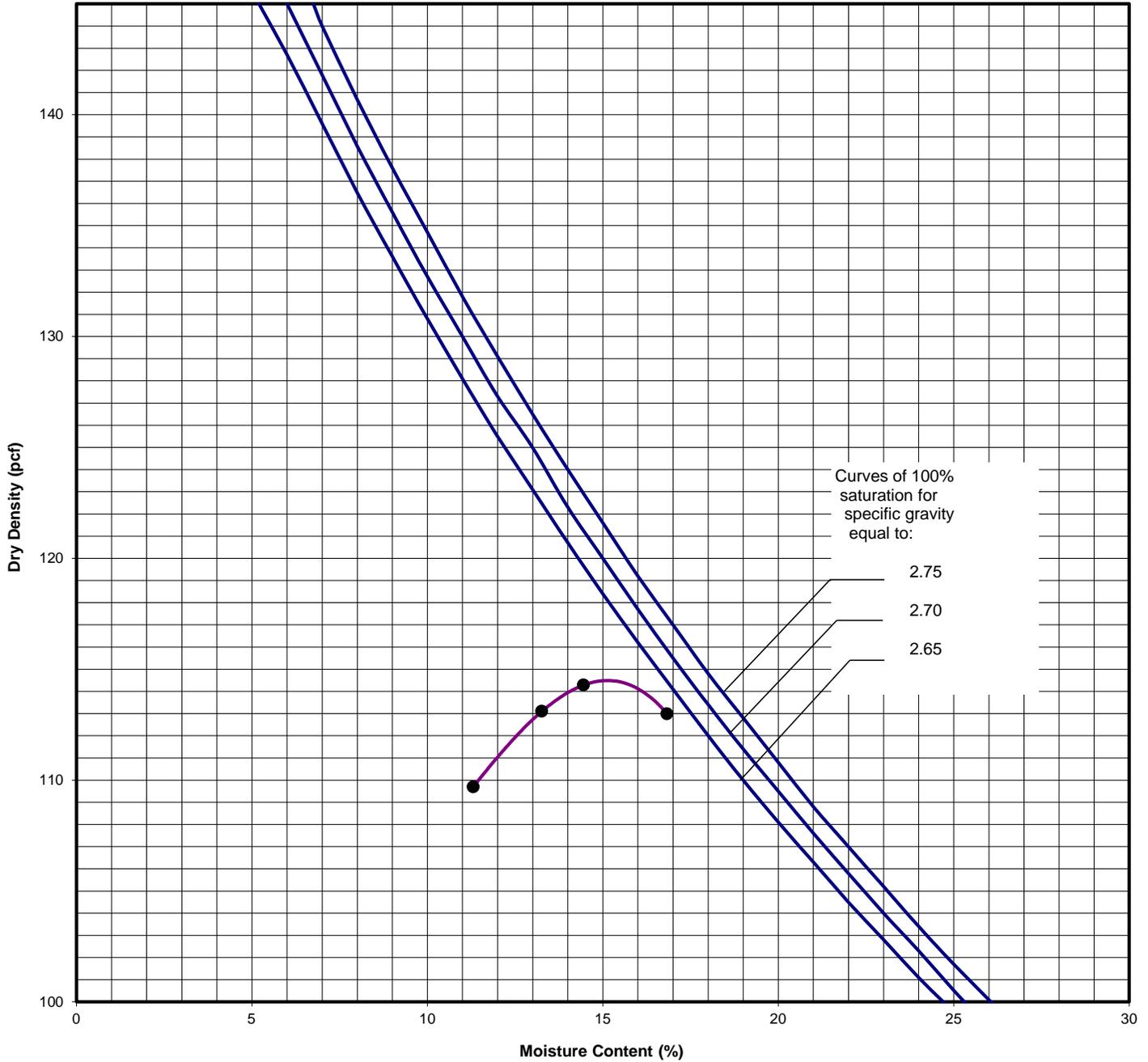
Project No.: LE19176

Grain Size Analysis

Plate  
C-3

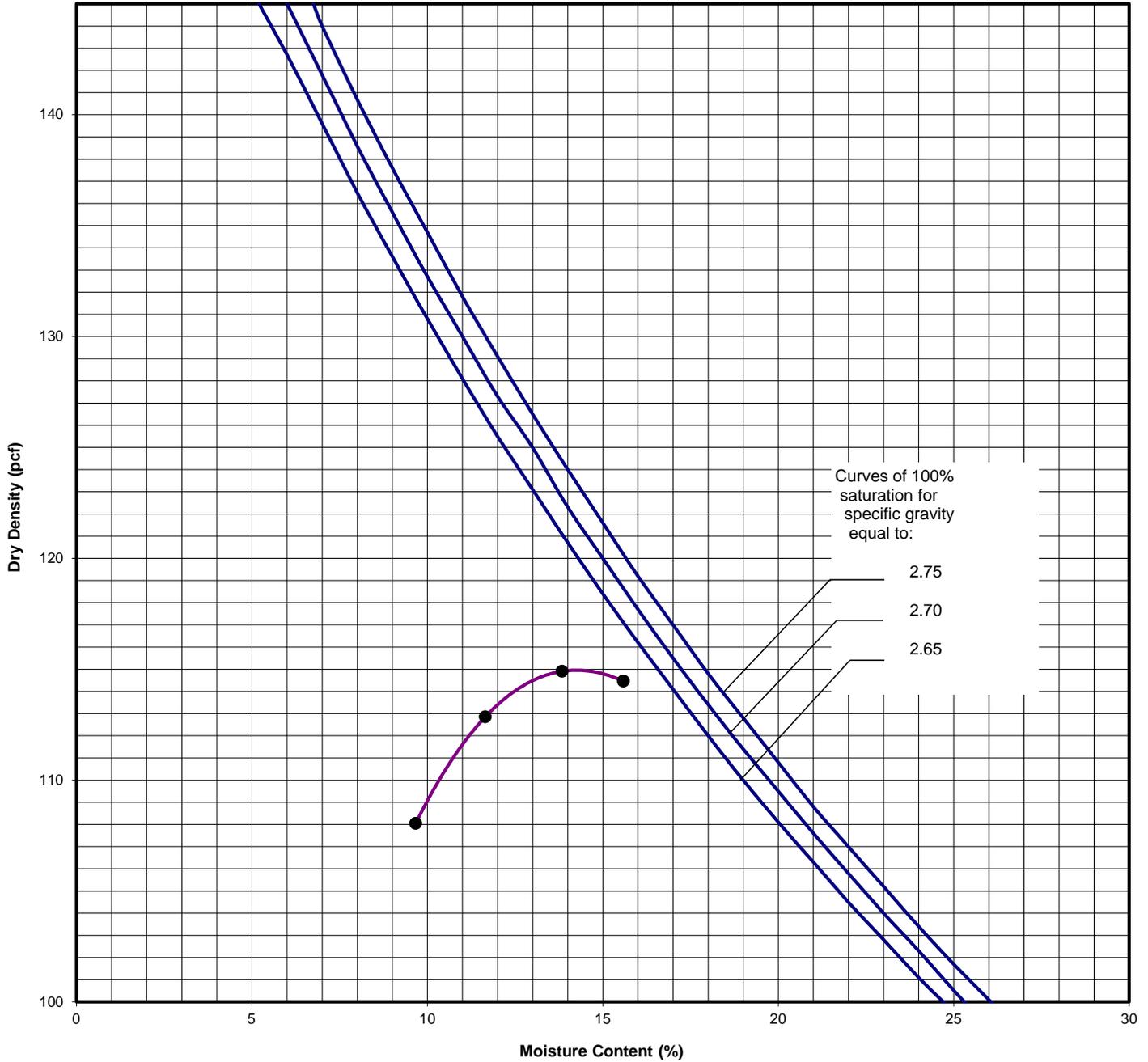
Client: The Holt Group  
Project: Niland Wwtp Evaporation Ponds  
Project No.: LE19176  
Date: 11/26/2019  
Lab. No.: EC19-507

Soil Description: Fat Clay (CH)  
Sample Location: Tp-1@0-10'  
Test Method: ASTM D-1557-A  
Maximum Dry Density (pcf): 114.5  
Optimum Moisture Content (%): 15.2



Client: The Holt Group  
Project: Niland Wwtp Evaporation Ponds  
Project No.: LE19176  
Date: 11/26/2019  
Lab. No.: EC19-511

Soil Description: Fat Clay (CH)  
Sample Location: TP-5@0-2'  
Test Method: ASTM D-1557-A  
Maximum Dry Density (pcf): 115.0  
Optimum Moisture Content (%): 14.3



Project No.: LE19176

### Moisture Density Relationship

Plate  
C-5

**Groundwater Monitoring Wells  
Niland WWTP  
Analytical Test Results**

Well Number		P-6	P-7	P-2	P-3
Sample ID		#1	#2	#3	#4
Analyte	Units				
TPH (Gas)	µg/L	nd	nd	nd	nd
TPH (Diesel)	mg/L	nd	nd	nd	nd
Oil & Grease	mg/L	nd	nd	nd	nd
TDS	mg/L	<b>9,320</b>	<b>22,200</b>	<b>6,210</b>	<b>6,510</b>
pH	SU	<b>6.56</b>	<b>6.49</b>	<b>6.76</b>	<b>6.57</b>
Ammonia	mg/L	0.297	0.114	0.207	0.278
Chloride	mg/L	770	7,600	1,020	1,650
Fluoride	mg/L	16.8	27.9	3.2	4.03
Nitrate	mg/L	nd	nd	6.04	nd
Nitrite	mg/L	nd	nd	nd	nd
Sulfate	mg/L	2,880	4,720	2,090	1,800
Calcium	mg/L	448	772	201	468
Sodium	mg/L	2,420	6,020	1,320	1,340
Potassium	mg/L	45	94.5	25.1	33.6
Phosphorous P	mg/L	0.217	1.248	nd	1.768
Phosphorous PO4	mg/L	0.665	3.83	nd	5.42
BOD	mg/L	<b>nd</b>	<b>nd</b>	<b>nd</b>	<b>nd</b>
Fecal Coliform	MPN/100ml	<b>&lt;1.8</b>	<b>&gt;1600</b>	3.7	<1.8

**Appendix C – Conditional Use Permit (CEQA Document)**

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When Recorded Return To:

Imperial County Planning & Dev. Services Depart.  
801 Main Street  
El Centro, California 92243

Recorded in Official Records,  
IMPERIAL COUNTY  
Doc#: 2019015433  
08/19/2019 10:17 AM

**AGREEMENT FOR CONDITIONAL USE PERMIT #19-0006  
EXPANSION/REHABILITATION OF NILAND COUNTY  
SANITATION DISTRICT FACILITY  
(Niland County Sanitation District)  
(Approved at Planning Commission on July 24, 2019)**

This Agreement is made and entered into on this 14<sup>th</sup> day of August, 2019 by and between **Niland County Sanitation District**, hereinafter referred to as Permittee, and the **COUNTY OF IMPERIAL**, a political subdivision of the State of California, (hereinafter referred to as "COUNTY").

**RECITALS**

**WHEREAS**, Permittee is the owner, and/or operator and/or successor-in-interest in certain land in Imperial County known as Assessor's Parcel Number 021-240-001 & 006-000 and 021-200-005-000, approximately 73.36 acres, and;

**WHEREAS**, Permittee has applied to the County for the expansion/rehabilitation of the existing Niland County Sanitation District facility, and;

**WHEREAS**, the County, after a noticed public hearing, agreed to issue Conditional Use Permit #19-0006 to Permittee, and/or his or her successor-in-interest subject to the following conditions:

1 **NOW THEREFORE**, The County issued the CUP (#19-0006) subject to the following  
2 conditions:

3 **GENERAL CONDITIONS:**  
4

5 *The "GENERAL CONDITIONS" are shown by the letter "G". These conditions are conditions that*  
6 *are either routinely and commonly included in all Conditional Use Permits as "standardized"*  
7 *conditions and/or are conditions that the Imperial County Planning Commission has established as*  
8 *a requirement on all CUP's for consistent application and enforcement. The Permittee is advised*  
9 *that the General Conditions are as applicable as the SITE SPECIFIC conditions!*

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10 **G-1 GENERAL LAWS:**

11 The Permittee shall comply with any and all local, state, and/or federal laws, rules,  
12 regulations, ordinances, and/or standards as they may pertain to this project  
13 whether specified herein or not.

14 **G-2 PERMIT/LICENSE:**

15 Permittee shall obtain any and all permits, licenses, and/or approvals, for the  
16 construction and/or operation of this project. This shall include, but shall not be  
17 limited to, County Division of Environmental Health Services (EHS), Planning &  
18 Development Services Department, Fire/Office of Emergency Services (OES),  
19 RWQCB, and Public Works Department. Permittee shall likewise comply with all  
20 such permit requirements for the life of the project. Additionally, Permittee shall  
21 submit a copy of such additional permit and/or licenses to the Planning &  
22 Development Services Department within 30-days of receipt, including  
23 amendments or alternatives thereto, if requested.

24 **G-3 RECORDATION:**

25 This permit shall not be effective until it is recorded at the Imperial County  
26 Recorders Office, and payment of the recordation fee shall be the responsibility of  
27 the Permittee. If the Permittee fails to pay the recordation fee within six (6) months  
28 from the date of approval, and/or this permit is not recorded within 180 days from  
the date of approval, this permit shall be deemed null and void, without notice  
having to be provided to Permittee. Permittee may request a written extension by  
filing such a request with the Planning Director at least 30 days prior to the original  
180-day expiration. The Director may approve an extension for a period not to  
exceed 180 days. An extension may not be granted if the request for an extension  
is filed after the expiration date.

**G-4 CONDITION PRIORITY:**

This project shall be constructed and operated as described in the Conditional Use  
Permit application, the project description, and as specified in these conditions.

1 Where a conflict occurs, the Conditional Use Permit conditions shall govern and  
2 take precedence.

3 **G-5 INDEMNIFICATION:**

4 As a condition of this Permit, Permittee agrees to defend, indemnify, hold  
5 harmless, and release the County, its agents, officers, attorneys, and employees  
6 from any claim, action, or proceeding brought against any of them, the purpose of  
7 which is to attack, set aside, void, or annul the Permit or adoption of the  
8 environmental document which accompanies it. This indemnification obligation  
9 shall include, but not be limited to, damages, costs, expenses, attorneys fees, or  
expert witness fees that may be asserted by any person or entity, including the  
Permittee, arising out of or in connection with the approval of this Permit, whether  
or not there is concurrent, passive or active negligence on the part of the County,  
its agents, officers, attorneys, or employees.

10 **G-6 RIGHT OF ENTRY:**

11 The County reserves the right to enter the premises at any time, announced or  
12 unannounced, in order to make the appropriate inspection(s) and to determine if  
the condition(s) of this permit are complied with. Access to authorized  
enforcement agency personnel shall not be denied.

13 **G-7 SEVERABILITY:**

14 Should any condition(s) of this permit be determined by a Court or other agency  
15 with proper jurisdiction to be invalid for any reason, such determination shall not  
invalidate the remaining provision(s) of this permit.

16 **G-8 PROVISION TO RUN WITH LAND:**

17 The provisions of this project are to run with the land/project and shall bind the  
18 current and future owner(s) successor(s)-in-interest; assignee(s) and/or  
19 transferee(s) of said project. Permittee shall not without prior notification to the  
20 Planning and Development Services Department assign, sell, or transfer, or grant  
21 control of project or any right or privilege therein. The Permittee shall provide a  
minimum of 60 days written notice prior to such proposed transfer becoming  
effective. The permitted use identified herein is limited for use upon this parcel  
described herein and may not be transferred to another parcel.

22 **G-9 COMPLIANCE/REVOCAION:**

23 Upon the determination by the Planning and Development Services Department  
24 that the project is or may not be in full compliance with any one or all of the  
25 conditions of this Conditional Use Permit, or upon the finding that the project is  
26 creating a nuisance as defined by law, the issue shall be brought immediately to  
27 the appropriate enforcement agency or to the Planning Commission for hearing to  
28 consider appropriate response including but not limited to the revocation of the  
CUP or to consider possible amendments to the CUP. The hearing shall be held  
upon due notice having been provided to the Permittee and to the public in  
accordance with established ordinance/policy.

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**G-10 TIME LIMIT:**

Unless otherwise specified within the project specific conditions this project shall be limited to a maximum of (3) three years from the recordation date of the CUP. The CUP may be extended for successive three (3) year(s) by the Planning Director upon a finding by the Planning & Development Services Department that the project is in full and complete compliance with all conditions of the CUP and any applicable land use regulation(s) of the County of Imperial. Unless specified otherwise herein no conditional use permit shall be extended for more than four (4) consecutive periods. If an extension is necessary or requested beyond fifteen (15) years, Permittee shall file a written request with the Planning Director for a hearing before the Planning Commission. Such request shall include the appropriate extension fee. An extension shall not be granted if the project is in violation of any one or all of the conditions or if there is a history of non-compliance with the project conditions.

**G-11 COSTS:**

Permittee shall pay any and all amounts determined by the County to defray any and all cost(s) for the review of reports, field investigations, monitoring, and other activities directly related to the enforcement/monitoring for compliance of this Conditional Use Permit, County Ordinance or any other applicable law. Any billing against this project, now or in the future, by the Planning and Development Services Department or any County Department for costs incurred as a result of this Permit, shall be billed through the Planning and Development Services Department.

**G-12 WATER AND SEWER:**

Permittee shall provide water and sewer to Federal, State and County standards. Water and sewer systems shall be approved by the Environmental Health Services and the Planning and Development Services Department.

**G-13 MINOR AMENDMENTS:**

The Planning Director may approve minor modifications to the Permit to accommodate minor changes or modification to the design, construction, and/or operation of the Project provided said changes are necessary for the project to meet other laws, regulations, codes, or conditions of the CUP and provided further, that such changes will not result in any additional environmental impacts.

**G-14 DEFINITIONS:**

In the event of a dispute, the meaning(s) or intent of word(s) phrase(s) and/or conditions or sections herein shall be determined by the Planning Commission of Imperial County. Their determination shall be final unless an appeal is made to the Board of Supervisors 10 days from the date of their decision.

1 **G-15 SPECIFICITY:**

2 The issuance of this permit does not authorize the Permittee to construct or  
3 operate this project in violation of any state, federal, local law nor beyond the  
4 specified boundaries of the project as shown the application/project  
5 description/permit, nor shall this permit allow any accessory or ancillary use not  
6 specified herein. This permit does not provide any prescriptive right or use to the  
7 Permittee for future addition and/or modification to this project.

8 **G-16 HEALTH HAZARD:**

9 If the County Health Officer determines that a significant health hazard exists to  
10 the public, the County Health Officer may require appropriate measures and the  
11 Permittee shall implement such measures to mitigate the health hazard. If the  
12 hazard to the public is determined to be imminent, such measures may be imposed  
13 immediately and may include temporary suspension of the subject operations.  
14 However, within 45 days of any such suspension of operations, the measures  
15 imposed by the County Health Officer must be submitted to the Planning  
16 Commission for review, and nothing shall prohibit Permittee from requesting a  
17 special Commission meeting and Permittee bears all costs.

18 **G-17 CHANGE OF OWNER/OPERATOR:**

19 In the event the ownership of the site or the operation of the site transfers from the  
20 current Permittee to a new successor Permittee, the successor Permittee shall be  
21 bound by all terms and conditions of this Permit as if said successor was the  
22 original Permittee. Current Permittee shall inform the County Planning and  
23 Development Services Department in writing at least 60 days prior to any such  
24 transfer. Failure of a notice of change of ownership or change of operator shall be  
25 grounds for the immediate revocation of the CUP. In the event of a change, the  
26 new Owner/Operator shall file with the Department, via certified mail, a letter  
27 stating that they are fully aware of all conditions and acknowledge that they will  
28 adhere to all.

**G-18 COMMENCEMENT OF WORK:**

No commencement of work until all conditions pursuant to the CUP has been  
satisfied. Evidence that all conditions pursuant to the CUP have been satisfied  
shall be provided to the Planning Director prior to commencement.

**G-19 FIRE PROTECTION:**

Permittee shall provide an adequate fire protection system and accessibility to the  
site in accordance with the National Fire Protection Act (NFPA), Uniform Fire Code  
and County Fire Department standards, as applicable.

**G-20 INSURANCE:**

The Permittee shall take out and maintain Workers Compensation Insurance as  
required by the State of California. The Permittee shall also secure liability  
insurance and such other insurance as required by state and/or federal law. A  
Certificate of Insurance is to be provided to the Planning and Development  
Services Department by the insurance carrier, and said insurance and certificate

1 shall be kept current for the life of the project. Certificates of Insurance shall be  
2 sent directly to the Planning and Development Services Department by the  
3 insurance carrier and shall name the Department as a recipient of both renewal  
4 and cancellation notices.

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## 5 **SPECIFIC PROJECT CONDITIONS:**

6 The "SPECIFIC CONDITIONS" are shown by the letter "S". These conditions are conditions "site specific"  
7 to this Conditional Use Permit. The Permittee is advised that the Specific Conditions are as applicable as  
8 the other types of conditions within this Conditional Use Permit that are incorporated herein by reference  
9 and whether included hereinafter or not!

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### 10 **S-1 PROJECT DESCRIPTION:**

11 The permit authorizes the Permittee to expand and rehabilitate its existing  
12 wastewater treatment facility to address exceedances discharge contamination  
13 from E. coli (bacteria), copper and thallium. The rehabilitation consists of  
14 construction of a three evaporation ponds on a parcel of land on the south side  
15 of Alcott Road west of Highway 111 adjacent to the existing wastewater  
16 treatment plant (WWTP). The evaporation ponds would add an additional step  
17 to the treatment process to eliminate wastewater discharge into the natural  
18 environment and eliminate the need for a National Pollutant Discharge  
19 Elimination System (NPDES) Permit. Effluent from the existing WWTP will be  
20 pumped via a new pump station and deposited into the three large open basins  
21 allowing water to evaporate through solar radiation and wind. Each of the three,  
22 10-acre water surface evaporation ponds to accommodate and average annual  
23 flow of 150,000 gallons per day and with a peak monthly flow of 200,000 gallons  
24 per day with sufficient freeboard to store water during the cool wet winter months  
25 for evaporation during the summer. Approximately, 50 mg/L suspended solids  
26 per day will accumulate in the evaporation basins and as water naturally  
27 evaporates the solids will compact as they settle to the bottom of the basin. It  
28 is projected that approximately five inches of solids per year will accumulate  
when the basins are operating at full capacity assuming that the solids will  
compact to a concentration of about 5,000 mg/L. The accumulated solids will  
be cleaned out and disposed at the land fill once every five years.

### 22 **S-2 ACCESS TO SITE:**

23 Access to site shall be as described in the application and/or approved by or  
24 through an encroachment permit.

### 25 **S-3 HOURS OF OPERATION:**

26 Permittee shall be allowed to operate the site, 24 hours per day, seven days a  
27 week.  
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**S-4 PERMITTING:**

Permittee shall obtain all required permits from the Department of Public Works, APCD, Imperial Irrigation District and other applicable federal and state agency(s).

**S-5 ANCILLARY USES & ADDITIONAL LAND USE PERMITS:**

This permit authorizes the Permittee to operate the site as described on the project's application with no additional ancillary facilities or uses. This permit shall be considered the primary permit for this site, and if additional Conditional Use Permit(s) are secured for this site, they shall be subservient to this permit at all times.

**S-6 ENFORCEMENT ACTION:**

County officials responsible for monitoring and/or enforcing the provision of this permit shall issue a notice requiring abatement of a violation of its terms within a reasonable time as set by ordinance or County policy. As an example, responsible County officials may issue a citation and/or cease-and-desist order for repeated violation until such violations are abated. Under specific violations County may order the facility to cease operation until it can or will be operated in full compliance.

**S-7 LIGHT AND GLARE:**

Permittee is allowed to have security as well as operational lighting. Said lighting shall be shielded and direct to on-site areas to minimize off-site interference from unacceptable levels of light and glare.

**S-8 CONFLICTING PERMIT CONDITIONS:**

In the event that there is a conflict between the conditions of this permit and any other permit, the most stringent conditions shall govern.

**S-9 MINOR ADMINISTRATIVE MODIFICATION:**

The Planning Director shall have the authority to make interpretations, issue administrative decision and provide directions that while not modifying the intent of any condition will allow for problem resolution at an administrative level. Both Director and/or Permittee have the right to defer such issues to the Planning Commission. However in no event shall any decision regarding this permit be brought to the Board of Supervisors without first having been brought to the Planning Commission.

**S-10 PUBLIC WORKS: 1**

1. The applicant shall furnish a Drainage and Grading Plan/Study, with associated fees, to provide for property grading and drainage control, which shall also include prevention of sedimentation and damage to off-site properties. The Study/Plan shall be submitted to the Department of Public Works, with associated fees, for review and approval. The applicant shall

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implement the approved plan. Employment of the appropriate Best Management Practices (BMP's) shall be included.

- 3. Prior to the issuance of grading and building permits, contractor shall complete the installation of temporary stabilized construction entrance, if required.
- 4. An encroachment permit shall be secured from the Department of Public Works for any and all new, altered or unauthorized existing driveway(s) to access the properties through surrounding roads.
- 5. All on-site traffic area shall be hard surfaced to provide all weather access for emergency service protection vehicles. The surfacing shall meet the Department of Public Works and Fire/OES Standards as well as those of the Air Pollution Control District and Imperial County Planning & Development Services.
- 6. Corner record is required to be filed with the County Surveyor prior to construction for monuments:  
8771. (b) When monuments exist that control the location of subdivisions, tracts, boundaries, roads, streets, or highways or provide horizontal or vertical survey control, the monuments shall be located and referenced by or under the direction of a licensed land surveyor or licensed civil engineer legally authorized to practice land surveying, prior to the time when any streets, highways, other rights-of-way, or easements are improved, constructed, reconstructed, maintained, resurfaced, or relocated and a corner record or record of survey of the references shall be filed with the County Surveyor.
- 7. A second corner record is required to be filed with the County Surveyor for monuments:  
877. (c) A permanent monument shall be reset in the surface of the new construction or a witness monument or monuments set to perpetuate the location if any monument could be destroyed, damaged, covered, disturbed or otherwise obliterated, and a corner record or record of survey shall be filed with the County Surveyor prior to the recording of a certificate of completion for the project. Sufficient controlling monuments shall be retained or replaced in their original positions to enable property, right-of-way and easement lines, property corners, and subdivision and tract boundaries to be reestablished without devious surveys necessarily originating on monument differing from those that currently control the area.

The following items are for informational purposes only. The applicant is responsible to determine if the enclosed items affect the subject project.

- A. All solid and hazardous waste shall be disposed of in an approved solid waste disposal site in accordance with existing County, State and Federal regulations.
- B. At time of development, if required, by section 8762(b) of the Professional Land Surveyors Act, a record of survey shall be filed with the County Recorder of Imperial County.

1 D. The project will require a National Pollutant Discharge Elimination System  
2 (NPDES) permit and Notice of Intent (NOI) from the Regional Water Quality  
3 Control Board (RWQCB) prior to County approval of onsite grading plan.

4 **S-11 IMPERIAL IRRIGATION DISTRICT: 2**

5 Please provide documentation from Imperial Irrigation District that you have  
6 complied with their requirements as stated in their comment letter dated  
7 June 24, 2019.

8 **S-12 AIR POLLUTION CONTROL DISTRICT: 3**

9 Permittee shall provide documentation from Air Pollution Control District  
10 that you have complied with their requirements as stated in their comment  
11 letter dated June 26, 2019.

12 **S-13 CA DEPT OF WATER RESOURCES: 4**

13 Permittee shall provide documentation that they are in compliance with the  
14 California Department of Water Resources requirements stated in their  
15 June 29, 2019 letter.

16 **S-14 CALTRANS: 5**

17 Permittee shall provide documentation that they are in compliance with  
18 CALTRANS as requested in their letter dated July 17, 2019

19 **S-15 MITIGATION MEASURES**

20 **Air Quality**

21 **MM AIR 1-1: Fleet Modernization for On-road Haul Trucks:** Trucks hauling  
22 materials such as debris or fill shall sprinkle to mitigate blowing dust prior to  
23 leaving the site. Idling shall be restricted to a maximum of 5 minutes when  
24 not in use. All on-road heavy-duty diesel trucks with a gross vehicle weight  
25 rating of 19,500 pounds or greater used on-site or to transport materials to  
26 and from the site shall comply with CARB 2010 on-road emission standards,  
27 where available.

28 **MM AIR 1-2: Fleet Modernization for Off-road Equipment:** All off-road  
equipment used at the site shall meet current requirements of CARB's OFF-  
ROAD diesel regulations. Idling shall be restricted to a maximum of 5  
minutes when not in use. All Track-Out or Carry-Out will be cleaned at the  
end of each workday or immediately when mud or dirt extends a cumulative  
distance of 50 linear feet or more onto adjacent paved roads. Movement of  
Bulk Material handling or transfer shall be stabilized prior to handling or at

1 points of transfer with application of sufficient water, chemical stabilizers or  
2 by sheltering or enclosing the operation and transfer line. The construction  
3 of any new unpaved road is prohibited within any area with a population of  
4 500 or more unless the road meets the definition of a Temporary Unpaved  
5 Road. Any temporary unpaved road shall be effectively stabilized and  
6 visible emissions shall be limited to no greater than 20% opacity for dust  
7 emission by paving, chemical stabilizers, dust suppressants and/or  
8 watering.

9 **MM AIR - 1-3:** ICAPCD Measures for Construction Combustion Equipment:  
10 Use of alternative fueled or catalyst equipped diesel construction  
11 equipment, including all off-road and portable diesel powered equipment.  
12 Limit, to the extent feasible, the hours of operation of heavy duty equipment  
13 and/or the amount of equipment in use. Replace fossil fueled equipment  
14 with electrically driven equivalents (provided they are not run via a portable  
15 generator set). Should any transformers/generators be used on-site, an  
16 Authority to Construct/Permit to Operate application shall be submitted to  
17 the APCD. Construction equipment operating on-site should be equipped  
18 with two to four degree engine timing retard or pre-combustion chamber  
19 engines. Construction equipment used for the project should utilize EPA  
20 Tier 2 or better engine technology. Keep vehicles well maintained to prevent  
21 leaks and minimize emissions, and encourage employees to do the same.

## 22 **Biological Resources**

23 **MM BIO 1-1:** Presence/absence surveys per the California Burrowing Owl  
24 Consortium (CBOC) protocol (1993) shall be conducted prior to initiation of  
25 the project to determine the location and abundance of Burrowing Owls  
26 within the project site. The survey protocol requires a focused burrow survey  
27 to identify the potential for the area to support burrowing owls. If the survey  
28 area contains natural or man-made structures that could potentially support  
burrowing owls, or owls are observed during the burrow survey, then three  
subsequent surveys will be required. The CDFW and/or lead agency may  
require mitigation for impacts on Burrowing Owls or their burrows. Impacts  
as defined by the CBOC include the following: Disturbance or harassment  
within 50 meters (approx. 169 ft) of occupied burrows, Destruction of  
burrows and burrow entrances. Burrows include structures such as  
culverts, concrete slabs and debris piles that provide shelter to Borrowing  
Owls, and Degradation of foraging habituated adjacent to occupied  
burrows. Burrowing Owls and their active burrows shall be avoided, if  
possible. Occupied burrows shall not be disturbed during the nesting  
season (February 1 – August 31) unless formally approved by CDFW. If  
impacts on Burrowing Owls are unavoidable, on-site mitigation in the form  
of passive relocation of the Burrowing Owls may be required. Passive  
relocation is deemed as prompting owls to move from occupied burrows  
within the proposed impact area to a natural or artificial burrow at least 50

1 meters from the impact area. This relocation can be accomplished by  
2 installing one-way doors on the burrow entrances and leaving them in place  
3 48 hours to ensure that owls have left the burrow before the burrow is  
4 collapsed. Relocation of Burrowing Owls should only be implemented  
5 during the non-breeding season. Detailed information on passive relocation  
6 and other Burrowing Owl mitigation information can be found in the CBOC  
7 guidelines/ mitigation. With implementation of the aforementioned  
8 mitigation, impacts on Burrowing Owls would be reduced to below a level  
9 of significance.

### 7 **Cultural Resources**

8 **MM CUL 1-1:** In the event archaeological resources potentially eligible for  
9 the MM CUL 1-1: In the event archaeological resources potentially eligible  
10 for the CRHR are encountered, surface disturbing work in the immediate  
11 vicinity of the discovery shall temporarily halt until appropriate treatment of  
12 the resource is determined by a qualified archaeologist in accordance with  
13 the provisions of CEQA Section 15064.5. The archaeological monitor shall  
14 have the authority to re-direct construction equipment in the event  
15 archaeological resources potentially eligible for the CRHR are encountered.

16 **MM CUL 1-2:** In the event that human remains are encountered during  
17 ground-disturbing activities, all ground-disturbing activities in the vicinity of  
18 the find would be stopped. The County Coroner would be notified in  
19 compliance with all relevant federal regulations and as required by CEQA  
20 Guidelines, Section 156064.5(e). All parties involved would ensure that any  
21 such remains are treated in a respectful manner and that all applicable state  
22 and federal laws are followed. If human remains are found to be of Native  
23 American origin, or if associated grave goods or objects of cultural  
24 patrimony are discovered, the provisions of the Native American Graves  
25 Protection and Repatriation Act [NAGPRA] would be followed. The Native  
26 American Heritage Commission shall be asked to determine the  
27 descendants who are to be notified or, if unidentifiable, to establish the  
28 procedures for burial.

### 21 **Hydrology and Water Quality**

22 **MM HM 1-1:** A geotechnical investigation of the project site shall occur prior  
23 to implementation of the project to determine the precise soil and  
24 groundwater conditions. Based on the results of this investigation,  
25 appropriate design and measures shall be incorporated into final  
26 engineering and design of the WWTP improvements.

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## **Geology and Soils**

**MM GS 1-1:** Based on the results of the geotechnical investigation of the project site, appropriate design and measures shall be incorporated into final engineering and design of the WWTP improvements.

1. *Public Works Letter, dated May 28, 2019*
2. *Imperial Irrigation District, dated June 24, 2019*
3. *APCD Letter, dated April 26, 2019*
4. *California Department of Water Resources*
5. **CALTRANS**

1                   **NOW THEREFORE**, County hereby issues Conditional Use Permit #19-0006  
2 and Permittee hereby accepts such permit upon the terms and conditions set forth  
3 herein.

4                   **IN WITNESS THEREOF**, the parties hereto have executed this Agreement the day  
5 and year first written.

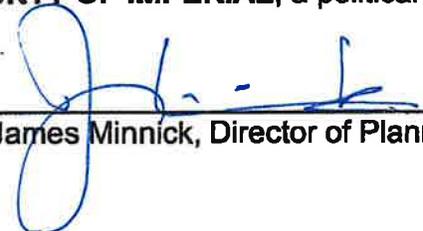
6                   **PERMITTEE :**

7                   Niland County Sanitation District

8  
9 By:   
10                   John Gay, Director

11                   8/14/19  
12                   Date

13                   **COUNTY OF IMPERIAL**, a political subdivision of the STATE OF CALIFORNIA:

14 By:   
15                   James Minnick, Director of Planning

16                   8.15.19  
17                   Date

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**PERMITTEE NOTARIZATION**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA  
COUNTY OF IMPERIAL } S.S.

On WED. AUG. 14, 2019 before me, CARLOS A. YEE,  
a Notary Public in and for said County and State, personally appeared  
JOHN A. GAY, who proved to me on the  
basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the  
within instrument and acknowledged to me that he/she/they executed the same in  
his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the  
instrument the person(s), or the entity upon behalf of which the person(s) acted, executed  
the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the  
foregoing is true and correct.

WITNESS my hand and official seal





Signature \_\_\_\_\_

ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to unauthorized document.

Title or Type of Document CONDITIONAL USE PERMIT  
Number of Pages 15 Date of Document 07/24/19 - PLANNING COMMISSION  
Signer(s) Other Than Named Above JAMES MINNICK

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**FOR COUNTY NOTARIZATION**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA  
COUNTY OF IMPERIAL } S.S.

On August 15, 2019 before me, PATRICIA A. VALENZUELA  
a Notary Public in and for said County and State, personally appeared  
JAMES MINNICK, who proved to me on the  
basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the  
within instrument and acknowledged to me that he/she/they executed the same in  
his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the  
instrument the person(s), or the entity upon behalf of which the person(s) acted, executed  
the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal

Signature Patricia A. Valenzuela



ATTENTION NOTARY: Although the information requested below is OPTIONAL, it could prevent fraudulent attachment of this certificate to unauthorized document.

Title or Type of Document CUP 19-0006  
Number of Pages 15 Date of Document August 14th, 2019  
Signer(s) Other Than Named Above \_\_\_\_\_

S:\APN\021\240\001\CUP19-0006\PC\CUP19-0006 Niland Wastewater.docx



**IMPERIAL COUNTY**  
**PLANNING & DEVELOPMENT SERVICES**  
801 Main Street, El Centro, CA 92243  
Phone: (442) 2652-1736 Fax: (442) 265-1760

## Memorandum

To: Clerk- Recorder

From: Gloria M. Flores 

Date: 08/19/2019

Re: Transfer Funds for Recording Fees for CUP19-0006 Niland County Sanitation

---

Please make the following journal entry:

Account	Description	Debit	Credit
7004000-301000	CUP19-0006 Niland County Sanitation	132.00	
1380001-473000	Recording Fees		132.00

Transfer is to pay for Recording Fees

**CUP19-0006 Niland County Sanitation**

If you have any questions, please do not hesitate to give me a call at (442) 265-1755

Thank you,

Gloria M. Flores

Planning & Development Services



CHUCK STOREY  
COUNTY CLERK/RECORDER  
940 MAIN STREET, SUITE 202  
EL CENTRO, CA, 92243  
(442) 265-1075

Cashier AlexisLeimgruber  
Register CC1-REC-WKS016

IMPERIAL COUNTY - PLANNING & DEVELOPMENT

Receipt # F2019016289

Date / Time 8/19/19 10:17 am

Description	Fee
PERMIT	
Document 2019015433	\$132.00
Time Recorded: 10:17 am	
Recording Fee:	\$132.00
Total Amount Due	\$132.00
Total Paid	
Transfer tendered	\$132.00
# 130001-473000	
Amount Due	0.00

Thank You  
PLEASE KEEP FOR REFERENCE



## MITIGATION MONITORING AND REPORTING PROGRAM

### NILAND SANITATION DISTRICT WASTEWATER TREATMENT PLANT IMPROVEMENTS

EEC ORIGINAL PKG

Impact	Mitigation	Timeframe for Implementation	Responsibility for Implementation	Oversight of Implementation
<b>AIR QUALITY</b>				
<p>Implementation of the proposed project may result in short-term emissions conflicting with air quality plan.</p>	<p><b>MM AIR 1-1:</b> <i>Fleet Modernization for On-road Haul Trucks:</i> Trucks hauling materials such as debris or fill shall sprinkle to mitigate blowing dust prior to leaving the site. Idling shall be restricted to a maximum of 5 minutes when not in use. All on-road heavy-duty diesel trucks with a gross vehicle weight rating of 19,500 pounds or greater used on-site or to transport materials to and from the site shall comply with CARB 2010 on-road emission standards, where available.</p> <p><b>MM AIR 1-2:</b> <i>Fleet Modernization for Off-road Equipmen:</i> All off-road equipment used at the site shall meet current requirements of CARB's OFF-ROAD diesel regulations. Idling shall be restricted to a maximum of 5 minutes when not in use. All Track-Out or Carry-Out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto adjacent paved roads. Movement of Bulk Material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers or by sheltering or enclosing the operation and transfer line. The construction of any new unpaved road is prohibited within any area with a population of 500 or more unless the road meets the definition of a Temporary Unpaved Road. Any temporary unpaved road shall be effectively stabilized and visible emissions shall be limited to no greater than 20% opacity for dust emission by having, chemical stabilizers, dust suppressants and/or watering.</p> <p><b>MM AIR 1-3:</b> <i>ICAPCD Measures for Construction Combustion Equipmen:</i> Use of alternative fueled or catalyst equipped diesel construction equipment, including all off-road and portable diesel powered equipment. Limit, to the extent feasible, the hours of operation of heavy duty equipment and/or the amount of equipment in use. Replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set). Should any transformers/generators be used on-site, an Authority to Construct/Permit to Operate application shall be submitted to the APCD. Construction equipment operating on-site should be equipped with two to four degree engine timing retard or pre-combustion chamber engines. Construction equipment used for the project should utilize EPA Tier 2 or better engine technology. Keep vehicles well maintained to prevent leaks and minimize emissions, and encourage employees to do the same.</p>	<p>Prior to Issuance of building permits</p>	<p>Project Applicant</p>	<p>Imperial County Public Works &amp; Planning and Development Department</p>
<b>BIOLOGICAL RESOURCES</b>				
<p>Construction activities of the proposed project could result in indirect noise and dust and disturbance of the burrowing owl habitats</p>	<p><b>MM BIO 1-1:</b> <i>Presence/absence surveys per the California Burrowing Owl Consortium (CBOC) protocol (1993) shall be conducted prior to initiation of the project to determine the location and abundance of Burrowing Owls within the project site. The survey protocol requires a focused burrow survey to identify the potential for the area to support burrowing owls. If the survey area contains natural or man-made structures that could potentially support burrowing owls, or owls are observed during the burrow survey, then three subsequent surveys will be required. The CDFW and/or lead agency may require mitigation for impacts on Burrowing Owls or their burrows. Impacts as defined by the CBOC include the following: Disturbance or harassment within 50 meters (approx. 169 ft) of occupied burrows, Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to Burrowing Owls, and Degradation of foraging habituated adjacent to occupied burrows. Burrowing Owls and their active burrows shall be avoided, if possible. Occupied burrows shall not be disturbed during the nesting season (February 1 – August 31) unless formally approved by CDFW. If impacts on Burrowing Owls are unavoidable, on-site mitigation in the form of passive relocation of the Burrowing Owls may be required. Passive relocation is deemed as prompting owls to move from occupied burrows within the proposed impact area to a natural or artificial burrow at least 50 meters from the impact area. This relocation can be accomplished by installing one-way doors on the burrow entrances and leaving them in place 48 hours to ensure that owls have left the burrow before the burrow is collapsed. Relocation of Burrowing Owls should only be implemented during the non-breeding season. Detailed information on passive relocation and other Burrowing Owl mitigation information can be found in the CBOC guidelines/ mitigation. With implementation of the aforementioned mitigation, impacts on Burrowing Owls would be reduced to below a level of significance.</i></p>	<p>Prior to the initiation of the project to determine the location and abundance</p>	<p>Project Applicant</p>	<p>Imperial County Public Works &amp; Planning and Development Department</p>

<b>CULTURAL RESOURCES</b>				
<p>Construction activities of the proposed project could cause substantial adverse change in the significance of an archaeological resources</p>	<p><b>MM CUL 1-1:</b> In the event archaeological resources potentially eligible for the CRHR are encountered, surface disturbing work in the immediate vicinity of the discovery shall temporarily halt until appropriate treatment of the resource is determined by a qualified archaeologist in accordance with the provisions of CEQA Section 15064.5. The archaeological monitor shall have the authority to re-direct construction equipment in the event archaeological resources potentially eligible for the CRHR are encountered.</p> <p><b>MM CUL 1-2:</b> In the event that human remains are encountered during ground-disturbing activities, all ground-disturbing activities in the vicinity of the find would be stopped. The County Coroner would be notified in compliance with all relevant federal regulations and as required by CEQA Guidelines, Section 156064.5(e). All parties involved would ensure that any such remains are treated in a respectful manner and that all applicable state and federal laws are followed. If human remains are found to be of Native American origin, or if associated grave goods or objects of cultural patrimony are discovered, the provisions of the Native American Graves Protection and Repatriation Act [NAGPRA] would be followed. The Native American Heritage Commission shall be asked to determine the descendants who are to be notified or, if unidentifiable, to establish the procedures for burial.</p>	<p>Prior to the issuance of building permit and during construction</p>	<p>Project Applicant</p>	<p>Imperial County Public Works &amp; Planning and Development Department</p>
<b>HYDROLOGY AND WATER QUALITY</b>				
<p>Construction of the proposed project would likely interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.</p>	<p><b>MM HM 1-1:</b> A geotechnical investigation of the project site shall occur prior to implementation of the project to determine the precise soil and groundwater conditions. Based on the results of this investigation, appropriate design and measures shall be incorporated into final engineering and design of the WWTP improvements.</p>	<p>During plan approval and during construction</p>	<p>Project Applicant</p>	<p>Imperial County and Contractor Monitoring</p>
<b>GEOLOGY AND SOILS</b>				
<p>Implementation of the proposed project can potentially result in on or off-site landslides, lateral spreading, subsidence, liquefaction or collapse; and risk to life or property.</p>	<p><b>MM GS 1-1:</b> Based on the results of the geotechnical investigation of the project site, appropriate design and measures shall be incorporated into final engineering and design of the WWTP improvements.</p>	<p>During plan approval and during construction</p>	<p>Project Applicant</p>	<p>Imperial County and Contractor Monitoring</p>

# PROJECT REPORT

TO: ENVIRONMENTAL EVALUATION COMMITTEE  
FROM: PLANNING & DEVELOPMENT SERVICES

AGENDA DATE: June 13, 2019

AGENDA TIME 1:30 PM / No. 2

PROJECT TYPE: Niland Wastewater Treatment Facility CUP19-0006 SUPERVISOR DIST # 4

LOCATION: 125 Alcott Road APN: 021-240-001/006 & 021-200-005-000

Niland, CA PARCEL SIZE: approx. 73.36 AC

GENERAL PLAN (existing) Agriculture GENERAL PLAN (proposed) N/A

ZONE (existing) A-1 ZONE (proposed) \_\_

GENERAL PLAN FINDINGS  CONSISTENT  INCONSISTENT  MAY BE/FINDINGS

PLANNING COMMISSION DECISION: HEARING DATE: \_\_\_\_\_

APPROVED  DENIED  OTHER

PLANNING DIRECTORS DECISION: HEARING DATE: \_\_\_\_\_

APPROVED  DENIED  OTHER

ENVIROMENTAL EVALUATION COMMITTEE DECISION: HEARING DATE: 06/13/2019

INITIAL STUDY: #19-0008

NEGATIVE DECLARATION  MITIGATED NEG. DECLARATION  EIR

## DEPARTMENTAL REPORTS / APPROVALS:

PUBLIC WORKS	<input type="checkbox"/>	NONE	<input checked="" type="checkbox"/>	ATTACHED
AG	<input checked="" type="checkbox"/>	NONE	<input type="checkbox"/>	ATTACHED
APCD	<input type="checkbox"/>	NONE	<input checked="" type="checkbox"/>	ATTACHED
E.H.S.	<input checked="" type="checkbox"/>	NONE	<input type="checkbox"/>	ATTACHED
FIRE / OES	<input checked="" type="checkbox"/>	NONE	<input type="checkbox"/>	ATTACHED
SHERIFF	<input checked="" type="checkbox"/>	NONE	<input type="checkbox"/>	ATTACHED
OTHER	<u>IID</u>			

## REQUESTED ACTION:

(See Attached)

- NEGATIVE DECLARATION**  
 **MITIGATED NEGATIVE DECLARATION**

*Initial Study & Environmental Analysis  
For:*

**CONDITIONAL USE PERMIT #19-0006  
NILAND COUNTY SANITATION DISTRICT  
WASTEWATER TREATMENT PLANT IMPROVEMENT PROJECT**



*Prepared By:*

 The Holt Group, Inc.  
1601 North Imperial Avenue  
El Centro, CA 92243

**FOR THE  
COUNTY OF IMPERIAL**  
**Planning & Development Services Department**  
801 Main Street  
El Centro, CA 92243  
(442) 265-1736  
[www.icpds.com](http://www.icpds.com)

**June 2019**

**EEC ORIGINAL PKG**

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## SECTION 1 INTRODUCTION

### A. PURPOSE

This document is a  policy-level,  project level Initial Study for evaluation of potential environmental impacts resulting with the proposed Conditional Use Permit for proposed improvements to the Niland County Sanitation District (NCSD) Wastewater Treatment Plant. Proposed improvements include the construction of three evaporation ponds and appurtenant structures on a 56-acre site to be acquired from the adjacent parcel. (Refer to Exhibit "A" & "B").

### B. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) REQUIREMENTS AND THE IMPERIAL COUNTY'S GUIDELINES FOR IMPLEMENTING CEQA

As defined by Section 15063 of the State California Environmental Quality Act (CEQA) Guidelines and Section 7 of the County's "CEQA Regulations Guidelines for the Implementation of CEQA, as amended", an **Initial Study** is prepared primarily to provide the Lead Agency with information to use as the basis for determining whether an Environmental Impact Report (EIR), Negative Declaration, or Mitigated Negative Declaration would be appropriate for providing the necessary environmental documentation and clearance for any proposed project.

According to Section 15065, an **EIR** is deemed appropriate for a particular proposal if the following conditions occur:

- The proposal has the potential to substantially degrade quality of the environment.
- The proposal has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- The proposal has possible environmental effects that are individually limited but cumulatively considerable.
- The proposal could cause direct or indirect adverse effects on human beings.

According to Section 15070(a), a **Negative Declaration** is deemed appropriate if the proposal would not result in any significant effect on the environment.

According to Section 15070(b), a **Mitigated Negative Declaration** is deemed appropriate if it is determined that though a proposal could result in a significant effect, mitigation measures are available to reduce these significant effects to insignificant levels.

This Initial Study has determined that the proposed applications will not result in any potentially significant environmental impacts and therefore, a Negative Declaration is deemed as the appropriate document to provide necessary environmental evaluations and clearance as identified hereinafter.

This Initial Study and Negative Declaration are prepared in conformance with the California Environmental Quality Act of 1970, as amended (Public Resources Code, Section 21000 et. seq.); Section 15070 of the State & County of Imperial's Guidelines for Implementation of the California Environmental Quality Act of 1970, as amended (California Code of Regulations, Title 14, Chapter 3, Section 15000, et. seq.); applicable requirements of the County of Imperial; and the regulations, requirements, and procedures of any other responsible public agency or an agency with jurisdiction by law.

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Pursuant to the County of Imperial Guidelines for Implementing CEQA, depending on the project scope, the County of Imperial Board of Supervisors, Planning Commission and/or Planning Director is designated the Lead Agency, in accordance with Section 15050 of the CEQA Guidelines. The Lead Agency is the public agency which has the principal responsibility for approving the necessary environmental clearances and analyses for any project in the County.

### **C. INTENDED USES OF INITIAL STUDY AND NEGATIVE DECLARATION**

This Initial Study and Negative Declaration are informational documents which are intended to inform County of Imperial decision makers, other responsible or interested agencies, and the general public of potential environmental effects of the proposed applications. The environmental review process has been established to enable public agencies to evaluate environmental consequences and to examine and implement methods of eliminating or reducing any potentially adverse impacts. While CEQA requires that consideration be given to avoiding environmental damage, the Lead Agency and other responsible public agencies must balance adverse environmental effects against other public objectives, including economic and social goals.

The Initial Study and Negative Declaration, prepared for the project will be circulated for a period of 20 days (*30-days if submitted to the State Clearinghouse for a project of area-wide significance*) for public and agency review and comments. At the conclusion, if comments are received, the County Planning & Development Services Department will prepare a document entitled "Responses to Comments" which will be forwarded to any commenting entity and be made part of the record within 10-days of any project consideration.

### **D. CONTENTS OF INITIAL STUDY & NEGATIVE DECLARATION**

This Initial Study is organized to facilitate a basic understanding of the existing setting and environmental implications of the proposed applications.

#### **SECTION 1**

**I. INTRODUCTION** presents an introduction to the entire report. This section discusses the environmental process, scope of environmental review, and incorporation by reference documents.

#### **SECTION 2**

**II. ENVIRONMENTAL CHECKLIST FORM** contains the County's Environmental Checklist Form. The checklist form presents results of the environmental evaluation for the proposed applications and those issue areas that would have either a significant impact, potentially significant impact, or no impact.

**PROJECT SUMMARY, LOCATION AND ENVIRONMENTAL SETTINGS** describes the proposed project entitlements and required applications. A description of discretionary approvals and permits required for project implementation is also included. It also identifies the location of the project and a general description of the surrounding environmental settings.

**ENVIRONMENTAL ANALYSIS** evaluates each response provided in the environmental checklist form. Each response checked in the checklist form is discussed and supported with sufficient data and analysis as necessary. As appropriate, each response discussion describes and identifies specific impacts anticipated with project implementation.

#### **SECTION 3**

**III. MANDATORY FINDINGS** presents Mandatory Findings of Significance in accordance with Section 15065 of the CEQA Guidelines.

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IV. **PERSONS AND ORGANIZATIONS CONSULTED** identifies those persons consulted and involved in preparation of this Initial Study and Negative Declaration.

V. **REFERENCES** lists bibliographical materials used in preparation of this document.

VI. **NEGATIVE DECLARATION – COUNTY OF IMPERIAL**

VII. **FINDINGS**

**SECTION 4**

VIII. **RESPONSE TO COMMENTS (IF ANY)**

IX. **MITIGATION MONITORING & REPORTING PROGRAM (MMRP) (IF ANY)**

**E. SCOPE OF ENVIRONMENTAL ANALYSIS**

For evaluation of environmental impacts, each question from the Environmental Checklist Form is summarized and responses are provided according to the analysis undertaken as part of the Initial Study. Impacts and effects will be evaluated and quantified, when appropriate. To each question, there are four possible responses, including:

1. **No Impact:** A "No Impact" response is adequately supported if the impact simply does not apply to the proposed applications.
2. **Less Than Significant Impact:** The proposed applications will have the potential to impact the environment. These impacts, however, will be less than significant; no additional analysis is required.
3. **Less Than Significant With Mitigation Incorporated:** This applies where incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact".
4. **Potentially Significant Impact:** The proposed applications could have impacts that are considered significant. Additional analyses and possibly an EIR could be required to identify mitigation measures that could reduce these impacts to less than significant levels.

**F. POLICY-LEVEL or PROJECT LEVEL ENVIRONMENTAL ANALYSIS**

This Initial Study and Negative Declaration will be conducted under a  policy-level,  project level analysis. Regarding mitigation measures, it is not the intent of this document to "overlap" or restate conditions of approval that are commonly established for future known projects or the proposed applications. Additionally, those other standard requirements and regulations that any development must comply with, that are outside the County's jurisdiction, are also not considered mitigation measures and therefore, will not be identified in this document.

**G. TIERED DOCUMENTS AND INCORPORATION BY REFERENCE**

Information, findings, and conclusions contained in this document are based on incorporation by reference of tiered documentation, which are discussed in the following section.

1. **Tiered Documents**

As permitted in Section 15152(a) of the CEQA Guidelines, information and discussions from other documents can be included into this document. Tiering is defined as follows:

---

"Tiering refers to using the analysis of general matters contained in a broader EIR (such as the one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project."

Tiering also allows this document to comply with Section 15152(b) of the CEQA Guidelines, which discourages redundant analyses, as follows:

"Agencies are encouraged to tier the environmental analyses which they prepare for separate but related projects including the general plans, zoning changes, and development projects. This approach can eliminate repetitive discussion of the same issues and focus the later EIR or negative declaration on the actual issues ripe for decision at each level of environmental review. Tiering is appropriate when the sequence of analysis is from an EIR prepared for a general plan, policy or program to an EIR or negative declaration for another plan, policy, or program of lesser scope, or to a site-specific EIR or negative declaration."

Further, Section 15152(d) of the CEQA Guidelines states:

"Where an EIR has been prepared and certified for a program, plan, policy, or ordinance consistent with the requirements of this section, any lead agency for a later project pursuant to or consistent with the program, plan, policy, or ordinance should limit the EIR or negative declaration on the later project to effects which:

- (1) Were not examined as significant effects on the environment in the prior EIR; or
- (2) Are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means."

## 2. Incorporation By Reference

Incorporation by reference is a procedure for reducing the size of EIRs/MND and is most appropriate for including long, descriptive, or technical materials that provide general background information, but do not contribute directly to the specific analysis of the project itself. This procedure is particularly useful when an EIR or Negative Declaration relies on a broadly-drafted EIR for its evaluation of cumulative impacts of related projects (*Las Virgenes Homeowners Federation v. County of Los Angeles* [1986, 177 Ca.3d 300]). If an EIR or Negative Declaration relies on information from a supporting study that is available to the public, the EIR or Negative Declaration cannot be deemed unsupported by evidence or analysis (*San Francisco Ecology Center v. City and County of San Francisco* [1975, 48 Ca.3d 584, 595]). This document incorporates by reference appropriate information from the "Final Environmental Impact Report and Environmental Assessment for the "County of Imperial General Plan EIR" prepared by Brian F. Mooney Associates in 1993 and updates.

When an EIR or Negative Declaration incorporates a document by reference, the incorporation must comply with Section 15150 of the CEQA Guidelines as follows:

- The incorporated document must be available to the public or be a matter of public record (CEQA Guidelines Section 15150[a]). The General Plan EIR and updates are available, along with this document, at the County of Imperial Planning & Development Services Department, 801 Main Street, El Centro, CA 92243 Ph. (442) 265-1736.
- This document must be available for inspection by the public at an office of the lead agency (CEQA Guidelines Section 15150[b]). These documents are available at the County of Imperial Planning & Development Services Department, 801 Main Street, El Centro, CA 92243 Ph. (442) 265-1736.

- 
- These documents must summarize the portion of the document being incorporated by reference or briefly describe information that cannot be summarized. Furthermore, these documents must describe the relationship between the incorporated information and the analysis in the tiered documents (CEQA Guidelines Section 15150[c]). As discussed above, the tiered EIRs address the entire project site and provide background and inventory information and data which apply to the project site. Incorporated information and/or data will be cited in the appropriate sections.
  - These documents must include the State identification number of the incorporated documents (CEQA Guidelines Section 15150[d]). The State Clearinghouse Number for the County of Imperial General Plan EIR is SCH #93011023.
  - The material to be incorporated in this document will include general background information (CEQA Guidelines Section 15150[f]). This has been previously discussed in this document.

---

## II. *Environmental Checklist*

---

1. **Project Title:** Niland County Sanitation District Wastewater Treatment Plan Improvement Project
2. **Lead Agency:** Imperial County Planning & Development Services Department
3. **Contact person and phone number:** Patricia Valenzuela, Planner IV, (442)265-1736, ext. 1749
4. **Address:** 801 Main Street, El Centro CA, 92243
5. **E-mail:** patriciavalenzuela@co.imperial.ca.us
6. **Project location:** The project site is on the south side of Alcott Road approximately 0.37 mile west of Highway 111 south of the unincorporated community of Niland. The site is further identified as Assessor's Parcel Numbers 021-240-001, 021-240-006, and 021-200-005 for a total project area of 73.36 acres.
7. **Project sponsor's name and address:**
8. **General Plan designation:**
9. **Zoning:** A-1 (Limited Agriculture) and A-2-G (General Agriculture)
10. **Description of project:** Improvements to the Niland County Sanitation District's (NCSD) wastewater treatment system are being proposed to address exceedances discharge contamination from E. coli (bacteria), copper, and thallium. Planned improvements include the rehabilitation of sections of the existing sanitary sewer collection system, critical components of the wastewater treatment plant, and the construction of three evaporation ponds on an approximate 56-acre parcel of land adjacent to the existing wastewater treatment plant (WWTP). Land will be acquired from the Imperial Irrigation District through a land swap agreement. The evaporation ponds would add an additional step to the treatment process to eliminate wastewater discharge into the natural environment and eliminate the need for a National Pollutant Discharge Elimination System (NPDES) Permit. Effluent from the existing WWTP will be pumped via a new pump station and deposited into the three large open basins allowing water to evaporate through solar radiation and wind. Each of the three, 10-acre water surface evaporation ponds to accommodate an average annual flow of 150,000 gallons per day with a peak monthly flow of 200,000 gallons per day with sufficient freeboard to store water during the cool wet winter months for evaporation during the summer. Approximately 50 mg/L suspended solids per day will accumulate in the evaporation basins and as water naturally evaporates the solids will compact as they settle to the bottom of the basin. It is projected that approximately five inches of solids per year will accumulate when the basins are operating at full capacity assuming that the solids will compact to a concentration of about 5,000 mg/L. The accumulated solids will be cleaned out and disposed at the land fill once every five years.

A Conditional Use Permit (CUP) is required for the project as it is located within A-1 (Limited Agriculture) and A-2-G (General Agriculture) zones. The existing wastewater treatment plant is situated within three separate but contiguous parcels.

11. **Surrounding land uses and setting:** The project site is primarily surrounded by agricultural land. The area directly to the northwest and west of the project site is zoned A-2-G (General Agriculture with Government Overlay) and the area to the east is zoned A-1 (Limited Agriculture). One parcel to the north of the project site across the street on Alcott Road is zoned C-2-G (Medium Commercial with Government Overlay). The remaining parcels about the project site to the north and northeast are zoned R-1-U (Low Density Residential with Urban Overlay). These residential parcels are at least one acre in size and the nearest existing residence is approximately 725' away from the project site.
12. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.):**

- 
- A. Imperial County Planning Commission (Conditional Use Permit)
  - B. California Water Resources Control Board (Financing and Waste Discharge Requirements)
  - C. Caltrans (Encroachment Permit)
  - D. Imperial Irrigation District (Encroachment Permit)
  - E. Imperial County Department of Public Works (Encroachment Permit)
  - F. Imperial County Planning and Development Services (Grading Permit)
  - G. Imperial County Air Pollution Control District (Construction Permit)

**13. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.? No have not received any request for consultation.**

**Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code, Section 21080.3.2). Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code, Section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code, Section 21082.3 (c) contains provisions specific to confidentiality.**

No requests for consultation have been received from tribal agencies.

**ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:**

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Aesthetics                | <input type="checkbox"/> Agriculture and Forestry Resources | <input type="checkbox"/> Air Quality                        |
| <input type="checkbox"/> Biological Resources      | <input type="checkbox"/> Cultural Resources                 | <input type="checkbox"/> Energy                             |
| <input type="checkbox"/> Geology /Soils            | <input type="checkbox"/> Greenhouse Gas Emissions           | <input type="checkbox"/> Hazards & Hazardous Materials      |
| <input type="checkbox"/> Hydrology / Water Quality | <input type="checkbox"/> Land Use / Planning                | <input type="checkbox"/> Mineral Resources                  |
| <input type="checkbox"/> Noise                     | <input type="checkbox"/> Population / Housing               | <input type="checkbox"/> Public Services                    |
| <input type="checkbox"/> Recreation                | <input type="checkbox"/> Transportation                     | <input type="checkbox"/> Tribal Cultural Resources          |
| <input type="checkbox"/> Utilities/Service Systems | <input type="checkbox"/> Wildfire                           | <input type="checkbox"/> Mandatory Findings of Significance |

**ENVIRONMENTAL EVALUATION COMMITTEE (EEC) DETERMINATION**

After Review of the Initial Study, the Environmental Evaluation Committee has:

- Found that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- Found that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- Found that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- Found that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- Found that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE DE MINIMIS IMPACT FINDING:  Yes  No

<u>EEC VOTES</u>	<u>YES</u>	<u>NO</u>	<u>ABSENT</u>
PUBLIC WORKS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ENVIRONMENTAL HEALTH SVCS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OFFICE EMERGENCY SERVICES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
APCD	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AG	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SHERIFF DEPARTMENT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ICPDS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

  
 \_\_\_\_\_  
 Jim Minnick, Director of Planning/EEC Chairman

**6-13-19**  
 \_\_\_\_\_  
 Date:

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## **PROJECT SUMMARY**

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### **A. Project Location:**

The project site is on the south side of Alcott Road approximately 0.37 mile west of Highway 111 south of the unincorporated community of Niland. The site address is 125 Alcott Road and is further identified as Assessor's Parcel Numbers 021-240-001, 021-240-006, and 021-200-005 for a total project are of 73.36 acres. Exhibit A on page 15 shows a Vicinity Map which illustrates the location of the proposed project.

### **B. Project Summary:**

The County of Imperial recently took over the ownership and operational responsibilities of the Niland Sanitary District. The system consists of a network of sewer collection infrastructure connected to an aeration pond wastewater treatment plant (WWTP). The treatment plant is located within a 17-acre site at 125 Alcott Road in the unincorporated community of Niland. Financial and management difficulties in the past have resulted in violations related to exceedances in E. coli (bacteria), copper, and thallium which culminated in a Cease and Desist Order in 2009 and amended in 2012.

Copper is a ductile metal with very high thermal and electrical conductivity. Since November 2005 the District has had Copper exceedances. A review of the last two years of Copper testing shows that most of the months there are measurable concentrations of Copper leading to the conclusion that Copper exceedances are likely to be a chronic problem since a point source has not been able to be identified.

Thallium is a metal that is found in ores that contains other elements and is mostly found in discharges from electronics, glass and drug factories. Thallium is very toxic. The Regional Board, with assistance from the engineering firm Tetra Tech carried out a Pretreatment Program Needs Assessment which was also unable to identify a source for the Thallium contamination.

Historically, the NCSD has had several E. Coli test exceedances but since 5/31/2011 no bacteria testing violations have occurred (through 7/1/13)<sup>2</sup>. The plant uses 12.5% sodium hypochlorite (liquid bleach) in a chlorine contact basin for disinfection. High temperatures can lead to decomposition of sodium hypochlorite stability if not stored properly. Adding a shade shelter will allow the operators to use less bleach during the summer months.

A Supplemental Preliminary Engineering Report (PER) was completed in September 2016 analyzing various improvement alternatives to address deficiencies in the wastewater treatment plant. The preferred alternative identified in the PER includes a rehabilitation of various components of the existing treatment plant and the installation of three new evaporation ponds. The PER examined all lands surrounding the existing wastewater treatment plant for suitability and feasibility. Parcels to the north were excluded because of the presence of Alcott Road separating those parcels from the existing treatment plant. The parcel to the east is owned by the State of California and is currently under active agricultural production. The parcels to the south and to the west are owned by the Imperial Irrigation District (IID) and are not currently being cultivated. A portion of the parcel to the west (APN 021-200-005) was ultimately selected as the preferred location to minimize earthwork and maximize cost efficiency.

The existing treatment facility was constructed in 1993 with a permitted capacity of 0.5 million gallons per day (MGD). Improvements to the Niland County Sanitation District's (NCSD) wastewater treatment system are being proposed to address exceedances discharge contamination from E. coli (bacteria), copper, and thallium. Planned improvements include the rehabilitation of sections of the existing sanitary sewer collection system, critical components of the wastewater treatment plant, and the construction of three evaporation ponds on an approximate 56-acre parcel of land adjacent to the existing wastewater treatment plant (WWTP). Land will be acquired from

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the Imperial Irrigation District through a land swap agreement. The proposed improvements are not capacity enhancing and no additional treatment capacity is proposed. Refer to Exhibit B on page 16 for Site Plan showing the proposed improvements.

The evaporation ponds would add an additional step to the treatment process to eliminate wastewater discharge into the natural environment and eliminate the need for a National Pollutant Discharge Elimination System (NPDES) Permit. Effluent from the existing WWTP will be pumped via a new pump station and deposited into the three large open basins allowing water to evaporate through solar radiation and wind. Each of the three, 10-acre water surface evaporation ponds to accommodate an average annual flow of 150,000 gallons per day with a peak monthly flow of 200,000 gallons per day with sufficient freeboard to store water during the cool wet winter months for evaporation during the summer. Approximately 50 mg/L suspended solids per day will accumulate in the evaporation basins and as water naturally evaporates the solids will compact as they settle to the bottom of the basin. It is projected that approximately five inches of solids per year will accumulate when the basins are operating at full capacity assuming that the solids will compact to a concentration of about 5,000 mg/L. The accumulated solids will be cleaned out and disposed at the land fill once every five years.

The County of Imperial, along with the former District were able to obtain grant funding from the Border Environment Infrastructure Fund (BEIF) Project Development Assistance Program (PDAP) to pay for improvements to the wastewater treatment plant. The Niland County Sanitation District is currently applying for funding from the Clean Water State Revolving Funds (SRF). Once funding is approved, it is anticipated that construction will begin during the first quarter of 2020 and be completed within nine months.

### **C. Environmental Setting:**

The project site encompasses an area of approximately 73.36 acres located approximately 0.5 mile south and 0.38 mile west of the unincorporated townsite of Niland. Niland is located in Imperial County, approximately 45 miles north of the California-Mexico border, in the Imperial Valley of Southern California. State Highway 111 runs north and south along the western portion of the community and is the main arterial in Niland. The Salton Sea is located approximately two miles to the west. The town, as well as the project site, is bordered to the east and northeast by agricultural fields and the Salton Sea to the west, and extensive agricultural development of the Imperial Valley to the south. Niland consists of quiet residential areas and limited commercial activities centralized around Highway 111. The community relies heavily on agricultural employment and government assistance as a source of income and is considered an economically disadvantaged community. The current population in Niland is currently estimated to be 1,145 people according to the US Census American Community Survey (ACS).

The Niland County Sanitation District (NCSD) provides wastewater collection and treatment services to residents of the Niland community. The NCSD owns and operates approximately six miles of sewer collection lines, one lift station, and a wastewater treatment plant located at 125 West Alcott Road. The plant is bounded by Orban Street to the west, Luna Road to the east, and Pound Road to the south. Treated wastewater is discharged into the "R" Drain, owned and operated by the Imperial Irrigation District. The Niland Sanitary Sewer District owns and operates the WWTP from two parcels at this location which is located approximately  $\frac{3}{4}$  of a mile southwest of the developed areas in the Niland community. The existing site occupies nearly 17 acres and another 57 acres will be added to the site for a total project site of nearly 74 acres.

The proposed project is adjacent to productive agricultural and developed lands. Agricultural irrigation water is available to land base in the vicinity of and within the project area. Farming operations in this area generally consist of medium to large-scale crop production with related operational facilities. Crops generally cultivated in the area may include alfalfa, barley, and/or Bermuda grass in any given year. The area surrounding the project site further has soils that are considered valuable for agricultural production. Although there is no Prime Farmland within the project vicinity which would have the best combination of physical and chemical features able to sustain long term agricultural production, there is Farmland of Statewide Importance within the project area. Similar to Prime Farmland, this land has the soil quality, growing season, and moisture supply needed to produce sustained high

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yields but contains minor shortcomings, such as greater slopes or less ability to store soil moisture. Farmland within the project area is considered to be most fertile, as identified by the Farmland Monitoring Map Program

There are rural residential homes within the vicinity of the project area. An area to the northeast of the project site is zoned R-1-U (Low Density Residential with Urban Overlay) and is sparsely developed with country homes. There are approximately eight of these homes within a half-mile radius of the project site.

Niland and the Imperial Valley are located between the Salton Sea, which lies to its north, the Anza-Borrego Desert State Park, which lies to the west, the Chocolate Mountains which lie to the northeast and the U.S./Mexican Border which constitutes its most southern boundary. The project site is located in the Imperial Valley portion of the Salton Trough, a topographic and geologic depression resulting from large scale regional faulting. Land in and around Niland is primarily flat, with several gently rising hills. The topography in the area has a gradual downward slope trending southwest, with an average slope across the town of less than 1 percent. According to the US Geological Survey data, the elevation in the Niland project area is generally between 125 and 150 feet below sea level. The Niland WWTP is at an approximate elevation of -178 feet.

Geological resources typically consist of surface and subsurface materials and their inherent properties. Imperial County, in general, is underlain by three natural geomorphic provinces: the Peninsular Ranges, the Colorado Desert, and the Mojave Desert. Each of these provinces is a naturally defined geologic region that displays a distinct landscape or landform with defining features based on geology, faults, topographic relief, and climate. Tectonic activity that formed the Trough continues at a high rate and therefore, the project site is considered likely to be subjected to moderate to strong ground motion from faults in the region. The entire Imperial Valley is seismically active and considered to be subjected to moderate and strong ground motion from earthquakes in the region. The primary seismic hazard in the Niland area is from the Brawley Seismic Zone and the San Jacinto, Elsinore, Sand Hills, Calipatria, and San Andreas Faults.

The project area is located in the Salton Sea Air Basin (SSAB) under the jurisdiction of the Imperial County Air Pollution Control District (ICAPCD). The SSAB is currently either in attainment or unclassified for all federal and state air pollutant standards with the exception of 8-hour ozone, PM<sub>10</sub>, and PM<sub>2.5</sub>. Imperial County is classified as a "serious" nonattainment area for PM<sub>10</sub> for the National Ambient Air Quality Standards (NAAQS). On November 13, 2009, EPA published Air Quality Designations for the 2006 24-Hour Fine Particle (PM<sub>2.5</sub>) NAAQS wherein Imperial County was listed as designated nonattainment for the 2006 24-hour PM<sub>2.5</sub> NAAQS. However, the nonattainment designation for Imperial County is only for the urban area within the County and the proposed projects is located within the nonattainment boundaries for PM<sub>2.5</sub>. On April 10, 2014, the California Air Resources Board (CARB) gave final approval to the 2013 Amendments to Area Designations for California Ambient Air Quality Standards (CAAQS). For the state PM<sub>2.5</sub> standard, effective July 1, 2014, the City of Calexico will be designated nonattainment, while the rest of the SSAB will be designated attainment.

The project area consists of the developed wastewater treatment plant site, and surrounding farmland/cultivated ruderal areas and isolated residential uses bordered by unpaved roadways and the Highway 111. One mile east of Niland, cultivated land ends and gives way to the Palo Verde Mountains. The Sonny Bono Salton Sea National Wildlife Refuge (NWR) is located 4.30 miles northwest of the project area and the Alamo River is located 4 miles southwest of the Niland Sanitary District WWTP site.

The Salton Sea State Park and State Recreation Area begin approximately 15 miles northwest of Niland and run along the shoreline of the Salton Sea. The closest Bureau of Land Management (BLM) administered land to the project area is approximately 2 miles north of Niland.

The Sonny Bono Salton Sea NWR is located between the southern tip of the Salton Sea and the entry point of the Alamo River to the Salton Sea, approximately 12 miles southwest of Niland. The refuge comprises of approximately 2,000 acres of land, divided into two distinct land parcels. Located along the Pacific Flyway, the refuge is an important host habitat to seasonal and migratory birds. Over 400 bird species have been recorded at

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the refuge, in addition to 41 species of mammals, 18 species of reptiles, 4 species of amphibians, and 15 species of fish (USFWS 2015).

The closest protected habitat to the project area is the Wister Waterfowl Management Area, an element of the Imperial Wildlife Area, approximately 0.5 miles northwest of Niland. The CDFG maintains the Imperial Wildlife Area, a 7,929-acre area that contains salt marshes, freshwater ponds, and desert scrub. The Imperial Wildlife Area provides habitat that supports nearly 400 different species. The Wildlife Area was created in 1954 in order to safeguard habitat for migratory birds, alleviate crop damage to adjacent farms, and to offer recreation opportunities.

Archaeological resources within Imperial County can be classified into two distinct sections: prehistoric and historic. Prehistoric archeology relates to aboriginal culture and systems which existed prior to Spanish colonization in 1769. Historical archeology deals with uncovering facts for which there is no known historical documentation. The most important feature in the study of the prehistory and history of Imperial County is Lake Cahuilla, the modern iteration of which is the Salton Sea. This enormous lake periodically formed when flooding in the Colorado River broke through low-lying areas and flooded the Salton Trough, inundating up to an average elevation of about 40 feet above mean sea level. Because Lake Cahuilla was a rare source of fresh water in the desert, human populations would have been attracted to live and gather plant and animal resources near the lake. Human occupation sites mark the ancient shorelines both above the high stand mark and along the lower, retreating shorelines.

#### **D. Analysis:**

The project was previously reviewed in an Initial Study in June 2013. An Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act (NEPA) was also prepared and adopted by the US Environmental Protection Agency (USEPA), US Department of Agriculture (USDA), and the Border Environment Cooperation Commission (BECC) in May 2016. The EA resulted in a Finding of No Significant Impact (FONSI).

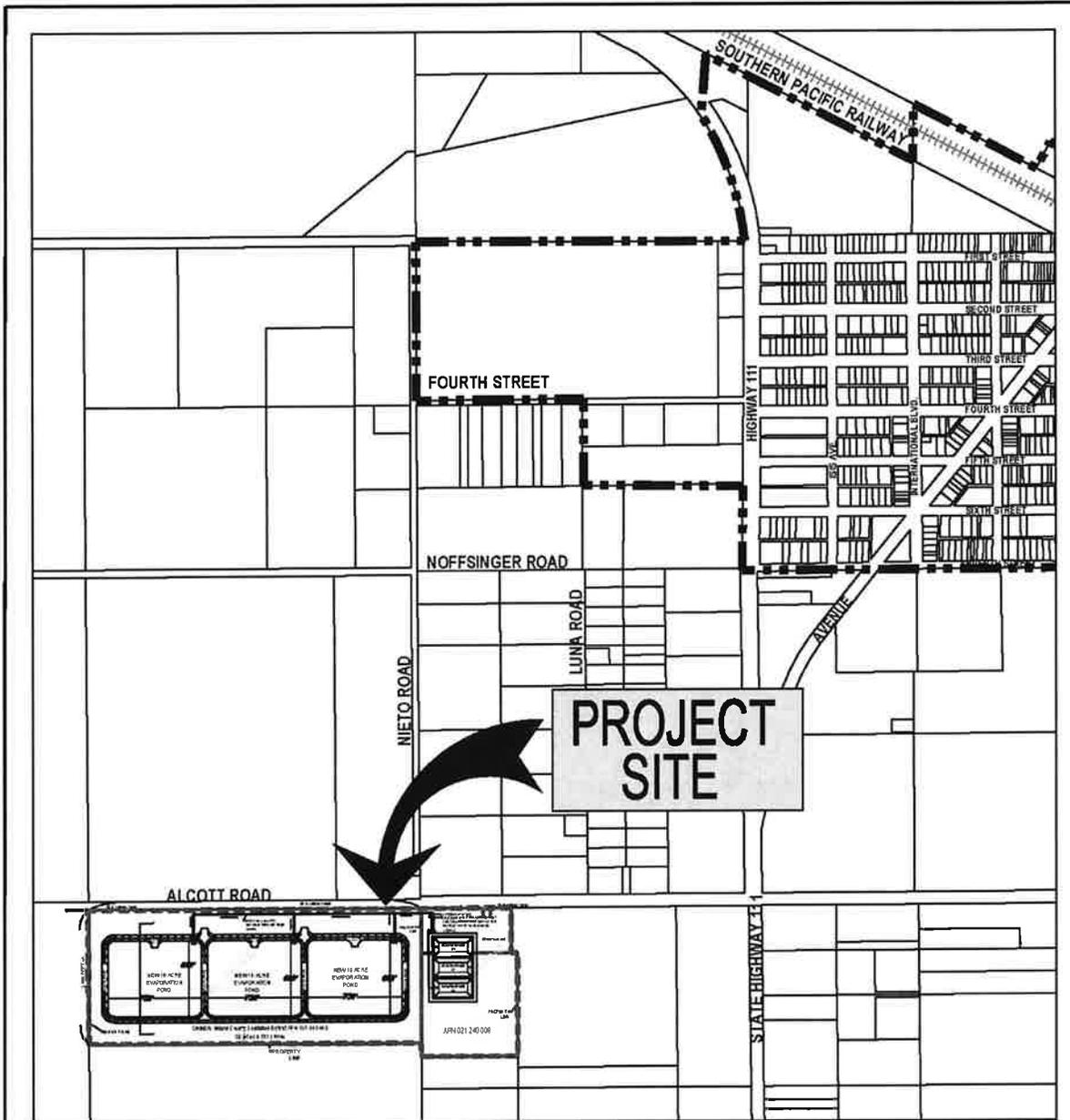
#### **E. General Plan Consistency:**

The Land Use Element of the General Plan designates the area for agricultural land uses. The Land Use Compatibility Matrix identifies special facilities such as wastewater treatment as being conditionally compatible within areas designated for agricultural land use. This is supported by Zoning Code which requires a Conditional Use Permit for wastewater treatment plant in the A-2 (General Agriculture) zone.

Goal #8 of the Land Use Element is to coordinate local land use planning activities among all local jurisdictions and state and federal agencies. Furthermore, Goal #8.7 is to ensure the development, improvement, timing, and location of community sewer, water, and drainage facilities will meet the needs of existing communities and new developing areas. The purpose of the improvement project is to correct deficiencies in the Niland wastewater treatment and to ensure compliance with state and federal requirements related to wastewater discharge.

Protection of environmental resources is an important goal covered in Goal #9 of the Land Use Element. Significant natural, cultural, and community character resources and the County's air and water quality are to be identified and preserved. As shown in this Initial Study and Mitigated Negative Declaration, mitigation measures are included to ensure that impacts to the environment are minimal.

# Exhibit "A" Vicinity Map



LEGEND:

**NILAND SERVICE AREA**
 **PROJECT LOCATION**

<b>The Holt Group, Inc.</b> ENGINEERING · PLANNING · SURVEYING 1601 N. Imperial Ave. El Centro, California 92243 (760)337-3183	 NOT TO SCALE	NILAND COUNTY SANITATION DISTRICT	<b>VICINITY MAP</b> PROJECT No. 542.090 DATE : May 2019
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## EVALUATION OF ENVIRONMENTAL IMPACTS:

- 1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- 2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
- 4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).
- 5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
  - a) Earlier Analysis Used. Identify and state where they are available for review.
  - b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
  - c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
- 6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- 7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
- 8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
- 9) The explanation of each issue should identify:
  - a) the significance criteria or threshold, if any, used to evaluate each question; and
  - b) the mitigation measure identified, if any, to reduce the impact to less than significance

**I. AESTHETICS**

Except as provided in Public Resources Code Section 21099, would the project:

- a) Have a substantial adverse effect on a scenic vista or scenic highway?

*There are no designated scenic highways in Imperial County (California Department of Transportation 2012). State Route 111 is considered eligible for scenic highway designation, approximately 15 miles north of the project site, where the roadway runs adjacent to the Salton Sea. The project site would not be visible from eligible portions of the highway. Additionally, the project site is not located within a scenic vista. The nearest major roadway is State Route 111, which is located approximately 0.5 miles to the east and contains limited views of the existing WWTP and project site. Therefore, the project would not create impacts and no mitigation measures are required.*

- b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

*The proposed project would not substantially damage scenic resources, nor is the site adjacent to designated or eligible state or federal scenic highway (see response to 1a). Therefore, the project would not create impacts and no mitigation measures are required.*

- c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surrounding? (Public views are those that are experienced from publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

*The project site is within the fenced boundaries of an existing WWTP; therefore, the proposed expansion would be consistent with the visual character of the site. Views in the vicinity are characteristic of the region, dominated by low lying agriculture in the foreground with desert mountains in the background. The low height profile of the proposed expansion of the NCSW WWTP would not constitute a substantial shift in the viewshed from State Route 111 and nearby residences. Additionally, structures located within the WWTP site that are no longer required would be removed. Therefore, the low visual sensitivity of the project vicinity and the low-profile of the proposed project would result in less than significant impacts.*

- d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

*The project does not contain substantial new sources or light or glare that would adversely affect day or nighttime views. Therefore, the project would not create impacts and no mitigation measures are required.*

**II. AGRICULTURE AND FOREST RESOURCES**

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. --Would the project:

- a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

*The affected land is located entirely within the existing 17.46-acre NCSW WWTP site and is not considered "Prime Farmland", "Unique Farmland", or "Farmland of Statewide or Local Importance" (California Department of Conservation [CDC] 2007). The project site is designated by the state of California's Important Farmland Map as "Other" (i.e., developed land). Additionally, the project is intended to serve the existing NCSW service area and would therefore not result in additional development that could result in the conversion of agricultural lands to non-agricultural uses. Therefore, the project would not create impacts and no mitigation measures are required.*

- b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?

**The existing parcel is not within a Williamson Act contract. While the site is zoned for agriculture, the proposed project would be consistent with the existing use of the site for wastewater treatment. Further, WWTPs are considered acceptable uses within agriculturally zoned lands. Therefore, implementation of WWTP improvements would be consistent with existing land use and would not conflict with surrounding agricultural land use.**

- c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?

**No forest land is located within or in the vicinity of the project site. Therefore, the project would not create impacts and no mitigation measures are required.**

- d) Result in the loss of forest land or conversion of forest land to non-forest use?

**No forest land is located within or in the vicinity of the project site. Therefore, the project would not create impacts and no mitigation measures are required.**

- e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

**The WWTP improvement project will not convert agricultural lands, nor impact existing agricultural uses or activities. Improvements are intended to address operational deficiencies and would not result in an expansion of the NCSD service area that would potentially result in conversion of agricultural lands to residential or other uses. Therefore, the project would not create impacts and no mitigation measures are required.**

### III. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to the following determinations. Would the Project:

- a) Conflict with or obstruct implementation of the applicable air quality plan?

**The proposed WWTP improvement activities would result in short-term construction emissions over a period of approximately 8 months, which would remain below Imperial County thresholds. Long-term emissions would be minimal. Therefore, the project would be consistent with the Imperial County Air Pollution Control District (ICAPCD) "Air Quality Attainment Plan" for projected emissions from proposed project activities.**

- b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

**Implementation of the proposed project, if conducted simultaneously with pending and proposed projects in the region, would have the potential to cumulatively impact air quality in the immediate area; however, impacts would be short-term, and the use of standard Imperial County MMs would reduce impacts to less than significant levels. In addition, the proposed wastewater system improvements would constitute a minor contribution towards cumulative impacts, given the scale and potential effects of proposed projects.**

- c) Expose sensitive receptors to substantial pollutants concentrations?

**The nearest sensitive receptors to the proposed project are residences located approximately 1,200 feet to the north of the WWTP site. Buffer requirements for WWTPs range from 250 to 1,000 feet from sensitive receptors (residential properties). The residence located nearest the Niland WWTP is approximately 1,600 feet northeast of the existing WWTP and it is anticipated that the project's short-term air quality impacts would negligibly affect sensitive receptors. No mitigation measures are required with implementation of standard MMs required by the Imperial County APCD.**

- d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people?)

*The proposed percolation ponds associated with the proposed project have the potential to generate odors. Hydrogen sulfide and ammonia-based compounds are common odor pollutants emitted from WWTPs. Under the proposed project, the percolation ponds would be constructed approximately 3,500 feet southwest of Niland, and approximately 1,200 feet southwest of the nearest residences. Despite this buffer, the potential for odors to occur to adjacent residences and within Niland exists under the proposed project; however, the project setback exceeds the EPA-prescribed 1,000-ft setback. Therefore, long-term operation of the proposed WWTP improvements under the proposed project may increase odors beyond baseline conditions but would generate less than significant odor effects for sensitive receptors. Therefore, no mitigation measures need be considered.*

**MITIGATION MEASURES (for a and b):**

*The following mitigation measures are intended to reduce air quality impacts for the proposed project. The project must adhere to Rule 310 and a "Fugitive Dust Control Plan" shall be submitted to the ICAPCD 10- days prior to any earthmoving activity with dust emissions limited to 20% opacity at all times. A copy of the "Fugitive Dust Control Plan" shall be kept at the site at all times. The on-site contractor shall obtain ICAPCD's approval of all applicable permits in order to reduce future emissions relating to the grading/construction activities, prior to issuance of building permits, to a less than significant level.*

**Mitigation Measures for Dust Control and NOx:**

- **AQ-1 Fleet Modernization for On-road Haul Trucks.**
  - Trucks hauling materials such as debris or fill shall sprinkle to mitigate blowing dust prior to leaving the site.
  - Idling shall be restricted to a maximum of 5 minutes when not in use.
  - All on-road heavy-duty diesel trucks with a gross vehicle weight rating of 19,500 pounds or greater used on-site or to transport materials to and from the site shall comply with CARB 2010 on-road emission standards, where available.
- **AQ-2 Fleet Modernization for Off-road Equipment.**
  - All off-road equipment used at the site shall meet current requirements of CARB's OFF-ROAD diesel regulations.
  - Idling shall be restricted to a maximum of 5 minutes when not in use.
- All Track-Out or Carry-Out will be cleaned at the end of each workday or immediately when mud or dirt extends a cumulative distance of 50 linear feet or more onto adjacent paved roads.
- Movement of Bulk Material handling or transfer shall be stabilized prior to handling or at points of transfer with application of sufficient water, chemical stabilizers or by sheltering or enclosing the operation and transfer line.
- The construction of any new unpaved road is prohibited within any area with a population of 500 or more unless the road meets the definition of a Temporary Unpaved Road. Any temporary unpaved road shall be effectively stabilized, and visible emissions shall be limited to no greater than 20% opacity for dust emission by paving, chemical stabilizers, dust suppressants and/or watering.

**ICAPCD Measures for Construction Combustion Equipment**

- Use of alternative fueled or catalyst equipped diesel construction equipment, including all off-road and portable diesel-powered equipment.
- Limit, to the extent feasible, the hours of operation of heavy-duty equipment and/or the amount of equipment in use.
- Replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set). Should any transformers/generators be used on-site, an Authority to Construct/Permit to Operate application shall be submitted to the APCD.

- Construction equipment operating on-site should be equipped with two to four-degree engine timing retard or pre-combustion chamber engines.
- Construction equipment used for the project should utilize EPA Tier 2 or better engine technology.
- Keep vehicles well maintained to prevent leaks and minimize emissions and encourage employees to do the same.

IV. **BIOLOGICAL RESOURCES** *Would the project:*

- a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

***Construction activities associated with the proposed project would be temporary and would occur within the existing WWTP site, which is a disturbed area and contains no native habitat. The impact of most concern regarding wildlife would be indirect noise and dust related to construction; however, this impact would be temporary. Species that use adjacent agricultural land or residential areas are typically those that are accustomed to human presence and thus have a low potential for being impacted by the project. Ground disturbance is anticipated to result in low levels of siltation in the R-Drain and adjacent agricultural canals; however, these impacts would be minimized through the development of a Stormwater Pollution Prevention Plan (SWPPP), which would ensure implementation of MMs, including silt fencing and suspension of construction activities during rainy periods. The proposed project is therefore anticipated to have a negligible effect on aquatic habitats.***

***The potential exists for burrowing owls to occur within the project site; therefore, a survey for burrowing owl would occur prior to construction in accordance with CDFW guidelines (Appendix B). Implementation of this mitigation measure would reduce potential impacts to a less than significant level. No other sensitive habitats or species are known to occur within the immediate vicinity of the project area.***

- b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

***There are no riparian or other sensitive natural communities identified in any state or federal regional plans that would be adversely affected by the proposed project. Proposed improvements to the WWTP would eliminate discharge of water that is often in non-compliance for E-coli, copper, TSS, and BOD to the R-Drain. A decrease in pathogens and pollutants entering the water would incrementally improve water quality and associated aquatic and riparian habitats occurring within the R-Drain and Salton Sea. Improvements to water quality over existing conditions resulting from implementation of the project would constitute a beneficial impact to biological resources.***

- c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

***No wetlands are present within the project site and no significant adverse impacts on federally protected wetlands through filling or other means would occur during construction activities [see comment b) above]. No mitigation measures are required with implementation of standard MMs required by the Imperial County.***

- d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

**The project is located within an existing disturbed area adjacent to agricultural uses. Therefore, the project would not substantially interfere with the movement of any fish or wildlife species corridors or impede the use of wildlife nursery sites. No mitigation measures are required given impacts would be less than significant.**

- e) Conflict with any local policies or ordinance protecting biological resource, such as a tree preservation policy or ordinance?

**The project activities would occur within a previously developed site and would not conflict with any policies or ordinances protecting biological resources or tree preservation ordinance. Therefore, the project would not create impacts and no mitigation measures are required.**

- f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

**The project activities would not substantially interfere with or conflict with an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, the project would not create impacts and no mitigation measures are required.**

**MITIGATION MEASURES: (for a)**

**Presence/absence surveys per the California Burrowing Owl Consortium (CBOC) protocol (1993) shall be conducted prior to initiation of the project to determine the location and abundance of Burrowing Owls within the project site. The survey protocol requires a focused burrow survey to identify the potential for the area to support burrowing owls. If the survey area contains natural or man-made structures that could potentially support burrowing owls, or owls are observed during the burrow survey, then three subsequent surveys will be required. The CDFW and/or lead agency may require mitigation for impacts on Burrowing Owls or their burrows. Impacts as defined by the CBOC include the following:**

- **Disturbance or harassment within 50 meters (approx. 169 ft) of occupied burrows;**
- **Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to Borrowing Owls;**
- **Degradation of foraging habituated adjacent to occupied burrows**

**Burrowing Owls and their active burrows shall be avoided, if possible. Occupied burrows shall not be disturbed during the nesting season (February 1 – August 31) unless formally approved by CDFW. If impacts on Burrowing Owls are unavoidable, on-site mitigation in the form of passive relocation of the Burrowing Owls may be required. Passive relocation is deemed as prompting owls to move from occupied burrows within the proposed impact area to a natural or artificial burrow at least 50 meters from the impact area. This relocation can be accomplished by installing one-way doors on the burrow entrances and leaving them in place 48 hours to ensure that owls have left the burrow before the burrow is collapsed. Relocation of Burrowing Owls should only be implemented during the non-breeding season. Detailed information on passive relocation and other Burrowing Owl mitigation information can be found in the CBOC guidelines/ mitigation. With implementation of the aforementioned mitigation, impacts on Burrowing Owls would be reduced to below a level of significance.**

**V. CULTURAL RESOURCES Would the project:**

- a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

**There are eleven cultural resources listed in the National Register of Historic Places in Imperial County. The closest resources to the project site are located in Salton City and El Centro, approximately 25 miles west and 30 miles south of the site (National Park Service 2004). A cultural resource records search for the Niland area was conducted for the proposed project in May 2012 through the South Coastal Information Center (SCIC) within the California Historic Resource Information System. A total of 21 cultural resources surveys and studies have been conducted within a 0.5-mile radius of Niland and three have occurred within portions of the WWTP site. The results of the records search determined that there are no recorded historic resources within 0.5 miles of the project site (SCIC 2012). Therefore, no impacts to historic resources are anticipated under implementation of the proposed project.**

- b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

**The May 2012 cultural resource records search identified total of 21 cultural resources surveys and studies conducted within a 0.5-mile radius of Niland and three that have occurred within portions of the WWTP site. The results of the records search determined that there are no recorded prehistoric resources within 0.5 miles of the project site (SCIC 2012). Therefore, the project is not anticipated to result in an adverse change in any significant archaeological resources.**

- c) Disturb any human remains, including those interred outside of dedicated cemeteries?

**There are no human remains or formal cemeteries on-site or immediately off-site; however, during surface disturbance and construction in the event cultural resources are found, then the mitigation measures listed below shall be implemented to reduce cultural resource impacts to a less than significant level.**

**MITIGATION MEASURES: (for V.b and V.c)**

**V.b) In the event archaeological resources potentially eligible for the CRHR are encountered, surface disturbing work in the immediate vicinity of the discovery shall temporarily halt until appropriate treatment of the resource is determined by a qualified archaeologist in accordance with the provisions of CEQA Section 15064.5. The archaeological monitor shall have the authority to re-direct construction equipment in the event archaeological resources potentially eligible for the CRHR are encountered.**

**V.c) In the event that human remains are encountered during ground-disturbing activities, all ground-disturbing activities in the vicinity of the find would be stopped. The County Coroner would be notified in compliance with all relevant federal regulations and as required by CEQA Guidelines, Section 15064.5(e). All parties involved would ensure that any such remains are treated in a respectful manner and that all applicable state and federal laws are followed. If human remains are found to be of Native American origin, or if associated grave goods or objects of cultural patrimony are discovered, the provisions of the Native American Graves Protection and Repatriation Act [NAGPRA] would be followed. The Native American Heritage Commission shall be asked to determine the descendants who are to be notified or, if unidentifiable, to establish the procedures for burial.**

**VI. ENERGY** Would the project:

- a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

**By its nature, evaporation ponds utilize solar energy to evaporate water. The installation of evaporation ponds would require the installation of additional pumps to transfer treated wastewater from the treatment facility. The pumps have minimal energy demand and would only operate at limited times. Additional energy use may be required to occasionally aerate the ponds, but this only occurs sporadically. Thus, there would be no impact to energy resources.**

- b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

**Energy demands are de minimis (as noted in VI.a. above) and therefore would not conflict or obstruct local plans.**

**VII. GEOLOGY AND SOILS** Would the project:

- a) Directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving:
- 1) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?

**No known active faults are located in the project area and no Alquist-Priolo Earthquake Fault Zoning has been established by the State for the planning area. Consequently, based on documented conditions the potential**

*for ground rupture is low. However, numerous faults and a seismic zone are located in the vicinity of Niland and the proposed project area would potentially be affected by ground shaking from these faults (California Department of Conservation 2008). Therefore, the proposed facilities would be constructed in accordance with the California State Building Code (Title 24 of the California Administrative Code), which contains specifications to minimize adverse effects due to ground shaking from earthquakes and liquefaction. No mitigation measures are required with implementation of standard building code standards as required by Imperial County.*

- 2) Strong Seismic ground shaking?

*The site is located in Imperial Valley which experiences earthquakes on a daily basis; therefore, the site may be subject to strong seismic ground shaking. No residential structures or habitable structures would be constructed as part of this project, which would reduce the potential risk of loss, injury or death to less than significant. No mitigation measures are required with implementation of California State Building Code standards as required by Imperial County.*

- 3) Seismic-related ground failure, including liquefaction and seiche/tsunami?

*The potential for seismic-related ground failure, liquefaction or a seiche/tsunami is not considered to be significant; however, a geotechnical study is currently being performed and the project would be constructed in accordance with the California State Building Code, which would reduce impacts to less than significant [see comment 1) above].*

- 4) Landslides?

*There is no potential for landslides due to the relatively flat topography of the site and vicinity. Therefore, the project would not create impacts and no mitigation measures are required.*

- b) Result in substantial soil erosion or the loss of topsoil?

*Soil disturbance associated with short-term construction activities would occur on non-prime soils. Erosion would be lessened through standard erosion control MMs (refer to Appendix B), and provisions to prevent soil erosion would be incorporated into the SWPPP to be developed prior to construction. Operation of the proposed project would not result in substantial exposure of vegetated soil or contain substantial runoff that would result in potential soil erosion or loss of topsoil. Therefore, with implementation of the MMs, impacts would be less than significant.*

**MITIGATION MEASURES: (for VI.b)**

*A geotechnical investigation of the project site shall occur prior to implementation of the project to determine the precise soil conditions. Based on the results of this investigation, appropriate design measures shall be incorporated into final engineering and Stormwater Pollution Prevention Plan of the WWTP improvements. Temporary soil stabilization measures shall be implemented at regular intervals throughout the defined rainy season to achieve and maintain the contract's disturbed soil area requirements. When the project's Special Provisions require it, temporary soil stabilization BMPs will be implemented 20 days prior to the defined rainy season. Non-active areas shall be stabilized within 14 days of cessation of construction activities.*

- c) Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse?

*A geotechnical investigation of the project site will be required to determine the precise soil and groundwater conditions (refer to mitigation measures below). Based on the results of this investigation, appropriate design and construction measures would be implemented to ensure that impacts would be less than significant.*

- d) Be located on expansive soil, as defined in the latest Uniform Building Code, creating substantial direct or indirect risk to life or property?

*A geotechnical investigation of the project site will be required to determine the precise soil and groundwater conditions (see to mitigation measures below). Based on the results of this investigation, appropriate design and construction measures would be implemented into the final engineering design to ensure that impacts would be less than significant.*

- e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

**A geotechnical investigation of the project site will be required to determine the precise soil and groundwater conditions (see to mitigation measures below). Based on the results of this investigation, appropriate design and construction measures would be implemented to ensure that impacts would be less than significant.**

- f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

**There are no paleontological resources or unique geologic features within the vicinity of the project site and therefore would not result in any adverse impacts.**

**MITIGATION MEASURES: (for VI.c, VI.d, and VI.e)**

**VI.c), VI.d), and VI.e) A geotechnical report shall be prepare and based on the results of the geotechnical investigation of the project site, appropriate design and measures shall be incorporated into final engineering and design of the WWTP improvements.**

**VIII. GREENHOUSE GAS EMISSION Would the project:**

- a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

**Based on the CALCEmod modeling of the project, short-term construction is anticipated to result in approximately 210.9 tons of GHGs per year during construction. Operational GHG emissions are anticipated to be approximately 565.5 tons per year (Appendix A). These amounts would not be significant on a local or regional scale or conflict with applicable plans or policies. Therefore, the project would not create impacts and no mitigation measures are required.**

- b) Conflict with an applicable plan or policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

**The project activities are not anticipated to conflict with a GHG plan, policy or regulations for reducing GHG emissions. Therefore, the project would not create impacts and no mitigation measures are required.**

**IX. HAZARDS AND HAZARDOUS MATERIALS Would the project:**

- a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

**Upon implementation of the proposed project, waste conveyed to the wastewater treatment system would be contained within the system until fully treated. No newly introduced hazardous chemicals would be used or stored in the maintenance of operation of the WWTP. The percolation ponds would need to be drained and waste sludge (bio-solids) removed two to four times per year and it is anticipated that bio-solids would either be land-applied or disposed of at an appropriate landfill. Appropriate disposal of bio-solids would be determined in a Bio-Solids Management Plan, which would be developed as part of the final WWTP improvements design and would be consistent with local, state, and federal regulations. Other hazardous waste that would potentially be created, disturbed, moved, or used as part of the proposed project would be treated or disposed of with the appropriate permit and in accordance with the Resource Conservation and Recovery Act 42 USC 6901- Treatment, Storage, or Disposal of Hazardous Wastes. The project would eliminate the discharge of untreated or partially treated wastewater into the environment and would constitute a beneficial impact to disposal of hazardous materials.**

- b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

**The proposed activities are not anticipated to create a significant hazard by releasing hazardous materials into the environment through implementation of appropriate standard procedures [see comment a) above]. The project would eliminate the discharge of untreated or partially treated wastewater into the environment and would constitute a beneficial impact to management of hazardous materials.**

- c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

**The proposed project is intended to improve the management of waste. No school, existing or proposed is located within one-quarter of a mile from the project site. Therefore, the project would not create impacts and no mitigation measures are required.**

- d) Be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

**The existing project site is not located on a list of hazardous materials site and is not in the vicinity of a hazardous materials site; therefore, the project would not create a significant public or environmental hazard.**

- e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

**The project site is not located within an airport land use plan or within two miles of a public airport or a public use airport. Therefore, the project would not create impacts and no mitigation measures are required.**

- f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

**The proposed project would not impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, the project would not create impacts and no mitigation measures are required.**

- g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

**The project would not expose people or structures to a significant loss, injury or death involving wildland fires. Therefore, the project would not create impacts and no mitigation measures are required.**

**X. HYDROLOGY AND WATER QUALITY Would the project:**

- a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

**Short-term impacts to surface water could result from run-off related to construction of the proposed wastewater treatment system improvements. Ground-disturbing activities associated with the proposed project would involve new construction of percolation ponds, an approximately 326-feet by 150-feet and 5-feet deep emergency overflow pond, an effluent pump station and a 6-inch PVC C-900 force main. Site preparation activities (e.g., grading, trenching) and construction would result in temporary exposure and compaction of soils, affecting surface water drainage flow patterns and percolation rates. In addition, a SWPPP would be developed prior to construction that would outline and ensure application of MMs, potentially including silt fencing, and suspension of construction activities during rainy periods, which would mitigate the effects of increased surface water runoff and sedimentation.**

**Implementation of the proposed project is intended to address compliance issues associated with the requirements of the existing WWTP's NPDES permit and requirements of the RWQCB, thereby reducing the potential for under-treated wastewater to enter the environment. The project would convert the existing Niland WWTP from a surface water discharge plant, with treated effluent currently discharging to the R-Drain, to an onsite land discharge system. Implementation of the project would involve the discharge of treated wastewater into percolation ponds (land effluent discharge), where treated wastewater would enter the groundwater or evaporate. Land disposal would offer additional treatment and eliminate**

**the discharge of wastewater to the R-Drain that is often in non-compliance with standards established for E-coli, copper, TSS, and BOD. High levels of pathogens and other pollutants currently found in the R-Drain, and consequently in the Salton Sea, would be reduced upon implementation of the proposed project. Therefore, the project would eliminate a source of water quality degradation in violation of standards and would constitute a beneficial impact to the operation and management of waste discharge.**

- b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

**A geotechnical investigation of the project site would occur prior to implementation of the project to determine the precise soil and groundwater conditions (see mitigation measure X.b below). Based on the results of this investigation, appropriate design and construction measures would be implemented to ensure that impacts would be less than significant.**

- c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site?

**The proposed activities will not substantially alter the existing drainage pattern of the site/area, or substantially alter the course of the R-Drain or other vicinity waterways resulting in substantial on- or off-site flooding. Therefore, the project would not create impacts and no mitigation measures are required.**

- (i) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or;

**The proposed activities will not create or contribute runoff water or provide substantial additional sources of polluted runoff as described in IX.a). Therefore, the project would not create impacts and no mitigation measures are required.**

- (ii) impede or redirect flood flows?

**The proposed activities will not occur within a 100-year flood hazard area or delineated map area (FEMA 2008); therefore, no impact would occur.**

- d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

**The project site is not located within a 100-year flood hazard area as noted above. The project site is not located within a low-lying coastal and therefore would not be subject to tsunami. The project site is within the vicinity of the Salton Sea, but no occurrences of seiches at the Salton Sea have been documented. Therefore, there is no risk of pollutant release due to project inundation.**

- e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

**The project is subject to compliance with all local, state and federal laws. No component of the project conflicts with or obstructs the implementation of a water quality control plan or sustainable groundwater management plan**

**MITIGATION MEASURES: (for X.b)**

A geotechnical investigation of the project site shall occur prior to implementation of the project to determine the precise soil and groundwater conditions. Based on the results of this investigation, appropriate design and measures shall be incorporated into final engineering and design of the WWTP improvements.

Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
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XI. **LAND USE AND PLANNING** *Would the project:*

- a) Physically divide an established community?

**The proposed project will not divide an established community as all proposed development will occur within an existing vacant parcel. There are rural residential homes to the north of the project site but there are not other residential structures on other sides of the project site. Therefore, the project would not create impacts and no mitigation measures are required.**

- b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

**The proposed project is located within the area of the existing NCSD WWTP and within a currently vacant site. WWTPs are permitted within A1 zoned lands with a Conditional Use Permit. The project would not conflict with a land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect.**

XII. **MINERAL RESOURCES** *Would the project:*

- a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

**The proposed project would not result in the loss of availability of a known valuable mineral resource. Therefore, the project would not create impacts and no mitigation measures are required.**

- b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

**The proposed project will not result in a loss of availability of a mineral resource recovery site in a general plan, specific plan or other land use plan. Therefore, the project would not create impacts and no mitigation measures are required.**

XIII. **NOISE** *Would the project result in:*

- a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

**Implementation of the proposed project would entail construction of two percolation ponds and an emergency overflow basin, as well as a lift station and 6-inch force main, which would require trenching, soil movement, pipe laying, and other similar construction activities over a 12-month period. Noise would occur during the construction of the lift station, force main, percolation ponds and emergency overflow basin; however, such impacts would be short-term and would occur largely along existing roadways adjacent to farmland, which is not considered a sensitive receptor. During construction, implementation of the proposed project would result in noise levels that are higher than existing ambient levels. However, construction noise generated during implementation of the proposed project would be short-term and temporary and would be reduced through standard Imperial County MMs for noise attenuation (e.g., the use of equipment sound mufflers and restriction of construction activity to normal working hours). The project would be required to comply with Imperial County Noise Element standards, which apply to noise measured at the nearest sensitive receptor (typically adjacent residences). County standards would require construction equipment operation to be limited to the hours of 7 a.m. to 7 p.m. Monday through Friday, and 9 a.m. to 5 p.m. Saturday, unless the Director of the Planning and Development Services Department directs otherwise. No commercial construction operations are permitted on Sunday or holidays (Imperial County 2008). Therefore, short-term noise impacts would be reduced to less than significant levels.**

**Long-term operational noise of the lift station under the proposed project would result in a new source of noise; however, noise generated would be consistent with the operation of WWTP machinery. Noise buffer requirements for WWTPs range from 250 to 1,000 feet from sensitive receptors (residential properties), depending on the noise controls included in the WWTP design. The residence located nearest the Niland WWTP is approximately 1,600 feet northeast of the existing WWTP and it is anticipated that the proposed project would negligibly increase noise associated with the WWTP. Resulting noise generation and exposure would therefore be less than significant.**

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
b) Generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**The proposed project would not expose people to excessive groundborne vibration or groundborne noise and with the implementation of standard Imperial County MMs (see discussion XIII.a); therefore, impacts would be less than significant.**

c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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**The nearest airport to the project site is the Cliff Hatfield Memorial airport which is approximately 6.75 miles from the project site. There are no private airfields within proximity of the project. Therefore, there would no impacts.**

**XIV. POPULATION AND HOUSING Would the project:**

a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and business) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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**The proposed project is intended to serve the existing residents and clients within the NCSD service area. Implementation of proposed project would result in the construction of wastewater treatment system improvements, thereby reducing the discharge of pathogens and other pollutants to the environment. For project development, construction crews would likely be hired from the available pool of workers in Niland, Brawley, El Centro, and other nearby communities, resulting in an increase in short-term construction employment. Construction and development activities would likely provide temporary employment and economic activity in Niland. Maintenance and upkeep of the additional WWTP infrastructure would be conducted by existing NCSD staff; however, one part-time bookkeeper (or other staff) shall be hired to assist with the new billing process. Therefore, the project is not anticipated to directly or indirectly result in substantial population growth. Therefore, the project would not create impacts and no mitigation measures are required.**

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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**The proposed project would not displace any housing unit. It will not displace any population, as the project would be constructed within the fenced boundaries of the existing WWTP. Therefore, the project would not create impacts and no mitigation measures are required.**

**XV. PUBLIC SERVICES**

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
---	--------------------------	--------------------------	--------------------------	-------------------------------------

**The proposed project would not result in substantial adverse physical impacts on new or physically altered governmental facilities. Therefore, the project would not create impacts and no mitigation measures are required.**

1) Fire Protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
---------------------	--------------------------	--------------------------	--------------------------	-------------------------------------

**The proposed project would result in improvements to the existing WWTP and would not result in the requirement of new fire protection facilities or service capabilities in Niland or County areas. Therefore, the project would not create impacts and no mitigation measures are required.**

2) Police Protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
-----------------------	--------------------------	--------------------------	--------------------------	-------------------------------------

Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
--------------------------------------	--	-------------------------------------	----------------

**The proposed project would result in improvements to the existing WWTP, within the fenced boundaries of the existing facility and neighboring vacant lot; therefore, the project would not result in the requirement of new police protection facilities or service capabilities in Niland or County areas. Therefore, the project would not create impacts and no mitigation measures are required.**

3) Schools?

**The proposed project would not result in the inducement of new population growth that would require the construction of new or alter the existing school system. Therefore, the project would not create impacts and no mitigation measures are required.**

4) Parks?

**The proposed project would not require the construction of any new parks in the vicinity of the project site. Therefore, the project would not create impacts and no mitigation measures are required.**

5) Other Public Facilities?

**The proposed project would not require the construction of any new or alter any existing public facilities. Therefore, the project would not create impacts and no mitigation measures are required.**

**XVI. RECREATION**

a) Would the project increase the use of the existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

**The proposed project would provide improved wastewater treatment services to Niland. Since the proposed project would not directly induce growth and would constitute a less than significant impact to population and housing, the project would not increase the use of existing regional parks and other recreational facilities. Therefore, the project would not create impacts and no mitigation measures are required.**

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment?

**The proposed project would not include recreational facilities or need to construct or expand existing recreational facilities. Therefore, the project would not create impacts and no mitigation measures are required.**

**XVII. TRANSPORTATION      Would the project:**

a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

**Under proposed project, construction activities would occur within the Niland WWTP site, away from existing major roadways. It is anticipated the construction vehicles would access the site regionally from SR-111 to Alcott Road to the project site. During construction, a less than significant increase in construction relation traffic would occur. During construction, roadway access to Alcott Road by residents or users of the area would potentially be temporarily restricted during movement of construction equipment or larger infrastructure components. Short-term impacts regarding access would be minimized by the use of standard engineering and traffic management practices and adherence to the Engineering Design Guidelines Manual for the Preparation and Checking of Street Improvement, Drainage, and Grading Plans within Imperial County. Once operational, the proposed project would not impact roadways or other transportation methods. Therefore, the project would not conflict with a plan, ordinance, or policy for performance of the circulation system, taking into account all modes of transportation, mass transit, non-motorized travel, intersections, highways, freeways, pedestrian and bicycle paths and would not create impacts. No mitigation measures are required.**

b) Would the project conflict or be inconsistent with the CEQA Guidelines section 15064.3, subdivision (b)?

Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
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**The proposed project would not conflict or be inconsistent with the CEQA Guidelines section 15064.3, subdivision (b). Therefore, the project would not create impacts and no mitigation measures are required.**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| c) Substantially increases hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|

**The proposed project does not involve the redesign or modification of the existing road network. There would be no changes therefore no increase in hazards would occur. Therefore, the project would not create impacts and no mitigation measures are required.**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| d) Result in inadequate emergency access? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|

**The proposed project does not involve the redesign or modification of the existing road network. Therefore, the project would not create impacts and no mitigation measures are required.**

**XVIII. TRIBAL CULTURAL RESOURCES**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place or object with cultural value to a California Native American tribe, and that is: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as define in Public Resources Code Section 5020.1(k), or  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

**The proposed project does not cause any substantial adverse change in any cultural site, feature, place, cultural landscape or a place of cultural value to a California Native American tribe. There are eleven cultural resources listed in the National Register of Historic Places in Imperial County. The closest resources to the project site are located in Salton Sea and El Centro, Approximately 25 miles west and 30 miles south of the site. The results of the records as resource surveys and studies have been conducted within 0.5 miles of the project site meaning no Historical Resources will be affected. Therefore, the project would not create impacts and no mitigation measures are required.**

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| (ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|

**The proposed project applies the criteria set forth in subdivision 5024.1. The design/construction plans shall incorporate language that stipulates that if buried cultural materials are encountered during construction, work in the area must halt until a qualified archaeologist can evaluate the nature and significance of the finding.**

**XIX. UTILITIES AND SERVICE SYSTEMS Would the project:**

- |   |                          |                          |                                     |                          |
|---|--------------------------|--------------------------|-------------------------------------|--------------------------|
| a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|-------------------------------------|--------------------------|

Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
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drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects?

**The proposed project would not increase storm water runoff and, therefore, would not require expansion of existing storm water facilities or construction of new storm water drainage systems. The project would incorporate construction of an emergency overflow pond, which would maintain capacity required for potential stormwater related overflow that could result in adverse environmental effects; therefore, impacts would be less than significant.**

- b) Have sufficient water supplies available to serve the project from existing and reasonably foreseeable future development during normal, dry and multiple dry years?

**The proposed project would not require new sources or additional quantities of water; therefore, it is anticipated that existing water supplies will remain sufficient to serve the proposed project. Therefore, the project would not create impacts and no mitigation measures are required.**

- c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

**Under implementation of the proposed project, improvements to the existing WWTP system would eliminate discharge of wastewater that does not meet regulatory requirements through the development of appropriate wastewater collection infrastructure. Since the NCSD is currently in non-compliance with their NPDES permit, the proposed project would have a beneficial impact on wastewater treatment services in Niland.**

- d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

**Waste sludge (bio-solids) from the evaporation ponds would need to be removed two to four times per year and it is anticipated that bio-solids would either be land-applied or disposed of at an appropriate landfill. Appropriate disposal of bio-solids would be determined in a County-required Bio-Solids Management Plan, which would be developed as part of the final WWTP improvements design and would be consistent with local, state, and federal regulations. The project would be served by a landfill with sufficient permitted capacity to accommodate such project's solid waste disposal needs. Therefore, project impacts would not create impacts and no mitigation measures are required.**

- e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

**The proposed project would comply with federal, state, local statutes and regulations relating to solid waste, and would therefore result in a less than significant impact, with no mitigations required.**

**XX. WILDFIRE**

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:

- a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

**The proposed project would not substantially impair an adopted emergency response plan or emergency evacuation plan. Therefore, the project would not create impacts and no mitigation measures are required.**

- b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled

	Potentially Significant Impact (PSI)	Potentially Significant Unless Mitigation Incorporated (PSUMI)	Less Than Significant Impact (LTSI)	No Impact (NI)
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spread of a wildfire?

***The proposed project does not exacerbate wildfire risks or expose project occupants to pollutant concentrations from a wildfire. Therefore, the project would not create impacts and no mitigation measures are required.***

- |  |                          |                          |                          |                                     |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|

***The proposed project does not require the installation or maintenance of associated infrastructure that can exacerbate fire risks or result in temporary or on going impacts to the environment. Therefore, the project would not create impacts and no mitigation measures are required.***

- |   |                          |                          |                          |                                     |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|
| d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|-------------------------------------|

***The proposed project does not expose people or structure to significant risks as stated. There is no potential for landslides due to the relatively flat topography of the site and vicinity. Therefore, the project would not create impacts and no mitigation measures are required.***

## SECTION 3

### III. MANDATORY FINDINGS OF SIGNIFICANCE

The following are Mandatory Findings of Significance in accordance with Section 15065 of the CEQA Guidelines.

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, eliminate tribal cultural resources or eliminate important examples of the major periods of California history or prehistory? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c) Does the project have environmental effects,   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**which will cause substantial adverse effects on human beings, either directly or indirectly?**

#### **IV. PERSONS AND ORGANIZATIONS CONSULTED**

This section identifies those persons who prepared or contributed to preparation of this document. This section is prepared in accordance with Section 15129 of the CEQA Guidelines.

##### **A. COUNTY OF IMPERIAL**

- Jim Minnick, Director of Planning & Development Services
- Michael Abraham, AICP, Assistant Director of Planning & Development Services
- Imperial County Air Pollution Control District
- Department of Public Works
- Fire Department
- Ag Commissioner
- Environmental Health Services
- Sheriff's Office

##### **B. OTHER AGENCIES/ORGANIZATIONS**

- Imperial Irrigation District
- Regional Water Quality Control Board

***(Written or oral comments received on the checklist prior to circulation)***

## V. REFERENCES

Border Environment Cooperation Commission (BECC), U.S. Environmental Protection Agency (USEPA), and U.S. Department of Agriculture – Rural Assistance (USDA). 2016. Niland Sanitary District Wastewater Treatment Plant Improvements Environmental Assessment (EA)

California Department of Water Resources. 2006. Salton Sea Draft Programmatic Environmental Impact Report.

California's Groundwater Bulletin. 2004. Hydrologic Region Colorado River, Imperial County Groundwater Basin. Bulletin 118. Available at: [http://www.water.ca.gov/pubs/groundwater/bulletin\\_118/basindescriptions/7-30.pdf](http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/7-30.pdf). Last updated February 27, 2004.

CalRecycle. Niland Solid Waste Site Summary Details. Available at: <https://www2.calrecycle.ca.gov/SWFacilities/Enforcement/Orders/>. Accessed on April 12, 2019.

"County of Imperial General Plan EIR", prepared by Brian F. Mooney & Associates in 1993; and as Amended by County in 1996, 1998, 2001, 2003, 2006 & 2008, 2015, 2016.

Imperial County Public Health Department. 2013. Health Indicators. Available at: <http://www.icphd.com/health-information-and-resources/data-&-statistics/health-status-report/>

Lafin, P. 1995. The Salton Sea: California's overlooked treasure. The Periscope, Coachella Valley Historical Society, Indio, California. 61 pp. Available at <http://www.sci.sdsu.edu/salton/PeriscopeSaltonSea.html>. Accessed 4 October 2012.

State of California Department of Fish and Game (CDFG). California Natural Diversity Database – Niland Quadrant. Accessed December 8, 2015.

State of California Department of Fish and Wildlife (CDFW). Salton Sea Abundant Bird Species. Available at: <https://www.wildlife.ca.gov/Regions/6/Salton-Sea-Birds/Salton-Sea-Bird-Species>. Access on December 29, 2015.

State of California Environmental Protection Agency (CalEPA). State Water Resources Quality Control Board (RWQCB). 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)

**NEGATIVE DECLARATION – County of Imperial**

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*The following Negative Declaration is being circulated for public review in accordance with the California Environmental Quality Act Section 21091 and 21092 of the Public Resources Code.*

---

**Project Name:** Wastewater Treatment Plant Improvement Project

**Project Applicant:** Niland County Sanitation District

**Project Location:** 125 Alcott Road, Niland, CA.

**Description of Project:** Improvements to the Niland County Sanitation District (NCSD) wastewater treatment plant system. Planned improvements include the rehabilitation of sections of the existing sanitary sewer collection system, critical components of the wastewater treatment plant, and the construction of three evaporation ponds on an approximate 56-acre parcel of land adjacent to the existing wastewater treatment plant.

**VI. FINDINGS**

This is to advise that the County of Imperial, acting as the lead agency, has conducted an Initial Study to determine if the project may have a significant effect on the environmental and is proposing this Negative Declaration based upon the following findings:

The Initial Study shows that there is no substantial evidence that the project may have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared.

The Initial Study identifies potentially significant effects but:

- (1) Proposals made or agreed to by the applicant before this proposed Mitigated Negative Declaration was released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur.
- (2) There is no substantial evidence before the agency that the project may have a significant effect on the environment.
- (3) Mitigation measures are required to ensure all potentially significant impacts are reduced to levels of insignificance.

A NEGATIVE DECLARATION will be prepared.

If adopted, the Negative Declaration means that an Environmental Impact Report will not be required. Reasons to support this finding are included in the attached Initial Study. The project file and all related documents are available for review at the County of Imperial, Planning & Development Services Department, 801 Main Street, El Centro, CA 92243 (442) 265-1736.

**NOTICE**

The public is invited to comment on the proposed Negative Declaration during the review period.

6-13-19      for [Signature]  
Date of Determination      Jim Minnick, Director of Planning & Development Services

The Applicant hereby acknowledges and accepts the results of the Environmental Evaluation Committee (EEC) and hereby agrees to implement all Mitigation Measures, if applicable, as outlined in the MMRP.

[Signature]      6/13/19  
Applicant Signature      Date

## SECTION 4

### VIII. RESPONSE TO COMMENTS

(ATTACH DOCUMENTS, IF ANY, HERE)

**IX. MITIGATION MONITORING & REPORTING PROGRAM (MMRP)**

(ATTACH DOCUMENTS, IF ANY, HERE)

S:\CEQA RULES\CEQA Rules 2018\Initial Study - Environmental Checklist Template 032219.docx



AIR POLLUTION CONTROL DISTRICT



April 26, 2019

**RECEIVED**  
APR 26 2019  
IMPERIAL COUNTY  
PLANNING & DEVELOPMENT SERVICES

Jim Minnick, Director  
Imperial County Planning & Development Services  
801 Main Street  
El Centro, CA 92243

SUBJECT: CUP 19-0006 / LLA 00307—Niland Wastewater Treatment Facility Improvements

Dear Mr. Minnick:

The Imperial County Air Pollution Control District ("Air District") would like to thank you for the opportunity to review and comment on Conditional Use Permit (CUP) 19-0006 and Lot Line Adjustment (LLA) 00307 submitted by the Imperial County Public Works Department that would allow for the rehabilitation of various components of the existing Niland County Sanitation District (NCSD) wastewater treatment facility at 125 Alcott Road in Niland, California. Planned improvements include the construction of three (3) evaporation ponds on an approximately 58-acre parcel of land on the south side of Alcott Road west of Highway 111 adjacent to the existing wastewater treatment plant (WWTP). Effluent from the existing WWTP will be pumped via a new pump station and deposited into three large open basins allowing water to evaporate through solar radiation and wind.

Air District Comments

Due to the potential for fugitive dust during construction of the three evaporation ponds the Air District politely requests that the applicant adhere to Regulation VIII Fugitive Dust Rules. Regulation VIII is intended to limit fugitive dust emissions to 20% opacity.

The Air District politely asks that the applicant arrange for a meeting with Air District personnel to discuss a necessary modification to the applicant's current permit for the additional pumps. At that time the applicant can discuss with Air District personnel the proper methods to mitigate the accumulated solids from becoming airborne during a wind event.

The applicant references a Lot Line Adjustment as part of the application. Based on the submitted documents, the Air District is unclear as to what lot line(s) are to be adjusted. The Air District politely asks for clarification on this matter.

Air District rules and regulations can be found on our website at [www.co.imperial.ca.us/Air Pollution](http://www.co.imperial.ca.us/AirPollution) under the "Planning" tab. The Air District can be contacted at (442) 265-1800.

Sincerely,

A handwritten signature in blue ink that reads "Curtis Blondell". The signature is written in a cursive style.

Curtis Blondell  
Environmental Coordinator





# IID

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April 24, 2019

**RECEIVED**

APR 24 2019

IMPERIAL COUNTY  
PLANNING & DEVELOPMENT SERVICES

Mr. Patricia Valenzuela  
Planner IV  
Planning & Development Services Department  
County of Imperial  
801 Main Street  
El Centro, CA 92243

**SUBJECT: Niland County Sanitation District's Wastewater Treatment Facility Rehabilitation (CUP19-0006/LLA00306)**

Dear Ms. Valenzuela:

On April 17, 2019, the Imperial Irrigation District received from the Imperial County Planning & Development Services Department, a request for agency comments on Conditional Use Permit no. 19-0006/Lot Line Adjustment no. 00306. The applicant, Imperial County Public Works, proposes the rehabilitation of the existing Niland County Sanitation District's wastewater treatment facility located at 125 Alcott Road, Niland, CA (APNs 021-240-002-000, -001-000, -006-000 and -005-000)

The IID has reviewed the information provided and has the following comments:

1. Given that the project contemplates increasing the existing pump size at the wastewater treatment plant, the applicant should be advised to contact Ignacio Romo, the IID service planner assigned to the area, at (760) 482-3444 or by e-mail at [igromo@iid.com](mailto:igromo@iid.com) to reassess the electrical service to the treatment plant. In addition to submitting a formal application for electrical service (available at the IID website <http://www.iid.com/home/showdocument?id=12923>) considering the new motor size, motor specifications and motor starting data, the applicant will be required to submit electrical loads, panel size, voltage, project CAD files (electronic and hard copy), project schedule, estimated in-service date, applicable fees, permits, easements and environmental compliance documentation pertaining to the provision of electrical service to the project. The applicant shall be responsible for any and all costs related to providing electrical service to the project.
2. A circuit study may be required due to existing circuit capacity issues. If a circuit study determines a need for upgrades, the applicant will be financially responsible for the circuit upgrade as well as the actual service to the expanded facility. See attached map showing existing IID electrical facilities near the wastewater treatment plant.

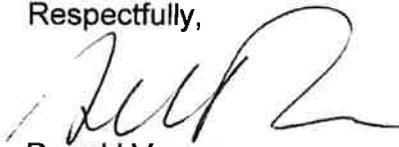
3. To insure there are no impacts to IID water facilities, an IID planning review will be required for the project in accordance with IID Water Department developer guidelines. A copy of the district's Developer Project Guide is available at <http://www.iid.com/home/showdocument?id=2328>. The applicant should be advised to submit project plans to the IID Water Department Engineering section prior to final design. For additional information regarding IID Water Department planning review, contact IID Water Dept. Engineering section, at (760) 339-9265.
4. The applicant should be advised to finalize the land swap process with IID before moving forward with the project.
5. Any construction or operation on IID property or within its existing and proposed right of way or easements including but not limited to: surface improvements such as proposed new streets, driveways, parking lots, landscape; and all water, sewer, storm water, or any other above ground or underground utilities; will require an encroachment permit, or encroachment agreement (depending on the circumstances). A copy of the IID encroachment permit application and instructions for its completion are available at <http://www.iid.com/departments/real-estate>. The IID Real Estate Section should be contacted at (760) 339-9239 for additional information regarding encroachment permits or agreements. No foundations or buildings will be allowed within IID's right of way.
6. In addition to IID's recorded easements, IID claims, at a minimum, a prescriptive right of way to the toe of slope of all existing canals and drains. Where space is limited and depending upon the specifics of adjacent modifications, the IID may claim additional secondary easements/prescriptive rights of ways to ensure operation and maintenance of IID's facilities can be maintained and are not impacted and if impacted mitigated. Thus, IID should be consulted prior to the installation of any facilities adjacent to IID's facilities. Certain conditions may be placed on adjacent facilities to mitigate or avoid impacts to IID's facilities.
7. Any new, relocated, modified or reconstructed IID facilities required for and by the project (which can include but is not limited to electrical utility substations, electrical transmission and distribution lines, etc.) need to be included as part of the project's CEQA and/or NEPA documentation, environmental impact analysis and mitigation. Failure to do so will result in postponement of any construction and/or modification of IID facilities until such time as the environmental documentation is amended and environmental impacts are fully analyzed. **Any and all mitigation necessary as a result of the construction, relocation and/or upgrade of IID facilities is the responsibility of the project proponent.**
8. Dividing a project into two or more pieces and evaluating each piece in a separate environmental document (Piecemealing or Segmenting), rather than evaluating the whole of the project in one environmental document, is explicitly forbidden by CEQA, because dividing a project into a number of pieces would allow a Lead

Patricia Valenzuela  
April 24, 2019  
Page 3

Agency to minimize the apparent environmental impacts of a project by evaluating individual pieces separately, each of which may have a less-than-significant impact on the environment, but which together may result in a significant impact. Segmenting a project may also hinder developing comprehensive mitigation strategies. In general, if an activity or facility is necessary for the operation of a project, or necessary to achieve the project objectives, or a reasonably foreseeable consequence of approving the project, then it should be considered an integral project component that should be analyzed within the environmental analysis. The project description should include all project components, including those that will have to be approved by responsible agencies. The State CEQA Guidelines define a project under CEQA as "the whole of the action" that may result either directly or indirectly in physical changes to the environment. This broad definition is intended to provide the maximum protection of the environment. CEQA case law has established general principles on project segmentation for different project types. For a project requiring construction of offsite infrastructure, the offsite infrastructure must be included in the project description. *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App. 4th 713.

Should you have any questions, please do not hesitate to contact me at 760-482-3609 or at [dvargas@iid.com](mailto:dvargas@iid.com). Thank you for the opportunity to comment on this matter.

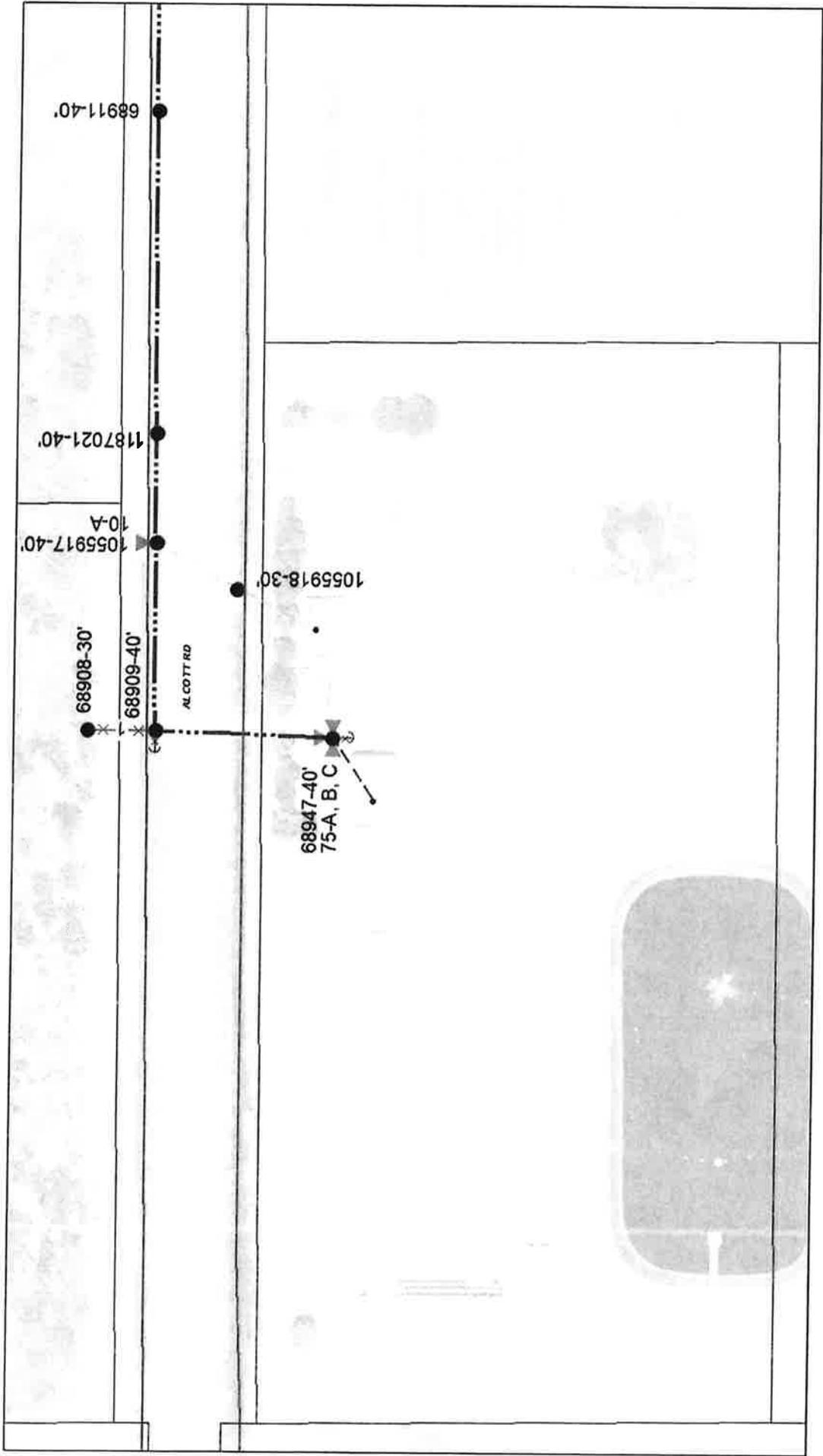
Respectfully,



Donald Vargas  
Compliance Administrator II

Enrique B. Martinez – General Manager  
Mike Pacheco – Manager, Water Dept.  
Charles Allegranza – Interim Manager, Energy Dept.  
Jamie Asbury – Deputy Manager, Energy Dept., Operations  
Enrique De Leon – Asst. Mgr., Energy Dept., Distr., Planning, Eng. & Customer Service  
Vance Taylor – Asst. General Counsel  
Robert Laurie – Asst. General Counsel  
Michael P. Kemp – Superintendent, Regulatory & Environmental Compliance  
Randy Gray – ROW Agent, Real Estate  
Jessica Lovecchio – Environmental Project Mgr. Sr., Water Dept.

EEC ORIGINAL PKG



**IID Facilities near the Project Site**





COUNTY OF IMPERIAL

DEPARTMENT OF PUBLIC WORKS

155 S. 11th Street  
El Centro, CA  
92243

Tel: (442) 265-1818  
Fax: (442) 265-1858

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<https://twitter.com/CountyDpw/>

Public Works works for the Public



May 28, 2019

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MAY 28 2019

IMPERIAL COUNTY  
PLANNING & DEVELOPMENT SERVICES

Mr. Jim Minnick, Director  
Planning & Development Services Department  
801 Main Street  
El Centro, CA 92243

Attention: Patricia Valenzuela, Planner IV

**SUBJECT: CUP 19-0006 Niland County Sanitation District / Imperial County Public Works**  
Located on 125 Alcott Road, Niland, CA 92257  
APN's 021-200-001/005/006-001

Dear Mr. Minnick:

This letter is in response to your submittal received by this department on May 20, 2019 for the above mentioned project. The applicant is proposing the rehabilitation of various components of the existing wastewater treatment facility.

Department staff has reviewed the package information and the following comments shall be Conditions of Approval:

1. Any activity and/or work within Imperial County Right-of-Way shall be completed under a permit issued by this Department (encroachment permit) as per Chapter 12.12 - Excavations on or Near a Public Road of the Imperial County Ordinance.

Any activity and/or work may include, but not be limited to, the installation of temporary stabilized construction entrances, access driveway, road improvements, temporary traffic control devices, etc.

2. Corner record is required to be filed with the county surveyor prior to construction for monuments:

8771. (b) When monuments exist that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide horizontal or vertical survey control, the monuments shall be located and referenced by or under the direction of a licensed land surveyor or licensed civil engineer legally authorized to practice land surveying, prior to the time when any streets, highways, other rights-of-way, or casements are improved, constructed, reconstructed, maintained, resurfaced, or relocated, and a corner record or record of survey of the references shall be filed with the county surveyor.

3. A second corner record is required to be filed with the county surveyor for monuments:

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MAY 29 2019

IMPERIAL COUNTY  
PLANNING & DEVELOPMENT SERVICES

8771. (c) A permanent monument shall be reset in the surface of the new construction or a witness monument or monuments set to perpetuate the location if any monument could be destroyed, damaged, covered, disturbed, or otherwise obliterated, and a corner record or record of survey shall be filed with the county surveyor prior to the recording of a certificate of completion for the project. Sufficient controlling monuments shall be retained or replaced in their original positions to enable property, right-of-way and easement lines, property corners, and subdivision and tract boundaries to be reestablished without devious surveys necessarily originating on monuments differing from those that currently control the area.

4. Prior to the issuance of grading and building permits, contractor shall complete the installation of temporary stabilized construction entrance, if required.
5. Drainage and Grading Plan to provide for property grading and drainage control, which shall also include prevention of sedimentation of damage to off-site properties. The grading plan shall be submitted to the Department of Public Works for review and approval. The Developer shall implement the approved plan. Employment of the appropriate Best Management Practices (BMP's) shall be included. (Per Imperial County Code of Ordinances, Chapter 12.10.020 B).
6. All on-site traffic area shall be hard surfaced to provide all weather access for emergency service protection vehicles. The surfacing shall meet the Department of Public Works and Fire/OES Standards as well as those of the Air Pollution Control District (APCD) (Per Imperial County Code of ordinances, Chapter 12.10.020 A).
7. All permanent structures shall be located outside the ultimate right of way.
- 8.

**INFORMATIVE:**

The following items are for informational purposes only. The Developer is responsible to determine if the enclosed items affect the subject project.

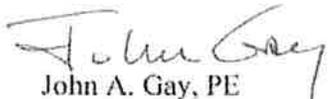
- All solid and hazardous waste shall be disposed of in approved solid waste disposal sites in accordance with existing County, State and Federal regulations (Per Imperial County Code of Ordinances, Chapter 8.72).
- The project may require a National Pollutant Discharge Elimination System (NPDES) permit and Notice of Intent (NOI) from the Regional Water Quality Control Board (RWQCB) prior to County approval of onsite grading plan (40 CFR 122.28).
- A Transportation Permit may be required from road agency(s) having jurisdiction over the haul route(s) for any hauls of heavy equipment and/or large vehicles which impose greater than legal loads on riding surfaces, including bridges. (Per Imperial County Code of Ordinances, Chapter 10.12 – Overweight Vehicles and Loads).

As this project proceeds through the planning and the approval process, additional comments and/or requirements may apply as more information is received.

Should you have any questions, please do not hesitate to contact this office. Thank you for the opportunity to review and comment on this project.

Respectfully,

By:

  
John A. Gay, PE  
Director of Public Works

CY/ag

**RECEIVED**  
MAY 29 2019  
IMPERIAL COUNTY  
PLANNING & DEVELOPMENT SERVICES



# CONDITIONAL USE PERMIT

I.C. PLANNING & DEVELOPMENT SERVICES DEPT.  
801 Main Street, El Centro, CA 92243 (760) 482-4236

- APPLICANT MUST COMPLETE ALL NUMBERED (black) SPACES - Please type or print -

1. PROPERTY OWNER'S NAME Niland County Sanitation District		EMAIL ADDRESS JohnGay@co.imperial.ca.us	
2. MAILING ADDRESS (Street / P O Box, City, State) 155 South 4th Street, El Centro, CA		ZIP CODE 92243	PHONE NUMBER (442) 265-1829
3. APPLICANT'S NAME NCSD		EMAIL ADDRESS JohnGay@co.imperial.ca.us	
4. MAILING ADDRESS (Street / P O Box, City, State) 155 South 4th Street, El Centro, CA		ZIP CODE 92243	PHONE NUMBER (442) 265-1829
4. ENGINEER'S NAME James G. Holt	CA. LICENSE NO. 31773	EMAIL ADDRESS jack@theholtgroup.net	
5. MAILING ADDRESS (Street / P O Box, City, State) 1601 N Imperial Avenue, El Centro, CA		ZIP CODE 92443	PHONE NUMBER (760) 337-33883
6. ASSESSOR'S PARCEL NO. <u>021-240-001/006 &amp; 021-240-005</u>		SIZE OF PROPERTY (in acres or square foot) <u>73.36 acres</u>	ZONING (existing) A2G
7. PROPERTY (site) ADDRESS N/A <u>125 Alcott Rd.</u>			
8. GENERAL LOCATION (i.e. city, town, cross street) Alcott Road at Highway 111, Niland CA			
9. LEGAL DESCRIPTION <u>SE 1/4 Sec 8 T11s R14e 160AC</u>			

## PLEASE PROVIDE CLEAR & CONCISE INFORMATION (ATTACH SEPARATE SHEET IF NEEDED)

10. DESCRIBE PROPOSED USE OF PROPERTY (list and describe in detail)	
See Attached	
11. DESCRIBE CURRENT USE OF PROPERTY	<u>Agricultural Land</u>
12. DESCRIBE PROPOSED SEWER SYSTEM	<u>Evaporation Ponds</u>
13. DESCRIBE PROPOSED WATER SYSTEM	<u>N/A</u>
14. DESCRIBE PROPOSED FIRE PROTECTION SYSTEM	<u>N/A</u>
15. IS PROPOSED USE A BUSINESS? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	IF YES, HOW MANY EMPLOYEES WILL BE AT THIS SITE?

### REQUIRED SUPPORT DOCUMENTS

A. SITE PLAN	_____
B. FEE	_____
C. OTHER	_____
D. OTHER	_____

I / WE THE LEGAL OWNER (S) OF THE ABOVE PROPERTY CERTIFY THAT THE INFORMATION SHOWN OR STATED HEREIN IS TRUE AND CORRECT.

John Gay	April 11, 2019
Print Name	Date
<u>John Gay</u>	_____
Signature	Date
Print Name	Date
Signature	_____

APPLICATION RECEIVED BY: <u>DRK</u>	DATE <u>4/15/19</u>	REVIEW / APPROVAL BY OTHER DEPT'S required. <input checked="" type="checkbox"/> P. W. <input checked="" type="checkbox"/> E. H. S. <input checked="" type="checkbox"/> A. P. C. D. <input type="checkbox"/> O. E. S. <input type="checkbox"/> _____ <input type="checkbox"/> _____
APPLICATION DEEMED COMPLETE BY: _____	DATE _____	
APPLICATION REJECTED BY: _____	DATE _____	
TENTATIVE HEARING BY: _____	DATE _____	
FINAL ACTION: <input type="checkbox"/> APPROVED <input type="checkbox"/> DENIED	DATE _____	

**CUP #**  
19-0006

IS# 19-0007

## **Conditional Use Permit Application**

### **NILAND COUNTY SANITATION DISTRICT Wastewater Treatment Plant Improvement Project**

#### **Project Description**

Improvements to the Niland County Sanitation District's (NCS) wastewater treatment system are being proposed to address exceedances discharge contamination from E. coli (bacteria), copper, and thallium. Planned improvements include the construction of three evaporation ponds on an approximate 58-acre parcel of land on the south side of Alcott Road west of Highway 111 adjacent to the existing wastewater treatment plant (WWTP). Land will be acquired from the Imperial Irrigation District through a land swap agreement. The evaporation ponds would add an additional step to the treatment process to eliminate wastewater discharge into the natural environment and eliminate the need for a National Pollutant Discharge Elimination System (NPDES) Permit. Effluent from the existing WWTP will be pumped via a new pump station and deposited into the three large open basins allowing water to evaporate through solar radiation and wind. Each of the three, 10-acre water surface evaporation ponds to accommodate an average annual flow of 150,000 gallons per day with a peak monthly flow of 200,000 gallons per day with sufficient freeboard to store water during the cool wet winter months for evaporation during the summer. Approximately 50 mg/L suspended solids per day will accumulate in the evaporation basins and as water naturally evaporates the solids will compact as they settle to the bottom of the basin. It is projected that approximately five inches of solids per year will accumulate when the basins are operating at full capacity assuming that the solids will compact to a concentration of about 5,000 mg/L. The accumulated solids will be cleaned out and disposed at the land fill once every five years.

**Appendix D – Environmental Assessment (NEPA Document)**



**U.S. Department of Housing and Urban  
Development**

451 Seventh Street, SW  
Washington, DC 20410  
www.hud.gov

espanol.hud.gov

# **Environmental Assessment**

## **Determinations and Compliance Findings for HUD-assisted Projects**

### **24 CFR Part 58**

#### **Project Information**

**Project Name:** Niland County Sanitary District Wastewater Treatment Plant Improvements

**Responsible Entity:** County of Imperial

**Grant Recipient** (if different than Responsible Entity):

**State/Local Identifier:** 20-CDBG-12086

**Preparer:** County of Imperial

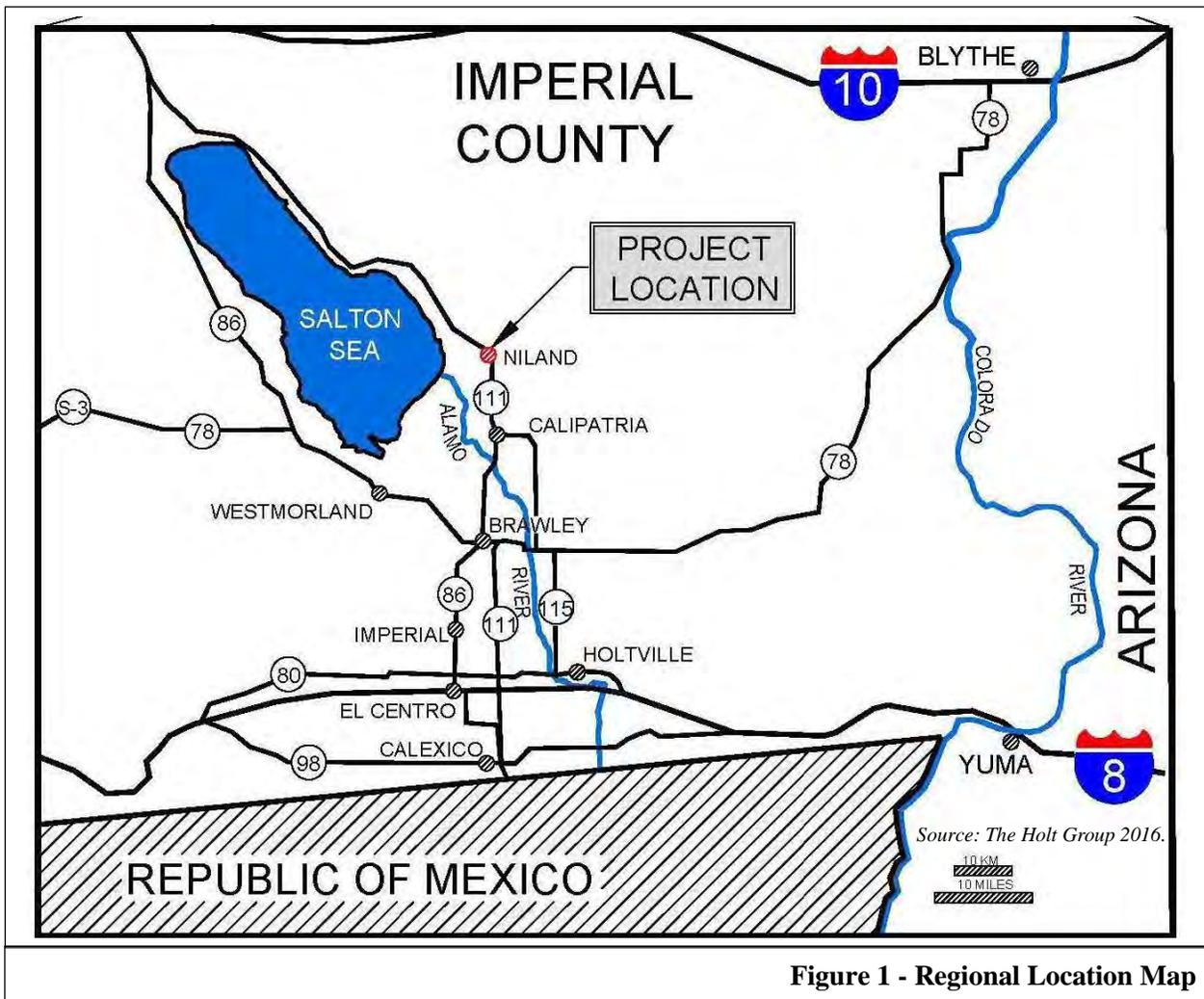
**Certifying Officer Name and Title:** Miguel Figueroa, Imperial County Executive Officer

**Grant Recipient** (if different than Responsible Entity):

**Consultant** (if applicable): Ericsson-Grant, Inc.

**Direct Comments to:** Jenell Guerrero, Administrative Analyst III,  
Imperial County Department of Public Works

**Project Location:** The Niland County Sanitary District Wastewater Treatment Plant (WWTP) Improvements are located in the Township of Niland, an unincorporated area of Imperial County that has been designated as a Colonia. Niland is located 45 miles north of the United States-Mexico border and is approximately 0.402 square miles. State Route (SR) 111 aligns north-south along the western portion of the community and is the main arterial in Niland (Figure 1). The Salton Sea is located approximately four miles to the west. Niland is bordered by the East Mesa to the east and northeast, agricultural fields and the Salton Sea to the west, and extensive agricultural development of the Imperial Valley to the south.



**Figure 1 - Regional Location Map**

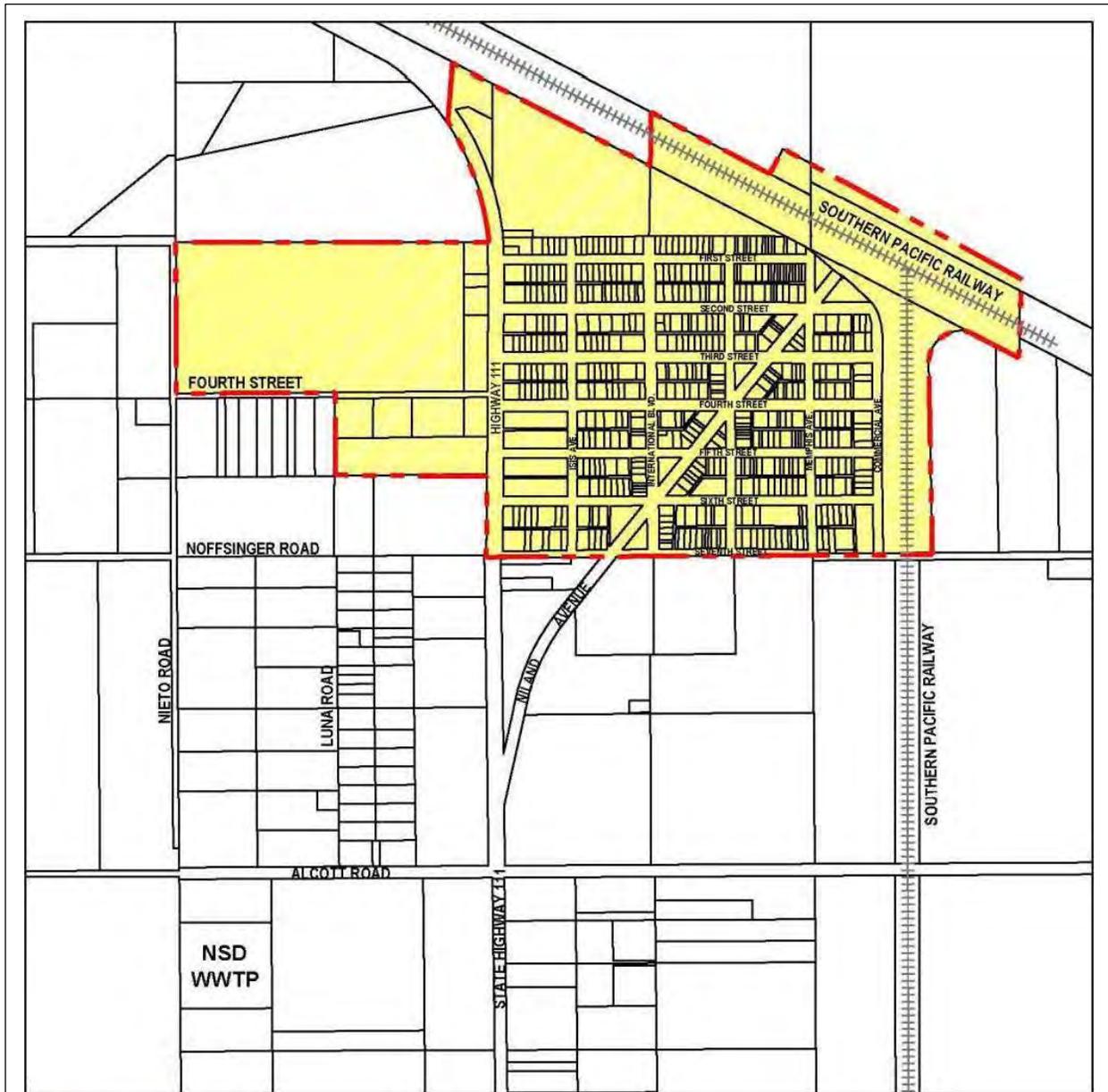
The Niland County Sanitary District owns and operates approximately six miles of sewer collections lines, one lift station, and a WWTP located at 125 West Alcott Road in the Township of Niland, Imperial County (Figure 2).



**Figure 2 - Niland County Sanitary District WWTP Location and Existing Sanitary District**

**Description of Proposed Project [24 CFR 50.12 & 58.32; 40 CFR 1508.25]:**

The Niland County Sanitary District wastewater collection system was built in the mid 1940's and provides wastewater collection and treatment services to residents of Niland. The Niland County Sanitary District service area covers approximately 1,290 acres (Figure 3) and has over 700 active sewer collection service connections.

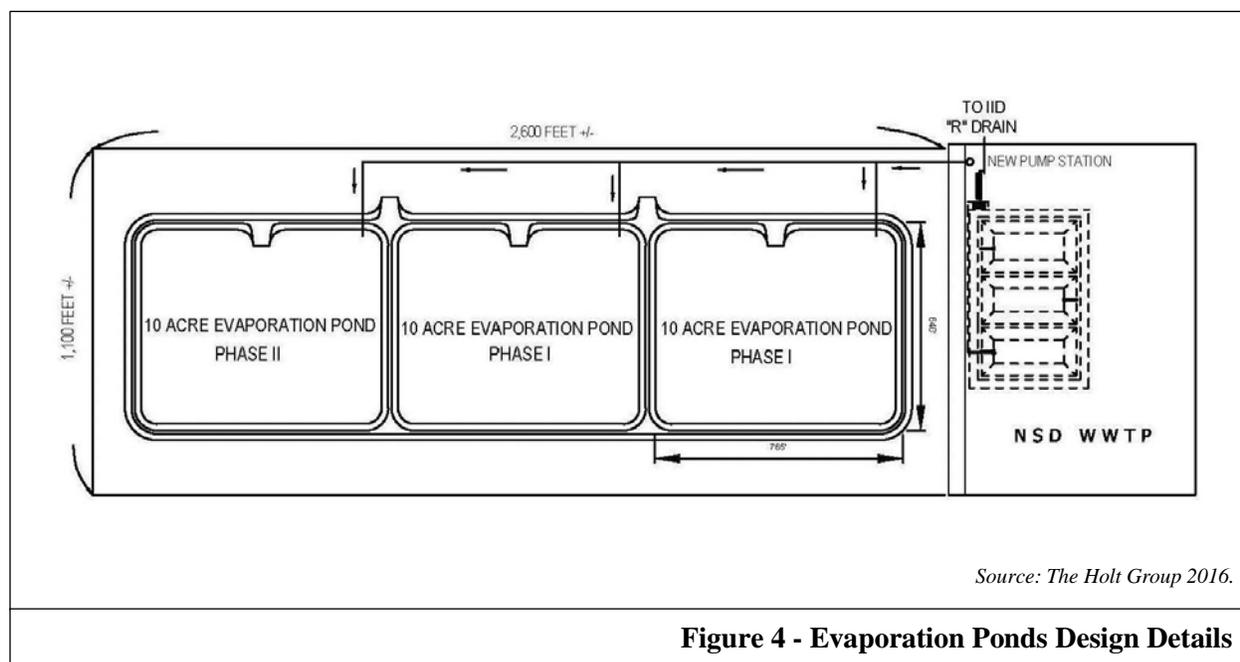


**Figure 3 - Niland County Sanitary District Service Area Map**

The Niland County Sanitary District's existing wastewater collection system consists of approximately 32,000 lineal feet of vitrified clay pipe and polyvinyl chloride pipe, ranging from 4 inches to 10 inches in diameter. The pipeline collection system gravity flows to the existing lift station at the WWTP. Treated effluent is discharged from the WWTP to an agricultural drain (Drain R) which is owned and operated by the Imperial Irrigation District (IID). The IID drain eventually flows into the Salton Sea.

Currently the Niland WWTP is operating in violation of the National Pollutant Discharge Elimination System Permit due to effluent quality. Specifically, the plant is in violation of Copper, Thallium and *E.Coli* levels. Three Alternatives were considered to address the National Pollutant Discharge Elimination System violation: The Evaporation Ponds Alternative, the Wetlands Alternative and the No Action Alternative. The Evaporation Ponds Alternative was selected as the Preferred Alternative (Proposed Action being analyzed in this Environmental Assessment) because it would eliminate the need for a National Pollutant Discharge Elimination System Permit, result in cost savings, eliminate uncompliant discharge to the IID drain and avoid violations and fines to the Niland County Sanitary District.

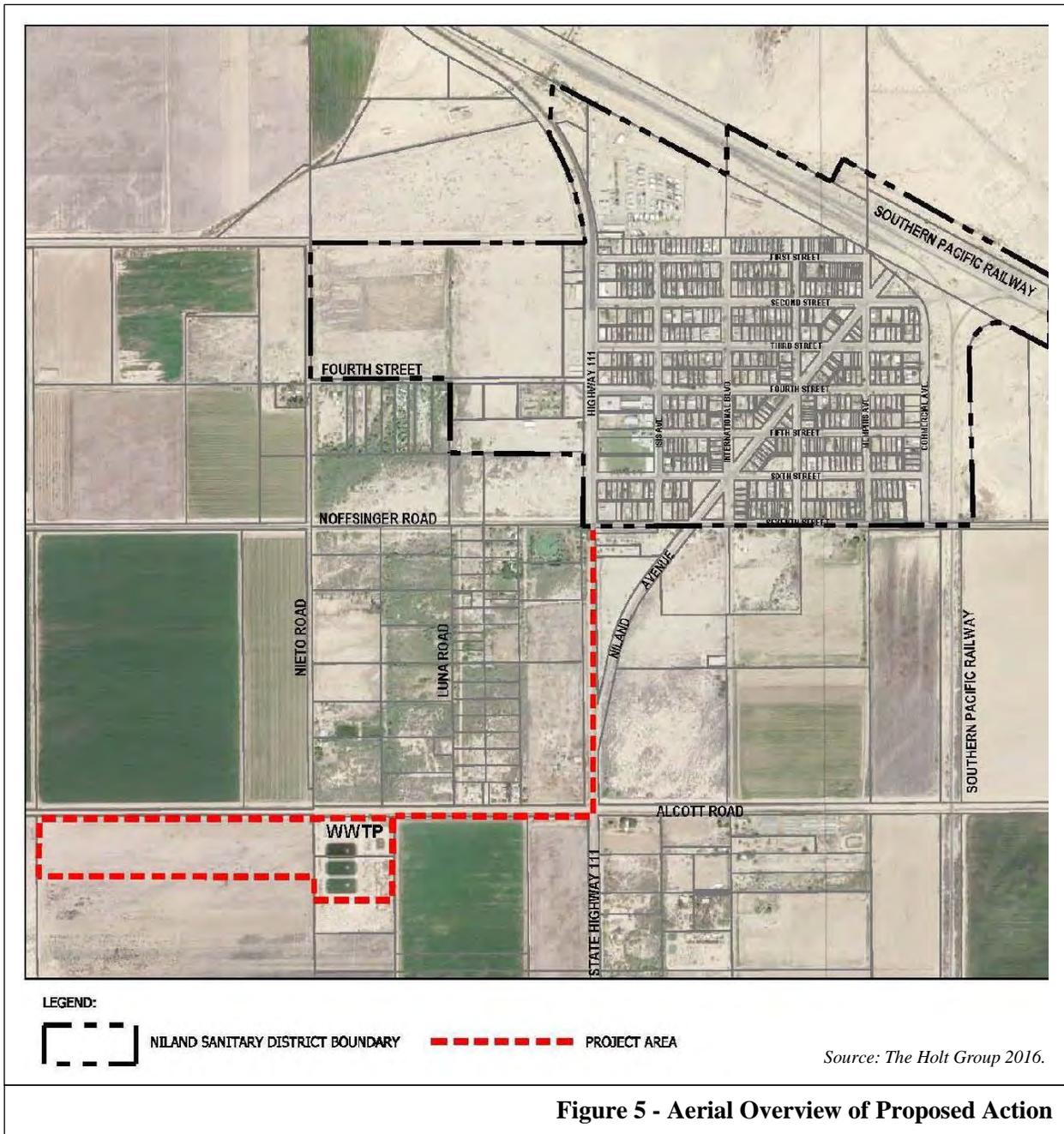
The Proposed Action would construct three evaporation ponds (Figure 4) in series on a 58-acre parcel adjacent to the existing WWTP under a new Waste Discharge Requirement (WDR) Permit. In addition, the Proposed Action would replace and rehabilitate the existing substandard sewer collection pipeline between the Niland WWTP and Noffsinger Road to the north. The proposed collection pipeline extends over a distance of 3,675 lineal feet (Figure 5) (The Holt Group 2016, p. 83).



Source: The Holt Group 2016.

**Figure 4 - Evaporation Ponds Design Details**

Effluent generated by the Niland WWTP will be discharged to on-site evaporation ponds to eliminate discharge into the IID “R” Drain as is currently occurring under the existing National Pollutant Discharge Elimination System Permit and instead result in zero discharge under a Waste Discharge Requirements (WDR) Permit. Eliminating the discharge of Niland WWTP effluent to the “R” Drain would have very little impact to the overall volume of flow and operation of the drain. The Proposed Action would result in improved sewer collection services and an effective wastewater treatment system with discharge maintained on-site within evaporation ponds rather discharged to IID irrigating system.



The overall objective of the Proposed Action is to obtain a new Water Discharge Permit from the Regional Water Quality Control Board. The proposed improvements will bring the Niland County Sanitary District into compliance with the Regional Water Quality Control Board permit requirements and provide Niland residents with reliable wastewater collection and treatment services.

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**Statement of Purpose and Need for the Proposal** [40 CFR 1508.9(b)]:

Currently, the treated discharge from the Niland County Sanitary District WWTP tests high in copper (a metal) which has resulted in a violation of National Pollutant Discharge Elimination System permit requirements. The WWTP has also been in violation for thallium (a metal found in ores) and *E. coli* (a bacteria) violations. Each of these violations is discussed in greater detail below. Note: The information in this section is derived from the Niland County Sanitary District Wastewater Treatment Plant Improvements Environmental Assessment prepared by the Holt Group (2016). The Environmental Assessment examined the Proposed Action in detail.

**Copper.** The current National Pollutant Discharge Elimination System Permit for the Niland County Sanitary District has an average monthly effluent limitation of 19 µg/L with a maximum daily limitation of 52 µg/L. The Niland County Sanitary District has had Copper exceedances since November 2005. Copper is non-detectable in the IID water supply and could be introduced to the drinking water from two main sources: erosion of copper pipes and use of Copper Sulfate to control algae growth in surface water reservoirs. The Golden State Water Company sampled 10 homes in Niland in 2013 as part of their triennial Lead and Copper Rule Testing. Seven of the homes had Copper concentrations less than 18 µg/L; two had concentrations of 20 µg/L; and one had a concentration of 160 µg/L. None of the test results approached the Drinking Water Alert Level of 1,300 µg/L (130 mg/L). Copper testing in 2014 and 2015 showed that most of the months there are measurable concentrations. This led to the conclusion that Copper exceedances are likely to be a chronic problem because a point source has not been identified (The Holt Group 2016, p. 7).

**Thallium.** Thallium is very toxic metal. As such, it has stringent limits. The Environmental Protection Agency (Environmental Protection Agency) has set the MCL (maximum contaminant level) for drinking water at 2 µg/L with a MCLG (maximum contaminant level goal) of 0.5 µg/L. The Regional Water Quality Control Board (with assistance from the engineering firm Tetra Tech) carried out a Pretreatment Program Needs Assessment. This Assessment was unable to identify a source for the Thallium contamination. The Regional Water Quality Control Board conjectures that the poor condition of the main sanitary sewer collection pipeline extending along Alcott Road and State Route 111 up to Noffsinger Road may allow water infiltration which contributes to the Thallium levels.

***E. Coli.*** Historically, the Niland County Sanitary District has had several *E. Coli* test exceedances. The WWTP uses 12.5% sodium hypochlorite (liquid bleach) in its treatment process. The chlorine is dosed using a metering pump and disinfection occurs in a chlorine contact basin. The original chlorine storage tank developed a leak and is out of use. Chlorine is currently stored in a tank which is opaque to protect from exposure to ultraviolet light. However, the tank is not protected by a shade structure. High temperatures can lead to decomposition of sodium hypochlorite stability. The decomposition rate of bleach is increased by a factor of 3.5 with every 10°C increase in storage temperature. Adding a shade shelter will allow the operators to use less bleach during the summer months.

In response to the Niland County Sanitary District's violations of Copper, Thallium and *E. Coli*, the Colorado River Basin Regional Water Quality Board (Regional Water Quality Control Board) issued a Cease and Desist Order (CDO R7-2012-0024) to the Niland County Sanitary District. The Cease and Desist included a timeline to construct alternative wastewater treatment facilities.

The Proposed Action would provide the residents of Niland with reliable wastewater collection and treatment services. By ceasing the discharge to the "R" Drain, the Niland County Sanitary District will no longer discharge treated effluent high in copper, and sometimes thallium and bacteria, in violation of the

National Pollutant Discharge Elimination System permit. The Niland County Sanitary District WWTP would

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come into compliance with the requirements of Environmental Protection Agency and the Regional Water Quality Control Board. In addition, the Proposed Action would also be able to accommodate limited future development within Niland County Sanitary District's approved service area as long as it is within the permitted capacity of the WWTP.

**Existing Conditions and Trends** [24 CFR 58.40(a)]:

The Proposed Action is located in the Township of Niland, an unincorporated area of Imperial County that has been designated as a Colonia (an unincorporated area near the Mexican border lacking public infrastructure and services). SR 111 aligns north-south along the western portion of the community and is the main arterial in Niland. The Salton Sea is located approximately four miles to the west. The town is bordered by the East Mesa to the east and northeast, agricultural fields and the Salton Sea to the west, and extensive agricultural development of the Imperial Valley to the south.

Niland's population was estimated at 1,145 under the 2013 American Community Survey (ACS), US Census Bureau. However, the 2015 population serviced by the Niland County Sanitary District was more accurately estimated at 1,362 persons (based on 510 residential sewer connections multiplied by 2.67 persons per household). The population is temporarily estimated to be 500 based on damage by a fire in June 2020 which displaced a significant portion of Niland's residents.

The Niland County Sanitary District provides wastewater collection and treatment services to residents of Niland. The Niland County Sanitary District owns and operates approximately six miles of sewer collections lines, one lift station, and a wastewater treatment plant located at 125 West Alcott Road. The Niland WWTP discharges treated effluent to an agricultural drain (the IID "R" Drain) which eventually flows into the Salton Sea.

In addition to wastewater service and treatment from the Niland County Sanitary District, Niland has utilities including water from the Golden State Water Company; overhead electrical service from IID; and telephone service.

The Niland WWTP has an average daily peak design capacity of 0.5 MGD. Currently, flow to the WWTP is estimated at 63,300 gallons/day or 13% of the National Pollutant Discharge Elimination System Permit approved capacity.

The WWTP includes three aeration ponds in series; one chemical building for sodium hypochlorite and metabisulfite storage; and one contact chamber used for disinfection and de-chlorination. Each pond is 350 feet long, 150 feet wide, and 11 feet deep. The ponds are aerated by splash aerators and are lined with high density polyethylene (HDPE) liners. Effluent from the last pond flows to a chemical feed system composed of a chlorine contact chamber, where it is chlorinated at a normal contact time of one hour by the addition of sodium hypochlorite. The disinfected effluent is then dechlorinated by mixing it with sodium metabisulfite in a flash mixer. The treated effluent is then discharged into the IID "R" drain, which flows four miles to the Salton Sea.

The Niland WWTP site is zoned for Agriculture and is surrounded by lands designated for agricultural use or low-density residential. Land uses to the north and southwest of the WWTP and project area consist of active agricultural lands and some isolated rural residential. Land uses immediately west of the WWTP are inactive agricultural lands. Improvements to the existing pipeline would involve land used for public right-of-way, such as the areas along Alcott Road or Highway 111 (The Holt Group 2016, p. 60).

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**Funding Information**

<b>Grant Number</b>	<b>HUD Program</b>	<b>Funding Amount</b>
20-CDBG-12086	CDBG	\$3,000,000

**Estimated Total HUD Funded Amount:**

\$3,000,000

**Estimated Total Project Cost (HUD and non-HUD funds) [24 CFR 58.32(d)]:**

\$8,626,998 HUD



**Photo 1:** Entry to existing Niland County Wastewater Treatment Plant.



**Photo 2:** View south from Operations Building towards existing evaporation ponds.



**Photo 3:** View east from entry bridge to existing WWTP.



**Photo 4:** Corner of State Route 111 and Alcott Road.



**Photo 5:** View north along State Route 111 from the intersection of Alcott Road and State Route 111.



**Photo 6:** State Route 111 at the Niland Avenue turn. The proposed pipeline would continue along State Route 111 past this intersection.

**Compliance with 24 CFR 50.4, 58.5, and 58.6 Laws and Authorities**

Record below the compliance or conformance determinations for each statute, executive order, or regulation. Provide credible, traceable, and supportive source documentation for each authority. Where applicable, complete the necessary reviews or consultations and obtain or note applicable permits of approvals. Clearly note citations, dates/names/titles of contacts, and page references. Attach additional documentation as appropriate.

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<b>STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 and 58.6</b>		
<b>Airport Hazards</b> 24 CFR Part 51 Subpart D	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The Proposed Action is approximately 8 miles north of the Calipatria Municipal Airport and is not within any airport compatibility zones. The Proposed Action would not be located within a Clear Zone or Accident Potential Zone at the Calipatria Municipal Airport (Documentation: NEPA Assist Tool - Attachment “B”).
<b>Coastal Barrier Resources</b> Coastal Barrier Resources Act, as amended by the Coastal Barrier Improvement Act of 1990 [16 USC 3501]	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The Proposed Action is in Niland approximately 110 miles east of the California Coast; not along the Atlantic or Gulf coast or along the shore areas of the Great Lakes of the United States. The Proposed Action would not result in an adverse effect to Coastal Barrier Resources. (Documentation: USFW Coastal Barrier Resources - Attachment “C”).
<b>Flood Insurance</b> Flood Disaster Protection Act of 1973 and National Flood Insurance Reform Act of 1994 [42 USC 4001-4128 and 42 USC 5154a]	Yes    No <input type="checkbox"/> <input checked="" type="checkbox"/>	The Proposed Action is located within Zone X floodplain area per the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Number 06025C0725C and dated September 26, 2008. Zone X as defined by FEMA is, “Areas determined to be outside the 0.2% annual chance floodplain (See Attachment “A”, EDR Report, p. 63; and Attachment “D” FEMA FIRM). The Proposed Action is not in a flood disaster area and no flood insurance would be necessary.

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<b>STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR 50.4 &amp; 58.5</b>		
<p><b>Clean Air</b></p> <p>Clean Air Act, as amended, particularly section 176(c) &amp; (d); 40 CFR Parts 6, 51, 93</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>Imperial County has been designated as a non-attainment area for both ozone and PM<sub>10</sub> (fugitive dust, 10 micrometers or less) standards. The total footprint of evaporation ponds would be approximately 58 acres adjacent to the Niland County Sanitary District WWTP. The collection pipeline extends over a 3,675 linear feet distance along Alcott Road and Highway 111 up to Noffsinger Road. Construction of the Proposed Action would result in a temporary increase in PM<sub>10</sub> in association with clearing, grading, and excavation to install the evaporation ponds and improve the existing system. The Imperial County Air Pollution Control District (ICAPCD) has construction emissions thresholds of 150 pounds per day (lbs/day) for PM<sub>10</sub> and PM<sub>2.5</sub>; 75 lbs/day for Nitrogen Oxide (NO<sub>x</sub>); 100 lbs/day for Carbon Monoxide (CO); and 500 lbs/day for Reactive Organic Gases (ROG) (ICAPCD 2007, p. 19). Based on the size of the area to be disturbed (58 acres and 3,675 linear feet) and the duration of the project (approximately 9 months) emissions of ozone precursors or other criteria pollutants would occur during construction. Operation of the proposed evaporation ponds and improvements to the WWTP system would not result in the generation of significant quantities of ozone precursors, or PM<sub>10</sub> and no additional employees would be needed to operate the facility. The temporary level of emissions increase during construction can be reduced with implementation of best management practices as required by the ICAPCD as well as all conditions imposed by the County of Imperial. Once completed, operational traffic is not anticipated to substantially increase Documentation: ICAPCD CEQA Air Quality Handbook 2007.</p>

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<b>Coastal Zone Management</b> Coastal Zone Management Act, sections 307(c) & (d)	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The Proposed Action is in Niland approximately 110 miles east of the California Coast. The Proposed Action would have no impact on Coastal Zone Management (Documentation: California Department Fish and Wildlife BIOS Attachment “E”).
<b>Contamination and Toxic Substances</b> 24 CFR Part 50.3(i) & 58.5(i)(2)	Yes No <input type="checkbox"/> <input checked="" type="checkbox"/>	The Proposed Action is in Niland, an unincorporated area of Imperial County that has been designated as a Colonia. The 58-acre parcel for the proposed evaporation ponds is adjacent to, and east of, the existing Niland County Sanitary District WWTP. The parcel is vacant but previously disturbed. A search of a one-mile radius from the parcel using the Department of Toxic Substances (DTSC’s) Envirostor website revealed one Leaking Underground Storage Tank (LUST) clean-up site (Exxon Station at 8004 Highway 111, Niland), and one military clean-up site (Chocolate Mountain NWR – Chocolate Mountain Naval Weapons Station). The clean-up at both sites was completed and these cases have been closed. Neither of the two clean-up sites are within footprint of the Proposed Action. No toxic substances or hazards were identified in the Envirostor database for the site of the Proposed Action. A one-mile radius search of the California State Water Resources Control Board’s GeoTracker website revealed no Waste Discharge Requirement Sites, DTSC Hazardous Waste Sites, Land Disposal Sites, etc. within one mile of the site of the Proposed Action including the site itself. No toxic facilities are on or near the site (See Attachment “F” Envirostor and Geotracker). The Project is not in an area affected by contamination and toxic substances.

<p><b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6</p>	<p>Are formal compliance steps or mitigation required?</p>	<p>Compliance determinations</p>
<p><b>Endangered Species</b></p> <p>Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>Based on a search of the California Endangered Species Database, several California Endangered Species were identified within a two-mile radius of the proposed evaporation ponds. The Sonoran Desert toad, burrowing owl, razorback sucker, yellow warbler and merlin (Refer to Attachment “A”, EDR NEPA Check, p. 3 “Natural Areas Map” p. 3, and Natural Areas Map Findings, pp. 55-63). No endangered species were identified on the 58- acre parcel or within the alignment of the proposed repair/replacement of the pipeline. A search of the Information for Planning and Consultation (IPaC) was also conducted. The IPaCs earth identified four endangered species with potential to occur in the area: Western Snowy Plover, Yuma Ridgway Rail, Desert Pupfish and Monarch Butterfly. Several migratory birds were also identified (see Attachment “G”). The parcel and surrounding area are vacant but have been previously disturbed. Likewise, the pipeline alignment has been previously disturbed. Mitigation measures BIO-1 requires a pre- construction be conducted 7-days prior to starting construction. The Proposed Action will also adhere to all conditions imposed by Imperial County as well as mitigation measures identified in the prior EA. With implementation of the conditions and Mitigation Measure BIO-1, the Proposed Action is not anticipated to have a negative effect on endangered species based on existing conditions.</p>

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<p><b>Explosive and Flammable Hazards</b></p> <p>24 CFR Part 51 Subpart C</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The Proposed Action is limited to improvements to the wastewater treatment plant and does not include constructing housing or increasing residential density.</p> <p>The 58-acre parcel and surrounding area was not found on a list of hazardous materials sites. The closest site (a closed LUST clean-up site) identified on Geotracker was within 1 mile of the project parcel. No explosive or flammable hazards are within or proximate to the parcel (See Attachment “F” Envirostor and Geotracker).</p> <p>The Proposed Action would use sodium hypochlorite and sodium metabisulfite for the wastewater treatment process. Neither sodium hypochlorite or sodium metabisulfite is flammable or explosive but both are considered hazardous due to their corrosive and or irritant qualities. Both would be stored on site in compliance with all applicable federal, state and local requirements.</p>

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<p><b>Farmlands Protection</b></p> <p>Farmland Protection Policy Act of 1981, particularly sections 1504(b) and 1541; 7 CFR Part 658</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>Based on the California Department of Natural Resources on-line map, the Proposed Action is located on land that is designated as “Other Land” with a portion of the pipeline extending through land that is designated as Farmland of Local Importance (See Attachment “H” “California Important Farmland 1984-2020” Map). The land for the proposed improvements is not currently under agricultural production and has not been so for a number of years. Installation of the pipeline through the area identified as Farmland of Local Importance would not convert the farmland as the pipeline would be buried. Therefore, the Proposed Action would not result in any adverse effect regarding Farmland Protection Policy Act.</p>
<p><b>Floodplain Management</b></p> <p>Executive Order 11988, particularly section 2(a); 24 CFR Part 55</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The Proposed Action is within Zone X per FEMA FIRM Map No. 06025C0725C, (Refer Attachment “A”, EDR NEPA Check, p. 69 “Flood Plain Map and Flood Plain Map Findings,” and Attachment “D” FEMA FIRM). Zone X is defined as an area of minimal flood hazard (i.e., a 0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile). The Proposed Action would not have an adverse effect on Floodplain Management.</p>

<p><b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6</p>	<p>Are formal compliance steps or mitigation required?</p>	<p>Compliance determinations</p>
<p><b>Historic Preservation</b></p> <p>National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800</p>	<p>Yes    No</p> <p><input type="checkbox"/>    <input checked="" type="checkbox"/></p>	<p>The Proposed Action is not listed in the CA Historic Sites Database or the National Register of Historical Places Database. (Refer to Attachment “A”, EDR National Environmental Protection Agency Check, p. 2 and p. 66-68). All work will be done within previously disturbed areas within the 58-acre parcel and public right-of-way, such as the areas along Alcott Road or SR 111. Construction workers, vehicles and staged materials will be monitored to ensure that project boundaries are maintained and that no areas outside of the parcel are disturbed. The likelihood of encountering cultural resources within the 58-acre parcel and pipeline alignment is low. However, as with any activity involving earthmoving, specifically excavation for the evaporation ponds and trenching for installation and repairs to pipeline, the potential exists to uncover unknown subsurface cultural resources or human remains. The Proposed Action will adhere to all conditions imposed by Imperial County. The Proposed Action is not anticipated to have an adverse effect on Historic Preservation.</p>

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<p><b>Noise Abatement and Control</b></p> <p>Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978; 24 CFR Part 51 Subpart B</p>	<p>Yes    No</p> <p><input type="checkbox"/>    <input checked="" type="checkbox"/></p>	<p>An increase in noise levels would occur in association with operation of heavy equipment (front-end loaders, excavators, trucks, rollers, graders, air compressors, generators, backhoes, etc.) during construction. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to noise levels in excess of 100 dBA when measured at 50 feet. However, these noise levels would diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. The anticipated noise levels from the aforementioned equipment would not exceed the American National Standard Institute (ANSI) guideline for adjacent residential properties (The Holt Group 2016, p. 82-83). These noise levels, however, are temporary (9 months for the entire project with intermittent increases along the pipeline alignment) and would no longer exist once construction is completed. The Proposed Action would be required to comply with the Imperial County Noise Ordinance. The Proposed Action will also adhere to all conditions imposed by Imperial County. In addition, because the Proposed Action does involve new construction for residential use or rehabilitation of existing residential property or a research demonstration project it is in compliance with 24 CFR Part 52 Subpart B. Documentation: Imperial County General Plan Noise Element, 1993.</p>
<p><b>Sole Source Aquifers</b></p> <p>Safe Drinking Water Act of 1974, as amended, particularly section 1424(e); 40 CFR Part 149</p>	<p>Yes    No</p> <p><input type="checkbox"/>    <input checked="" type="checkbox"/></p>	<p>Environmental Protection Agency Region 9 (Pacific Southwest) includes California, Arizona, Nevada and the Hawaiian Islands. No sole source aquifers are located beneath or in proximity to the Proposed Action (Refer to Attachment "I" Map of Region 9 Sole Source Aquifers in California).</p>

<b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6	Are formal compliance steps or mitigation required?	Compliance determinations
<p><b>Wetlands Protection</b></p> <p>Executive Order 11990, particularly sections 2 and 5</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>A search of the National Wetland Inventory Data identified 183 wetlands within a two-mile radius of the 58-acre parcel, including eight within 1/8-mile of the site; four between 1/8- and 1/4-mile; fifteen between 1/4- and 1/2-mile; 33 between 1/2- and 1-mile; and 138 between 1 and 2 miles from the site. A one-mile search radius from the 58-acre parcel did not identify any State Wetlands Data (Refer to EDR Report Attachment “A” p. 2 and pp. 71 - 96). There are no wetlands identified on or adjacent to the 58-acre parcel. The Proposed Action would have no effect on wetland protection. A pre-construction environmental briefing shall take place to educate the construction crews regarding proximity to off-site wetlands and explain that no staging or access to these areas is allowed.</p>
<p><b>Wild and Scenic Rivers</b></p> <p>Wild and Scenic Rivers Act of 1968, particularly section 7(b) and (c)</p>	<p>Yes No</p> <p><input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>California has approximately 189,454 miles of rivers. Of this total, approximately 1,999.6 miles are designated as “Wild and Scenic.” None of these rivers extend through the County of Imperial. (Refer to Attachment “J”, California Wild and Scenic River System and Management Agencies). The Proposed Action would have no effect on Wild and Scenic River System and Management Agencies.</p>

<p><b>Compliance Factors:</b> Statutes, Executive Orders, and Regulations listed at 24 CFR §58.5 and §58.6</p>	<p>Are formal compliance steps or mitigation required?</p>	<p>Compliance determinations</p>
<p><b>ENVIRONMENTAL JUSTICE</b></p>		
<p><b>Environmental Justice</b> Executive Order 12898</p>	<p>Yes No <input type="checkbox"/> <input checked="" type="checkbox"/></p>	<p>The Proposed Action is needed to address existing discharge violations and bring the Niland County Sanitary District WWTP into compliance with the requirements of its National Pollutant Discharge Elimination System permit. Specifically, the WWTP has experienced violations with regard to Copper, Thallium and <i>E. Coli</i> levels. The construction of the evaporation ponds and improvements and repairs to the pipeline would not result in a disproportionately high or adverse human health or environmental impact on a minority population, low-income population or Indian tribe, because there is no disproportionate impact from one or more environmental hazards and no health risks are present in association with the Proposed Action. On the contrary, the proposed Action would eliminate discharge violations and allow the Niland County Sanitary District WWTP to obtain a Water Discharge Requirement permit which would benefit the residents of Niland.</p>

**Environmental Assessment Factors** [24 CFR 58.40; Ref. 40 CFR 1508.8 &1508.27] Recorded below is the qualitative and quantitative significance of the effects of the proposal on the character, features and resources of the project area. Each factor has been evaluated and documented, as appropriate and in proportion to its relevance to the proposed action. Verifiable source documentation has been provided and described in support of each determination, as appropriate. Credible, traceable and supportive source documentation for each authority has been provided. Where applicable, the necessary reviews or consultations have been completed and applicable permits of approvals have been obtained or noted. Citations, dates/names/titles of contacts, and page references are clear. Additional documentation is attached, as appropriate. **All conditions, attenuation or mitigation measures have been clearly identified.**

**Impact Codes:** Use an impact code from the following list to make the determination of impact for each factor.

- (1) Minor beneficial impact
- (2) No impact anticipated
- (3) Minor Adverse Impact – May require mitigation
- (4) Significant or potentially significant impact requiring avoidance or modification which may require an Environmental Impact Statement

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>LAND DEVELOPMENT</b>		
<b>Conformance with Plans/ Compatible Land Use and Zoning/Scale and Urban Design</b>	2	<p>The Proposed Action would result in construction of evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline. The use of ponds to evaporate all effluent generated by the Niland County Sanitary District WWTP would eliminate effluent discharge into the IID “R” Drain under the current National Pollutant Discharge Elimination System Permit and result in zero discharge under a Waste Discharge Requirement Permit. Additionally, the repair/replacement of the deficient sections of the sanitary sewer collection pipeline may reduce the amount of infiltration, a potential contributor of some of the identified pollutants (e.g., Copper). The Imperial County Land Use Plan (Updated 2007) designates Niland as an Urban Area. The 58-acres site is designated Agriculture and is zoned A-1 (Limited Agriculture within Urban Boundaries Only). Potable water treatment and Wastewater Treatment Plants are allowable uses within this zone with a Conditional Use Permit [Note: the CUP was approved at the Imperial County Planning Commission on July 24, 2019]. The evaporation ponds are proposed adjacent to, and east of, the existing WWTP expanding the existing use. Therefore, the proposed Action would have no impact with regard to conformance with plans, compatibility with land use and zoning/scale and urban design.</p>

Environmental Assessment Factor	Impact Code	Impact Evaluation
<p><b>Soil Suitability/Slope/Erosion/ Drainage/Storm Water Runoff</b></p>	<p>2</p>	<p>Niland is flat and is comprised primarily of residential development, a portion of which was burned by a fire in June 2020. According to the 1981 USDA NRCS soil survey for Imperial County, general soil groups in and around Niland are Imperial, Imperial-Holtville-Glenbar, and Niland-Imperial. These soils are generally deep, highly calcareous, and contain gypsum and soluble salts. They consist of silty clays, silty clay loams, and clay loams, and are moderately well-drained (The Holt Group 2016, p. 47). Because the area is generally flat, soil erosion is not a major concern. However, structural hazards are a concern because minor earthquakes are a common occurrence in the vicinity of Niland and the area has a moderately high earthquake risk. The Proposed Action does not involve construction of any structures (The Holt Group 2016, p. 48). The Proposed Action will also adhere to all conditions imposed by Imperial County.</p> <p>Currently, the Colonia has no storm drains. The proposed Action would not change drainage or stormwater runoff patterns or volume. The proposed Action includes construction of three evaporation ponds to facilitate removing solids to be constructed east of the existing Niland County Sanitary District WWTP and eliminate the need for discharge flows. Each basin would have a ramp to allow equipment to enter the basin and remove the dried solids that would compact as they settle to the bottom of the basin. Therefore, the Proposed Action would have no impact with regard to soil suitability/slope/erosion/drainage and storm water runoff.</p>

Environmental Assessment Factor	Impact Code	Impact Evaluation
<p><b>Hazards and Nuisances including Site Safety and Noise</b></p>	<p>3</p>	<p>The Proposed Action will result in the development of three evaporation ponds on a 58-acre parcel adjacent to the existing Niland County Sanitary District WWTP and the repair/replacement of the deficient sections of the sanitary sewer collection pipeline. Some hazardous materials would be used during construction. In addition, the Niland County Sanitary District WWTP uses a number of chemicals consisting of sodium hypochlorite and sodium bisulfite. Numerous local, state, and federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and waste that would be applicable at the WWTP. With implementation of the Proposed Action, the WWTP would cease the use of sodium bisulfite, but would continue to handle the aforementioned chemicals on a routine basis. Additionally, safety repairs to the crossing bridge and the Ground Water Pump Station wet well's entrance cover would be completed as part of the Proposed Action. The Proposed Action will also adhere to all conditions imposed by Imperial County.</p> <p>The sanitary sewer pipeline conveys untreated wastewater from Niland to the Niland County Sanitary District WWTP. Due to nature of all construction activities, the potential exists for accidents to occur during construction activities. The Proposed Action would involve two bypasses to the laterals and ditches; thus, the potential exists for accidental spills of untreated wastewater during the construction phase. The Proposed Action will also adhere to all conditions imposed by Imperial County.</p> <p>The primary seismic hazard in the area is the potential for strong groundshaking during earthquakes along the San Andreas, Imperial, Elmore Ranch, Brawley Seismic Zone and Superstition Hills faults. Although the 58-acre parcel and alignment of the pipeline does not lie within a State of California Alquist-Priolo Earthquake Fault Zone, the proposed facilities would need to be constructed in accordance with the California Uniform Building Code which contains specifications to minimize adverse effects due to ground shaking from earthquakes and liquefaction (The Holt Group 2016, p. 95). The Proposed Action will also adhere to all conditions imposed by Imperial County.</p> <p>Operation of the Niland County Sanitary District WWTP involves the use of some hazardous materials used for the treatment process as well as the waste sludge that would accumulate in the evaporation ponds. Improper use, storage, transport, or disposal of these materials may result in harm to humans, degradation of surface or ground water, air pollution,</p>

Environmental Assessment Factor	Impact Code	Impact Evaluation
		<p>these laws are to protect public health and the environment (The Holt Group 2016, p. 45). The evaporation ponds would need waste sludge (bio-solids) removed and properly disposed of every 5 years. Bio-solids would be considered hazardous waste. The Proposed Action will adhere to all conditions imposed by Imperial County.</p> <p>Some short-term noise would be generated during construction. The with the nearest resident to the 58-acre parcel is 686 linear feet away. The collection pipeline extends over a 3,675 linear feet distance with the nearest resident located within 46 linear feet of construction along Alcott Road and SR 111 up to Noffsinger Road (The Holt Group 2016, p. 83). Increased construction noise would be temporary and intermittent. The Proposed Action will adhere to all conditions imposed by Imperial County.</p>
<b>Energy Consumption</b>	1	<p>The IID Energy Division currently provides electricity to the Niland County Sanitary District WWTP. Energy consumption would occur during construction in association with fuel for vehicles and heavy equipment. Once completed, energy would be needed to pump effluent to the evaporation ponds. However, no additional pumping facilities beyond what is currently used would be needed (The Holt Group 2016, p. 78). The Proposed Action would decrease the permitted capacity of the WWTP from 0.50 MGD to 0.15 MGD. The Niland County Sanitary District WWTP currently uses an estimated 193,290-kilowatt hours (KwH) of energy. With implementation of the Proposed Action, energy consumption would decline to 171,810 KwH (The Holt Group 2016, p. 117). Electricity from solar energy facilities would be utilized at the Niland County Sanitary District WWTP. Thus, negligible impacts to energy are anticipated. Overall, energy consumption is not anticipated to be substantial or wasteful as a result of implementing the Proposed Action.</p>

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>SOCIOECONOMIC</b>		
<b>Employment and Income Patterns</b>	1	The Proposed Action would result in temporary benefits to socioeconomics by creating some short-term construction jobs for approximately 9 months. No long-term employment would be generated. The minimal number and temporary nature of the construction employment would not create a substantial increase in population in Imperial County. Therefore, on an overall basis, the Proposed Action would have no effect on employment and income patterns.
<b>Demographic Character Changes, Displacement</b>	1	The Proposed Action is the construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline for the Niland County Sanitary District wastewater system. The Proposed Action would not result in any changes to the demographic character of Niland.
<b>COMMUNITY FACILITIES AND SERVICES</b>		
<b>Educational and Cultural Facilities</b>	2	The Proposed Action is the construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline for the Niland County Sanitary District wastewater system. The Proposed Action would not result in any changes to the educational and cultural facilities of Niland.
<b>Commercial Facilities</b>	2	The Proposed Action would result in construction of evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline for the Niland County Sanitary District wastewater system. The Proposed Action would not induce population growth creating the need for more commercial facilities. Therefore, the Proposed Action would have no effect on commercial facilities.
<b>Health Care and Social Services</b>	1	The Proposed Action is the construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline for the Niland County Sanitary District wastewater system. The Proposed Action would not affect health care and social services in Imperial County. However, it would provide a minor beneficial impact by bringing the Niland County Sanitary District WWTP into compliance with its National Pollutant Discharge Elimination System discharge permit.

<b>Environmental Assessment Factor</b>	<b>Impact Code</b>	<b>Impact Evaluation</b>
<b>Solid Waste Disposal / Recycling</b>	3	<p>The Proposed Action would result in construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline. The evaporation ponds would need waste sludge (bio-solids) removed once every five (5) years. Disposal of bio-solids would be determined in a Bio-Solids Management Plan developed consistent with local, state, and federal regulations as part of the final WWTP improvements design. The replacement/rehabilitation of the deteriorating sanitary sewer collection pipeline has the potential for a waste hazard/accident during construction as the pipeline conveys untreated wastewater to the Niland County Sanitary District WWTP. The Proposed Action involves two bypasses to laterals and ditches, thus, the potential exists for accidental spills of untreated wastewater during the construction phase. Additionally, other hazardous waste could potentially be created, disturbed, moved, or used as part of the construction of the Proposed Action. Thus all hazardous waste will need be treated or disposed of with the appropriate permit and in accordance with the Resource Conservation and Recovery Act 42 USC 6901- Treatment, Storage, or Disposal of Hazardous Wastes (The Holt Group 2016, p. 112). The Proposed Action will adhere to all conditions imposed by Imperial County. Trash and wastepaper generated by staff at the facility would be disposed of at a local landfill and would not change with implementation of the Proposed Action.</p>
<b>Waste Water / Sanitary Sewers</b>	1	<p>The Proposed Action would result in construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline. The Proposed Action would result in improved adequacy of sewer collection services and effective wastewater treatment system with a no-point discharge. The Proposed Action would result in improved adequacy of sewer collection services and effective waste water treatment system with a no-point discharge. Any potential impacts that may result from the implementation the Proposed Action would be temporary and mitigatable.</p>

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>Water Supply</b>	2	<p>The Proposed Action would result in construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline. The Proposed Action addresses deficiencies in the Niland County Sanitary District WWTP that are resulting in a violation of the Plant's National Pollutant Discharge Elimination System Permit due to effluent quality. The current National Pollutant Discharge Elimination System Permit for the Niland County Sanitary District has an average monthly effluent limitation of 19 µg/L with a maximum daily limitation of 52 µg/L. Since November 2005 the Niland County Sanitary District has had Copper exceedances. Copper is non-detect in the IID water supply and could infiltrate drinking water from erosion of copper pipes and use of Copper Sulfate to control algae growth in surface water reservoirs. Golden State Water Company sampled homes in Calipatria and Niland in 2013 as part of their triennial Lead and Copper Rule Testing. None of the test results approached the Drinking Water Alert Level of 1,300 µg/L. (130 mg/L). A review of the last two years of Copper testing shows that most of the months there are measurable concentrations of Copper leading to the conclusion that Copper exceedances are likely to be a chronic problem since a point source has not been able to be identified. The Regional Water Quality Control Board suspects the poor condition of the main sanitary sewer collection pipeline that extends along Alcott Road and SR 111 up to Noffsinger Road may be a contributing factor as a result of infiltration (The Holt Group 2016, p. 12). Implementation of the Proposed Action would repair/replace deficient sections of the sanitary sewer collection pipeline. This may reduce the amount of infiltration and potential contributor of some of the identified pollutants thereby resulting in a minor beneficial impact on water quality. Based on the provision of water infrastructure and adequate groundwater, no impacts to water supply would occur.</p>
<b>Public Safety - Police, Fire and Emergency Medical</b>	2	<p>The Proposed Action would result in construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline. Police protection is provided by the Imperial County Sheriff's Department. Fire protection and emergency medical services are provided by the Imperial County Fire Department. The Proposed Action would not increase the demand on the police, fire and emergency medical services. No impact would occur to public safety.</p>

<b>Environmental Assessment Factor</b>	<b>Impact Code</b>	<b>Impact Evaluation</b>
<b>Parks, Open Space and Recreation</b>	2	The Proposed Action would result in construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline. The Proposed Action would not require construction of new, or expansion of existing, parks, open space or recreational facilities.

Environmental Assessment Factor	Impact Code	Impact Evaluation
<p><b>Transportation and Accessibility</b></p>	<p>2</p>	<p>The Proposed Action would result in construction of three evaporation ponds and repair/replacement of the sanitary sewer collection main pipeline. The Proposed Action would generate a short-term increase in traffic associated with construction workers, equipment and delivery. However, these trips would not have a substantial effect on local roadways given the low volumes of traffic in the area. Construction activities will create traffic along of Alcott Road which is an unimproved roadway. Because dust has been previously identified as an air-quality concern, temporary maintenance activities to Alcott Road may be necessary during construction. Additionally, the poor condition of the bridge across the “R” Drain that provides access to the Niland County Sanitary District WWTP poses some safety concerns that will need to be addressed during construction (The Holt Group 2016, p. 69). Due to the deteriorating condition of the bridge that accesses the WWTP site, a detour of all heavy equipment and delivery trucks would be required. This action would require an encroachment permit or temporary construction easement for an alternate construction route from the County of Imperial. Construction activities within the Caltrans right-of- way would not result in any lane closures but would necessitate an Encroachment permit from Caltrans (The Holt Group 2016, p. 115). Short term construction traffic increases would be minimized with implementation of standard engineering and traffic management practices. A Traffic Plan will need to be developed and reviewed by the corresponding agencies. Any potential increases in traffic and delays on roadways near the WWTP site would be temporary and consistent with the duration of the construction period. The Proposed Action will adhere to all conditions imposed by Imperial County. The Proposed Action does not include any aviation components, nor would it cause any aviation safety risks. Therefore, the proposed project would not result in a change of air traffic patterns or result in substantial safety risks.</p>

Environmental Assessment Factor	Impact Code	Impact Evaluation
<b>NATURAL FEATURES</b>		
<b>Unique Natural Features, Water Resources</b>	2	<p>The Farmland Mapping and Monitoring Program monitors conversion of the state’s agricultural lands. Niland is primarily surrounded by Farmland of Local Importance with some areas of Prime Farmland and Farmland of Statewide Importance. However, the Proposed Action would be located on “Other Land” in area that has been previously disturbed with a portion of the pipeline extending through Farmland of Local Importance (See Attachment “H” “California Important Farmland 1984-2020” Map). The pipeline would be buried and not result in a conversion of farmland. No noteworthy unique natural features are located on the 58-acre parcel as it has been previously disturbed. No impact to unique natural features or water resources is anticipated in association with implementation of the Proposed Action.</p>
<b>Vegetation, Wildlife</b>		<p>No wildlife species exist within the Niland County Sanitary District WWTP site as it is surrounded by a fence and developed. Representative species occurring within the proposed 58-acre purchase site include giant reed, canary Island date palm, blue elderberry, tamarisk, and Mexican fan palm. Representative species along sewer pipeline improvements route include cheese bush, wingscale, desert holly, desert saltbush, California buckwheat, desertthorn, mesquite, and spiny senna. Douglas mugwort also occurs within the route of the proposed sewer pipeline improvements (The Holt Group 2016, p. 51). The agricultural setting of the Niland County Sanitary District WWTP make it suitable for burrowing owl habitat. The biological survey completed in March of 2016 identified no special status species. Due to the proximity to known habitat for the Burrowing Owl, which is listed as a Species of Special Concern, a habitat assessment was performed during the site survey. It was determined that the areas were not suitable for Burrowing Owl nesting and foraging habitats. Although no special species or species of concern were identified at the proposed 58-acre parcel, the parcel’s proximity to the Salton Sea make it an important avian nesting and foraging habitat. Special precautions should be taking during construction activities that occur during the nesting season. Mitigation measures BIO-1 and BIO-2 would avoid any impacts to birds or any other wildlife, if present. Documentation: Attachment A, EDR NEPA Check, p. 3 “Natural Areas Map”, and Natural Areas Map Findings, pp. 55-</p>
<b>Other Factors</b>		None applicable.

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**Additional Studies Performed:**

The following studies were prepared for the proposed Niland County Sanitary District Wastewater Treatment Plant as part of the Environmental Assessment completed for the Border Environment Cooperating Commission (BECC); the United State Environmental Protection Agency (US Environmental Protection Agency); and the United State Department of Agriculture – Rural Assistance (USDA).

Preliminary Geotechnical Investigation Report Wastewater Treatment Plant Improvements, Niland County Sanitary District, Imperial County, California Prepared by AMEC Environment & Infrastructure, Inc. September 24, 2013.

Biological Resources Technical Memorandum, Niland Service District Proposed Land Purchase Project, Niland, California. Prepared by Michael Baker International. April, 2016.

Cultural Resources Assessment Niland Services District Proposed Land Purchase Project, Imperial County, California. BCR Consulting, Inc. April 13, 2016.

**Field Inspection** (Date and completed by):

On July 14, 2020, EGI staff performed a survey of the parcel and took photographs of the site and surrounding area.

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**List of Sources, Agencies and Persons Consulted** [40 CFR 1508.9(b)]:

California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program. 2017. Imperial County Important Farmland 2016. Published June 2017.

California Important Farmland Time Series. <https://maps.conservation.ca.gov/dlrp/ciftimeseries/> Accessed August 13, 2023.

EDR NEPA Search Map Report. 2020. Niland WWTP Alcott Rd Calipatria, CA 92233. Inquiry Number: 6115956.1s. July 9, 2020.

EnviroStor 2020. Accessed at:

<https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=125+alcot+road%2C+niland%2C+ca>  
Referenced in text as (EnviroStor 2020). Accessed July 13, 2020.

Federal Emergency Management Agency (FEMA). 2008. Flood Insurance Rate Map Imperial County California and Incorporated Areas. Map Number 06025C0725C. Effective Date: September 26, 2008.

Geotracker 2020. Accessed at:

<https://www.geotracker.waterborads.ca.gov/map/?CMD=runreport&myaddress=125+alcot+road%2C+niland%2C+ca> Referenced in text as (GeoTracker 2020). Accessed July 13, 2020.

Imperial County Air Pollution Control District. 2007. *2007 ICAPCD CEQA Handbook for the Preparation of Air Quality Impact Assessments*. November 2007.

Imperial County, 2008. Imperial County General Plan, Imperial County Land Use Plan. Updated March 1, 2007.

Information for Planning and Consultation. 2023. <https://ipac.ecosphere.fws.gov/location/index> Accessed August 13, 2023.

Lauchner Pries, Shannon. State Historian II. State Office of Historic Preservation. 2020.

National Wild and Scenic Rivers System. Accessed at <https://www.rivers.gov/california.php> Accessed July 13, 2020.

The Holt Group. 2016. Niland Sanitary District Wastewater Treatment Plant Improvements Environmental Assessment (EA). June 29, 2016.

United States Environmental Protection Agency. 2020. Pacific Southwest Region 9, Groundwater, Sole Source Aquifer. Accessed at:

<https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b> Accessed July 14, 2020.

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**List of Permits Obtained:**

Dust Control Permit – Imperial County Air Pollution Control District

Grading Permit – City of Imperial, Community Development Department, Building & Safety Division

Conditional Use Permit from Imperial County

Lot Line Adjustment from the Imperial County Planning & Development Services & Public Works Department

Waste Discharge Requirements (WDR) Permit from the California Regional Water Quality Control Board  
Encroachment Permits from Imperial County Public Works Department

Encroachment Permits from Imperial Irrigation District

Encroachment Permits from California Department of Transportation (Caltrans)

**Public Outreach** [24 CFR 50.23 & 58.43]:

The EA/FONSI is available for review at the local Housing and Urban Development (HUD) office located at 1275 Main Street, El Centro, 92243 or the Imperial County Workforce Development Board at 2799 South 4<sup>th</sup> Street, El Centro, 92243. HUD will mail notices to any individual requesting notification.

The Imperial County Workforce Development Office will send notices to any interested individuals or groups interested in the project and will notice the Finding of No Significant Impact (FONSI) in the Imperial Valley Press (in English) and the El Sol del Valley Imperial (in Spanish). In addition, a notice regarding the FONSI will be sent to the State Historic Preservation Office for (SHPO) review and comment; to the HUD at 1725 23<sup>rd</sup> Street, Suite 100, Sacramento, CA 95816; and the Environmental Protection Agency, District#9 Regional Office at 75 Hawthorne Street, San Francisco, CA 94105-3901.

**Cumulative Impact Analysis** [24 CFR 58.32]:

The Proposed Action is in Niland, a sparsely populated area in rural Imperial County. Currently a Fire Station/Cooling Center is under construction in Niland. No other projects are currently under construction or planned in the area at the moment. Therefore, no cumulative impacts would occur.

**Alternatives** [24 CFR 58.40(e); 40 CFR 1508.9]

An alternative involving subsurface wetlands was considered. The Wetlands Alternative would use subsurface wetlands as a passive treatment technology for the removal of the metals and polishing of effluent. The wetlands would accept treated effluent from the existing Niland County Sanitary District Wastewater Treatment Plant which would remain operational under an National Pollutant Discharge Elimination System Permit. The effluent would be processed through the existing WWTP. The subsurface wetlands (shallow basins filled with rock) have a water level below the rock surface that would accept water through orifices as it enters the wetland. The subsurface wetlands will require 2.5 acres with a three-foot depth of rock to accommodate 20,000 square feet of total wetland area. The subsurface wetland would reduce the metals to the permit requirements. Effluent would continue to be point discharged to the R Drain. The new wetlands would be constructed on site without interference with operations except for the final connections. Additionally, key improvements to the wastewater collection system would be made (The Holt Group 2016, p. 14).

---

**No Action Alternative** [24 CFR 58.40(e)]:

Under the No Action Alternative, the Proposed Action would not be implemented, and the existing wastewater facilities would continue to be operated and maintained in the current failing condition. No improvements would be made to the wastewater collection system either. However, the No Action Alternative would result in the Niland County Sanitary District WWTP being in non-compliance. Further, the residents of Niland would continue to have water impacted by pollutants. Overall, the long-term health and safety benefits of the Proposed Action outweigh the temporary construction-related impacts.

**Summary of Findings and Conclusions:**

The Proposed Action would result in improved adequacy of sewer collection services and effective wastewater treatment system with a no-point discharge. Any potential impacts that may result from the implementation of any of the proposed actions would be temporary and mitigatable. The proposed Project would result in an overall beneficial impact for the residents of Niland.

---

**Mitigation Measures and Conditions [40 CFR 1505.2(c)]**

Summarize below all mitigation measures adopted by the Responsible Entity to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

<b>Law, Authority, or Factor</b>	<b>Mitigation Measure</b>
	<p><b><i>Mitigation Measure BIO-1:</i></b> Within seven (7) days prior to commencement of grading/construction activities, a qualified biologist shall perform a preconstruction survey within 500 feet from the proposed work limits.</p> <p><b><i>Mitigation Measure BIO-2:</i></b> Should any burrows be discovered during the pre-construction survey, the following mitigation measures, and any other mitigation measures recommended by the biologist, shall be required:</p> <ul style="list-style-type: none"><li>a) A focused burrowing owl survey will be required under CDFG guidelines (Staff Report on Burrowing Owl Mitigation, 1995) within 30 days prior to construction activities.</li><li>b) The District will contract with a qualified biologist to manage the passive relocation of the active burrow located within the zone of construction (Alternative 1). (Staff Report on Burrowing Owl Mitigation, 1995) with consultation with CDFG Bermuda Dunes office. Prior to relocation, two artificial burrows per active burrow to be closed will be installed in the vicinity of the WWTP. Any active burrows found along the sanitary sewer collection pipeline will be sheltered in place to protect during construction.</li></ul>

**Determination:**

**Finding of No Significant Impact** [24 CFR 58.40(g)(1); 40 CFR 1508.27]

The project will not result in a significant impact on the quality of the human environment.

**Finding of Significant Impact** [24 CFR 58.40(g)(2); 40 CFR 1508.27]

The project may significantly affect the quality of the human environment.

Preparer Signature:  Date: August 23, 2023

Name/Title/Organization: Kevin L. Grant, Managing Principal, Ericsson-Grant, Inc.

Certifying Officer Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name/Title: \_\_\_\_\_

This original, signed document and related supporting material must be retained on file by the Responsible Entity in an Environmental Review Record (ERR) for the activity/project (ref: 24 CFR Part 58.38) and in accordance with recordkeeping requirements for the HUD program(s).

**ATTACHMENT A**

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**EDR REPORT**

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**Niland WWTP**

Alcott Rd

Calipatria, CA 92233

Inquiry Number: 6115956.1s

July 09, 2020

# EDR NEPASearch™ Map Report



6 Armstrong Road, 4th floor  
Shelton, CT 06484  
Toll Free: 800.352.0050  
[www.edrnet.com](http://www.edrnet.com)

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***Thank you for your business.***  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

#### **Disclaimer - Copyright and Trademark Notice**

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## EDR NEPA Search DESCRIPTION

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies include in their decision-making processes appropriate and careful consideration of all environmental effects and actions, analyze potential environmental effects of proposed actions and their alternatives for public understanding and scrutiny, avoid or minimize adverse effects of proposed actions, and restore and enhance environmental quality as much as possible.

The EDR NEPA Search Map Report provides information which may be used, in conjunction with additional research, to determine whether a proposed site or action will have significant environmental effect.

### TARGET PROPERTY ADDRESS

NILAND WWTP  
ALCOTT RD  
CALIPATRIA, CA 92233

Inquiry #: 6115956.1s  
Date: 7/9/20

### TARGET PROPERTY COORDINATES

Latitude (North):	33.226009 - 33° 13' 33.6"
Longitude (West):	115.526352 - 115° 31' 34.9"
Universal Transverse Mercator:	Zone 11
UTM X (Meters):	637318.9
UTM Y (Meters):	3677118.8

The report provides maps and data for the following items (where available). Search results are provided in the Map Findings Summary on page 2 of this report.

<b>Section</b>	<b>Regulation</b>
<b>Natural Areas Map</b>	
• Federal Lands Data:	
- Officially designated wilderness areas	47 CFR 1.1307(1)
- Officially designated wildlife preserves, sanctuaries and refuges	47 CFR 1.1307(2)
- Wild and scenic rivers	40 CFR 6.302(e)
- Fish and Wildlife	40 CFR 6.302
• Threatened or Endangered Species, Fish and Wildlife, Critical Habitat Data (where available)	47 CFR 1.1307(3); 40 CFR 6.302
<b>Historic Sites Map</b>	
• National Register of Historic Places	47 CFR 1.1307(4); 40 CFR 6.302
• State Historic Places (where available)	
• Indian Reservations	
<b>Flood Plain Map</b>	
• National Flood Hazard Layer Data (where available)	47 CFR 1.1307(6); 40 CFR 6.302
• FEMA Q3 Flood Data (where available)	47 CFR 1.1307(6); 40 CFR 6.302
<b>Wetlands Map</b>	
• National Wetlands Inventory Data (where available)	47 CFR 1.1307(7); 40 CFR 6.302
• State Wetlands Data (where available)	47 CFR 1.1307(7); 40 CFR 6.302
<b>FCC &amp; FAA Map</b>	
• FCC antenna/tower sites, FAA Markings and Obstructions, Airports, Topographic gradient	47 CFR 1.1307(8)

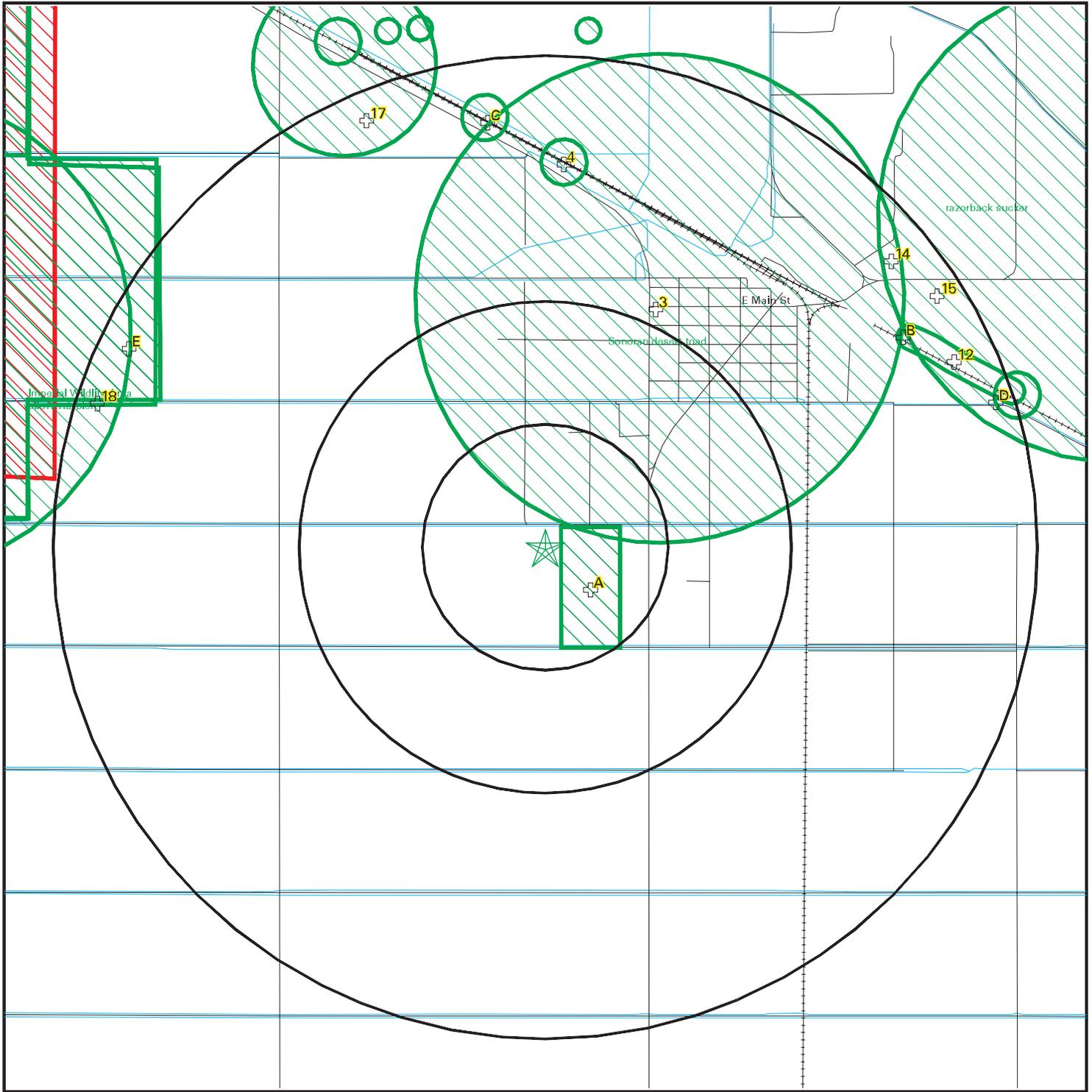
### **Key Contacts and Government Records Searched**

# MAP FINDINGS SUMMARY

The databases searched in this report are listed below. Database descriptions and other agency contact information is contained in the Key Contacts and Government Records Searched section on page 107 of this report.

Applicable Regulation from 47 CFR/FCC Checklist	Database	Search Distance (Miles)	Within Search	Within 1/8 Mile
<b><u>NATURAL AREAS MAP</u></b>				
1.1307a (2) Officially Designated Wildlife Preserve	US Federal Lands	2.00	NO	NO
	US Wilderness Preservation	2.00	NO	NO
	US Federal Lands	2.00	NO	NO
	CA Protected Areas	2.00	YES	YES
	CA Government Lands	2.00	YES	YES
	CA Conservation Easement	2.00	NO	NO
	US Proclamation Boundaries	2.00	NO	NO
	CA ACEC	2.00	NO	NO
	US Scenic River	2.00	NO	NO
	US ACEC	2.00	NO	NO
	CA PCT Lands	2.00	YES	NO
	US NCED	2.00	NO	NO
	US Critical Water Habitat	2.00	NO	NO
	US Critical Land Habitat	2.00	NO	NO
1.1307a (3) Threatened or Endangered Species or Critical Habitat	US Endangered Species	County	YES	N/A
1.1307a (3) Threatened or Endangered Species or Critical Habitat	CA Endangered Species	2.00	YES	YES
<b><u>HISTORIC SITES MAP</u></b>				
1.1307a (4) Listed or eligible for National Register	CA Historic Landmarks	2.00	NO	NO
1.1307a (4) Listed or eligible for National Register	Natchez Trace National Scenic	2.00	NO	NO
1.1307a (4) Listed or eligible for National Register	Potomac Heritage National Scen	2.00	NO	NO
	Indian Reservations	2.00	NO	NO
1.1307a (4) Listed or eligible for National Register	US Trails	2.00	NO	NO
1.1307a (4) Listed or eligible for National Register	National Register of Hist. Pla	2.00	NO	NO
<b><u>FLOOD PLAIN MAP</u></b>				
1.1307 (6) Located in a Flood Plain	Special Flood Hazard Area (1%)	2.00	NO	NO
1.1307 (6) Located in a Flood Plain	0.2% Annual Chance Flood Hazar	2.00	NO	NO
<b><u>WETLANDS MAP</u></b>				
1.1307 (7) Change in surface features (wetland fill)	NWI	2.00	YES	YES
1.1307 (7) Change in surface features (wetland fill)	STATE	2.00	NO	NO
	CA COASTAL ZONE	20.00	NO	NO
<b><u>FCC &amp; FAA SITES MAP</u></b>				
	Cellular	2.00	YES	NO
	Antenna Structure Registration	2.00	YES	NO
	AM Antenna	2.00	NO	NO
	FM Antenna	2.00	NO	NO
	FAA DOF	2.00	YES	NO
	Airports	2.00	NO	---
	Power Lines	2.00	YES	---

# Natural Areas Map



- |                   |                           |
|-------------------|---------------------------|
| ★ Target Property | ⊕ Locations               |
| ∩ Roads           | ▨ Federal Areas           |
| ∩ County Boundary | ∩ Federal Linear Features |
| ∩ Waterways       | ▨ State Areas             |
| ■ Water           | ∩ State Linear Features   |



SITE NAME: Niland WWTP  
 ADDRESS: Alcott Rd  
 Calipatria CA 92233  
 LAT/LONG: 33.22601 / 115.526354

CLIENT: Ericsson-Grant Inc.  
 CONTACT: Kevin Grant  
 INQUIRY #: 6115956.1s  
 DATE: July 8, 2020

# NATURAL AREAS MAP FINDINGS

## Federal Endangered Species from the U.S. Fish and Wildlife for IMPERIAL County

### Group:Birds

Common Name: Southwestern willow flycatcher  
Status: Endangered

Scientific Name: Empidonax traillii extimus

Common Name: Western snowy plover  
Status: Threatened

Scientific Name: Charadrius alexandrinus nivosus

Common Name: Least Bell's vireo  
Status: Endangered

Scientific Name: Vireo bellii pusillus

Common Name: Yuma clapper rail  
Status: Endangered

Scientific Name: Rallus longirostris yumanensis

### Group:Fishes

Common Name: Desert pupfish  
Status: Endangered

Scientific Name: Cyprinodon macularius

Common Name: Razorback sucker  
Status: Endangered

Scientific Name: Xyrauchen texanus

### Group:Flowering Plants

Common Name: Peirson's milk-vetch  
Status: Threatened

Scientific Name: Astragalus magdalenae var. peirsonii

### Group:Insects

Common Name: Quino checkerspot butterfly  
Status: Endangered

Scientific Name: Euphydryas editha quino (=E. e. wrighti)

### Group:Mammals

Common Name: Peninsular bighorn sheep  
Status: Endangered

Scientific Name: Ovis canadensis nelsoni

### Group:Reptiles

Common Name: Desert tortoise  
Status: Threatened

Scientific Name: Gopherus agassizii

## Federal Endangered Species from the U.S. Fish and Wildlife for CA State

### Group:Amphibians

Common Name: Western spadefoot  
Status: Under Review

Scientific Name: Spea hammondi

Common Name: Channel Islands slender salamander  
Status: Species of Concern

Scientific Name: Batrachoseps pacificus pacificus

Common Name: Limestone salamander  
Status: Under Review

Scientific Name: Hydromantes brunus

Common Name: Large-blotched ensatina  
Status: Species of Concern

Scientific Name: Ensatina eschscholtzii klauberi

Common Name: Oregon spotted frog

Scientific Name: Rana pretiosa

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Status: Threatened

<p>Common Name: Lowland leopard (=San Felipe leopard) frog Status: Species of Concern</p>	<p>Scientific Name: <i>Rana yavapaiensis</i></p>
<p>Common Name: Del Norte salamander Status: Species of Concern</p>	<p>Scientific Name: <i>Plethodon elongatus</i></p>
<p>Common Name: Owens Valley web-toes salamander Status: Species of Concern</p>	<p>Scientific Name: <i>Hydromantes</i> sp.</p>
<p>Common Name: Mount Lyell salamander Status: Species of Concern</p>	<p>Scientific Name: <i>Hydromantes platycephalus</i></p>
<p>Common Name: Foothill yellow-legged frog Status: Under Review</p>	<p>Scientific Name: <i>Rana boylei</i></p>
<p>Common Name: Breckenridge Mountain slender salamander Status: Species of Concern</p>	<p>Scientific Name: <i>Batrachoseps</i> sp.</p>
<p>Common Name: California tiger Salamander Status: Endangered</p>	<p>Scientific Name: <i>Ambystoma californiense</i></p>
<p>Common Name: Kern Plateau salamander Status: Under Review</p>	<p>Scientific Name: <i>Batrachoseps robustus</i></p>
<p>Common Name: Lesser slender salamander Status: Under Review</p>	<p>Scientific Name: <i>Batrachoseps minor</i></p>
<p>Common Name: Yellow-blotched ensatina Status: Species of Concern</p>	<p>Scientific Name: <i>Ensatina eschscholtzii croceator</i></p>
<p>Common Name: Northern red-legged frog Status: Species of Concern</p>	<p>Scientific Name: <i>Rana aurora aurora</i></p>
<p>Common Name: Relictual slender salamander Status: Under Review</p>	<p>Scientific Name: <i>Batrachoseps relictus</i></p>
<p>Common Name: Cascades frog Status: Under Review</p>	<p>Scientific Name: <i>Rana cascadae</i></p>
<p>Common Name: Inyo Mountains slender salamander Status: Under Review</p>	<p>Scientific Name: <i>Batrachoseps campi</i></p>
<p>Common Name: Shasta salamander Status: Under Review</p>	<p>Scientific Name: <i>Hydromantes shastae</i></p>
<p>Common Name: Arizona toad Status: Under Review</p>	<p>Scientific Name: <i>Bufo microscaphus microscaphus</i></p>
<p>Common Name: Kern Canyon slender salamander Status: Under Review</p>	<p>Scientific Name: <i>Batrachoseps simatus</i></p>
<p>Common Name: Black toad Status: Species of Concern</p>	<p>Scientific Name: <i>Bufo exsul</i></p>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Tailed frog  
Status: Species of Concern

Scientific Name: *Ascaphus truei*

#### Group:Arachnids

Common Name: Carlow's Cave pseudoscorpion  
Status: Species of Concern

Scientific Name: *Aphrastochthonius similis*

Common Name: Hom's micro-blind harvestman  
Status: Species of Concern

Scientific Name: *Microcina homi*

Common Name: Lum's micro-blind harvestman  
Status: Species of Concern

Scientific Name: *Microcina lumi*

Common Name: Edgewood blind harvestman  
Status: Species of Concern

Scientific Name: *Calcina minor*

Common Name: Lee's micro-blind harvestman  
Status: Species of Concern

Scientific Name: *Microcina leei*

Common Name: Jung's micro-blind harvestman  
Status: Under Review

Scientific Name: *Microcina jungi*

Common Name: Grubbs' cave pseudoscorpion  
Status: Species of Concern

Scientific Name: *Aphrastochthonius grubbsi*

Common Name: Music Hall Cave pseudoscorpion  
Status: Species of Concern

Scientific Name: *Pseudogarypus orpheus*

Common Name: Lacey's cave pseudoscorpion  
Status: Species of Concern

Scientific Name: *Larca laceyi*

Common Name: Empire Cave pseudoscorpion  
Status: Species of Concern

Scientific Name: *Microcreagris imperialis*

Common Name: Santa Cruz telemid spider  
Status: Species of Concern

Scientific Name: *Telema* sp.

Common Name: Aalbu's cave pseudoscorpion  
Status: Species of Concern

Scientific Name: *Archeolarca aalbui*

Common Name: Monterey Dunes scorpion  
Status: Species of Concern

Scientific Name: *Pauroctonus maritimus*

Common Name: Tiburon micro-blind harvestman  
Status: Species of Concern

Scientific Name: *Microcina tiburona*

#### Group:Birds

Common Name: Xantus'sMurrelet  
Status: Candidate

Scientific Name: *Synthliboramphus hypoleucus*

Common Name: Spotted Towhee  
Status: Species of Concern

Scientific Name: *Pipilo maculatus clementae*

Common Name: Cooper's hawk

Scientific Name: *Accipiter cooperii*

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Status: Species of Concern

Common Name: Grasshopper sparrow  
Status: Species of Concern

Scientific Name: *Ammodramus savannarum* ssp. *perpallidus*

Common Name: Black-backed woodpecker  
Status: Under Review

Scientific Name: *picoides arcticus*

Common Name: Tufted Puffin  
Status: Under Review

Scientific Name: *Fratercula cirrhata*

Common Name: Sharp shinned hawk  
Status: Species of Concern

Scientific Name: *Accipiter striatus*

Common Name: Common Yellowthroat  
Status: Species of Concern

Scientific Name: *Geothlypis trichas sinuosa*

Common Name: Yuma clapper rail  
Status: Endangered

Scientific Name: *Rallus longirostris yumanensis*

Common Name: Southwestern willow flycatcher  
Status: Endangered

Scientific Name: *Empidonax traillii extimus*

Common Name: Southern California rufous-crowned  
sparrow  
Status: Species of Concern

Scientific Name: *Aimophila ruficeps canescens*

Common Name: California spotted Owl  
Status: Under Review

Scientific Name: *Strix occidentalis occidentalis*

Common Name: Tricolored blackbird  
Status: Under Review

Scientific Name: *Agelaius tricolor*

Common Name: San Joaquin LeConte's thrasher  
Status: Species of Concern

Scientific Name: *Toxostoma lecontei macmillanorum*

Common Name: Eagle Mountain scrub jay  
Status: Species of Concern

Scientific Name: *Aphelocoma coerulescens cana*

Common Name: Elegant tern  
Status: Species of Concern

Scientific Name: *Sterna elegans*

Common Name: Least bittern  
Status: Species of Concern

Scientific Name: *Ixobrychus exilis hesperis*

Common Name: Song Sparrow  
Status: Species of Concern

Scientific Name: *Melospiza melodia pusillula*

Common Name: Little willow flycatcher  
Status: Species of Concern

Scientific Name: *Empidonax traillii brewsteri*

Common Name: Song Sparrow  
Status: Species of Concern

Scientific Name: *Melospiza melodia samuelis*

Common Name: Large-billed savannah sparrow  
Status: Species of Concern

Scientific Name: *Passerculus sandwichensis rostratus*

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Black tern  
Status: Species of Concern

Scientific Name: *Chlidonias niger*

Common Name: Song Sparrow  
Status: Species of Concern

Scientific Name: *Melospiza melodia maxillaris*

Common Name: Fulvous whistling duck  
Status: Species of Concern

Scientific Name: *Dendrocygna bicolor*

Common Name: Belding's savannah sparrow  
Status: Species of Concern

Scientific Name: *Passerculus sandwichensis beldingi*

Common Name: Bell's sage sparrow  
Status: Species of Concern

Scientific Name: *Amphispiza belli belli*

#### Group: Conifers and Cycads

Common Name: Monterey cypress  
Status: Species of Concern

Scientific Name: *Cupressus macrocarpa*

Common Name: Torrey, Del Mar pine  
Status: Species of Concern

Scientific Name: *Pinus torreyana torreyana*

Common Name: Tecate cypress  
Status: Species of Concern

Scientific Name: *Cupressus forbesii*

Common Name: Bolander's beach pine  
Status: Species of Concern

Scientific Name: *Pinus contorta bolanderi*

Common Name: Monterey pine  
Status: Species of Concern

Scientific Name: *Pinus radiata*

Common Name: Torrey Island pine  
Status: Species of Concern

Scientific Name: *Pinus torreyana insularis*

Common Name: Mendocino cypress  
Status: Species of Concern

Scientific Name: *Cupressus goveniana pigmaea*

Common Name: Yellow cedar  
Status: Under Review

Scientific Name: *Callitropsis nootkatensis*

#### Group: Crustaceans

Common Name: [Unnamed] isopod  
Status: Species of Concern

Scientific Name: *Caecidotea tomalensis*

Common Name: Vernal pool tadpole shrimp  
Status: Endangered

Scientific Name: *Lepidurus packardi*

Common Name: Longhorn fairy shrimp  
Status: Endangered

Scientific Name: *Branchinecta longiantenna*

Common Name: California freshwater shrimp  
Status: Endangered

Scientific Name: *Syncaris pacifica*

Common Name: Mono Lake brine shrimp

Scientific Name: *Artemia monica*

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Status: Species of Concern

Common Name: Conservancy fairy shrimp  
Status: Endangered

Scientific Name: Branchinecta conservatio

Group: Ferns and Allies

Common Name: Crater Lake grap fern  
Status: Species of Concern

Scientific Name: Botrychium pumicola nealleyi

Common Name: No common name  
Status: Species of Concern

Scientific Name: Botrychium crenulatum

Group: Fishes

Common Name: Rough sculpin  
Status: Species of Concern

Scientific Name: Cottus asperimus

Common Name: Kern River rainbow trout  
Status: Species of Concern

Scientific Name: Oncorhynchus mykiss gilberti

Common Name: Steelhead  
Status: Endangered

Scientific Name: Oncorhynchus (=Salmo) mykiss

Common Name: Goose Lake redband trout  
Status: Species of Concern

Scientific Name: Oncorhynchus mykiss ssp.

Common Name: Eagle Lake rainbow Trout  
Status: Under Review

Scientific Name: Oncorhynchus mykiss aquilarum

Common Name: Flannelmouth sucker  
Status: Species of Concern

Scientific Name: Catostomus latipinnis

Common Name: Steelhead  
Status: Under Review

Scientific Name: Oncorhynchus (=Salmo) mykiss

Common Name: longfin smelt  
Status: Candidate

Scientific Name: Spirinchus thaleichthys

Common Name: Benton Valley speckled dace  
Status: Species of Concern

Scientific Name: Rhinichthys osculus ssp.

Common Name: Jenny Creek sucker  
Status: Species of Concern

Scientific Name: Catostomus rimiculus ssp.

Common Name: Arroyo chub  
Status: Species of Concern

Scientific Name: Gila orcuttii

Common Name: Steelhead  
Status: Threatened

Scientific Name: Oncorhynchus (=Salmo) mykiss

Common Name: Owens speckled dace  
Status: Species of Concern

Scientific Name: Rhinichthys osculus ssp.

Common Name: Red Hills roach  
Status: Species of Concern

Scientific Name: Lavinia symmetricus ssp.

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Santa Ana speckled dace Status: Species of Concern	Scientific Name: <i>Rhinichthys osculus</i> ssp.
Common Name: Shoshone pupfish Status: Species of Concern	Scientific Name: <i>Cyprinodon nevadensis shoshone</i>
Common Name: Long Valley speckled dace Status: Species of Concern	Scientific Name: <i>Rhinichthys osculus</i> ssp.
Common Name: Klamath largescale sucker Status: Species of Concern	Scientific Name: <i>Catostomus snyderi</i>
Common Name: Goose Lake sucker Status: Species of Concern	Scientific Name: <i>Catostomus occidentalis lacusanserinus</i>
Common Name: Sacramento perch Status: Species of Concern	Scientific Name: <i>Archoplites interruptus</i>
Common Name: green sturgeon Status: Threatened	Scientific Name: <i>Acipenser medirostris</i>
Common Name: Pit roach Status: Species of Concern	Scientific Name: <i>Lavinia symmetricus mitrulus</i>
Common Name: Warner Valley redband trout Status: Species of Concern	Scientific Name: <i>Oncorhynchus mykiss</i> ssp.
Common Name: Amargosa Canyon speckled dace Status: Species of Concern	Scientific Name: <i>Rhinichthys osculus</i> ssp.
Common Name: Russian River tule perch Status: Species of Concern	Scientific Name: <i>Hysteroecarpus traskii</i> pomo
Common Name: Goose Lake lamprey Status: Species of Concern	Scientific Name: <i>Lampetra tridentata</i> ssp.
Common Name: Gualala roach Status: Species of Concern	Scientific Name: <i>Lavinia symmetricus parvipinnis</i>

### Group: Flowering Plants

Common Name: Marin dwarf-flax Status: Threatened	Scientific Name: <i>Hesperolinon congestum</i>
Common Name: Fleshy owl's-clover Status: Threatened	Scientific Name: <i>Castilleja campestris</i> ssp. <i>succulenta</i>
Common Name: Pine Hill ceanothus Status: Endangered	Scientific Name: <i>Ceanothus roderickii</i>
Common Name: Hoover's spurge Status: Threatened	Scientific Name: <i>Chamaesyce hooveri</i>
Common Name: Suisun thistle Status: Endangered	Scientific Name: <i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Vine Hill clarkia Status: Endangered	Scientific Name: <i>Clarkia imbricata</i>
Common Name: Soft bird's-beak Status: Endangered	Scientific Name: <i>Cordylanthus mollis</i> ssp. <i>mollis</i>
Common Name: Baker's larkspur Status: Endangered	Scientific Name: <i>Delphinium bakeri</i>
Common Name: Yellow larkspur Status: Endangered	Scientific Name: <i>Delphinium luteum</i>
Common Name: lone (incl. Irish Hill) buckwheat Status: Endangered	Scientific Name: <i>Eriogonum apricum</i> (incl. var. <i>prostratum</i> )
Common Name: Pine Hill flannelbush Status: Endangered	Scientific Name: <i>Fremontodendron californicum</i> ssp. <i>decumbens</i>
Common Name: El Dorado bedstraw Status: Endangered	Scientific Name: <i>Galium californicum</i> ssp. <i>sierrae</i>
Common Name: Sebastopol meadowfoam Status: Endangered	Scientific Name: <i>Limnanthes vinculans</i>
Common Name: San Joaquin Orcutt grass Status: Threatened	Scientific Name: <i>Orcuttia inaequalis</i>
Common Name: Sacramento Orcutt grass Status: Endangered	Scientific Name: <i>Orcuttia viscida</i>
Common Name: Pitkin Marsh lily Status: Endangered	Scientific Name: <i>Lilium pardalinum</i> ssp. <i>pitkinense</i>
Common Name: Few-flowered navarretia Status: Endangered	Scientific Name: <i>Navarretia leucocephala</i> ssp. <i>pauciflora</i> (=N. <i>pauciflora</i> )
Common Name: Many-flowered navarretia Status: Endangered	Scientific Name: <i>Navarretia leucocephala</i> ssp. <i>plieantha</i>
Common Name: Colusa grass Status: Threatened	Scientific Name: <i>Neostapfia colusana</i>
Common Name: Hairy Orcutt grass Status: Endangered	Scientific Name: <i>Orcuttia pilosa</i>
Common Name: Lake County stonecrop Status: Endangered	Scientific Name: <i>Parvisedum leiocarpum</i>
Common Name: Calistoga allocarya Status: Endangered	Scientific Name: <i>Plagiobothrys strictus</i>
Common Name: Napa bluegrass Status: Endangered	Scientific Name: <i>Poa napensis</i>
Common Name: Hartweg's golden sunburst	Scientific Name: <i>Pseudobahia bahiifolia</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Status: Endangered

Common Name: San Joaquin adobe sunburst  
Status: Threatened

Scientific Name: *Pseudobahia peirsonii*

Common Name: Layne's butterweed  
Status: Threatened

Scientific Name: *Senecio layneae*

Common Name: Keck's Checker-mallow  
Status: Endangered

Scientific Name: *Sidalcea keckii*

Common Name: Kenwood Marsh checker-mallow  
Status: Endangered

Scientific Name: *Sidalcea oregana* ssp. *valida*

Common Name: Metcalf Canyon jewelflower  
Status: Endangered

Scientific Name: *Streptanthus albidus* ssp. *albidus*

Common Name: Presidio Manzanita  
Status: Endangered

Scientific Name: *Arctostaphylos hookeri* var. *ravenii*

Common Name: Sonoma sunshine  
Status: Endangered

Scientific Name: *Blennosperma bakeri*

Common Name: Tiburon mariposa lily  
Status: Threatened

Scientific Name: *Calochortus tiburonensis*

Common Name: Coyote ceanothus  
Status: Endangered

Scientific Name: *Ceanothus ferrisiae*

Common Name: Sonoma spineflower  
Status: Endangered

Scientific Name: *Chorizanthe valida*

Common Name: Tiburon jewelflower  
Status: Endangered

Scientific Name: *Streptanthus niger*

Common Name: Hidden Lake bluecurls  
Status: Threatened

Scientific Name: *Trichostema austromontanum* ssp. *compactum*

Common Name: Fountain thistle  
Status: Endangered

Scientific Name: *Cirsium fontinale* var. *fontinale*

Common Name: Presidio clarkia  
Status: Endangered

Scientific Name: *Clarkia franciscana*

Common Name: Palmate-bracted bird's beak  
Status: Endangered

Scientific Name: *Cordylanthus palmatus*

Common Name: Tiburon paintbrush  
Status: Endangered

Scientific Name: *Castilleja affinis* ssp. *neglecta*

Common Name: Sonoma alopecurus  
Status: Endangered

Scientific Name: *Alopecurus aequalis* var. *sonomensis*

Common Name: lone manzanita  
Status: Threatened

Scientific Name: *Arctostaphylos myrtifolia*

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Pallid manzanita Status: Threatened	Scientific Name: <i>Arctostaphylos pallida</i>
Common Name: Solano grass Status: Endangered	Scientific Name: <i>Tuctoria mucronata</i>
Common Name: San Mateo thornmint Status: Endangered	Scientific Name: <i>Acanthomintha obovata</i> ssp. <i>duttonii</i>
Common Name: Clara Hunt's milk-vetch Status: Endangered	Scientific Name: <i>Astragalus clarianus</i>
Common Name: Chinese Camp brodiaea Status: Threatened	Scientific Name: <i>Brodiaea pallida</i>
Common Name: Mariposa pussypaws Status: Threatened	Scientific Name: <i>Calyptridium pulchellum</i>
Common Name: Stebbins' morning-glory Status: Endangered	Scientific Name: <i>Calystegia stebbinsii</i>
Common Name: White sedge Status: Endangered	Scientific Name: <i>Carex albida</i>
Common Name: Santa Clara Valley dudleya Status: Endangered	Scientific Name: <i>Dudleya setchellii</i>
Common Name: Island tree poppy Status: Species of Concern	Scientific Name: <i>Dendromecon rigida</i> <i>rhamnoides</i>
Common Name: Northcoast birds-beak Status: Species of Concern	Scientific Name: <i>Cordylanthus maritimus</i> <i>palustris</i>
Common Name: Loch Lomond coyote thistle Status: Endangered	Scientific Name: <i>Eryngium constancei</i>
Common Name: Red Hills vervain Status: Threatened	Scientific Name: <i>Verbena californica</i>
Common Name: San Francisco lessingia Status: Endangered	Scientific Name: <i>Lessingia germanorum</i> (=L.g. var. <i>germanorum</i> )
Common Name: Payson's jewelflower Status: Species of Concern	Scientific Name: <i>Caulanthus simulans</i>
Common Name: Santa Barbara false-lupine Status: Species of Concern	Scientific Name: <i>Thermopsis macrophylla</i> <i>agnina</i>
Common Name: Beaked clarkia Status: Species of Concern	Scientific Name: <i>Clarkia rostrata</i>
Common Name: Boundary Peak rock-cress Status: Species of Concern	Scientific Name: <i>Boechera pinzliae</i>
Common Name: Island jepsonia Status: Species of Concern	Scientific Name: <i>Jepsonia malvifolia</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Channel Island tree poppy Status: Species of Concern	Scientific Name: <i>Dendromecon rigida</i> ssp. <i>harfordii</i>
Common Name: Springville clarkia Status: Threatened	Scientific Name: <i>Clarkia springvillensis</i>
Common Name: Pennell's bird's-beak Status: Endangered	Scientific Name: <i>Cordylanthus tenuis</i> ssp. <i>capillaris</i>
Common Name: Hollisteria Status: Species of Concern	Scientific Name: <i>Hollisteria lanata</i>
Common Name: Tuolumne fawn-lily Status: Species of Concern	Scientific Name: <i>Erythronium tuolumnense</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Holocarpa virgata elongata</i>
Common Name: Peirson's spring beauty Status: Species of Concern	Scientific Name: <i>Claytonia lanceolata peirsonii</i>
Common Name: Hispid birds-beak Status: Species of Concern	Scientific Name: <i>Cordylanthus mollis hispidus</i>
Common Name: Wart-stemmed ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus verrucosus</i>
Common Name: Oso manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos osoensis</i>
Common Name: Dudley's lousewort Status: Species of Concern	Scientific Name: <i>Pedicularis dudleyi</i>
Common Name: Pierpoint Springs liveforever Status: Species of Concern	Scientific Name: <i>Dudleya cymosa costifolia</i>
Common Name: Mono milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus monoensis monoensis</i>
Common Name: Kern mallow Status: Endangered	Scientific Name: <i>Eremalche kernensis</i>
Common Name: San Mateo woolly sunflower Status: Endangered	Scientific Name: <i>Eriophyllum latilobum</i>
Common Name: Long-petaled lewisia Status: Species of Concern	Scientific Name: <i>Lewisia longipetala</i>
Common Name: Monterrey manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos montereyensis</i>
Common Name: [Unnamed] checkermallow Status: Species of Concern	Scientific Name: <i>Sidalcea malvaeflora patula</i>
Common Name: Howe's hedgehog cactus Status: Species of Concern	Scientific Name: <i>Echinocereus engelmannii howei</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Tuolumne coyote-thistle Status: Species of Concern	Scientific Name: <i>Eryngium pinnatisectum</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Lessingia micradenia micradenia</i>
Common Name: Santa Catalina Island manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos catalinae</i>
Common Name: Cuyamaca raspberry Status: Species of Concern	Scientific Name: <i>Rubus glaucifolius ganderi</i>
Common Name: [Unnamed] milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus lentiformis</i>
Common Name: Brandegee eriastrum Status: Species of Concern	Scientific Name: <i>Eriastrum brandegeae</i>
Common Name: San Clemente Island brodiaea Status: Species of Concern	Scientific Name: <i>Triteleia clementina</i>
Common Name: Summer-holly Status: Species of Concern	Scientific Name: <i>Comarostaphylis diversifolia diversifolia</i>
Common Name: Borrego Valley peppergrass Status: Species of Concern	Scientific Name: <i>Lepidium flavum felipense</i>
Common Name: Ahart's dwarf rush Status: Species of Concern	Scientific Name: <i>Juncus leiospermus var. ahartii</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Chorizanthe polygonoides longispina</i>
Common Name: San Francisco wallflower Status: Species of Concern	Scientific Name: <i>Erysimum franciscanum</i>
Common Name: Diablo rock-rose Status: Species of Concern	Scientific Name: <i>Helianthella castanea</i>
Common Name: Carmel Valley malacothrix Status: Species of Concern	Scientific Name: <i>Malacothrix saxatilis arachnoidea</i>
Common Name: Lupine, San Mateo tre Status: Species of Concern	Scientific Name: <i>Lupinus arboreus eximius</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Dendrographa leucophaea</i>
Common Name: Butte County meadowfoam Status: Endangered	Scientific Name: <i>Limnanthes floccosa ssp. californica</i>
Common Name: Bakersfield cactus Status: Endangered	Scientific Name: <i>Opuntia treleasei</i>
Common Name: Klamath manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos klamathensis</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Laguna Mountains aster Status: Species of Concern	Scientific Name: Machaeranthera asteroides lagunensis
Common Name: Heart-leaved pitcher-sage Status: Species of Concern	Scientific Name: Lepechinia cardiophylla
Common Name: Caper-fruited tropidocarpum Status: Species of Concern	Scientific Name: Tropidocarpum capparideum
Common Name: Santiago Peak phacelia Status: Species of Concern	Scientific Name: Phacelia suaveolens keckii
Common Name: Panamint daisy Status: Species of Concern	Scientific Name: Enceliopsis covillei
Common Name: Shasta River mariposa lily Status: Species of Concern	Scientific Name: Calochortus monanthus
Common Name: Jaeger's bush milk-vetch Status: Species of Concern	Scientific Name: Astragalus pachypus jaegeri
Common Name: Mouse buckwheat Status: Species of Concern	Scientific Name: Eriogonum nudum murinum
Common Name: Ashy phacelia Status: Species of Concern	Scientific Name: Phacelia distans
Common Name: Little mousetail Status: Species of Concern	Scientific Name: Myosurus minimus apus
Common Name: Orcutt's dudleya Status: Species of Concern	Scientific Name: Dudleya attentuata orcuttii
Common Name: Star-fruited, small stonecrop Status: Species of Concern	Scientific Name: Sedum radiatum depauperatum
Common Name: Bodie Hills draba Status: Species of Concern	Scientific Name: Cusickiella quadricostata
Common Name: Pappose spikeweed Status: Species of Concern	Scientific Name: Hemizonia parryi congdonii
Common Name: Hoover's rosinweed Status: Species of Concern	Scientific Name: Calycadenia hooveri
Common Name: Glandular dwarf-flax Status: Species of Concern	Scientific Name: Hesperolinon adenophyllum
Common Name: Otay lotus Status: Species of Concern	Scientific Name: Lotus crassifolius otayensis
Common Name: Kingston Mountains cinquefoil Status: Species of Concern	Scientific Name: Ivesia patellifera
Common Name: Bear Valley wooly-pod Status: Species of Concern	Scientific Name: Astragalus leucolobus

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Bellinger's meadowfoam Status: Species of Concern	Scientific Name: <i>Limnanthes floccosa bellingeriana</i>
Common Name: San Clemente Island milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus nevinii</i>
Common Name: Bear Valley pyrrocoma Status: Species of Concern	Scientific Name: <i>Pyrrocoma uniflora gossypina</i>
Common Name: Munz's mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus palmeri munzii</i>
Common Name: Orcutt's linanthus Status: Species of Concern	Scientific Name: <i>Linanthus orcuttii</i>
Common Name: Tiburon tarweed Status: Species of Concern	Scientific Name: <i>Hemizonia multicaulis vernalis</i>
Common Name: Warner Springs lessingia Status: Species of Concern	Scientific Name: <i>Lessingia glandulifera tomentosa</i>
Common Name: Descanso milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus oocarpus</i>
Common Name: Klamath gentian Status: Species of Concern	Scientific Name: <i>Gentiana plurisetosa</i>
Common Name: Little San Bernardino Mountains gilia Status: Species of Concern	Scientific Name: <i>Gilia maculata</i>
Common Name: Mono Lake lupine Status: Species of Concern	Scientific Name: <i>Lupinus duranii</i>
Common Name: Suisun aster Status: Species of Concern	Scientific Name: <i>Aster chilensis lentus</i>
Common Name: Kruckeberg's jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus morrisonii kruckebergii</i>
Common Name: Ferris' milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus tener var. ferrisae</i>
Common Name: Salinas Valley popcornflower Status: Species of Concern	Scientific Name: <i>Plagiobothrys uncinatus</i>
Common Name: Twisselmann's nemacladus Status: Species of Concern	Scientific Name: <i>Nemacladus twisselmannii</i>
Common Name: Orange lupine Status: Species of Concern	Scientific Name: <i>Lupinus citrinus</i>
Common Name: Cuesta Pass sidalcea Status: Species of Concern	Scientific Name: <i>Sidalcea hickmanii anomala</i>
Common Name: San Francisco popcornflower Status: Species of Concern	Scientific Name: <i>Plagiobothrys torreyi var. diffusus</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Catalina ironwood Status: Species of Concern	Scientific Name: <i>Lyonothamnus floribundus floribundus</i>
Common Name: Orcutt's brodiaea Status: Species of Concern	Scientific Name: <i>Brodiaea orcuttii</i>
Common Name: Parry's horkelia Status: Species of Concern	Scientific Name: <i>Horkelia parryi</i>
Common Name: Panamint Mountains lupine Status: Species of Concern	Scientific Name: <i>Lupinus magnificus magnificus</i>
Common Name: Mono Hot Springs evening-primrose Status: Species of Concern	Scientific Name: <i>Camissonia sierrae alticola</i>
Common Name: Forked fiddleneck Status: Species of Concern	Scientific Name: <i>Amsinckia vernicosa furcata</i>
Common Name: Jaeger's caulostramina Status: Species of Concern	Scientific Name: <i>Caulostramina jaegeri</i>
Common Name: San Bernardino butterweed Status: Species of Concern	Scientific Name: <i>Packera bernardina</i>
Common Name: Island tree mallow Status: Species of Concern	Scientific Name: <i>Lavatera assurgentiflora</i>
Common Name: Wedge-leaved horkelia Status: Species of Concern	Scientific Name: <i>Horkelia cuneata sericea</i>
Common Name: Arroyo Seco bush-mallow Status: Species of Concern	Scientific Name: <i>Malacothamnus palmeri lucianus</i>
Common Name: Sand mesa manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos rudis</i>
Common Name: Sonoma ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus sonomensis</i>
Common Name: Santa Lucia manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos luciana</i>
Common Name: Refugio manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos refugioensis</i>
Common Name: Donner Pass buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum umbellatum torreyanum</i>
Common Name: Orcutt's bird's-beak Status: Species of Concern	Scientific Name: <i>Cordylanthus orcuttianus</i>
Common Name: Piute buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum breedlovei breedlovei</i>
Common Name: San Bernardino Mountains dudleya Status: Species of Concern	Scientific Name: <i>Dudleya abramsii affinis</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Dwarf goldenstar Status: Species of Concern	Scientific Name: Bloomeria humilis
Common Name: Ojai fritillary Status: Species of Concern	Scientific Name: Fritillaria ojaiensis
Common Name: Humboldt Bay owl's clover Status: Species of Concern	Scientific Name: Castilleja ambigua humboldtiensis
Common Name: Prostrate hosackia Status: Species of Concern	Scientific Name: Lotus nuttallianus
Common Name: San Luis Obispo monardella Status: Species of Concern	Scientific Name: Monardella frutescens
Common Name: Closed-lip beardtongue Status: Species of Concern	Scientific Name: Penstemon personatus
Common Name: Velvety false-lupine Status: Species of Concern	Scientific Name: Thermopsis macrophylla semota
Common Name: Nuttall's scrub oak Status: Species of Concern	Scientific Name: Quercus dumosa
Common Name: San Gabriel manzanita Status: Species of Concern	Scientific Name: Arctostaphylos gabrielensis
Common Name: Hanaupah laphamia Status: Species of Concern	Scientific Name: Perityle villosa
Common Name: Seaside, Coulter's daisy Status: Species of Concern	Scientific Name: Lasthenia glabrata coulteri
Common Name: Sp. nov. ined. (chaparral) beargrass Status: Species of Concern	Scientific Name: Nolina sp.
Common Name: Palmer's mariposa lily Status: Species of Concern	Scientific Name: Calochortus palmeri palmeri
Common Name: No common name Status: Species of Concern	Scientific Name: Ivesia longibracteata
Common Name: Ertter's milk-vetch Status: Species of Concern	Scientific Name: Astragalus ertterae
Common Name: Heartscale Status: Species of Concern	Scientific Name: Atriplex cordulata
Common Name: Mt. Eddy draba Status: Species of Concern	Scientific Name: Draba carnosula
Common Name: Shirley Meadows mariposa lily Status: Species of Concern	Scientific Name: Calochortus westonii
Common Name: Candleholder dudleya Status: Species of Concern	Scientific Name: Dudleya candelabrum

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Santa Cruz gooseberry Status: Species of Concern	Scientific Name: <i>Ribes thacherianum</i>
Common Name: Munz cholla Status: Species of Concern	Scientific Name: <i>Opuntia munzii</i>
Common Name: Lakeside ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus cyaneus</i>
Common Name: Point Reyes meadowfoam Status: Species of Concern	Scientific Name: <i>Limnanthes douglasii sulphurea</i>
Common Name: Los Angeles sunflower Status: Species of Concern	Scientific Name: <i>Helianthus nuttallii parishii</i>
Common Name: Howell's lewisia Status: Species of Concern	Scientific Name: <i>Lewisia cotyledon howellii</i>
Common Name: Santa Barbara Island cream cups Status: Species of Concern	Scientific Name: <i>Platystemon californicus ciliatus</i>
Common Name: Island snapdragon Status: Species of Concern	Scientific Name: <i>Gambelia speciosa</i>
Common Name: Adobe sanicle Status: Species of Concern	Scientific Name: <i>Sanicula maritima</i>
Common Name: Nissenan manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos nissenana</i>
Common Name: Parish's rock-cress Status: Species of Concern	Scientific Name: <i>Arabis parishii</i>
Common Name: Tiehm's rock-cress Status: Species of Concern	Scientific Name: <i>Arabis tiehmii</i>
Common Name: Yosemite wooly-sunflower Status: Species of Concern	Scientific Name: <i>Eriophyllum nubigenum</i>
Common Name: Jones layia Status: Species of Concern	Scientific Name: <i>Layia jonesii</i>
Common Name: White bear desert-poppy Status: Species of Concern	Scientific Name: <i>Arctomecon merriamii</i>
Common Name: Panamint dudleya Status: Species of Concern	Scientific Name: <i>Dudleya saxosa saxosa</i>
Common Name: Dunn's mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus dunnii</i>
Common Name: California dissanthelium Status: Species of Concern	Scientific Name: <i>Dissanthelium californicum</i>
Common Name: Temblor buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum temblorense</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Shaw's agave Status: Species of Concern	Scientific Name: <i>Agave shawii</i>
Common Name: Pickering ivesia Status: Species of Concern	Scientific Name: <i>Ivesia pickeringii</i>
Common Name: Forked buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum bifurcatum</i>
Common Name: San Bernardino rock-cress Status: Species of Concern	Scientific Name: <i>Arabis breweri pecuniaria</i>
Common Name: Butterworth's buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum butterworthianum</i>
Common Name: Borrego aster Status: Species of Concern	Scientific Name: <i>Xylorhiza orcuttii</i>
Common Name: The Lassics lupine Status: Species of Concern	Scientific Name: <i>Lupinus constancei</i>
Common Name: Giant spanishneedle Status: Species of Concern	Scientific Name: <i>Palafoxia arida gigantea</i>
Common Name: San Clemente island bedstraw Status: Species of Concern	Scientific Name: <i>Galium catalinense acrispum</i>
Common Name: Pecho manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos pechoensis</i>
Common Name: Lavin's milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus oophorus lavinii</i>
Common Name: Tahquitz ivesia Status: Species of Concern	Scientific Name: <i>Ivesia callida</i>
Common Name: Adder's-mouth Status: Species of Concern	Scientific Name: <i>Malaxis brachypoda</i>
Common Name: Black-flowered figwort Status: Species of Concern	Scientific Name: <i>Scrophularia atrata</i>
Common Name: Indian Valley brodiaea Status: Species of Concern	Scientific Name: <i>Brodiaea coronaria rosea</i>
Common Name: Alkali mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus striatus</i>
Common Name: Franciscan manzanita Status: Endangered	Scientific Name: <i>Arctostaphylos franciscana</i>
Common Name: Coast lily Status: Species of Concern	Scientific Name: <i>Lilium maritimum</i>
Common Name: Mt. Gleason paintbrush Status: Species of Concern	Scientific Name: <i>Castilleja gleasonii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Gander's pitcher-sage Status: Species of Concern	Scientific Name: <i>Lepechinia ganderi</i>
Common Name: Mt. Tamalpais thistle Status: Species of Concern	Scientific Name: <i>Cirsium hydrophilum vaseyi</i>
Common Name: Greene's mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus greenei</i>
Common Name: Yellow-tubered toothwort Status: Species of Concern	Scientific Name: <i>Cardamine nuttallii</i>
Common Name: Mendocino bush-mallow Status: Species of Concern	Scientific Name: <i>Malacothamnus mendocinensis</i>
Common Name: Mono phacelia Status: Species of Concern	Scientific Name: <i>Phacelia monoensis</i>
Common Name: Butte County catchfly Status: Species of Concern	Scientific Name: <i>Silene occidentalis longistipitata</i>
Common Name: Barton Flats horkelia Status: Species of Concern	Scientific Name: <i>Horkelia wilderae</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Ivesia jaegeri</i>
Common Name: Rusby's desert-mallow Status: Species of Concern	Scientific Name: <i>Sphaeralcea rusbyi eremicola</i>
Common Name: Oregon fireweed Status: Species of Concern	Scientific Name: <i>Epilobium oreganum</i>
Common Name: Pallid birds-beak Status: Species of Concern	Scientific Name: <i>Cordylanthus tenuis pallescens</i>
Common Name: San Clemente Island evening-primrose Status: Species of Concern	Scientific Name: <i>Camissonia guadalupensis clementina</i>
Common Name: Carmel Valley bush-mallow Status: Species of Concern	Scientific Name: <i>Malacothamnus palmeri involucratum</i>
Common Name: Coast wallflower Status: Species of Concern	Scientific Name: <i>Erysimum ammophilum</i>
Common Name: Hutchinson's delphinium Status: Species of Concern	Scientific Name: <i>Delphinium hutchinsonae</i>
Common Name: Otay manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos otayensis</i>
Common Name: Jacumba milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus douglasii perstrictus</i>
Common Name: Santa Susana tarweed Status: Species of Concern	Scientific Name: <i>Hemizonia minthornii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Santa Lucia pogogyne Status: Species of Concern	Scientific Name: Pogogyne clareana
Common Name: Moreno currant Status: Species of Concern	Scientific Name: Ribes canthariforme
Common Name: Pine City stonecrop Status: Species of Concern	Scientific Name: Sedum pinetorum
Common Name: [Unnamed] milk-vetch Status: Species of Concern	Scientific Name: Astragalus tegetarioides
Common Name: Cienega Seca oxytheca Status: Species of Concern	Scientific Name: Oxytheca parishii ciengensis
Common Name: Tracy's sanicle Status: Species of Concern	Scientific Name: Sanicula tracyi
Common Name: Tulare horkelia Status: Species of Concern	Scientific Name: Horkelia tularensis
Common Name: Palmer's haplopappus Status: Species of Concern	Scientific Name: Haplopappus palmeri palmeri
Common Name: Northcoast semaphore grass Status: Species of Concern	Scientific Name: Pleuropogon hooverianus
Common Name: Mt. Hamilton jewelflower Status: Species of Concern	Scientific Name: Streptanthus callistus
Common Name: Recurved larkspur Status: Species of Concern	Scientific Name: Delphinium recurvatum
Common Name: Hospital Canyon larkspur Status: Species of Concern	Scientific Name: Delphinium californicum interius
Common Name: Island wallflower Status: Species of Concern	Scientific Name: Erysimum insulare insulare
Common Name: Talus fritillary Status: Species of Concern	Scientific Name: Fritillaria falcata
Common Name: Mendocino gentian Status: Species of Concern	Scientific Name: Gentiana setigera
Common Name: Lost Hills saltbush Status: Species of Concern	Scientific Name: Atriplex vallicola
Common Name: Vine Hill manzanita Status: Species of Concern	Scientific Name: Arctostaphylos densiflora
Common Name: Bolander's horkelia Status: Species of Concern	Scientific Name: Horkelia bolanderi
Common Name: Howell's montia Status: Species of Concern	Scientific Name: Montia howellii

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: July gold Status: Species of Concern	Scientific Name: <i>Dedeckera eurekaensis</i>
Common Name: Santa Catalina figwort Status: Species of Concern	Scientific Name: <i>Scrophularia villosa</i>
Common Name: Ahart's whitlow-wort Status: Species of Concern	Scientific Name: <i>Paronychia ahartii</i>
Common Name: Fern-leaved ironwood Status: Species of Concern	Scientific Name: <i>Lyonothamnus floribundus asplenifolius</i>
Common Name: The Lassics sandwort Status: Species of Concern	Scientific Name: <i>Minuartia decumbens</i>
Common Name: Fremont's rosinweed Status: Species of Concern	Scientific Name: <i>Calycadenia fremontii</i>
Common Name: Valley spearscale Status: Species of Concern	Scientific Name: <i>Atriplex joaquiniana</i>
Common Name: Secund jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus glandulosus hoffmanii</i>
Common Name: Plumas ivesia Status: Species of Concern	Scientific Name: <i>Ivesia sericoleuca</i>
Common Name: Arid northern clarkia Status: Species of Concern	Scientific Name: <i>Clarkia borealis arida</i>
Common Name: Bonny Doon manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos silvicola</i>
Common Name: Santa Catalina monkey-flower Status: Species of Concern	Scientific Name: <i>Mimulus traskiae</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Eschscholzia multiflora twisselmannii</i>
Common Name: Barstow wooly-sunflower Status: Species of Concern	Scientific Name: <i>Eriophyllum mohavense</i>
Common Name: Pitkin Marsh paintbrush Status: Species of Concern	Scientific Name: <i>Castilleja uliginosa</i>
Common Name: Pleasant Valley mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus clavatus avius</i>
Common Name: Short-jointed beavertail cactus Status: Species of Concern	Scientific Name: <i>Opuntia basilaris brachyclada</i>
Common Name: San Bernardino Mountains monkey-flower Status: Species of Concern	Scientific Name: <i>Mimulus exiguus</i>
Common Name: Scott Valley phacelia Status: Species of Concern	Scientific Name: <i>Phacelia greenei</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: San Luis serpentine dudleya Status: Species of Concern	Scientific Name: <i>Dudleya abramsii bettinae</i>
Common Name: Marble Mountain catchfly Status: Species of Concern	Scientific Name: <i>Silene marmorensis</i>
Common Name: Parrish's brittlescale Status: Species of Concern	Scientific Name: <i>Atriplex parishii</i>
Common Name: Flax-like monardella Status: Species of Concern	Scientific Name: <i>Monardella linoides oblonga</i>
Common Name: Western bog violet Status: Species of Concern	Scientific Name: <i>Viola primulifolia occidentalis</i>
Common Name: Johnston's buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum microthecum johnstonii</i>
Common Name: Whipple's monkey-flower Status: Species of Concern	Scientific Name: <i>Mimulus whipplei</i>
Common Name: Drymaria dwarf-flax Status: Species of Concern	Scientific Name: <i>Hesperolinon drymarioides</i>
Common Name: Jared's peppergrass Status: Species of Concern	Scientific Name: <i>Lepidium jaredii jaredii</i>
Common Name: Crisp monardella Status: Species of Concern	Scientific Name: <i>Monardella crispa</i>
Common Name: Humboldt Bay gumplant Status: Species of Concern	Scientific Name: <i>Grindelia stricta blakei</i>
Common Name: Jointed buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum intrafractum</i>
Common Name: Charlotte's phacelia Status: Species of Concern	Scientific Name: <i>Phacelia nashiana</i>
Common Name: Heckner's lewisia Status: Species of Concern	Scientific Name: <i>Lewisia cotyledon heckneri</i>
Common Name: Munz's hedgehog cactus Status: Species of Concern	Scientific Name: <i>Echinocereus engelmannii munzii</i>
Common Name: Goldenbush Status: Species of Concern	Scientific Name: <i>Isocoma arguta</i>
Common Name: Bodie Hills rock-cress Status: Species of Concern	Scientific Name: <i>Arabis bodiensis</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Stylocline masonii</i>
Common Name: Compact cobweb thistle Status: Species of Concern	Scientific Name: <i>Cirsium occidentale compactum</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: No common name Status: Species of Concern	Scientific Name: <i>Teloschistes villosus</i>
Common Name: Peirson's morning-glory Status: Species of Concern	Scientific Name: <i>Calystegia peirsonii</i>
Common Name: The Cedars globe-lily Status: Species of Concern	Scientific Name: <i>Calochortus raichei</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Lessingia arachnoidea</i>
Common Name: Sierra Valley ivesia Status: Species of Concern	Scientific Name: <i>Ivesia aperta aperta</i>
Common Name: Ballona cinquefoil Status: Species of Concern	Scientific Name: <i>Potentilla multijuga</i>
Common Name: Silver-haired ivesia Status: Species of Concern	Scientific Name: <i>Ivesia argyrocoma</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Heterodermia erinacea</i>
Common Name: San Benito spineflower Status: Species of Concern	Scientific Name: <i>Chorizanthe biloba immemora</i>
Common Name: Cedar Crest allocarya Status: Species of Concern	Scientific Name: <i>Plagiobothrys glyptocarpus modestus</i>
Common Name: Trinity phacelia Status: Species of Concern	Scientific Name: <i>Phacelia dalesiana</i>
Common Name: Kingston bedstraw Status: Species of Concern	Scientific Name: <i>Galium hilendiae kingstonense</i>
Common Name: Short-leaved dudleya Status: Species of Concern	Scientific Name: <i>Dudleya blochmaniae blochmaniae</i>
Common Name: [Unnamed] linanthus Status: Species of Concern	Scientific Name: <i>Linanthus concinnus</i>
Common Name: Point Reyes stickyseed Status: Species of Concern	Scientific Name: <i>Blennosperma nanum robustum</i>
Common Name: Mason's lilaeopsis Status: Species of Concern	Scientific Name: <i>Lilaeopsis masonii</i>
Common Name: Mojave tarweed Status: Species of Concern	Scientific Name: <i>Hemizonia mohavensis</i>
Common Name: Island hazardia Status: Species of Concern	Scientific Name: <i>Hazardia cana</i>
Common Name: Parish's gooseberry Status: Species of Concern	Scientific Name: <i>Ribes divaricatum parishii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Mt. Hamilton thistle Status: Species of Concern	Scientific Name: <i>Cirsium fontinale campylon</i>
Common Name: Conejo buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum crocatum</i>
Common Name: Masonic Mountain jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus oliganthus</i>
Common Name: Panamint Mountains buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum microthecum panamintense</i>
Common Name: Egg Lake monkey-flower Status: Species of Concern	Scientific Name: <i>Mimulus pygmaeus</i>
Common Name: Black wooly-pod Status: Species of Concern	Scientific Name: <i>Astragalus funereus</i>
Common Name: Cuyamaca larkspur Status: Species of Concern	Scientific Name: <i>Delphinium hesperium cuyamacae</i>
Common Name: Cooke's phacelia Status: Species of Concern	Scientific Name: <i>Phacelia cookei</i>
Common Name: Marin checkermallow Status: Species of Concern	Scientific Name: <i>Sidalcea hickmanii viridis</i>
Common Name: Henderson's bentgrass Status: Species of Concern	Scientific Name: <i>Agrostis hendersonii</i>
Common Name: Nine Mile Canyon phacelia Status: Species of Concern	Scientific Name: <i>Phacelia novemmillensis</i>
Common Name: Curve-podded Mojave milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus mohavensis hemigyris</i>
Common Name: Freed's jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus brachiatus hoffmanii</i>
Common Name: Snake cholla Status: Species of Concern	Scientific Name: <i>Opuntia parryi serpentina</i>
Common Name: Wolf's evening-primrose Status: Species of Concern	Scientific Name: <i>Oenothera wolfii</i>
Common Name: Stephens' beardtongue Status: Species of Concern	Scientific Name: <i>Penstemon stephensii</i>
Common Name: Parish's phacelia Status: Species of Concern	Scientific Name: <i>Phacelia parishii</i>
Common Name: Blasdale's bentgrass Status: Species of Concern	Scientific Name: <i>Agrostis blasdalei blasdalei</i>
Common Name: [Unnamed] scurf-pea Status: Species of Concern	Scientific Name: <i>Pediomelum castoreum</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Shaggy-hair lupine Status: Species of Concern	Scientific Name: <i>Lupinus spectabilis</i>
Common Name: Short-lobed broomrape Status: Species of Concern	Scientific Name: <i>Orobanche parishii brachyloba</i>
Common Name: San Nicolas Island lomatium Status: Species of Concern	Scientific Name: <i>Lomatium insulare</i>
Common Name: Tecopa bird's-beak Status: Species of Concern	Scientific Name: <i>Cordylanthus tecopensis</i>
Common Name: Many-stemmed liveforever Status: Species of Concern	Scientific Name: <i>Dudleya multicaulis</i>
Common Name: Hearst's ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus hearstiorum</i>
Common Name: Variegated dudleya Status: Species of Concern	Scientific Name: <i>Dudleya variegata</i>
Common Name: Sandmat manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos pumila</i>
Common Name: Northern California black walnut Status: Species of Concern	Scientific Name: <i>Juglans californica hindsii</i>
Common Name: Delta tule-pea Status: Species of Concern	Scientific Name: <i>Lathyrus jepsonii jepsonii</i>
Common Name: Stebbins lewisia Status: Species of Concern	Scientific Name: <i>Lewisia stebbinsii</i>
Common Name: Wilkin's harebell Status: Species of Concern	Scientific Name: <i>Campanula wilkinsiana</i>
Common Name: Cup Lake draba Status: Species of Concern	Scientific Name: <i>Draba asterophora macrocarpa</i>
Common Name: Mecca aster Status: Species of Concern	Scientific Name: <i>Xylorhiza cognata</i>
Common Name: Small-leaved rose Status: Species of Concern	Scientific Name: <i>Rosa minutifolia</i>
Common Name: Cambria morning-glory Status: Species of Concern	Scientific Name: <i>Calystegia subacaulis episcopalis</i>
Common Name: San Benito thornmint Status: Species of Concern	Scientific Name: <i>Acanthomintha obovata obovata</i>
Common Name: Bear Valley phlox Status: Species of Concern	Scientific Name: <i>Phlox dolichantha</i>
Common Name: Owens Peak lomatium Status: Species of Concern	Scientific Name: <i>Lomatium shevockii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Wild Rose Canyon buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum eremicola</i>
Common Name: Mt. Saint Helena morning-glory Status: Species of Concern	Scientific Name: <i>Calystegia collina oxyphylla</i>
Common Name: Large red buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum grande rubescens</i>
Common Name: Dog Valley ivesia Status: Species of Concern	Scientific Name: <i>Ivesia aperta canina</i>
Common Name: Del Norte manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos nortensis</i>
Common Name: [Unnamed] milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus gilmanii</i>
Common Name: Seaside birds-beak Status: Species of Concern	Scientific Name: <i>Cordylanthus rigidus littoralis</i>
Common Name: Sp. nov. ined. (Del Norte) rock-cress Status: Species of Concern	Scientific Name: <i>Arabis</i> sp.
Common Name: California marina Status: Species of Concern	Scientific Name: <i>Marina orcuttii orcuttii</i>
Common Name: San Felipe monardella Status: Species of Concern	Scientific Name: <i>Monardella nana leptosiphon</i>
Common Name: San Francisco owl's-clover Status: Species of Concern	Scientific Name: <i>Triphysaria floribunda</i>
Common Name: San Benito fritillary Status: Species of Concern	Scientific Name: <i>Fritillaria viridea</i>
Common Name: Red-flowered lotus Status: Species of Concern	Scientific Name: <i>Lotus rubriflorus</i>
Common Name: Palmer's grapplinghook Status: Species of Concern	Scientific Name: <i>Harpagonella palmeri palmeri</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Stylocline citroleum</i>
Common Name: Humboldt lily Status: Species of Concern	Scientific Name: <i>Lilium humboldtii ocellatum</i>
Common Name: Death Valley sandpaperplant Status: Species of Concern	Scientific Name: <i>Petalonyx thurberi gilmanii</i>
Common Name: San Diego marsh elder Status: Species of Concern	Scientific Name: <i>Iva hayesiana</i>
Common Name: Merced phacelia Status: Species of Concern	Scientific Name: <i>Phacelia ciliata opaca</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Tomales clarkia Status: Species of Concern	Scientific Name: <i>Clarkia concinna raichei</i>
Common Name: Spinysepaled eryngo Status: Species of Concern	Scientific Name: <i>Eryngium spinosepalum</i>
Common Name: Bakersfield saltbush Status: Species of Concern	Scientific Name: <i>Atriplex tularensis</i>
Common Name: Dorr's Cabin jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus morrisonii hirtiflorus</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Malacothrix crispifolia</i>
Common Name: Mt. Tedoc linanthus Status: Species of Concern	Scientific Name: <i>Linanthus nuttallii howellii</i>
Common Name: Smooth tarplant Status: Species of Concern	Scientific Name: <i>Hemizonia pungens laevis</i>
Common Name: Pajaroensis manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos pajaroensis</i>
Common Name: Rock sanicle Status: Species of Concern	Scientific Name: <i>Sanicula saxatilis</i>
Common Name: Kernville poppy Status: Species of Concern	Scientific Name: <i>Eschscholzia procera</i>
Common Name: Mt. Hamilton coreopsis Status: Species of Concern	Scientific Name: <i>Coreopsis hamiltonii</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Lessingia micradenia glabrata</i>
Common Name: Aphanisma Status: Species of Concern	Scientific Name: <i>Aphanisma blitoides</i>
Common Name: Mosquin's clarkia Status: Species of Concern	Scientific Name: <i>Clarkia mosquinii mosquinii</i>
Common Name: East Bay clarkia Status: Species of Concern	Scientific Name: <i>Clarkia concinna automixa</i>
Common Name: Silky cryptantha Status: Species of Concern	Scientific Name: <i>Cryptantha crinita</i>
Common Name: Bensoniella Status: Species of Concern	Scientific Name: <i>Bensoniella oregona</i>
Common Name: Santa Margarita manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos pilosula pilosula</i>
Common Name: Robison's monardella Status: Species of Concern	Scientific Name: <i>Monardella robisonii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Brewer's dwarf-flax Status: Species of Concern	Scientific Name: <i>Hesperolinon breweri</i>
Common Name: Howell's alkali grass Status: Species of Concern	Scientific Name: <i>Puccinellia howellii</i>
Common Name: Maritime california-lilac Status: Species of Concern	Scientific Name: <i>Ceanothus maritimus</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Collinsia antonina</i>
Common Name: Schreiber's manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos glutinosa</i>
Common Name: Pale-yellow layia Status: Species of Concern	Scientific Name: <i>Layia heterotricha</i>
Common Name: Hardham's evening-primrose Status: Species of Concern	Scientific Name: <i>Camissonia hardhamiae</i>
Common Name: Comanche layia Status: Species of Concern	Scientific Name: <i>Layia leucopappa</i>
Common Name: Southern tarplant Status: Species of Concern	Scientific Name: <i>Hemizonia parryi australis</i>
Common Name: Howell's tauschia Status: Species of Concern	Scientific Name: <i>Tauschia howellii</i>
Common Name: Lake County dwarf-flax Status: Species of Concern	Scientific Name: <i>Hesperolinon didymocarpum</i>
Common Name: Morrison's jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus morrisonii morrisonii</i>
Common Name: Rincon ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus confusus</i>
Common Name: Little Sur manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos edmundsii</i>
Common Name: Valley sagittaria Status: Species of Concern	Scientific Name: <i>Sagittaria sanfordii</i>
Common Name: Rock lady Status: Species of Concern	Scientific Name: <i>Holmgrenanthe petrophila</i>
Common Name: Cone Peak bedstraw Status: Species of Concern	Scientific Name: <i>Galium californicum lucense</i>
Common Name: Butte County sidalcea Status: Species of Concern	Scientific Name: <i>Sidalcea robusta</i>
Common Name: San Nicolas Island buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum grande timorum</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: No common name Status: Species of Concern	Scientific Name: <i>Malacothrix intermedia</i>
Common Name: Dune larkspur Status: Species of Concern	Scientific Name: <i>Delphinium parryi blochmaniae</i>
Common Name: Amargosa penstemon Status: Species of Concern	Scientific Name: <i>Penstemon fruticiformis amargosae</i>
Common Name: Preston Peak rock-cress Status: Species of Concern	Scientific Name: <i>Arabis mcdonaldiana</i>
Common Name: Thread-leaved penstemon Status: Species of Concern	Scientific Name: <i>Penstemon filiformis</i>
Common Name: Blair's munzothamnus Status: Species of Concern	Scientific Name: <i>Stephanomeria blairii</i>
Common Name: Stebbins' madia Status: Species of Concern	Scientific Name: <i>Madia stebbinsii</i>
Common Name: Mission Canyon bluecup Status: Species of Concern	Scientific Name: <i>Githopsis diffusa filicaulis</i>
Common Name: Saw-toothed lewisia Status: Species of Concern	Scientific Name: <i>Lewisia serrata</i>
Common Name: White-margined penstemon Status: Species of Concern	Scientific Name: <i>Penstemon albomarginatus</i>
Common Name: Contact Mine streptanthus Status: Species of Concern	Scientific Name: <i>Streptanthus brachiatus brachiatus</i>
Common Name: Coast barrel cactus Status: Species of Concern	Scientific Name: <i>Ferocactus viridescens</i>
Common Name: Santa Cruz manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos andersonii</i>
Common Name: San Jacinto bedstraw Status: Species of Concern	Scientific Name: <i>Galium californicum primum</i>
Common Name: Mt. Vision ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus gloriosus porrectus</i>
Common Name: Rock Creek broomrape Status: Species of Concern	Scientific Name: <i>Orobanche valida valida</i>
Common Name: Raiches manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos stanfordiana raichei</i>
Common Name: Sandfood Status: Species of Concern	Scientific Name: <i>Pholisma sonorae</i>
Common Name: Spanish needle onion Status: Species of Concern	Scientific Name: <i>Allium shevockii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Petaluma popcornflower Status: Species of Concern	Scientific Name: <i>Plagiobothrys mollis vestitus</i>
Common Name: Montara manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos montaraensis</i>
Common Name: [Unnamed] adobe-lily Status: Species of Concern	Scientific Name: <i>Fritillaria pluriflora</i>
Common Name: Snow Mountain buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum nervulosum</i>
Common Name: Supple daisy Status: Species of Concern	Scientific Name: <i>Erigeron supplex</i>
Common Name: Hoover's button-celery Status: Species of Concern	Scientific Name: <i>Eryngium aristulatum hooveri</i>
Common Name: San Luis lupine Status: Species of Concern	Scientific Name: <i>Lupinus ludovicianus</i>
Common Name: Legenere Status: Species of Concern	Scientific Name: <i>Legenere limosa</i>
Common Name: Pink sand-verbena Status: Species of Concern	Scientific Name: <i>Abronia umbellata breviflora</i>
Common Name: Prostrate buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum prociduum</i>
Common Name: Butte County morning-glory Status: Species of Concern	Scientific Name: <i>Calystegia atriplicifolia buttensis</i>
Common Name: San Bernardino Mountains orthocarpus Status: Species of Concern	Scientific Name: <i>Castilleja lasiorhyncha</i>
Common Name: Parry's tetracoccus Status: Species of Concern	Scientific Name: <i>Tetracoccus dioicus</i>
Common Name: Red Rock tarweed Status: Species of Concern	Scientific Name: <i>Hemizonia arida</i>
Common Name: Trinity buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum alpinum</i>
Common Name: Applegate stonecrop Status: Species of Concern	Scientific Name: <i>Sedum oblanceolatum</i>
Common Name: Twisselmann's buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum twisselmannii</i>
Common Name: San Clemente Island buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum giganteum formosum</i>
Common Name: Algodones Dunes sunflower Status: Species of Concern	Scientific Name: <i>Helianthus niveus tephrodes</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Plummer's mariposa lily Status: Species of Concern	Scientific Name: Calochortus plummerae
Common Name: Point Reyes horkelia Status: Species of Concern	Scientific Name: Horkelia marinensis
Common Name: Davidson's bush-mallow Status: Species of Concern	Scientific Name: Malacothamnus davidsonii
Common Name: Bristlecone catseye Status: Species of Concern	Scientific Name: Cryptantha roosiorum
Common Name: Vine Hill ceanothus Status: Species of Concern	Scientific Name: Ceanothus foliosus vineatus
Common Name: Marin knotweed Status: Species of Concern	Scientific Name: Polygonum marinense
Common Name: Hardy Creek barberry Status: Species of Concern	Scientific Name: Berberis nervosa mendocinensis
Common Name: Parasol clover Status: Species of Concern	Scientific Name: Trifolium bolanderi
Common Name: Fragrant fritillary Status: Species of Concern	Scientific Name: Fritillaria liliacea
Common Name: Ziegler's layia Status: Species of Concern	Scientific Name: Layia platyglossa
Common Name: Seaside tarweed Status: Species of Concern	Scientific Name: Hemizonia multicaulis multicaulis
Common Name: Foothill mariposa lily Status: Species of Concern	Scientific Name: Calochortus weedii intermedius
Common Name: Mendocino coast paintbrush Status: Species of Concern	Scientific Name: Castilleja mendocinensis
Common Name: Slough thistle Status: Species of Concern	Scientific Name: Cirsium crassicaule
Common Name: South Coast Range morning-glory Status: Species of Concern	Scientific Name: Calystegia collina venusta
Common Name: Cache Peak buckwheat Status: Species of Concern	Scientific Name: Eriogonum kennedyi pinicola
Common Name: California beaked-rush Status: Species of Concern	Scientific Name: Rhynchospora californica
Common Name: Pringle monardella Status: Species of Concern	Scientific Name: Monardella pringlei
Common Name: Southern island phacelia Status: Species of Concern	Scientific Name: Phacelia floribunda

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Humboldt milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus agnicidus</i>
Common Name: Trask's milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus traskiae</i>
Common Name: Veiny monardella Status: Species of Concern	Scientific Name: <i>Monardella douglasii venosa</i>
Common Name: Tecate tarweed Status: Species of Concern	Scientific Name: <i>Hemizonia floribunda</i>
Common Name: South coast saltbush Status: Species of Concern	Scientific Name: <i>Atriplex pacifica</i>
Common Name: Arroyo de la Cruz manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos cruzensis</i>
Common Name: Santa Cruz Island monkey-flower Status: Species of Concern	Scientific Name: <i>Mimulus brandegeei</i>
Common Name: Northcoast phacelia Status: Species of Concern	Scientific Name: <i>Phacelia insularis continentis</i>
Common Name: Sand dune phacelia Status: Under Review	Scientific Name: <i>Phacelia argentea</i>
Common Name: Inyo mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus excavatus</i>
Common Name: Webber's milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus webberi</i>
Common Name: Delta coyote-thistle Status: Species of Concern	Scientific Name: <i>Eryngium racemosum</i>
Common Name: Hall's madia Status: Species of Concern	Scientific Name: <i>Madia hallii</i>
Common Name: Red Hills soaproot Status: Species of Concern	Scientific Name: <i>Chlorogalum grandiflorum</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Ceanothus arboreus glaber</i>
Common Name: Guadalupe Island lupine Status: Species of Concern	Scientific Name: <i>Lupinus guadalupensis</i>
Common Name: Sequoia gooseberry Status: Species of Concern	Scientific Name: <i>Ribes tularensis</i>
Common Name: Swamp harebell Status: Species of Concern	Scientific Name: <i>Campanula californica</i>
Common Name: Parry's spineflower Status: Species of Concern	Scientific Name: <i>Chorizanthe parryi parryi</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Parish's bush-mallow Status: Species of Concern	Scientific Name: <i>Malacothamnus parishii</i>
Common Name: Tamalpais manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos hookeri montana</i>
Common Name: San Clemente Island brodiaea Status: Species of Concern	Scientific Name: <i>Brodiaea kinkiensis</i>
Common Name: Tamalpais jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus batrachopus</i>
Common Name: Panoche peppergrass Status: Species of Concern	Scientific Name: <i>Lepidium jaredii album</i>
Common Name: Dacite manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos tomentosa daciticola</i>
Common Name: Fresno County bird's-beak Status: Species of Concern	Scientific Name: <i>Cordylanthus tenuis barbatus</i>
Common Name: Bolinas ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus masonii</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Astragalus lentiginosus antonius</i>
Common Name: San Diego goldenstar Status: Species of Concern	Scientific Name: <i>Muilla clevelandii</i>
Common Name: Hearsts' manzanita Status: Species of Concern	Scientific Name: <i>Arctostaphylos hookeri hearstiorum</i>
Common Name: Orocopia sage Status: Species of Concern	Scientific Name: <i>Salvia greatai</i>
Common Name: Abbott's bush-mallow Status: Species of Concern	Scientific Name: <i>Malacothamnus abbottii</i>
Common Name: Merced monardella Status: Species of Concern	Scientific Name: <i>Monardella leucocephala</i>
Common Name: Alverson's foxtail cactus Status: Species of Concern	Scientific Name: <i>Coryphantha vivipara alversonii</i>
Common Name: San Gabriel River dudleya Status: Species of Concern	Scientific Name: <i>Dudleya cymosa crebrifolia</i>
Common Name: Kern River daisy Status: Species of Concern	Scientific Name: <i>Erigeron multiceps</i>
Common Name: Jepson's onion Status: Species of Concern	Scientific Name: <i>Allium jepsonii</i>
Common Name: Auburua Ranch jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus insignis lyonii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Saline Valley phacelia Status: Species of Concern	Scientific Name: <i>Phacelia amabilis</i>
Common Name: Nevada oryctes Status: Species of Concern	Scientific Name: <i>Oryctes nevadensis</i>
Common Name: Kaweah brodiaea Status: Species of Concern	Scientific Name: <i>Brodiaea insignis</i>
Common Name: Baldwin Lake linanthus Status: Species of Concern	Scientific Name: <i>Linanthus killipii</i>
Common Name: Mt. Diablo jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus hispidus</i>
Common Name: Thorne's buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum ericifolium thornei</i>
Common Name: Diamond-petaled poppy Status: Species of Concern	Scientific Name: <i>Eschscholzia rhombipetala</i>
Common Name: Showy raillardella Status: Species of Concern	Scientific Name: <i>Raillardella pringlei</i>
Common Name: Scadden Flat checkerbloom Status: Species of Concern	Scientific Name: <i>Sidalcea stipularis</i>
Common Name: Slender mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus clavatus gracilis</i>
Common Name: Mojave monkey-flower Status: Species of Concern	Scientific Name: <i>Mimulus mohavensis</i>
Common Name: Anthony Peak lupine Status: Species of Concern	Scientific Name: <i>Lupinus antoninus</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Arnica lonchophylla</i>
Common Name: Poison Canyon stickseed Status: Species of Concern	Scientific Name: <i>Hackelia brevicula</i>
Common Name: Borrego bedstraw Status: Species of Concern	Scientific Name: <i>Galium angustifolium borregoense</i>
Common Name: Hickman's onion Status: Species of Concern	Scientific Name: <i>Allium hickmanii</i>
Common Name: One-awned spineflower Status: Species of Concern	Scientific Name: <i>Chorizanthe rectispina</i>
Common Name: Inyo laphamia Status: Species of Concern	Scientific Name: <i>Perityle inyoensis</i>
Common Name: DeDecker's lupine Status: Species of Concern	Scientific Name: <i>Lupinus padre-crowleyi</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Thurber's reedgrass Status: Species of Concern	Scientific Name: Calamagrostis crassiglumis
Common Name: Stebbins' lomatium Status: Species of Concern	Scientific Name: Lomatium stebbinsii
Common Name: Sp. nov. ined. (Pit River) jewelflower Status: Species of Concern	Scientific Name: Streptanthus sp.
Common Name: Mountains Springs bush lupine Status: Species of Concern	Scientific Name: Lupinus excubitus medius
Common Name: Gander butterweed Status: Species of Concern	Scientific Name: Packera ganderi
Common Name: Forest Camp sandwort Status: Species of Concern	Scientific Name: Arenaria macradenia kuschei
Common Name: Monterey ceanothus Status: Species of Concern	Scientific Name: Ceanothus cuneatus rigidus
Common Name: Most beautiful jewelflower Status: Species of Concern	Scientific Name: Streptanthus albidus peramoenus
Common Name: San Francisco gumplant Status: Species of Concern	Scientific Name: Grindelia hirsuta maritima
Common Name: Mt. Hamilton harebell Status: Species of Concern	Scientific Name: Campanula sharsmithiae
Common Name: Congdon's lomatium Status: Species of Concern	Scientific Name: Lomatium congdonii
Common Name: Plaskett Meadows linanthus Status: Species of Concern	Scientific Name: Linanthus harknessii condensatus
Common Name: Lemon colored fawn-lily Status: Species of Concern	Scientific Name: Erythronium citrinum rodrickii
Common Name: Raven's milk-vetch Status: Species of Concern	Scientific Name: Astragalus monoensis ravenii
Common Name: Nevin's wooly-sunflower Status: Species of Concern	Scientific Name: Eriophyllum nevinii
Common Name: California ditaxis Status: Species of Concern	Scientific Name: Ditaxis serrata
Common Name: Tehama dwarf-flax Status: Species of Concern	Scientific Name: Hesperolinon tehamense
Common Name: Piute Mountains jewelflower Status: Species of Concern	Scientific Name: Streptanthus cordatus piutensis
Common Name: No common name Status: Species of Concern	Scientific Name: Calochortus weedii vestus

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Slender pentachaeta Status: Species of Concern	Scientific Name: <i>Pentachaeta exilis aeolica</i>
Common Name: Purple monkey-flower Status: Species of Concern	Scientific Name: <i>Mimulus purpureus purpureus</i>
Common Name: Calistoga ceanothus Status: Species of Concern	Scientific Name: <i>Ceanothus divergens</i>
Common Name: Butte fritillary Status: Species of Concern	Scientific Name: <i>Fritillaria eastwoodiae</i>
Common Name: Pale yellow lupine Status: Species of Concern	Scientific Name: <i>Lupinus luteolus</i>
Common Name: Arroyo de la Cruz mariposa lily Status: Species of Concern	Scientific Name: <i>Calochortus clavatus recurvifolius</i>
Common Name: Umpqua green-gentian Status: Species of Concern	Scientific Name: <i>Frasera fastigiata</i>
Common Name: Canyon Creek stonecrop Status: Species of Concern	Scientific Name: <i>Sedum paradisum</i>
Common Name: Ash Creek ivesia Status: Species of Concern	Scientific Name: <i>Ivesia paniculata</i>
Common Name: Cliff spurge Status: Species of Concern	Scientific Name: <i>euphorbia misera</i>
Common Name: Small-flowered morning-glory Status: Species of Concern	Scientific Name: <i>Convolvulus equitans</i>
Common Name: Beautiful Hulsea Status: Species of Concern	Scientific Name: <i>Hulsea vestita ssp. callicarpha</i>
Common Name: Cleveland's bush monkeyflower Status: Species of Concern	Scientific Name: <i>Diplacus clevelandii</i>
Common Name: Fish's milkwort Status: Species of Concern	Scientific Name: <i>Polygala cornuta var. fishiae</i>
Common Name: Mt. Diablo phacelia Status: Species of Concern	Scientific Name: <i>Phacelia phacelioides</i>
Common Name: Gairdner's yampah Status: Species of Concern	Scientific Name: <i>Perideridia gairdneri gairdneri</i>
Common Name: Santa Catalina Island desert-thorn Status: Species of Concern	Scientific Name: <i>Lycium hassei</i>
Common Name: No common name Status: Species of Concern	Scientific Name: <i>Lecanora xanthosora</i>
Common Name: Stebbins' phacelia Status: Species of Concern	Scientific Name: <i>Phacelia stebbinsii</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Silver, Santa Cruz Island hosackia Status: Species of Concern	Scientific Name: <i>Lotus argophyllus niveus</i>
Common Name: Smooth pungent forsellesia Status: Species of Concern	Scientific Name: <i>Glossopetalon pungens glabra</i>
Common Name: Eastwood's goldenweed Status: Species of Concern	Scientific Name: <i>Ericameria fasciculata</i>
Common Name: Rayless layia Status: Species of Concern	Scientific Name: <i>Layia discoidea</i>
Common Name: San Gabriel bedstraw Status: Species of Concern	Scientific Name: <i>Galium grande</i>
Common Name: Island morning-glory Status: Species of Concern	Scientific Name: <i>Calystegia macrostegia amplissima</i>
Common Name: Santa Barbara Island buckwheat Status: Species of Concern	Scientific Name: <i>Eriogonum giganteum compactum</i>
Common Name: The Geysers panic grass Status: Species of Concern	Scientific Name: <i>Dichanthelium acuminatum acuminatum</i>
Common Name: Flat-seeded spurge Status: Species of Concern	Scientific Name: <i>Chamaesyce platysperma</i>
Common Name: Narrow-leaved nightshade Status: Species of Concern	Scientific Name: <i>Solanum tenuilobatum</i>
Common Name: Green liveforever Status: Species of Concern	Scientific Name: <i>Dudleya virens</i>
Common Name: Three Peaks jewelflower Status: Species of Concern	Scientific Name: <i>Streptanthus morrisonii elatus</i>
Common Name: Big Bear milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus lentiginosus sierrae</i>
Common Name: Deane's milk-vetch Status: Species of Concern	Scientific Name: <i>Astragalus deanei</i>
Common Name: Ft. Tejon wooly-sunflower Status: Species of Concern	Scientific Name: <i>Eriophyllum lanatum hallii</i>
Common Name: El Dorado mule-ears Status: Species of Concern	Scientific Name: <i>Wyethia reticulata</i>
Common Name: Siskiyou onion Status: Species of Concern	Scientific Name: <i>Allium tribracteatum</i>
Common Name: Enterprise clarkia Status: Species of Concern	Scientific Name: <i>Clarkia mosquinii xerophila</i>
Common Name: San Francisco Bay spineflower Status: Species of Concern	Scientific Name: <i>Chorizanthe cuspidata cuspidata</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Santa Cruz silverpuffs Status: Species of Concern	Scientific Name: Stebbinsoseris decipiens
Common Name: Hetch Hetchy monkey-flower Status: Species of Concern	Scientific Name: Mimulus filicaulis
Common Name: Caliente clarkia Status: Species of Concern	Scientific Name: Clarkia tembloriensis ssp. calientensis
Common Name: Lemon lily Status: Species of Concern	Scientific Name: Lilium parryi
Common Name: Two carpeled dwarf-flax Status: Species of Concern	Scientific Name: Hesperolinon bicarpellatum
Common Name: Baker's meadowfoam Status: Species of Concern	Scientific Name: Limnanthes bakeri

#### Group:Insects

Common Name: Denning's cryptic caddisfly Status: Species of Concern	Scientific Name: Cryptochia denningi
Common Name: Shirrtail Creek stonefly Status: Species of Concern	Scientific Name: Megaleuctra sierra
Common Name: Sonoma arctic skipper Status: Species of Concern	Scientific Name: Carterocephalus palaemon ssp.
Common Name: Globose dune beetle Status: Species of Concern	Scientific Name: Coelus globosus
Common Name: Sierra pygmy grasshopper Status: Species of Concern	Scientific Name: Tetrix sierrana
Common Name: Bumblebee scarab Status: Species of Concern	Scientific Name: Lichnanthe ursina
Common Name: Franklin's bumblebee Status: Under Review	Scientific Name: Bombus franklini
Common Name: Gold rush hanging fly Status: Species of Concern	Scientific Name: Orbittacus obscurus
Common Name: Brownish dubiraphian riffle beetle Status: Species of Concern	Scientific Name: Dubiraphia brunnescens
Common Name: Coachella Valley jerusalem cricket Status: Species of Concern	Scientific Name: Stenopelmatus cahuilansis
Common Name: Desert monkey grasshopper Status: Species of Concern	Scientific Name: Psychomastix deserticola
Common Name: Point Conception jerusalem cricket Status: Species of Concern	Scientific Name: Ammopelmatus muwu

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Sacramento anthicid Status: Species of Concern	Scientific Name: <i>Anthicus sacramento</i>
Common Name: Wawona riffle beetle Status: Species of Concern	Scientific Name: <i>Atractelmis wawona</i>
Common Name: San Joaquin tiger beetle Status: Species of Concern	Scientific Name: <i>Cicindela tranquebarica</i> ssp.
Common Name: Sagehen Creek goeracean caddisfly Status: Species of Concern	Scientific Name: <i>Goeracea oregona</i>
Common Name: Hopping's blister beetle Status: Species of Concern	Scientific Name: <i>Lytta hoppingi</i>
Common Name: Kelso Dune glaresis scarab Status: Species of Concern	Scientific Name: <i>Glaresis arenata</i>
Common Name: Wilbur Springs shore fly Status: Species of Concern	Scientific Name: <i>Paracoenia calida</i>
Common Name: Antioch andrenid bee Status: Species of Concern	Scientific Name: <i>Perdita scitula antiochensis</i>
Common Name: Point Reyes blue Status: Species of Concern	Scientific Name: <i>Icaricia icariodes</i> ssp.
Common Name: Simple hydroporus diving beetle Status: Species of Concern	Scientific Name: <i>Hydroporus simplex</i>
Common Name: Antioch cophuran robberfly Status: Species of Concern	Scientific Name: <i>Cophura hurdi</i>
Common Name: MacNeill sooty wing skipper Status: Species of Concern	Scientific Name: <i>Hesperopsis graciellae</i>
Common Name: King's Creek ecclisomyian caddisfly Status: Species of Concern	Scientific Name: <i>Ecclisomyia bilera</i>
Common Name: King's Creek parapsyche caddisfly Status: Species of Concern	Scientific Name: <i>Parapsyche extensa</i>
Common Name: Kings Canyon cryptochian caddisfly Status: Species of Concern	Scientific Name: <i>Cryptochia excella</i>
Common Name: San Clemente Island coenonycha beetle Status: Species of Concern	Scientific Name: <i>Coenonycha clementina</i>
Common Name: Spiny rhyacophilan caddisfly Status: Species of Concern	Scientific Name: <i>Rhyacophila spinata</i>
Common Name: Delta june beetle Status: Species of Concern	Scientific Name: <i>Polyphylla stellata</i>
Common Name: Trinity Alps ground beetle Status: Species of Concern	Scientific Name: <i>Nebria sahlbergii</i> triad

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: San Francisco lacewing Status: Species of Concern	Scientific Name: Nothochrysa californica
Common Name: San Gabriel Mountains blue Status: Species of Concern	Scientific Name: Plejebus saepiolus ssp.
Common Name: White Mountains copper Status: Species of Concern	Scientific Name: Lycaena rubicus ssp.
Common Name: Oso Flaco patch butterfly Status: Species of Concern	Scientific Name: Chlosyne leanira osoflaco
Common Name: Golden-horned caddisfly Status: Species of Concern	Scientific Name: Neothremma genella
Common Name: Rude's long-horned beetle Status: Species of Concern	Scientific Name: Necydalis rudei
Common Name: Busck's gall moth Status: Species of Concern	Scientific Name: Carolella busckana
Common Name: Andrew's marble butterfly Status: Species of Concern	Scientific Name: Euchloe hyantis andrewsi
Common Name: [Unnamed] ground beetle Status: Species of Concern	Scientific Name: Scaphinotus behrensi
Common Name: White Mountains saepiolus blue Status: Species of Concern	Scientific Name: Plejebus saepiolus ssp.
Common Name: White Mountains sandhill skipper Status: Species of Concern	Scientific Name: Polites sabuleti albomontana
Common Name: Greenest tiger beetle Status: Species of Concern	Scientific Name: Cicindela tranquebarica viridissima
Common Name: Siskiyou caddisfly Status: Species of Concern	Scientific Name: Neothremma siskiyou
Common Name: Casey's June Beetle Status: Endangered	Scientific Name: Dinacoma caseyi
Common Name: Channel Islands dune beetle Status: Species of Concern	Scientific Name: Coelus pacificus
Common Name: Hurd's metapogon robberfly Status: Species of Concern	Scientific Name: Metapogon hurdi
Common Name: Molestan blister beetle Status: Species of Concern	Scientific Name: Lytta molesta
Common Name: Nelson's miloderes weevil Status: Species of Concern	Scientific Name: Miloderes nelsoni
Common Name: Lake Tahoe benthic stonefly Status: Species of Concern	Scientific Name: Capnia lacustra

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Bilobed rhyacophilan caddisfly Status: Species of Concern	Scientific Name: Rhyacophila mosana
Common Name: Santa Cruz Island shore weevil Status: Species of Concern	Scientific Name: Trigonoscuta stantoni
Common Name: Ancient ant Status: Species of Concern	Scientific Name: Smithistruma reliquia
Common Name: Pinnacles shield-back katydid Status: Species of Concern	Scientific Name: Idiostatus kathleenae
Common Name: Oso Flaco robber fly Status: Species of Concern	Scientific Name: Ablautus schlingeri
Common Name: Morro Bay blue butterfly Status: Species of Concern	Scientific Name: Icaricia icarioides moroensis
Common Name: Valley mydas fly Status: Under Review	Scientific Name: Rhapsiomidas trochilus
Common Name: Giuliani's dubiraphian riffle beetle Status: Species of Concern	Scientific Name: Dubiraphia giulianii
Common Name: Amphibious caddisfly Status: Species of Concern	Scientific Name: Desmona bethula
Common Name: Cheese-weed moth lacewing Status: Species of Concern	Scientific Name: Oliarces clara
Common Name: Monarch butterfly Status: Under Review	Scientific Name: Danaus plexippus plexippus
Common Name: Humboldt ground beetle Status: Species of Concern	Scientific Name: Scaphinotus longiceps
Common Name: Curved-foot hygrotus diving beetle Status: Species of Concern	Scientific Name: Hygrotus curvipes
Common Name: Mono checkerspot Status: Species of Concern	Scientific Name: Euphydryas editha monoensis
Common Name: White Mountains icarioides blue Status: Species of Concern	Scientific Name: Plejebus icarioides ssp.
Common Name: Pinnacles optioservus riffle beetle Status: Species of Concern	Scientific Name: Optioservus canus
Common Name: Long-tailed caddisfly Status: Species of Concern	Scientific Name: Farula sp.
Common Name: Santa Monica shieldback katydid Status: Species of Concern	Scientific Name: Neduba longipennis
Common Name: Mission blue butterfly Status: Endangered	Scientific Name: Icaricia icarioides missionensis

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Myrtle's silverspot butterfly Status: Endangered	Scientific Name: <i>Speyeria zerene myrtleae</i>
Common Name: San Bruno elfin butterfly Status: Endangered	Scientific Name: <i>Callophrys mossii bayensis</i>
Common Name: Callippe silverspot butterfly Status: Endangered	Scientific Name: <i>Speyeria callippe callippe</i>
Common Name: Delhi Sands flower-loving fly Status: Endangered	Scientific Name: <i>Rhaphiomidas terminatus abdominalis</i>
Common Name: California diplectronon caddisfly Status: Species of Concern	Scientific Name: <i>Diplectrona californica</i>
Common Name: Wandering skipper Status: Species of Concern	Scientific Name: <i>Panoquina errans</i>
Common Name: [Unnamed] riffle beetle Status: Species of Concern	Scientific Name: <i>Microcylleopus similis</i>
Common Name: Spring Mountains icarioides blue Status: Species of Concern	Scientific Name: <i>Plejebus icarioides</i> ssp.
Common Name: Lange's El Segundo Dune weevil Status: Species of Concern	Scientific Name: <i>Onychobaris langei</i>
Common Name: Sandy beach tiger beetle Status: Species of Concern	Scientific Name: <i>Cicindela hirticollis gravida</i>
Common Name: Yellow-banded andrenid bee Status: Species of Concern	Scientific Name: <i>Perdita hirticeps luteocincta</i>
Common Name: Leech's chaetarthrian water scavenger beetle Status: Species of Concern	Scientific Name: <i>Chaetarthria leechi</i>
Common Name: San Gabriel Mountains elfin Status: Species of Concern	Scientific Name: <i>Incisalia mossii</i> ssp.
Common Name: Woolly hydroporus diving beetle Status: Species of Concern	Scientific Name: <i>Hydroporus hirsutus</i>
Common Name: Fort Dick limnephilus caddisfly Status: Species of Concern	Scientific Name: <i>Limnephilus atercus</i>
Common Name: Ciervo aegialian scarab Status: Species of Concern	Scientific Name: <i>Aegialia concinna</i>
Common Name: Cold Spring caddisfly Status: Species of Concern	Scientific Name: <i>Lepidostoma ermanae</i>
Common Name: White Mountains skipper Status: Species of Concern	Scientific Name: <i>Hesperia mirimae</i> ssp.
Common Name: Doyen's trigonoscuta dune weevil	Scientific Name: <i>Trigonoscuta</i> sp.

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Status: Species of Concern

Common Name: Siskiyou ground beetle  
Status: Species of Concern

Scientific Name: *Nebria gebleri siskiyouensis*

Common Name: Antioch mutillid wasp  
Status: Species of Concern

Scientific Name: *Myrmosula pacifica*

Common Name: Hermes copper butterfly  
Status: Candidate

Scientific Name: *Lycaena hermes*

Common Name: Confusion caddisfly  
Status: Species of Concern

Scientific Name: *Cryptochia shasta*

Common Name: Death Valley june beetle  
Status: Species of Concern

Scientific Name: *Polyphylla erratica*

Common Name: Ford's sand dune moth  
Status: Species of Concern

Scientific Name: *Psammobotys fordii*

Common Name: Dorothy's El Segundo Dune weevil  
Status: Species of Concern

Scientific Name: *Trigonoscuta dorothea dorothea*

Common Name: Santa Catalina Island trigonoscuta weevil  
Status: Species of Concern

Scientific Name: *Trigonoscuta catalina*

Common Name: Saratoga Springs belostoman bug  
Status: Species of Concern

Scientific Name: *Belostoma saratogae*

Common Name: Antioch Dunes anthicid  
Status: Species of Concern

Scientific Name: *Anthicus antiochensis*

Common Name: Wing-shoulder minute moss beetle  
Status: Species of Concern

Scientific Name: *Ochthebius crassalus*

Common Name: Antioch sphecid wasp  
Status: Species of Concern

Scientific Name: *Philanthus nasalis*

Common Name: Dohrn's elegant eucnemid beetle  
Status: Species of Concern

Scientific Name: *Paleoxenus dohrni*

Common Name: Redheaded sphecid wasp  
Status: Species of Concern

Scientific Name: *Eucerceris ruficeps*

Common Name: [Unnamed] riffle beetle  
Status: Species of Concern

Scientific Name: *Microcylleopus fomicoideus*

Common Name: Boharts' blue  
Status: Species of Concern

Scientific Name: *Philotiella speciosa bohartorum*

Common Name: Castle Crags rhyacophilan caddisfly  
Status: Species of Concern

Scientific Name: *Rhyacophila lineata*

Common Name: Middlekauf's shieldback katydid  
Status: Species of Concern

Scientific Name: *Idiostatus middlekaufi*

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Atascadero june beetle Status: Species of Concern	Scientific Name: Polyphylla nubila
Common Name: Travertine band-thigh diving beetle Status: Species of Concern	Scientific Name: Hygrotus fontinalis
Common Name: Leech's skyline diving beetle Status: Species of Concern	Scientific Name: Hydroporus leechi
Common Name: South Forks ground beetle Status: Species of Concern	Scientific Name: Nebria darlingtoni
Common Name: Morrison's blister beetle Status: Species of Concern	Scientific Name: Lytta morrisoni
Common Name: Marin elfin Status: Species of Concern	Scientific Name: Incisalia mossii ssp.
Common Name: Saline Valley snow-front june beetle Status: Species of Concern	Scientific Name: Polyphylla anteronivea
Common Name: Wilbur Springs minute moss beetle Status: Species of Concern	Scientific Name: Ochthebius reticulus
Common Name: Tehachapi Mountain silverspot Status: Species of Concern	Scientific Name: Speyeria egleis tehachapina
Common Name: Valley oak ant Status: Under Review	Scientific Name: Proceratium californicum
Common Name: Coachella giant sand treader cricket Status: Species of Concern	Scientific Name: Macrobaenetes valgum
Common Name: Ricksecker's water scavenger beetle Status: Species of Concern	Scientific Name: Hydrochara rickseckeri
Common Name: Brown-tassel trigonoscuta weevil Status: Species of Concern	Scientific Name: Trigonoscuta brunneotesselata
Common Name: Henne's eucosman moth Status: Species of Concern	Scientific Name: Eucosma hennei
Common Name: Samwell Cave cricket Status: Species of Concern	Scientific Name: Pristocephophilus sp.
Common Name: Kelso jerusalem cricket Status: Species of Concern	Scientific Name: Ammopelmatus kelsoensis
Common Name: White sand bear scarab Status: Species of Concern	Scientific Name: Lichnanthe albopilosa
Common Name: Dry Creek cliff strider bug Status: Species of Concern	Scientific Name: Oravelia pege
Common Name: Antioch efferian robberfly Status: Species of Concern	Scientific Name: Efferia antiochi

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: San Emigdio blue  
Status: Species of Concern  
Scientific Name: *Plebulina emigdonis*

Common Name: Blaisdell trigonoscuta weevil  
Status: Species of Concern  
Scientific Name: *Trigonoscuta blaisdelli*

Common Name: Mojave Desert blister beetle  
Status: Species of Concern  
Scientific Name: *Lytta inseparata*

Common Name: Oso Flaco flightless moth  
Status: Species of Concern  
Scientific Name: *Areniscythis brachypteris*

Common Name: Kelso giant sand treader cricket  
Status: Species of Concern  
Scientific Name: *Macrobaenetes kelsoensis*

Common Name: Oblivious tiger beetle  
Status: Species of Concern  
Scientific Name: *Cicindela latesignata obliviosa*

Common Name: Moestan blister beetle  
Status: Species of Concern  
Scientific Name: *Lytta moesta*

#### Group:Lichens

Common Name: [Unnamed] lichen  
Status: Species of Concern  
Scientific Name: *Texosporium sancti-jacobi*

Common Name: Splitting yarn lichen  
Status: Species of Concern  
Scientific Name: *Sulcaria isidiisera*

#### Group:Mammals

Common Name: Tipton kangaroo rat  
Status: Endangered  
Scientific Name: *Dipodomys nitratoides nitratoides*

Common Name: White-footed vole  
Status: Species of Concern  
Scientific Name: *Arborimus albipes*

Common Name: Buena Vista Lake ornate Shrew  
Status: Endangered  
Scientific Name: *Sorex ornatus relictus*

Common Name: Riparian woodrat (=San Joaquin Valley)  
Status: Endangered  
Scientific Name: *Neotoma fuscipes riparia*

Common Name: White-eared pocket mouse  
Status: Species of Concern  
Scientific Name: *Perognathus alticola alticola*

Common Name: San Nicolas Island fox  
Status: Species of Concern  
Scientific Name: *Urocyon littoralis dickeyi*

Common Name: Mountain beaver  
Status: Species of Concern  
Scientific Name: *Aplodontia rufa californica*

Common Name: Owens Valley California vole  
Status: Species of Concern  
Scientific Name: *Microtus californicus vallicola*

Common Name: Allen's big-eared bat  
Scientific Name: *Idionycteris phyllotis*

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Status: Species of Concern

Common Name: California red tree vole  
Status: Species of Concern

Scientific Name: Arborimus pomo

Common Name: Salt marsh ornate shrew  
Status: Species of Concern

Scientific Name: Sorex ornatus salicornicus

Common Name: Yuma hispid cotton rat  
Status: Species of Concern

Scientific Name: Sigmodon hispidus eremicus

Common Name: Berkeley kangaroo rat  
Status: Species of Concern

Scientific Name: Dipodomys heermanni berkleyensis

Common Name: Point Reyes jumping mouse  
Status: Species of Concern

Scientific Name: Zapus trinotatus orarius

Common Name: Pacific Townsend's big-eared bat  
Status: Species of Concern

Scientific Name: Plecotus townsendii townsendii

Common Name: Greater western mastiff-bat  
Status: Species of Concern

Scientific Name: Eumops perotis californicus

Common Name: Pallid San Diego pocket mouse  
Status: Species of Concern

Scientific Name: Perognathus fallax pallidus

Common Name: Earthquake Merriam's kangaroo rat  
Status: Species of Concern

Scientific Name: Dipodomys merriami collinus

Common Name: Los Angeles little pocket mouse  
Status: Species of Concern

Scientific Name: Perognathus longimembris brevinasus

Common Name: Lodgepole chipmunk  
Status: Species of Concern

Scientific Name: Tamias speciosus speciosus

Common Name: Short-nosed kangaroo rat  
Status: Species of Concern

Scientific Name: Dipodomys nitratooides brevinasus

Common Name: Tulare grasshopper mouse  
Status: Species of Concern

Scientific Name: Onychomys torridus tularensis

Common Name: Mojave river vole  
Status: Species of Concern

Scientific Name: Microtus californicus mohavensis

Common Name: San Francisco dusky-footed woodrat  
Status: Species of Concern

Scientific Name: Neotoma fuscipes annectens

Common Name: San Diego black-tailed jackrabbit  
Status: Species of Concern

Scientific Name: Lepus californicus bennettii

Common Name: Guadalupe fur seal  
Status: Threatened

Scientific Name: Arctocephalus townsendi

Common Name: Dulzura California pocket mouse  
Status: Species of Concern

Scientific Name: Perognathus californicus femoralis

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Stephens' California vole Status: Species of Concern	Scientific Name: <i>Microtus californicus stephensi</i>
Common Name: Salt marsh vagrant shrew Status: Species of Concern	Scientific Name: <i>Sorex vagrans halicoetes</i>
Common Name: San Diego desert woodrat Status: Species of Concern	Scientific Name: <i>Neotoma lepida intermedia</i>
Common Name: Palm Springs little pocket mouse Status: Species of Concern	Scientific Name: <i>Perognathus longimembris bangsi</i>
Common Name: Pale Townsend's big-eared bat Status: Species of Concern	Scientific Name: <i>Plecotus townsendii pallescens</i>
Common Name: Occult little brown bat Status: Species of Concern	Scientific Name: <i>Myotis lucifugus occultus</i>
Common Name: California wolverine Status: Species of Concern	Scientific Name: <i>Gulo gulo luteus</i>
Common Name: San Bernardino northern flying squirrel Status: Under Review	Scientific Name: <i>Glaucomys sabrinus californicus</i>
Common Name: Tehachapi white-eared pocket mouse Status: Species of Concern	Scientific Name: <i>Perognathus alticola inexpectatus</i>
Common Name: Colorado River cotton rat Status: Species of Concern	Scientific Name: <i>Sigmodon arizonae plenus</i>
Common Name: Suisun ornate shrew Status: Species of Concern	Scientific Name: <i>Sorex ornatus sinuosus</i>
Common Name: Salinas pocket mouse Status: Species of Concern	Scientific Name: <i>Perognathus inornatus psammophilus</i>
Common Name: Southern grasshopper mouse Status: Species of Concern	Scientific Name: <i>Onychomys torridus ramona</i>
Common Name: Channel Islands spotted skunk Status: Species of Concern	Scientific Name: <i>Spilogale putorius amphiala</i>
Common Name: Yuma puma Status: Species of Concern	Scientific Name: <i>Felis concolor browni</i>
Common Name: Island fox Status: Status Undefined	Scientific Name: <i>Urocyon littoralis</i>
Common Name: Jacumba little pocket mouse Status: Species of Concern	Scientific Name: <i>Perognathus longimembris internationalis</i>
Common Name: Spotted bat Status: Species of Concern	Scientific Name: <i>Euderma maculatum</i>
Common Name: Point Reyes mountain beaver Status: Species of Concern	Scientific Name: <i>Aplodontia rufa phaea</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Monterey ornate shrew Status: Species of Concern	Scientific Name: <i>Sorex ornatus salarius</i>
Common Name: San Joaquin pocket mouse Status: Species of Concern	Scientific Name: <i>Perognathus inornatus</i>
Common Name: Northwestern San Diego pocket mouse Status: Species of Concern	Scientific Name: <i>Perognathus fallax fallax</i>
Common Name: Cave myotis Status: Species of Concern	Scientific Name: <i>Myotis velifer</i>
Common Name: California leaf-nosed bat Status: Species of Concern	Scientific Name: <i>Macrotus californicus</i>
Common Name: Sierra Nevada snowshoe hare Status: Species of Concern	Scientific Name: <i>Lepus americanus tahoensis</i>
Common Name: San Clemente deer mouse Status: Species of Concern	Scientific Name: <i>Peromyscus maniculatus clementis</i>
Common Name: Marysville California kangaroo rat Status: Species of Concern	Scientific Name: <i>Dipodomys californicus eximius</i>
Common Name: San Clemente Island fox Status: Species of Concern	Scientific Name: <i>Urocyon littoralis clementae</i>
Common Name: Merced kangaroo rat Status: Species of Concern	Scientific Name: <i>Dipodomys heermanni dixonii</i>
Common Name: Nelson's antelope ground squirrel Status: Species of Concern	Scientific Name: <i>Ammospermophilus nelsoni</i>
Common Name: Mexican long-tongued bat Status: Species of Concern	Scientific Name: <i>Choeronycteris mexicana</i>
Common Name: Alameda Island mole Status: Species of Concern	Scientific Name: <i>Scapanus latimanus parvus</i>
Common Name: Monterey dusky-footed woodrat Status: Species of Concern	Scientific Name: <i>Neotoma fuscipes luciana</i>
Common Name: Santa Catalina ornate shrew Status: Species of Concern	Scientific Name: <i>Sorex ornatus willetti</i>
Common Name: Riparian brush rabbit Status: Endangered	Scientific Name: <i>Sylvilagus bachmani riparius</i>

#### Group: Reptiles

Common Name: San Diego ringneck snake Status: Species of Concern	Scientific Name: <i>Diadophis punctatus similis</i>
Common Name: California horned lizard Status: Species of Concern	Scientific Name: <i>Phrynosoma coronatum frontale</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Coronado skink Status: Species of Concern	Scientific Name: <i>Eumeces skiltonianus interparietalis</i>
Common Name: Rosy boa Status: Species of Concern	Scientific Name: <i>Charina trivirgata</i>
Common Name: San Diego banded gecko Status: Species of Concern	Scientific Name: <i>Coleonyx variegatus abbotti</i>
Common Name: San Bernardino ringneck snake Status: Species of Concern	Scientific Name: <i>Diadophis punctatus modestus</i>
Common Name: Banded gila monster Status: Species of Concern	Scientific Name: <i>Heloderma suspectum cinctum</i>
Common Name: San Diego Mountain king snake Status: Species of Concern	Scientific Name: <i>Lampropeltis zonata pulchra</i>
Common Name: Panamint alligator lizard Status: Under Review	Scientific Name: <i>Elgaria panamintina</i>
Common Name: Two-striped garter snake Status: Species of Concern	Scientific Name: <i>Thamnophis hammondi</i>
Common Name: Santa Cruz Island gopher snake Status: Species of Concern	Scientific Name: <i>Pituophis melanoleucus pumilis</i>
Common Name: South coast garter snake Status: Species of Concern	Scientific Name: <i>Thamnophis sirtalis</i> ssp.
Common Name: Southwestern pond turtle Status: Species of Concern	Scientific Name: <i>Actinemys marmorata pallida</i>
Common Name: Northern red diamond rattlesnake Status: Species of Concern	Scientific Name: <i>Crotalus ruber ruber</i>
Common Name: Silvery legless lizard Status: Species of Concern	Scientific Name: <i>Anniella pulchra pulchra</i>
Common Name: Southern rubber boa Status: Under Review	Scientific Name: <i>Charina bottae umbratica</i>
Common Name: Chuckwalla Status: Species of Concern	Scientific Name: <i>Sauromalus ater</i>
Common Name: San Bernardino mountain king snake Status: Species of Concern	Scientific Name: <i>Lampropeltis zonata parvirubra</i>
Common Name: Coastal rosy boa Status: Species of Concern	Scientific Name: <i>Charina trivirgata roseofusca</i>
Common Name: Sierra night lizard Status: Species of Concern	Scientific Name: <i>Xantusia vigilis sierrae</i>
Common Name: Coastal western whiptail Status: Species of Concern	Scientific Name: <i>Cnemidophorus tigris multiscutatus</i>

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Orange-throated whiptail  
Status: Species of Concern  
Scientific Name: *Cnemidophorus hyperythrus*

Common Name: San Diego horned lizard  
Status: Species of Concern  
Scientific Name: *Phrynosoma coronatum blainvillii*

Common Name: Coast patch-nosed snake  
Status: Species of Concern  
Scientific Name: *Salvadora hexalepis virgultea*

Common Name: San Joaquin whipsnake  
Status: Species of Concern  
Scientific Name: *Masticophis flagellum ruddocki*

Common Name: Mojave fringe-toed Lizard  
Status: Status Undefined  
Scientific Name: *Uma scoparia*

Common Name: Barefoot gecko  
Status: Species of Concern  
Scientific Name: *Coleonyx switaki*

#### Group:Snails

Common Name: Peninsula Coast Range shoulderband  
Status: Species of Concern  
Scientific Name: *Helminthoglypta nickliniana awania*

Common Name: White desertsnailed  
Status: Species of Concern  
Scientific Name: *Eremarionta immaculata*

Common Name: Newcomb's littorine snail  
Status: Species of Concern  
Scientific Name: *Algamorda newcombiana*

Common Name: Owens springsnail  
Status: Species of Concern  
Scientific Name: *Pyrgulopsis owensensis*

Common Name: [Unnamed] snail  
Status: Species of Concern  
Scientific Name: *Valvata virens*

Common Name: Cockerell's striate disc  
Status: Species of Concern  
Scientific Name: *Discus shemeki cockerelli*

Common Name: Yates' tight coin  
Status: Species of Concern  
Scientific Name: *Ammonitella yatesii*

Common Name: San Clemente islandsnail  
Status: Species of Concern  
Scientific Name: *Micrarionta gabbii*

Common Name: Aardhals springsnail  
Status: Species of Concern  
Scientific Name: *Pyrgulopsis aardahli*

Common Name: Morongo desertsnailed  
Status: Species of Concern  
Scientific Name: *Eremarionta morongoana*

Common Name: Wongs springsnail  
Status: Species of Concern  
Scientific Name: *Pyrgulopsis wongi*

Common Name: Pomo bronze shoulderband  
Status: Species of Concern  
Scientific Name: *Helminthoglypta arrosa pomoensis*

## NATURAL AREAS MAP FINDINGS

### Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Grapevine Springs squat tryonia Status: Species of Concern	Scientific Name: Tryonia rowlandsi
Common Name: Victorville shoulderband Status: Species of Concern	Scientific Name: Helminthoglypta mohaveana
Common Name: Bridges' Coast Range shoulderband Status: Species of Concern	Scientific Name: Helminthoglypta nickliniana bridgesi
Common Name: Kern shoulderband Status: Species of Concern	Scientific Name: Helminthoglypta callistoderma
Common Name: [Unnamed] islandsnail Status: Species of Concern	Scientific Name: Micrarionta rowelli bakerensis
Common Name: California McCoy snail islandsnail Status: Species of Concern	Scientific Name: Micrarionta rowelli mccoiana
Common Name: Badwater snail Status: Species of Concern	Scientific Name: Assiminea infima
Common Name: Mimic tryonia Status: Species of Concern	Scientific Name: Tryonia imitator
Common Name: Williams' bronze shoulderband Status: Species of Concern	Scientific Name: Helminthoglypta arrosa williamsi
Common Name: Santa Barbara islandsnail Status: Species of Concern	Scientific Name: Micrarionta facta
Common Name: Hirsute sierra sideband Status: Species of Concern	Scientific Name: Monadenia mormonum hirsuta
Common Name: Yosemite mariposa sideband Status: Species of Concern	Scientific Name: Monadenia hillebrandi yosemitensis
Common Name: Thousand Palms desertsnaill Status: Species of Concern	Scientific Name: Eremarionta millepalmarum
Common Name: Button's Sierra sideband Status: Species of Concern	Scientific Name: Monadenia mormonum buttoni
Common Name: White Abalone Status: Endangered	Scientific Name: Haliotis sorenseni
Common Name: Grapevine Springs elongate tryonia Status: Species of Concern	Scientific Name: Tryonia margae
Common Name: Redwood shoulderband Status: Species of Concern	Scientific Name: Helminthoglypta sequoicola consors
Common Name: Merced Canyon shoulderband Status: Species of Concern	Scientific Name: Helminthoglypta allynsmithi
Common Name: Wintu sideband Status: Under Review	Scientific Name: Monadenia troglodytes ssp. wintu

# NATURAL AREAS MAP FINDINGS

## Federal Endangered Species from the U.S. Fish and Wildlife for CA State (Continued...)

Common Name: Globular pebblesnail Status: Under Review	Scientific Name: Fluminicola sph
Common Name: Fish Slough springsnail Status: Species of Concern	Scientific Name: Pyrgulopsis perturbata
Common Name: Santa Barbara shelled slug Status: Species of Concern	Scientific Name: Binneya notabilis
Common Name: Shasta sideband Status: Under Review	Scientific Name: Monadenia troglodytes troglodytes
Common Name: Robust tryonia Status: Species of Concern	Scientific Name: Tryonia robusta
Common Name: Peninsular Range shoulderband Status: Species of Concern	Scientific Name: Helminthoglypta traski coelata
Common Name: Catalina mountainsnail Status: Species of Concern	Scientific Name: Radiocentrum avalonense
Common Name: Keeled sideband Status: Species of Concern	Scientific Name: Monadenia circumcarinata
Common Name: San Nicolas islandsnail Status: Species of Concern	Scientific Name: Micrarionta feralis
Common Name: Pricklypear islandsnail Status: Species of Concern	Scientific Name: Micrarionta opuntia

**Map ID**  
**Direction**  
**Distance**  
**Distance (ft.)**

**EDR ID**  
**Database**

A1  
East  
0-1/8 mi  
335

CANAPA100097191  
CA Protected Areas

Holding ID:	88221
Unit Name:	California State Lands Commission
Public Access Level:	Open Access
Alternate Site Name:	Not Reported
Owning Agency:	California State Lands Commission
Agency Jurisdiction:	State
Agency Type:	State Agency
Public Access:	<a href="http://www.slc.ca.gov/">http://www.slc.ca.gov/</a>
Managing Agency:	California State Lands Commission
Holding Name:	California State Lands Commission
Special Use:	Not Reported
Year Acquired:	0
GAP Designation:	State Resource Management Area
Protection Rank:	Managed for multiple uses, subject to extractive (mining or logging)

# NATURAL AREAS MAP FINDINGS

URL: or OHV use.  
Not Reported

A2  
East  
0-1/8 mi  
335

Agency: California State Lands Commission  
Group: Other State Lands  
Level: State

CAGO10000059651  
CA Government Lands

3  
NNE  
0-1/8 mi  
632

Common Name: Sonoran desert toad  
Scientific Name: *Incilius alvarius*  
Global Rank: G5  
State Rank: SH  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1

CAESP00202713  
CA Endangered Species

4  
North  
1-2 mi  
7790

Common Name: Sonoran desert toad  
Scientific Name: *Incilius alvarius*  
Global Rank: G5  
State Rank: SH  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1

CAESP00202913  
CA Endangered Species

Common Name: burrowing owl  
Scientific Name: *Athene cucularia*  
Global Rank: G4

## NATURAL AREAS MAP FINDINGS

State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1215

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B5  
ENE  
1-2 mi  
8764

CAESP00203380  
CA Endangered Species

Common Name: Sonoran desert toad  
Scientific Name: *Incilius alvarius*  
Global Rank: G5  
State Rank: SH  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1

Common Name: burrowing owl  
Scientific Name: *Athene cunicularia*  
Global Rank: G4  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1216

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B6  
ENE  
1-2 mi  
8767

CAESP00203382  
CA Endangered Species

Common Name: burrowing owl  
Scientific Name: *Athene cunicularia*  
Global Rank: G4  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1216

# NATURAL AREAS MAP FINDINGS

C7  
North  
1-2 mi  
8828

CAESP00202849  
CA Endangered Species

Common Name: Sonoran desert toad  
Scientific Name: *Incilius alvarius*  
Global Rank: G5  
State Rank: SH  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1

Common Name: burrowing owl  
Scientific Name: *Athene cucularia*  
Global Rank: G4  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1214

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E8  
WNW  
1-2 mi  
8839

CANAPA100096273  
CA Protected Areas

Holding ID: 37924  
Unit Name: Imperial Wildlife Area  
Public Access Level: Open Access  
Alternate Site Name: Not Reported  
Owning Agency: California Department of Fish and Wildlife  
Agency Jurisdiction: State  
Agency Type: State Agency  
Public Access: <https://www.wildlife.ca.gov/>  
Managing Agency: California Department of Fish and Wildlife  
Holding Name: Imperial Wildlife Area  
Special Use: Not Reported  
Year Acquired: 0  
GAP Designation: State Conservation Area  
Protection Rank: Managed for biodiversity-disturbance events suppressed.  
URL: <https://www.wildlife.ca.gov/Lands/Places-to-Visit/Imperial-WA>

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E9  
WNW  
1-2 mi  
8839

CAGO10000059035  
CA Government Lands

# NATURAL AREAS MAP FINDINGS

Agency: California Department of Fish and Wildlife  
Group: CA Dept. of Fish and Wildlife  
Level: State

E10  
WNW  
1-2 mi  
8913

CANAPU000033814  
CA PCT Lands

Property Name: IMPERIAL WA  
Administrative Area: Not Reported  
Owner: CA Department of Fish and Game  
Manager: CA Department of Fish and Game  
Updated: Not Reported  
Data Source: CA Dept of Fish and Game  
Admin Level: STATE  
Assessor Recorded Date: 19-JUL-55

C11  
North  
1-2 mi  
8914

CAESP00202819  
CA Endangered Species

Common Name: burrowing owl  
Scientific Name: Athene cunicularia  
Global Rank: G4  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1214

12  
ENE  
1-2 mi  
9003

CAESP00203373  
CA Endangered Species

Common Name: razorback sucker  
Scientific Name: Xyrauchen texanus  
Global Rank: G1  
State Rank: S1  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: Endangered  
State Listing Status: Endangered  
Element Type: Animal

# NATURAL AREAS MAP FINDINGS

Element Occurrence #: 16

Common Name: burrowing owl  
Scientific Name: *Athene cucularia*  
Global Rank: G4  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1216

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B13  
ENE  
1-2 mi  
9003

CAESP00203379  
CA Endangered Species

Common Name: Sonoran desert toad  
Scientific Name: *Incilius alvarius*  
Global Rank: G5  
State Rank: SH  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1

Common Name: razorback sucker  
Scientific Name: *Xyrauchen texanus*  
Global Rank: G1  
State Rank: S1  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: Endangered  
State Listing Status: Endangered  
Element Type: Animal  
Element Occurrence #: 16

Common Name: burrowing owl  
Scientific Name: *Athene cucularia*  
Global Rank: G4  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1216

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14  
ENE  
1-2 mi  
9004

CAESP00203008  
CA Endangered Species

## NATURAL AREAS MAP FINDINGS

Common Name: Sonoran desert toad  
Scientific Name: *Incilius alvarius*  
Global Rank: G5  
State Rank: SH  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1

Common Name: razorback sucker  
Scientific Name: *Xyrauchen texanus*  
Global Rank: G1  
State Rank: S1  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: Endangered  
State Listing Status: Endangered  
Element Type: Animal  
Element Occurrence #: 16

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15  
ENE  
1-2 mi  
9013

CAESP00202572  
CA Endangered Species

Common Name: razorback sucker  
Scientific Name: *Xyrauchen texanus*  
Global Rank: G1  
State Rank: S1  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: Endangered  
State Listing Status: Endangered  
Element Type: Animal  
Element Occurrence #: 16

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D16  
ENE  
1-2 mi  
9020

CAESP00202572  
CA Endangered Species

Common Name: razorback sucker  
Scientific Name: *Xyrauchen texanus*  
Global Rank: G1  
State Rank: S1  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: Endangered  
State Listing Status: Endangered  
Element Type: Animal

## NATURAL AREAS MAP FINDINGS

Element Occurrence #: 16

17  
NNW  
1-2 mi  
9261

CAESP00202553  
CA Endangered Species

Common Name: lowland (=Yavapai, San Sebastian & San Felipe) leopard frog  
Scientific Name: *Lithobates yavapaiensis*  
Global Rank: G4  
State Rank: SX  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 4

18  
WNW  
1-2 mi  
9636

CAESP00202812  
CA Endangered Species

Common Name: yellow warbler  
Scientific Name: *Dendroica petechia brewsteri*  
Global Rank: G5T3?  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 28

D19  
ENE  
1-2 mi  
10150

CAESP00203523  
CA Endangered Species

Common Name: razorback sucker  
Scientific Name: *Xyrauchen texanus*  
Global Rank: G1  
State Rank: S1  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: Endangered  
State Listing Status: Endangered  
Element Type: Animal  
Element Occurrence #: 16

## NATURAL AREAS MAP FINDINGS

Common Name: merlin  
Scientific Name: Falco columbarius  
Global Rank: G5  
State Rank: S3  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 23

D20  
ENE  
1-2 mi  
10170

CAESP00203539  
CA Endangered Species

Common Name: merlin  
Scientific Name: Falco columbarius  
Global Rank: G5  
State Rank: S3  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 23

Common Name: razorback sucker  
Scientific Name: Xyrauchen texanus  
Global Rank: G1  
State Rank: S1  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: Endangered  
State Listing Status: Endangered  
Element Type: Animal  
Element Occurrence #: 16

Common Name: burrowing owl  
Scientific Name: Athene cunicularia  
Global Rank: G4  
State Rank: S2  
CA Rare Plant Rank: Not Applicable  
Federal Listing Status: None  
State Listing Status: None  
Element Type: Animal  
Element Occurrence #: 1216

# Endangered Species Codes

**Global Imperilment Rank Codes - GRANK:** Priority rank (1-5) based on number of occurrences through element's range.

G1 - Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 - Imperiled globally because of rarity (6-20 occurrences or few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G3 - Vulnerable. Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range. (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 - 100.

G4 - Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 - Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH - Possibly extinct or eliminated. Of historical occurrence throughout its range, i.e., formerly part of the established biota, with the expectation that it may be rediscovered (e.g., Bachman's Warbler). For historic and ecological communities, no likelihood for rediscovery, but possibility of restoration (e.g., American Chestnut Forest).

GNA - Not applicable to the element at a global level. Includes Hybrids, Invasive species, species of Domestic Origin, Cultural communities, and communities that have been managed.

GNR - Rank not assigned.

GU - Unrankable. Possibly in peril range-wide but status uncertain; more information is needed.

GX - Believed to be extinct throughout range (e.g., Passenger Pigeon) with virtually no likelihood that it will be rediscovered. For an ecological community, no restoration potential.

G#G# - Rank with a range. Used to show the range of uncertainty, will not skip more than 1 rank.

T-RANKS - T subranks are given to global ranks when a subspecies, variety, or race is considered at the state level. The subrank is made up of a "T" plus a number or letter (1, 2, 3, 4, 5, H, U, X) with the same ranking rules as a full species.

**State Rank Codes - SRANK:** Priority rank (1-5) based on number of occurrences through element's range.

S1 - Critically imperiled, Extremely rare. Typically 5 or fewer estimated occurrences in the state, or only a few remaining individuals, may be especially vulnerable to extirpation.

S2 - Imperiled, very rare. Typically between 5 and 20 estimated occurrences or with many individuals in fewer occurrences, often susceptible to becoming extirpated.

S3 - Vulnerable, rare to uncommon. Typically between 21 and 100 estimated occurrences, may have fewer occurrences but with large number of individuals in some populations, may be susceptible to large-scale disturbances.

S4 - Common, apparently secure under present conditions. Typically 100 or more estimated occurrences, but may be fewer with many large populations, may be restricted to only a portion of the state, usually not susceptible to immediate threats.

S5 - Demonstrably widespread, common, and secure in the state and essentially ineradicable under present conditions.

SA - Accidental.

SH - Historically known from the state, but not verified for an extended period, usually 15 years.

SU - Unrankable, not assessed. Possibly in peril in the state, but status uncertain, more information is needed. When possible, the most likely rank is assigned and a question mark is added to show uncertainty.

SX - Apparently extirpated from state.

SNR - Unranked. The state rank not yet assessed.

SRF - Reported falsely in the state.

SE - Exotic for local area.

SZ - Birds that migrate through the state but have no identifiable location.

S#S# - State level of G#G#.

# Endangered Species Codes, (Continued...)

## General Ranking Notes

Q - A "Q" in the global rank indicates the element's taxonomic classification as a species is a matter of conjecture among scientists.

A - Accidental - far outside usual range

C - Captive or Cultivated only

HYB - Element represents an interspecific hybrid, not a species

R - Reported but not confirmed

Z - Zero Occurrences

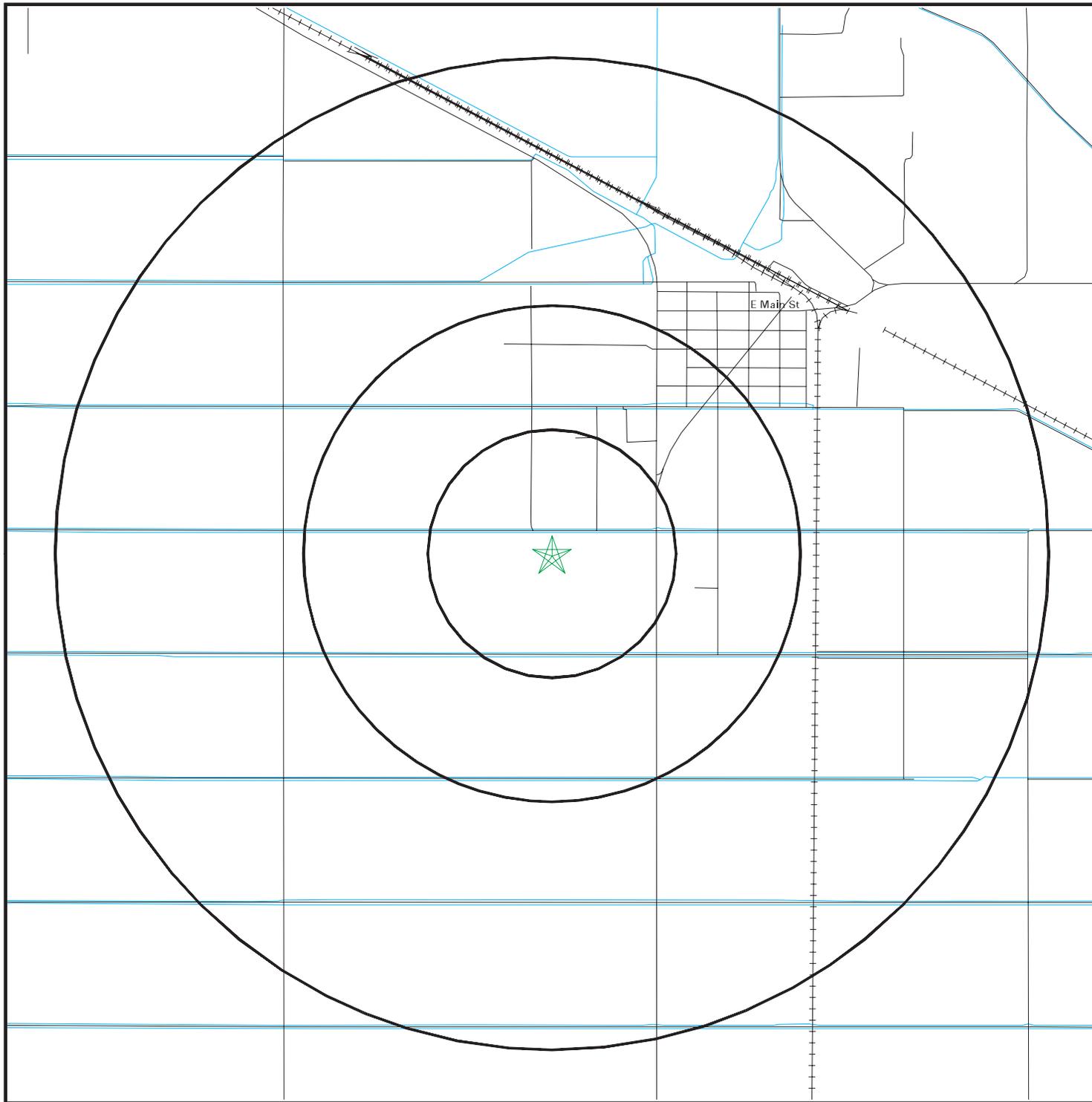
## Breeding Status Qualifiers (animals only)

B - Breeding population of the element

N - Nonbreeding population of the element

M - Migrant population

# Historic Sites Map



- ★ Target Property
- ◆ Historic Sites
- Streets
- County Boundary
- Waterways
- Water
- Federal Historic Areas
- State Historic Areas
- US Indian Reservations
- Scenic Trail



<p>SITE NAME: Niland WWTP          ADDRESS: Alcott Rd          Calipatria CA 92233          LAT/LONG: 33.22601 / 115.526354</p>	<p>CLIENT: Ericsson-Grant Inc.          CONTACT: Kevin Grant          INQUIRY #: 6115956.1s          DATE: July 8, 2020</p>
<p>TC6115956.1s Page 66 of 115</p>	

## HISTORIC SITES MAP FINDINGS

Map ID  
Direction  
Distance  
Distance (ft.)

EDR ID  
Database

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No mapped sites were found in EDR's search of available government records within the search radius around the target property.

## UNMAPPABLE HISTORIC SITES

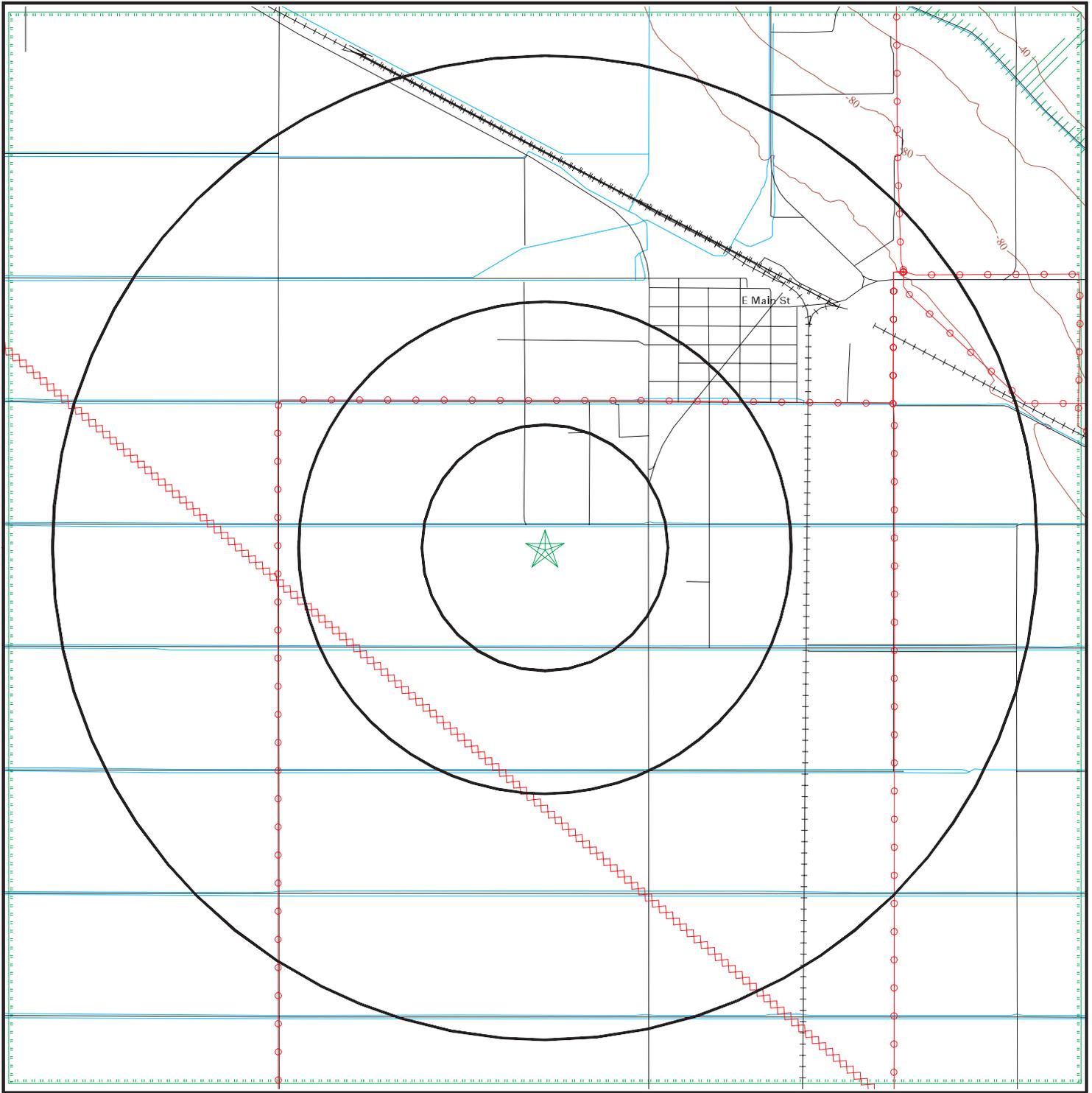
Due to poor or inadequate address information, the following sites were not mapped:

Status  
EDR ID  
Database

---

No unmapped sites were found in EDR's search of available government records.

# Flood Plain Map



- Major Roads
- Contour Lines
- Waterways
- County Boundary

- Power Lines
- Pipe Lines
- Fault Lines

- Water
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- Electronic FEMA data available
- Electronic FEMA data not available



SITE NAME: Niland WWTP  
 ADDRESS: Alcott Rd  
 Calipatria CA 92233  
 LAT/LONG: 33.22601 / 115.526354

CLIENT: Ericsson-Grant Inc.  
 CONTACT: Kevin Grant  
 INQUIRY #: 6115956.1s  
 DATE: July 8, 2020

# FLOOD PLAIN MAP FINDINGS

Source: FEMA FIRM Flood Data, FEMA Q3 Flood Data

**Flood Panel Number**                      **FEMA Source Type**

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Flood Plain panel at target property:

06025C0725C                      (FEMA FIRM Flood data)

Additional Flood Plain panel(s) in search area:

06025C0425C                      (FEMA FIRM Flood data)

06025C0750C                      (FEMA FIRM Flood data)

Map ID

Direction

Distance

Distance (ft.)

Description

Database

---



## WETLANDS MAP FINDINGS

Source: Fish and Wildlife Service NWI data

NWI hardcopy map at target property: Niland  
 Additional NWI hardcopy map(s) in search area:  
 Wister  
 Iris

Map ID	Direction	Distance	Distance (ft.)	Code and Description*	Database
A1	West	0-1/8 mi	38	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.226009 / -115.526474	NWI
A2	NW	0-1/8 mi	66	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.226139 / -115.526505	NWI
A3	NNE	0-1/8 mi	125	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.226334 / -115.526215	NWI
A4	SSW	0-1/8 mi	143	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.225639 / -115.526497	NWI
A5	NE	0-1/8 mi	207	PUBFx [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.226372 / -115.525826	NWI
A6	North	0-1/8 mi	435	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227207 / -115.526352	NWI
A7	North	0-1/8 mi	505	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227398 / -115.526352	NWI
A8	North	0-1/8 mi	556	PSS1A [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [A] Temporarily Flooded Lat/Lon: 33.227539 / -115.526321	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
A9 NNE 1/8-1/4 mi 736	PSS1C [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [C] Seasonally Flooded Lat/Lon: 33.227898 / -115.525475	NWI
B10 North 1/8-1/4 mi 1139	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.229141 / -115.526512	NWI
B11 North 1/8-1/4 mi 1160	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.229198 / -115.526184	NWI
B12 NNE 1/8-1/4 mi 1317	PSS1C [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [C] Seasonally Flooded Lat/Lon: 33.229126 / -115.524155	NWI
C13 NE 1/4-1/2 mi 1481	PSS1A [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [A] Temporarily Flooded Lat/Lon: 33.229023 / -115.523087	NWI
C14 NE 1/4-1/2 mi 1520	PSS1C [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [C] Seasonally Flooded Lat/Lon: 33.229195 / -115.523125	NWI
D15 ENE 1/4-1/2 mi 1664	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.227089 / -115.521057	NWI
B16 NNE 1/4-1/2 mi 1879	PEM1C [P] Palustrine [EM] Emergent [1] Persistent [C] Seasonally Flooded Lat/Lon: 33.231064 / -115.525085	NWI
D17 ENE 1/4-1/2 mi 2092	PSS1A [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [A] Temporarily Flooded Lat/Lon: 33.227562 / -115.519760	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
E18 South 1/4-1/2 mi 2097	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.220245 / -115.526360	NWI
F19 North 1/4-1/2 mi 2173	PSS1C [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [C] Seasonally Flooded Lat/Lon: 33.231937 / -115.525490	NWI
F20 North 1/4-1/2 mi 2192	PSS1A [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [A] Temporarily Flooded Lat/Lon: 33.231968 / -115.525284	NWI
E21 SSW 1/4-1/2 mi 2242	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.220009 / -115.528008	NWI
C22 NE 1/4-1/2 mi 2253	PEM1C [P] Palustrine [EM] Emergent [1] Persistent [C] Seasonally Flooded Lat/Lon: 33.231071 / -115.522102	NWI
F23 NNE 1/4-1/2 mi 2259	PSS1C [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [C] Seasonally Flooded Lat/Lon: 33.232090 / -115.524864	NWI
C24 NE 1/4-1/2 mi 2282	PEM1A [P] Palustrine [EM] Emergent [1] Persistent [A] Temporarily Flooded Lat/Lon: 33.231018 / -115.521858	NWI
D25 ENE 1/4-1/2 mi 2340	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227432 / -115.518890	NWI
D26 East 1/4-1/2 mi 2351	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227242 / -115.518799	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
F27 North 1/4-1/2 mi 2507	PSS1A [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [A] Temporarily Flooded Lat/Lon: 33.232853 / -115.527298	NWI
G28 NE 1/2-1 mi 3066	PSS1C [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [C] Seasonally Flooded Lat/Lon: 33.232971 / -115.520699	NWI
H29 North 1/2-1 mi 3074	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234463 / -115.526390	NWI
30 SE 1/2-1 mi 3104	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.220253 / -115.518860	NWI
H31 North 1/2-1 mi 3114	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234467 / -115.527924	NWI
H32 North 1/2-1 mi 3154	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234676 / -115.526367	NWI
H33 North 1/2-1 mi 3197	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234703 / -115.527885	NWI
G34 NNE 1/2-1 mi 3261	PUBFx [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.233799 / -115.521080	NWI
H35 North 1/2-1 mi 3271	PSS1C [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [C] Seasonally Flooded Lat/Lon: 33.234951 / -115.527496	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
G36 NNE 1/2-1 mi 3273	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.233517 / -115.520454	NWI
G37 NNE 1/2-1 mi 3308	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.233788 / -115.520744	NWI
I38 East 1/2-1 mi 3592	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227249 / -115.514702	NWI
I39 East 1/2-1 mi 3604	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227409 / -115.514679	NWI
H40 North 1/2-1 mi 3719	PSS1A [P] Palustrine [SS] Scrub Shrub [1] Broad-Leaved Deciduous [A] Temporarily Flooded Lat/Lon: 33.236202 / -115.525398	NWI
G41 NE 1/2-1 mi 3823	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234447 / -115.518898	NWI
42 North 1/2-1 mi 3834	PUBFx [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.236420 / -115.524406	NWI
43 ESE 1/2-1 mi 4149	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.220211 / -115.514664	NWI
J44 NW 1/2-1 mi 4361	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234489 / -115.536423	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
J45 NW 1/2-1 mi 4416	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234688 / -115.536446	NWI
K46 East 1/2-1 mi 4625	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.226334 / -115.511230	NWI
L47 WSW 1/2-1 mi 4713	PUBFh [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [h] Diked/Impounded Lat/Lon: 33.219311 / -115.539543	NWI
M48 South 1/2-1 mi 4749	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212955 / -115.526344	NWI
L49 WSW 1/2-1 mi 4799	PUBFh [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [h] Diked/Impounded Lat/Lon: 33.218918 / -115.539581	NWI
M50 South 1/2-1 mi 4818	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212765 / -115.526337	NWI
K51 East 1/2-1 mi 4837	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.227669 / -115.510651	NWI
M52 South 1/2-1 mi 4883	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212589 / -115.526520	NWI
M53 South 1/2-1 mi 4890	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212578 / -115.525841	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
M54 South 1/2-1 mi 4910	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212574 / -115.527885	NWI
M55 South 1/2-1 mi 4930	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212601 / -115.524025	NWI
M56 South 1/2-1 mi 4995	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.212326 / -115.527702	NWI
N57 SSW 1/2-1 mi 5020	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212570 / -115.530067	NWI
O58 SSE 1/2-1 mi 5045	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212589 / -115.522194	NWI
N59 SSW 1/2-1 mi 5138	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212566 / -115.531502	NWI
N60 SSW 1/2-1 mi 5243	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212585 / -115.532585	NWI
P61 SSE 1/2-1 mi 5267	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212971 / -115.518852	NWI
M62 South 1-2 mi 5302	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.211441 / -115.525833	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
P63 SSE 1-2 mi 5348	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212730 / -115.518837	NWI
O64 South 1-2 mi 5367	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.211411 / -115.523842	NWI
Q65 SSW 1-2 mi 5403	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212559 / -115.533844	NWI
R66 SW 1-2 mi 5437	PUBFx [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.214142 / -115.537163	NWI
Q67 SSW 1-2 mi 5615	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212555 / -115.535347	NWI
68 East 1-2 mi 5703	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.227554 / -115.507790	NWI
S69 North 1-2 mi 5726	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.241749 / -115.526352	NWI
T70 West 1-2 mi 5755	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227245 / -115.545113	NWI
T71 West 1-2 mi 5786	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.227440 / -115.545197	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
Q72 SSW 1-2 mi 5798	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212540 / -115.536484	NWI
73 NNW 1-2 mi 5977	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.241928 / -115.531174	NWI
U74 South 1-2 mi 6012	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.209553 / -115.528130	NWI
75 ESE 1-2 mi 6056	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.219959 / -115.507904	NWI
R76 SW 1-2 mi 6075	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212624 / -115.538223	NWI
U77 South 1-2 mi 6110	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.209217 / -115.526421	NWI
78 WSW 1-2 mi 6114	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.220203 / -115.545105	NWI
U79 South 1-2 mi 6113	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.209213 / -115.525826	NWI
V80 SSW 1-2 mi 6129	L2USCx [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.211430 / -115.536392	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
W81 South 1-2 mi 6155	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.209209 / -115.523956	NWI
U82 South 1-2 mi 6220	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.208939 / -115.527481	NWI
W83 SSE 1-2 mi 6258	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.209179 / -115.522110	NWI
W84 South 1-2 mi 6316	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.208664 / -115.525513	NWI
X85 SW 1-2 mi 6389	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212601 / -115.539841	NWI
S86 North 1-2 mi 6503	R4SBJ [R] Riverine [4] Intermittent [SB] Streambed [J] Intermittently Flooded Lat/Lon: 33.243866 / -115.527298	NWI
Y87 WNW 1-2 mi 6510	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234505 / -115.545090	NWI
W88 SSE 1-2 mi 6514	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.208488 / -115.521973	NWI
Z89 ENE 1-2 mi 6533	R4SBJx [R] Riverine [4] Intermittent [SB] Streambed [J] Intermittently Flooded [x] Excavated Lat/Lon: 33.234699 / -115.507660	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
Y90 WNW 1-2 mi 6546	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.234673 / -115.545120	NWI
Z91 ENE 1-2 mi 6551	PEM1Ah [P] Palustrine [EM] Emergent [1] Persistent [A] Temporarily Flooded [h] Diked/Impounded Lat/Lon: 33.234737 / -115.507607	NWI
Y92 WNW 1-2 mi 6600	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.234978 / -115.545113	NWI
X93 SW 1-2 mi 6609	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212597 / -115.540916	NWI
W94 South 1-2 mi 6640	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.207890 / -115.523758	NWI
W95 South 1-2 mi 6700	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.207939 / -115.522102	NWI
V96 SSW 1-2 mi 6903	L2UBFx [L] Lacustrine [2] Littoral [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.209286 / -115.537025	NWI
X97 SW 1-2 mi 6942	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212551 / -115.542435	NWI
98 NW 1-2 mi 7025	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.237186 / -115.545090	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AA99 West 1-2 mi 7077	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.227749 / -115.549400	NWI
AA100 West 1-2 mi 7086	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.228012 / -115.549408	NWI
AA101 West 1-2 mi 7115	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.228680 / -115.549400	NWI
Y102 WNW 1-2 mi 7187	L2USCx [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.235001 / -115.547279	NWI
AA103 West 1-2 mi 7261	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.227776 / -115.550003	NWI
AB104 South 1-2 mi 7368	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.205757 / -115.526398	NWI
AC105 SE 1-2 mi 7380	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212959 / -115.507866	NWI
106 ENE 1-2 mi 7410	R4SBJ [R] Riverine [4] Intermittent [SB] Streambed [J] Intermittently Flooded Lat/Lon: 33.234749 / -115.504456	NWI
AC107 SE 1-2 mi 7422	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212715 / -115.507950	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AD108 SW 1-2 mi 7458	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212940 / -115.545143	NWI
AA109 West 1-2 mi 7461	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.227745 / -115.550667	NWI
AB110 South 1-2 mi 7462	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.205498 / -115.526337	NWI
111 SW 1-2 mi 7476	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.211163 / -115.543259	NWI
AE112 NNE 1-2 mi 7476	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.246075 / -115.521072	NWI
AD113 SW 1-2 mi 7483	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.212738 / -115.545044	NWI
114 NNE 1-2 mi 7663	R4SBJx [R] Riverine [4] Intermittent [SB] Streambed [J] Intermittently Flooded [x] Excavated Lat/Lon: 33.244980 / -115.515465	NWI
AF115 SSE 1-2 mi 7723	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.205723 / -115.518906	NWI
116 NE 1-2 mi 7771	R4SBJ [R] Riverine [4] Intermittent [SB] Streambed [J] Intermittently Flooded Lat/Lon: 33.243652 / -115.512016	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AG117 WNW 1-2 mi 7810	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.234985 / -115.549553	NWI
AF118 SSE 1-2 mi 7810	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.205498 / -115.518814	NWI
AA119 West 1-2 mi 7814	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.227703 / -115.551826	NWI
AH120 NW 1-2 mi 7820	PUBFx [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.240398 / -115.545349	NWI
AE121 NNE 1-2 mi 7882	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.246948 / -115.519737	NWI
AI122 North 1-2 mi 7897	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.247635 / -115.524155	NWI
AG123 WNW 1-2 mi 7974	PEM1Cx [P] Palustrine [EM] Emergent [1] Persistent [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.236080 / -115.549507	NWI
AH124 NW 1-2 mi 8056	PUBFx [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.241085 / -115.545647	NWI
AG125 WNW 1-2 mi 8084	L2USCx [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.235867 / -115.550041	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AH126 NW 1-2 mi 8106	R2UBHx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.241749 / -115.545113	NWI
AH127 NW 1-2 mi 8155	R2UBHx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.241928 / -115.545128	NWI
AH128 NW 1-2 mi 8197	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.241089 / -115.546257	NWI
129 SW 1-2 mi 8246	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.208229 / -115.543076	NWI
130 NE 1-2 mi 8287	R4SBJ [R] Riverine [4] Intermittent [SB] Streambed [J] Intermittently Flooded Lat/Lon: 33.239994 / -115.504959	NWI
AJ131 WNW 1-2 mi 8358	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.238335 / -115.549423	NWI
132 North 1-2 mi 8366	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.248966 / -115.527855	NWI
AK133 West 1-2 mi 8435	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.227936 / -115.553841	NWI
AI134 North 1-2 mi 8437	R4SBAx [R] Riverine [4] Intermittent [SB] Streambed [A] Temporarily Flooded [x] Excavated Lat/Lon: 33.249176 / -115.525093	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AK135 West 1-2 mi 8467	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.227589 / -115.553970	NWI
AL136 West 1-2 mi 8470	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.224895 / -115.554016	NWI
AL137 West 1-2 mi 8470	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.223766 / -115.553925	NWI
AM138 NE 1-2 mi 8481	PUSAx [P] Palustrine [US] Unconsolidated Shore [A] Temporarily Flooded [x] Excavated  Lat/Lon: 33.242054 / -115.506226	NWI
AJ139 WNW 1-2 mi 8491	PEM1Cx [P] Palustrine [EM] Emergent [1] Persistent [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.238972 / -115.549446	NWI
AM140 NE 1-2 mi 8533	PUSAx [P] Palustrine [US] Unconsolidated Shore [A] Temporarily Flooded [x] Excavated  Lat/Lon: 33.242634 / -115.506668	NWI
AN141 West 1-2 mi 8559	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.221695 / -115.553871	NWI
AN142 WSW 1-2 mi 8655	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.220680 / -115.553940	NWI
AO143 NNE 1-2 mi 8659	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.249012 / -115.519073	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AO144 NNE 1-2 mi 8695	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.249069 / -115.518883	NWI
AN145 WSW 1-2 mi 8835	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.220524 / -115.554497	NWI
146 NNW 1-2 mi 8929	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.249199 / -115.535896	NWI
AP147 NW 1-2 mi 8984	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.241158 / -115.549545	NWI
AK148 West 1-2 mi 9045	PEM1Cx [P] Palustrine [EM] Emergent [1] Persistent [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.228111 / -115.555824	NWI
AQ149 WNW 1-2 mi 9047	L2USC [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.235092 / -115.553886	NWI
AN150 WSW 1-2 mi 9052	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.220562 / -115.555237	NWI
AK151 West 1-2 mi 9091	L2USC [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.228897 / -115.555885	NWI
AQ152 WNW 1-2 mi 9114	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.235008 / -115.554176	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AR153 WNW 1-2 mi 9233	L2USC [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.231083 / -115.555931	NWI
AP154 NW 1-2 mi 9232	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.242451 / -115.549347	NWI
AN155 WSW 1-2 mi 9261	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.220562 / -115.555939	NWI
156 SE 1-2 mi 9271	R4SBC [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.205715 / -115.508011	NWI
AS157 SW 1-2 mi 9325	R2UBF [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.205769 / -115.545059	NWI
AQ158 WNW 1-2 mi 9335	L2USC [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.235020 / -115.554932	NWI
AR159 WNW 1-2 mi 9374	PEM1C [P] Palustrine [EM] Emergent [1] Persistent [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.232971 / -115.555862	NWI
160 NNE 1-2 mi 9381	R4SBA [R] Riverine [4] Intermittent [SB] Streambed [A] Temporarily Flooded Lat/Lon: 33.249302 / -115.513199	NWI
AT161 WSW 1-2 mi 9426	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.220554 / -115.556488	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
AP162 NW 1-2 mi 9434	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.242435 / -115.550217	NWI
AS163 SW 1-2 mi 9453	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.205463 / -115.545273	NWI
AP164 NW 1-2 mi 9460	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.243366 / -115.549385	NWI
AP165 NW 1-2 mi 9559	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.242382 / -115.550804	NWI
AT166 WSW 1-2 mi 9633	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.220566 / -115.557182	NWI
AQ167 WNW 1-2 mi 9647	L2UBFx [L] Lacustrine [2] Littoral [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.235065 / -115.556000	NWI
AQ168 WNW 1-2 mi 9807	L2UBFx [L] Lacustrine [2] Littoral [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.235016 / -115.556580	NWI
169 West 1-2 mi 9810	PEM1Cx [P] Palustrine [EM] Emergent [1] Persistent [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.226925 / -115.558411	NWI
AU170 NW 1-2 mi 9924	PUSCx [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.245247 / -115.549362	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
171 NNE 1-2 mi 9943	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.252636 / -115.519028	NWI
172 NE 1-2 mi 9991	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated  Lat/Lon: 33.242405 / -115.500130	NWI
AV173 South 1-2 mi 10019	R2UBFx [R] Riverine [2] Lower Perennial [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated  Lat/Lon: 33.198467 / -115.526321	NWI
AV174 South 1-2 mi 10100	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.198246 / -115.526413	NWI
AU175 NW 1-2 mi 10230	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.245083 / -115.550941	NWI
AW176 WNW 1-2 mi 10248	PUBFx [P] Palustrine [UB] Unconsolidated Bottom [F] Semipermanently Flooded [x] Excavated  Lat/Lon: 33.234962 / -115.558128	NWI
177 SSE 1-2 mi 10286	R4SBCx [R] Riverine [4] Intermittent [SB] Streambed [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.198460 / -115.518784	NWI
178 NW 1-2 mi 10328	L2USC [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.242470 / -115.553864	NWI
AU179 NW 1-2 mi 10345	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated  Lat/Lon: 33.246227 / -115.550133	NWI

\*See Wetland Classification System for additional information.

## WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
180 NW 1-2 mi 10347	PUBHx [P] Palustrine [UB] Unconsolidated Bottom [H] Permanently Flooded [x] Excavated Lat/Lon: 33.249481 / -115.545448	NWI
AW181 WNW 1-2 mi 10361	L2USC [L] Lacustrine [2] Littoral [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.236671 / -115.557762	NWI
AU182 NW 1-2 mi 10420	PUSC [P] Palustrine [US] Unconsolidated Shore [C] Seasonally Flooded [x] Excavated Lat/Lon: 33.245876 / -115.550896	NWI
183 WNW 1-2 mi 10500	PEM1Fx [P] Palustrine [EM] Emergent [1] Persistent [F] Semipermanently Flooded [x] Excavated Lat/Lon: 33.237732 / -115.557732	NWI

\*See Wetland Classification System for additional information.

# WETLANDS CLASSIFICATION SYSTEM

National Wetland Inventory Maps are produced by the U.S. Fish and Wildlife Service, a sub-department of the U.S. Department of the Interior. In 1974, the U.S. Fish and Wildlife Service developed a criteria for wetland classification with four long range objectives:

- to describe ecological units that have certain homogeneous natural attributes,
- to arrange these units in a system that will aid decisions about resource management,
- to furnish units for inventory and mapping, and
- to provide uniformity in concepts and terminology throughout the U.S.

High altitude infrared photographs, soil maps, topographic maps and site visits are the methods used to gather data for the productions of these maps. In the infrared photos, wetlands appear as different colors and these wetlands are then classified by type. Using a hierarchical classification, the maps identify wetland and deepwater habitats according to:

- system
- subsystem
- class
- subclass
- modifiers

(as defined by Cowardin, et al. U.S. Fish and Wildlife Service FWS/OBS 79/31. 1979.)

The classification system consists of five systems:

1. marine
2. estuarine
3. riverine
4. lacustrine
5. palustrine

The marine system consists of deep water tidal habitats and adjacent tidal wetlands. The riverine system consists of all wetlands contained within a channel. The lacustrine systems includes all nontidal wetlands related to swamps, bogs & marshes. The estuarine system consists of deepwater tidal habitats and where ocean water is diluted by fresh water. The palustrine system includes nontidal wetlands dominated by trees and shrubs and where salinity is below .5% in tidal areas. All of these systems are divided in subsystems and then further divided into class.

National Wetland Inventory Maps are produced by transferring gathered data on a standard 7.5 minute U.S.G.S. topographic map. Approximately 52 square miles are covered on a National Wetland Inventory map at a scale of 1:24,000. Electronic data is compiled by digitizing these National Wetland Inventory Maps.

**SYSTEM**

**MARINE**

**SUBSYSTEM**

**1 - SUBTIDAL**

**2 - INTERTIDAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom	AB-AQUATIC BED	RF-REEF	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm		1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic

**SYSTEM**

**E - ESTUARINE**

**SUBSYSTEM**

**1 - SUBTIDAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	

**SUBSYSTEM**

**2 - INTERTIDAL**

CLASS	AB-AQUATIC BED	RF-REEF	SB - STREAMBED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	SS-SCRUB SHRUB	FO-FORESTED
Subclass	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

**SYSTEM**

**R - RIVERINE**

**SUBSYSTEM**

**1 - TIDAL      2 - LOWER PERENNIAL      3 - UPPER PERENNIAL      4 - INTERMITTENT      5 - UNKNOWN PERENNIAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	*SB-STREAMBED	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	**EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

\* STREAMBED is limited to TIDAL and INTERMITTENT SUBSYSTEMS, and comprises the only CLASS in the INTERMITTENT SUBSYSTEM.  
 \*\*EMERGENT is limited to TIDAL and LOWER PERENNIAL SUBSYSTEMS.

**SYSTEM**

**L - LACUSTRINE**

**SUBSYSTEM**

**1 - LIMNETIC**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	

**SUBSYSTEM**

**2 - LITTORAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

**SUBSYSTEM**

**P - PALUSTRINE**

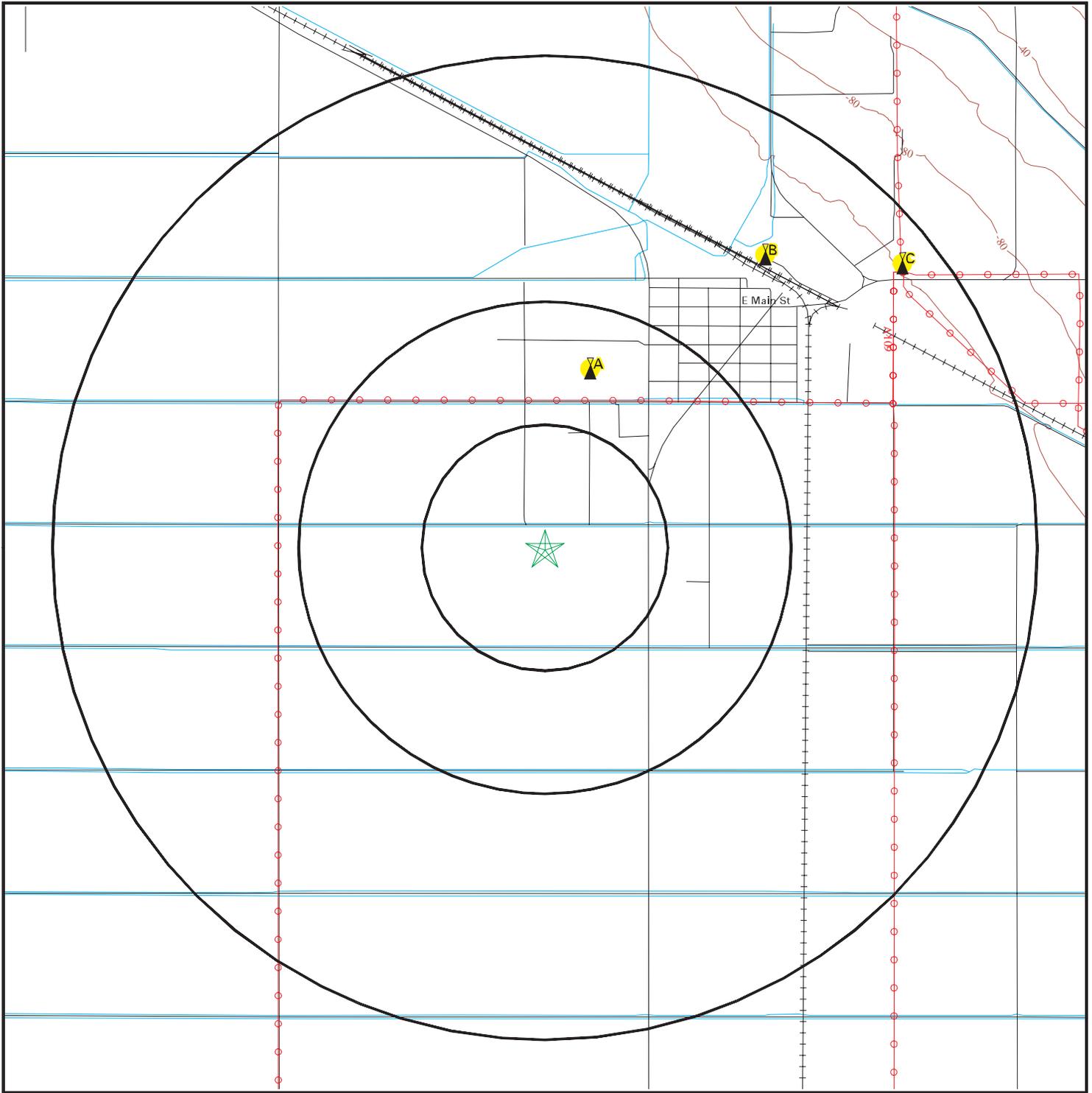
CLASS	RB--ROCK BOTTOM	UB--UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	US--UNCONSOLIDATED SHORE	ML--MOSS- LICHEN	EM--EMERGENT	SS--SCRUB-SHRUB	FO--FORESTED	OW-OPEN WATER/ Unknown
Subclass	1 Bedrock 2 Rubble 3 Mud 4 Organic	1 Cobble-Gravel 2 Sand	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown 6 Unknown Surface	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent	1 Broad-Leaved 2 Needle-Leaved 3 Broad-Leaved 4 Needle-Leaved 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved 2 Needle-Leaved 3 Broad-Leaved 4 Needle-Leaved 5 Dead 6 Deciduous 7 Evergreen	

**MODIFIERS**

In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

WATER REGIME				WATER CHEMISTRY			SOIL	SPECIAL MODIFIERS
Non-Tidal	Tidal	Coastal Halinity	Inland Salinity	pH	all Fresh Water			
A Temporarily Flooded	H Permanently Flooded	K Artificially Flooded	*S Temporary-Tidal		1 Hyperhaline	7 Hypersaline	g Organic	b Beaver
B Saturated	J Intermittently Flooded	L Subtidal	*R Seasonal-Tidal		2 Euhaline	8 Eusaline	n Mineral	d Partially Drained/Ditched
C Seasonally Flooded	K Artificially Flooded	M Irregularly Exposed	*T Semipermanent -Tidal		3 Mixohaline (Brackish)	9 Mixosaline	a Acid	f Farmed
D Seasonally Flooded/ Well Drained	W Intermittently Flooded/Temporary	N Regularly Flooded	V Permanent -Tidal		4 Polyhaline	0 Fresh	t Circumneutral	h Diked/Impounded
E Seasonally Flooded/ Saturated	Y Saturated/Semipermanent/ Seasonal	P Irregularly Flooded	U Unknown		5 Mesohaline		i Alkaline	r Artificial Substrate
F Semipermanently Flooded	Z Intermittently Exposed/Permanent	*These water regimes are only used in tidally influenced, freshwater systems.			6 Oligohaline			s Spoil
G Intermittently Exposed	U Unknown				0 Fresh			x Excavated

# FCC & FAA Sites Map



-  Streets
-  Contour Lines
-  County Boundary
-  Waterways
-  Power Lines
-  Water
-  Sites



SITE NAME: Niland WWTP  
 ADDRESS: Alcott Rd  
 Calipatria CA 92233  
 LAT/LONG: 33.22601 / 115.526354

CLIENT: Ericsson-Grant Inc.  
 CONTACT: Kevin Grant  
 INQUIRY #: 6115956.1s  
 DATE: July 8, 2020

# FCC & FAA SITES MAP FINDINGS TOWERS

**Map ID**  
**Direction**  
**Distance**  
**Distance (ft.)**

**EDR ID**  
**Database**

A1  
NNE  
1/2-1 mi  
3957

DOF161200025879  
FAA DOF

Obstacle #: 06-020099  
Obstacle Type: TOWER  
Quantity: 1  
Ft Above Ground: 200  
Ft Above Sea Level: 42  
Verification Status: Verified  
Lighting: None  
Horizontal Accuracy: +/- 50 ft  
Vertical Accuracy: +/- 20 ft  
Markings: None  
Action: Change  
Action Date: 2009308

A2  
NNE  
1/2-1 mi  
3972

ANT130000080523  
ANTREG

Registration #: 1235434  
File #: A0590925  
Issue Date: 4/11/2008  
Entity: SBA Towers II LLC  
Height: 60.7  
Address: 8031 Hwy 111 (CA105112-A)  
FAA Study: 2008-AWP-1883-OE  
FAA Circular: Not Reported  
License ID: L01211381  
Contact Name: Edward G. Roach  
Contact Address: 5900 Broken Sound Pkwy NW  
Contact City: Boca Raton  
Contact State: FL  
Contact Zip: 33487  
ASR Search: <http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp>

This record is for a license, and it may or may not indicate a site which has been built.

# FCC & FAA SITES MAP FINDINGS TOWERS

**Map ID**  
**Direction**  
**Distance**  
**Distance (ft.)**

**EDR ID**  
**Database**

B3  
NE  
1-2 mi  
7860

DOF161200025884  
FAA DOF

Obstacle #: 06-000365  
Obstacle Type: TOWER  
Quantity: 1  
Ft Above Ground: 260  
Ft Above Sea Level: 140  
Verification Status: Verified  
Lighting: Medium Intensity White Strobe  
Horizontal Accuracy: +/- 20 ft  
Vertical Accuracy: +/- 50 ft  
Markings: None  
Action: Change  
Action Date: 2012088

B4  
NE  
1-2 mi  
7867

ANT130000010060  
ANTREG

Registration #: 1013320  
File #: A0759164  
Issue Date: 3/26/2012  
Entity: UNION PACIFIC RAILROAD COMPANY  
Height: 79.2  
Address: 6M-W BLDG SP YD  
FAA Study: 2012-AWP-2191-OE  
FAA Circular: 70/7460-1K  
License ID: L00005111  
Contact Name: BRAD G. ZIELIE  
Contact Address: 1400 DOUGLAS ST. STOP 0650  
Contact City: OMAHA  
Contact State: NE  
Contact Zip: 68179  
ASR Search: <http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp>

This record is for a license, and it may or may not indicate a site which has been built.

## FCC & FAA SITES MAP FINDINGS TOWERS

**Map ID**  
**Direction**  
**Distance**  
**Distance (ft.)**

**EDR ID**  
**Database**

C5  
 NE  
 1-2 mi  
 9770

CELL16100003566  
 CELLULAR

Call Sign: KNKN269  
 Location #: 16  
 Address: Niland: BEAL RD 1 MI E  
 City: NILAND  
 Structure Type: TOWER  
 Ground Elevation: -30.5  
 Overall Height: 60

This record is for a license, and it may or may not indicate a site which has been built.

C6  
 NE  
 1-2 mi  
 9770

CELL16100001710  
 CELLULAR

Call Sign: KNKN205  
 Location #: 10  
 Address: (Niland) BEAL RD 1 MI E  
 City: NILAND  
 Structure Type: LTOWER  
 Ground Elevation: -30.5  
 Overall Height: 60

This record is for a license, and it may or may not indicate a site which has been built.

# FCC & FAA SITES MAP FINDINGS TOWERS

**Map ID**  
**Direction**  
**Distance**  
**Distance (ft.)**

**EDR ID**  
**Database**

C7  
NE  
1-2 mi  
9775

ANT130000012197  
ANTREG

Registration #: 1016231  
File #: A0019456  
Issue Date: 4/22/1997  
Entity: IMPERIAL IRRIGATION DISTRICT  
Height: 56  
Address: BEAL RD 1 MI E  
FAA Study: 94-AWP-0892-OE  
FAA Circular: Not Reported  
License ID: Not Reported  
Contact Name: CHUCK SCROGGINS  
Contact Address: 333 E BARIONI BLVD  
Contact City: IMPERIAL  
Contact State: CA  
Contact Zip: 92251  
ASR Search: <http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp>

This record is for a license, and it may or may not indicate a site which has been built.

C8  
NE  
1-2 mi  
9839

DOF161200025883  
FAA DOF

Obstacle #: 06-002321  
Obstacle Type: TOWER  
Quantity: 1  
Ft Above Ground: 198  
Ft Above Sea Level: 98  
Verification Status: Unverified  
Lighting: None  
Horizontal Accuracy: +/- 250 ft  
Vertical Accuracy: +/- 50 ft  
Markings: None  
Action: Change  
Action Date: 2014124

# FCC & FAA SITES MAP FINDINGS TOWERS

Map ID  
Direction  
Distance  
Distance (ft.)

EDR ID  
Database

C9  
NE  
1-2 mi  
9843

ANT130000031909  
ANTREG

Registration #: 1041023  
File #: A0048309  
Issue Date: 3/17/1998  
Entity: SOUTHERN CELLULAR, INC. DBA = RAMCELL OF CALIFORNIA  
Height: 57.3  
Address: 1 MILE NE  
FAA Study: Not Reported  
FAA Circular: Not Reported  
License ID: Not Reported  
Contact Name: JILL D. RAMSEY  
Contact Address: 6915 HARRODSBURG ROAD  
Contact City: NICHOLASVILLE  
Contact State: KY  
Contact Zip: 40356  
ASR Search: <http://wireless2.fcc.gov/UISApp/AsrSearch/asrRegistrationSearch.jsp>

This record is for a license, and it may or may not indicate a site which has been built.

# FCC & FAA SITES MAP FINDINGS AIRPORTS

EDR ID  
Database

---

No Sites Reported.

# FCC & FAA SITES MAP FINDINGS

## POWERLINES

EDR ID  
Database

4940  
POWERLINES

Voltage: 60  
Range: Yes  
Hi voltage: 92  
Volt cat: 0-69 kV  
Type: Alternating current  
Status: Active  
Corridor: Single line  
Owner: Imperial Irrigation District  
Owner id: IIDCA  
Num owners: Single Owner  
Operator: Imperial Irrigation District  
Operator id: IIDCA  
Last owner: Not Reported  
Last own id: Not Reported  
Last oper: Not Reported  
Last oper id: Not Reported  
Mileage: 3.8151263000000002

64646  
POWERLINES

Voltage: 60  
Range: Yes  
Hi voltage: 92  
Volt cat: 0-69 kV  
Type: Alternating current  
Status: Active  
Corridor: Single line  
Owner: Imperial Irrigation District  
Owner id: IIDCA  
Num owners: Single Owner  
Operator: Imperial Irrigation District  
Operator id: IIDCA  
Last owner: Not Reported  
Last own id: Not Reported  
Last oper: Not Reported  
Last oper id: Not Reported  
Mileage: 5.5124653600000002

28767  
POWERLINES

Voltage: 110  
Range: Yes  
Hi voltage: 161  
Volt cat: 70-138 kV  
Type: Alternating current

# FCC & FAA SITES MAP FINDINGS

## POWERLINES

EDR ID  
Database

---

Status: Active  
Corridor: Single line  
Owner: Imperial Irrigation District  
Owner id: IIDCA  
Num owners: Single Owner  
Operator: Imperial Irrigation District  
Operator id: IIDCA  
Last owner: Not Reported  
Last own id: Not Reported  
Last oper: Not Reported  
Last oper id: Not Reported  
Mileage: 6.2630496600000001

---

111856  
POWERLINES

Voltage: 60  
Range: Yes  
Hi voltage: 92  
Volt cat: 0-69 kV  
Type: Alternating current  
Status: Active  
Corridor: Multiple lines  
Owner: Imperial Irrigation District  
Owner id: IIDCA  
Num owners: Single Owner  
Operator: Imperial Irrigation District  
Operator id: IIDCA  
Last owner: Not Reported  
Last own id: Not Reported  
Last oper: Not Reported  
Last oper id: Not Reported  
Mileage: .59894745999999999

---

5631  
POWERLINES

Voltage: 60  
Range: Yes  
Hi voltage: 92  
Volt cat: 0-69 kV  
Type: Alternating current  
Status: Active  
Corridor: Multiple lines  
Owner: Imperial Irrigation District  
Owner id: IIDCA  
Num owners: Single Owner  
Operator: Imperial Irrigation District  
Operator id: IIDCA

# FCC & FAA SITES MAP FINDINGS POWERLINES

EDR ID  
Database

---

Last owner: Not Reported  
Last own id: Not Reported  
Last oper: Not Reported  
Last oper id: Not Reported  
Mileage: .5989474599999999

---

28306  
POWERLINES

Voltage: 110  
Range: Yes  
Hi voltage: 161  
Volt cat: 70-138 kV  
Type: Alternating current  
Status: Active  
Corridor: Single line  
Owner: Imperial Irrigation District  
Owner id: IIDCA  
Num owners: Single Owner  
Operator: Imperial Irrigation District  
Operator id: IIDCA  
Last owner: Not Reported  
Last own id: Not Reported  
Last oper: Not Reported  
Last oper id: Not Reported  
Mileage: 51.275699879999998

---

108503  
POWERLINES

Voltage: 110  
Range: Yes  
Hi voltage: 161  
Volt cat: 70-138 kV  
Type: Alternating current  
Status: Active  
Corridor: Single line  
Owner: Imperial Irrigation District  
Owner id: IIDCA  
Num owners: Single Owner  
Operator: Imperial Irrigation District  
Operator id: IIDCA  
Last owner: Not Reported  
Last own id: Not Reported  
Last oper: Not Reported  
Last oper id: Not Reported  
Mileage: 2.52917448

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Various Federal laws and executive orders address specific environmental concerns. NEPA requires the responsible offices to integrate to the greatest practical extent the applicable procedures required by these laws and executive orders. EDR provides key contacts at agencies charged with implementing these laws and executive orders to supplement the information contained in this report.

### **NATURAL AREAS**

#### **Wilderness Areas**

##### Government Records Searched in This Report

##### FED\_LAND: Federal Lands

Source: USGS

Telephone: 703-648-5094

Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.

- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2005

##### US NWP: National Wilderness Preservation System

This map layer consists of National Wilderness Preservation System areas of 320 acres or more, in the United States, Puerto Rico, and the U.S. Virgin Islands. Some established wilderness areas which are larger than 320 acres are not included in this map layer because their boundaries were not available from the owning or administering agency.

Source: U.S. Geological Survey.

Telephone: 888-275-8747

##### Federal Contacts for Additional Information

##### National Park Service, Pacific West Region

600 Harrison Street, Suite 600

San Francisco, CA 94107

415-427-1300

##### USDA Forest Service, Pacific Southwest

630 Sansome Street

San Francisco, CA 94111

415-705-2557

##### BLM - California State Office

2800 Cottage Way, Room W-1834

Sacramento, CA 95825-1886

916-978-4400

##### Fish & Wildlife Service, Fish & Wildlife Region 8

2800 Cottage Way W-2606

Sacramento, CA 95825

916-414-6464

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

### **Wildlife Preserves, Sanctuaries and Refuges**

#### Government Records Searched in This Report

##### **FED\_LAND: Federal Lands**

Source: USGS

Telephone: 703-648-5094

Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.

- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2005

##### **CA Conservation Easement: Conservation Easement Database**

The California Conservation Easement Database (CCED) contains GIS data for conservation and open space easements for public and private property.

Source: GreenInfo Network.

Telephone: 510-350-8700

##### **CA Government Land: CA Government Owned Land**

Statewide GIS layer of land ownership, compiled from multiple data sources and snapped to county parcels.

Source: Cal Fire.

Telephone: 916-653-5123

##### **CA PCT Lands: CA Public, Conservation and Trust Lands**

A 1:100,000 polygon features class representing public, conservation and trust land ownership in the state of California. Developed for the California Resources Agency Legacy Project, this dataset depicts ownership features as submitted by major public, trust, and non-profit groups in the state.

Source: California Resources Agency.

Telephone: 510-653-1369

##### **CA Protected Areas: Protected Areas Database**

The California Protected Areas Database (CPAD) contains GIS data about lands that are owned in fee and protected for open space purposes by over 1,000 public agencies or non-profit organizations.

Source: GreenInfo Network.

Telephone: 510-350-8700

##### **CA ACEC: Areas of Critical Environmental Concern**

BLM Areas of Critical Environmental Concern in California

Source: Bureau of Land Management.

Telephone: 916-978-4400

##### **US ACEC: Areas of Critical Environmental Concern Designated Polygons**

The designated ACECs are "areas within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems of processes, or to protect life and safety from natural hazards

Source: Bureau of Land Management.

Telephone: 202-912-7352

##### **US Critical Water Habitat: US Critical Water Habitat**

When a species is proposed for listing as endangered or threatened under the Endangered Species Act, the U.S. Fish and Wildlife Service must consider whether there are areas of habitat believed to be essential the species conservation. Those areas may be proposed for designation as critical habitat. Critical habitat is a term defined and used in the Act.

Source: US Fish & Wildlife Services.

Telephone: 970-226-9468

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

US Proclamation Boundaries: US Proclamation Boundaries  
Approved, Proclamation or Extent Boundary  
Source: USGS.  
Telephone: 208-301-8288

US Scenic River: National Wild and Scenic River System  
National Wild and Scenic Rivers System  
Source: USGS National Atlas and the Interagency Wild and Scenic River Coordinating Council.  
Telephone: 509-546-8333

US NCED: National Conservation Easement Database  
NCED shows a comprehensive picture of privately owned conservation easement lands in the U.S. The NCED will allow better strategic planning for conservation and development by merging data on land protection with biodiversity and resources, improving ecological and economic plans and investments.  
Source: U.S Endowment for Forestry and Communities.  
Telephone: 202-621-1647

US Critical Land Habitat: US Critical Land Habitat  
When a species is proposed for listing as endangered or threatened under the Endangered Species Act, the U.S. Fish and Wildlife Service must consider whether there are areas of habitat believed to be essential the species conservation. Those areas may be proposed for designation as critical habitat. Critical habitat is a term defined and used in the Act.  
Source: US Fish & Wildlife Services.  
Telephone: 970-226-9468

Federal Contacts for Additional Information  
Fish & Wildlife Service, Fish & Wildlife Region 8  
2800 Cottage Way W-2606  
Sacramento, CA 95825  
916-414-6464

State Contacts for Additional Information  
Department of Fish and Wildlife 916-653-7667

### **Wild and scenic rivers**

#### Government Records Searched in This Report

##### FED\_LAND: Federal Lands

Source: USGS

Telephone: 703-648-5094

Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.

- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2005

Federal Contacts for Additional Information  
Fish & Wildlife Service, Fish & Wildlife Region 8  
2800 Cottage Way W-2606  
Sacramento, CA 95825  
916-414-6464

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

### Endangered Species

#### Government Records Searched in This Report

CA Endangered Species: Natural Diversity Database

Source: Dept. of Fish and Game.

Telephone: 916-324-3812

CA Endangered Species: California Natural Diversity Database

The California Natural Diversity Database (CNDDB) provides location and status information for the California most imperiled species.

Source: Department of Fish and Wildlife.

Telephone: 916-322-2493

Federal Endangered Species by County: Threatened and Endangered Species Listing

Endangered, Threatened, Emergency Listing (Endangered), Emergency Listing (Threatened), Experimental Population (Essential), Experimental Population (Non-Essential), Similarity of Appearance (Endangered), Similarity of Appearance (Threatened).

Source: US Fish and Wildlife Services.

Telephone: 800-344-9453

#### Federal Contacts for Additional Information

Fish & Wildlife Service, Fish & Wildlife Region 8

2800 Cottage Way W-2606

Sacramento, CA 95825

916-414-6464

#### State Contacts for Additional Information

Natural Heritage Program, Dept. of Fish & Game 916-322-2493

### LANDMARKS, HISTORICAL, AND ARCHEOLOGICAL SITES

#### Historic Places

##### Government Records Searched in This Report

National Register of Historic Places:

The National Register of Historic Places is the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. These contribute to an understanding of the historical and cultural foundations of the nation.

The National Register includes:

- All prehistoric and historic units of the National Park System;
- National Historic Landmarks, which are properties recognized by the Secretary of the Interior as possessing national significance; and
- Properties significant in American, state, or local prehistory and history that have been nominated by State Historic Preservation Officers, federal agencies, and others, and have been approved for listing by the National Park Service.

Date of Government Version: 07/19/2015

CA Historic Landmarks: CA Historical Landmarks

Historical Landmarks are sites, buildings, features or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value

Source: Office of Historic Preservation.

Telephone: 916-653-6624

Potomac Heritage National Scenic Trail: Potomac Heritage National Scenic Trail

Source: Potomac Heritage NST Office.

Telephone: 304-535-4014

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Natchez Trace National Scenic Trail: Natchez Trace National Scenic Trail

Source: Natchez Trace Parkway.

Telephone: 800-305-7417

Indian Reservations: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Source: USGS.

Telephone: 202-208-3710

US Trails: US Trails

This dataset contains a baseline inventory and condition assessment of all non-motorized trails on U.S. Fish and Wildlife Service lands as part of the National Trails Inventory Program conducted by the US Dept. of Transportation, Federal Highway Administration, Federal Lands Highway Division.

Source: U.S. Fish and Wildlife.

Telephone: 703-358-2205

### Federal Contacts for Additional Information

Park Service; Advisory Council on Historic Preservation

1849 C Street NW

Washington, DC 20240

Phone: (202) 208-6843

### State Contacts for Additional Information

Office of Historic Preservation, Ept. Of Parks & Recreation 916-653-6624

### **Indian Religious Sites**

#### Government Records Searched in This Report

Indian Reservations:

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Source: USGS

Phone: 888-275-8747

Date of Government Version: 12/31/2005

### Federal Contacts for Additional Information

Department of the Interior- Bureau of Indian Affairs

Office of Public Affairs

1849 C Street, NW

Washington, DC 20240-0001

Office: 202-208-3711

Fax: 202-501-1516

National Association of Tribal Historic Preservation Officers

1411 K Street NW, Suite 700

Washington, DC 20005

Phone: 202-628-8476

Fax: 202-628-2241

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

### State Contacts for Additional Information

A listing of local Tribal Leaders and Bureau of Indian Affairs Representatives can be found at:  
<http://www.doi.gov/bia/areas/agency.html>

Phoenix Area Office, Bureau of Indian Affairs  
One North First Street P.O. Box 10  
Phoenix, AZ 85001  
602-379-6600

Sacramento Area Office, Bureau of Indian Affairs  
2800 Cottage Way  
Sacramento, CA 95825  
916-979-2600

Cultural Division, Yuork Tribe  
1034 6th Street  
Eureka, CA 95501

### **Scenic Trails**

### State Contacts for Additional Information

Pacific Crest Trail Association  
5325 Elkhorn Boulevard, #256  
Sacramento, California 95842  
916-349-2109

## **FLOOD PLAIN, WETLANDS AND COASTAL ZONE**

### **Flood Plain Management**

#### Government Records Searched in This Report

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts Special Flood Hazard Areas (1%) and 0.2% Annual Chance of Flood Hazard as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.

Source: FEMA

Phone: 877-336-2627

Date of Government Version: 2015, 2003

### Federal Contacts for Additional Information

Federal Emergency Management Agency 877-3362-627

### State Contacts for Additional Information

Office of Emergency Services 916-262-1843

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

### **Wetlands Protection**

#### Government Records Searched in This Report

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005, 2010, and 2015 from the U.S. Fish and Wildlife Service.

Source: U.S. Fish and Wildlife Service.

Phone: 608-238-9333

Date of Government Version: 05/28/2015

State Wetlands Data: Wetland Inventory

Source: Department of Fish and Wildlife

Telephone: 916-445-0411

#### Federal Contacts for Additional Information

Fish & Wildlife Service 813-570-5412

#### State Contacts for Additional Information

Department of Fish and Wildlife 916-653-7667

### **Coastal Zone Management**

#### Government Records Searched in This Report

CAMA Management Areas

Dept. of Env., Health & Natural Resources

919-733-2293

#### Federal Contacts for Additional Information

Office of Ocean and Coastal Resource Management

N/ORM, SSMC4

1305 East-West Highway

Silver Spring, Maryland 20910

301-713-3102

#### State Contacts for Additional Information

California Coastal Commission 415-904-5200

#### Government Records Searched in This Report

CA Coastline Information

Department of Fish and Game

831-649-7143

### **FCC & FAA SITES MAP**

For NEPA actions that come under the authority of the FCC, the FCC requires evaluation of Antenna towers and/or supporting structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods, as defined by the applicable zoning law.

#### Government Records Searched in This Report

##### **Cellular**

Federal Communications Commission

445 12th Street, SW

Washington, DC 20554

888-225-5322

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

### **Antenna Structure Registration**

Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554  
888-225-5322

### **AM Antenna**

Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554  
888-225-5322

### **FM Antenna**

Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554  
888-225-5322

### **FAA Digital Obstacle File**

Federal Aviation Administration (FAA)  
1305 East-West Highway, Station 5631  
Silver Spring, MD 20910-3281  
Telephone: 301-713-2817

Describes known obstacles of interest to aviation users in the US. Used by the Federal Aviation Administration (FAA) and the National Oceanic and Atmospheric Administration to manage the National Airspace System.

### **Airport Landing Facilities**

Federal Aviation Administration  
Telephone (800) 457-6656  
Private and public use landing facilities.

### **Electric Power Transmission Line Data**

PennWell Corporation

This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

### **Excessive Radio Frequency Emission**

For NEPA actions that come under the authority of the FCC, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the determination of whether the particular facility, operation or transmitter would cause human exposure to levels of radio frequency in excess of certain limits.

### Federal Contacts for Additional Information

Office of Engineering and Technology  
Federal Communications Commission  
445 12th Street SW  
Washington, DC 20554  
Phone: 202-418-2470

## KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

### OTHER CONTACT SOURCES

#### **NEPA Single Point of Contact**

State Contacts for Additional Information  
Grants Coordination  
State Clearinghouse  
P.O. Box 3044  
Room 222  
Sacramento, CA 95812-3044  
916-445-0613

### STREET AND ADDRESS INFORMATION

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**ATTACHMENT B**

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**NEPA ASSIST TOOL**

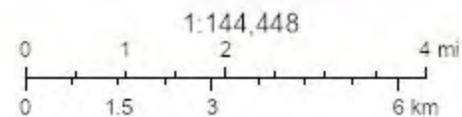
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# Distance to Nearest Airport



August 9, 2023

-  Search Result (point)
-  Airport Points



California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA.

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# ATTACHMENT C

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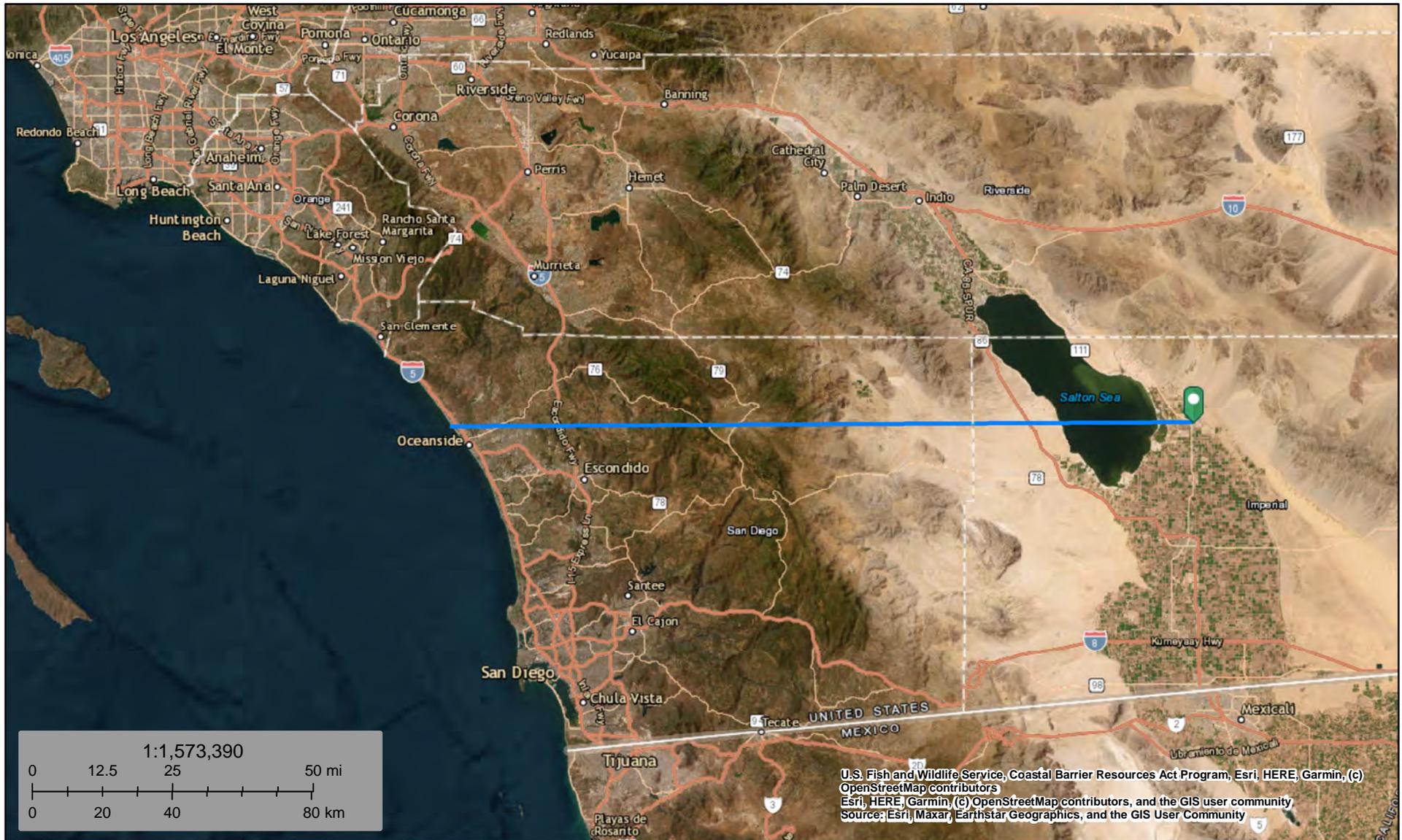
## USFW COASTAL BARRIER RESOURCES

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# U.S. Fish and Wildlife Service Coastal Barrier Resources System

## Coastal Barrier Resource Map



August 9, 2023

### CBRS Units

- Otherwise Protected Area
- System Unit

This map is for general reference only. The Coastal Barrier Resources System (CBRS) boundaries depicted on this map are representations of the controlling CBRS boundaries, which are shown on the official maps, accessible at <https://www.fws.gov/library/collections/official-coastal-barrier-resources-system-maps>. All CBRS related data should be used in accordance with the layer metadata found on the CBRS Mapper website.

The CBRS Buffer Zone represents the area immediately adjacent to the CBRS boundary where users are advised to contact the Service for an official determination (<https://www.fws.gov/service/coastal-barrier-resources-system-property-documentation>) as to whether the property or project site is located "in" or "out" of the CBRS.

CBRS Units normally extend seaward out to the 20- or 30-foot bathymetric contour (depending on the location of the unit). The true seaward

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**ATTACHMENT D**

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**FEMA FIRM**

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**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations Contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

**Coastal Base Flood Elevations** shown on this map apply only landward of 0.0' NAVD 88. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations shown in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The horizontal datum was NAD 83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. Base flood elevations shown on this FIRM may be converted to the Imperial County datum, in NAVD88, by adding 1000 feet. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services  
NOAA, NINGS12  
National Geodetic Survey  
SSMC-3 #9202  
1315 East-West Highway  
Silver Springs, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

**Base map** information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1992 or later.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, an accompanying Flood Insurance Study Report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.

**LEGEND**

**SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No base flood elevations determined.
- ZONE AE** Base flood elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently de-certified. Zone AR indicates that the former flood control system is being requested to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no base flood elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

**FLOODWAY AREAS IN ZONE AE**

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
- Base Flood Elevation line and value; elevation in feet\* (EL 987)
- Base Flood Elevation value where uniform within zone; elevation in feet\*

\*Referenced to the North American Vertical Datum of 1988

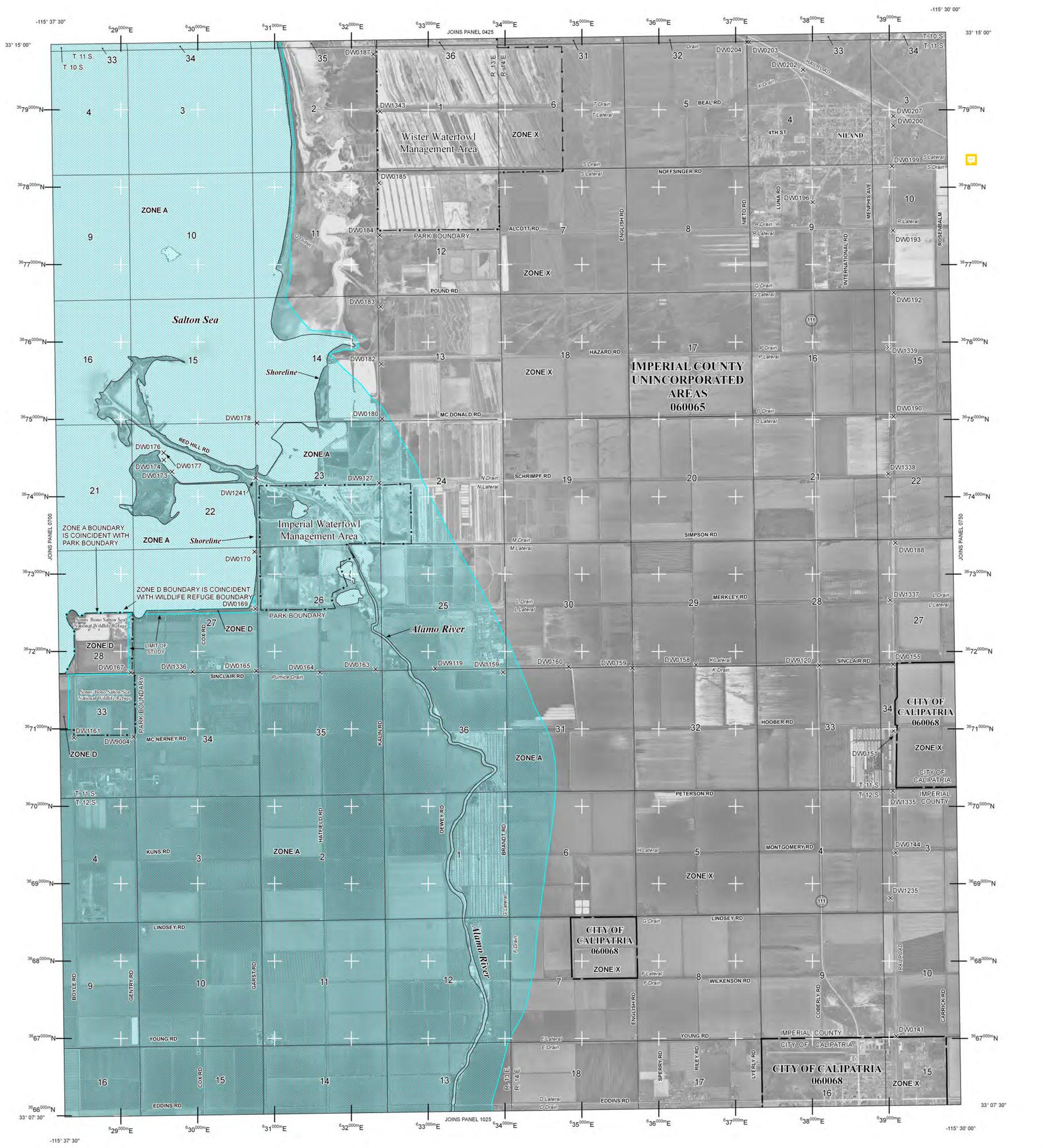
- (A) - (A) Cross section line
- - - - - 23 - - - - - Transsect line
- 97° 07' 30", 32° 22' 30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 37° 00' 00" N 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT 5000-foot grid ticks: California State Plane coordinate system, VI zone (FPSZONE 0406), Lambert Conformal Conic
- DX5510 X Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORY  
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP  
September 26, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.  
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-639-6620.



**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0725C**

**FIRM**  
FLOOD INSURANCE RATE MAP  
IMPERIAL COUNTY,  
CALIFORNIA  
AND INCORPORATED AREAS

**PANEL 725 OF 2300**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**

COMMUNITY	NUMBER	PANEL SUFFIX
IMPERIAL COUNTY, UNINCORPORATED AREAS	060065	0725 C
CALIPATRIA, CITY OF	060068	0725 C

Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject.

**MAP NUMBER**  
06025C0725C

**EFFECTIVE DATE**  
SEPTEMBER 26, 2008

Federal Emergency Management Agency

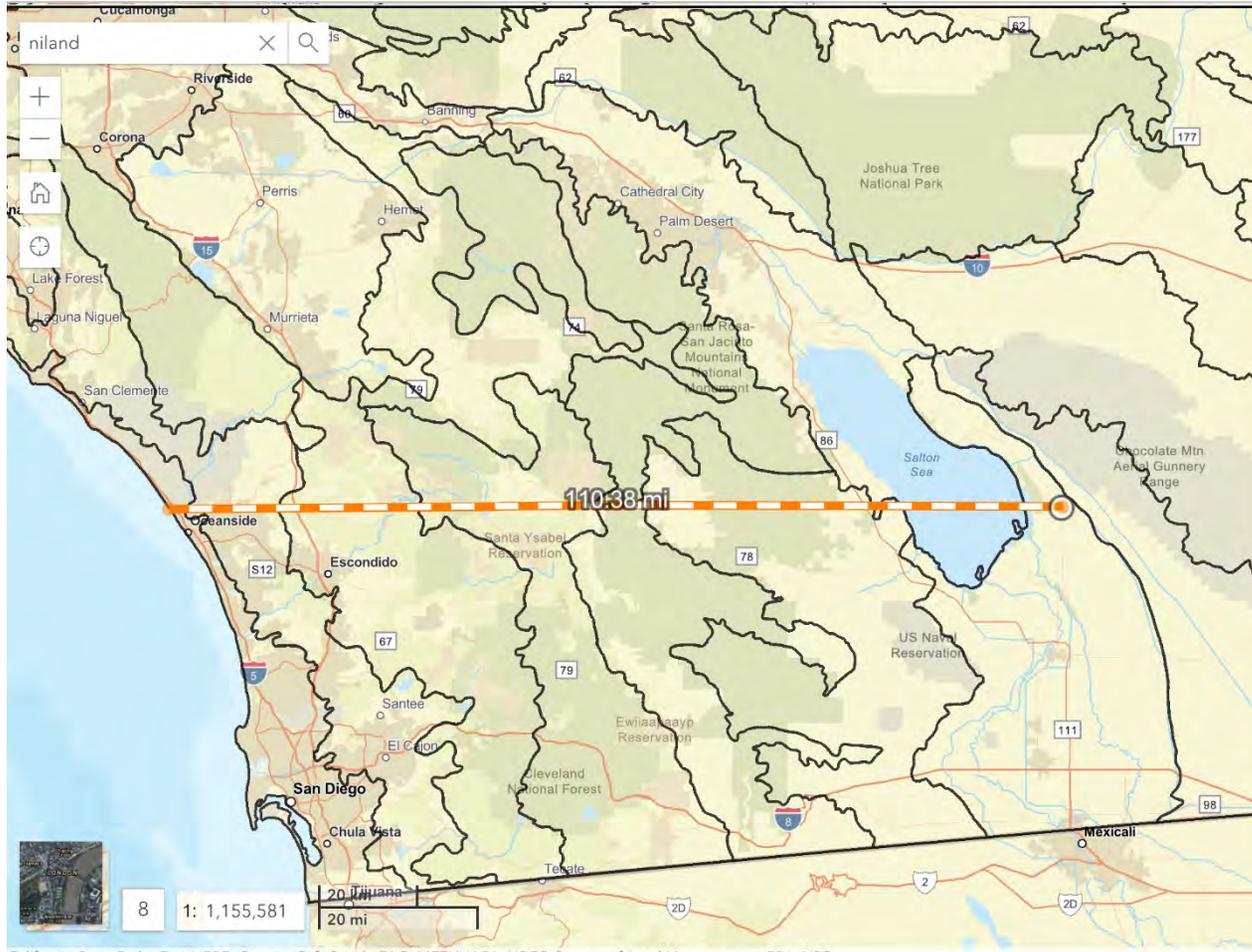
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# ATTACHMENT E

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CALIFORNIA DEPARTMENT FISH  
AND WILDLIFE BIOS

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Measurement

Measurement Tool



Unit  
Imperial

Distance  
110.38 mi

New measurement

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# ATTACHMENT F

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ENVIROSTOR AND GEOTRACKER

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Property Owner Sampling

Confined Animal Sites

Other Sites

Project Sites

Non-Case Information Sites

Sampling Points - Public

Field Points

AGLand Domestic Wells

SIGNIFIES A CLOSED SITE

Tools

Measure a Distance

Site Quick Search

Right-click or perform a long left-click on the map to access additional location specific tools

Map Coverages

Geology and Hydrogeology

California Watersheds

Geologic Units

DWR Groundwater Basins - [INFO](#)

Local and State Coverages

Disadvantaged Communities

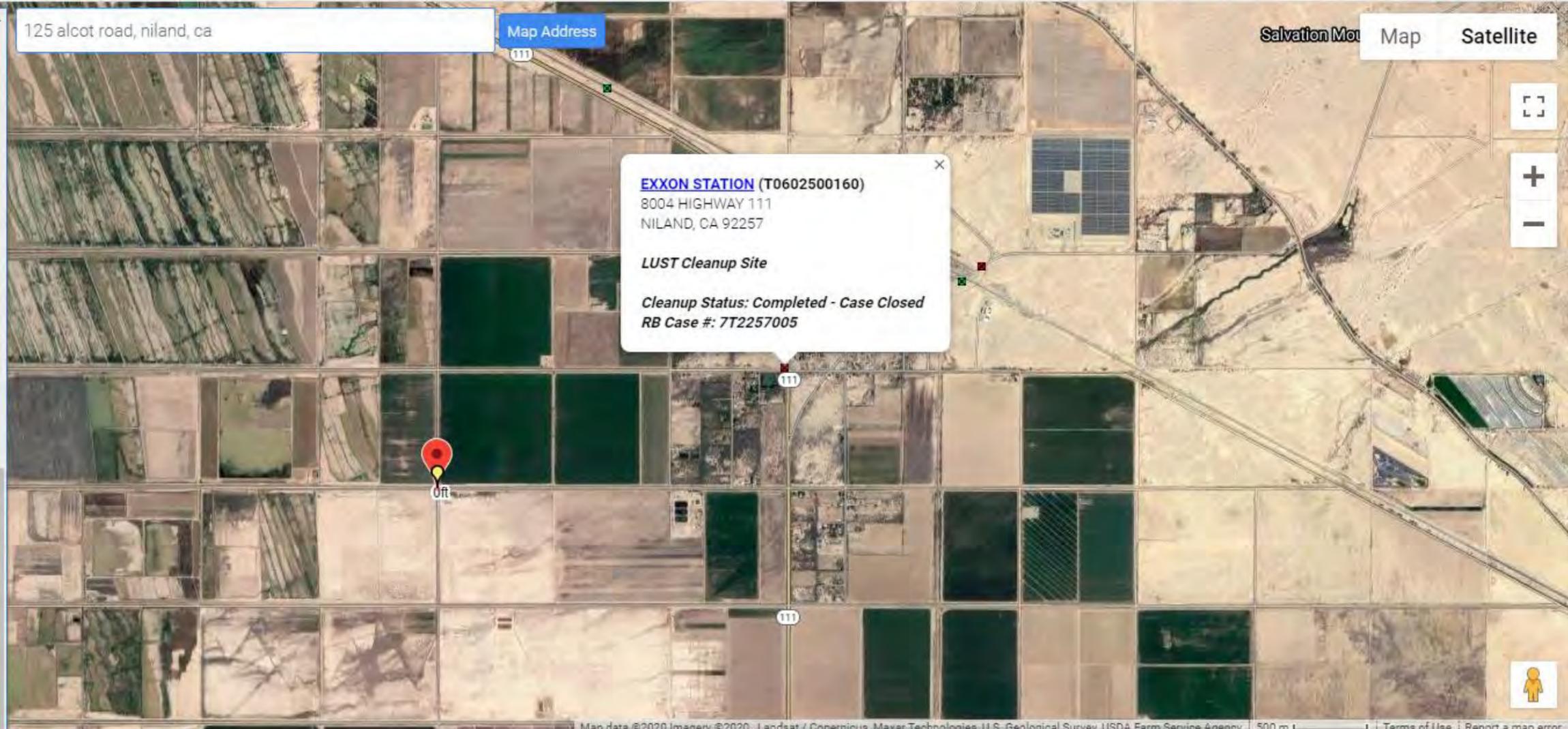
Counties

Regional Board Boundaries

Department of Water Resources Regions

Public Water Systems

Oil / Gas - [INFO](#)



SITES CURRENTLY VISIBLE ON MAP

7 SITES LISTED

[EXPORT THIS LIST TO EXCEL](#)

SITE NAME	GLOBAL ID	FAC ID	STATUS	ADDRESS	CITY
<input checked="" type="checkbox"/> BLACK GOLD SERVICE STATION	T0602500158		COMPLETED - CASE CLOSED	8131 HIGHWAY 111	NILAND
<input checked="" type="checkbox"/> CALIPATRIA UNIFIED SCHOOL DIST	T0602500049		COMPLETED - CASE CLOSED	651 WEST MAIN STREET	CALIPATRIA
<input checked="" type="checkbox"/> CAMPBELL (ABANDONED)	T0602500157		COMPLETED - CASE CLOSED	8132 HIGHWAY 111	NILAND
<input checked="" type="checkbox"/> CHOCOLATE MOUNTAIN NWR - CHOCOLATE MOUNTAIN NAVAL WEAPONS STATION - SITES	DOD100091300		COMPLETED - CASE CLOSED		NILAND
<input checked="" type="checkbox"/> EXXON STATION	T0602500160		COMPLETED - CASE CLOSED	8004 HIGHWAY 111	NILAND
<input checked="" type="checkbox"/> UNION PACIFIC RAILROAD- NILAND	SL0607160795		COMPLETED - CASE CLOSED	EAST OF HWY 111 & ADJACENT TO MAIN ST	NILAND
<input checked="" type="checkbox"/> UNION PACIFIC RAILROAD- WISTER	SL0607122899		COMPLETED - CASE CLOSED	652 NORTHWEST OF NILAND	NILAND

# ATTACHMENT G

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INFORMATION FOR PLANNING  
AND CONSULTATION (IP<sub>d</sub>C)

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# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

### Imperial County, California



## Local office

Carlsbad Fish And Wildlife Office

☎ (760) 431-9440

📠 (760) 431-5901

2177 Salk Avenue - Suite 250

2777 Sunk Avenue Suite 200  
Carlsbad, CA 92008-7385

NOT FOR CONSULTATION

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries<sup>2</sup>).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

- 
1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Birds

NAME	STATUS
Western Snowy Plover <i>Charadrius nivosus nivosus</i> There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/8035">https://ecos.fws.gov/ecp/species/8035</a>	Threatened
Yuma Ridgway's Rail <i>Rallus obsoletus yumanensis</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/3505">https://ecos.fws.gov/ecp/species/3505</a>	Endangered

## Fishes

NAME	STATUS
Desert Pupfish <i>Cyprinodon macularius</i> Wherever found There is <b>final</b> critical habitat for this species. Your location does not overlap the critical habitat. <a href="https://ecos.fws.gov/ecp/species/7003">https://ecos.fws.gov/ecp/species/7003</a>	Endangered

## Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

## Bald & Golden Eagles

There are no documented cases of eagles being present at this location. However, if you believe eagles may be using your site, please reach out to the local Fish and Wildlife Service office.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds  
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds  
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

**What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?**

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply). To see a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

**What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

## What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the [Eagle Act](#) should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

**The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location.** To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be

present and breeding in your project area.

NAME

BREEDING SEASON

**Black Skimmer** *Rynchops niger*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/5234>

Breeds May 20 to Sep 15

**Clark's Grebe** *Aechmophorus clarkii*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Jun 1 to Aug 31

**Costa's Hummingbird** *Calypte costae*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/9470>

Breeds Jan 15 to Jun 10

**Gila Woodpecker** *Melanerpes uropygialis*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/5960>

Breeds Apr 1 to Aug 31

**Gull-billed Tern** *Gelochelidon nilotica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9501>

Breeds May 1 to Jul 31

**Long-eared Owl** *asio otus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3631>

Breeds Mar 1 to Jul 15

**Marbled Godwit** *Limosa fedoa*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9481>

Breeds elsewhere

**Mountain Plover** *Charadrius montanus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3638>

Breeds elsewhere

Western Grebe *Aechmophorus occidentalis*

Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/6743>

Willet *Tringa semipalmata*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

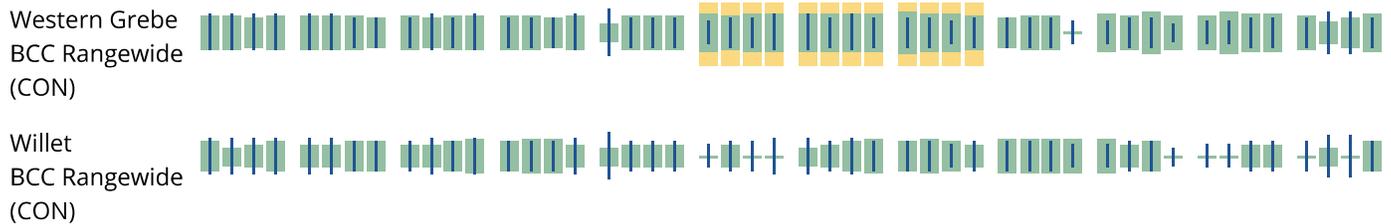
How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

### Breeding Season (■)





**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering or migrating in my area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

### What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

### Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of

presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

## Facilities

### National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

### Fish hatcheries

There are no fish hatcheries at this location.

## Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

[R2UBFx](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

**NOTE:** This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

#### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

#### Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

#### Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should

seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

# ATTACHMENT H

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## CALIFORNIA IMPORTANT FARMLAND 1984-2020 MAP

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California  
Department of Conservation

Search



CA Farmland Conservancy

Conservation Districts

Farmland Mapping

Williamson Act

## California Important Farmland: 1984-2020

Disclaimer

Overview

New Urban and Built-Up

Most Recent

1984

1986

1988

1990

1992

1994

1996

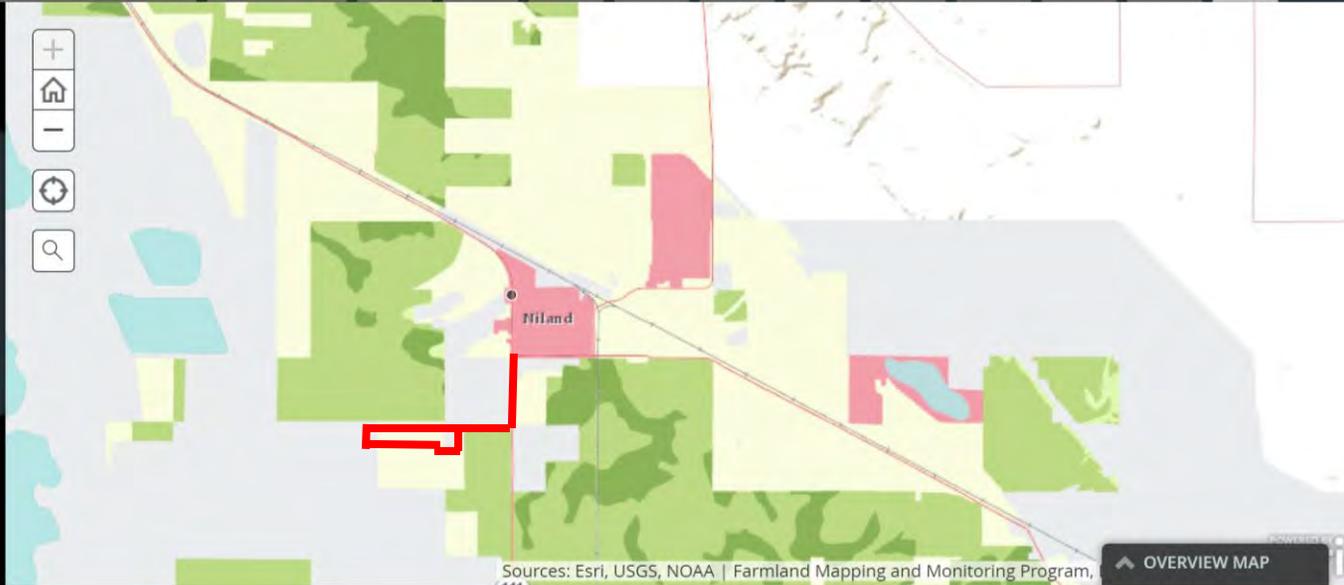
1998

2000

2002



- Farmland of Statewide Importance
- Unique Farmland
- Grazing Land
- Farmland of Local Importance
- Farmland of Local Potential
- Other Land
- Confined Animal Agriculture
- Nonagricultural or Natural Vegetation
- Vacant or Disturbed Land
- Rural Residential Land



Sources: Esri, USGS, NOAA | Farmland Mapping and Monitoring Program,

OVERVIEW MAP

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[Contact Us](#)

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# ATTACHMENT I

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## MAP OF REGION 9 SOLE SOURCE AQUIFERS IN CALIFORNIA

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Source: United States Environmental Protection Agency/Google Earth 2016.

## MAP OF SOLE SOURCE AQUIFERS RELATIVE TO PROJECT SITE

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# ATTACHMENT J

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## CALIFORNIA WILD AND SCENIC RIVER SYSTEM AND MANAGEMENT AGENCIES

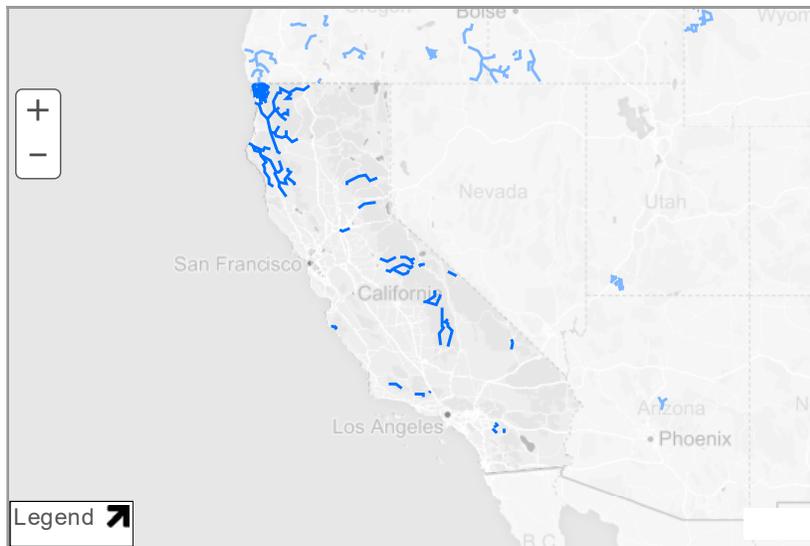
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HOME | NATIONAL SYSTEM | MANAGEMENT | RESOURCES | PUBLICATIONS | CONTACT US | 50 YEARS

### CALIFORNIA

California has approximately 189,454 miles of river, of which 1,999.6 miles are designated as wild & scenic—1% of the state's river miles.



Seen as barren by the first explorers to today's first-time visitors, the rivers of the high desert simply hide their treasures well.

+ View larger map

- Amargosa River
- American River (Lower)
- American River (North Fork)
- Bautista Creek
- Big Sur River
- Black Butte River
- Cottonwood Creek
- Eel River
- Feather River
- Fuller Mill Creek
- Kern River
- Kings River
- Klamath River
- Merced River
- Owens River Headwaters
- Palm Canyon Creek
- Piru Creek
- San Jacinto River (North Fork)
- Sespe Creek

Sisquoc River  
Smith River  
Trinity River  
Tuolumne River

[NATIONWIDE RIVERS INVENTORY](#) | [CONTACT US](#) | [PRIVACY NOTICE](#) | [Q & A SEARCH ENGINE](#) | [SITE MAP](#)



**Designated Rivers**

[About WSR Act](#)  
[State Listings](#)  
[Profile Pages](#)

**National System**

[WSR Table](#)  
[Study Rivers](#)  
[Stewardship](#)  
[WSR Act Legislation](#)

**River Management**

[Council](#)  
[Agencies](#)  
[Management Plans](#)  
[GIS Mapping](#)

**Resources**

[Q & A Search](#)  
[Bibliography](#)  
[Publications](#)  
[GIS Mapping](#)  
[Logo & Sign Standards](#)  
[Display](#)

**Appendix E – Stormwater Pollution Prevention Plan (SWPPP)**

# Preliminary

WASTE DISCHARGE IDENTIFICATION (WDID) NUMBER:

## STORMWATER POLLUTION PREVENTION PLAN

for

542.089 Niland - WWTP and Collection System Improvements

RISK LEVEL: 2

CALTRANS ENCROACHMENT PERMIT NUMBER FOR LOCAL AGENCY / PRIVATE  
ENTITY:

CALTRANS ENCROACHMENT PERMIT NUMBER FOR CONTRACTOR:

Prepared for:

County of Imperial  
940 E Main Street  
El Centro, CA 92243

Submitted by:

Project Site Address

125 West Alcott Road, Niland, CA 92257

Contractor's Water Pollution Control (WPC) Manager/Qualified SWPPP Developer(OSD)

Contractor's Alternate Water Pollution Control (WPC) Manager/Qualified SWPPP  
Developer(OSD)

Contractor's Qualified SWPPP Developer (OSD) (if SWPPP not developed by WPC Manager)

Jack Holt  
760-337-3883

Contractor's Qualified SWPPP Practitioner (OSP) (if different from WPC Manager)

SWPPP Developed by:

The Holt Group, Inc  
1601 North Imperial Avenue  
El Centro, CA 92243  
760-337-3883  
Jack Holt - Project Engineer

SWPPP Date

9/21/2023



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- 100.2 Contractor and QSD SWPPP Certification
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  - 100.3.1 SWPPP Amendments Certification and Approval
  - 100.3.2 Amendment Log
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Appendix N .....CEM-2052 Stormwater Sample Field Test Report Form  
Appendix O .....CEM-2062 Numeric Action Level Exceedance Report Form  
Appendix P .....CEM-2063 Numeric Effluent Limitation Violation Report – ATS Discharges Form

**SWPPP Files**

File Category 20.01 .....Stormwater Pollution Prevention Plan (SWPPP)  
File Category 20.02 .....Stormwater Pollution Prevention Plan Amendments  
File Category 20.03 .....Water Pollution Control Schedule Updates  
File Category 20.05 .....Notice of Intent

File Category 20.06	.....Legally Responsible Person Authorization of Approved Signatory
File Category 20.10	.....Correspondence
File Category 20.21	.....Subcontractor Contact Information and Notification Letters
File Category 20.22	.....Material Suppliers Contact Information and Notification Letters
File Category 20.23	.....Contractor Personnel Training Documentation
File Category 20.31	.....Contractor Stormwater Site Inspection Reports
File Category 20.32	.....Caltrans Stormwater Site Inspection Reports
File Category 20.33	.....Site Visual Monitoring Inspection Reports
File Category 20.34	.....Best Management Practices Monthly Status Reports
File Category 20.35	.....Corrective Actions Summary
File Category 20.40	.....Weather Monitoring Logs
File Category 20.45	.....Rain Event Action Plans
File Category 20.46	.....Rain/Storm Event Sampling and Analysis Plan
File Category 20.50	.....Non-Stormwater Discharge Sampling and Test Results
File Category 20.51	.....Non-Visible Pollutant Sampling and Test Results
File Category 20.52	.....Turbidity, pH and SSC Sampling and Test Results
File Category 20.53	.....Required Regional Water Board Monitoring Sampling and Test Results
File Category 20.54	.....ATS Monitoring Sampling and Test Results
File Category 20.55	.....Field Testing Equipment Maintenance and Calibration Records
File Category 20.61	.....Notice of Discharge Reports
File Category 20.62	.....Numeric Action Level Exceedance Reports
File Category 20.63	.....Numeric Effluent Limitation Violation Reports
File Category 20.70	.....Annual Certification of Compliance
File Category 20.80	.....Stormwater Annual Reports
File Category 20.90	.....Notice of Termination

# SECTION 100

## SWPPP Certifications and Approval

### ***100.1 Legally Responsible Person Certification and Caltrans Approval***

This SWPPP complies with the applicable requirements of the Construction General Permit (CAS000002, Order No. 2009-009-DWQ as amended by Order 2010-0014-DWQ and 2012-006-DWQ) issued by the State Water Resources Control Board. This SWPPP was developed pursuant to the contract Special Provisions, Caltrans Standard Specifications and the Caltrans Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual. The Contractor and Local Agency are responsible and liable at all times for compliance with applicable requirements of the Construction General Permit (CAS000002, Order No. 2009-009-DWQ as amended by Order 2010-0014-DWQ and 2012-006-DWQ) for which compliance is ultimately determined by the Regional Water Quality Control Board (RWQCB), the State Water Resources Control Board (SWRCB), and/or the U.S. Environmental Protection Agency (USEPA). Include copies of the SWRCB-issued WDID Number and NOI form as Attachment B.

*"For Local Agency Use Only"*

**Local Agency Legally Responsible Person Certification of the  
Stormwater Pollution Prevention Plan**

Project Name: 542.089 Niland - WWTP and Collection System Improvements

Caltrans Encroachment Permit  
Number issued to Local Agency:

Caltrans Encroachment Permit  
Number issued to Contractor:

Local Agency Name: County of Imperial

“I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

\_\_\_\_\_  
Legally Responsible Person’s Signature

\_\_\_\_\_  
Date

\_\_\_\_\_

\_\_\_\_\_

*Stormwater Pollution Prevention Plan (SWPPP)*  
**542.089 Niland - WWTP and Collection System Improvements**

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Legally Responsible Person's Name

Telephone Number

---

Legally Responsible Person's Title

*For Use by Caltrans Only*

**CALTRANS OVERSIGHT ENGINEER'S CONCURRENCE OF SWPPP**

I, and/or personnel acting under my direction and supervision, have reviewed this SWPPP and concur with the Legally Responsible Person's findings that it meets the requirements set forth in the contract Special Provisions, Caltrans Standard Specifications, and the Caltrans SWPPP/WPCP Preparation Manual.

---

Caltrans Oversight Engineer's Signature

Date of SWPPP Concurrence

---

Caltrans Oversight Engineer's Name

Telephone Number

## **100.2 Contractor and QSD SWPPP Certification**

### **Contractor's Certification of SWPPP**

Project Name: 542.089 Niland - WWTP and Collection System Improvements

Caltrans Encroachment Permit  
Number issued to Local Agency /  
Private Entity:

Caltrans Encroachment Permit  
Number issued to Contractor:

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, to the best of my knowledge and belief, is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

---

Contractor's Signature

Date

*Stormwater Pollution Prevention Plan (SWPPP)*  
**542.089 Niland - WWTP and Collection System Improvements**

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Contractor's Name

Telephone Number

Project Manager

---

Contractor's Title

**QSD's Certification of SWPPP**

Project Name: 542.089 Niland - WWTP and Collection System Improvements

Caltrans Encroachment Permit  
Number issued to Local Agency /  
Private Entity:

Caltrans Encroachment Permit  
Number issued to Contractor:

"I certify under penalty of law that I relied upon available project and site information, current watershed and basin plan maps and available soil data to develop this SWPPP so that Best Management Practices (BMPs) were designed and placed in accordance with industry standards and best professional judgment to reduce pollutants from leaving the job site. All other sources relied upon to gain information for this project's SWPPP were appropriate and dependable, based on my best professional judgment. To the best of my knowledge and belief, the information submitted in this SWPPP is in compliance with all requirements of the Construction General Permit (CAS000002, Order No. 2009-009-DWQ as amended by Order 2010-0014-DWQ and 2012-006-DWQ). I certify that the 'required text' portions of this document are unaltered from the original required text and content."

---

QSD's Signature

---

Date

Jack Holt

760-337-3883

---

QSD's Name

---

QSD's Telephone Number

Project Engineer

---

QSD's Title

## **100.3 Amendments**

### **100.3.1 SWPPP Amendments Certification and Approval**

This SWPPP is meant to be a "living document," therefore, updated and additional information is expected to be added to the SWPPP as the project progresses, including information regarding changes in the field that do not require an amendment, such as the following:

- adding BMPs as required by a *Rain Event Action Plan*

*Stormwater Pollution Prevention Plan (SWPPP)*

**542.089 Niland - WWTP and Collection System Improvements**

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- increasing or decreasing the quantity of BMPs in the field that are already part of the erosion control plan in the SWPPP,
- moving BMPs shown on the WPCDs to protect water quality during different phases of construction,
- updating WPCDs to reflect actual site conditions, and
- maintenance and repairs to BMPs.

This SWPPP shall be amended when:

- a change in construction or operations affects the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4);
- a contract change order includes additional water pollution control practices, not already specified in the approved SWPPP;
- deemed necessary by the RE;
- SWPPP objectives to reduce or eliminate pollutants in stormwater discharges have not been achieved; or
- a CGP violation has occurred; when the RWQCB determines that a CGP violation has occurred, the SWPPP shall be amended and corrective actions implemented within 14 calendar days after notification by the RWQCB.

The following information shall be included in each amendment:

- who requested the amendment;
- the location of proposed change;
- the reason for the change;
- the original BMP proposed, if any;
- the new BMP proposed; and
- any existing implemented BMP(s).

Approved and certified amendments shall be inserted into the appropriate section or attachment of the SWPPP. All SWPPP amendments prepared by the WPC Manager and approved by the Contractor shall be accepted and certified by the LRP or Approved Signatory. A blank copy of the CEM-2008 SWPPP/WPCP Amendment Certification and Approval form is in Appendix A. For approved amendments, the signed SWPPP Amendment Certification and Approval form shall be attached to the SWPPP amendment.

A copy of each approved and certified amendment shall be inserted into Attachment AA. All SWPPP amendments shall be listed in the SWPPP Amendment Log, available in Appendix B. The Amendment Log shall be kept in SWPPP File Category 20.02 and a copy shall be inserted into Attachment AA.

The SWPPP will be completely revised if either the number of amendments or the amount of information contained in the amendments makes implementation of the SWPPP confusing, as determined by the RE, or the Contractor requests to revise the SWPPP based on planned changes in activities that would require a major SWPPP amendment.

### **100.3.2 Amendment Log**

*Stormwater Pollution Prevention Plan (SWPPP)*

**542.089 Niland - WWTP and Collection System Improvements**

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All approved and certified SWPPP amendments shall be shown on the SWPPP Amendment Log. A blank Amendment Log is available in Appendix B. The SWPPP Amendment Log shall include the following information:

- amendment number;
- amendment date;
- brief description of the amendment;
- name of individual requesting amendment; and
- approval date.

All SWPPP amendment(s) prepared and approved as discussed in Section 100.3.1 shall be documented in the Amendment Log and kept in SWPPP File Category 20.02: Stormwater Pollution Prevention Plan Amendments. A copy of the Amendment Log shall also be inserted into Attachment AA.

### ***100.4 Annual Compliance and Approval***

By July 15 of each year, the Local Agency / Private Entity shall submit an Annual Certification of Compliance to the Caltrans Oversight RE stating that the project is in compliance with the terms and conditions of the Permits and the SWPPP. By August 1 of each year, the Caltrans Oversight Engineer will review and accept the Annual Certification of Compliance. The Caltrans Oversight Engineer will document acceptance of the Annual Certificate of Compliance by completing and signing the Acceptance of Annual Certification of Compliance. A blank copy of the CEM-2070 SWPPP/WPCP Annual Certification of Compliance form is included in Appendix C. Completed Annual Certification of Compliance forms will be filed in SWPPP File Category 20.70: Annual Certification of Compliance.

# SECTION 200

## OBJECTIVES

This SWPPP has five (5) main objectives, which are listed below.

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion, and all other activities associated with construction activity, are controlled.
2. Where not otherwise required to be under a California Regional Water Quality Control Board (RWQCB) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated.
3. Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from the construction activity to the best available technology (BAT) / best conventional technology (BCT) standard.
4. Calculations and design details for site run-on, as well as BMP controls, are complete and correct.
5. Stabilization BMPs designed to eliminate or reduce pollutants after construction is complete have been installed

This SWPPP was developed to conform to the required elements of the CGP (CAS000002, Order No. 2009-0009-DWQ as amended by Order 2010-0014-DWQ and 2012-006-DWQ) issued by the SWRCB.

This SWPPP is designed to be a useful document for those who must implement the SWPPP on a daily basis in the field. Most of the information necessary for the daily implementation of the SWPPP is contained in Attachment BB: Water Pollution Control Drawings, Attachment CC: Water Pollution Control Best Management Practices List, and Attachment DD: Water Pollution Control Schedule.

This SWPPP is also a “living document” because updated and additional information is added to the SWPPP file categories as the project progresses, including:

- SWPPP Amendments;
- Subcontractor and Material Supplier Information;
- Contractor Personnel Training Documentation;
- Site Inspection Reports;
- Monthly Status Reports;
- Rain Event Action Plans;
- Sampling and Analysis Results; and
- Notice of Discharge Reports.

The SWPPP shall be readily available on site for the duration of the project.

# SECTION 300

## PROJECT AND CONTRACTOR INFORMATION

### 300.1 Project Description

THE NILAND WASTEWATER TREATMENT PLANT (WWTP) HAS A LONG HISTORY OF EFFLUENT DISCHARGE VIOLATIONS DATING BACK TO 2003. THE MAJORITY OF THE VIOLATIONS WERE THE RESULT OF NPDES DISCHARGE PERMIT VIOLATIONS FOR COPPER AND THALLIUM. A 2016 PRELIMINARY ENGINEERING REPORT (PER) PREPARED BY THE HOLT GROUP, INC. REVIEWED THE NILAND WWTP EFFLUENT VIOLATIONS AND ALTERNATIVE IMPROVEMENTS TO ADDRESS THE VIOLATIONS. THE ALTERNATIVE SELECTED TO ADDRESS THE DISCHARGE VIOLATIONS WAS TO CONSTRUCT EVAPORATION PONDS FOR THE ULTIMATE DISPOSAL OF THE TREATED EFFLUENT WASTEWATER. THE EVAPORATION PONDS WILL ALLOW FOR THE ELIMINATION OF THE POINT DISCHARGE TO THE IMPERIAL IRRIGATION DISTRICT "R" DRAIN AND THE NPDES DISCHARGE PERMIT WASTEWATER EFFLUENT REQUIREMENTS. A WASTE DISCHARGE REQUIREMENT (WDR) PERMIT WILL BE REQUIRED FOR THE NILAND WWTP AND EVAPORATION POND SYSTEM IN LIEU OF THE NPDES DISCHARGE PERMIT. IN ADDITION TO THE CONSTRUCTION OF EVAPORATION PONDS, IMPROVEMENTS TO THE GRAVITY SANITARY SEWER PIPELINE COLLECTION SYSTEM UPSTREAM OF THE WWTP ARE TO BE ACCOMPLISHED. THE IMPROVEMENTS TO THE GRAVITY SANITARY SEWER PIPELINE COLLECTION SYSTEM WILL LIMIT INFILTRATION (INCLUDING COPPER AND THALLIUM) INTO THE COLLECTION SYSTEM AND WWTP. THE EXISTING WWTP WILL REMAIN OPERATIONAL TO TREAT THE INFLUENT RAW WASTEWATER TO A SECONDARY EFFLUENT CONDITION PRIOR TO DIRECTING THE SECONDARY EFFLUENT TO THE EVAPORATION PONDS. CAPITAL IMPROVEMENTS TO THE EXISTING WWTP COMPONENTS (RESULTANT FROM AGED TREATMENT PLANT INFRASTRUCTURE) WILL ALSO BE ACCOMPLISHED TO INSURE THE EXISTING WASTEWATER TREATMENT PLANT COMPONENTS ARE SATISFACTORILY FUNCTIONING.

THE THREE (3) PRIMARY NILAND WWTP AND COLLECTION SYSTEM PROJECT COMPONENTS AND MAJOR ITEMS ASSOCIATED WITH EACH COMPONENT CONSIST OF THE FOLLOWING ITEMS:

1. EXISTING WWTP CAPITAL IMPROVEMENTS INCLUDING:

1.1 REPLACEMENT OF FIBERGLASS GRATING AND REPAIR OF MANHOLE COVER AT THE TOP OF THE RAW INFLUENT PUMP STATION WET WELL.

1.2 REPAIR OF HDPE LINER MATERIAL AT THE AERATION PONDS.

1.3 CAPITAL IMPROVEMENTS TO THE CHLORINATION/DE-CHLORINATION STRUCTURE. REPAIR OF CONCRETE SPALLING AND FAILURE AREAS ALONG THE CHLORINATION/DE-CHLORINATION STRUCTURE WALLS. THE CONCRETE FLASHMIXER CONCRETE CEILING IS TO BE REPLACED. SECTIONS OF THE HANDRAIL ARE TO BE REPAIRED AND REPLACED. THE EXISTING EYEWASH STATION IS TO BE REPLACED.

1.4 CAPITAL IMPROVEMENTS AT THE CHEMICAL CONTAINMENT STRUCTURE FACILITY INCLUDE CONCRETE FOUNDATION AND WALL REHABILITATION/REPLACEMENT. THE SODIUM HYPOCHLORITE CHEMICAL TANK AND DUPLEX CHEMICAL PUMPING SYSTEM ARE TO BE REPLACED. THE TWO (2) EXISTING EYEWASH STATIONS ARE TO BE REPLACED. THE SODIUM BISULFITE CHEMICAL SYSTEM PUMPS ARE TO BE REPLACED.

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1.5 THE CHEMICAL RATE OF FLOW CONTROLLERS INSIDE THE WASTEWATER TREATMENT PLANT ARE TO BE REPLACED.

1.6 CAPITAL IMPROVEMENTS AT THE FLOWMETER/SAMPLING VAULT INCLUDE THE INSTALLATION OF HAND RAIL ALONG THE EXTERIOR OF THE SAMPLING VAULT.

1.7 CAPITAL IMPROVEMENTS AT THE GROUND WATER PUMP STATION INCLUDES THE REPLACEMENT OF THE ALUMINUM GRATE/COVER LOCATED AT THE TOP OF THE WET WELL.

1.8 THE EXISTING RESILIENT WEDGE GATE VALVES ALONG THE PIPING WITHIN THE AERATION PONDS AND REMAINING PLANT FACILITY ARE CURRENTLY NON-FUNCTIONAL. THE RESILIENT WEDGE GATE VALVES ARE TO BE REPLACED WITH ECCENTRIC PLUG VALVES.

1.9 THE WWTP ENTRANCE ROAD BRIDGE CROSSING THE IMPERIAL IRRIGATION DISTRICT "R" CANAL IS TO BE REPLACED. THE BRIDGE WILL BE REPLACED BY THE IMPERIAL IRRIGATION DISTRICT.

1.10 A NEW POTABLE WATER TREATMENT PLANT IS TO BE CONSTRUCTED FOR THE WWTP WASH DOWN WATER AND POTABLE WATER USED BY THE LABORATORY BUILDING.

1.11 OTHER MINOR EXISTING WWTP CAPITAL IMPROVEMENTS.

2. CONSTRUCTION OF EVAPORATION PONDS AND EFFLUENT CONVEYANCE SYSTEM INCLUDING:

2.1 INSTALLATION OF AN EFFLUENT PUMP STATION DOWNSTREAM OF THE EXISTING WWTP FLOWMETER/SAMPLING VAULT. THE EFFLUENT PUMP STATION WILL TRANSMIT THE EXISTING WWTP TREATED EFFLUENT TO THE EVAPORATION PONDS.

2.2 INSTALLATION OF 8 INCH DIAMETER GRAVITY AND 6 INCH DIAMETER FORCE MAIN CONVEYANCE PIPING FROM THE EFFLUENT PUMP STATION TO THE EVAPORATION PONDS INCLUDING VALVES, FITTINGS AND APPURTENANCES.

2.3 INSTALLATION OF A STANDPIPE ALONG THE GRAVITY AND FORCE MAIN EFFLUENT CONVEYANCE PIPING. INSTALLATION OF PCC HEADWALLS AT THE PIPING OUTLET POINT TO THE EVAPORATION PONDS.

2.4 CONSTRUCTION OF THREE (3) EVAPORATION PONDS USING THE NATIVE EARTH AT THE PROJECT SITE. EACH EVAPORATION POND BOTTOM SHALL CONSIST OF 10 ACRES. THE TOTAL EVAPORATION POND SITE IS COMPRISED OF 56 ACRES.

2.5 INSTALLATION OF AN HDPE LINER ALONG THE INTERIOR EMBANKMENTS OF THE EVAPORATION PONDS.

2.6 INSTALLATION OF A 6 FOOT HIGH CHAIN LINK FENCE AROUND THE PERIMETER OF THE EVAPORATION POND SITE.

2.7 CONSTRUCTION OF AN ACCESS ROAD EXTENDING FROM THE INTERIOR OF THE EXISTING WWTP TO THE EVAPORATION POND SITE.

2.8 INSTALLATION OF MONITORING WELLS AROUND THE PERIMETER OF THE EVAPORATION PONDS.

3. COLLECTION SYSTEM IMPROVEMENTS

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3.1 REHABILITATE THE EXISTING WASTEWATER COLLECTION SYSTEM 10 INCH GRAVITY PIPELINE ALONG ALCOTT ROAD FROM THE EXISTING WWTP TO HIGHWAY 111 WITH A CURED IN PLACE PIPING (CIPP) METHOD.

3.2 REHABILITATION OF TEN (10) EXISTING SANITARY SEWER MANHOLES ALONG THE GRAVITY SANITARY SEWER OUTFALL PIPELINE.

3.3 REPLACEMENT OF FOUR (4) EXISTING SANITARY SEWER MANHOLES ALONG THE GRAVITY SANITARY SEWER OUTFALL PIPELINE.

3.4 REHABILITATE THE EXISTING 10 INCH SANITARY SEWER PIPELINE BENEATH THE IID “S” LATERAL AND DRAIN AT THE INTERSECTION OF NOFFSINGER ROAD AND HIGHWAY 111 WITH A CURED IN PLACE PIPING (CIPP) METHOD.

3.5 REHABILITATE THE EXISTING 8 INCH SANITARY SEWER PVC PIPELINE SIPHON EXTENDING BENEATH THE IID "R" DRAIN WITH A CURED IN PLACED PIPING (CIPP) METHOD. REPLACE THE 10 INCH VCP PIPELINE SECTIONS IMMEDIATELY UPSTREAM AND DOWNSTREAM OF THE 8 INCH PIPELINE SIPHON WITH NEW 10 INCH SDR 26 PVC SANITARY SEWER PIPELINES.

3.6 OTHER MINOR COLLECTION SYSTEM IMPROVEMENTS.

**300.2 Project Risk Level**

The risk level assessment of the project site was calculated to be Risk Level 2 . This risk level will determine the minimum level of BMPs that will be acceptable based on the project site and the project construction activities. The risk level is the basis for the minimum level of site-specific monitoring and reporting that will be required. The risk level is based on project duration, proximity to impaired receiving waters, and soil conditions. The Risk Level Determination is discussed in Section 500.1.3 and the calculations are included in Attachment C.

**300.3 Construction Sites Estimates**

The following are estimates of the construction site.

- Construction site area 70 acres
- Percentage impervious area before construction 0.7%
- Runoff coefficient before construction 0.40
- Percentage impervious area after construction 0.8%
- Runoff coefficient after construction

Run-on from off-site areas anticipated:  Yes  No

Anticipated stormwater run-on flow rate to the construction site:

Anticipated drainage patterns following the completion of grading activities are shown on the WPCDs from Attachment BB.

**300.4 Vicinity and Site Map**



*Stormwater Pollution Prevention Plan (SWPPP)*  
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Company:

Address:

,

Phone Number:

Emergency Phone Number (24/7):

Email address:

**Alternate WPC Manager**

Name:

Title: **Alternate WPC Manager**

Company:

Address:

,

Phone Number:

Email address:

**Qualified SWPPP Developer (QSD)**

Name: **Jack Holt**

Title: **Qualified SWPPP Developer**

Company: **The Holt Group, Inc**

Address: **1601 North Imperial Avenue  
El Centro, CA 92243**

Phone Number: **760-337-3883**

Email address:

**Resident Engineer**

Name:

Title: **Resident Engineer**

Company: **County of Imperial**

*Stormwater Pollution Prevention Plan (SWPPP)*  
**542.089 Niland - WWTP and Collection System Improvements**

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Address: **940 E Main Street**  
**El Centro, CA 92243**

Phone Number:

Emergency Phone Number (24/7)

Email address:

**Contractor**

Name:

Title: **Contractor**

Company:

Address:

,

Phone Number:

Emergency Phone Number (24/7)

Email address:

**Qualified SWPPP Practitioner (QSP)**

Name:

Title:

Company:

Address:

,

Phone Number:

Emergency Phone Number (24/7)

Email address:

**Erosion and Sediment Control Provider**

Name:

Title:

Company:

*Stormwater Pollution Prevention Plan (SWPPP)*  
**542.089 Niland - WWTP and Collection System Improvements**

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Address:

,

Phone Number:

Emergency Phone Number (24/7)

Email address:

**Stormwater Sampling and Testing Agent**

Name:

Title:

Company:

Address:

,

Phone Number:

Emergency Phone Number (24/7)

Email address:

### ***300.7 List of Subcontractor and Materials Suppliers***

The following subcontractors will be working on this project:

1

SWPPP Responsibility:

Contact information for each subcontractor will be provided in the SWPPP Notification log in SWPPP File Category 20.21: Subcontractor Contact Information and Notification Letters. Contact information shall include subcontractor name, type of work performed, contact name, phone number and emergency telephone number (24/7).

The following materials suppliers will be delivering materials to the project site and must comply with pertinent SWPPP requirements:

1

Contact information for each material supplier will be provided in the SWPPP Notification log in SWPPP File Category 20.22: Material Supplier Contact Information and Notification Letters. Contact information shall include company name, type of material supplied, contact name and phone number.

All subcontractors and material suppliers shall be notified that the project is covered by the

**Stormwater Pollution Prevention Plan (SWPPP)**

**542.089 Niland - WWTP and Collection System Improvements**

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- SWRCB Order No. 2009-0009-DWQ as amended by Order 2010-0014-DWQ and 2012-006-DWQ, NPDES General Permit No. CAS000002, National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, September 02, 2009 (Construction General Permit).

Each subcontractor and material supplier shall also be notified that the project has a SWPPP and the pertinent water pollution control BMPs with which the subcontractor or material supplier must comply. If subcontractors or material suppliers are added during the project, appropriate notification that the project has a SWPPP and the pertinent water pollution control BMPs shall be given to the subcontractor or materials supplier prior to working or supplying materials on the project site.

A SWPPP Notification Letter shall be sent to all subcontractors and material suppliers. A sample notification letter and notification letter log is provided in Appendix D. A copy of SWPPP Notification Letters sent to subcontractors and material suppliers are in SWPPP File Category 20.21: Subcontractor Contact Information and Notification Letters or 20.22 Material Supplier Contact Information and Notification Letters. Notification letter logs and contact information are filed in SWPPP File Category 20.21: Subcontractor Contact Information and Notification Letters and File Category 20.22: Material Supplier Contact Information and Notification Letters.

### **300.8 Training**

The Contractor's WPC Manager is a QSD. The WPC Manager for this project, meets the qualifications and certification requirements of Section VII, Training Qualifications and Certification Requirements, of the CGP based on:

- 

The WPC Manager has received the following training:

- 

The WPC Manager has the following SWPPP development and implementation experience:

- 

The SWPPP for this project was developed by a QSD. The QSD that developed the SWPPP meets the qualifications and certification requirements of Section VII, Training Qualifications and Certification Requirements, of the CGP based on:

- 

The QSD has received the following training.

- 

The QSD has the following SWPPP development experience.

- 

A QSP will be assisting the WPC Manager to ensure that: required BMPs are implemented; non-stormwater and

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stormwater visual observations and sampling and analysis are performed; BMP maintenance is completed; and weekly training is provided. Since September 2, 2011, the QSP for this project, must meet the qualifications and certification requirements of Section VII, Training Qualifications and Certification Requirements, of the CGP based on:

- 

The QSP has received the following training.

- 

The QSP has the following SWPPP implementation experience.

- 

Ongoing, formal training sessions for individuals responsible for SWPPP development and implementation shall be selected from one of the following organizations.

- City of Los Angeles Storm Water Program
- County of Los Angeles Storm Water Program
- State of California RWQCB
- IECA-, ABAG- and/or AGC-sponsored training
- USEPA-sponsored training
- Recognized municipal stakeholder organizations throughout California
- Professional organizations and societies in the building and construction field
- 

Contractor or subcontractor employees responsible for water pollution control BMP installation, maintenance and repair have received the following training.

- 

Contractor and subcontractor employees shall be trained prior to working on the site in the following subjects:

- water pollution control rules and regulations
- implementation and maintenance for:
  - temporary soil stabilization,
  - temporary sediment control,
  - tracking control,
  - wind erosion control,

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- material pollution prevention control,
- waste management, and
- non-stormwater management
- identification and handling of hazardous substances
- potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances

Informal employee training shall include tailgate site meetings to be conducted weekly; tailgate meetings should address the following topics:

- water pollution control BMP deficiencies and corrective actions;
- BMPs that are required for work activities during the week;
- spill prevention and control;
- material delivery, storage, use, and disposal;
- waste management; and
- non-stormwater management procedures.

A summary of formal and informal training of various personnel is shown in Attachment E. A copy of all training certificate(s) (e.g., Caltrans 24-Hour Training Class and CGP Training) for the WPC Manager and the Qualified SWPPP Developer are included in Attachment E.

Training records for project personnel shall be updated by completing the CEM-2023 Stormwater Training Record form, available in Appendix E, and the CEM-2024 Stormwater Training Log - Optional form, available in Appendix F. Records of training, with training certificates attached, when applicable, and the training log will be kept in SWPPP File Category 20.23: Contractor Personnel Training Documentation. Personnel training records, with required documentation attached and an updated training log, shall be submitted to the RE within five (5) days of completion of training.

Training information, consisting of the following items, shall be provided in the Stormwater Annual Report:

- documentation of all training for individuals responsible for all activities associated with compliance with CGP
- documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair, and
- documentation of all training for individuals responsible for overseeing, revising, and amending the SWPPP.
-

# SECTION 400 REFERENCES, OTHER PLANS, PERMITS AND AGREEMENTS

The documents listed below are made a part of this SWPPP by reference.

- Standard Plans and Specifications, dated 2018.
- Contract Plans and Special Provisions for Contract No. , dated , prepared by .
- SWRCB-Order No. 2009-0009-DWQ, Order No. 2009-0009-DWQ as amended by Order 2010-0014-DWQ and 2012-006-DWQ NPDES General Permit No. CAS000002, National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction and Land Disturbance Activities (Construction General Permit), September 2009
- RWQCB Basin Plan: *Water Quality Control Plan for the Colorado River Basin Region*
- *Caltrans Statewide Storm Water Management Plan* (SWMP), dated July 2016
- *Caltrans SWPPP/WPCP Preparation Manual*, dated October 2016
- *Caltrans Construction Site Monitoring Program Guidance Manual*, August 2013
- 

Attachment F includes copies of the Caltrans Statewide Permit, the CGP, and other local, state, and federal plans and permits. A list of the other local, state, and federal plans and permits included in Attachment F is provided below.

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# SECTION 500 DETERMINATION OF CONSTRUCTION SITE BEST MANAGEMENT PRACTICES

## 500.1 Pollutant Sources

### 500.1.1 Inventory of Materials and Activities that May Pollute Stormwater

The following table contains a list of construction activities that have the potential to contribute pollutants, including sediment, to stormwater discharges. All potential pollutants, except sediment, and their locations shall be listed in this section, and, where possible, the locations shall be shown on the WPCDs from Attachment BB. Details for controlling these pollutants using soil stabilization and sediment control BMPs are discussed in Sections 500.3.1 through 500.3.5. Potential non-storm water and waste management-related discharges are further described in Sections 500.4.1 and 500.4.2, respectively.

TABLE 500.1.1 ANTICIPATED CONSTRUCTION SITE ACTIVITIES WITH THE POTENTIAL TO DISCHARGE POLLUTANTS	
<input checked="" type="checkbox"/> Demolition	<input checked="" type="checkbox"/> Pavement Removal (asphalt concrete, concrete) <input type="checkbox"/> Structure Demolition/Removal over or Adjacent to Water <input type="checkbox"/> Building Demolition (Structure, HVAC, insulation) <input type="checkbox"/> Hardscape Demolition (Parking areas, curbs, gutters, sidewalks)
<input checked="" type="checkbox"/> Earthwork	<input checked="" type="checkbox"/> Clearing and Grubbing <input checked="" type="checkbox"/> Grading Activities <input type="checkbox"/> Soil Import and Export <input checked="" type="checkbox"/> Stockpiling <input checked="" type="checkbox"/> Excavation <input type="checkbox"/> Disturbance of Contaminated Soil <input checked="" type="checkbox"/> Dewatering <input type="checkbox"/> Temporary Stream Crossing <input type="checkbox"/> Drainage Construction <input checked="" type="checkbox"/> Dredging <input type="checkbox"/> Pile Driving <input type="checkbox"/> Utilities <input type="checkbox"/> Line Flushing (hydrostatic test water, pipe flushing) <input type="checkbox"/> Landscaping, Planting and Plant Maintenance, Amending of Soil and Mulching <input type="checkbox"/> Material and Equipment Use over Water
<input checked="" type="checkbox"/> Masonry, Concrete, Asphalt Work	<input checked="" type="checkbox"/> Saw Cutting (cement and brick dust, saw cut slurries) <input type="checkbox"/> Paving and Grinding

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<b>TABLE 500.1.1</b> <b>ANTICIPATED CONSTRUCTION SITE ACTIVITIES WITH THE POTENTIAL TO DISCHARGE POLLUTANTS</b>	
	<input checked="" type="checkbox"/> Concrete Placement (colored chalks) <input checked="" type="checkbox"/> Concrete Curing (curing and glazing compounds) <input checked="" type="checkbox"/> Concrete Finishing (surface cleaners) <input type="checkbox"/> Concrete Waste Management
<input type="checkbox"/> Building Construction	<input type="checkbox"/> Paint Preparation, Painting, Stenciling, and Etching <input type="checkbox"/> Material Use <input type="checkbox"/> Material Delivery and Storage <input type="checkbox"/> Adhesives (glues, resins, epoxy synthetics, caulks, sealers, putty, sealing agents and coal tars) <input type="checkbox"/> Cleaning, Polishing (metal, ceramic, tile), and Sandblasting Operations <input type="checkbox"/> Plumbing [solder (lead, tin), flux (zinc chloride), pipe fitting] <input type="checkbox"/> Framing (sawdust, particle board dust and treated woods) <input type="checkbox"/> Interior Construction (tile cutting, flashing, saw-cutting drywall, galvanized metal in nails and fences, and electric wiring)
<input type="checkbox"/> Equipment Use	<input type="checkbox"/> Vehicle and Equipment Cleaning <input type="checkbox"/> Vehicle and Equipment Fueling <input type="checkbox"/> Vehicle and Equipment Maintenance
<input checked="" type="checkbox"/> Waste Management	<input type="checkbox"/> Hazardous Waste Management <input type="checkbox"/> Solid Waste Management (litter, trash, and debris) <input type="checkbox"/> Liquid Waste Management (wash water) <input checked="" type="checkbox"/> Sanitary Septic Waste Management (portable toilets, disturbance of existing sewer lines)

The WPC Manager shall update the list of potential pollutants in accordance with onsite conditions, documenting all materials or equipment that have been received or produced onsite that are not designed to be outdoors and are potential sources of stormwater contamination.

**Materials Management Plan**

Table 500.1.1 includes a list of construction activities and associated materials that are anticipated to be used onsite. These activities and associated materials will or could potentially contribute pollutants, other than sediment, to storm water runoff.

A list of construction materials that will be on site and have the potential to contribute pollutants, other than sediment, to stormwater runoff, which has been prepared to prevent or minimize the off-site discharge of those pollutants, are provided below.

The following stockpiles will be covered and bermed prior to likely precipitation events.

- Native excavation materials
- Construction debris/concrete waste

The following materials will be kept off the ground or bermed and covered prior to likely precipitation events.

-

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The following materials will be properly stored according to Material Safety Data Sheet requirements.

- 

The following dumpsters shall be covered prior to likely precipitation events.

- Dumpsters at all locations onsite.

The following areas will be inspected for leaks or spills prior to likely precipitation events.

- Portable Toilets
- 

Potential pollutants shall not be stored within 50 feet of stormwater conveyance features or concentrated flow paths. In addition, authorized non-stormwater discharges shall not be made within 50 feet of potential pollutants.

### **500.1.2 Potential Pollutants from Site Features or Known Contaminates**

Former site usage or known site contamination may contribute pollutants to stormwater discharges from the site. Based on information available for the project site, the following site usage and historical contamination has been determined:

Former Industrial Operations:     Yes     No

Description of Former Industrial Operations

Historic Contamination:         Yes     No

- 

The following contaminants are known to exist at the project site locations identified:

- 

### **500.1.3 Risk Level Determination**

A construction site risk assessment has been performed for the project and the resultant risk level is Risk Level 2.

The risk level was determined through the use of the RUSLE method (K, LS provided in SMARTS, and a site-specific analysis). The risk level is based on project duration, location, proximity to impaired receiving waters and soil conditions. A copy of the Risk Level determination submitted on SMARTS with the PRDs is included in Attachment C.

The following list of values was utilized to estimate the sediment and receiving water risk factors in order to determine the risk level for the project.

Original Construction Start Date: 1-4-24  
Anticipated Construction End Date: 12-5-24  
Construction Duration Estimate: 336 Days  
R=8.23, K Factor=0.43, LS Factor=0.68

Watershed Erosion Estimate (R<sub>x</sub>K<sub>x</sub>L<sub>S</sub>) = 2.41 Tons/Acre  
Site Sediment Risk Factor=LOW  
Receiving Water Risk=HIGH  
Project Combined Risk Level = Level 2

## **500.2 Pre-Construction Existing Stormwater Control Measures**

The following are existing (pre-construction) control measures encountered within the project site.

- 

The existing surface elevations in the area to be constructed are relatively flat, with a fall in elevation of 0.5 foot in 500 feet (0.1%), slightly flowing northeasterly.

The entire area is relatively flat and sheet flows into the adjacent open ditch/IID R Drain during major storm events. The open channel ultimately finds its way into the Salton Sea.

## **500.3 BMP Selection for Erosion and Sediment Control**

The Contractor shall control construction site erosion through the implementation of effective erosion and sediment control measures in accordance with the CGP. The Contractor and the WPC Manager shall develop a schedule that includes the sequencing of construction activities and the implementation of effective erosion control BMPs while taking local climate (rainfall, wind, etc.) into consideration, thereby reducing the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking. The SWPPP schedule shall: describe when work activities will be performed that could cause the discharge of pollutants in stormwater; describe the water pollution control practices associated with each construction phase; and identify the soil stabilization and sediment control practices for all disturbed soil areas. Effective soil cover shall be provided for:

- Temporary stockpile of erodible materials

Additional erosion and sediment control BMPs may be required in other locations on the project site as work progresses in order to prevent sediment from leaving the construction site. These measures shall be determined by the Contractor and the WPC Manager in the field. As long as the water pollution control measures consist of additions to the BMPs already selected in the approved SWPPP, then these additional measures do not require a SWPPP amendment and the WPC Manager shall simply show the additional measures on the WPCDs. If erosion control or sediment control BMPs must be changed because of field conditions or because they are determined to be ineffective, the SWPPP must be amended. Once deemed necessary, corrective actions/design changes to the SWPPP shall be reviewed and signed by the WPC Manager, implemented, as required by Standard Specification 13-1.03A, within 24 hours of identification unless a longer period is authorized (but cannot be authorized longer than required by the CGP: implemented within 72 hours of identification and completed as soon as possible thereafter). Immediate corrective action is required for numeric action level (NAL) exceedances. Routine BMP maintenance or the implementation of an additional quantity of a BMP included in the SWPPP as recommended by the WPC Manager does not require an amendment to the SWPPP.

An effective combination of erosion (soil stabilization) and sediment control BMPs shall be implemented and maintained during the project. The following principles shall be followed to the maximum extent practicable to control erosion and sedimentation in disturbed areas at the site.

- Frequent watering/dust control of the site during construction activities.
- Establishment of finish surface to match existing surface

A more concise listing of the BMP control measures to be implemented and maintained at the project site are denoted in the BMP selection tables in the following sub-sections.

### 500.3.1 Temporary Run-on Control BMPs

<b>TABLE 500.3.1 TEMPORARY RUN-ON CONTROL BMPs</b>						
CONSTRUCTION BMP ID NO.(1)	BMP NAME	CONTRACT MIN REQUIRE- MENT(2)	CONTRACT BID ITEM	BMP USED		IF A CONTRACT MINIMUM REQUIREMENT BUT NOT USED, STATE REASON
				Yes	No	
SS-1	Scheduling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SS-2	Preservation of Property/ Preservation of Existing Vegetation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SS-9	Earth Dikes / Drainage Swales & Lined Swales	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SS-10	Outlet Protection / Velocity Dissipation Devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-11	Slope Drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-12	Streambank Stabilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-4	Temporary Check Dam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-5	Fiber Rolls	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SC-6	Temporary Gravel Bag Berm/Earthen Berm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-8	Temporary Sandbag Barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
<b>ALTERNATIVE BMPs USED(3)</b>						
<input type="radio"/> Yes <input checked="" type="radio"/> No						

**Notes:**

- (1) The BMP designations (SS-1, SC-5, etc.) are solely for maintaining continuity with existing Caltrans documents and are not provided to imply that the Construction Site BMP Manual is a required contract document.
- (2) Minimum requirements are based on the required Contract Provisions, Standard Special Provisions, Plans and Specifications. Not all minimum requirements may be applicable to every project. Applicability to a specific project shall be determined by the QSD or WPC Manager.
- (3) Use of alternative BMPs will require written approval by the RE.

#### Implementation of Temporary Run-on Controls BMPs

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Temporary run-off control will consist of drainage swale, and temporary fiber rolls.

**500.3.2 Soil Stabilization (Erosion Control)**

Soil stabilization, also referred to as erosion control, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Soil stabilization BMPs protect the soil surface by covering and/or binding soil particles. This project will incorporate SWPPP/WPCP Preparation Manual minimum temporary soil stabilization requirements, temporary soil stabilization measures required by the contract documents, and other measures selected by the Contractor.

Sufficient soil stabilization materials will be maintained on site to allow implementation in conformance with Caltrans requirements and as described in this SWPPP. This includes implementation requirements for active and non-active areas that require deployment before the onset of rain.

The following soil stabilization BMP selection table indicates the BMPs that shall be implemented to control erosion on the construction site. Temporary soil stabilization BMPs are listed by location in the WPCBMPL in Attachment CC and are shown on the WPCDs from Attachment BB. Any details for temporary soil stabilization BMPs are shown in Attachment BB.

<b>TABLE 500.3.2 TEMPORARY SOIL STABILIZATION BMPs</b>						
CONSTRUCTION BMP ID NO.(1)	BMP NAME	CONTRACT MIN REQUIRE- MENT(2)	CONTRACT BID ITEM	BMP USED		IF A CONTRACT MINIMUM REQUIREMENT BUT NOT USED, STATE REASON
				Yes	No	
SS-1	Scheduling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SS-2	Preservation of Property/ Preservation of Existing Vegetation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SS-3	Temporary Hydraulic Mulch (Bonded Stabilized Fiber Matrix)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-3	Temporary Hydraulic Mulch (Polymer Stabilized Fiber Matrix)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-4	Temporary Erosion Control (With Temporary Seeding)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-5	Temporary Soil Stabilizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-6	Temporary Erosion Control (Straw Mulch with Stabilizing Emulsion)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-7	Temporary Erosion Control Blanket (On Slope)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	

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SS-7	Temporary Erosion Control Blanket (In swale or ditch)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-7	Temporary Cover (Geotextiles and Mats)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-8	Temporary Mulch (Wood)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-9	Earth Dikes / Drainage Swales & Lined Swales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-10	Outlet Protection/ Velocity Dissipation Devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-11	Slope Drains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SS-12	Streambank Stabilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
<b>ALTERNATIVE BMPs USED <sup>(3)</sup></b>						
<input type="radio"/> Yes <input checked="" type="radio"/> No						

**Notes:**

- (1) The BMP designations (SS-1, SC-3, etc.) are solely for maintaining continuity with existing Caltrans documents and are not provided to imply that the Construction Site BMP Manual is a required contract document.
- (2) Minimum requirements are based on the required Contract Provisions, Standard Special Provisions, Plans and Specifications. Not all minimum requirements may be applicable to every project. Applicability to a specific project shall be determined by the QSD or WPC Manager.
- (3) Use of alternative BMPs will require written approval by the RE.

The BMPs selected for the project are listed below along with an explanation of how they will be incorporated into the project.

- Temporary stockpile of erodible materials

**SS-1 - Scheduling:** The Contractor shall provide a construction schedule indicating the implementation of soil stabilization BMPs prior to the commencement of the construction activities. The project schedule will sequence construction activities with the installation of both soil stabilization and sediment control measures. BMPs will be deployed in a sequence to follow the progress of demolition, grading, and construction.

**SS-2 - Preservation of Property/Preservation of Existing Vegetation:** The Contractor will protect and preserve the existing vegetation outside of the project construction area. Preservation of such vegetation will serve to control erosion and aid in filtering out sediment. The construction schedule will be arranged as much as practicable to leave existing vegetation undisturbed throughout the construction of the project.

**500.3.3 Sediment Control**

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Sediment controls are structural measures that are intended to complement and enhance the selected soil stabilization (erosion control) measures and reduce sediment discharges from construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This project will incorporate SWPPP/WPCP Preparation Manual minimum temporary sediment control requirements, temporary sediment control measures required by the contract documents, and other measures selected by the Contractor.

Sediment control BMPs will be installed at all appropriate locations along the site perimeter and at all operational internal inlets to storm drain systems at all times.

Throughout the duration of the project, temporary sediment control materials, equivalent to 10 percent of the materials installed on site, will be maintained on site for implementation in event of predicted rain, or the need for rapid response to failures or emergencies, in conformance with other Caltrans requirements, and as described in the SWPPP. This includes implementation requirements for active areas and non-active areas before the onset of rain.

The following sediment control BMP selection table indicates the BMPs that shall be implemented to control sediment on the construction site. Temporary sediment control BMPs are listed by location in the WPCBMPL in Attachment CC and are shown on the WPCDs from Attachment BB. Any details for temporary sediment control BMPs are shown in Attachment BB.

<b>TABLE 500.3.3 TEMPORARY SEDIMENT CONTROL BMPs</b>						
<b>CONSTRUCTION BMP ID NO.(1)</b>	<b>BMP NAME</b>	<b>CONTRACT MIN REQUIRE- MENT(2)</b>	<b>CONTRACT BID ITEM</b>	<b>BMP USED</b>		<b>IF A CONTRACT MINIMUM REQUIREMENT BUT NOT USED, STATE REASON</b>
				Yes	No	
SC-1	Temporary Silt Fence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-2	Temporary Sediment Basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-3	Temporary Sediment Trap/Curb Cutback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-4	Temporary Check Dam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-5	Fiber Rolls	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SC-6	Temporary Gravel Bag Berm/Earthen Berm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-7	Street Sweeping	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SC-8	Temporary Sandbag Barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	

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SC-9	Temporary Straw Bale Barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-10	Temporary Drain Inlet Protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-11	Compost Stock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
SC-12	Flexible Sediment Barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
<b>ALTERNATIVE BMPs USED <sup>(3)</sup></b>						
<input type="radio"/> Yes <input checked="" type="radio"/> No						

**Notes:**

- (1) The BMP designations (SS-1, SC-3, etc.) are solely for maintaining continuity with existing Caltrans documents and are not provided to imply that the Construction Site BMP Manual is a required contract document.
- (2) Minimum requirements are based on the required contract provisions, standard special provisions, plans and specifications. Not all minimum requirements may be applicable to every project. Applicability to a specific project shall be determined by the QSD or WPC Manager.
- (3) Use of alternative BMPs will require written approval by the RE

The following list of BMPs and associated narratives explain how the selected BMPs will be incorporated into the project.

Frequent dust control/watering of the project site will be conducted during construction activities to keep the dust generation to a minimum.

SC-5 Fiber Rolls: Fiber rolls will be placed along the perimeter of inactive stockpiles, small DSAs and on slopes, as required.

SC-7 – Street Sweeping: Road sweeping and vacuuming will occur during soil hauling, demolition of existing water facilities, installation of pipe backfill material and as necessary to keep streets clear of tracked materials and debris. The Contractor shall complete street sweeping daily and as needed to keep the project site and adjacent streets clean and free of dust/debris.

### **500.3.4 Tracking Control**

Tracking control BMPs are be implemented to reduce sediment tracking from the construction site onto private or public roads. This project will incorporate SWPPP/WPCP Preparation Manual minimum temporary tracking control requirements, temporary tracking control measures required by the contract documents, and other measures selected by the Contractor.

The following tracking control BMP selection table indicates the BMPs that shall be implemented to reduce sediment tracking from the construction site onto private or public roads. Temporary tracking control BMPs are listed by location in the WPCBMPL in Attachment CC and shown on the WPCDs from Attachment BB. Any details for temporary tracking control BMPs are shown in Attachment BB.

<b>TABLE 500.3.4</b>

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<b>TEMPORARY TRACKING CONTROL BMPs</b>						
<b>CONSTRUCTION BMP ID NO.(1)</b>	<b>BMP NAME</b>	<b>CONTRACT MIN REQUIRE- MENT(2)</b>	<b>CONTRACT BID ITEM</b>	<b>BMP USED</b>		<b>IF A CONTRACT MINIMUM REQUIREMENT BUT NOT USED, STATE REASON</b>
				Yes	No	
SC-7	Street Sweeping	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
TC-1	Temporary Construction Entrance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
TC-2	Stabilized Construction Roadway	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
TC-3	Temporary Entrance / Outlet Tire Wash	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
<b>ALTERNATIVE BMPs USED (3)</b>						
<input type="radio"/> Yes <input checked="" type="radio"/> No						

**Notes:**

- (1) The BMP designations (SS-1, SC-3, etc.) are solely for maintaining continuity with existing Caltrans documents and are not provided to imply that the Construction Site BMP Manual is a required contract document.
- (2) Minimum requirements are based on the required Contract Provisions, Standard Special Provisions, Plans and Specifications. Not all minimum requirements may be applicable to every project. Applicability to a specific project shall be determined by the QSD or WPC Manager.
- (3) Use of alternative BMPs will require written approval by the RE.

The following list of BMPs and associated narratives explain how the selected BMPs will be incorporated into the project.

•

SC-7 – Street Sweeping: Road sweeping and vacuuming will occur during soil hauling, demolition of existing water facilities, installation of pipe backfill material and as necessary to keep streets clear of tracked materials and debris. The Contractor shall complete street sweeping daily and as needed to keep the project site and adjacent streets clean and free of dust/debris.

TC-1 – Temporary Construction Entrance: The Contractor shall place Temporary Construction Entrance at the staging area as requested by the Owner representative.

TC-3 – Temporary Entrance/Outlet Tire Wash: The Contractor shall place a Temporary Entrance/Outlet Tire Wash at the staging area as requested by the Owner representative.

**500.3.5 Wind Erosion Control**

Wind erosion control BMPs will be implemented to prevent sediment from leaving the construction site. This project will incorporate SWPPP/WPCP Preparation Manual minimum temporary wind erosion control requirements, temporary wind erosion control measures required by the contract documents, and other measures selected by the Contractor.

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The following temporary wind erosion control BMP selection table indicates the BMPs that shall be implemented to reduce wind erosion at the construction site. Temporary wind erosion control BMPs are listed by location in the WPCBMPL in Attachment CC and shown on the WPCDs from Attachment BB. Any details for temporary wind erosion control BMPs are shown in Attachment BB.

<b>TABLE 500.3.5 TEMPORARY WIND EROSION CONTROL BMPs</b>						
<b>CONSTRUCTION BMP ID NO.(1)</b>	<b>BMP NAME</b>	<b>CONTRACT MIN REQUIRE- MENT (2)</b>	<b>CONTRACT BID ITEM</b>	<b>BMP USED</b>		<b>IF A CONTRACT MINIMUM REQUIREMENT BUT NOT USED, STATE REASON</b>
				Yes	No	
WE-1	Wind Erosion Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
TC-1	Temporary Construction Entrance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
TC-2	Stabilized Construction Roadway	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
----	All Soil Stabilization Measures included in Section 500.3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
<b>ALTERNATIVE BMPs USED (3)</b>						
<input type="radio"/> Yes <input checked="" type="radio"/> No						

**Notes:**

- (1) The BMP designations (SS-1, SC-3, etc.) are solely for maintaining continuity with existing Caltrans documents and are not provided to imply that the Construction Site BMP Manual is a required contract document.
- (2) Minimum requirements are based on the required contract provisions, standard special provisions, plans and specifications. Not all minimum requirements may be applicable to every project. Applicability to a specific project shall be determined by the QSD or WPC Manager.
- (3) Use of alternative BMPs will require written approval by the RE.

The following list of BMPs and narrative explain how the selected BMPs shall be incorporated into the project.

•

Frequent dust control/watering of the project site will be conducted during construction activities to keep the dust generation to a minimum.

**WE-1 – Wind Erosion Control:**

Water shall be periodically applied to disturbed soil areas using water truck within the project limits and at the staging area to control dust generation and maintain optimum moisture content for compaction. Wind erosion control and water conservation practices BMPs will be implemented to provide dust control and prevent discharges from dust control activities and water supply equipment. Water application rates will be minimized as necessary to prevent runoff ponding. Any leakages from water equipment shall be repaired immediately.

During windy conditions (when forecasted or actual wind speeds exceeding 25 mph occur), additional dust control measures shall be implemented to provide sufficient erosion control. The dust control measure shall include covering of stockpiled material and native materials. Stockpiles shall be covered using plastic covers with gravel bags to prevent

wind dispersal of any sediment.

## **500.4 BMP Selection for Construction Site Management**

Construction site management shall consist of controlling potential sources of water pollution before they come in contact with stormwater systems or watercourses. The Contractor shall control material pollution and manage waste and non-stormwater discharges at the construction site by implementing effective handling, storage, use, and disposal practices.

### **500.4.1 Non-Stormwater Site Management**

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the Caltrans Permit or authorized under a separate NPDES permit, shall be prohibited. The selection of non-stormwater BMPs is based on whether construction activities with a potential for non-stormwater discharges will be conducted, as discussed in the Materials Management Plan and in Section 500.4. This project will incorporate SWPPP/WPCP Preparation Manual minimum non-stormwater pollution control requirements, non-stormwater pollution temporary wind erosion control measures required by the contract documents, and other measures selected by the Contractor.

The following non-stormwater control BMP selection table indicates the BMPs that shall be implemented to prevent non-stormwater discharges from construction activities conducted at the project site. Non-stormwater pollution control BMPs are listed by location in the WPCBMPL in Attachment CC and shown on the WPCDs from Attachment BB. Any details for non-stormwater pollution control BMPs are shown in Attachment BB.

<b>TABLE 500.4.1</b>						
<b>TEMPORARY NON-STORMWATER POLLUTION CONTROL BMPs</b>						
<b>CONSTRUCTION BMP ID NO.(1)</b>	<b>BMP NAME</b>	<b>CONTRACT MIN REQUIRE- MENT(2)</b>	<b>CONTRACT BID ITEM</b>	<b>BMP USED</b>		<b>IF A CONTRACT MINIMUM REQUIREMENT BUT NOT USED, STATE REASON</b>
				Yes	No	
NS-1	Water Control and Conservation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
NS-2	Dewatering(3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-3	Paving, Sealing, Sawcutting, and Grinding Operations	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
NS-4	Temporary Stream Crossing (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-5	Clear Water Diversion (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-6	Illegal Connection and Illegal Discharge Detection Reporting	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
NS-7	Potable Water / Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	

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NS-8	Vehicle and Equipment Cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-9	Vehicle and Equipment Fueling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-10	Vehicle and Equipment Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-11	Pipe Driving Operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-12	Concrete Curing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-13	Material and Equipment Used Over Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-14	Concrete Finishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
NS-15	Structure Demolition / Removal Over or Adjacent to Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
<b>ALTERNATIVE BMPs USED<sup>(4)</sup></b>						
<input type="radio"/> Yes <input checked="" type="radio"/> No						

**Notes:**

- (1) The BMP designations (SS-1, SC-3, etc.) are solely for maintaining continuity with existing Caltrans documents and are not provided to imply that the Construction Site BMP Manual is a required contract document.
- (2) Minimum requirements are based on the required contract provisions, standard special provisions, plans and specifications. Not all minimum requirements may be applicable to every project. Applicability to a specific project shall be determined by the QSD or WPC Manager.
- (3) The BMPs listed above are incidental and do not include operations listed as separated line items in the contract.
- (4) Use of alternative BMPs will require written approval by the RE.

The following list of BMPs and associated narratives explain how the selected BMPs will be incorporated into the project.

•

**NS-1 Water Control and Conservation / Potable Water and Irrigation:**

Water application rates will be minimized, as required, to prevent runoff and ponding. Water equipment leaks will be repaired immediately. The water truck filling area will be stabilized.

Irrigated areas within the construction limits will be inspected for excess watering.

The exposure of construction materials to precipitation will be minimized. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (e.g., poles, equipment pads, cabinets, conductors, insulators, bricks).

**NS-3 Paving, Sealing, Sawcutting, and Grinding Operations:**

Paving and Grinding Operation BMPs will be implemented to prevent paving materials from being discharged off site.

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Following paving operations, the area will be swept and the entire parking area will be inspected for paving materials.

NS-6 Illegal Connection and Illegal Discharge:

The contractor will monitor and report any illicit/illegal discharge.

**500.4.2 Waste Management and Materials Pollution Control**

An inventory of construction activities, materials, and wastes is provided in Section 500.1.1. The following BMP consideration checklist lists the BMPs that have been selected to control construction site wastes and materials. Locations and details of applicable materials handling and waste management BMPs are shown on the WPCDs from Attachment BB. In the narrative description, a list of waste disposal facilities and the type of waste to be disposed at each facility is also provided. The following list of BMPs and associated narratives explain how the selected BMPs will be incorporated into the project.

<b>TABLE 500.4.2 TEMPORARY WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL BMPs</b>						
CONSTRUCTION BMP ID NO.(1)	BMP NAME	CONTRACT MIN REQUIRE- MENT(2)	CONTRACT BID ITEM	BMP USED		IF A CONTRACT MINIMUM REQUIREMENT BUT NOT USED, STATE REASON
				Yes	No	
WM-1	Material Delivery and Storage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-2	Material Use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-3	Stockpile Management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-4	Spill Prevention and Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-5	Solid Waste Management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-6	Hazardous Waste Management (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-7	Contaminated Soil Management (3)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-8	Concrete Waste Management	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-8	Temporary Concrete Washout (Portable)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-8	Temporary Concrete Washout Facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	

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WM-9	Sanitary/Septic Waste Management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	
WM-10	Liquid Waste Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	
<b>ALTERNATIVE BMPs USED (4)</b>						
<input type="radio"/> Yes <input checked="" type="radio"/> No						

**Notes:**

- (1) The BMP designations (SS-1, SC-3, etc.) are solely for maintaining continuity with existing Caltrans documents and are not provided to imply that the Construction Site BMP Manual is a required contract document.
- (2) Minimum requirements are based on the required contract provisions, standard special provisions, plans and specifications. Not all minimum requirements may be applicable to every project. Applicability to a specific project shall be determined by the QSD or WPC Manager.
- (3) The BMPs listed above are incidental and do not include operations listed as separated line items in the contract.
- (4) Use of alternative BMPs will require written approval by the RE.

**WM-1 & WM-2 Material Delivery, Storage, and Use BMPs:**

In general, BMPs shall be implemented to help prevent discharges of construction materials during delivery, storage, and use. Spill clean-up materials, material safety datasheets, a material inventory, and emergency contact numbers shall be maintained and stored in the contractor's service trucks.

**WM-3 Stockpile Management:**

Stockpile Management shall be implemented to reduce or eliminate pollution of stormwater from stockpiles of soil and paving materials such as Portland Cement Concrete (P.C.C.) rubble, aggregate base, aggregate subbase and pre-mixed aggregate. Plastic covers shall be used.

**WM-4 Spill Prevention and Control:**

Spill Prevention and Control shall be implemented to contain and clean-up spills and prevent material discharges to the storm drain system. Spill prevention is also discussed above in Material Delivery, Storage and Use BMPs, and below in the following waste management section.

**WM-5 & WM-6 Waste Management:**

Solid Waste Management BMP (WM-5) and Hazardous Waste Management BMP (WM-6) shall be implemented to minimize stormwater contact with waste materials and prevent waste discharges. Solid wastes shall be loaded directly onto trucks for offsite disposal. Solid waste, including rubble stockpiles, shall be removed and disposed of offsite daily. Hazardous wastes shall be appropriately and clearly marked containers and segregated from other non-waste materials. Waste shall be stored in sealed containers constructed of a suitable material and shall be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179. All hazardous waste shall be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.

**WM-8 Temporary Concrete Washout:**

The discharges from concrete washout will consist of rinse water and residual concrete. Concrete pours shall not be conducted during or immediately prior to rainfall events. Temporary Concrete Washout BMP shall be implemented onsite or offsite in a designated area.

**WM-9 Sanitary and Septic Wastes:**

The contractor shall implement Sanitary and Septic Waste Management BMP. Portable toilets shall be located and maintained on the project site for the duration of the project. Weekly maintenance shall be implemented, and wastes shall be disposed of offsite. The toilets shall be located away from concentrated flow paths and traffic flow. Portable restroom facilities shall be secured to the ground to avoid tip-overs.

## **500.5 Water Pollution Control Drawings**

The WPCDs are the component of the project SWPPP that show the BMPs, by project phase/stage, that are necessary for the project to be in compliance with the CGP. The construction activity phases used in this SWPPP are the preliminary phase, grading phase, highway construction phase, and the highway planting / erosion control establishment phase. These phases are defined below.

### **Preliminary Phase (Pre-Construction Phase – Part of the Grading Phase)**

Includes rough grading/or disking, clearing and grubbing operations, or any soil disturbance prior to mass grading.

### **Grading Phase**

Includes reconfiguring the topography for the highway, including excavation for roadway (e.g., necessary blasting of hard rock), highway embankment construction (fills); mass grading, and stockpiling of select material for capping operations.

### **Highway Construction Phase**

Encompasses both highway and structure construction. Highway construction includes final roadway excavation, placement of base materials and highway paving, finish grading, curbs, gutters and sidewalks, public utilities, public water facilities including fire hydrants, public sanitary sewer systems, storm drain systems and/or other drainage improvements, highway lighting, traffic signals and/or other highway electrical work, guardrail, concrete barriers, sign installation, pavement markers, traffic striping and pavement markings. Structure construction includes structure footings, bridges, retaining walls, major culverts, overhead sign structures and buildings.

### **Highway Planting / Erosion Control Establishment Phase**

Includes clearing and grubbing operations, soil preparation (grading, incorporation of soil amendments, and placement of topsoil), irrigation (trenching, installation and trench backfilling), minor grading (top dressing and fine grading of lawn and ground cover areas), planting (seeding and planting of vegetation), mulching (application of wood chips or other mulches) and plant establishment (weeding, plant replacement, and, if needed, fertilizer application, irrigation maintenance, and reapplication of mulch). Erosion control includes placement of permanent erosion control materials and maintenance of temporary sediment controls during the erosion control establishment period.

The WPCDs provide field staff with the information on where to install BMPs so that they are effective. The WPCDs, WPCBML and Water Pollution Control Schedule provide the necessary tools for a Contractor to plan and implement BMPs to meet the requirements of the project SWPPP.

The WPCD cover sheet(s) shall include a listing of the BMPs that will be used along with the associated BMP symbols used on the WPCDs.

WPCDs are provided for all areas that are directly related to the construction activity, including but not limited to staging areas, storage yards, material borrow areas and storage areas, access roads, etc., whether or not they reside within the Caltrans rights-of-way

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The WPCDs shall show the construction project site in detail, including:

- the construction site perimeter;
- geographic features within or immediately adjacent to the site; include surface waters such as lakes, streams, springs, wetlands, estuaries, ponds, and the ocean;
- site topography before and after construction; include roads, paved areas, buildings, slopes, drainage facilities, and areas of known or suspected contamination; and
- permanent (post-construction) BMPs.

The WPCDs shall show the following site information:

- discharge points from the project to off-site storm drain systems or receiving waters;
- tributary areas and drainage patterns across the project area (show using flow arrows) into each on-site stormwater inlet or receiving water;
- tributary areas and drainage patterns to each on-site stormwater inlet, receiving water or discharge point;
- off-site tributary drainage areas that generate run-on to the project;
- temporary on-site drainage(s) to carry concentrated flows;
- drainage patterns and slopes anticipated after major grading activities are completed;
- outlines of all areas of existing vegetation, soil cover, or native vegetation that will remain undisturbed during the project;
- outlines of all areas of planned soil disturbance (disturbed soil areas, DSAs);
- known location(s) of contaminated or hazardous soils; and
- any potential non-stormwater discharges and activities, such as dewatering operations, concrete saw-cutting or coring, pressure washing, waterline flushing, diversions, cofferdams, and vehicle and equipment cleaning; if operations can't be located on the WPCDs, a narrative description should be provided.

The WPCDs show proposed locations of all construction site BMPs. Additional detail drawings are provided if necessary to convey site-specific BMP configurations. The WPCDs shall show construction site BMPs including the following:

- temporary soil stabilization and temporary sediment control BMPs that will be used during construction; any temporary on-site drainage(s) to carry concentrated flows, BMPs implemented to divert off-site drainage around or through the construction site, and BMPs that protect stormwater inlets;
- construction entrances used for site ingress and egress points and any proposed temporary construction roads;
- BMPs to mitigate or eliminate non-stormwater discharges;
- BMPs for waste management and materials pollution control, including, but not limited to storage of soil or waste; construction material loading, unloading, storage and access areas; and areas designated for waste handling and disposal; and
- BMPs for vehicle and equipment storage, fueling, maintenance, and cleaning.

The WPCDs can be found in Attachment BB of the SWPPP.

## **500.6 Water Pollution Control BMP List**

The Water Pollution Control Best Management Practices List (WPCBMPL) provides, by location and project phase/stage, the BMPs necessary for the project to be in compliance with the CGP. The WPCBMPL provides field staff both with a list of necessary BMPs and with an estimated quantity for each BMP by location and phase/stage of the project. The construction activity phases are typically the Preliminary Phase, Grading Phase, Highway Construction Phase, and the Highway Planting / Erosion Control Establishment Phase. The construction activity phases are defined in Section 500.5.

The WPCBMPL, water pollution control drawings and water pollution control schedule provide the tools necessary for the Contractor to plan and implement BMPs to meet the requirements of the project SWPPP. The BMPs listed on the WPCBMPL are the base line for site inspections and visual monitoring.

The WPCBMPL cover sheet includes a list of all BMPs to be used on the project based on Section 500 Determination of Construction Site Best Management Practices.

The names and number of locations listed on the WPCBMPL were established so that field staff and inspectors can easily identify where BMPs need to be located. The WPCBMPL includes all locations that are directly related to the construction activity, including but not limited to staging areas, storage yards, material borrow areas and storage areas, access roads, etc., whether or not they reside within Caltrans rights-of-way.

Necessary additional information to convey site-specific BMP configurations or BMP modifications are noted on the WPCBMPL.

All construction site BMPs are listed on the WPCBMPL including the following:

- temporary soil stabilization and temporary sediment control BMPs that will be used during construction; include temporary on-site drainage(s) to carry concentrated flows
- BMPs implemented to divert off-site drainage around or through the construction site, and BMPs that protect stormwater inlets
- BMPs to mitigate or eliminate non-stormwater discharges BMPs for waste management and materials pollution control, including, but not limited to storage of soil or waste; construction material loading, unloading, storage and access areas; and areas designated for waste handling and disposal
- BMPs for vehicle and equipment storage, fueling, maintenance, and cleaning
- permanent BMPs that are a component of the project SWPPP

The WPCBMPL can be found in Attachment CC of the SWPPP.

## **500.7 Water Pollution Control Schedule**

The Water Pollution Control Schedule (WPCS) is the component of the project SWPPP that shows the timeline for when BMPs will be installed so that the project is in compliance with the CGP. The WPCS provides field staff with the information necessary to plan for adequate materials and crews to install BMPs at the right time so that they are effective. The WPCS, WPCBMPL, and WPCDs provide the necessary tools for the Contractor to plan and implement BMPs to meet the requirements of the project SWPPP.

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The WPCS shall contain an adequate level of detail to show major activities sequenced with the implementation of construction site BMPs, including:

- project start and finish dates, including each stage of the project
- SWPPP review and approval
- annual certifications
- mobilization dates
- mass clearing and grubbing/roadside clearing dates
- major grading/excavation dates
- dates named in other permits such as TRPA, Fish and Game and Army Corps of Engineers Permits
- dates for submittal of SWPPP amendments as required in the contract specifications

The WPCS shall show by location the dates for the deployment of:

- temporary soil stabilization BMPs
- temporary sediment control BMPs
- wind erosion control BMPs
- tracking control BMPs
- non-stormwater BMPs
- waste management and materials pollution control BMPs

The WPCS shall include:

- paving, saw-cutting, and any other pavement-related operations;
- major planned stockpiling operations;
- dates for other significant long-term operations or activities that may cause non-stormwater discharges, such as dewatering, grinding, etc; and
- final stabilization activities for each disturbed soil area of the project.

The WPCS shall be updated quarterly and the quarterly updates shall be filed in SWPPP File Category 20.03: Water Pollution Control Schedule Updates.

The Water Pollution Control Schedule can be found in Attachment DD of the SWPPP.

# SECTION 600

## PROJECT SITE IMPLEMENTATION PROGRAM

### **600.1 Water Pollution Control (WPC) Manager Responsibilities**

The WPC Manager shall have primary responsibility and authority to implement the SWPPP and ensure the project is in compliance with the CGP. The WPC Manager is responsible for implementing the SWPPP and amending the SWPPP when any of the conditions specified in Section 100.3 are met. The Contractor has assigned authority to the WPC Manager to mobilize crews and subcontractors, as necessary, for SWPPP and CGP compliance. The WPC Manager will be available at all times throughout duration of the project.

Duties of the Contractor's WPC Manager include but are not limited to the following

- ensuring full compliance with the SWPPP and the CGP
- implementing all elements of the SWPPP, including but not limited to implementing:
  - prompt and effective erosion and sediment control measures
  - all non-stormwater management, and materials and waste management activities such as: monitoring discharges (dewatering, diversion devices); performing general site cleanup; cleaning vehicles and equipment, performing fueling and maintenance activities; providing spill control; ensuring that no materials other than stormwater are discharged in quantities that will have an adverse effect on receiving waters or storm drain systems, etc.
- overseeing and ensuring that the following site inspections and visual site monitoring are conducted:
  - daily required BMP inspections
  - weekly routine stormwater site BMP inspections
  - quarterly non-stormwater site inspections
  - pre-storm inspections prior to forecasted storm events
  - daily inspections during extended forecasted storm events
  - post-storm inspections for qualifying rain events
- mobilizing crews to repair, replace, and/or implement additional BMPs due to deficiencies, failures or other shortcomings identified during inspections, to be completed within 24 hours of identification in compliance with Standard Specification 13-1.03A (the contractor's WPC Manager shall be assigned authority by the Contractor to mobilize crews), unless a longer period is authorized.
- coordinating with the RE to assure that if design changes to BMPs are required due to deficiencies, failures or other shortcomings identified during inspections, the changes are completed as soon as possible and the SWPPP is revised accordingly
- monitoring NWS Forecast Office forecasts for both forecasted storm events and qualifying rain events; these events are defined as follows:
  - a forecasted storm event is defined as a 50% or greater likelihood that 0.10 inch or more of precipitation will fall within a 24-hour period

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- a qualifying rain event is defined as a rain event that may produce or has produced ½ inch or greater of precipitation at the time of discharge, with a 48-hour dry period between events
- monitoring weather at the project site
- preparing and implementing qualifying rain event sampling and analysis plans
- preparing and implementing Rain Event Action Plans for forecasted storm events
- mobilizing crews immediately, in the event of NAL exceedances, to repair existing BMPs and/or implement additional BMPs (the Contractor’s WPC Manager shall be assigned authority by the Contractor to mobilize crews),
- coordinating with the RE in the event of NAL exceedances to assure that any SWPPP revisions (corrective actions) are made immediately, either to prevent pollutants and authorized non-stormwater discharges from contaminating stormwater, or to substantially reduce the pollutants to levels consistently below the NALs, so that the project complies with the SWPPP, the CGP and approved plans at all times,
- submitting NAL exceedances reports to the RE
- submitting test results for stormwater samples to the RE
- preparing amendments to the SWPPP when required
- preparing contractor’s SWPPP Annual Compliance Certification
- preparing the Stormwater Annual Reports
- ensuring elimination of all unauthorized discharges
- preparing and submitting Notice of Discharge reports to the RE
- preparing and submitting reports of illegal connections or illicit discharges to the RE

### 600.2 Site Inspections

Stormwater site inspections and visual monitoring are necessary to ensure that the project is in compliance with the requirements of the CGP. Project site visual monitoring requirements are covered in Section 700 Construction Site Monitoring Program. Project site inspections of stormwater BMPs are conducted to identify and record:

- that BMPs are properly installed
- what BMPs need maintenance to operate effectively
- what BMPs have failed
- what BMPs could fail to operate as intended.

Routine stormwater site inspections shall be conducted by the contractor’s WPC Manager or other 24-hour trained staff at the following minimum frequencies:

- daily inspections of:
  - storage areas for hazardous materials and waste
  - hazardous waste disposal and transporting activities

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- hazardous material delivery and storage activities
- vehicle and equipment cleaning facilities if vehicle and equipment cleaning occurs daily
- vehicle and equipment maintenance and fueling areas if vehicle and equipment maintenance and fueling occurs daily
- vehicles and equipment at the job site to verify that operators are inspecting vehicles and equipment each day of use.
- demolition sites within 50 feet of storm drain systems and receiving waters
- pile driving areas for leaks and spills if pile driving occurs daily
- temporary concrete washouts if concrete work occurs daily
- paved roads at job site access points for street sweeping if earthwork and other sediment or debris generating activities occur daily
- dewatering work if dewatering work occurs daily
- temporary active treatment system if temporary active treatment system activities occur daily
- work over water if work over water occurs daily
- daily inspections for projects within the Lake Tahoe Hydrologic Unit
- daily inspections of access roadways
- weekly inspection of site BMPs

Stormwater site inspections shall be documented on CEM-2030 Stormwater Site Inspection Report, in Appendix G. Completed stormwater inspection reports shall be submitted to the RE within 24 hours after completion of the inspection. Copies of completed inspection reports will be kept in SWPPP File Category 20.31: Contractor Stormwater Site Inspection Reports,

Deficiencies identified during site inspections and correction of deficiencies will be tracked on the CEM-2035 Stormwater Corrective Actions Summary, in Appendix I. Corrective Action Summary forms shall be submitted to the RE when corrections are completed but must be submitted within five (5) days after completion of the site inspection. Completed Stormwater Site Inspection Report Corrective Actions Summary forms shall be filed in SWPPP File Category 20.35: Corrective Actions Summary. A copy of the completed Corrective Actions Summary form will also be attached to the corresponding Stormwater Site Inspection Report that generated the need for the CEM-2035 Stormwater Corrective Actions Summary

### **600.3 Weather Forecast Monitoring**

The WPC Manager shall have primary responsibility to monitor the National Weather Service Forecast Office for forecasted precipitation based on project site location. Precipitation forecast information shall be obtained from the National Weather Service Forecast Office accessible at: <http://www.srh.noaa.gov/>.

The project site location to be used for obtaining forecast from National Weather Forecast Office website is:

125 West Alcott Road, Niland, CA 92257

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The WPC Manager shall monitor the weather forecast on a daily basis for predicted precipitation within the following 96 hours. The WPC Manager shall monitor the forecast for the next 24, 48, 72 and 96 hours to determine if the forecast for precipitation is 50 percent or greater for any 6-hour period. If the forecast for precipitation is 50 percent or greater, the WPC Manager shall calculate the amount of precipitation forecasted for each 24-hour period and the total precipitation for the forecasted storm event and record the information. Weather forecast monitoring shall be recorded be filed in File Category 20.40: Weather Monitoring Logs.

When the forecast for precipitation is 50 percent or greater and the forecasted amount of precipitation is 0.10 inch or more for any 24-hour period within the next 48 hours, the WPC Manager shall perform a pre-storm site inspection and ensure that the site is prepared for the likely forecasted storm event.

For Risk Level 2 and 3 the WPC Manager will prepare a Rain Event Action Plan for forecasted storm events.

Forecasted storm event site preparation shall include, but is not limited to, the installation of soil stabilization and sediment BMPs on active disturbed soil areas and stockpiles.

### **600.4 Weather Monitoring**

The WPC Manager shall have primary responsibility to monitor weather at the project site. The WPC Manager, on a daily basis, shall monitor the weather and record the weather conditions.

When there is precipitation, the WPC Manager shall ensure that storm precipitation data is obtained from the project site rain gauge. Precipitation monitoring will include recording the time, amount of precipitation measured in the project site rain gauge, amount of precipitation within a 24-hour period, and total cumulative amount of precipitation for the forecasted storm event.

If no pre-storm visual site monitoring was performed, and the amount of precipitation for any 24-hour period is 0.10 inch or greater, the WPC Manager will implement during storm visual site monitoring, as discussed in Section 700.1.

When a forecasted storm event was not forecasted to be a qualifying rain event, but the measured cumulative amount of precipitation for the storm event and the expected severity of the continuing storm event results in ½ inch or more of precipitation, the WPC Manager will prepare to sample.

Weather monitoring will be conducted daily. Weather monitoring documentation shall be kept in File Category 20.40: Weather Monitoring Logs.

### **600.5 Best Management Practices Status Report**

The WPC Manager shall prepare a monthly status report of the water pollution control BMPs (site BMPs) installed on the project site. The monthly BMP status report will be based on the progress of the work and the WPCBMPL for the project, with any additional BMPs the WPC Manager has determined are necessary based on the stage of construction and construction activities.

Because the SWPPP, including the WPCBMPL and WPCDs, are based on the entire project site and all construction activities, the monthly BMP status report should be a “snapshot” of which BMPs are deployed on the project site, so a project inspector or reviewer can easily determine what could be expected to be seen on the project site that month. The monthly status report will be used by stormwater inspectors and contractor personnel to ensure SWPPP compliance.

The weekly status report will be used to ensure that weekly training meetings cover BMPs that are required for work activities during the week. The weekly status report will be provided to regulatory agency staff who visit the project site to indicate which BMPs should be in place and which are scheduled to be implemented during the coming week.

The monthly status of stormwater BMPs will be documented on CEM-2034 Stormwater Best Management Practices and Materials Inventory Report form, in Appendix H. Completed monthly status reports shall be submitted to the RE 48 hours prior to the beginning of the work week. Copies of the completed reports will be kept in SWPPP File Category 20.34: Monthly Best Management Practices and Materials Inventory Reports.

## **600.6 Rain Event Action Plans (REAP)**

REAPs will be prepared by the WPC Manager when there is a forecasted storm event. A forecasted storm event is any weather pattern that is forecasted to have a 50 percent or greater probability of producing precipitation of 0.10 inch or more within any 24-hour period at the project site location. The WPC Manager will prepare the REAP for the forecasted storm event based on the current construction activity phase of the project. For REAPs, the construction activity phases are the Highway Construction Phase, Highway Planting / Erosion Control Establishment Phase or Inactive Project Phase. The construction activity phases are defined in Section 500.5.

When the NWS forecast for 72 hours and greater predicts a forecasted storm event, the WPC Manager will prepare a REAP using the REAP form appropriate to the current project stage. REAP forms are available in Appendix L. Prepared REAPs shall be submitted to the RE at least 48 hours prior to a forecasted storm event. If the NWS forecast changes and a storm event is forecasted to occur within 24-72 hours then a REAP must be prepared. If the NWS forecast changes and a storm event is forecasted to occur within the next 24 hours a REAP will not be prepared and the WPC Manager will take immediate actions to ready the project site for the forecasted storm event.

The WPC Manager shall implement a REAP within the 48 hours prior to the forecasted storm event. A copy of the REAP shall be available on the job site at least 48 hours prior to the forecasted storm event. Copies of REAPs will be maintained in SWPPP File Category 20.45: Rain Event Action Plans in reverse chronologic order.

# **SECTION 700**

## **CONSTRUCTION SITE MONITORING PROGRAM**

### ***700.1 Site Visual Monitoring Inspection***

This Construction Site Monitoring Program includes conducting site visual monitoring inspections of the project site to address the following objectives:

- determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives
- determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges
- determine whether BMPs included in the REAP are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges
- demonstrate that the site is in compliance with the discharge prohibitions and applicable NALs and Receiving Water Monitor Triggers of the CGP
- determine whether immediate corrective actions, additional BMP implementation, or SWPPP amendments are necessary to reduce pollutants in stormwater and authorized non-stormwater discharges
- demonstrate that the site is in compliance with the discharge prohibitions
- document the presence or evidence of any non-stormwater discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source, if applicable, and the response taken to eliminate unauthorized non-stormwater discharges and to reduce or prevent pollutants from contacting non-stormwater discharges

#### ***700.1.1 Visual Monitoring Locations***

##### **Locations of Visual Monitoring Prior To A Storm Event**

Visual monitoring (a pre-storm inspection) of the project site is required when the forecast for precipitation is greater than 50 percent within the next 24, 48, 72, 96 hours, and the amount of precipitation forecasted for any 24-hour period is 0.10 inch or greater. Within 48 hours of a forecasted storm event, a stormwater visual monitoring site inspection shall be performed and shall include observations of:

- stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutant sources
- BMPs to identify whether they have been properly implemented
- any stormwater storage and containment areas to detect leaks and ensure maintenance of adequate freeboard

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2 drainage area(s) on the project site and the Contractor’s yard, staging areas, and storage areas have been identified as required forecasted storm event visual observation location(s), according to Section I.3.e of Attachments C, D, and E of the CGP. Drainage area(s) are shown on the WPCDs in Attachment BB and are listed by drainage area location number and location description in Table 700.1.1.1: Drainage Areas.

<b>TABLE 700.1.1.1 DRAINAGE AREAS</b>	
<b>Drainage Area No.</b>	<b>Location</b>
DA-01	See Attachment BB.
DA-02	See Attachment BB.

4 stormwater storage or containment area(s) are located on the project site. These stormwater storage and containment area(s) have been identified as required forecasted storm event visual observation location(s). Stormwater storage or containment area(s) are shown on the WPCDs from Attachment BB and are listed by storage or containment area location number and location description in Table 700.1.1.2: Stormwater Storage and Containment Areas.

<b>TABLE 700.1.1.2 STORMWATER STORAGE AND CONTAINMENT AREAS</b>	
<b>Location No.</b>	<b>Location</b>
SA-01	See Attachment BB.
SA-02	See Attachment BB.
SA-03	See Attachment BB.
SA-04	See Attachment BB.

**Locations of Visual Monitoring during Extended Forecasted Storm Events and within 48 Hours After a Qualifying Rain Event**

During any extended forecasted storm events and within 48 hours after a qualifying rain event (a rain event that has produced ½ inch or more of precipitation), a stormwater visual monitoring site inspection is required to observe:

- stormwater discharges at all discharge locations
- BMPs to identify and record those that need maintenance to operate effectively, those that have failed, and those that could fail to operate as intended
- the discharge of stored or contained stormwater

0 discharge location(s) are located on the project site. These stormwater discharge location(s) have been identified as required visual observation location(s). Stormwater discharge location(s) are shown on the WPCDs in Attachment BB and are listed in Table 700.1.1.3: Stormwater Discharge Locations.

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**TABLE 700.1.1.3  
STORMWATER DISCHARGE LOCATIONS**

<b>Unique Sampling Location Identifier</b>	<b>Location</b>
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BMP locations shown on the WPCDs in Attachment BB and are listed on the WPCBMPL in Attachment CC.

4 stormwater storage or containment area(s) are located on the project site. Stormwater storage or containment area(s) are shown on the WPCDs in Attachment BB and are listed on Table 700.1.1.2: Stormwater Storage and Containment Areas.

**Locations of Visual Monitoring for Non-Stormwater Discharges**

A visual monitoring site inspection for non-stormwater discharges requires that each drainage area be observed for the presence of or indications of prior unauthorized and authorized non-stormwater discharges.

2 drainage area(s) are located on the project site and in the contractor’s yard, staging areas, and storage areas that have been identified as observation location(s) for non-stormwater discharges. Drainage area(s) are shown on the WPCDs in Attachment BB and are listed in Table 700.1.1.1: Drainage Areas.

**700.1.2 Visual Monitoring Schedule**

On a daily basis, contractor personnel will visual monitor the all immediate access roadways.

On a daily basis contractor personnel will visually monitor BMPs during applicable activities:

- storage areas for hazardous materials and waste
- hazardous waste disposal and transporting activities
- hazardous material delivery and storage activities
- vehicle and equipment cleaning facilities if vehicle and equipment cleaning occurs daily
- vehicle and equipment maintenance and fueling areas if vehicle and equipment maintenance and fueling occurs daily
- vehicles and equipment at the job site to verify that operators are inspecting vehicles and equipment each day of use.
- demolition sites within 50 feet of storm drain systems and receiving waters
- pile driving areas for leaks and spills if pile driving occurs daily
- temporary concrete washouts if concrete work occurs daily
- paved roads at job site access points for street sweeping if earthwork and other sediment or debris generating activities occur daily
- dewatering work if dewatering work occurs daily
- temporary active treatment system if temporary active treatment system activities occur daily

- work over water if work over water occurs daily

Stormwater site visual monitoring inspections shall be conducted at a minimum:

- within 48 hours prior to a forecasted storm event (any weather pattern that is forecasted to have a 50 percent or greater probability of producing 0.1 inches or more of precipitation in the project area within a 24 period)
- at 24-hour intervals during any extended forecasted storm event
- within 48 hours after a qualifying rain event (a rain event that has produced ½ inch or more of precipitation)

Non-stormwater discharge site visual monitoring inspections shall be conducted, at a minimum, during each of the following periods: January-March, April-June, July-September, and October-December.

If visual monitoring of the site for stormwater is unsafe because of dangerous weather conditions, such as flooding and electrical storms, then the site inspector shall document the conditions that prevented the inspection. The documentation of the site visual monitoring inspection shall be filed in SWPPP File Category 20.33: Site Visual Monitoring Inspection Reports.

### **700.1.3 Visual Monitoring Procedures**

Site visual monitoring inspections shall be overseen by the contractor's WPC Manager. Site visual monitoring will be conducted by the WPC Manager, appointed QSP or stormwater inspector.

The name(s) and contact number(s) of the site visual monitoring inspection personnel are listed below and their training qualifications are provided in Attachment E:

- |                        |                |
|------------------------|----------------|
| • Assigned Inspector:  | Contact phone: |
| • Alternate Inspector: | Contact phone: |

#### **Daily Access Road Monitoring**

All immediate access roads must be inspected on a daily basis. Any sediment or other construction-related materials deposited on the roads must be removed daily (or more frequently when necessary) and prior to any rain event.

#### **Daily BMP Monitoring During Applicable Activities**

Standard Specification 13-1.03C requires that the contractor personnel on the site shall inspect the following activities on a daily basis:

- storage areas for hazardous materials and waste
- hazardous waste disposal and transporting activities
- hazardous material delivery and storage activities
- vehicle and equipment cleaning facilities if vehicle and equipment cleaning occurs daily
- vehicle and equipment maintenance and fueling areas if vehicle and equipment maintenance and fueling occurs daily
- vehicles and equipment at the job site to verify that operators are inspecting vehicles and equipment each day of use.

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- demolition sites within 50 feet of storm drain systems and receiving waters
  - pile driving areas for leaks and spills if pile driving occurs daily
  - temporary concrete washouts if concrete work occurs daily
  - paved roads at job site access points for street sweeping if earthwork and other sediment or debris generating activities occur daily
  - dewatering work if dewatering work occurs daily
  - temporary active treatment system if temporary active treatment system activities occur daily
  - work over water if work over water occurs daily

**Discharge Monitoring**

During inspections, the contractor personnel shall be observant of any discharges or evidence of a prior discharge that could cause adverse conditions in the storm sewer system or the receiving water. If a discharge or evidence of a prior discharge is discovered by the contractor, the WPC Manager or contractor shall immediately notify the RE, and shall file a written report on the CEM-2061 Notice of Discharge form with the RE within 24 hours of the discharge or discovery of evidence of a prior discharge. Corrective measures shall be implemented immediately following the discovery of the discharge. Form CEM-2061 for reporting discharges is available in Appendix K.

Caltrans will notify the owner/operator of the MS4 and the RWQCB as soon as practicable, but no later than 24 hours after onset of or threat of discharge which can cause adverse conditions to the storm sewer system or the receiving water. This applies to any such discharge that is not covered by California Emergency Management Agency procedures for discharges from a highway to a storm sewer system subject to a MS4 permit.

Discharges requiring reporting include:

- stormwater from a DSA discharged to a waterway without treatment by an effective combination of temporary erosion and sediment control BMPs
- non-stormwater, except conditionally exempted discharges, discharged to a waterway or a storm drain system, without treatment by an approved control measure (BMP)
- stormwater discharged to a waterway or a storm drain system where the control measures (BMPs) have been overwhelmed or not properly maintained or installed
- discharge of hazardous substances above the reportable quantities, as provided in 40 CFR 110.3, 117.3 or 302.4
- stormwater runoff containing hazardous substances from spills discharged to a waterway or storm drain system

The initial notification to the RWQCB of a discharge or threat of discharge will be made immediately for any discharge that can cause adverse conditions to the storm sewer system or the receiving water, with a follow-up in writing within 24 hours. Adverse conditions include, but are not limited to, serious violations or serious threatened violations of Waste Discharge Requirements (WDRs), significant spills of petroleum products or toxic chemicals, or serious damage to control facilities that could affect compliance. Caltrans shall perform follow-up monitoring of major spills and/or perform confirmation sampling to ensure that threats to waters of the U.S. have been eliminated as determined by the local RWQCB.

**Weekly BMP Monitoring**

Weekly monitoring is required to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. The weekly BMP monitoring shall include observations of:

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- all stormwater storage and containment areas identified in Table 700.1.1.2 to detect leaks and ensure maintenance of adequate freeboard
- all BMPs for proper installation and adequate maintenance.

Observations of the site and any recommended corrective actions will be documented in the CEM-2030 Stormwater Site Inspection Report. Any photographs used to document observations will be referenced in the stormwater site inspection report. Corrective actions documented in site inspection reports shall be immediately reviewed by the WCP Manager and, if deemed necessary, implemented within 24 hours.

### **Visual Monitoring Prior To A Forecasted Storm Event**

Visual monitoring of the project site is required when the forecast for precipitation is greater than 50 percent within the next 24, 48, 72, or 96 hours and the amount of precipitation forecasted for any 24-hour period during the storm event is 0.10 inch or greater within a 24-hour period. Site visual monitoring shall be conducted within 48 hours prior to a forecasted storm event. The pre-storm site visual monitoring shall include observations of:

- all drainage areas identified in Table 700.1.1.1 to identify any spills, leaks, or uncontrolled pollutant sources;
- all stormwater storage and containment areas identified in Table 700.1.1.2 to detect leaks and ensure maintenance of adequate freeboard
- all BMPs for proper installation and adequate maintenance.

Observations of the site and any recommended corrective actions will be documented in the CEM-2030 Stormwater Site Inspection Report. Any photographs used to document observations will be referenced in the stormwater site inspection report. Corrective actions documented in site inspection reports shall be immediately reviewed by the WCP Manager and, if deemed necessary, implemented within 24 hours and prior to the forecasted storm event.

Any corrective actions identified by a pre-storm visual monitoring site inspection shall be included in the REAP for the forecasted storm event.

### **Visual Monitoring during Extended Forecasted Storm Events**

Stormwater visual monitoring site inspections shall be conducted at least once each 24-hour period during any extended forecasted storm events. During any extended forecasted storm event, the site visual monitoring inspector shall visually observe:

- stormwater discharges at all discharge locations (Table 700.1.1.3)
- all stored or contained stormwater that is derived from and discharged subsequent to the qualifying rain event producing precipitation of ½ inch or more at the time of discharge; stored or contained stormwater that will likely discharge after working hours, due to anticipated precipitation, shall be observed prior to the discharge during working hours

Stormwater discharges and stored or contained stormwater will be observed for the presence or absence of floating and suspended materials, sheens on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

During any forecasted storm event, stormwater visual monitoring site inspections will include the observation of all site BMPs for:

- proper installation
- achievement of maintenance requirements

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- possible failure
- BMPs that could fail to operate as intended
- effectiveness, so that design changes can be implemented as soon as feasible if needed

Observations of the site and any recommended corrective actions will be documented in the CEM-2030 Stormwater Site Inspection Report. Any photographs used to document observations will be referenced on the stormwater site inspection report. Corrective actions documented in site inspection reports shall be immediately reviewed by the WCP Manager and, if deemed necessary, implemented, as required by Standard Specification 13-1.03A, within 24 hours of identification unless a longer period is authorized (but cannot be authorized longer than required by the CGP: implemented within 72 hours of identification and completed as soon as possible thereafter). If BMPs require design changes, the changes shall be implemented and the SWPPP shall be amended to include the changes.

### **Visual Monitoring Within 48 Hours after a Qualifying Rain Event**

Site visual monitoring post-qualifying rain events shall be conducted within 48 hours after the qualifying rain event. The post-storm site visual monitoring inspection shall include observations of:

- discharges of stormwater that have not been processed by a BMP or evidence of stormwater that has not been processed by a BMP at all discharge locations
- evidence of a breach at stored or contained stormwater that is derived from and discharged subsequent to the qualifying rain event producing precipitation of ½ inch or more at the time of discharge; stored or contained stormwater that will likely discharge after working hours, due to anticipated precipitation, shall be observed prior to the discharge during working hours

Stormwater discharges and stored or contained stormwater will be observed for the presence or absence of floating and suspended materials, sheens on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

Post-qualifying rain event stormwater visual monitoring site inspections will include observation of all site BMPs to determine if BMPs have failed to operate as intended because of:

- improper installation
- lack of maintenance
- lack of effectiveness

Observations of the site and any recommended corrective actions will be documented in the CEM-2030 Stormwater Site Inspection Report. Any photographs used to document observations will be referenced on the stormwater site inspection report. Corrective actions documented in site inspection reports shall be immediately reviewed by the WCP Manager and, if deemed necessary, necessary implemented, as required by Standard Specification 13-1.03A, within 24 hours of identification unless a longer period is authorized (but cannot be authorized longer than required by the CGP: implemented within 72 hours of identification and completed as soon as possible thereafter). If BMPs require design changes, the changes shall be implemented and the SWPPP shall be amended to include the changes.

### **Visual Monitoring of Non-Stormwater Discharges**

For non-stormwater site visual monitoring, each drainage area will be monitored quarterly for the presence or prior indications of unauthorized and authorized non-stormwater discharges, and their sources. The presence or absence of non-stormwater discharges based on site observations will be documented in the CEM-2030 Stormwater Site Inspection Report. Documentation of observed non-stormwater discharges will include presence or absence of floating and suspended materials, sheens on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

Site observations of the site and any recommended corrective actions will be documented. Corrective actions documented in site inspection reports shall be immediately reviewed by the WCP Manager and, if deemed necessary implemented, as required by Standard Specification 13-1.03A, within 24 hours of identification unless a longer period is authorized (but cannot be authorized longer than required by the CGP: implemented within 72 hours of identification and completed as soon as possible thereafter). If BMPs require design changes, the changes shall be implemented and the SWPPP shall be amended to include the changes. Corrective actions shall be documented in the CEM-2035 Stormwater Corrective Actions Summary. Any photographs used to document observations will be referenced in the CEM-2030 Stormwater Site Inspection Report.

### **700.1.4 Visual Monitoring Follow-up and Tracking Procedures**

For deficiencies identified during visual monitoring (site inspections), the required repairs or maintenance of BMPs shall begin and be completed as soon as possible, while taking into consideration worker safety. For deficiencies identified during visual site inspections that require design changes, including additional BMPs, the implementation, as required by Standard Specification 13-1.03A, will begin within 24 hours of identification unless a longer period is authorized (but cannot be authorized longer than required by the CGP: implemented within 72 hours of identification and completed as soon as possible thereafter). When design changes to BMPs are required, the SWPPP shall be amended, including the WCBMPL and WPCDs. If NALs are exceeded, corrective actions shall be approved by the WPC Manager and implemented immediately.

Deficiencies identified on site inspection reports, as well as corrections of deficiencies, will be tracked on the CEM-2035 Stormwater Corrective Actions Summary, in Appendix I. Corrective action summaries shall be submitted to the RE when corrections are completed, but must be submitted within five (5) days of a site inspection.

### **700.1.5 Data Management and Reporting**

The results of site visual monitoring (pre-storm, during storm, post-storm, and quarterly inspections) shall be recorded on the CEM-2030 Stormwater Site Inspection Report, in Appendix G. A copy of each report shall be kept in SWPPP File Category 20.33.

All reports shall be provided to the RE within 24 hours of the site inspection.

Deficiencies identified during visual monitoring (site inspections) and correction of deficiencies will be tracked on the CEM-2035 Stormwater Corrective Actions Summary, in Appendix I. Corrective Action Summary forms shall be submitted to the RE when corrections are completed, but must be submitted within five (5) days of the site inspection. Completed Stormwater Corrective Actions Summary forms shall be filed in SWPPP File Category 20.35: Corrective Actions Summary. A copy of the completed Corrective Actions Summary form will also be attached to the corresponding inspection report and shall be kept in the SWPPP Category 20.33.

If a discharge or evidence of a prior discharge that could cause adverse condition in the storm sewer or the receiving water is discovered by the Contractor, the WPC Manager or Contractor shall immediately notify the RE, and no more than 6 hours after discovery, and will file a written report to the RE within 24 hours of the discovery of evidence of a prior discharge. The written report to the RE will contain:

- the date, time, location, and type of unauthorized discharge;
- The nature of the operation that caused the discharge;
- An initial assessment of any impacts caused by the discharge;
- the BMPs deployed before the discharge;

- the date of deployment and type of BMPs deployed after the discharge, including additional measures installed or planned to reduce or prevent re-occurrence
- steps taken or planned to reduce, eliminate and/or prevent recurrence of the discharge

Reporting of discharges shall be documented on the CEM-2061 Notice of Discharge form, in Appendix K. Completed Notice of Discharge reports shall be submitted to the RE within 24 hours of discovery of evidence of a discharge. Copies of the Notice of Discharge reports will be kept in SWPPP File Category 20.61: Notice of Discharge Reports.

## **700.2 Sampling and Analysis Plans**

### **700.2.1 General SAP**

A sampling and analysis plan (SAP) describes how samples will be collected, under what conditions, where and when the samples will be collected, what the sample will be tested for, what test methods and detection limits will be used, and what methods/procedures will be performed to ensure the integrity of the sample during collection, storage, shipping and testing (i.e., quality assurance/quality control protocols). Therefore, a SAP shall include the components listed below.

1. Scope of Monitoring Activities
2. Monitoring Preparation
3. Monitoring Strategy
4. Sample Collection and Handling
5. Sampling Analysis
6. Quality Control and Assurance
7. Data Management and Reporting
8. Data Evaluation
9. Change of Conditions

This SWPPP contains a non-visible pollutants SAP. The SWPPP may also contain four additional specific SAPS based on the project risk level, project dewatering requirements, RWQCB sampling and analysis requirements, and a SAP for monitoring an active treatment system.

#### **700.2.1.1 Scope of Monitoring Activities**

For specific details with regard to monitoring activities, refer to the specific SAP identified below.

- Non-visible Pollutants (Section 700.2.2.1)
- Non-Stormwater Discharges (Section 700.2.3.1)
- Stormwater pH and Turbidity (Section 700.2.4.1)
- Monitoring required by the Regional Board (Section 700.2.5.1)
- Monitoring for Active Treatment Systems (ATS) (Section 700.2.6.1)

### **700.2.1.2 Monitoring Preparation**

To ensure an effective construction site monitoring and reporting program, the following monitoring preparation activities are required:

- identifying qualified sampling personnel
- ensuring the availability of an adequate quantity of monitoring supplies
- ensuring the availability of field instruments; field instruments must be properly maintained and calibrated prior to sampling events
- identifying a qualified testing laboratory that is capable of performing stormwater and non-stormwater analysis for those constituents that must be tested in a laboratory

#### **700.2.1.2.1 Qualified Sampling Personnel**

Sampling personnel shall be trained to collect, maintain, and ship samples in accordance with the Surface Water Ambient Monitoring Program (SWAMP) 2008 Quality Assurance Program Plan (QAPrP).

- Stormwater sampling and field analysis will be performed by the following primary and alternative stormwater samplers:

- 

The primary stormwater sampler has received the following stormwater sampling training:

- 

The primary stormwater sampler has the following stormwater sampling experience:

- 

The alternate stormwater sampler has received the following stormwater sampling training:

- 

The alternate stormwater sampler has the following stormwater sampling experience:

- 

Training records of designated contractor sampling personnel are provided in Attachment D, Contractor Personnel Stormwater Training.

Safety practices for sample collection will be in accordance with the .

#### **700.2.1.2.2 Monitoring Supplies**

#### **700.2.1.2.3 Field Instruments**

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The field instrument(s) shown in Table 700.2.1.2.3: Field Instruments will be used to analyze the constituents shown:

<b>TABLE 700.2.1.2.3 FIELD INSTRUMENTS</b>	
<b>Field Instrument</b>	<b>Constituent</b>

The instrument(s) shall be maintained in accordance with manufacturer’s instructions.

The instrument(s) shall be calibrated before each sampling and analysis event.

A Standard Operating Procedure (SOP) for calibration and maintenance of field instruments shall be implemented based on the meter manufacturer’s instructions. A copy of the manufacturer’s instructions shall be attached to the SOP so that they are readily available.

Maintenance and calibration records shall be maintained in SWPPP File Category 20.55: Field Testing Equipment Maintenance and Calibration Records.

#### **700.2.1.2.4 Testing Laboratory**

Samples collected on the project site that require laboratory testing will be tested by a laboratory certified by the State Department of Health Services. Samples collected on the project site will be analyzed by:

Laboratory Name:

Address:

Contact Name:

Title:

Phone Number:

Emergency Phone Number (24/7):

Email Address:

#### **700.2.1.3 Monitoring Strategy**

The monitoring strategy includes identifying analytical constituents, potential sampling locations, identification of actual sampling locations, and sampling schedule,

##### **700.2.1.3.1 Analytical Constituents**

Stormwater and non-stormwater discharges shall be monitored for the analytical constituents specified in the specific SAP(s) in this SWPPP.

##### **700.2.1.3.2 Potential Sampling Locations**

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Potential sampling locations must be representative of the stormwater and non-stormwater discharges from the construction site. Existing conditions and associated construction activities within each drainage area form the basis for determining representative stormwater sampling locations.

Project drainage areas and potential sampling locations have been determined by:

- reviewing project plans
- visiting project site
- reviewing topography maps

The WPCDs show the demarcation of all drainage areas that are either:

- within the project site
- cover part of the project site

The QSD must identify potential sampling locations where concentrated run-off:

- leaves the Caltrans right-of-way
- drains into an MS4
- discharges into a receiving water

Potential run-on sampling locations were determined where concentrated run-on:

- enters the right-of-way
- combines with the stormwater on site and then discharges into an MS4, including the location(s) of discharge into the MS4

The following locations were determined when runoff discharges directly into receiving water bodies:

- the discharge location(s) into the receiving water
- a potential sampling location upstream of all discharge locations
- a potential sampling location downstream from all discharge location(s) into the receiving water.

Necessary potential sampling locations were determined when:

- there are potential sources of non-visible pollutants, as discussed in Section 500.1, and discharge locations are downgradient
- run-on locations are present that may contribute non-visible pollutants
- there are potential non-stormwater discharges and corresponding discharge locations are downgradient
- there are proposed dewatering construction activities

If an ATS is used on site, then sample locations must be included in Section 700.2.6.

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Potential stormwater and non-stormwater sampling locations must be shown on the WPCDs in Attachment BB and listed in Attachment EE: Stormwater Sample Locations. The QSD has identified each of the potential sampling locations with a unique sample location identification code, as shown below. The identification code must start with a number and must be different for each location. If the construction site lies in a west-to-east orientation, starting with one (01) from the east, the potential sampling locations shall be numbered toward the west. If the construction site lies in a south-to-north orientation, the potential sampling locations shall be numbered toward the north.

To further distinguish among the locations, each potential sampling location has been identified with one of the following abbreviations based on the sampling location type:

- discharge locations leaving Caltrans right-of-way: DL
- discharge locations from areas with known non-visible pollutants: NVP
- discharge locations upgradient of areas with known non-visible pollutants: UNVP
- discharge locations to an MS4: MS
- run-on locations: RO
- discharge locations into a receiving water: RW
- downstream of all discharge locations: RWD
- upstream of all discharge locations: RWU
- dewatering discharge locations: DDL
- contained stormwater discharge locations: CSDL
- discharge locations for ATS: ATS

The unique sample location identification code shall follow this format, **SSSTTTXX** , where:

SSS	=	sampling location identifier number (e.g., 010)
TTTT	=	sampling location type (e.g. DL)
XX	=	identifier number for the type of sampling location

For example, the sampling location identification for the 15th sampling location based on starting from the south end of the project for a stormwater discharge location that has been identified to be the ninth discharge location would be **015DL09**.

Potential sampling locations shown on the WPCDs shall be identified with unique sampling location identifiers. Each potential sample location must be listed on Stormwater Sample Locations in Attachment EE. The unique identification of each potential sampling location based on its number and abbreviation of type shall be used on all sampling documentation.

The WPC Manager may have to revise and/or add additional sampling locations during the course of construction as conditions dictate.

### 700.2.1.3.3 Identification of Actual Sampling Locations

For each forecasted storm event, actual sampling locations will be determined by the WPC Manager based on the strategy described in each specific SAP.

### 700.2.1.3.4 Sampling Schedule

For the sampling schedule, see the specific SAPs in the CSMP. If a scheduled sampling activity is unsafe because of dangerous weather conditions, such as flooding and electrical storms, then the stormwater sampler shall document why an exception to performing the sampling was necessary.

#### **700.2.1.4 Sample Collection and Handling**

Sample collection procedures shall be used to ensure that representative samples are collected and that the potential for contamination of samples is minimized. Sample handling procedures are followed to ensure that samples are identified accurately and that the required analysis is clearly documented. Chain-of-custody requirements for samples are necessary to trace the possession of the sample from collection through analysis.

##### **700.2.1.4.1 Sample Collection Procedures**

Samples shall be collected, maintained and shipped in accordance with the SWAMP's 2008 QAPrP.

Grab samples shall be collected and preserved in accordance with the methods identified in each specific SAP. Only personnel trained in proper water quality sampling shall collect samples.

Samples from areas of sheet flow can be collected using the collection procedures shown in the video at <http://www.youtube.com/watch?v=AmEJUNp44aU>. For pH and turbidity sampling, sheet flow sampling can be conducted as described below to concentrate the flow in order to collect a sample or follow other procedures approved by the RE.

- Place several rows of sandbags in a half circle directly in the path of the sheet flow to pond water, and wait for enough water to spill over. Then place a cleaned or decontaminated flexible hose along the top, and cover with another sandbag so that ponded water will only pour through the flexible hose and into sample bottles. Do not reuse the same sandbags during future sampling events as they may cross-contaminate future samples.
- Place a cleaned or decontaminated dustpan with open handle in the path of the sheet flow so that water will pour through the handle and into sample bottles.

For receiving water sampling, upstream samples shall be collected to represent the water body upgradient of the construction site. Downstream samples shall be collected to represent the water body mixed with direct discharge from the construction site. Samples shall not be collected directly from ponded, sluggish, or stagnant water.

Receiving water upstream and downstream samples shall be collected using one of the following methods:

- placing a sample bottle directly into the stream flow in or near the main current upstream of sampling personnel and allowing the sample bottle to fill completely;
- OR
- placing a decontaminated or sterile bailer or other sterile collection device in or near the main current to collect the sample and then transferring the collected water to appropriate sample bottles allowing the sample bottle to fill completely.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel shall follow the procedures listed below.

- Wear a clean pair of surgical gloves donned prior to the collection and handling of each sample at each location.

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- Decontaminate sampling equipment prior to sample collection using a TSP-soapy water wash, distilled water rinse, and final rinse with distilled water. Dispose of decontamination water/soaps appropriately (i.e., do not discharge to the storm drain system or receiving water).
- Do not allow the inside of the sample bottle to come into contact with any material other than the run-off sample.
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection.
- Do not leave the cooler lid open for an extended period of time once samples are placed inside.
- Do not sample near a running vehicle where exhaust fumes may impact the sample.
- Do not touch the exposed end of a sampling tube, if applicable.
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles.
- Do not eat, smoke, or drink during sample collection/field measurement.
- Do not sneeze or cough in the direction of an open sample bottle.
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample.

### 700.2.1.4.2 Sample Handling Procedures

Immediately following collection, sample bottles to be forwarded for laboratory analytical testing shall be capped, labeled, documented on the Chain-of-Custody Record, sealed in a re-sealable storage bag, placed in an ice-chilled cooler, at  $0 \pm 4$  degrees Celsius, and delivered within 24 hours to the laboratory shown in sub-section 700.2.1.2.4.

Immediately following collection, samples used for field analysis shall be tested in accordance with the field instrument manufacturer's instructions and results recorded on the CEM-2052 Stormwater Sample Field Test Report form.

### 700.2.1.4.3 Sample Documentation Procedures

All original data documented on sample bottle identification labels, the Chain-of-Custody, and the CEM-2051 Stormwater Sampling and Testing Activity Log - Optional Form, shall be recorded using waterproof ink. These shall be considered accountable documents. If an error is made on an accountable document, the individual shall make corrections by lining through the error and entering the correct information. The erroneous information shall not be obliterated. All corrections shall be initialed and dated.

The following form, used for sample documentation, is provided in the SWPPP appendices:

- CEM-2051 Stormwater Sampling and Testing Activity Log - Optional Form, in Appendix M

Duplicate samples shall be identified in a manner consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples can be identified in the CEM-2051 Stormwater Sampling and Testing Activity Log - Optional Form.

Sample Bottle Identification Labels: Sampling personnel shall attach an identification label to each sample bottle, which shall include, at a minimum, the following information:

- project name
- contract number and/or project identifier number

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- unique sample identification code, which shall follow this format, **SSSSYYMMDDHHmmTT** , where

SSSSS	=	sampling location identifier number (e.g., 01MS1)
YY	=	last two digits of the year (e.g. 11)
MM	=	month (01-12)
DD	=	day (01-31)
HH	=	hour sample collected (00-23)
mm	=	minute sample collected (00-59)
TT	=	Type or QA/QC Identifier (if applicable)
G	=	grab
FS	=	field duplicate

For example, the sample number for a grab sample collected at Station 01MS1, collected at 4:15PM on December 8, 2011 would be **01MS11112081615G**.

- constituent to be analyzed
- initials of person who collected the sample

Stormwater Sampling and Testing Activity Log: A log of sampling events and test results shall include:

- sampling date
- separate times for collected samples and QA/QC samples, recorded to the nearest minute
- unique sample identification number and location
- constituent analyzed
- names of sampling personnel
- weather conditions (including precipitation amount)
- test results
- other pertinent data

Sample Information, Identification and Chain-of-Custody Record Forms: All samples to be analyzed by a laboratory will be accompanied by a Chain-of-Custody. The samplers will sign the Chain-of-Custody when samples are turned over to the testing laboratory. Chain-of-custody procedures will be strictly adhered to for QA/QC purposes.

### **700.2.1.5 Sample Analysis**

For the analytical methods to be used to determine the presence of pollutant(s), see the specific SAPs in this CSMP.

### **700.2.1.6 Quality Assurance/Quality Control**

For verification of laboratory or field analysis, duplicate samples shall be collected at a rate of 10 percent or 1 minimum duplicate per sampling event. The duplicate sample shall be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample shall be collected immediately after the primary sample has been collected. Duplicate samples shall not influence any evaluations or conclusions; however, they shall be used as a check on laboratory or field analysis quality assurance.

### **700.2.1.7 Data Management and Reporting**

All test results shall be documented on either the CEM-2052 Stormwater Sample Field Test Report form and/or may be entered on the CEM-2051 Stormwater Sampling and Testing Activity Log - Optional Form. These shall be considered accountable documents. If an error is made on an accountable document, the individual shall make corrections by lining through the error and entering the correct information. The erroneous information shall not be obliterated. All corrections shall be initialed and dated.

For field tests, the submitted information shall include a signed copy of the Chain-of-Custody and CEM-2052 Stormwater Sample Field Test Report form. Appendix N contains the CEM-2052 Stormwater Sample Field Test Report form, which must accompany the Chain-of-Custody Record. The test results can be recorded on the CEM-2051 Stormwater Sampling and Testing Activity Log - Optional Form, in Appendix M.

For laboratory testing, all laboratory analysis results shall be reviewed for consistency among laboratory methods, sample identifications, dates, and times for both primary samples and QA/QC samples. The test results may be recorded on the CEM-2051 Stormwater Sampling and Testing Activity Log - Optional Form.

All sampling and testing documentation, including the Chain-of-Custody, CEM-2051 Stormwater Sampling and Testing Activity Logs - Optional Form, CEM-2052 Stormwater Sample Field Test Reports, and Laboratory Test Reports shall be kept in the appropriate SWPPP file category. Sampling and testing documentation shall be filed in the appropriate following SWPPP file category based on the specific SAP that required the sampling and analysis:

- non-visible pollutant sampling and testing – SWPPP File Category 20.51;
- non-stormwater discharge sampling and testing – SWPPP File Category 20.50
- turbidity, pH, and SSC sampling and testing – SWPPP File Category 20.52
- required RWQCB sampling and testing – SWPPP File Category 20.53
- ATS sampling and testing – SWPPP File Category 20.54

If corrective actions are taken as a result of the data evaluation, a copy of the completed CEM-2035 Stormwater Corrective Actions Summary shall be filed in File Category 20.35: Corrective Actions Summary.

A copy of completed sampling records and reports and an updated CEM-2051 Stormwater Sampling and Testing Log - Optional shall be submitted to the RE. All water quality analytical results, including QA/QC data, shall be submitted to the RE within 48 hours of sampling for field analyzed samples, and within 30 days for laboratory analyses.

In addition to a paper copy of the water quality test results, the test results shall be submitted electronically in Microsoft Excel (.xls) format, and shall include, at a minimum, the following information from the lab: Sample ID Number, Contract Number, Constituent, Reported Value, Laboratory Name, Method Reference, Method Number, Method Detection Limit, and Reported Detection Limit. Electronic copies of stormwater data shall be forwarded by email to at for inclusion into a statewide database.

### **700.2.1.8 Data Evaluation**

For data evaluation of stormwater sample test results, see specific SAPs.

### **700.2.1.9 Change of Conditions**

Whenever stormwater visual monitoring site inspections indicate a change in site conditions that might affect the appropriateness of sampling locations, sampling and testing protocols shall be revised accordingly. All such revisions shall be implemented as soon as feasible, and the SWPPP updated or amended.

## **700.2.2 Sampling and Analysis Plan for Non-Visible Pollutants**

This SAP has been prepared for monitoring non-visible pollutants in stormwater and non-stormwater discharges from the project site and off-site activities directly related to the project, in accordance with the requirements of the CGP and applicable requirements of the Caltrans Construction Site Monitoring Program Guidance Manual, August 2013. This SAP for monitoring non-visible pollutants includes all of the components listed in Section 700.2.1.

### **700.2.2.1 Scope of Monitoring Activities**

The scope of monitoring for discharges of non-visible pollutants from the construction site is based on the construction materials and construction activities to be performed on the project site, potential for the presence of non-visible pollutants, based on the historical use of the site, and potential non-visible pollutants in run-off from areas where soil amendments have been used on the project site.

The construction materials, wastes or activities listed below, and identified in Section 500.1.1, are potential sources of non-visible pollutants to stormwater discharges from the project. Storage, use, and operational locations are shown on the WPCDs in Attachment BB.

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The existing site features listed below, and identified in Section 500.1.2, are potential sources of non-visible pollutants to stormwater discharges from the project.

- 

The soil amendments listed below have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil and will be used on the project site.

- 

### **700.2.2.2 Monitoring Preparation**

Refer to the general requirements in General SAP Section 700.2.1.2 for monitoring preparation.

#### **700.2.2.2.1 Qualified Sampling Personnel**

Refer to the general requirements in General SAP Section 700.2.1.2.1 for Qualified Sampling Personnel.

#### **700.2.2.2.2 Monitoring Supplies**

Refer to the general information in General SAP Section 700.2.1.2.2 regarding monitoring supplies.

#### **700.2.2.2.3 Field Instruments**

Refer to the general information in General SAP Section 700.2.1.2.3 regarding field instruments.

#### **700.2.2.2.4 Testing Laboratory**

Refer to the contact information found in General SAP Section 700.2.1.2.4 for the Testing Laboratory.

### **700.2.2.3 Monitoring Strategy**

The monitoring strategy for non-visible pollutants in stormwater discharges is to identify all potential non-visible pollutants that may be on the project site, non-visible pollutant sources, and water quality indicators that will indicate the presence of the non-visible pollutant in stormwater discharges. Locations will be identified where sources of non-visible pollutants will be used, stored or exist because of historical use of the project site so that these areas are monitored prior to and during forecasted storm events.

Non-visible pollutant monitoring is only required where a discharge can cause or contribute to an exceedance of a water quality standard based on one of the following triggers:

- construction materials and waste are exposed
- the site contains historical non-visible pollutants
- construction activity has occurred or material has been placed within the past 24 hours that may cause an exceedance of a water quality standard
- there is run-on to the site that may contain non-visible pollutants
- there is a breach, malfunction, leak or spill from a BMP

When one of the triggers that indicates a non-visible pollutant source may have come in contact with stormwater is discovered during a site inspection conducted prior to, during or after a forecasted storm event, the WPC Manager will require that sampling and analysis of the stormwater discharge be conducted for the applicable non-visible pollutant water quality indicator(s).

For the forecasted storm event in which a trigger for a non-visible pollutant sampling and analysis has occurred, the WPC Manager will also require the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. The WPC Manager will perform an evaluation of the analysis results from the non-visible pollutant stormwater discharge sampling location and the analysis results from the uncontaminated run-off sampling location to determine if there is an increased level of the tested non-visible pollutant analyte in the stormwater discharge.

#### **700.2.2.3.1 Analytical Constituents**

**Identification of Potential Non-Visible Pollutants**

The following table lists the specific sources and types of potential non-visible pollutants on the project site and the applicable water quality indicator constituent(s) for that pollutant.

**700.2.2.3.2 Potential Sampling Locations**

Using the criteria in Section 700.2.1.3.2, the potential sampling locations on the project site for monitoring non-visible pollutants were identified. Sampling locations are based on: proximity to planned non-visible pollutant storage; occurrence or use; accessibility for sampling and personnel safety; and other factors in accordance with the applicable requirements in the Caltrans Construction Site Monitoring Program Guidance Manual, latest edition. Sampling locations shall be shown on the WPCDs in Attachment BB and listed on Stormwater Sampling Locations in Attachment EE:

2 sampling location(s) on the project site and the contractor’s support facilities have been identified as potential locations for the collection of samples of runoff from planned material and waste storage areas and areas where non-visible pollutant producing construction activities are planned. Potential non-visible pollutant sampling locations are listed in the Table 700.2.2.3.2.1: Potential Non-Visible Pollutant Sampling Locations.

<b>TABLE 700.2.2.3.2.1 POTENTIAL NON-VISIBLE POLLUTANT SAMPLING LOCATIONS</b>	
<b>Sampling Location Identifier</b>	<b>Location Description</b>
SAM-NV-01	See Attachment BB.
SAM-NV-02	See Attachment BB.

Potential non-visible pollutant sampling locations shall be shown on the WPCDs in Attachment BB and listed on Stormwater Sampling Locations in Attachment EE:

2 sampling location(s) has been identified for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. This location(s) was selected such that the sample will not have come in contact with (1) operational or storage areas associated with the materials, wastes, and activities identified in Section 500.1.1; (2) potential non-visible pollutants due to historical use of the site, as identified in Section 500.1.2; (3) areas in which soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied; or (4) disturbed soils areas. Potential non-visible pollutant uncontaminated sampling locations are listed in Table 700.2.2.3.2.2: Potential Uncontaminated Non-visible Pollutant Sampling Locations.

<b>TABLE 700.2.2.3.2.2 POTENTIAL UNCONTAMINATED NON-VISIBLE POLLUTANT SAMPLING LOCATIONS</b>	
<b>Sampling Location Identifier</b>	<b>Location Description</b>
SAM-NV-01	See Attachment BB.
SAM-NV-02	See Attachment BB.

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Potential non-visible pollutant uncontaminated sampling locations shall be shown on the WPCDs from Attachment BB and listed on Stormwater Sampling Locations in Attachment EE.

**700.2.2.3.3 Actual Sampling Locations**

Sampling for non-visible pollutants at any potential non-visible pollutant sampling location will be based on any of the conditions listed below having been identified during the visual monitoring site inspections.

- Locations where materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from the storage area.
- Locations where materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the forecasted storm event, and (3) the potential exists for discharge of non-visible pollutants to surface waters or a storm drain system.
- Locations where a construction activity ( including but not limited to those identified in Section 500.1.1) with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the forecasted storm event, (2) involved the use of applicable BMPs that were observed to be breached, malfunctioning, or improperly implemented, and (3) resulted in the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Locations where soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and the potential exists for discharge of non-visible pollutants to surface waters or a storm drain system.
- Locations where stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site, and the potential exists for discharge of non-visible pollutants to surface waters or a storm drain system.

If the presence of a material storage, waste storage, or operations area where spills have been observed or the potential for the discharge of non-visible pollutants to surface waters or a storm drain system was noted during a site inspection conducted prior to or during a forecasted storm event and such an area has not been identified on the list of potential non-visible pollutant sampling locations, the WPC Manager must identify the corresponding discharge location and the corresponding upgradient sampling location as actual non-visible sampling locations. The additional sampling location for non-visible pollutant monitoring shall be shown on the WPCDs from Attachment BB and added to Attachment EE: Stormwater Sampling Locations.

For forecasted storm events, the selection of the actual sampling locations for non-visible pollutants by the WPC Manager will be documented on the CEM-2048 Storm Event Sampling and Analysis Plan form, in Appendix N. The completed SAP for each storm event will be filed in File Category 20.46: Storm/Rain Event Action, Sampling and Analysis Plans. Within 24 hours prior to a storm event, a copy of the storm event SAP shall be submitted to the RE.

For qualifying rain events, the selection of the actual sampling locations for non-visible pollutants by the WPC Manager will be documented on the CEM-2049 Qualifying Rain Event Sampling and Analysis Plan. The completed SAP for each qualifying rain event will be filed in File Category 20.46: Storm/Rain Event Sampling and Analysis Plans. Within 24 hours prior to a storm event, a copy of the SAP shall be attached to the REAP and submitted to the RE.

**700.2.2.3.4 Sampling Schedule**

In addition to the general scheduling requirements in General SAP Section 700.2.1.3.4, samples for non-visible pollutant monitoring, including both the non-visible pollutants samples and uncontaminated background samples, shall be collected during the first two hours of discharge from storm events that result in a sufficient discharge for sample collection. Samples shall be collected during daylight hours, 7 days a week.

#### **700.2.2.4 Sample Collection and Handling**

Refer to the general requirements for sample collection and handling in General SAP Section 700.2.1.4.

##### **700.2.2.4.1 Sample Collection Procedures**

Refer to the general procedures for sample collection in General SAP Section 700.2.1.4.1.

##### **700.2.2.4.2 Sample Handling Procedures**

Refer to the general procedures for sample handling in General SAP Section 700.2.1.4.2.

##### **700.2.2.4.3 Sample Documentation Procedures**

In addition to the general sample documentation procedures provided in General SAP Section 700.2.1.4.3, when applicable, the contractor's stormwater inspector will document in the CEM-2030 Stormwater Site Inspection Report, that samples for non-visible pollutants were taken during a storm event, based on the criteria for non-visible pollutant sampling described in Section 700.2.2.3.3.

#### **700.2.2.5 Sample Analysis**

Samples collected for monitoring of non-visible pollutants will be analyzed by the laboratory identified in Section 700.2.1.2.4. Samples shall be analyzed for the constituents identified in Table 700.2.2.3.1, using the analytical methods identified in the following table, entitled "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants."

#### **700.2.2.6 Quality Assurance/Quality Control**

Refer to the general requirements regarding Quality Assurance/Quality Control (QA/QC) in General SAP Section 700.2.1.6.

#### **700.2.2.7 Data Management and Reporting**

Refer to general requirements for data management and reporting in Section General SAP 700.2.1.7.

### **700.2.2.8 Data Evaluation**

Water quality sample analytical results for non-visible pollutants shall be compared to the uncontaminated background sample results. Should the discharge (downgradient) sample show an increased level of the tested non-visible pollutant analyte relative to the background sample, the BMPs, site conditions, and surrounding influences shall be assessed to determine the probable cause for the increase.

As determined by the site and data evaluation, appropriate BMPs shall be repaired or modified to mitigate discharges of non-visual pollutant concentrations. Once deemed necessary, corrective actions shall be implemented, as required by Standard Specification 13-1.03A, within 24 hours of identification unless a longer period is authorized (but cannot be authorized longer than required by the CGP: implemented within 72 hours of identification and completed as soon as possible thereafter), and documented on the CEM-2035 Stormwater Corrective Actions Summary. Revisions/design changes to BMPs required as a result of data evaluation and site assessment shall be implemented based on an amendment to the SWPPP.

### **700.2.2.9 Change of Conditions**

Refer to the general requirements for change of conditions in General SAP Section 700.2.1.9.

## **700.2.3 Sampling and Analysis Plan for Non-Stormwater Discharges**

This SAP has been prepared for monitoring non-stormwater discharges from the project site and off-site activities directly related to the project, in accordance with the requirements of the CGP and applicable requirements of the Caltrans Construction Site Monitoring Program Guidance Manual, August 2013. This SAP for monitoring non-stormwater discharges includes all of the components listed in Section 700.2.1.

### **700.2.3.1 Scope of Monitoring Activities**

Non-stormwater discharges can be authorized by a separate NPDES permit or conditional exemption. For non-stormwater discharges that are unauthorized where runoff is discharged off site, sampling and testing of the discharge must be conducted in compliance with the CGP.

Examples of unauthorized non-stormwater discharges common to construction activities include:

- vehicle and equipment wash water, including concrete washout water
- slurries from concrete cutting and coring operations, or grinding operations
- slurries from concrete or mortar mixing operations
- residue from high-pressure washing of structures or surfaces
- wash water from cleaning painting equipment

- runoff from dust control applications of water or dust palliatives
- sanitary and septic wastes
- chemical leaks and/or spills of any kind, including but not limited to, petroleum, paints, cure compounds, etc

When an unauthorized non-stormwater discharge is discovered, the WPC Manager will require sampling and analysis of the effluent to detect whether non-visible pollutants are present in the discharge. Sampling and analysis of non-stormwater discharges shall be performed in accordance with Section 700.2.2, the SAP for non-visible pollutants.

Sampling and analysis for pH and turbidity of stored or impounded stormwater discharges subsequent to a qualifying rain event (a rain event that has produced ½ inch or more of precipitation at the time of discharge) shall be performed in accordance with Section 700.2.4, the SAP for stormwater pH and turbidity.

### **700.2.3.2 Monitoring Preparation**

Refer to the general requirements for monitoring preparation in General SAP Section 700.2.1.2.

#### **700.2.3.2.1 Qualified Sampling Personnel**

Refer to the general requirements for Qualified Sampling Personnel in General SAP Section 700.2.1.2.1.

#### **700.2.3.2.2 Monitoring Supplies**

Refer to the general information regarding monitoring supplies in General SAP Section 700.2.1.2.2.

#### **700.2.3.2.3 Field Instruments**

Refer to the general information regarding field instruments in General SAP Section 700.2.1.2.3.

#### **700.2.3.2.4 Testing Laboratory**

Refer to the contact information for the testing laboratory found in General SAP Section 700.2.1.2.4.

### **700.2.3.3 Monitoring Strategy**

Non-stormwater discharges from the construction site will be monitored for exceedances of water quality standards.

#### **700.2.3.3.1 Analytical Constituents**

For non-stormwater dewatering discharges and discharges of stored stormwater, samples shall be analyzed for the following constituents:

- turbidity
- pH
- 

**700.2.3.3.2 Potential Sampling Locations**

Using the criteria in Section 700.2.1.3.2, potential sampling locations on the project site for monitoring dewatering discharges, discharges of impounded stormwater, and other non-stormwater discharges were identified. Sampling locations were based on: proximity to planned non-stormwater dewatering; non-stormwater occurrence or use; accessibility for sampling and personnel safety; and other factors in accordance with the applicable requirements in the *Caltrans Construction Site Monitoring Program Guidance Manual*, August 2013. Sampling locations shall be shown on the WPCDs in Attachment BB and listed on Stormwater Sampling Locations in Attachment EE.

sampling location(s) on the project site have been identified as potential locations for the collection of non-stormwater dewatering samples and the sampling location(s) are listed in Table 700.2.3.3.2.1: Potential Non-stormwater Dewatering Sampling Locations.

TABLE 700.2.3.3.2.1 POTENTIAL NON-STORMWATER DEWATERING SAMPLING LOCATIONS	
Sampling Location Identifier	Location Description

sampling location(s) on the project site been identified as potential locations for the collection of discharge samples of impounded stormwater and the sampling location(s) are listed in Table 700.2.3.3.2.2: Potential Impounded Stormwater Discharge Sampling Locations.

TABLE 700.2.3.3.2.2 POTENTIAL IMPOUNDED STORMWATER DISCHARGE SAMPLING LOCATIONS	
Sampling Location Identifier	Location Description

**700.2.3.3.3 Actual Sampling Locations**

Actual sampling locations will be determined by the WPC Manager prior to dewatering activities based on the potential dewatering discharge sample locations initially selected.

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When stormwater is impounded in excavations on the project site and the impounded stormwater has the potential to create runoff from the project site, the WPC Manager will determine the actual sampling location for collecting impounded stormwater discharge samples.

If new locations for dewatering discharges or impounded stormwater discharges that have not been identified on the list of potential stormwater and non-stormwater sampling locations are identified during the course of construction, the WPC Manager must create sampling location identifiers for the dewatering discharge sampling location. The additional sampling location for dewatering discharge monitoring shall be shown on the WPCDs in Attachment BB and added to Attachment EE: Stormwater Sampling Locations.

### 700.2.3.3.4 Sampling Schedule

Whenever there are dewatering discharges or impounded stormwater discharges, sampling will be performed daily during discharging. Sampling will be performed upon commencement of the dewatering discharge or impounded stormwater discharge, and then at least a minimum of three (3) samples per day will be collected for analysis, depending on visual monitoring.

### 700.2.3.4 Sample Collection and Handling

Refer to the general requirements for sample collection and handling in General SAP Section 700.2.1.4.

#### 700.2.3.4.1 Sample Collection Procedures

Refer to the general procedures for sample collection in General SAP Section 700.2.1.4.1.

#### 700.2.3.4.2 Sample Handling Procedures

Refer to the general procedures for sample handling in General SAP Section 700.2.1.4.2.

#### 700.2.3.4.3 Sample Documentation Procedures

In addition to the general procedures for sample documentation in General SAP Section 700.2.1.4.3, when applicable, the contractor's stormwater inspector will document on the CEM-2030 Stormwater Site Inspection Report that samples for non-stormwater discharge pollutants were taken based on a visual monitoring site inspection.

### 700.2.3.5 Sample Analysis

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Samples from non-stormwater discharges shall be analyzed for pH and turbidity at a minimum. (If other constituents are warranted.)

The WPC Manager may determine that samples of non-stormwater discharges, need to be analyzed for non-visible pollutants. If the WPC Manager determines that non-visible pollutants may have contaminated the discharge, the samples shall be analyzed for the suspected pollutants. Sampling and analysis for non-visible pollutants in non-stormwater discharges shall be performed following the guidance in Section 700.2.2, the SAP for non-visible pollutants.

Samples shall be analyzed for the constituents indicated in the following table, titled “Sample Collection, Preservation and Analysis for Monitoring Water Extracted by Dewatering or Impounded Stormwater Discharges.”

<b>TABLE 700.2.3.5 SAMPLE COLLECTION, PRESERVATION AND ANALYSIS FOR MONITORING WATER EXTRACTED BY DEWATERING OR IMPOUNDED STORMWATER DISCHARGES</b>						
<b>Parameter</b>	<b>Test Method</b>	<b>Sample Preservation</b>	<b>Minimum Sample Volume<sup>(1)</sup></b>	<b>Sample Bottle</b>	<b>Maximum Holding Time</b>	<b>Detection Limit (min)</b>
Turbidity	Field test with calibrated portable instrument	Store at 4° C (39.2° F)	100 mL	Polypropylene or Glass	48 hours	1 NTU
pH	Field test with calibrated portable instrument	Store at 4° C (39.2° F)	100 mL	Polypropylene	15 Minutes	0.2

Notes: 1. Minimum sample volume recommended. Specific volume requirements will vary by instrument; check instrument manufacturer instructions.

- °C - degrees Celsius
- °F - degrees Fahrenheit
- L - liter
- ml - milliliters
- NTU - Nephelometric Turbidity Unit

**700.2.3.6 Quality Assurance/Quality Control**

Refer to the general requirements regarding Quality Assurance/Quality Control (QA/QC) in Section General SAP 700.2.1.6. For samples analyzed for turbidity and pH the following replaces the requirements for QA/QC in Section 700.2.1.6:

The contractor shall coordinate with the Caltrans RE on sampling locations and timing for quality assurance verification of field sampling and analysis. The contractor shall notify the RE at least 24 hours prior to dewatering discharge or impounded stormwater discharge sampling events.

**700.2.3.7 Data Management and Reporting**

Refer to the general requirements for data management and reporting in General SAP Section 700.2.1.7.

**700.2.3.8 Data Evaluation**

An evaluation of the water quality sample analytical results, including sampling locations and the QA/QC data, shall be submitted to the RE for every day that the water from dewatering is discharged. Should the dewatering discharge concentrations exceed applicable water quality standards, discharging will be stopped immediately and the WPC Manager or other personnel shall evaluate the dewatering BMPs to determine the probable cause for the exceedance. For dewatering discharges, Caltrans requires that the turbidity of any sample must not exceed 200 NTU. The pH value of any sample must be within the range of 6.7 to 8.3 pH units.

Samples of non-stormwater collected during discharge shall be evaluated by determining if suspected contaminants are present. Unauthorized discharges will be stopped as soon as possible and the RE will be notified immediately and a written report of discharge shall be completed and submitted to the RE. Authorized discharges shall be sampled for pH and turbidity and all suspected pollutants. For pH and turbidity, sample results shall be compared to the NAL.

As determined by the data evaluation and project site assessment, appropriate BMPs shall be repaired or modified to mitigate the exceedances. Corrective actions taken shall be documents on the CEM-2035 Stormwater Corrective Actions Summary. Any revisions/design changes to BMPs shall be implemented based on an amendment to the SWPPP.

### **700.2.3.9 Changes of Conditions**

Refer to the general requirements for changes of conditions in General SAP Section 700.2.1.9.

## **700.2.4 Sampling and Analysis Plan for Stormwater pH and Turbidity**

This SAP has been prepared for monitoring pH and turbidity in stormwater discharges from the project site and off-site activities directly related to the project in accordance with the requirements of the CGP and applicable requirements of the Caltrans Construction Site Monitoring Program Guidance Manual, August 2013. This SAP for monitoring pH and turbidity includes all of the components listed in Section 700.2.1.

### **700.2.4.1 Scope of Monitoring Activities**

The scope of monitoring for this SAP includes monitoring for pH and turbidity in stormwater discharges from the project site and, run-on to the project site.

This project discharges into , a water body that is sediment-sensitive. Monitoring of the receiving water will be required when direct discharges to the receiving water.

### **700.2.4.2 Monitoring Preparation**

Refer to the general requirements for monitoring preparation in General SAP Section 700.2.1.2.

#### **700.2.4.2.1 Qualified Sampling Personnel**

Refer to the general requirements for Qualified Sampling Personnel in General SAP Section 700.2.1.2.1.

#### **700.2.4.2.2 Monitoring Supplies**

Refer to the general information regarding monitoring supplies in General SAP Section 700.2.1.2.2.

#### **700.2.4.2.3 Field Instruments**

Refer to the general information regarding field instruments in General SAP Section 700.2.1.2.3.

#### **700.2.4.2.4 Testing Laboratory**

Refer to the contact information for the testing laboratory found in General SAP Section 700.2.1.2.4.

### **700.2.4.3 Monitoring Strategy**

Monitor representative stormwater discharges from the project site for pH and turbidity during qualifying rain events (a rain event that has produced precipitation in the form of rain and produced run-off at the time of discharge).

#### **700.2.4.3.1 Analytical Constituents**

Stormwater discharge samples are to be analyzed for pH and turbidity.

#### **700.2.4.3.2 Potential Sampling Locations**

Using the criteria in Section 700.2.1.3.2, the potential sampling locations on the project site for monitoring pH and turbidity were identified. Potential sampling locations for monitoring stormwater discharges for pH and turbidity are based on drainage areas; run-on and runoff locations; accessibility for sampling and personnel safety; and other factors in accordance with the applicable requirements in the Caltrans Construction Site Monitoring Program Guidance Manual, August 2013. Stormwater discharge locations shall be shown on the WPCDs in Attachment BB and listed on Stormwater Sample Locations in Attachment EE:

The stormwater discharge locations on the project site are listed in Table 700.2.4.3.2.1 “Stormwater Discharge Locations.”

<b>TABLE 700.2.4.3.2.1 STORMWATER DISCHARGE LOCATIONS</b>	
<b>Sampling Location Identifier</b>	<b>Location</b>

The project does not receive run-on with the potential to combine with stormwater discharges.

#### **700.2.4.3.3 Actual Sampling Locations**

The WPC Manager shall select sampling locations from the list of potential sampling locations for stormwater discharge sampling shown on the WPCDs from Attachment BB and listed on Stormwater Sampling Locations in Attachment EE. If the construction activity has not started within the drainage area at a sampling location, and there is no disturbed soil within a drainage area, sampling from the stormwater discharge location from that drainage area is not required.

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Within 72 to 48 hours prior to each qualifying rain event, the WPC Manager must identify the drainage areas that must be sampled. To identify these drainage areas, the WPC Manager must refer to the WPCDs and consider the conditions described below and activities within each drainage area that could have an effect on the stormwater discharge pH or turbidity.

1. **Turbidity:** The area of the disturbed soil at the time of precipitation could have an impact on the stormwater run-off turbidity. The area of the disturbed soil at the time of predicted precipitation must be expressed as a percentage of the total drainage area. It is reasonable to assume that a larger percentage of disturbed soil area could result in a more turbid run-off.
2. **pH:** The type of construction activities that could have an impact on stormwater run-off pH (for example, concrete work and saw cutting, lime stabilization work, use of crushed concrete, etc).

For representative sampling of construction site discharges, 20 percent of the drainage areas with disturbed soil areas and 20 percent of the drainage areas where activities that could potentially have an impact on the discharge pH must be sampled. At least five (5) drainage area discharge locations for each qualifying rain event must be sampled. If there are five (5) or fewer drainage area sampling locations in a project, then all drainage area sampling locations must be sampled. The drainage areas with the largest percentage of disturbed soil area must be included in the selected drainage areas to be sampled. The drainage areas where the most extensive activities (activities that potentially can alter discharge pH) are in progress must be included in the selected drainage areas to be sampled.

This representative monitoring strategy for stormwater discharges requires collection of additional samples based upon the preceding sampling event stormwater discharge pH or turbidity analysis results when the:

- turbidity analysis results – even in one sampling location – in the previous sampling event have exceeded 200 NTU, the number of drainage areas with disturbed soil areas requiring sampling will be raised to 50 percent.
- turbidity analysis results – even in one sampling location – in the previous sampling event have exceeded 250 NTU, the number of drainage areas with disturbed soil areas requiring sampling will be raised to 100 percent.
- pH analysis results – even in one sampling location – in the previous sampling event have not fallen within 6.5 to 8.5 pH unit range, the number of drainage areas requiring sampling where construction activities could have an impact on the discharge pH readings will be raised to 50 percent.
- pH analysis results – even in one sampling location – in the previous sampling event have not fallen within 6.0 to 9.0 pH unit range, the number of drainage areas requiring sampling where construction activities could have an impact on the discharge pH readings will be raised to 100 percent.

The selection of additional sampling locations, based on turbidity results, will involve drainage areas with the highest percentage of disturbed soil area. The selection of additional sampling locations, based on pH results, will be involve drainage areas with construction activities that are most likely to affect stormwater discharge pH.

#### **700.2.4.3.4 Sampling Schedule**

Discharge samples shall be collected for turbidity and pH for qualifying rain events that result in a discharge from the project site. When applicable, upstream, downstream, and run-on samples shall be collected for analysis of turbidity and pH. Sampling and testing for turbidity and pH will be performed daily during all qualifying rain events. Samples shall be collected during working hours.

*Stormwater Pollution Prevention Plan (SWPPP)*

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At least 48 hours prior to each qualifying rain event, the WPC Manager must prepare a list of sampling locations that must be sampled for the qualifying rain event.

The locations shall include all of the following sampling location types:

- discharge locations from the drainage areas with the largest percentage of disturbed soil areas,
- discharge locations from the drainage areas where construction activities that could have an impact on stormwater run-off pH are in progress, and
- if applicable, at least one sampling location from drainage areas where the disturbed soil areas have been stabilized.

The sampling locations must be sampled in the following order: starting with the sampling location on the northwest corner of the WPCDs as the first entry and move clockwise on the WPCDs.

The Caltrans stormwater site inspector and contractor inspector must coordinate and select the sampling locations and the time to meet and collect simultaneous samples for the purposes of QA/QC.

Every reasonable attempt has to be made to collect at least three grab samples per day from each sampling location during the qualifying rain event.

Sampling must start immediately after the flow begins or as soon as possible thereafter. The individual responsible for collecting samples must begin sampling with the first sampling location identified and move on to the next sampling location until all locations are sampled. It is preferable that the three rounds of sampling are performed over the first three hours of the flow; however, depending on the time of the day or other dictating conditions in the field, the three rounds of sampling could be performed over a shorter period of time to ensure that three samples per location are collected.

If stormwater sampling is unsafe because of dangerous weather conditions, such as flooding and electrical storms, then the stormwater sampler shall document the conditions resulting in the sampling not being performed as planned.

### 700.2.4.4 Sample Collection and Handling

Refer to the general requirements for sample collection and handling in General SAP Section 700.2.1.4.

#### 700.2.4.4.1 Sample Collection Procedures

In addition to the general procedures for sample collection in General SAP Section 700.2.1.4.1, the procedures described below apply to sample collection for monitoring of pH and turbidity.

- Grab samples shall be collected and preserved in accordance with the methods identified in Table 700.2.4.5.1: Sample Collection, Preservation and Analysis for Monitoring Turbidity and pH, provided in Section 700.2.4.5.
- Only personnel trained in proper water quality sampling shall collect samples.

#### 700.2.4.4.2 Sample Handling Procedures

Refer to the general procedures for sample handling in General SAP Section 700.2.1.4.2.

**700.2.4.4.3 Sample Documentation Procedures**

Refer to the general procedures for sample documentation in General SAP Section 700.2.1.4.3.

**700.2.4.5 Sample Analysis**

Samples shall be analyzed for the constituents indicated in Table 700.2.4.5.1: “Sample Collection, Preservation and Analysis for Monitoring Turbidity and pH.”

<b>TABLE 700.2.4.5.1 SAMPLE COLLECTION, PRESERVATION AND ANALYSIS FOR MONITORING TURBIDITY AND PH</b>						
<b>Parameter</b>	<b>Test Method</b>	<b>Sample Bottle</b>	<b>Minimum Sample Volume<sup>(1)</sup></b>	<b>Sample Preservation</b>	<b>Maximum Holding Time</b>	<b>Detection Limit (min)</b>
Turbidity	Field test with calibrated portable instrument	Polypropylene or Glass	100 mL	Store at 4° C (39.2° F)	48 hours	1 NTU
pH	Field test with calibrated portable instrument	Polypropylene	100 mL	Store at 4° C (39.2° F)	15 minutes	0.2

**Acronyms/Notes:**

- C = Celsius
- F = Fahrenheit
- Min = minimum
- mL = milliliter
- NTU = Nephelometric Turbidity Units

(1) Minimum sample volume recommended. Specific volume requirements will vary by instrument; check instrument manufacturer instructions.

**700.2.4.6 Quality Assurance/Quality Control**

Refer to the general requirements regarding Quality Assurance/Quality Control (QA/QC) in General SAP Section 700.2.1.6. The following replaces the requirements for QA/QC in Section 700.2.1.6 for turbidity and pH quality assurance testing. However, Section 700.2.1.6 requirements apply for SSC quality assurance testing: The contractor shall coordinate with Caltrans RE on sampling locations and timing for quality assurance verification of field sampling and analysis activities. The contractor shall notify the RE at least 24 hours prior to sampling events.

**700.2.4.7 Data Management and Reporting**

Refer to general requirements for data management and reporting in General SAP Section 700.2.1.7.

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In addition to the general requirements for data management and reporting in Section 700.2.1.7, the additional reporting described below is required.

**Numeric Action Limit Exceedance Reporting** - This project is subject to NALs for pH and turbidity as shown in Table 700.2.4.7.1 “NALs for Monitoring pH and Turbidity.”

<b>TABLE 700.2.4.7.1 NALs FOR MONITORING pH AND TURBIDITY</b>				
<b>Parameter</b>	<b>Test Method</b>	<b>Detection Limit (min)</b>	<b>Unit</b>	<b>Numeric Action Level</b>
pH	Field test with calibrated portable instrument	0.2	pH units	Lower NAL = 6.5 Upper NAL = 8.5
Turbidity	Field test with calibrated portable instrument	1	NTU	250 NTU

**Acronyms:**

Min = Minimum

NAL = numeric action level

NTU = Nephelometric Turbidity Units

If the NAL for pH or turbidity or both are exceeded, then form CEM-2062 NAL Exceedance Report will be completed and submitted to the RE within 48 hours after the sampling and analysis event. The NAL Exceedance Report will

- test results, analytical methods, reporting units, and detection limits
- date, sampling location, time of sampling, and visual observations
- predicted quantity of precipitation of the forecasted storm event, and estimated quantity of precipitation at the time of sampling
- description of BMPs
- corrective actions taken to manage the NAL exceedance

Once deemed necessary, corrective actions shall be immediately implemented and documented. Appendix I contains the CEM-2035 Stormwater Corrective Actions Summary form and Appendix O contains the CEM-2062 NAL Exceedance Report form. NAL exceedance reports will be filed in SWPPP File Category 20.62: Numeric Action Level Exceedance Reports.

**700.2.4.8 Data Evaluation**

An evaluation of the water quality sample analytical results, including sampling locations and the QA/QC data, shall be submitted to the RE for every day of stormwater sampling. If the stormwater discharge concentrations exceed applicable water quality standards, the WPC Manager or other personnel shall evaluate the project site BMPs to determine the probable cause for the exceedance.

As determined by the data evaluation and project site assessment, appropriate BMPs shall be repaired or modified to mitigate the exceedances. Corrective actions taken shall be documented on the CEM-2035 Stormwater Corrective Actions Summary. Any revisions/design changes to BMPs shall be implemented based on an amendment to the SWPPP.

#### **700.2.4.9 Change of Condition**

Refer to the general requirements for changes of conditions in General SAP Section 700.2.1.9.

#### **700.2.5 *Sampling and Analysis Plan for Monitoring Required by Regional Board***

This project does not require a Sampling and Analysis Plan for Monitoring required by a RWQCB.

#### **700.2.6 *Sampling and Analysis Plan for Monitoring of Active Treatment System***

This project does not require a SAP for an ATS because deployment of such a system is not planned.

# SECTION 800

## POST-CONSTRUCTION CONTROL PRACTICES

### ***800.1 Post-Construction Control Practices***

The following are the post-construction BMPs for the project site

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### ***800.2 Post-Construction Operation/Maintenance***

The post-construction BMPs that are listed above will be funded and maintained in the following manner.

short-term funding: County of Imperial

long-term funding: County of Imperial

The responsible party for the long-term maintenance of post-construction BMPs is Niland County Sanitation District, County of Imperial

# **SECTION 900**

## **SWPPP REPORTING REQUIREMENTS**

### **900.1 Recordkeeping**

To manage the various documents required by the SWPPP and to provide easy access to the documents, the following SWPPP file categories will be used to file SWPPP compliance documents:

File Category 20.01	Stormwater Pollution Prevention Plan (SWPPP)
File Category 20.02	Stormwater Pollution Prevention Plan Amendments
File Category 20.03	Water Pollution Control Schedule Updates
File Category 20.05	Notice of Intent
File Category 20.06	Legally Responsible Person Authorization of Approved Signatory
File Category 20.10	Correspondence
File Category 20.21	Subcontractor Contact Information and Notification Letters
File Category 20.22	Material Suppliers Contact Information and Notification Letters
File Category 20.23	Contractor Personnel Training Documentation
File Category 20.31	Contractor Stormwater Site Inspection Reports
File Category 20.32	Caltrans Stormwater Site Inspection Reports
File Category 20.33	Site Visual Monitoring Inspection Reports
File Category 20.34	Best Management Practices Weekly Status Reports
File Category 20.35	Corrective Actions Summary
File Category 20.40	Weather Monitoring Logs
File Category 20.45	Rain Event Action Plans
File Category 20.46	Storm/Rain Event Sampling and Analysis Plan
File Category 20.50	Non-Stormwater Discharge Sampling and Test Results
File Category 20.51	Non-Visible Pollutant Sampling and Test Results
File Category 20.52	Turbidity, pH and SSC Sampling and Test Results
File Category 20.53	Required Regional Water Board Monitoring Sampling and Test Results
File Category 20.54	ATS Monitoring Sampling and Test Results
File Category 20.55	Field Testing Equipment Maintenance and Calibration Records
File Category 20.61	Notice of Discharge Reports
File Category 20.62	Numeric Action Level Exceedance Reports
File Category 20.63	Numeric Effluent Limitation Violation Reports
File Category 20.70	Annual Certification of Compliance
File Category 20.80	Stormwater Annual Reports

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File Category 20.90 .....Notice of Termination

Records shall be retained for a minimum of three years for the following items:

- approved SWPPP document and amendments
- Stormwater Site Inspection Reports
- Site Inspection Report Corrections Summary
- Rain Event Action Plans (REAPs)
- Notice of Discharge Reports
- Numeric Action Limit (NAL) Exceedance Reports
- Numeric Effluent Limitaion (NEL) Violation Reports
- sampling records and analysis reports
- Annual Compliance Certifications
- copies of all applicable permits

## **900.2 Stormwater Annual Report**

A Stormwater Annual Report will be prepared for this project to document the stormwater monitoring information and training information.

The stormwater monitoring information listed below shall be included in the Stormwater Annual Report.

- A summary and evaluation of all sampling and analysis results, including copies of laboratory reports.
- The analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter.
- A summary of all corrective actions taken during the compliance year.
- Identification of any compliance activities or corrective actions that were not implemented.
- •A summary of all violations of the CGP.
- The names of individual(s) who performed site inspections, sampling, site visual monitoring inspections and/or measurements.
- The date, place, and time of site inspections, sampling, site visual monitoring inspections, and/or measurements, including precipitation (rain gauge).
- Any site visual monitoring inspection and sample collection exception records.

The stormwater training information listed below shall be included in the Stormwater Annual Report.

- Documentation of all training for individuals responsible for all activities associated with compliance with the CGP.
- Documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair.
- Documentation of all training for individuals responsible for overseeing, revising and amending the SWPPP.

### **900.3 Discharge Reporting**

If an unauthorized discharge is discovered or evidence of a previously unseen discharge is discovered, the Contractor shall notify the RE within 6 hours of the discovery, and will file a written report with the RE within 24 hours after the discovery. The written report to the RE will contain the following items:

- date, time, location, and type of unauthorized discharge
- nature of operation that caused the discharge
- initial assessment of any impacts caused by the discharge
- BMPs deployed before the discharge event and date(s) of deployment
- BMPs deployed after the discharge event, including re-installation, maintenance or repair of initial BMPs
- steps taken or planned to reduce, eliminate and/or prevent recurrence of the discharge

Reporting of discharges shall be documented on the CEM-2061 Notice of Discharge form in Appendix M. A log of all reportable discharges shall be documented on CEM-2065 Discharge Reporting Log form in Appendix Z. Completed CEM-2061 Notice of Discharge forms shall be submitted to the RE within 24 hours after the discharge event or discovery of evidence of a prior discharge. Copies of completed forms will be kept in File Category 20.61: Notice of Discharge Reports.

### **900.4 Regulatory Agency Notice or Order Reporting**

If a written notice or order is issued to the project by any regulatory agency, the Contractor will notify the RE within 6 hours of receiving the notice or order and will file a written report to the RE within 48 hours of receiving the notice or order. Corrective measures will be implemented immediately following receipt of the notice or order.

The report to the RE will contain the following items

- the date, time, location, and cause or nature of the notice or order
- the BMPs deployed prior to receiving the notice or order
- the date of deployment and type of BMPs deployed after receiving the notice or order, including additional BMPs installed or planned to reduce or prevent recurrence
- an implementation and maintenance schedule for any affected BMPs

### **900.5 Illegal Connection/Illicit Discharge Reporting**

If the Contractor discovers an illegal connection to a storm drain system or any pipe discharging onto the project site, not shown on the project plans, the Contractor shall notify the RE within 6 hours of the discovery and shall file a written report to the RE within 48 hours of the discovery.

If the Contractor discovers any illicit discharge, including illegal disposing of material on the project site, the Contractor shall immediately notify the RE and shall file a written report to the RE within 3 days of discovery.

The report to the RE will contain the following items:

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- the date, time, and location of the discovery
- the details for the illegal connection or illicit discharge, including any photographs taken
- any actions taken to contain the illicit discharge
- any sampling and testing performed on material that was illegally disposed of or discharged

# ATTACHMENT A

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LEGALLY RESPONSIBLE PERSON AUTHORIZATION OF APPROVED SIGNATORY

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**LEGALLY RESPONSIBLE PERSON**  
**AUTHORIZATION OF APPROVED SIGNATORY**  
 CEM-2006 (REV 11/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements 125 West Alcott Road Niland, CA 92257	CONTRACT NUMBER/CO/RTE/PM
LEGALLY RESPONSIBLE PERSON NAME AND TITLE John Gay, Director of Public Works	PROJECT IDENTIFIER NUMBER  LEGALLY RESPONSIBLE PERSON ADDRESS 115 South 11th Street El Centro, CA 92243

The Legally Responsible Person appoints the following person:

Authorized approved signatory name and title

Authorized approved signatory address

I hereby agree and further authorize the above-named designated authorized approved signatory to certify all permit registration documents, Numeric Action Level Exceedance Reports, ATS, Numeric Effluent Limitation Violation Reports, Receiving Water Monitoring Trigger Reports, Annual Reports, and Notices of Termination in accordance with Section IV.I, Section IV.XVI, Attachment D, and Attachment E of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2010-0014-DWQ & 2012-0006-DWQ, NPDES No. CAS000002.

I hereby further authorize the above-named designated approved signatory to submit documents electronically to the State Water Resources Control Board SMARTS database.

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ at \_\_\_\_\_ California

Legally responsible person signature	Approved signatory signature
Legally responsible person name	Approved signatory name
Phone number	Phone number

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## Instructions

### General Information

- This form is required for compliance with provisions in Section IV.I of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, amended by 2010-0014-DWQ & 2012-0006-DWQ, NPDES No. CAS000002.
- The legally responsible person (LRP) for Caltrans projects is the district director. The LRP may authorize the project resident engineer to be the approved signatory.
- For a local agency, the LRP is either a principal executive officer or ranking elected official. The local agency LRP may authorize the project resident engineer to be the approved signatory.
- For a private entity performing work in the state right-of-way under an encroachment permit, the LRP must be one of the following:
  1. For a corporation, a responsible corporate officer.
  2. For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
- The private entity LRP may not authorize an approved signatory.
- Include a copy of the completed form in the project Storm Water Pollution Prevention Plan.

### Form

#### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a project identifier number. For projects without a number, write N/A in the field.

#### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the contract number field.

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# ATTACHMENT B

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NOTICE OF INTENT (NOI)

# ATTACHMENT C

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## RISK LEVEL DETERMINATION

## Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

*Hydrologic soil group* is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

*Group A.* Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

*Group B.* Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

*Group C.* Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

*Group D.* Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

*Depth* to the upper and lower boundaries of each layer is indicated.

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

*Classification* of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

*Percentage of rock fragments* larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

*Liquid limit and plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

#### References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

## Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk "\*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Imperial County, California, Imperial Valley Area														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	
114—Imperial silty clay, wet														
Imperial, wet	85	C	0-12	Silty clay	CH, CL	A-7	0- 0- 0	0- 0- 0	85-100-100	80-100-100	76-98-100	72-95-95	40-50-60	20-25-35
			12-60	Silty clay loam, silty clay, clay	CH, CL	A-7	0- 0- 0	0- 0- 0	85-100-100	80-100-100	72-95-100	60-85-95	40-50-60	15-23-30
115—Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes														
Imperial, wet	41	C	0-12	Silty clay loam	CL	A-6	0- 0- 0	0- 0- 0	85-100-100	80-100-100	76-98-100	68-90-95	35-38-40	15-18-20
			12-60	Silty clay loam, silty clay, clay	CH, CL	A-7	0- 0- 0	0- 0- 0	85-100-100	80-100-100	72-95-100	60-85-95	40-50-60	15-23-30
Glenbar, wet	40	C	0-13	Silty clay loam	CL	A-6	0- 0- 0	0- 0- 0	85-100-100	80-98-100	76-95-100	68-85-95	30-35-40	10-13-15
			13-60	Clay loam, silty clay loam	CL	A-6	0- 0- 0	0- 0- 0	85-100-100	80-98-100	72-95-100	56-80-95	30-35-40	10-13-15

## Data Source Information

Soil Survey Area: Imperial County, California, Imperial Valley Area  
Survey Area Data: Version 14, Sep 1, 2022

## Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

## Report—Map Unit Description

### Imperial County, California, Imperial Valley Area

#### 114—Imperial silty clay, wet

##### Map Unit Setting

*National map unit symbol:* h8zn

*Elevation:* -230 to 200 feet

*Mean annual precipitation:* 0 to 3 inches  
*Mean annual air temperature:* 72 to 75 degrees F  
*Frost-free period:* 300 to 350 days  
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

*Imperial, wet, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Imperial, Wet****Setting**

*Landform:* Basin floors  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Clayey alluvium derived from mixed and/or clayey lacustrine deposits derived from mixed

**Typical profile**

*H1 - 0 to 12 inches:* silty clay  
*H2 - 12 to 60 inches:* silty clay loam

**Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 5 percent  
*Maximum salinity:* Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)  
*Sodium adsorption ratio, maximum:* 20.0  
*Available water supply, 0 to 60 inches:* Moderate (about 8.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3w  
*Land capability classification (nonirrigated):* 7w  
*Hydrologic Soil Group:* C  
*Ecological site:* R040XD007CA - Lacustrine Basin and Large River Floodplain  
*Hydric soil rating:* No

**Minor Components****Meloland**

*Percent of map unit:* 4 percent  
*Hydric soil rating:* No

**Glenbar**

*Percent of map unit:* 4 percent

*Hydric soil rating:* No

**Holtville**

*Percent of map unit:* 4 percent

*Hydric soil rating:* No

**Niland**

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

**115—Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes****Map Unit Setting**

*National map unit symbol:* h8zp

*Elevation:* -230 to 200 feet

*Mean annual precipitation:* 0 to 3 inches

*Mean annual air temperature:* 72 to 75 degrees F

*Frost-free period:* 300 to 350 days

*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

*Imperial, wet, and similar soils:* 41 percent

*Glenbar, wet, and similar soils:* 40 percent

*Minor components:* 19 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Imperial, Wet****Setting**

*Landform:* Basin floors

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Clayey alluvium derived from mixed and/or clayey lacustrine deposits derived from mixed

**Typical profile**

*H1 - 0 to 12 inches:* silty clay loam

*H2 - 12 to 60 inches:* silty clay loam

**Properties and qualities**

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water*

*(Ksat):* Moderately high (0.20 to 0.57 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 5 percent  
*Maximum salinity:* Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)  
*Sodium adsorption ratio, maximum:* 20.0  
*Available water supply, 0 to 60 inches:* Moderate (about 8.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3w  
*Land capability classification (nonirrigated):* 7w  
*Hydrologic Soil Group:* C  
*Ecological site:* R040XD007CA - Lacustrine Basin and Large River Floodplain  
*Hydric soil rating:* No

**Description of Glenbar, Wet****Setting**

*Landform:* Basin floors  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from mixed

**Typical profile**

*H1 - 0 to 13 inches:* silty clay loam  
*H2 - 13 to 60 inches:* clay loam

**Properties and qualities**

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Moderately well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum content:* 5 percent  
*Maximum salinity:* Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)  
*Sodium adsorption ratio, maximum:* 15.0  
*Available water supply, 0 to 60 inches:* High (about 10.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3w  
*Land capability classification (nonirrigated):* 7w  
*Hydrologic Soil Group:* C  
*Ecological site:* R040XD007CA - Lacustrine Basin and Large River Floodplain  
*Hydric soil rating:* No

### **Minor Components**

#### **Meloland**

*Percent of map unit:* 10 percent

*Hydric soil rating:* No

#### **Holtville**

*Percent of map unit:* 9 percent

*Hydric soil rating:* No

### **Data Source Information**

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 14, Sep 1, 2022

## Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Depth* to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

*Sand* as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Silt* as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity ( $K_{sat}$ ), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Moist bulk density* is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

*Saturated hydraulic conductivity (Ksat)* refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

*Available water capacity* refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Linear extensibility* refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

*Erosion factors* are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor Kw* indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

*Erosion factor Kf* indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

*Wind erodibility groups* are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

*Wind erodibility index* is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

## Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Imperial County, California, Imperial Valley Area														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
114—Imperial silty clay, wet														
Imperial, wet	0-12	- 5-	-45-	40-50- 60	1.40-1.45 -1.50	0.42-0.91-1.40	0.10-0.13-0.15	6.0- 7.5- 8.9	0.0- 0.5- 1.0	.28	.28	5	4	86
	12-60	-18-	-42-	35-40- 60	1.45-1.50 -1.55	1.40-2.70-4.00	0.10-0.14-0.18	6.0- 7.5- 8.9	0.0- 0.3- 0.5	.32	.32			
115—Imperial-Glenbar silty clay loams, wet, 0 to 2 percent slopes														
Imperial, wet	0-12	-17-	-48-	30-35- 40	1.45-1.50 -1.55	1.40-2.70-4.00	0.13-0.16-0.18	3.0- 4.5- 5.9	0.0- 0.5- 1.0	.37	.37	5	6	48
	12-60	-18-	-42-	35-40- 60	1.45-1.50 -1.55	1.40-2.70-4.00	0.10-0.14-0.18	6.0- 7.5- 8.9	0.0- 0.3- 0.5	.32	.32			
Glenbar, wet	0-13	- 7-	-62-	27-31- 35	1.45-1.50 -1.55	1.40-2.70-4.00	0.15-0.18-0.21	3.0- 4.5- 5.9	0.0- 0.5- 1.0	.43	.43	5	6	48
	13-60	-27-	-42-	27-31- 35	1.40-1.45 -1.50	1.40-2.70-4.00	0.15-0.18-0.21	3.0- 4.5- 5.9	0.0- 0.3- 0.5	.43	.43			

## Data Source Information

Soil Survey Area: Imperial County, California, Imperial Valley Area

Survey Area Data: Version 14, Sep 1, 2022



## Rainfall Erosivity Factor Calculator for Small Construction Sites

EPA's stormwater regulations allow NPDES permitting authorities to waive NPDES permitting requirements for stormwater discharges from small construction sites if:

- the construction site disturbs less than five acres, and
- the rainfall erosivity factor ("R" in the revised universal soil loss equation, or RUSLE) value is less than five during the period of construction activity.

If your small construction project is located in an area where EPA is the permitting authority and your R factor is less than five, you qualify for a low erosivity waiver (LEW) from NPDES stormwater permitting. If your small construction project does not qualify for a waiver, then NPDES stormwater permit coverage is required. Follow the steps below to calculate your R-Factor.

LEW certifications are submitted through the NPDES eReporting Tool or "CGP-NeT". Several states that are authorized to implement the NPDES permitting program also accept LEWs. Check with your state NPDES permitting authority for more information.

- [Submit your LEW through EPA's eReporting Tool](#)
- [List of states, Indian country, and territories where EPA is the permitting authority.\(pdf\)](#)
- [Construction Rainfall Erosivity Waiver Fact Sheet](#)
- [Small Construction Waivers and Instructions.\(pdf\)](#)

The R-factor calculation can also be integrated directly into custom applications using the [R-Factor web service](#).

For questions or comments, email EPA's CGP staff at [cgp@epa.gov](mailto:cgp@epa.gov).

- Select the estimated start and end dates of construction by clicking the boxes and using the dropdown calendar.

The period of construction activity begins at initial earth disturbance and ends with final stabilization.

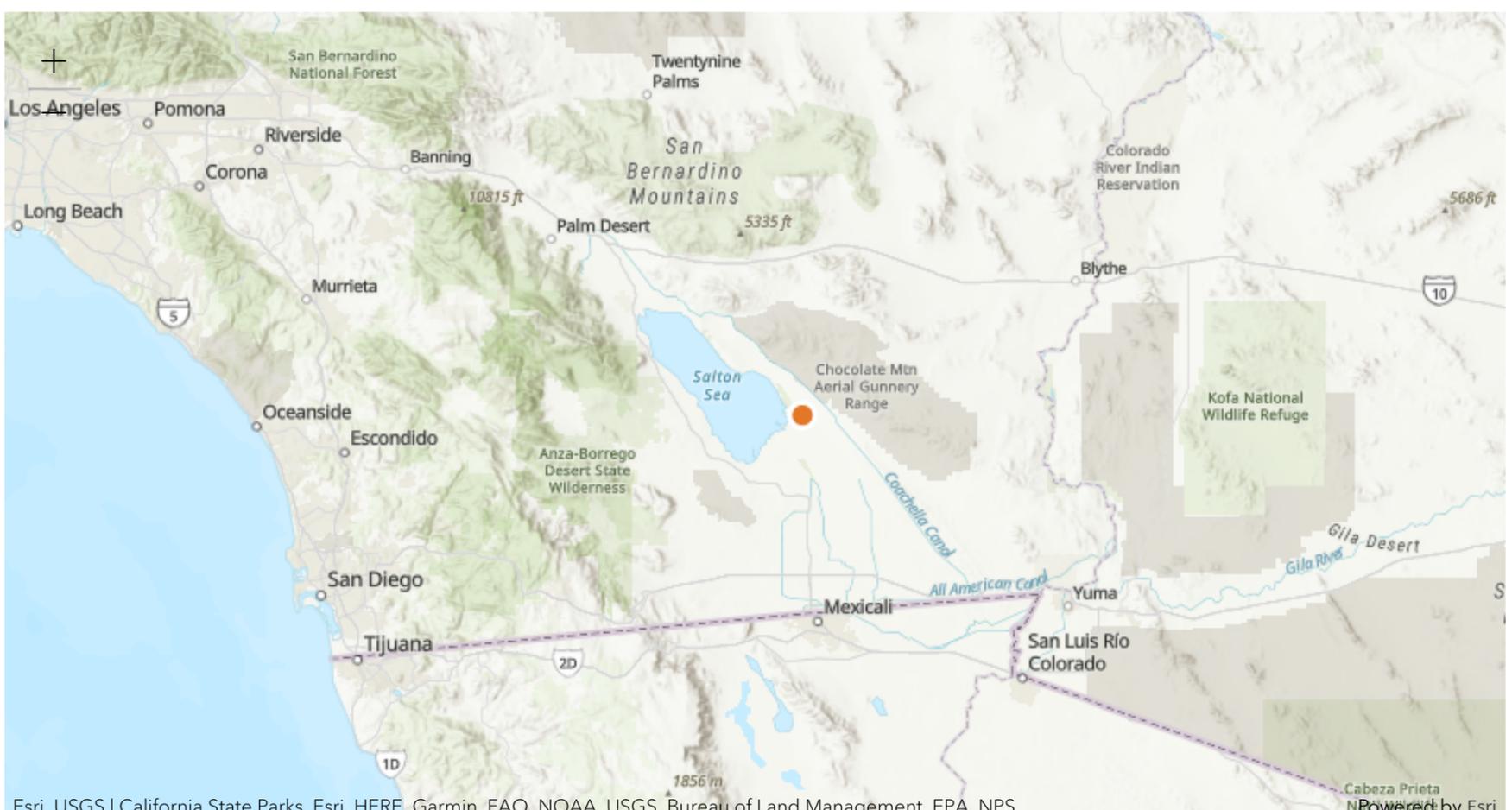
**Start Date:**

**End Date:**

- Locate your small construction project using the search box below or by clicking on the map.

**Location:**

**Search**





Click the "Calculate R Factor" button below to calculate an R Factor for your small construction project.

### Calculate R Factor

## Facility Information

<b>Start Date:</b> 01/04/2024	<b>Latitude:</b> 33.2273
<b>End Date:</b> 12/05/2024	<b>Longitude:</b> -115.5286

### Calculation Results

Rainfall erosivity factor (R Factor) = **8.23**

A rainfall erosivity factor of 5.0 or greater has been calculated for your site's period of construction.

**You do NOT qualify for a waiver from NPDES permitting requirements and must seek Construction General Permit (CGP) coverage.** If you are located in an [area where EPA is the permitting authority\\_\(pdf\)](#), you must submit a Notice of Intent (NOI) through the [NPDES eReporting Tool \(NeT\)](#). Otherwise, you must seek coverage under your state's CGP.

You are logged-in as: **James Holt**  
 If this account does not belong to you, please log out.

Navigate To:

**Risk**

The application is organized into different tabs. Please complete all applicable tabs before submitting the form. If you want to complete the application at a later time, please click on "Save & Exit".

<b>WDID/App ID:</b> - 565095	<b>Owner:</b> The Holt Group Inc	<b>Certified Date:</b>
<b>Status:</b> Not Submitted	1601 N Imperial Avenue El Centro CA 92243	<b>Processed Date:</b>
<b>Order No:</b> 2009-0009-DWQ	<b>Site:</b> Niland Wastewater Treatment Plant	<b>NOT Effective Date:</b>
<b>Permit Type:</b> Construction - NOI	125 West Alcott Road Niland CA 92257	<b>Previous ID:</b> -

- [Owner Info](#)
  - [Developer Info](#)
  - [Site Info](#)
  - [Risk](#)
  - [Addl. Site Info](#)
  - [Post Construction](#)
  - [Billing Info](#)
  - [Attachments](#)
  - [Certification](#)
  - [Reports](#)
  - [Inspections](#)
  - [Print](#)
- [Status History](#)
  - [Linked Users](#)
  - [NOTs](#)
  - [COIs](#)

<b>SEDIMENT RISK FACTOR WORKSHEET</b> Instructions: Enter R,K and LS factor values. System will calculate watershed erosion estimates and site sediment risk factor	
<b>A. Sediment Risk</b>	
<b>A) R Factor Value:</b> <a href="#">(What's this?)</a>	<input type="text" value="8.23"/> <a href="#">*Erosivity Calculator</a>
<b>B) K Factor Value (weighted average, by area, for all site soils)</b> <a href="#">(What's this?)</a> ***If not using the SWRCB map(Populate K Factor) upload your analysis on the Attachment Tab prior to submitting to the SWRCB.	<input type="text" value="0.43"/> * <input type="button" value="Populate K Factor"/>
<b>C) LS Factor (weighted average, by area, for all slopes)</b> <a href="#">(What's this?)</a> ***If not using the SWRCB map(Populate LS Factor) upload your analysis on the Attachment Tab prior to submitting to the SWRCB.	<input type="text" value="0.68213254"/> * <input type="button" value="Populate LS Factor"/>
<b>Watershed Erosion Estimate (=R*K*LS) in tons/acre</b>	
<input type="text" value="2.413998845806"/>	
<b>Site Sediment Risk Factor</b> Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >= 15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	
<input type="text" value="Low"/>	

<b>RECEIVING WATER (RW) RISK FACTOR WORKSHEET</b> A. Watershed Characteristics	
A.1.(a) Does the disturbed area discharge directly or indirectly to a 303(d) listed waterbody impaired by sediment?  <div style="text-align: center;"><a href="#">OR</a></div> A.1.(b) Is the disturbed area located within a sub-watershed draining to a 303(d) listed waterbody impaired by sediment?  <div style="text-align: center;"><a href="#">OR</a></div> A.2. Is the disturbed area located within a planning watershed draining to a waterbody with designated beneficial uses of COLD, SPAWN AND MIGRATORY?	<div style="text-align: center;"> <input type="button" value="Populate Receiving Water Risk"/>  <input type="text" value="Yes"/> *                     </div> <p style="text-align: center;">Yes = High, No = Low</p> <div style="text-align: center;"> <a href="#">Statewide Map of High Receiving Water Risk Watersheds</a> </div> <div style="text-align: center; margin-top: 20px;"> <input type="text" value="High"/> </div>

<b>C. Combined Risk Level Matrix</b>							
	<b>Sediment Risk</b> Low      Medium      High						
<b>Receiving Water Risk</b>	<table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Low</td> <td style="background-color: #00FFFF; padding: 5px;">Level1</td> <td style="background-color: #FFFF00; padding: 5px;">Level2</td> </tr> <tr> <td style="padding: 5px;">High</td> <td style="background-color: #FFFF00; padding: 5px;">Level2</td> <td style="background-color: #FF0000; padding: 5px;">Level3</td> </tr> </table>	Low	Level1	Level2	High	Level2	Level3
Low	Level1	Level2					
High	Level2	Level3					
<b>Project Sediment Risk:</b>	<input type="text" value="Low"/>						
<b>Project Receiving Water Risk:</b>	<input type="text" value="High"/>						
<b>Project Combined Risk:</b>	<input type="text" value="Level2"/>						

Fields marked with \* are mandatory fields.

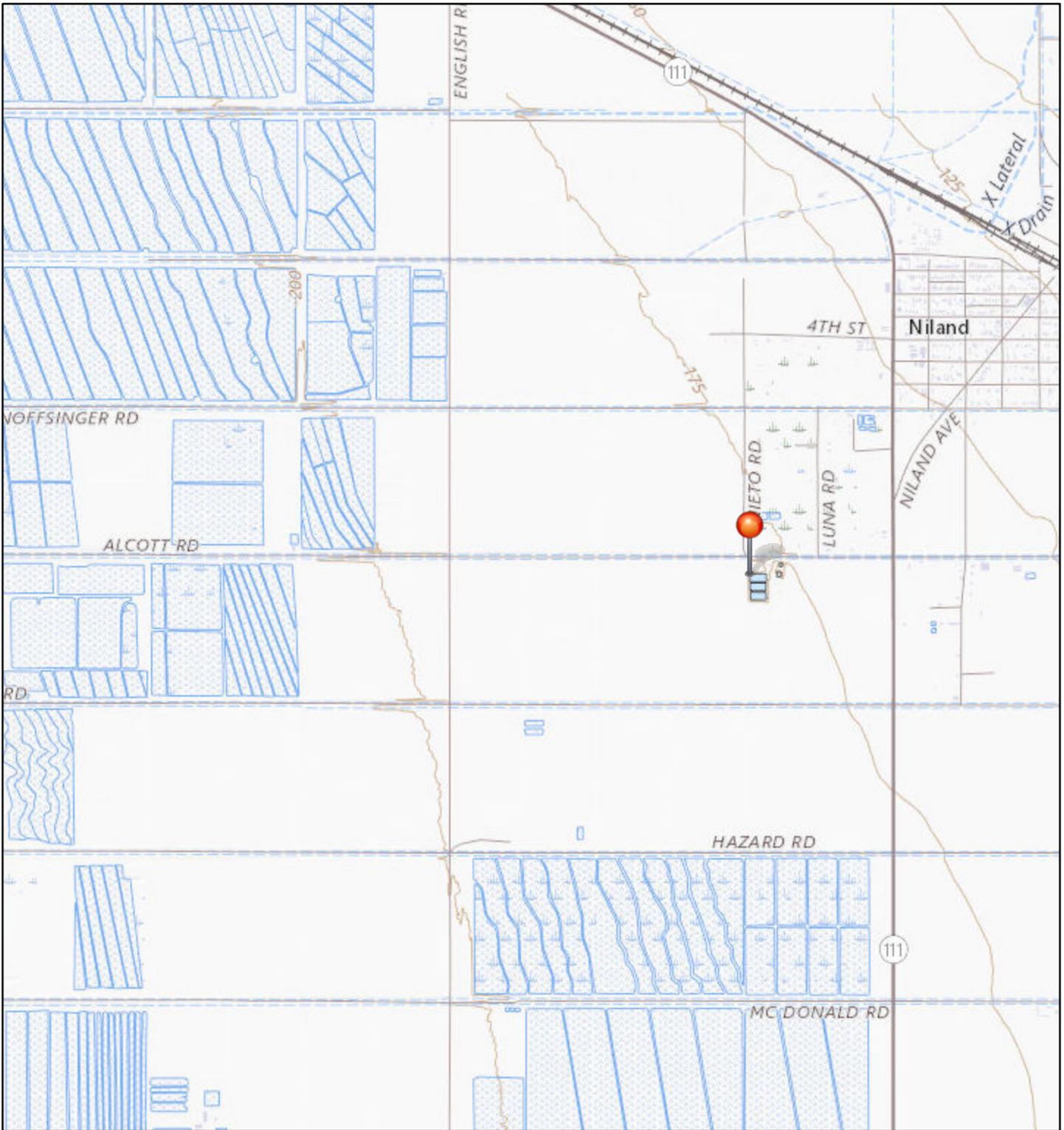


# ATTACHMENT D

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VICINITY MAP AND SITE MAP

# VICINITY MAP

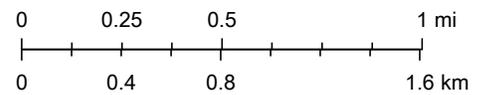


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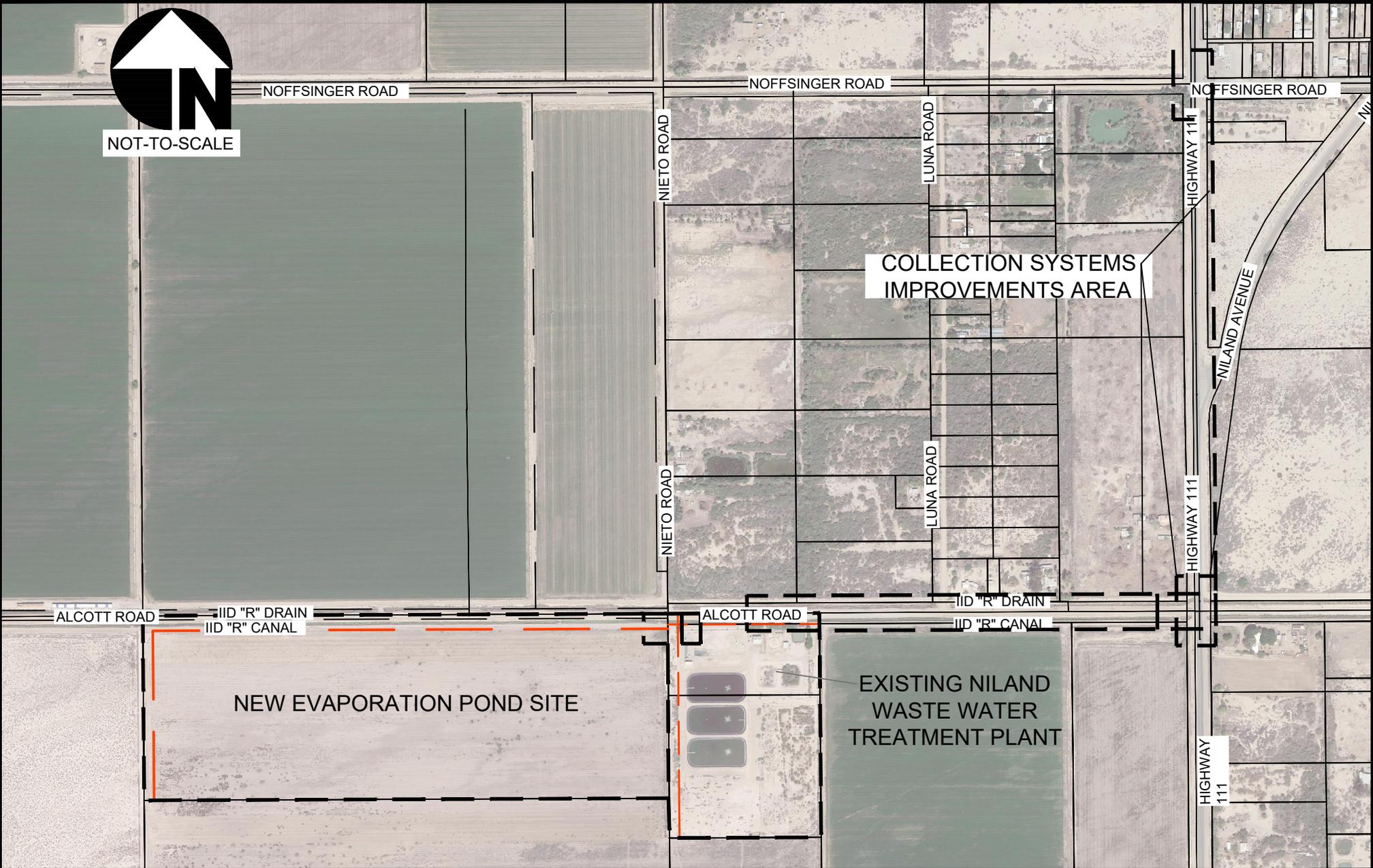
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census

USGS  
2021 USGS

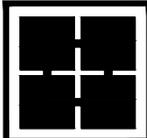
C:\Users\adial\The Holt Group\542.089 - 542.089\04 - CAD & PDF DRAWINGS\542.089 - SITE MAP SWPPP.dwg 08/31/2023 15:54



NOT-TO-SCALE



**The Holt Group**  
ENGINEERING PLANNING SURVEYING



201 E. Hobsonway Blythe, Ca 92225  
1601 N. Imperial Ave. El Centro, Ca 92243

760.922.4658  
760.337.3883

COUNTY OF IMPERIAL - NILAND COUNTY SANITATION DISTRICT  
WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEMS IMPROVEMENTS  
SITE MAP

NILAND, IMPERIAL COUNTY, CA

JOB NUMBER: 542.089

DATE: 9/01/23

SHEET: 1  
OF 1 SHEETS

BY: RS

# ATTACHMENT E

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CONTRACTOR PERSONNEL STORMWATER TRAINING

# ATTACHMENT F

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OTHER PLANS / PERMITS / AGREEMENTS

# ATTACHMENT AA

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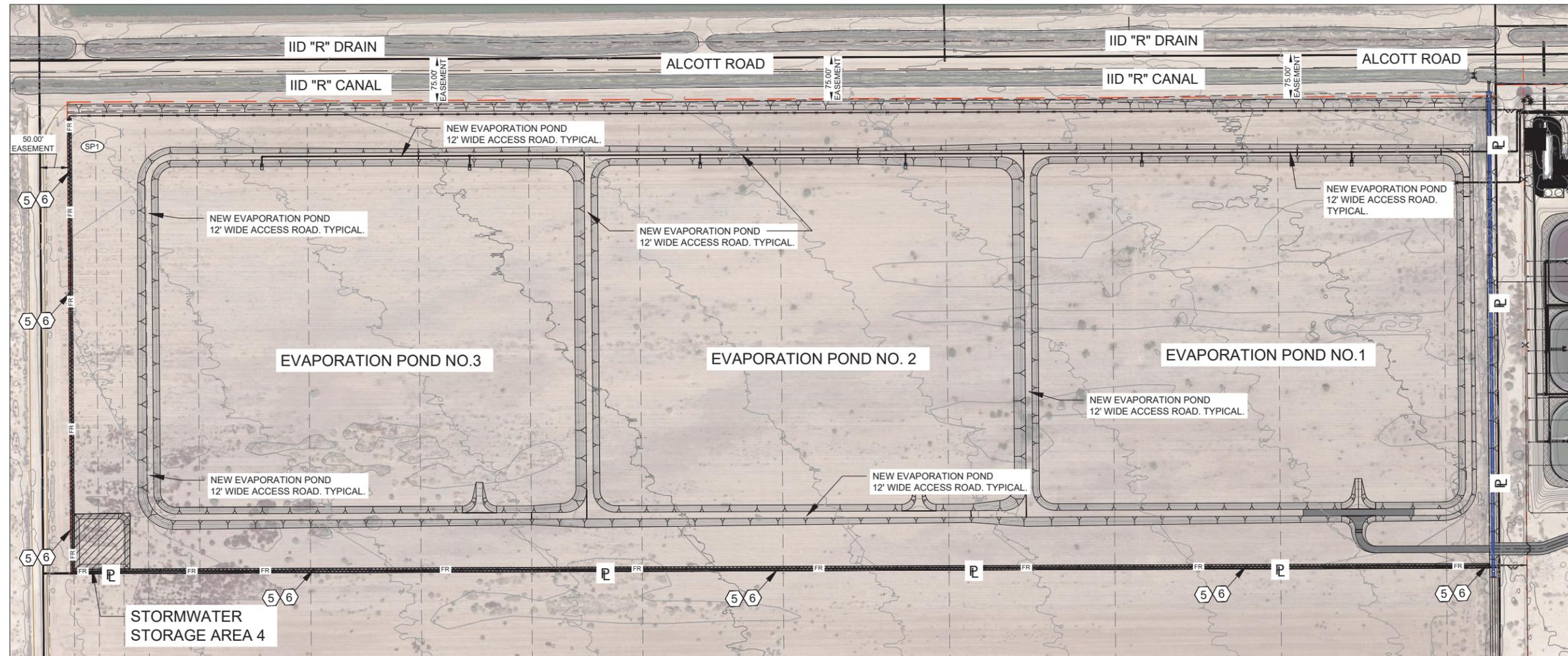
SWPPP AMENDMENTS

# ATTACHMENT BB

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WATER POLLUTION CONTROL DRAWINGS





**BMP KEYNOTES**

- ① CONTRACTOR SHALL LOCATE THE PORTABLE RESTROOM FACILITIES IN THE STAGING AREA. INSTALL TWO (2) PORTABLE RESTROOM FACILITIES. SEE DETAIL E5 FOR TYPICAL STAGING AREA ON SHEET 38.
- ② INSTALL TWO (2) LAYER GRAVEL-FILLED BAGS. SEE DETAIL E3 ON SHEET 38.
- ③ INSTALL CONCRETE WASHOUT AREA. SEE DETAIL E4 ON SHEET 38.
- ④ INSTALL CONSTRUCTION ENTRANCE PER DETAIL E1 AND E5 ON SHEET 38.
- ⑤ INSTALL FIBER ROLLS PER DETAIL E2 ON SHEET 38. INSTALL FIBER ROLLS ON INTERIOR OF DIRT BERM TOE OF SLOPE, SEE BMP KEYNOTE 6.
- ⑥ INSTALL DIRT BERM PER DETAIL I ON SHEET 27.

**LEGEND**

PORTABLE TOILET	
GRAVEL BAGS	
CONCRETE WASHOUT AREA	
CONSTRUCTION ENTRANCE	
FIBER ROLLS	FR
SAMPLE POINT	SP1
DIRT BERM	

**GENERAL EROSION CONTROL NOTES:**

1. EROSION CONTROL PLAN INCLUDES ALL POSSIBLE BMPs FOR THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL APPLY APPROPRIATE BMPs FOR EACH PHASE OF CONSTRUCTION.
2. STREET SWEEPING (DURING MASS GRADING ACTIVITIES, STREETS WILL BE SWEEPED AS NECESSARY TO PREVENT DIRT AND DUST FROM LEAVING THE CONSTRUCTION AREA).
3. CONTRACTOR SHALL PROVIDE ADEQUATE DUST SUPPRESSION TO MEET ALL COUNTY OF IMPERIAL AIR POLLUTION CONTROL DISTRICT REQUIREMENTS.
4. ALL BEST MANAGEMENT PRACTICES SHALL MEET THE REQUIREMENTS OF THE LATEST VERSION OF CALTRANS CONSTRUCTION SITE BMP FACT SHEETS.
5. SITE DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES.
6. NO SITE CLEARING OR GRADING SHALL BEGIN UNTIL ALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED.
7. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.

**NOTE:**  
THE ENTIRE PROJECT AREA IS THE DRAINAGE AREA, EXCLUDING THE AERATION PONDS, THE EVAPORATION PONDS, SLUDGE CONTAINMENT BASIN, AND RAW WATER POND.

<b>REVISION</b>	<b>DATE</b>	<b>COMMENTS</b>		PREPARED UNDER THE DIRECT SUPERVISION OF:  JAMES G. "JACK" HOLT 09/15/2023 DATE	31773 R.C.E. No. 12/31/24 REG. EXP.		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:  JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	62028 R.C.E. No. 09/30/25 REG. EXP.		PUBLIC WORKS DEPARTMENT <b>COUNTY OF IMPERIAL</b> EL CENTRO, CALIFORNIA	DATE 09/15/2023 DRAWN RS DESIGNED RS SCALE N/A CHECKED JGH	PROJECT TITLE COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS EVAPORATION POND EROSION CONTROL PLAN	REFERENCE THG #542.089 SHEET 37 OF 45
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# ATTACHMENT CC

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## WATER POLLUTION CONTROL BEST MANAGEMENT PRACTICES LIST

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**ATTACHMENT CC WATER POLLUTION CONTROL**  
**BEST MANAGEMENT PRACTICES LIST**

CEM-20-CC (REV 03/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements 125 West Alcott Road	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
CONTRACTOR NAME AND SITE ADDRESS	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> Risk Level 3

**Water Pollution Control Best Management Practices List (WPCBMPL)**

Project Phases included in WPCBMPL <input type="checkbox"/> Preliminary Phase <input type="checkbox"/> Grading Phase <input type="checkbox"/> Highway Construction Phase <input type="checkbox"/> Highway Planting / Erosion Control Phase	Projected Stages included in WPCBMPL <input type="checkbox"/> 1 Stage <input type="checkbox"/> 2 Stages <input type="checkbox"/> 3 Stages <input type="checkbox"/> 4 Stages
--	---

Project Required BMP	Best Management Practice (BMP)	BMP ID	Total Quantity Required
<b>TEMPORARY SOIL STABILIZATION</b>			
<input type="checkbox"/>	Preservation of Existing Vegetation	SS-02	
<input type="checkbox"/>	Hydraulic Mulch	SS-03	
<input type="checkbox"/>	Hydroseeding	SS-04	
<input type="checkbox"/>	Soil Binders	SS-05	
<input type="checkbox"/>	Straw Mulch	SS-06	
<input type="checkbox"/>	Geotextiles, Mats, Plastic Covers, and Erosion Control Blankets	SS-07	
<input type="checkbox"/>	Wood Mulching	SS-08	
<input type="checkbox"/>	Earth Dikes/Drainage Swales, and Lined Ditches	SS-09	
<input type="checkbox"/>	Outlet Protection/Velocity Dissipation Devices	SS-10	
<input type="checkbox"/>	Slope Drains	SS-11	
<input type="checkbox"/>	Streambank Stabilization	SS-12	
<b>TEMPORARY SEDIMENT CONTROL</b>			
<input type="checkbox"/>	Silt Fence	SC-01	
<input type="checkbox"/>	Sediment/Distilling Basin	SC-02	
<input type="checkbox"/>	Sediment Trap	SC-03	
<input type="checkbox"/>	Check Dams	SC-04	
<input type="checkbox"/>	Fiber Rolls	SC-05	
<input type="checkbox"/>	Gravel Bad Berm	SC-06	
<input type="checkbox"/>	Sandbag Barrier	SC-08	
<input type="checkbox"/>	Straw Bale Barrier	SC-09	
<input type="checkbox"/>	Storm Drain Inlet Protection	SC-10	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**ATTACHMENT CC WATER POLLUTION CONTROL**  
**BEST MANAGEMENT PRACTICES LIST**

CEM-20-CC (REV 03/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements 125 West Alcott Road	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER

**Water Pollution Control Best Management Practices List**

Project Required BMP	Best Management Practice (BMP)	BMP ID	Total Quantity Required
<b>WIND EROSION CONTROL</b>			
<input type="checkbox"/>	Wind Erosion Control	WE-01	
<b>TRACKING CONTROLS</b>			
<input type="checkbox"/>	Stabilized Construction Entrance/Exit	TC-01	
<input type="checkbox"/>	Stabilized Construction Roadway	TC-02	
<input type="checkbox"/>	Entrance/Exit Tire Wash	TC-03	
<input type="checkbox"/>	Street Sweeping	SC-07	
<b>NON-STORMWATER MANAGEMENT</b>			
<input type="checkbox"/>	Water Conservation Practices	NS-01	
<input type="checkbox"/>	Dewatering Operations	NS-02	
<input type="checkbox"/>	Paving and Grinding Operations	NS-03	
<input type="checkbox"/>	Temporary Stream Crossing	NS-04	
<input type="checkbox"/>	Clear Water Diversion	NS-05	
<input type="checkbox"/>	Illicit Connection/Illegal Discharge Detection and Reporting	NS-06	
<input type="checkbox"/>	Potable Water/Irrigation	NS-07	
<input type="checkbox"/>	Vehicle and Equipment Cleaning	NS-08	
<input type="checkbox"/>	Vehicle and Equipment Fueling	NS-09	
<input type="checkbox"/>	Vehicle and Equipment Maintenance	NS-10	
<input type="checkbox"/>	Pile Driving Operations	NS-11	
<input type="checkbox"/>	Concrete Curing	NS-12	
<input type="checkbox"/>	Material and Equipment Use Over Water	NS-13	
<input type="checkbox"/>	Concrete Finishing	NS-14	
<input type="checkbox"/>	Structure Demolition/Removal Over or Adjacent to Water	NS-15	
<b>WASTE MANAGEMENT AND POLLUTION CONTROL</b>			
<input type="checkbox"/>	Material Delivery and Storage	WM-01	
<input type="checkbox"/>	Material Use	WM-02	
<input type="checkbox"/>	Stockpile Management	WM-03	
<input type="checkbox"/>	Spill Prevention and Control	WM-04	
<input type="checkbox"/>	Solid Waste Management	WM-05	
<input type="checkbox"/>	Hazardous Waste Management	WM-06	
<input type="checkbox"/>	Contaminated Soil Management	WM-07	
<input type="checkbox"/>	Concrete Waste Management	WM-08	
<input type="checkbox"/>	Sanitary/Septic Waste Management	WM-09	
<input type="checkbox"/>	Liquid Waste Management	WM-10	

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**ATTACHMENT CC WATER POLLUTION CONTROL**  
**BEST MANAGEMENT PRACTICES LIST**

CEM-20-CC (REV 03/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements 125 West Alcott Road	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER

No.	Water Pollution Control Best Management Practices List			
1	Location:	Project Phase:	Location shown on WPCD sheet number:	Disturbed Soil Area: _____ acres
		Stage:		
	<b>Best Management Practice (BMP)</b>		<b>BMP ID</b>	<b>Quantity Required</b>
Comments:				
2	Location:	Project Phase:	Location shown on WPCD sheet number:	Disturbed Soil Area: _____ acres
		Stage:		
	<b>Best Management Practice (BMP)</b>		<b>BMP ID</b>	<b>Quantity Required</b>
Comments:				

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STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**ATTACHMENT CC WATER POLLUTION CONTROL**  
**BEST MANAGEMENT PRACTICES LIST**

CEM-20-CC (REV 03/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements 125 West Alcott Road	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER

No.	Water Pollution Control Best Management Practices List			
	Location:	Project Phase: Stage:	Location shown on WPCD sheet number:	Disturbed Soil Area: _____ acres
	<b>Best Management Practice (BMP)</b>		<b>BMP ID</b>	<b>Quantity Required</b>
	Comments:			
	Location:	Project Phase: Stage:	Location shown on WPCD sheet number:	Disturbed Soil Area: _____ acres
	<b>Best Management Practice (BMP)</b>		<b>BMP ID</b>	<b>Quantity Required</b>
	Comments:			
	Location:	Project Phase: Stage:	Location shown on WPCD sheet number:	Disturbed Soil Area: _____ acres
	<b>Best Management Practice (BMP)</b>		<b>BMP ID</b>	<b>Quantity Required</b>
	Comments:			

# ATTACHMENT DD

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WATER POLLUTION CONTROL SCHEDULE

# ATTACHMENT EE

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## STORMWATER SAMPLING LOCATIONS

**SWPPP ATTACHMENT EE  
STORMWATER SAMPLING LOCATIONS**

CEM-20EE (NEW 9/2012)

PROJECT INFORMATION NAME AND SITE ADDRESS Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements 125 West Alcott Road Niland, CA 92257	CONTRACT NUMBER/CO/RT/PM	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input checked="" type="checkbox"/> Risk Level 2 <input type="checkbox"/> Risk Level 3
	PROJECT IDENTIFIER NUMBER	

**STORMWATER SAMPLING LOCATIONS**

**Project Site Non-Visible Pollutant Sampling Locations**

SWPPP Table 700.2.2.3.2.1 & Table 700.2.2.3.2.2

Location No.	Uncontaminated Location No.	Location	Pollutant Source	Pollutant	Water Quality Indicator Constituent

Instruction: Include the following Table for all Risk Levels.

**Project Site Drainage Areas**

SWPPP Table 700.1.1.1

Drainage Area No.	Location	Drainage Area (acres)	Disturbed Soil Area (acres)	Percentage of Drainage Area that is Disturbed Soil Area (%)

**SWPPP ATTACHMENT EE  
STORMWATER SAMPLING LOCATIONS**

CEM-20EE (NEW 9/2012)

PROJECT NAME Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements	CONTRACT NUMBER/CO/RTE/PM	PROJECT IDENTIFIER NUMBER
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**STORMWATER SAMPLING LOCATIONS CONTINUED**

Instruction: Include the following Table for all Risk Levels when dewatering will be performed on the project site. Delete the Table if there is no dewatering planned for the project site.

**Project Site Dewatering Sampling Locations**

SWPPP Table 700.2.3.3.2.1

Location No.	Location	Dewatering Permit?	Pollutant From Construction Activity	Water Quality Indicator Constituent
		<input type="checkbox"/> YES <input type="checkbox"/> NO		
		<input type="checkbox"/> YES <input type="checkbox"/> NO		
		<input type="checkbox"/> YES <input type="checkbox"/> NO		

Instruction: Include the following Table for all Risk Levels when there is a potential for impounded stormwater that will have to be discharged from the project site.

**Project Site Potential Impounded Stormwater Sampling Locations**

(SWPPP Table 700.2.3.3.2.2)

Location No.	Location	Dewatering Permit?	Pollutant From Construction Activity	Water Quality Indicator Constituent
		<input type="checkbox"/> YES <input type="checkbox"/> NO		
		<input type="checkbox"/> YES <input type="checkbox"/> NO		
		<input type="checkbox"/> YES <input type="checkbox"/> NO		

Instruction: Include the following Table for all Risk Levels when there are dewatering activities or a potential for impounded stormwater that will have to be discharged from the project site and there is a high risk receiving water.

**Project Site Potential Dewatering/Impounded Stormwater Sampling Locations and Receiving Water Sampling Locations**

(SWPPP Table 700.2.3.3.2.3)

Dewatering/ Impounded Stormwater Location No.	Location	Receiving Water Location No.	Location

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**SWPPP ATTACHMENT EE  
STORMWATER SAMPLING LOCATIONS**

CEM-20EE (NEW 9/2012)

PROJECT NAME Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements	CONTRACT NUMBER/CO/RTE/PM	PROJECT IDENTIFIER NUMBER
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**STORMWATER SAMPLING LOCATIONS CONTINUED**

Instruction: Include the following Table for Risk Level 2 and Risk Level 3 projects. Delete the Table for Risk Level 1 projects.

**Project Site Discharge Sampling Locations for Turbidity and pH**

SWPPP Table 700.2.4.3.2.1

Location No.	Location	Drainage Area (acres)	Disturbed Soil Area (acres)	Percentage of Drainage Area that is Disturbed Soil Area (%)	Are there construction activities that may affect pH of stormwater discharges?
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO

Instruction: Include the following Table for Risk Level 2 and Risk Level 3 when project site has discharge locations that discharge directly to a receiving water. Delete the Table for Risk Level 1 projects.

**Receiving Water Sampling Locations for Turbidity and pH When Project Site Discharges Directly To The Receiving Water**

SWPPP Table 700.2.4.3.2.2

Location No.	Location	Drainage Area (acres)	Disturbed Soil Area (acres)	Percentage of Drainage Area that is Disturbed Soil Area (%)	Are there construction activities that may affect pH of stormwater discharges?
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO
					<input type="checkbox"/> YES <input type="checkbox"/> NO

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**SWPPP ATTACHMENT EE  
STORMWATER SAMPLING LOCATIONS**

CEM-20EE (NEW 9/2012)

PROJECT NAME Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements	CONTRACT NUMBER/CO/RTE/PM	PROJECT IDENTIFIER NUMBER
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**STORMWATER SAMPLING LOCATIONS CONTINUED**

Instruction: Include the following Table for all Risk Levels. Delete the Table for Risk Level 1 projects if there are no project site run-on locations.

**Project Site Run-on Sampling Locations**

SWPPP Table 700.2.4.3.2.4

Location No.	Location	Run-on May Affect Water Quality Discharged at Project Site Discharge Location No.	Is there any off-site disturbed soil area that could affect run-on water quality at this location?	Are there any off-site pollutants identified that could affect run-on water quality at this location?	Identified Potential Off-site Pollutants
			<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
			<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
			<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
			<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
			<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	

Instruction: Include the following Table for all Risk Level 3 projects. Delete the Table for Risk Level 1 and Risk Level 2 projects.

**Receiving Water Sampling Locations**

SWPPP Table 700.2.4.3.2.5

Location No.	Location	Project Site Discharge Location No.	Do discharges from this project site discharge location reach receiving water?
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

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**SWPPP ATTACHMENT EE  
STORMWATER SAMPLING LOCATIONS**

CEM-20EE (NEW 9/2012)

PROJECT NAME Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements	CONTRACT NUMBER/CO/RTE/PM	PROJECT IDENTIFIER NUMBER
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**STORMWATER SAMPLING LOCATIONS CONTINUED**

Instruction: Include the following Table when the RWQCB has requested specific water quality standard monitoring of project site discharge locations.

**Stomwater Discharge Locations Required To Be Monitored By RWQCB**

SWPPP Table 700.5.3.2.1

Location No.	Location	Water Quality Standard(s)	Is there potential site run-on that may affect water quality standard(s)?
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

Instruction: Include the following Table when the RWQCB has requested specific water quality standard monitoring of receiving waters.

**Receiving Water Sampling Locations Required To Be Monitored By RWQCB**

SWPPP Table 700.2.4.3.2.5

Location No.	Location	Water Quality Standard(s)

Instruction: Include the following Table when the project receives run-on with the potential to combine with stormwater discharges locations or receiving waters that require RWQCB specified water quality monitoring.

**Run-on Locations With Potential To Combine With Stormwater Discharges Required To Be Monitored By RWQCB**

SWPPP Table 700.2.5.3.2.4

Location No.	Location	Water Quality Standard(s)

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**SWPPP ATTACHMENT EE  
STORMWATER SAMPLING LOCATIONS**

CEM-20EE (NEW 9/2012)

PROJECT NAME Niland County Sanitation District - Wastewater Treatment Plant and Collections System Improvements	CONTRACT NUMBER/CO/RTE/PM	PROJECT IDENTIFIER NUMBER
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**STORMWATER SAMPLING LOCATIONS CONTINUED**

Instruction: Include the following Table for Risk Level 3 when an active treatment system will be used on the project site. Delete the Table if active treatment system is not planned to be used on the project site.

**Active Treatment System (ATS) Sampling Locations**

SWPPP Table 700.2.6.3.2

Location No.	Location	Chemical/Additive Used in Active Treatment System	Residual Chemical/Additive Indicator Constituent

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# APPENDIX A

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CEM-2008 SWPPP/WPCP AMENDMENT CERTIFICATION AND ACCEPTANCE FORM

**SWPPP/WPCP AMENDMENT CERTIFICATION AND ACCEPTANCE**

CEM-2008 (REV 11/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL
	<input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A. WPCP
	<input type="checkbox"/> Risk Level 2 <input type="checkbox"/> N/A. Project resides in the Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2011-0019, NPDES No. CAG616002.
	<input type="checkbox"/> Risk Level 3

**Storm Water Pollution Prevention Plan (SWPPP)/Water Pollution Control Program (WPCP)  
Amendment Number \_\_\_\_\_**

CONTRACTOR WATER POLLUTION CONTROL MANAGER SIGNATURE	DATE
CONTRACTOR WATER POLLUTION CONTROL MANAGER NAME	PHONE NUMBER

**Contractor Certification of SWPPP or WPCP Amendment**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or persons directly responsible for gathering the information, the information submitted, to the best of my knowledge and belief, is true, accurate, and complete. I am aware that significant penalties exist for submitting false information, including the possibility of fine and imprisonment for knowing violations.

CONTRACTOR SIGNATURE	DATE
CONTRACTOR NAME	PHONE NUMBER
TITLE	

**Resident Engineer Acceptance of SWPPP or WPCP Amendment**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those directly responsible for gathering the information, the information submitted, to the best of my knowledge and belief, is true, accurate, and complete. I am aware that significant penalties exist for submitting false information, including the possibility of fine and imprisonment for knowing violations.

RESIDENT ENGINEER SIGNATURE	DATE OF AMENDMENT ACCEPTANCE
RESIDENT ENGINEER NAME	PHONE NUMBER

**SWPPP/WPCP AMENDMENT CERTIFICATION AND ACCEPTANCE**

CEM-2008 (REV 11/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Required for Private Entity Administered Projects**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those directly responsible for gathering the information, the information submitted, to the best of my knowledge and belief is true, accurate, and complete. I am aware that significant penalties exist for submitting false information, including the possibility of fine and imprisonment for knowing violations.

LEGALLY RESPONSIBLE PERSON SIGNATURE	DATE
LEGALLY RESPONSIBLE PERSON NAME	PHONE NUMBER
TITLE	

**Required for Local Agency/Private Entity Administered Project****Caltrans Oversight Engineer's Concurrence With SWPPP/WPCP Amendment**

I and personnel acting under my direction and supervision have reviewed this SWPPP/ WPCP and find that it meets the requirements set forth in the contract Special Provisions, Caltrans *Standard Specifications*, and the Caltrans SWPPP/WPCP Preparation Manual.

OVERSIGHT ENGINEER SIGNATURE	DATE OF AMENDMENT CONCURRENCE
OVERSIGHT ENGINEER NAME	PHONE NUMBER

**ADA Notice**

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## Instructions

### General Information

- The information on CEM-2008 is required for projects with either a Stormwater Pollution Prevention Plan (SWPPP) or a Water Pollution Control Program (WPCP) to document amendment acceptance and certification.
- SWPPP amendments must be certified by the approved signatory as identified in CEM-2006 or 2006T, "Legally Responsible Person Authorization of Approved Signatory," signed by the legally responsible person (LRP).
  1. For Caltrans, the LRP is the district director. The LRP may authorize the project resident engineer to be approved signatory.
  2. For a local agency, the LRP is either a principal executive officer or a ranking elected official. The local agency LRP may authorize the project resident engineer to be approved signatory.
  3. For a private entity performing work in the state right-of-way under an encroachment permit, the LRP must be one of the following:
    - a. For a corporation, a responsible corporate officer.
    - b. For a partnership or sole proprietorship, a general partner or the proprietor, respectively.The private entity LRP may not authorize an approved signatory.
  4. Attach a completed copy of CEM-2008 to each SWPPP or WPCP amendment, and include it in the SWPPP Attachment DD or the WPCP Attachment C.

### Form

#### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the Contract Number field.

#### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number. For projects without one, write "N/A" in the field.

#### WDID Number

For projects that have a Water Pollution Control Program enter "WPCP" in this field.

# APPENDIX B

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CEM-2009 SWPPP/WPCP AMENDMENTS LOG FORM



## SWPPP/WPCP AMENDMENTS LOG

CEM-2009 (REV 11/2013)

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### Instructions

#### General Information

- Projects with either a Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP) require the information on this form to track amendments.
- Attach a completed copy of the form to each accepted SWPPP/WPCP amendment, and include in SWPPP Attachment DD or WPCP Attachment C.

#### Form

##### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the Contract Number field.

##### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a project identifier number. For projects without one, write "N/A" in the field.

##### WDID Number

For projects with WPCP enter "WPCP" in this field.

When the resident engineer has accepted SWPPP or WPCP amendments, enter:

1. The amendment number.
2. The date the Water Pollution Control Manager signed form CEM-2008.
3. A brief description of the amendment.
4. The name and title of person who requested the amendment.
5. The date the resident engineer accepted form CEM-2008.

# APPENDIX C

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CEM-2070 SWPPP/WPCP ANNUAL CERTIFICATION OF COMPLIANCE FORM



**SWPPP/WPCP ANNUAL CERTIFICATION OF COMPLIANCE**

CEM-2070 (REV 12/2013)

Page 2 of 4

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Required for Private Entity Administered Projects  
Private Entity Legally Responsible Person Annual Certification of Compliance**

I certify that the project is in compliance with the project site approved Stormwater Pollution Prevention Plan or Water Pollution Control Program including approved amendments. The project site and activities thereon are in compliance with the Caltrans Statewide NPDES Permit No. CAS000003, the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES Permit No. CAS000002, or Order No. R6T-2011-0019, NPDES No. CAG-616002, whichever is applicable.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that significant penalties exist for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Legally responsible person signature	Date
Legally responsible person name	Phone number
Title	

**SWPPP/WPCP ANNUAL CERTIFICATION OF COMPLIANCE**

CEM-2070 (REV 12/2013)

Page 3 of 4

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Resident Engineer Approval of Annual Certification of Compliance**

An inspection of the project site for annual certification of compliance was conducted on (date) _____	Annual Certification of Compliance project site inspection conducted by _____
--	---

I certify that I, or personnel acting under my direction and supervision, have inspected the project site and find the following:

- Yes     No    Water pollution control measures are being implemented in accordance with the SWPPP or WPCP approved for the project, including approved SWPPP/WPCP amendments.
- Yes     No    The project site and activities thereon are in compliance with the Caltrans Statewide NPDES Permit No. CAS000003, the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES Permit No. CAS000002, or Order No. R6T-2011-0019, NPDES No. CAG-616002, whichever is applicable.

The box above is checked "no" based on the project site annual certification inspection, and the following corrective actions are necessary for the project to be in compliance with SWPPP/WPCP or NPDES Permits

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that significant penalties exist for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Resident engineer signature	Date of approval
Resident engineer name	Phone number

**Required for Local Agency or Private Entity-Administered Project  
Caltrans Oversight Engineer's Concurrence With Annual Certification of Compliance**

I, or personnel acting under my direction and supervision, have reviewed this Annual Certification of Compliance and concur that the project is in compliance with SWPPP or WPCP approved for the project, including approved SWPPP/WPCP amendments and applicable NPDES Permits.

Oversight engineer signature	Date of concurrence
Oversight engineer name	Phone number

## SWPPP/WPCP ANNUAL CERTIFICATION OF COMPLIANCE

CEM-2070 (REV 12/2013)

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### Instructions

#### General Information

- Projects with either a Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP) require an Annual Certification of Compliance by July 15th of each year.
- Document the project site inspection for annual certification on form CEM-2030, "Stormwater Site Inspection Report."
- A legally responsible person (LRP) or a signatory approved by the LRP must certify the Stormwater Pollution Prevention Plan Annual Certification of Compliance.
  - For Caltrans, the LRP is the district director. The LRP may authorize the project resident engineer to be the approved signatory.
  - For a local agency, the LRP is either a principal executive officer or ranking elected official. The local agency's LRP may authorize the project resident engineer to be the approved signatory. If the local agency's LRP has not approved the local agency's resident engineer to be an approved signatory then the local agency's LRP must sign in the resident engineer signature box of the Annual Certification of Compliance.
  - For a private entity performing work in the state right-of-way under an encroachment permit, the LRP must be one of the following:
    - For a corporation—a responsible corporate officer.
    - For a partnership or sole proprietorship—a general partner or the proprietor, respectively.
    - The private entity's LRP may not authorize an approved signatory.
- File a completed copy of this form in SWPPP/WPCP file category 20.70, Annual Certification of Compliance.
- This form is used for Annual Certification as well as replaces form CEM-2001.

#### Form

##### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the Contract Number field.

##### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write "N/A" in the field.

##### WDID Number

For projects that have Water Pollution Control Program, enter "WPCP" in this field.

##### SWPPP Projects Site Risk Level

Check the box for the appropriate SWPPP risk level, or N/A for projects residing in the Lake Tahoe Hydrologic Unit, or N/A for projects that have Water Pollution Control Program.

# APPENDIX D

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SUBCONTRACTOR / MATERIAL SUPPLIER NOTIFICATION LETTER AND CONTACT  
INFORMATION

Appendix D

SUBCONTRACTOR	WORK TO BE PERFORMED	CONTACT INFO.
		TBD

# APPENDIX E

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CEM-2023 STORMWATER TRAINING RECORD FORM





## STORMWATER TRAINING RECORD

CEM-2023 (REV 11/2013)

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### Instructions

#### General Information

- Projects with either a Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP) require the information on this form to document stormwater training for contractor and subcontractor managers, supervisors, and employees. Include the form and required training documentation in the stormwater annual report for SWPPP projects.
- Use this form to document training for employees responsible for activities associated with Construction General Permit compliance and contract specifications. Use this form to document required weekly stormwater training.
- Provide this training record and an updated copy of CEM-2024 (CEM-2024 is an optional form used at the WPCM's discretion) "Stormwater Training Log," to the resident engineer (RE) within five days of the date of training.
- Attach additional copies of page 2 of this form if necessary to record all individuals attending this training.
- Stormwater training needs to be completed at the frequency stipulated in the project specifications and/or the SWPPP, whichever is more frequent.
- Names may be written or typed. Initials must be original. Originals are filed with RE as stipulated above.
- Attach copy of training material/topic with submittal to RE.

#### Form

- **Contract Number/Co/Rte/PM**  
For local agency encroachment permit projects write the encroachment permit number in the Contract Number field.
- **Project Identifier Number**  
Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write N/A in the field.
- **WDID Number**  
For projects with Water Pollution Control Program, enter "WPCP."
- **Attendee Roster**  
Enter employee name, contractor or subcontractor company name and employee phone number.
- **Training Audience**  
Enter one of the following responses:  
  
General—Training for individuals responsible for activities associated with compliance with the Construction General Permit.  
  
BMPs—Training for individuals responsible for BMP installation, inspection, maintenance, and repair.  
  
SWPPP—Training for individuals responsible for overseeing, revising, and amending the SWPPP.

# APPENDIX F

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CEM-2024 STORMWATER TRAINING LOG-OPTIONAL FORM

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A. WPCP <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> N/A. Project resides in the Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2011-0019, NPDES No. CAG616002. <input type="checkbox"/> Risk Level 3
SUBMITTED BY CONTRACTOR (PRINT AND SIGN NAME)	DATE

**STORMWATER TRAINING LOG**

Date of Training	Training Audience	Number of Training Attendees	Stormwater Training Course Title or Topics Covered	Date Training Documentation (CEM-2023) Provided to Resident Engineer
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			
	<input type="checkbox"/> General <input type="checkbox"/> BMPs <input type="checkbox"/> SWPPP			

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## Instructions

### General Information

- For projects with either a Stormwater Pollution Prevention Plan (SWPPP) or a Water Pollution Control Program (WPCP) the information shown on this form may be used to document stormwater training for contractor and subcontractor managers, supervisors, and employees. The stormwater annual report for SWPPP projects will include required training documentation and the information on this form, or in another form used at the discretion of the Water Pollution Control Manager (WPCM).
- If this form is used, provide an updated copy of CEM-2024 with attached training documentation to the resident engineer within five days of training, along with CEM-2023 and a copy of training materials and topic(s) covered.
- This form is optional, and provided as a management tool for the WPCM to assist in compiling and organizing information required of the annual report.

### Form

#### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the Contract Number field.

#### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write N/A in the field.

#### WDID Number

For projects with Water Pollution Control Program enter "WPCP" in this field.

#### Training Audience

Check one of the following responses:

General—training for individuals responsible for activities associated with compliance with the General Construction Permit.

BMPs—training for individuals responsible for BMP installation, inspection, maintenance, and repair.

SWPPP—training for individuals responsible for overseeing revising and amending the SWPPP.

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# APPENDIX G

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CEM-2030 STORMWATER SITE INSPECTION REPORT

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A. WPCP <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> N/A. Project resides in The Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2016-0010, NPDES No. CAG616002 <input type="checkbox"/> Risk Level 3
SUBMITTED BY CONTRACTOR (PRINT AND SIGN NAME)	DATE
WATER POLLUTION CONTROL MANAGER NAME AND COMPANY NAME	PHONE NUMBER
	EMERGENCY (24/7) PHONE NUMBER

**GENERAL INFORMATION**

INSPECTOR'S NAME	Accompanied by Caltrans staff? <input type="checkbox"/> Yes <input type="checkbox"/> No    If Yes, Name/Initials _____	DATE OF INSPECTION
------------------	---	--------------------

Weather Condition <input type="checkbox"/> Clear <input type="checkbox"/> Partly cloudy <input type="checkbox"/> Cloudy	Precipitation Condition <input type="checkbox"/> None <input type="checkbox"/> Heavy rain <input type="checkbox"/> Misty <input type="checkbox"/> Hail <input type="checkbox"/> Light rain <input type="checkbox"/> Snow <input type="checkbox"/> Rain	Wind Condition <input type="checkbox"/> None <input type="checkbox"/> Less than 5 mph <input type="checkbox"/> Greater than 5 mph
--	--	--

Construction Phase <input type="checkbox"/> Highway construction <input type="checkbox"/> Plant establishment <input type="checkbox"/> Suspension of work (inactive site)	Site Information Total project area _____ acres Total project disturbed soil area _____ acres Current phase disturbed soil area _____ acres Current phase inactive disturbed soil _____ acres
--	---

Inspection Type <i>Check appropriate box(es)</i>	Storm Information	
<input type="checkbox"/> Weekly <input type="checkbox"/> Annual Certification of Compliance <input type="checkbox"/> Quarterly non-stormwater	Time elapsed since last storm _____ days	Precipitation amount from last storm _____ inches
<input type="checkbox"/> Pre-storm	Time storm is expected _____ (time) _____ (date)	Expected precipitation amount _____ inches
<input type="checkbox"/> During storm event	Time elapsed since storm began _____ hours-minutes	Precipitation amount from storm recorded from site rain gauge _____ inches
<input type="checkbox"/> Post storm	Time elapsed since storm _____ hours-minutes	Precipitation amount from storm recorded from site rain gauge _____ inches

Date	Daily Site Inspection of Best Management Practices (BMP) List Daily inspections for previous calendar week. Do not include weekly inspection.	Daily inspection performed by	Any corrective actions identified as completed or new?		If yes, were the actions added or verified on CEM-2035, as appropriate?		Date shown on corrective action form
			YES	NO	YES	NO	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Site Inspection of Best Management Practices, continued**  
 For project specific BMPs, insert the BMP name and additional inspection requirements below.

<b>Temporary Linear Sediment Barriers</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Right location?		Properly installed or cross barriers installed?		Maintenance performed when 1/3 height or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No			
Location 1									
Location 2									
Location 3									

<b>Storm Drain Inlet Protection</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	All inlets protected?		Properly installed?		Maintenance or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No			
Location 1									
Location 2									
Location 3									

<b>Stockpile Management</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date stockpile created	Is the stockpile listed as a location on stockpile management inactive stockpiles? If yes, stop here.		Is there a storm event forecasted? If yes, stop here and take action.		Is stockpile being actively used? If yes, stop here.		If no to previous question, what is the last day stockpile was actively used?	How long since stockpile actively used?	Has it been 3 days since the stockpile has been actively used? If yes, take action.	
		Date	Yes	No	Yes	No	Yes			No	Date
Location 1											
Location 2											

Notes:

1. If it has been 3 days (72 hours) since a stockpile has been active then the stockpile is inactive and must be reported as a location on stockpile management inactive stockpiles.
2. Stockpiles must be covered and have perimeter control installed prior to a storm event.

Location Number	Comments / Corrective Actions	Photos?	Action No.
		Yes	
1			
2			

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Inactive Stockpile Management	Type of Material or Waste	Is the stockpile properly located?		Is the stockpile covered?		Does the stockpile have a perimeter control?		Does the stockpile need maintenance or repair?		
		Yes	No	Yes	No	Yes	No	Yes	No	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No										
Location 1										
Location 2										
Location Number	Comments / Corrective Actions								Photos?	Action No.
1									Yes	
2										

Sediment and Desilting Basins	Are basin inlets, outlets, and spillways in working order?		Is water contained in basin?		Is maintenance needed to provide required retention or detention?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No									
Location 1									
Location 2									
Location 3									

Tracking Controls	Do all entrances and exits have tracking controls?		Is pavement free from visible sediment tracking?		Does sediment need to be removed from rock or ribbed plates?		Is daily sweeping done?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes	No	Yes		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No											
Location 1											
Location 2											
Location 3											

Wind Erosion Control	Water trucks on-site?		Visible dust?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No							
Location 1							
Location 2							
Location 3							

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Dewatering Operations <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Dewatering currently active?		Dewatering conforms with RWQCB permit?		Dewatering discharge within discharge specified limitations?		Photos?	Comments and Required Actions	Action No.				
	Yes	No	Yes	No	Yes	No	Yes						
Location 1													
Location 2													
Location 3													
Temporary Stream Crossing <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Constructed as shown on the plan?		Conforms to 404 permit and 1601 agreement requirements?		Maintenance or repair required?		Photos?	Comments and Required Actions	Action No.				
	Yes	No	Yes	No	Yes	No	Yes						
Location 1													
Location 2													
Location 3													
Material Storage <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Located away from drainage courses and water courses?		Areas protected from run on and runoff?		Bagged and boxed materials stored on pallets?		Areas reasonably clean and free of spills, leaks, and other material?		Is material inventory up to date?		Liquid materials in secondary containment?		Photos?
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Location 1													
Location 2													
Location 3													
Comments and Required Actions													Action No.
Location 1													
Location 2													
Location 3													

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

<b>Waste Management Sanitation Facilities</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Located away from drainage courses and water courses?		Secured to ground or foundation?		Clean and has adequate capacity?		Ground checked for any spills or leaks?		Any spills or leaks found?		Photos?	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
Location 1												
Location 2												
Location 3												

Location Number	Comments / Corrective Actions	Action No.
1		
2		
3		

<b>Project-specific BMP</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Properly located?		Properly installed?		Maintenance or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location 1									
Location 2									
Location 3									

<b>Project-specific BMP</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Properly located?		Properly installed?		Maintenance or repair needed?						Photos?	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
Location 1												
Location 2												
Location 3												

Location Number	Comments and Required Actions	Action No.
Location 1		
Location 2		
Location 3		

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Site Inspection Report General Comments**

Are the BMPs installed as required by the Stormwater Pollution Prevention Plan for the phase of construction?

Yes     No

Does the SWPPP need to be amended?

Yes     No

Does the SWPPP currently reflect the current site conditions and contractor operations?

Yes     No

Is hazardous waste stored on the jobsite?

Yes     No

Are there water pollution control concerns on the project site not addressed by the comments and required actions shown above for BMPs, based on the field review of the jobsite?

Yes     No    *If yes, provide details, comments, and required actions below for each location.*

Location	Water Pollution Control Concern	Comments and Required Actions	Action No.

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Stormwater Inspection Report Certification**

I certify under penalty of law that this Stormwater Inspection Report was performed in accordance with the General Permit. The information contained in this inspection report was gathered from a field site inspection. I am aware that Section 309 (c)(4) of the Clean Water Act provides for significant penalties, including fines and imprisonment for knowingly submitting a false material statement, representation, or certification.

Stormwater Inspector (Name)	Date Report Completed
-----------------------------	-----------------------

Stormwater Inspector (Signature)

I certify under penalty of law that this Stormwater Inspection Report was performed in accordance with the General Permit by me or under my direction or supervision. The information contained in this inspection report was gathered and evaluated by qualified personnel prior to submittal. Based on my review of the information and inquiry of those who gathered and evaluated the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that Section 309 (c)(4) of the Clean Water Act provides for significant penalties, including fines and imprisonment for knowingly submitting a false material statement, representation, or certification.

Water Pollution Control Manager (Name)	Date
--	------

Water Pollution Control Manager (Signature)

**Stormwater Inspection Report Acceptance**

If hazardous waste is stored on the jobsite, the resident engineer should notify the district hazardous waste coordinator.

Was the District Hazardous Waste Coordinator notified?

- N/A, no hazardous waste stored on the jobsite
- YES, Date \_\_\_\_\_ Time \_\_\_\_\_
- NO

Accepted by Resident Engineer (Print Name)	Date
--	------

Resident Engineer (Signature)

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### Instructions

#### General Information

- Construction General Permit attachments C, D, and E, Section G.5. require the information on this form.
- If the inspection form does not contain enough lines to report all locations on a jobsite, click on the "Add Item" button so that all locations are inspected and reported.
- Obtain forecasted precipitation information from the National Weather Service Forecast Office website, <https://www.weather.gov/forecastmaps>.
- Weather information should be the best estimate of the beginning of the storm event, duration of the event, and time elapsed since the last storm.
- Rainfall amounts should be recorded from the project site rain gauge.
- "Daily Site Inspection of Best Management Practices" section is to be filled out by the water pollution control manager.

#### Storm Visual Inspections

- For non-visible pollutant inspections, report on all locations shown in the Stormwater Pollution Prevention Plan.

#### Required Actions

- All corrective actions identified in this report must also be recorded on Form CEM-2035, "Stormwater Corrective Actions Summary."
  - Locations identified where BMPs are failing or have other shortcomings require implementation of repairs or design changes within 72 hours of identification, and BMP repairs or other changes must be completed as soon as possible.
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-

# APPENDIX H

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CEM-2034 MONTHLY STORMWATER BEST MANAGEMENT & MATERIALS INVENTORY  
REPORT FORM







# MONTHLY STORMWATER BEST MANAGEMENT PRACTICES & MATERIALS INVENTORY REPORT - OPTIONAL

CEM-2034 (NEW 12/2013)

Page 4 of 4

## Instructions

### General Information

- The Water Pollution Control Manager must oversee preparation of this form and submit a copy to the resident engineer every month.
- Attach additional copies of page 2 and page 3 of this form to include all required locations.
- Insert consecutive numbers for each location when using page 2 or page 3 of this form

BMP Name	BMP ID	BMP Name	BMP ID
<b>Temporary Soil Stabilization</b>		<b>Non-Stormwater Management</b>	
Preservation of existing vegetation	SS-02	Water conservation practices	NS-01
Hydraulic mulch	SS-03	Dewatering operations	NS-02
Hydroseeding	SS-04	Paving and grinding operations	NS-03
Soil binders	SS-05	Temporary stream crossing	NS-04
Straw mulch	SS-06	Clear water diversion	NS-05
Geotextiles, mats, plastic covers, and lined ditches	SS-07	Illegal connection or discharge detection and reporting	NS-06
Wood mulching	SS-08	Potable water and irrigation	NS-07
Earth dikes, drainage swales and lined ditches	SS-09	Vehicle and equipment cleaning	NS-08
Outlet protection and velocity dissipation devices	SS-10	Vehicle and equipment fueling	NS-09
Slope drains	SS-11	Vehicle and equipment maintenance	NS-10
Streambank stabilization	SS-12	Pile-driving operations	NS-11
<b>Temporary Sediment Control</b>		Concrete curing	NS-12
Silt fence	SC-01	Material and equipment use over water	NS-13
Sediment or distilling basin	SC-02	Concrete finishing	NS-14
Sediment trap	SC-03	Structure demolition or removal over or adjacent to water	NS-15
Checkdams	SC-04	<b>Waste Management and Pollution Control</b>	
Fiber rolls	SC-05	Material delivery and storage	WM-01
Gravel bag berm	SC-06	Material use	WM-02
Sandbag barrier	SC-08	Stockpile management	WM-03
Straw bale barrier	SC-09	Spill prevention and control	WM-04
Storm drain inlet protection	SC-10	Solid waste management	WM-05
<b>Wind Erosion Control</b>		Hazardous waste management	WM-06
Wind erosion control	WE-01	Contaminated soil management	WM-07
<b>Tracking Controls</b>		Concrete waste management	WM-08
Stabilized construction entrance and exit	TC-01	Sanitary or septic waste management	WM-09
Stabilized construction roadway	TC-02	Liquid waste management	WM-10
Entrance and exit tire wash	TC-03		
Street sweeping	TC-04		

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# APPENDIX I

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CEM-2035 STORMWATER CORRECTIVE ACTIONS SUMMARY

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFICATION NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	SWPPP PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A. WPCP <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> N/A. Project resides in the Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2011-0019, NPDES No.CAG61002 <input type="checkbox"/> Risk Level 3
Submitted by contractor (print and sign name)	Date

Implement required actions identified in this Stormwater Corrective Actions Summary as soon as possible, but actions must begin within 72 hours of the site inspection, or be completed before the next predicted rain event, whichever is sooner.

Corrective Action Number	Verification of Stormwater Site Inspection Corrective Action	Date Corrective Actions Identified
	BMP Type	Location
	Required Action	Verified by (print name and title)
	Date Completed	Verified by (signature)
	Comments	
	BMP Type	Location
	Required Action	Verified by (print name and title)
	Date Completed	Verified by (signature)
	Comments	
	BMP Type	Location
	Required Action	Verified by (print name and title)
	Date Completed	Verified by (signature)
	Comments	
	BMP Type	Location
	Required Action	Verified by (print name and title)
	Date Completed	Verified by (signature)
	Comments	

Add Page
Delete Page

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFICATION NUMBER
	WDID NUMBER

**Stormwater Site Inspection Report Corrective Action Summary Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the people who manage the system or are directly responsible for gathering the information, the information submitted is true, accurate, and complete to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment of knowing violations.

Water Pollution Control Manager (name)	Date
--	------

Water Pollution Control Manager (signature)

**Stormwater Site Inspection Report Corrective Action Summary Acceptance**

Resident Engineer (name)	Date
--------------------------	------

Resident Engineer (signature)

**Instructions**

**General Information**

- If the summary form does not have enough lines to report all required actions, use additional copies of this form's page 1 to report all required corrective actions from an Inspection form.
- On page 1 of this form and additional copies of page 1, insert consecutive numbers for each required corrective action.

**Required Actions**

- Identified locations - where BMPs are failing or have other shortcomings - required repairs or design changes within 72 hours of identification and complete BMP repairs or other changes as soon as possible, or before the next predicted rain event, whichever is sooner, per the Lake Tahoe Hydrologic Unit Permit.
- Daily inspection required for waste containers (covered at end of shift), tracking, and other per project specifications.

# APPENDIX J

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CEM-2045 RAIN EVENT ACTION PLAN FORMS

**RAIN EVENT ACTION PLAN**

CEM-2045 (REV 02/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM	
	PROJECT IDENTIFIER NUMBER	
	WDID NUMBER	
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL	
	<input type="checkbox"/> Risk Level 2 <input type="checkbox"/> Risk Level 3	
Submitted by contractor (print and sign name)	Date	
Water Pollution Control Manager name and company name	Phone number	
	Emergency (24/7) phone number	
Erosion and sediment control provider or subcontractor name and company	Phone number	
	Emergency (24/7) phone number	
Stormwater sampling and testing agent or subcontractor name and company	Phone number	
	Emergency (24/7) phone number	

**Storm Information**

Attach forecasted precipitation information from the National Weather Service Forecast Office website, <http://www.weather.gov>

Project site ZIP code	Date forecast checked	Time forecast checked
Forecast percentage probability of precipitation in 0 - 24 hours	Expected precipitation amount	Date
Forecast percentage probability of precipitation in 24 - 48 hours	Expected precipitation amount	Date
Forecast percentage probability of precipitation in 48 - 72 hours	Expected precipitation amount	Date
Will predicted weather pattern rain event produce 1/2-inch or more rain?  <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>Note:</b> A qualifying rain event happens when a predicted weather pattern will produce 1/2-inch or more of precipitation. A qualifying rain event will require stormwater visual monitoring site inspections and sampling and analysis of stormwater discharges.	

**Phase Information**

Highway Construction Phase       Plant Establishment Phase       Inactive

**Sampling Schedule**

Based on the weather forecast, stormwater discharge sampling is required to begin on \_\_\_\_\_ (date) at approximately \_\_\_\_\_ (time).  
Stormwater discharge sampling is required every 24 hours during an extended storm event based on the predicted duration of the storm event.  
It is required on the following date:

\_\_\_\_\_

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**RAIN EVENT ACTION PLAN**

CEM-2045 (REV 02/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Activities Associated with Highway Construction Projects, Plant Establishment, Inactive Projects**

*Check ALL boxes below that apply to current project site.*

<input type="checkbox"/> Cleaning and grubbing <input type="checkbox"/> Earthwork <input type="checkbox"/> Culvert construction <input type="checkbox"/> Rough grading <input type="checkbox"/> Storm drain installation <input type="checkbox"/> Utility installation water-gas-sewer <input type="checkbox"/> Structure foundations (including piles) <input type="checkbox"/> Subgrade grading <input type="checkbox"/> Subbase and base placement	<input type="checkbox"/> Finish grading <input type="checkbox"/> Structure construction <input type="checkbox"/> Soundwall construction <input type="checkbox"/> Curbs, gutters, and sidewalks <input type="checkbox"/> Paving operations <input type="checkbox"/> Finishing roadway <input type="checkbox"/> Metal beam guard rail installation <input type="checkbox"/> Sign installation <input type="checkbox"/> Highway electrical work	<input type="checkbox"/> Traffic striping and pavement markings <input type="checkbox"/> Highway planting <input type="checkbox"/> Soil amendments <input type="checkbox"/> Plant establishment <input type="checkbox"/> Material delivery and storage <input type="checkbox"/> Equipment maintenance and fueling <input type="checkbox"/> Erosion and sediment control <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
---	--	---

**Subcontractors or Trades Active on Site for Highway Construction, Plant Establishment, Inactive Projects**

*Check ALL boxes below that apply to current project site.*

<input type="checkbox"/> Grading (operating engineers) <input type="checkbox"/> Underground storm drain (operating engineers and laborers) <input type="checkbox"/> Underground utilities (operating engineers and laborers) <input type="checkbox"/> Underground utilities (public or private utility company) <input type="checkbox"/> Pile installation (pile butts) <input type="checkbox"/> Concrete foundations (carpenters, laborers, and concrete finishers) <input type="checkbox"/> Bar reinforcement placement <input type="checkbox"/> Structure construction (carpenters and laborers) <input type="checkbox"/> Concrete placement (operating engineer, laborers and concrete finishers) <input type="checkbox"/> Hot mix asphalt placement (operating engineers and laborers)	<input type="checkbox"/> Curb, gutter and sidewalk (carpenters, laborers and concrete finishers) <input type="checkbox"/> Lighting and signals (operating engineers and electricians) <input type="checkbox"/> Metal beam guard rail (operating engineers and laborers) <input type="checkbox"/> Signs (operating engineers) <input type="checkbox"/> Traffic striping and pavement markings <input type="checkbox"/> Masonry soundwalls (masons and laborers) <input type="checkbox"/> Erosion and sediment control <input type="checkbox"/> Highway planting <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
--	---

**Trade (Subcontractor) Information Provided**

*Check ALL boxes below that apply to current project site.*

<input type="checkbox"/> Project SWPPP Handout <input type="checkbox"/> Contract Specifications <input type="checkbox"/> Educational Material Handout <input type="checkbox"/> SWPPP Training Workshop	<input type="checkbox"/> Tailgate Meetings <input type="checkbox"/> Poster and Signage <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
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**RAIN EVENT ACTION PLAN**

CEM-2045 (REV 02/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Predicted Rain-Event-Triggered Actions**

Activity	Actions Required Before Predicted Rain Event
Information and Scheduling	<input type="checkbox"/> Project superintendent informed of predicted rain at _____ (time) on _____ (date). <input type="checkbox"/> Foreman and subcontractors informed of predicted rain. <input type="checkbox"/> Erosion control or sediment control provider notified to provide: <input type="checkbox"/> Pre-storm crew with at least _____ people <input type="checkbox"/> Pre-storm crew to start implementing storm event actions by _____ (time) on _____ (date)  <input type="checkbox"/> Sample collection and testing provider alerted if non-visible pollutant sampling and testing required. List of non-visible pollutant sampling locations and parameters: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____  <input type="checkbox"/> Check that adequate erosion and sediment control materials are on hand for: <input type="checkbox"/> Pre-storm required actions <input type="checkbox"/> Extended storm event maintenance and repair  <input type="checkbox"/> Confirm that the BMP site map is updated and provide a copy to erosion and sediment control provider or subcontractor.  <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
	<b>Additional Actions Required Before a Qualifying Rain Event</b>
	<input type="checkbox"/> Pre-storm stormwater site inspection completed. <input type="checkbox"/> Listed corrective actions identified by pre-storm stormwater site inspection that must be corrected before storm event on page 7 of this Rain Event Action Plan (REAP). <input type="checkbox"/> Staff scheduled for inspections during storm. <input type="checkbox"/> Erosion control or sediment control provider notified at _____ (time) on _____ (date) to provide crew during the storm event of at least _____. <input type="checkbox"/> The attached contingency plan is to be implemented in the event of flooding:

**RAIN EVENT ACTION PLAN**

CEM-2045 (REV 01/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Predicted Rain-Event-Triggered Actions, (continued)**

Activity	Construction Site Monitoring Program Actions Required Before a Qualifying Rain Event
Information and Scheduling	<input type="checkbox"/> Review the discharge location site map for the current phase of the project and include additional non-visible pollutant sampling locations identified during pre-storm stormwater site inspection.  <input type="checkbox"/> Alert sample collection and testing provider that sampling will be required and provide the following: <input type="checkbox"/> Updated discharge location site map <input type="checkbox"/> The required number of sampling locations for this phase of the project: <input type="checkbox"/> _____ Discharge points <input type="checkbox"/> _____ Run-on locations <input type="checkbox"/> _____ Receiving waters for Risk Level 3 <input type="checkbox"/> _____ Non-visible potential discharge points  <p style="margin-left: 20px;">Run-on Sampling Locations</p> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____  <p style="margin-left: 20px;">Receiving Water Sampling Locations</p> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____  <p style="margin-left: 20px;">Discharge Sampling Locations</p> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____

**RAIN EVENT ACTION PLAN**

CEM-2045 (REV 02/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Predicted Rain-Event-Triggered Actions (continued)**

Activity	Actions Required Before Predicted Rain Event
Material Storage Areas	<input type="checkbox"/> Material covered or in sheds (For example: treated wood and metals) <input type="checkbox"/> Stockpiles covered and perimeter control installed <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
Waste Management Areas	<input type="checkbox"/> Dumpsters closed <input type="checkbox"/> Drain holes plugged <input type="checkbox"/> Recycling bins covered <input type="checkbox"/> Sanitary stations bermed and protected from tipping <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
Concrete Rinse Out Areas	<input type="checkbox"/> Wash-out bins covered <input type="checkbox"/> Adequate capacity for rain <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____
Operations	<input type="checkbox"/> Operations to shut down for rain event <ul style="list-style-type: none"> <li><input type="checkbox"/> Grading</li> <li><input type="checkbox"/> Concrete pours</li> <li><input type="checkbox"/> Hot mix asphalt paving</li> <li><input type="checkbox"/> Other _____</li> <li><input type="checkbox"/> Other _____</li> </ul> <input type="checkbox"/> Soil amendments not to be applied within the 24 hours before a rain event <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____

**RAIN EVENT ACTION PLAN**

CEM-2045 (REV 02/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Predicted Rain-Event-Triggered Actions (continued)**

Activity	Actions Required Before Predicted Rain Event																		
Secure Site for Storm Event	<input type="checkbox"/> Trenches and excavation protected. <input type="checkbox"/> Perimeter and excavations protected. <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____																		
Site Erosion and Sediment Control BMPs	<input type="checkbox"/> Site perimeter controls are in place. <input type="checkbox"/> Catch basin and drop inlet protection are in place. <input type="checkbox"/> Sediment basins and traps have adequate capacity. <input type="checkbox"/> Deploy temporary perimeter control on inactive areas. <input type="checkbox"/> Deploy temporary perimeter control around active disturbed soil areas and active stockpiles. <input type="checkbox"/> Sweep access roads. <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____																		
Spills and Drips	<input type="checkbox"/> Clean up all spills and drips, including paint, fuel, and oil. <input type="checkbox"/> Empty drip pans. <input type="checkbox"/> Other _____ <input type="checkbox"/> Other _____																		
Pre-storm Inspection Identified Corrective Actions	<table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:80%;"></th> <th style="text-align: center;">Corrective Action Number</th> </tr> </thead> <tbody> <tr><td><input type="checkbox"/> _____</td><td style="text-align: center;">_____</td></tr> </tbody> </table>		Corrective Action Number	<input type="checkbox"/> _____	_____														
	Corrective Action Number																		
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**RAIN EVENT ACTION PLAN**

CEM-2045 (REV 02/2019)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Certification of Rain Event Action Plan**

I certify under penalty of law that this Rain Event Action Plan (REAP) will be implemented in accordance with the Construction General Permit by me or under my direction or supervision. The information contained in this REAP was gathered and evaluated by qualified personnel before submittal. Based on my review of the information and inquiry of those who gathered and evaluated the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that Section 309 (c)(4) of the Clean Water Act provides for significant penalties, including fines and imprisonment for knowingly submitting false material statement, representation or certification.

Water Pollution Control Manager name	Date
Water Pollution Control Manager signature	
Accepted by resident engineer name	Date
Resident engineer signature	

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**Instruction****General Information**

- This form must be completed for Risk Level 2 and Risk Level 3 projects with the chance for precipitation of 50 percent or greater, within 72 hours of the forecast date. The Rain Event Action Plan (REAP) must be developed 48 hours prior to any likely precipitation rain event (any weather pattern that is forecast to have a 50 percent or greater probability of producing precipitation in the project area).
- The CGP requires a pre-storm inspection within two business days (48 hours) prior to a "qualifying rain event" which is defined as any event producing precipitation of 0.5 inch or more over the duration of the rain event. Because the size of a rain event cannot be accurately predicted, Caltrans requires a pre-storm inspection based on a forecasted storm event, which is defined as any rain event that is forecasted to produce 0.1 inch or more of precipitation within any 24-hour period. The trigger for a pre-storm event visual inspection is the same as for a REAP: 50 percent or greater probability of producing 0.1 inch or more of precipitation within any 24-hour period in the project area based on the National Weather Service Forecast Office (National Oceanic and Atmospheric Administration).
- Within 24 hours prior to a storm event, the REAP must be submitted to the resident engineer. The REAP must be made available on site and implementation begun no later than 24 hours prior to the likely precipitation event.
- File this form in SWPPP File Category 20.45.

**Form**

- **Contract Number/Co/Rte/PM**  
For encroachment permit projects, write the local agency or private entity encroachment permit number in the contract number field.
- **Project Identifier Number**  
For projects without a number, write N/A in the field.

# APPENDIX K

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CEM-2061 NOTICE OF DISCHARGE FORM

**NOTICE OF DISCHARGE REPORT**

CEM-2061 (REV 01/2018)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	WDID NUMBER
	DISCHARGE REPORT NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> Risk Level 3 <input type="checkbox"/> N/A. WPCP
Submitted by contractor (print and sign name)	Date

**A. Discharge Information**

Discharge Location	Discharge Type <input type="checkbox"/> Stormwater <input type="checkbox"/> Authorized non-stormwater <input type="checkbox"/> Non-authorized non-stormwater <input type="checkbox"/> Other
Discharge samples taken? <input type="checkbox"/> YES <input type="checkbox"/> NO If yes, complete Section E	Discharge identified by Name: _____ Title: _____ Date/Time: _____

Date and time water pollution control manager notified of discharge:

Date and time resident engineer or district construction stormwater coordinator notified of discharge:

**B. Discharge Information**

Describe the discharge, based on a visual observation; estimate discharge quantities:	Photographs <input type="checkbox"/> YES <input type="checkbox"/> NO
Describe the source and the operation that cause the discharge:	
Describe existing BMPs at the discharge location:	<input type="checkbox"/> YES <input type="checkbox"/> NO

**C. Field Response**

Was the discharge eliminated? <input type="checkbox"/> YES <input type="checkbox"/> NO
Describe changes in operation and BMPs implemented to eliminate the discharge and control the source:
Corrective action plan and implementation schedule:

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**NOTICE OF DISCHARGE REPORT**

CEM-2061 (REV 01/2018)

DISCHARGE REPORT NUMBER

**D. Assessment of Discharge**

Discussion of the discharge event: how, why, whether the discharge was preventable, etc., who participated (required: WPC Manager, RE, contractor's field superintendent)?

Future corrective actions to minimize or eliminate (provide a schedule and list responsible parties):

Were quantities estimated in Section B corrected by field measurements?

**E. Sampling and Analysis Results**

Required when discharge samples are taken. Attach CEM-2052 or lab results report.

- Are discharge samples taken?  YES  NO
- Is lab results report attached?  YES  NO  RESULTS PENDING
- If applicable, provide lab information: lab name, contract name, date samples sent, attach a copy of chain of custody, etc.
- Is CEM-2052 attached?  YES  NO  N/A

**F. Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Water Pollution Control Manager (name)

WPC Manager Phone Number

Water Pollution Control Manager (signature)

Date

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**NOTICE OF DISCHARGE REPORT**

CEM-2061 (REV 01/2018)

DISCHARGE REPORT NUMBER

**For Caltrans Use**

Accepted by Resident Engineer (name)	Date	
Resident Engineer (signature)		
Discharge reported by telephone or email to the Regional Water Quality Control Board (RWQCB)?	Date discharge reported to RWQCB	Reported by
A. Immediately and no later than 2 hours after discovery (sewage discharging)? <input type="checkbox"/> YES <input type="checkbox"/> NO		
B. Within 24 hours (project specific)? <input type="checkbox"/> YES <input type="checkbox"/> NO		
C. As soon as possible but within 48 hours? <input type="checkbox"/> YES <input type="checkbox"/> NO		
Notice of Discharge Report submitted to RWQCB within 14 days (3 days for District 7 and District 11)?	Date report submitted to RWQCB	Resident Engineer or DCSWC initials
A. Within 24 hours (sewage discharge)? <input type="checkbox"/> YES <input type="checkbox"/> NO		
B. Within 14 days? <input type="checkbox"/> YES <input type="checkbox"/> NO		
C. Within _____ days (project specific)? <input type="checkbox"/> YES <input type="checkbox"/> NO		

**Instructions****GENERAL INFORMATION**

- This form is required for compliance with provisions in Section E.2.c, "Monitoring and Discharge Characterization Requirements," of the National Pollutant Discharge Elimination System (NPDES) Permit Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation, Order No. 2012-0011-DWQ, NPDES No. CAS000003.
- This form is to be completed when the contractor, Caltrans, State Water Resources Control Board, or Regional Water Quality Control Board staff determines that stormwater discharges, authorized non-stormwater discharges, or non-authorized, non-stormwater discharges are causing or contributing to an exceedance of an applicable water quality standard.
- This form is appropriate when there is evidence of a discharge that occurred outside of business hours where no sampling occurred.
- This form is appropriate when there is a discharge of AC grindings; concrete debris, rubble, or fines; dry materials; construction wastes; or, contaminated soils or sediment.
- When a discharge occurs, Section C is used to describe the maintenance or repair of BMPs that were done and Section D is used to describe BMPs that will be implemented in the future.
- Water quality standards are contained in the Statewide Water Quality Control Plan or applicable Regional Water Quality Control Boards (RWQCBs) Basin Plan.
- Sampling guidance is found in the current edition of the *Construction Site Monitoring Program Guidance Manual*.
- If sampling is done, effluent samples must be collected.
- Include a copy of the completed form in the project Storm Water Pollution Prevention Plan (SWPPP) files.

**FORM**

- **Contract Number/Co/Rte/PM**  
For encroachment permit projects, write the local agency or private entity encroachment permit number in the contract number field.
- **Discharge Information**  
Do not leave any subsection blank. Caltrans permit specifically requires Caltrans to submit the information in this section to RWQCBs. For non-stormwater discharges, describe the construction operation or activity that caused the discharge.
- **Field Response**  
Corrective action plan must include a description of maintenance or repair for existing BMPs and an implementation schedule for future BMP changes or implementation.
- **Sampling and Analysis Results**  
Leave this section blank if the no box is checked for discharge samples taken.
- **Notice of Discharge Report Certification**  
For instruction on reporting timelines, see Section 9.4, Noncompliance Reporting, of Statewide Stormwater Management Plan, May 2003.

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# APPENDIX L

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CEM-2058 STORMWATER METER CALIBRATION RECORD – SPECIALTY METERS FORM

# STORMWATER METER CALIBRATION RECORD - SPECIALTY METERS

CEM-2058 (REV 12/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A. WPCP <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> N/A. Project resides in the Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2011-0019, NPDES No. CAG616002. <input type="checkbox"/> Risk Level 3
SUBMITTED BY CONTRACTOR (PRINT AND SIGN NAME)	DATE

**Meter**

Multi-meter:     YES     NO

Meter Manufacturer	Meter Model Number	Meter Serial Number
--------------------	--------------------	---------------------

**Conductivity Meter Calibration Date** \_\_\_\_\_

Standard Solution (uS/cm)	Cal Standard Solution Expiration Date	Initial Calibration		Re-Calibration		Drift Check		Notes	Initials
		Time		Time		Time			
		Cal	Read	Cal	Read	Read	Acceptable Performance		

Meter Manufacturer	Meter Model Number	Meter Serial Number
--------------------	--------------------	---------------------

**Dissolved Oxygen Meter Calibration Date** \_\_\_\_\_

Standard	Cal Standard Solution Expiration Date	Initial Calibration		Re-Calibration		Drift Check		Notes	Initials
		Time		Time		Time			
		Cal	Read	Cal	Read	Read	Acceptable Performance		

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**STORMWATER METER CALIBRATION RECORD - SPECIALTY METERS**

CEM-2058 (REV 12/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
Meter Manufacturer	Meter Model Number
	Meter Serial Number

**Meter Calibration Date**

Standard	Cal Standard Solution Expiration Date	Initial Calibration		Re-Calibration		Drift Check		Notes	Initials
		Time		Time		Time			
		Cal	Read	Cal	Read	Read	Acceptable Performance		

Meter Manufacturer	Meter Model Number	Meter Serial Number
--------------------	--------------------	---------------------

**Meter Calibration Date**

Standard	Cal Standard Solution Expiration Date	Initial Calibration		Re-Calibration		Drift Check		Notes	Initials
		Time		Time		Time			
		Cal	Read	Cal	Read	Read	Acceptable Performance		

Date	Notes

**Review**

I have reviewed this document and, based on my inquiry of the person or persons who manage the system of those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete.

Water Pollution Control Manager	Date
---------------------------------	------

Water Pollution Control Manager Signature

## STORMWATER METER CALIBRATION RECORD - SPECIALTY METERS

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### Instructions

#### General Information

- Projects with a Construction Site Monitoring Program require the information on this form as part of the Stormwater Pollution Prevention Plan for specialty stormwater analysis meter calibration if a specialty meter was used. This form is not intended to be used with a turbidity or pH meter.
- Completed forms shall be filed in project file category 20.55, Field Testing Equipment Maintenance and Calibration Records.

#### Form

##### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the Contract Number field.

##### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write "N/A" in the field.

Acceptable performance for conductivity drift is  $\pm 10$  percent, and acceptable performance for dissolved oxygen is  $\pm 10$  percent.

# APPENDIX M

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CEM-2051 STORMWATER SAMPLING AND TESTING ACTIVITY LOG – OPTIONAL FORM

**STORMWATER SAMPLING AND ANALYSIS LOG - OPTIONAL**

CEM-2051 (REV 1/2014)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL
	<input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A. Project resides in the Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2011-0019, NPDES No. CAG616002. <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> Risk Level 3
SUBMITTED BY CONTRACTOR (PRINT AND SIGN NAME)	DATE

**STORMWATER SAMPLING AND ANALYSIS LOG REVIEW**

I have reviewed this document and based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete.

Are laboratory test results attached to this stormwater sampling and analysis log submittal?

YES     NO

Water Pollution Control Manager Signature	Date
---	------

**STORMWATER SAMPLING AND ANALYSIS LOG - OPTIONAL**

CEM-2051 (REV 1/2014)

CONTRACT NUMBER/CO/RTE/PM	PROJECT IDENTIFIER NUMBER	WDID NUMBER	DATE
---------------------------	---------------------------	-------------	------

**STORMWATER SAMPLING AND ANALYSIS LOG**

Log Number	Date of Sampling	Sampling Location	Time Sample Taken	Amount of Precipitation	Sample Identification	Analysis	Analysis Result	Daily Average Analysis Result	Lab Report Attached
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No
						<input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/>			<input type="checkbox"/> Yes <input type="checkbox"/> No

## STORMWATER SAMPLING AND ANALYSIS LOG - OPTIONAL

CEM-2051 (REV 1/2014)

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### Instructions

#### General Information

- The information shown on this form is required for projects with a Stormwater Pollution Prevention Plan (SWPPP) to document stormwater sampling and analysis. The information on this form is required for the stormwater annual report for SWPPP projects.
- Complete this form after every storm event that requires sampling and analysis.
- Complete this form weekly for logging non-stormwater sampling and analysis, and indicate in the sampling location column the reason for non-stormwater samples, such as sample from dewatering operation.
- This form is provided as an optional management tool, to be used at the discretion of the water pollution control manager.

#### Form

##### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the Contract Number field.

##### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write N/A in the field.

##### Log No.

Log numbering should be consecutive starting from the first storm event to the last storm event for a project.

##### Amount of Precipitation

Enter the cumulative amount of precipitation from the storm event at the time each sample is taken.

##### Analysis Result

For turbidity and pH, a minimum of three samples is required to determine the daily average. If more than three daily samples are taken, use two rows to report all samples, and report the daily average in the second row.

# APPENDIX N

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CEM-2052 STORMWATER SAMPLE FIELD TEST REPORT FORM

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**STORMWATER SAMPLE FIELD TEST REPORT/  
 RECEIVING WATER MONITORING REPORT**  
 CEM-2052 (REV 7/2014)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A. WPCP <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> N/A. Project resides in the Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2011-0019, NPDES No. CAG616002. <input type="checkbox"/> Risk Level 3
Submitted by contractor (print and sign name)	Date

**Stormwater Samples Analysis**

Date of sampling	
Sample location identification number	Date of Analysis
Sample Analyzed By (signature)	Samples to be analyzed for parameters
Sampled Analyzed By (print name)	<input type="checkbox"/> Turbidity
Analyzer Phone Number (   )	<input type="checkbox"/> pH
Company	<input type="checkbox"/> Other _____
	<input type="checkbox"/> Other _____

**Turbidity Analysis Information**

Meter Manufacturer	Model Number	Serial Number	Calibration Date
Analytical Method	Method Reporting Unit	Method Detection Limit	

**pH Analysis Information**

pH Meter Manufacturer	Model Number	Serial Number	Calibration Date
Analytical Method	Method Reporting Unit	Method Detection Limit	



STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  
**STORMWATER SAMPLE FIELD TEST REPORT/  
 RECEIVING WATER MONITORING REPORT**  
 CEM-2052 (REV 7/2014)

**Receiving Water Sample Analysis Results**

Sample Identification	Exception See Instructions	pH	NTU	SSC	Parameter Analysis *		
					Time Sample Collected	Time Sample Read	Sample Value and Units
Qualifying Rain Event Daily Average Analysis Result							

**Review and Record Keeping**

Test results entered into sampling and testing activity log?  <input type="checkbox"/> Yes <input type="checkbox"/> No	Numeric action level exceedance?  <input type="checkbox"/> Yes <input type="checkbox"/> No	Receiving water monitoring triggers exceeded?  <input type="checkbox"/> Yes <input type="checkbox"/> No	ATS NEL exceeded?  <input type="checkbox"/> Yes <input type="checkbox"/> No
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\* Complete and attach CEM-2058 to document calibration of instruments used to analyze these parameters.

## Instructions

### General Information

- This form is required for compliance with provisions in Section I of Attachments C, D, and E of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002 and provisions of General Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for Lake Tahoe Hydrologic Unit Order No. R6T-2011-0019 NPDES No. CAG616002.
- The Caltrans, *Construction Site Monitoring Program Guidance Manual*, latest edition, contains sampling guidance.
- Complete form CEM-2058 if other parameters are tested.
- Sampling and sample preservation must be in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association).
- Collect, maintain, and ship samples according to the State Water Resources Control Board's (SWRCB), Surface Water Ambient Monitoring Program's (SWAMP) Quality Assurance Program Plan (QAPrP), latest edition.
- Complete a separate stormwater sample field analysis report daily for each sampling location.
- Include a copy of the completed form in the project Stormwater Pollution Prevention Plan files.

### Form

#### Contract Number/Co/Rte/PM

For local agency encroachment permit projects, write the encroachment permit number in the Contract Number field.

#### Analysis Result

Analytical results less than the method detection limit must be reported as "less than the method detection limit".

#### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, enter N/A in the field.

#### Qualifying Rain Event Daily Average Analysis Result

A minimum of three daily samples are required to calculate the daily average for a qualifying rain event.

#### Sample pH Analysis

Sample pH reading must be done within 15 minutes of sample collection.

#### Numeric Action Level Exceedance

In the event that any daily average effluent samples analysis results exceeds an applicable Numeric Action Level (NAL), complete form CEM-2062 "Numeric Action Level Exceedance Report," and submit all storm event sampling results to the State Water Resources Control Board (SWRCB) no later than ten days after the conclusion of the storm event.

#### Receiving Water Monitoring Trigger (RWMT) Exceedance

In the event that any daily average RWMT is exceeded, complete form CEM-2062, "Numeric Action Level Exceedance Report / Receiving Water Monitoring Trigger Report" and submit all storm event sampling results to the resident engineer within six hours.

#### Add Exceptions Reasons:

- N - No Run-off at time of inspection
- O - Outside of normal business hours
- U - Unsafe conditions/unsafe access

# APPENDIX O

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CEM-2062 NUMERIC ACTION LEVEL EXCEEDANCE REPORT FORM

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
CONTRACTOR NAME AND ADDRESS	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
Submitted by contractor (print and sign name)	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> Risk Level 3
Date	

**Numeric Action Level Exceedance Information: Attach CEM-2052**

**Storm Event Information**

Start of storm event	End of storm event	Duration of storm event	Storm event precipitation amount recorded from site rain gauge	Storm event precipitation amount recorded from governmental rain gauge
Date	Date	Hours : Minutes	inches	inches
Time	Time			

**ADA Notice**

This document is available in alternative accessible formats. For more information, please contact the Forms Management Unit at (279) 2 TTY 711, in writing at Forms Management Unit, 1120 N Street, MS-89, Sacramento, CA 95814, or by email at Forms.Management.Unit@dol

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Exceedance Location Information**

Photographs

Visual observation of location	<input type="checkbox"/> YES <input type="checkbox"/> NO
The nature and cause of the water quality standard exceedance, based on a visual observation of the discharge location	<input type="checkbox"/> YES <input type="checkbox"/> NO
BMPs currently installed at the location of the discharge	<input type="checkbox"/> YES <input type="checkbox"/> NO
Additional BMPs that will be implemented to prevent or reduce pollutants causing or contributing to exceedance of a water quality standard	<input type="checkbox"/> YES <input type="checkbox"/> NO
Implementation schedule for additional BMPs	<input type="checkbox"/> YES <input type="checkbox"/> NO
Maintenance or repair of BMPs	<input type="checkbox"/> YES <input type="checkbox"/> NO
Implementation schedule for BMPs maintenance or repair	<input type="checkbox"/> YES <input type="checkbox"/> NO
Other required corrective actions	<input type="checkbox"/> YES <input type="checkbox"/> NO
Implementation schedule for corrective actions	<input type="checkbox"/> YES <input type="checkbox"/> NO

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Numeric Action Level Exceedance Report Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those person directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Water Pollution Control Manager name	Date
Water Pollution Control Manager signature	

**For Caltrans Use**

Resident engineer name	Date
Resident engineer signature	

Numeric Action Level Exceedance Report submitted to State Board SMARTS database within 24 hours after NAL exceedance was identified?  <input type="checkbox"/> YES <input type="checkbox"/> NO	Date input	Resident engineer initials
All storm event sampling results submitted to State Water Board SMARTS database within 10 days after the conclusion of the storm event?  <input type="checkbox"/> YES <input type="checkbox"/> NO	Date input	Resident engineer initials

**Notice of Discharge Reporting**

Discharge reported by telephone or email to the Regional Water Quality Control Board (RWQCB) within 48 hours of discovery?  <input type="checkbox"/> YES <input type="checkbox"/> NO	Date discharge reported to RWQCB	Resident engineer initials
Notice of Discharge Report submitted to RWQCB within 14 days (3 days for District 7 and District 11)?  <input type="checkbox"/> YES <input type="checkbox"/> NO	Date report submitted to RWQCB	Resident engineer initials

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## Instructions

### General Information

- This form is required for compliance with provisions for Numeric Action Level (NAL) Exceedance Report in Section I of Attachment D or E of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002.
- Sampling guidance is found in the Caltrans, *Construction Site Monitoring Program Guidance Manual*, latest edition.
- In the event that any daily average effluent sample analysis result exceeds an applicable NAL, submit all storm event sampling results to the State Regional Water Quality Control Board (RWQCB) no later than 10 days after the conclusion of the storm event.
- RWQCBs have the authority to require the submittal of an NAL Exceedance Report.
- You may submit an NAL Exceedance Report to RWQCB instead of a Notice of Discharge Report.
- Include a copy of the completed form in the project Storm Water Pollution Prevention Plan (SWPP) files.

### Form

#### Contract Number/Co/Rte/PM

For local agency encroachment permit projects write the encroachment permit number in the Contract Number field.

#### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write N/A in the field.

#### Storm Event Precipitation Amount at Sample Time

At time of sample collection, record amount of precipitation from onsite rain gauge.

#### Analysis Results

Analytical results that are less than the method detection limit shall be reported as "Less than the method detection limit."

#### Qualifying Rain Event Daily Average Analysis Result

A minimum of three daily samples is required to calculate the daily average for a qualifying rain event.

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# APPENDIX P

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CEM-2063 NUMERIC EFFLUENT LIMITATION VIOLATION REPORT – ATS DISCHARGE  
FORM

**NUMERIC EFFLUENT LIMITATION VIOLATION REPORT - ATS DISCHARGES**

CEM-2063 (REV 12/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL <input type="checkbox"/> Risk Level 1 <input type="checkbox"/> N/A: WPCP <input type="checkbox"/> Risk Level 2 <input type="checkbox"/> Risk Level 3
SUBMITTED BY CONTRACTOR (PRINT AND SIGN NAME)	DATE

**Numeric Effluent Limitation Violation Information**  
*Attach form CEM-2052 or lab results*

**Storm Event Information**  
*Attach a copy of the governmental rain gauge information.*

Start of storm event  _____ Date  _____ Time	End of storm event  _____ Date  _____ Time	Duration of storm event  _____ Hours : Minutes	Storm event precipitation amount recorded from site rain gauge  _____ inches	Storm event precipitation amount recorded from governmental rain gauge  _____ inches
Storm event 24-hour maximum precipitation amount recorded from onsite rain gauge  _____ inches	Storm event 24-hour maximum precipitation amount from governmental rain gauge  _____ inches	ATS Compliance storm (10-year, 24-hour storm)  _____ inches	ATS Compliance storm exception (10-year, 24-hour storm) <input type="checkbox"/> Yes <input type="checkbox"/> No	

**Additional Information**

Run-on samples taken? <input type="checkbox"/> Yes <input type="checkbox"/> No	Receiving water samples taken? <input type="checkbox"/> Yes <input type="checkbox"/> No
Run-on sample identification	Receiving water sample identification

**NUMERIC EFFLUENT LIMITATION VIOLATION REPORT - ATS DISCHARGES**

CEM-2063 (REV 12/2013)

Page 2 of 3

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

**Numeric Effluent Limitation Violation Report Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those person directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Water Pollution Control Manager Name	Date
Water Pollution Control Manager Signature	

**For Caltrans Use**

Resident engineer name	Date
Resident engineer signature	

Numeric Effluent Limitation Violation Report submitted to State Board SMARTS database within 24 hours after NEL exceedance was identified?  <input type="checkbox"/> Yes <input type="checkbox"/> No	Date input	Resident engineer initials
All storm event sampling results submitted to State Water Board SMARTS database within 5 days after the conclusion of the storm event?  <input type="checkbox"/> Yes <input type="checkbox"/> No	Date input	Resident engineer initials

**Notice of Discharge Reporting**

Discharge reported by telephone or email to the Regional Water Quality Control Board (RWQCB) within 48 hours of discovery?  <input type="checkbox"/> YES <input type="checkbox"/> NO	Date discharge reported to RWQCB	Resident engineer initials
Notice of Discharge Report submitted to RWQCB within 14 days (3 days for District 7 and District 11)?  <input type="checkbox"/> YES <input type="checkbox"/> NO	Date report submitted to RWQCB	Resident engineer initials

## NUMERIC EFFLUENT LIMITATION VIOLATION REPORT - ATS DISCHARGES

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### Instructions

#### General Information

- This form is required for compliance with provisions for Numeric Effluent Limitation (NEL) Violation Report in Attachment F of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-2006-DWQ NPDES No. CAS000002.
- Sampling guidance is found in the Caltrans, *Construction Site Monitoring Program Guidance Manual*, latest edition.
- When the daily average of effluent samples analysis results exceeds an applicable NEL, submit the NEL Violation Report to the State Water Resources Control Board (SWRCB), Storm Water Multi Application and Report Tracking System (SMARTS) within 24 hours after a NEL Exceedance has been identified.
- When the daily average of effluent samples analysis results exceeds an applicable NEL, submit all storm event sampling results to the SWRCB SMARTS within 5 days after the conclusion of the storm event.
- Regional Water Quality Control Boards have the authority to require the submittal of a NEL Violation Report.
- You may submit a NEL Violation Report to RWQCB instead of a Notice of Discharge Report.
- Include a copy of the completed form in the project Storm Water Pollution Prevention Plan (SWPPP) files.

#### Form

##### Contract Number/Co/Rte/PM

For local agency encroachment permit projects write the encroachment permit number in the Contract Number field.

##### Project Identifier Number

Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write N/A in the field.

##### Storm Event Precipitation Amount

Record amount of precipitation from onsite and government rain gauges.

##### Analysis Results

Analytical results that are less than the method detection limit shall be reported as "Less than the method detection limit."

##### Compliance Storm Event

The 10-year, 24-hour storm (expressed in tenths of an inch of rainfall), as determined by using the maps.

<http://www.wrcc.dri.edu/pcpnfreq/nca10y24.gif>

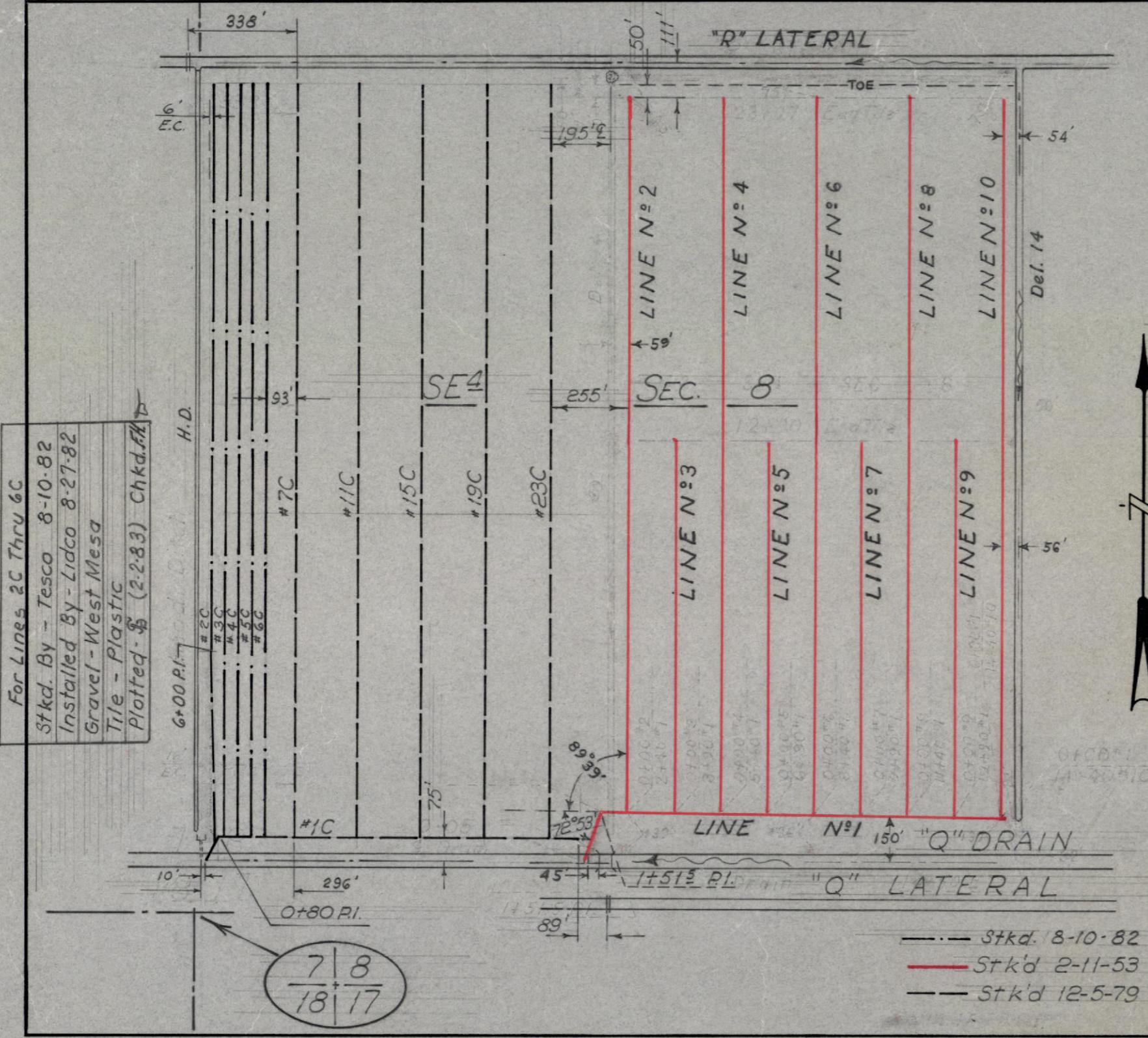
<http://www.wrcc.dri.edu/pcpnfreq/sca10y24.gif>

Compliance storm verification must be done by reporting the onsite rain gauge readings as well as nearby governmental rain gauge readings. Attach a copy of the governmental rain gauge readings to this report.

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**Appendix F – Agricultural Perforated Pipes (Tile Lines) – IID As-Built Drawings**



For Lines 2C Thru 6C  
 Stkd. By - Tesco 8-10-82  
 Installed By - Lidco 8-27-82  
 Gravel - West Mesa  
 Tile - Plastic  
 Plotted - S (2-2-83) Chkd. F.H.

Line No.	Outlet Elev.	Footage Staked	Out. Sta. O+00=	TILE INSTALLED			
				8"	6"	3"	4"
1	804.50	1450	T.O.		1450		
2	805.00	2307	2+40#1				2307
3	805.14	1200	3+90#1				600
4	805.29	2307	5+40#1				2307
5	805.44	1200	6+90#1				1100
6	805.59	2307	8+40#1				2307
7	805.95	1200	9+90#1				800
8	806.35	2307	11+40#1				2300
9	806.85	1200	12+90#1				750
10	807.25	2307	14+40#1				2300
1C	801.40	1232	T.O.	1232			
7C	802.30	2411	3+22#1C				2411
11C	802.60	2411	5+26#1C				2411
15C	803.20	2411	7+30#1C				2411
19C	803.90	2411	9+34#1C				2411
23C	804.50	2411	11+38#1C				2411
2C			0+65#1C				2426
3C			0+98#1C				2411
4C			1+42#1C				2411
5C			1+86#1C				2411
6C			2+30#1C				2411

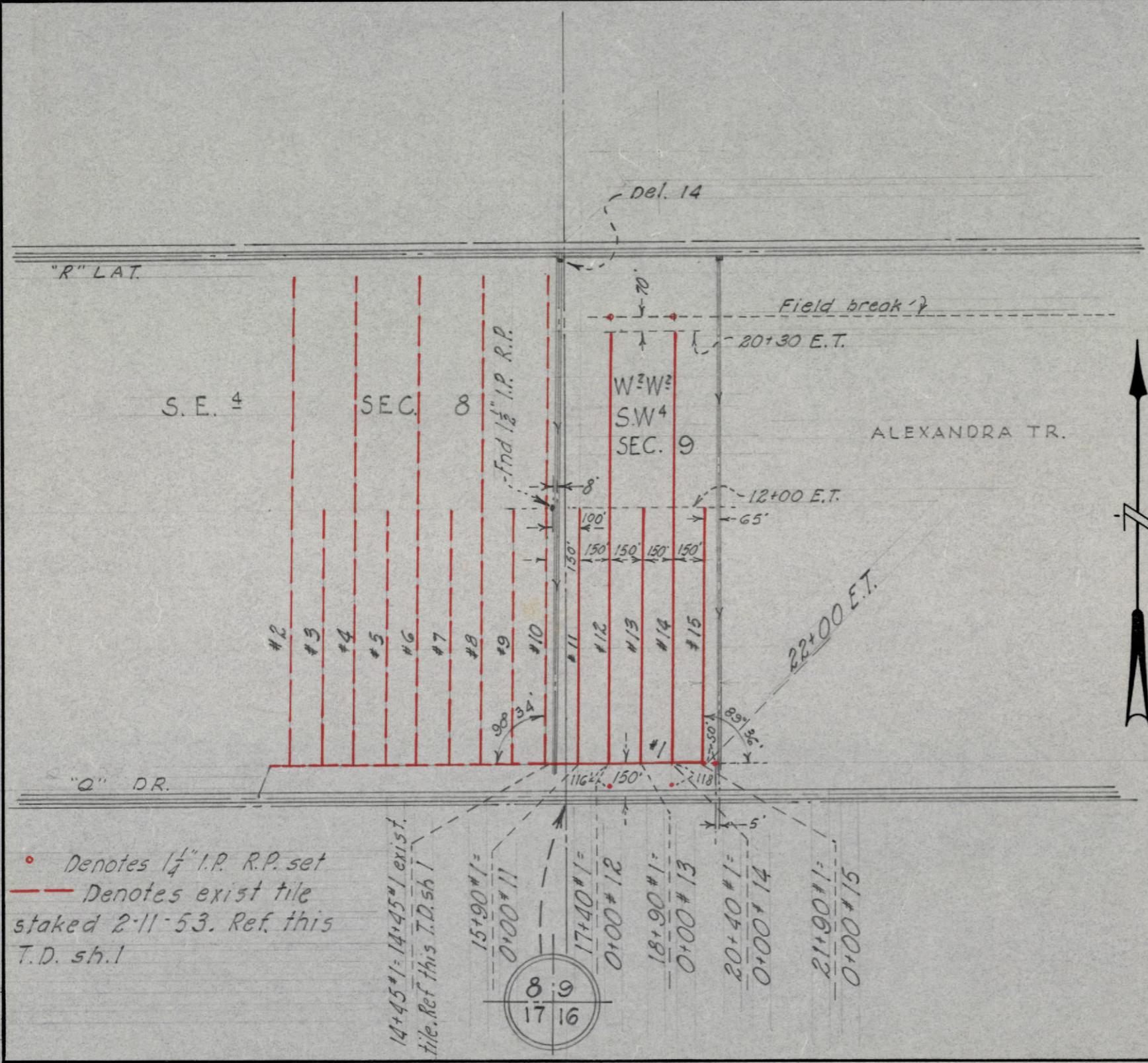
Const. F.B. 4184<sup>58</sup> By M<sup>c</sup>Cain Date 2-11-53  
 Installed By LaBolsa #48 Date 3-18-53  
 Gravel Used West Mesa  
 Tile Used LaBolsa  
 Const. F.B. Staked By TESCO Date 12-5-79  
 Installed By Bolsa Drainage Date 12-21-79  
 Gravel Used West Mesa  
 Tile Used A.D.T. S

References:

IMPERIAL IRRIGATION DISTRICT  
 ENGINEERING DEPARTMENT  
 IMPERIAL, CALIFORNIA

TILE DRAIN CONSTRUCTION  
 SE4 SECTION 8

Smiley Land & Cattle Co. Property T. 11 S.-R. 14 E.  
 Scale: 1"=400' Plotted By Dube Checked By APD, KC  
 Well Book Sh. 1 of 2 Shs. TD 1354



Line No.	Outlet Elev.	Footage Staked	TILE INSTALLED			
			8"	6"	5"	4"
#1	807.29	755		755		
#11	808.27	1200				1200
#12	809.02	2030				2030
#13	809.77	1200				1200
#14	810.52	2030				2030
#15	811.27	1200				1200

Const. F.B.	4502 <sup>93</sup>	By	Havens	Date	2-18-55
Installed By	La Bolsa 2.5 Rt & F.S.		Date	2-28-55	
Gravel Used	West Mesa		Job	609	
Tile Used	La Bolsa				
Const. F.B.		By		Date	
Installed By				Date	
Gravel Used					
Tile Used					

References:

IMPERIAL IRRIGATION DISTRICT  
ENGINEERING DEPARTMENT  
IMPERIAL, CALIFORNIA

TILE DRAIN CONSTRUCTION  
W<sup>2</sup>W<sup>2</sup> SW<sup>4</sup> SEC. 9

Dearborn Property T. 11 S. - R. 14 E.  
Scale: 1" = 600' Plotted By A.J.O. Checked By JLS  
Well Book NONE Sh. 2 of 2 Shs. TD 1354

• Denotes 1/4" I.P. R.P. set  
— Denotes exist tile staked 2-11-53. Ref. this T.D. sh. 1

14+45#1 = 14+45#1 exist. tile. Ref. this T.D. sh. 1  
15+90#1 =  
17+40#1 =  
18+90#1 =  
20+40#1 =  
21+90#1 =



## PROJECT MANUAL

**NILAND COUNTY SANITATION DISTRICT –  
WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS  
COUNTY PROJECT NO. 6582NSD**

### **ADDENDUM NUMBER 2 JANUARY 18, 2024**

Funded by:

**North American Development (NAD) Bank - PDAP  
Contract No. TAA19-002/NADBC19-129**

**California Department of Housing and Community Development (HCD)  
Through Its Community Development Block Grant (CDBG) Program  
HCD Project No. SR49337  
CDBG Grant No. 20-CDBG-12086**

**United States Department of Agriculture (USDA) Rural Development**

Prepared by:

**The Holt Group, Inc.  
THG Project No. 542.089**

For:

**Imperial County Public Works Department  
155 South 11<sup>th</sup> Street  
El Centro, CA 92243  
Point of Contact: David Dale  
Office: (442) 265-1818**



**VOLUME 3 OF 5  
TECHNICAL SPECIFICATIONS**

**TECHNICAL SPECIFICATIONS**

**DIVISION 1 - GENERAL REQUIREMENTS**

01070	ABBREVIATIONS
01090	REFERENCE STANDARDS
01300	CONTRACTOR SUBMITTALS
01312	PROJECT MEETINGS
01352	SAFETY AND HEALTH
01505	MOBILIZATION
01520	TEMPORARY FACILITIES
01530	PROTECTION OF EXISTING FACILITIES
01550	SITE ACCESS AND STORAGE
01560	PROJECT ENVIRONMENTAL CONTROLS
01600	MATERIALS AND EQUIPMENT
01660	MECHANICAL EQUIPMENT - INSTALLATION AND START-UP
01700	PROJECT CLOSEOUT
01722	SURVEY AND CONSTRUCTION STAKING
01730	OPERATION AND MAINTENANCE MANUALS
01783	AS-BUILTS

**DIVISION 2 - SITEWORK**

02050	DEMOLITION AND SALVAGE
02140	DEWATERING
02150	SHEETING, SHORING AND BRACING
02200	EARTHWORK
02221	TRENCHING, BACKFILLING AND COMPACTING
02630	DUCTILE IRON PIPE
02640	PVC PIPE
02650	PIPE FITTINGS, TRANSITION COUPLINGS, AND HARDWARE

02666	PRESSURE PIPELINE WATER TESTING
02670	DISINFECTION OF POTABLE WATER PIPELINES
02680	TESTING OF HYDRAULIC STRUCTURES
02726	MANHOLE AND PRECAST VAULT CONSTRUCTION
02737	CURED IN PLACE PIPE (CIPP)
02770	HDPE LINER
02780	GEOTEXTILE FABRIC

**DIVISION 3 - CONCRETE**

03100	CONCRETE FORMWORK
03200	REINFORCEMENT STEEL
03300	CAST-IN-PLACE CONCRETE
03315	GROUT
03400	PRECAST CONCRETE

**DIVISION 5 - METALS**

05120	STRUCTURAL STEEL
05220	CONCRETE BOLTS
05650	PRE-ENGINEERED SHADE STRUCTURE

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

07110	SHEET MEMBRANE WATERPROOFING
07900	SEALANTS AND CAULKING

**DIVISION 9 - FINISHES**

09800	PROTECTIVE COATINGS
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**DIVISION 11 - EQUIPMENT**

11300	PUMPS, GENERAL
11440	PUMP SKID SYSTEM
11510	SUBMERSIBLE PUMP
11540	CHEMICAL METERING PUMPS
11550	FLASH MIXER

11560 FLOATING AERATOR

**DIVISION 13 – SPECIAL CONSTRUCTION**

13320 HDPE TANK

13480 ALUMINUM ACCESS HATCH

**DIVISION 15 - MECHANICAL**

15615 VALVES

15707 CHEMICAL PIPING

15740 STAINLESS STEEL PIPE, FITTINGS, AND VALVES

15830 MISCELLANEOUS VALVES

**SECTION 01070 - ABBREVIATIONS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Wherever in these Contract Documents the following abbreviations or acronyms are used, they shall have the meanings indicated as follows:

1.02 ABBREVIATIONS AND ACRONYMS

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of the State Highway and Transportation Officials
A2LA	American Association of Laboratory Accreditation
A.C.	Asphalt Concrete
ACI	American Concrete Institute
ADA	American Disabilities Act
AGC	Associated General Contractors
AGMA	American Gear Manufacturer's Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute, Inc.
AOS	Apparent Opening Size
APA	American Plywood Association
API	American Petroleum Institute
APN	Assessor's Parcel Number
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agriculture Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Society for Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturer's Association
CBC	California Building Code
CBR	California Bearing Ratio
CDX	Apa Rated Plywood Sheathing Exposure
CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
ETL	Electrical Test Laboratories
ETL	Extract, Transform Load
EPDM	Ethylene Propylene Diene M-Class

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FHWA	Federal Highway Administration
GAI	Geosynthetic Accreditation Institute
GCP	Construction General Permit
GPM	Gallons per Minute
GRI	Geosynthetic Research Institute
HDPE	High Density Polyethylene
HPC	Heterotrophic Plate Count
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IID	Imperial Irrigation District
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
IPS	Iron Pipe Size
ISA	Instrument Society of America
LAP	Laboratory Accreditation Program
LLDPE	Linear Low Density Polyethylene
MARV	Minimum Average Roll Value
MD	Machine Direction
MGD	Million Gallons per Day
MPA	Mega Pascal
MBMA	Metal Building Manufacturer's Association
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NGLI	National Lubricating Grease Institute
No.	Number
NOI	Notice of Intent
NOT	Notice of Termination
NSF	National Sanitation Foundation
NTPEP	National Transportation Product Evaluation Program
OD	Outside Diameter
OEM	Original Equipment Manufacturer
OIT	Oxidative Induction Time
OS&Y	Outside Stem and York
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCC	Portland Concrete Cement
PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
SBR	Styrene Butadiene Rubber
SCH	Schedule
SDR	Standard Dimension Ratio
SMA	Screen Manufacturer's Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPDT	Single Pole-Double Throw
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
USEPA	United States Environmental Protection Agency

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UV	Ultra-Violet Disinfection
WCRSI	Western Concrete Reinforcing Steel Institute
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association
XMD	Cross Machine Direction

1.03 PLAN SHEET ABBREVIATIONS

%	Percent
AASHTO	American Association of State Highway and Transportation Officials
A.C.	Asphalt Concrete
A.C.P.	Asbestos Cement Pipe
AC-FT	Acer Feet
ADA	American Disabilities Act
Agg.	Aggregate
AOS	Apparent Opening Size
APP	Approximate
ASTM	American Society for Testing and Materials
AVE	Average
AWWA	American Water Works Association
BC	Beginning of Curve
BLDG.	Building
BTM	Bottom
B.V.	Butterfly Valve
C2B	Class 2 Base
CC	Cubic Centimeter
C.I.	Cast Iron
CIRC	Circumferential
CL	Centerline
CLR	Clear
C.M.C.	Cement Mortar Coated
C.M.L.	Cement Mortar Lined
CPVC	Chlorinated Polyvinyl Chloride
D.I.	Ductile Iron
DIA	Diameter
DWG	Drawing
D/W	Driveway
Δ	Delta
EC	End of Curve
EF	Each Face
EL.	Elevation
ELEV.	Elevation
E.P.	Edge of Pavement
EPDM	Ethylene Propylene Diene M-Class
EW	Each Way
FF	Finish Floor Elevation
FG	Finished Grade
F <sub>L</sub>	Flowline
FL.	Flanged
F.M.	Flow Meter
FM	Force Main
FS	Finish Surface
GALV	Galvanized
GPH	Gallons per Hour
GPM	Gallons per Minute
GW	Ground Water

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H.B.	Hose Bib
HDPE	High Density Polyethylene
HP	Horsepower
HW	High Water
I.D.	Inside Diameter
INV. EL.	Invert Elevation
INV.	Invert
IPS	Iron Pipe Size
L.	Length
LBS	Pounds
MAX.	Maximum
MG	Million Gallon
MGD	Million Gallons per Day
M.H.	Manhole
MIN.	Minimum
MISC.	Miscellaneous
M.J.	Mechanical Joint
MPH	Miles per Hour
N. RIM	North Rim
N.S.	Native Surface
N.T.S.	Not To Scale
NSCD	Niland County Sanitation District
O.C.	On Center
O.D.	Outside Diameter
OHC	Overhead Cable
OHE	Overhead Electric Line
OHT	Overhead Telephone Line
OS&Y	Outside Stem & York
P.C.C.	Portland Concrete Cement
P.E.	Plain End
PL	Property Line
P.P.	Power Pole
PP#	Power Pole Number
PPM	Parts per Million
PSI	Pounds per Square Inch
PT	Pressure Transmitter
PVC	Polyvinyl Chloride
P/S	Prestressing
R.C.	Reinforced Concrete
ROW	Right-of-Way
S.	Slope
SCH	Schedule
SCHED	Schedule
SD	Storm Drain
SDFM	Storm Drain Force Main
SDR	Standard Dimension Ratio
SQ	Square
SS	Sanitary Sewer
SST	Stainless Steel
STA	Station
S/W	Sidewalk
SWPPP	Storm Water Pollution Prevention Plan
TBD	To Be Determined
TBM	Temporary Benchmark
T.C.	Top of Curb or Top of Concrete
TDH	Total Dynamic Head

**ABBREVIATIONS**

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TF	Top of Footing
TMH	Top of Manhole
TOE	Top of Slope
TOF	Top of Floor
TOW	Top of Wall
T.P.	Top of Pavement
TV	Television
TYP.	Typical
UE	Underground Electricity
UNO	Unless Noted Otherwise
UT	Underground Telephone
VERT	Vertical

**END OF SECTION 01070**

**SECTION 01090 - REFERENCE STANDARDS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Whenever in these Specifications references are made to published specifications, codes, standards or other requirements, it shall be understood that when no date is specified, only the latest published specifications, standards or requirements of the respective issuing agencies, as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of, or omission from, said standards or requirements.

1.02 REFERENCE SPECIFICATIONS, CODE AND STANDARDS

- A. All work specified herein shall conform to or exceed the requirements of the referenced specifications, codes, and standards to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications.
- B. References herein to “Building Code” or UBC shall mean the Uniform Building Code of the International Conference of Building Officials (ICBO). The latest edition of the code, as of the date of award, as approved and adopted by the agency having jurisdiction, including all addenda, modifications, amendments, or other lawful changes thereto, shall apply to the Work.
- C. References herein to American Water Works Association or AWWA shall comply with the latest edition of the code, as of the date of advertisement.
- D. In case of conflict between codes, reference standards, drawings and other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or labor. The contractor shall bid the most stringent requirements.
- E. Applicable Standard Specifications: The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards and specifications listed herein; except, that wherever references to “Standard Specifications” are made, the provisions therein for measurement and payment shall not apply.
- F. References herein to “OSHA Regulations for Construction” shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- G. References herein to “OSHA Standards” shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- H. All materials and equipment appurtenances that can contact potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61.
- I. References in the Contract Documents to “Standard Specifications” shall mean the Greenbook, formally known as the “Standard Specifications for Public Works

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Construction” as published by the American Public Works Association, including all current supplements, addenda, and revisions thereof, latest edition.

**END OF SECTION 01090**

**SECTION 01300 - CONTRACTOR SUBMITTALS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. All submittals by the Contractor shall be submitted to the Construction Manager at the Site. The Construction Manager may submit the submittals to the Design Engineer if required as authorized by the Owner. The Construction Manager will forward the approved submittals to the Owner.
- B. Within ten (10) days after the date of Notice to Proceed, the Contractor shall submit the following items to the Construction Manager:
  - 1. A Construction Schedule providing the starting and completion dates of the various stages of the Work. The Contractor shall be prepared to discuss its construction schedule at the pre-construction conference.
  - 2. Schedule of Values or lump sum price breakdown for progress payment purposes.
- C. Equipment submittals shall comply with Section 01660 – Mechanical Equipment – Installation and Start-Up

1.02 SUBMITTAL REQUIREMENTS AND PROCESS

- A. The Contractor shall prepare a detailed list of required submittals required for the Niland County Sanitation District Wastewater Treatment Plant and Collection System Project within ten (10) days of receiving the Notice to Proceed. The Construction Manager will review and forward comments regarding the submittal list to the contractor within ten (10) days after receiving the list. The Owner shall also review and offer comments regarding the submittal list. The Construction Manager shall insure the submittal list for the Niland County Sanitation District Wastewater Treatment Plant and Collection System Project is approved within 10 days after the issuance of the Notice to Proceed.
- B. Wherever called for in the Contract Documents or when requested by the Construction Manager, the Contractor shall furnish to the Resident Project Representative for review, six (6) copies of each submittal.
- C. All submittals shall be accompanied by a submittal transmittal form. This form may be obtained from the Construction Manager. A separate transmittal form shall be used for each specific item for which a submittal is required. Each submittal should be referenced to the specification section requiring the submittal. All Contractor submittals shall be carefully reviewed by an authorized representative of the Contractor, prior to submission to the Construction Manager. Each submittal shall be dated, signed, and certified by the Contractor as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the Construction Manager of any Contractor submittals will be made for any items which have not been so certified by the Contractor. All non-certified submittals will be returned to the Contractor without action taken by the Engineer and any delays caused thereby shall be the sole responsibility of the Contractor.
- D. Multiple-page submittals shall be collated into sets with each set stapled or bound.
- E. The Construction Manager will return copies of each submittal to the Contractor with review comments within fifteen (15) calendar days following their receipt by the

Resident Project Representative. There will be three (3) copies of a submittal returned to the Contractor when marked either “NO EXCEPTIONS TAKEN” or “APPROVED AS NOTED”, and no formal revision and re-submission of said submittal will be required. However, if one or more copies of the submittal are returned to the Contractor marked “REVISE AND RESUBMIT” or “REJECTED”, the Contractor shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the Construction Manager.

- F. Fabrication of an item shall commence only after the Engineer has reviewed the submittal and returned copies to the Contractor marked either “NO EXCEPTIONS TAKEN” or “APPROVED AS NOTED”. Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work.
- G. The Engineer’s review of Contractor’s submittals shall not relieve the Contractor of the entire responsibility for the correctness of details and dimensions. The Contractor shall assume all responsibility and risk for any misfits due to any errors in the Contractor submittals. The Contractor shall be responsible for the dimensions and the design of adequate connections and details.

1.03 CONTRACTOR’S SCHEDULE SUBMITTAL

- A. The Contractor shall submit to the Resident Project Representative a construction schedule for the Work showing a general plan for orderly progression of the Work including mobilization of equipment and timing of procurement of major materials and equipment.
- B. The Construction Manager may request that the Contractor provide a revised or updated Construction Schedule if, at any time, the Construction Manager considers the completion date to be in jeopardy because of any portion of the Work falling behind schedule or the sequence of operations becomes different from the previous schedule.

1.04 PROPOSED SUBSTITUTES OR “OR EQUAL” ITEM SUBMITTAL

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Other items of material or equipment, or material or equipment of other Suppliers may be submitted to the Engineer for review under the circumstances described below subject to the Contract Documents and General Conditions.
  - 1. The Contractor shall be responsible for resultant changes and all additional costs or credit to the Owner which the accepted substitution requires in the Contractor’s work, the work of its subcontractors and of other contractors and shall effect such changes without cost to the Owner.
- B. The procedure for review by the Engineer will include the following:
  - 1. If proposed substitute material or equipment has been judged to be unacceptable by the Engineer, the Contractor shall provide the material or equipment named in the Contract Documents.

1.05 SAMPLES SUBMITTAL

- A. The Contractor shall submit not less than two (2) samples, unless noted otherwise in a material or equipment specification, to the Engineer for acceptance at no additional cost to the Owner. Samples shall be submitted for acceptance a minimum of ten (10) days prior to ordering such material for delivery to the job site. If accepted by the Engineer, one (1) set of samples will be returned to the Contractor and one (1) set of samples shall remain at the job site until completion of the Work.

1.06 OPERATION, MAINTENANCE AND TECHNICAL MANUAL SUBMITTAL

- A. The Contractor shall furnish operation, maintenance and technical manuals for mechanical equipment (that is provided by the Contractor).
- B. All technical manuals shall be submitted to the Engineer not later than the seventy-five percent (75%) of construction completion date or fourteen (14) days prior to start-up of equipment if started before seventy-five percent (75%) completion of project. All discrepancies found in the technical manuals shall be corrected by the Contractor within thirty (30) days from the date of written notification by the Engineer.

1.07 AS-BUILT SUBMITTAL

- A. The Contractor shall maintain, during the progress of the Work, one (1) set of As-Built Drawings and shall neatly mark on them all project changes from the details shown on the original Contract Drawings. Special attention shall be given to recording on the drawings the horizontal and vertical location of all buried utilities that differ from the locations indicated or which were revealed during the construction.
- B. As-Built drawings shall be accessible to the Construction Manager at all times during the construction period and shall be delivered to the Construction Manager and the Design Engineer upon completion of the Work.
- C. Upon substantial completion of the Work and prior to final acceptance the Contractor shall deliver a complete set of As-Built drawings to the Engineer.

1.08 SUPERINTENDENT SUBMITTAL

- A. A letter designating the Project Superintendent shall be forwarded to the Construction Manager for his review. The letter shall also include emergency contact information for the Project Superintendent and other Contractor Representative.

1.09 MATERIAL AND EQUIPMENT SUBMITTAL LIST

Please refer to Special Condition Section 4, Project Submittal, for the minimum list of submittals to be forward for review during the construction period. The Engineer, Owner and Construction Manager reserves the right to request additional submittal documents during the construction period. All general requirements submittals as listed on special conditions section 4, except the operations and maintenance manual, shall be required to be forwarded to the construction manager with 7 calendar days after the issuance of the notice to proceed.

**END OF SECTION 01300**

**SECTION 01312 - PROJECT MEETINGS**

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Required to enable orderly review during pre-installation conference and progress of the Work, and to provide for systematic discussion of installation problems and other construction problems arisen, the Construction Manager will conduct project meetings throughout the construction period.

1.02 RELATED WORK SPECIFIED ELSEWHERE

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Division 1 - General Requirements.
2. The Contractor's relations with his Subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.03 SUBMITTALS

A. Conform to provisions of Section 01300 – Contractor Submittals of the Technical Specifications.

B. Agenda Items:

1. To the maximum extent practicable, advise the Construction Manager at least twenty-four (24) hours in advance of project meetings regarding items to be added to the agenda or requesting the cancellation of any Meeting.

C. Memorandums:

1. The Construction Manager will compile a memorandum of each project meeting and will furnish one copy to the Contractor, Resident Project Representative, and all other involved parties.
2. Recipients of copies may make and distribute such other copies as they wish.

1.04 QUALITY ASSURANCE

- A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

PART TWO - PRODUCTS (NOT APPLICABLE)

PART THREE - EXECUTION

3.01 MEETING SCHEDULE

- A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly during time period when full time construction activities are occurring at the site and bi-weekly when part-time construction activities are occurring at the project site; or as otherwise directed by the Construction Manager.

- B. Coordinate as necessary to establish mutually acceptable schedule for additional meetings.

3.02 MEETING LOCATION

- A. The Construction Manager will establish the meeting location. To the maximum extent practicable, meetings will be held in the Contractor's office at the Site, or other designated area.

3.03 PRECONSTRUCTION MEETING

- A. A Preconstruction Meeting will be scheduled to be held within fifteen (15) working days after the Notice to Proceed has been issued.

- 1. Provide attendance by authorized representatives of the Contractor and major Subcontractors.
- 2. The Construction Manager will advise other interested parties.

- B. Minimum Agenda: Data will be distributed and discussed on at least the following items.

- 1. Organizational arrangement of Contractor's forces and personnel, and those of the subcontractors, and materials suppliers.
- 2. Organizational arrangement of the Owner's forces and personnel and other authorized representatives.
- 3. Channels and procedures for communication.
- 4. Construction Schedule, including sequence of events and critical work.
- 5. Contract Documents, including distribution of required copies of original Documents and revisions.
- 6. Processing of Shop Drawings and other data submitted to the Construction Manager for review.
- 7. Processing of bulletin, addenda, field decisions, Requests for Information and Change Orders.
- 8. Rules and regulations governing performance of the Work.
- 9. Procedures for site security, project quality control, housekeeping, and related matters.
- 10. It is the responsibility of the Contractor for Site Safety & First Aid; however, it shall be on the agenda.
- 11. Procedures for contractor's request.
- 12. Emergency Information: The name, addresses, and telephone numbers of the Contractor, and Subcontractors, or their representatives, shall be filed with the Construction Manager prior to start of the Work.

3.04 PROJECT MEETINGS

A. Attendance:

1. To the maximum extent practicable, the Project Superintendent and other representatives who have full knowledge of the project and full authority to act for the Contractor shall represent the Contractor at Project Meetings throughout the progress of the Work.
2. Subcontractors, materials suppliers, and others may be invited to attend these Project Meetings in which their aspect of the Work is involved.
3. The Contractor may not cancel or be absent from any meeting without advanced approval from the Construction Manager. The Contractor must submit a written request with reason to the Construction Manager twenty-four (24) hours before the scheduled meeting. If approved, the Contractor shall notify all parties of the cancellation.

B. Minimum Agenda:

1. Review progress of the Work since last meeting. Review actual starts and finish dates of activities.
2. Review status (total complete and outstanding) of submittal for approval, Request for Information and Change Orders.
3. Identify old and new problems, which impede planned progress, identify responsible party for the follow-up actions. Mutually agree to a common solution and date of correction.
4. Review Bi-weekly Progress Reports including the forecasts.
5. Status of As-Builts.
6. Project site Walk-Through. Record all discussion and follow-up actions.
7. Any project site health and/or accident or safety issues.

3.05 SPECIFIC SITE MEETINGS

- A. Required when necessary to enable orderly review and discussion of site conditions and problems requiring solution during the progress of the contracted work. Notify the Construction Manager of the need for additional site meetings as early as possible to resolve the problem without any impact to the Project Schedule.
- B. Provide necessary labor, tools, and equipment such as shoring, scaffolding, ladder, etc. to gain access to the specific sites.
- C. The Contractor or The Contractor's authorized representative shall be present at all times.

All discussion and follow-up actions shall be recorded by the Construction Manager, and the memorandum(s) shall be distributed at the next meeting or at the earliest time.

**END OF SECTION 01312**

**SECTION 01352 – SAFETY AND HEALTH**

PART 1 - GENERAL

1.01 DESCRIPTION

The Contractor is responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work. The Contractor shall take all necessary precautions for the safety of and provide necessary protection to prevent injury or loss to, all employees.

Comply with all applicable Cal/OSHA health and safety requirements. Secure all work areas and close any open holes or excavations when not working by marking with ribbons and cones, and post signs indicating to stay away due to the existence of open excavations.

The Contractor is responsible for ensuring that all subcontractors abide with the contents of this section, and the Health and Safety Plan.

The Contractor is responsible for ensuring that all subcontractors abide with the safety rules and regulations with working near overhead and underground power lines.

If the Engineer observes any of the contractor's employees or subcontractors engaging in an unsafe act or procedure that may result in serious injury or death to the person performing that act or procedure, or to any other person, the Engineer shall have the right, but not the duty to stop the work until the condition is corrected. The Contractor is responsible for any increased costs that result from this work stoppage.

Hold daily tailgate safety meetings to reiterate all safety measures to be taken and discuss any violations committed and preventative measures. Notify the Engineer of the time and place for these meetings. Summarize the daily tailgate safety meetings in a weekly rollup report including meeting topics and attendance.

Provide all personnel working on the project with required orientation and training on the potential hazards and all the appropriate use of safety equipment. Maintain records of those in attendance.

1.02 REFERENCE CODES, AND STANDARDS

A. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations, (OSHA), including all changes and amendments thereto.

B. Reference here to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations, (OSHA), including all changes and amendments thereto.

C. Reference here to "Trench Construction Safety Orders", shall mean Title 8, Article 6, Subchapter 4, Construction Safety Orders, California Code of Regulations, California Occupational Safety and Health Regulations, (Cal/OSHA), including all changes and amendments thereto.

1.03 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – Submittals.
- B. Health and Safety Plan

1.04 PROJECT CONDITIONS

- A. Provide and maintain a work environment and procedures that will:
  - 1. Safeguard the public and Owner's personnel and Engineer exposed to Contractor operations and activities.
  - 2. Avoid interruptions of site operations and delays in project completion dates.
  - 3. Control costs in contract performance.
- B. Do not require persons employed in performance of this contract, including subcontracts, to work under conditions which are unsanitary, hazardous, or dangerous to the employee's health or safety.
- C. Provide appropriate safety barricades, signs, and signal lights.
- D. Maintain accurate record of and report to the Owner and Engineer the following occurrences during performance of this contract:
  - 1. Death.
  - 2. Occupational disease.
  - 3. Traumatic injury to employees or the public.
  - 4. Property damage in excess of \$2,500.
- E. Smoking is not permitted at the project site.
- F. Safety vests, hard hats and steel toed boots shall be worn by all personnel during work. Other personnel protective equipment will be worn as dictated in the Health and Safety Plan.

1.05 QUALITY ASSURANCE

- A. Contractor's Onsite Safety Representative:
  - 1. The effectiveness of the Contractor's Onsite Safety Representative in prosecuting the HSP will be subject to continued review and approval by the Owner.
  - 2. Should the Contractor's safety effort be considered inadequate, the Owner has the option to require the Contractor to employ a full-time qualified Safety Professional.
  - 3. Contractor's Onsite Safety Representative authorities, duties and responsibilities:
    - a. Review and approve the Contractor's HSP prior to submittal.
    - b. Responsible for effectively implementing the Contractor's HSP.
    - c. Full authorization to correct unsafe acts on the spot.
    - d. Prepare safety inspection reports.
    - e. Onsite during construction activities.

1.06 HEALTH AND SAFETY PLAN

Submit a detailed health and safety plan (HSP) in accordance with all applicable Cal/OSHA and Federal OSHA regulations, and any other applicable federal, state, or local agency regulations or requirements. If any of these requirements are in conflict, the more stringent requirement shall apply. The Contractor's failure to be thoroughly familiarized with the aforementioned safety and health provisions shall not relieve the contractor of responsibility for full compliance with obligations and requirements set forth herein. The HSP must include:

- 1. Organizational structure.
- 2. Comprehensive work plan.
- 3. Hazard analysis for each site task.
- 4. Employee training.
- 5. Personal protective equipment to be used for each task.

6. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used.
7. Site control measures.
8. Emergency response plan.
9. Spill containment program.
10. Handling procedures for potential pollutants including fuels, lubricants, bitumen, dust palliatives, raw sewage, wash water, silt laden water, cement, and waste.
11. The effectiveness of the HSP will be subject to continued review and approval by the Owner.

Maintain a copy of the HSP at the site for the duration of work. The HSP does not supersede or in any way relieve the Contractor of obligations under any applicable CAL/OSHA regulations including 29 CFR 1910 and 29 CFR 1926.

1.07 WASTEWATER HEALTH AND SAFETY CONSIDERATIONS

Wastewater is located within the project site. The new wastewater exhibits very poor water quality. Working near the water can be highly dangerous.

**END OF SECTION**

**SECTION 01505 - MOBILIZATION**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Mobilization shall consist of preparatory work and operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the Project site for all other work and operations that must be performed or costs incurred before beginning work on the various Contract items on the Project site.
- B. Mobilization shall include, but not be limited to, the following items, all as required for the proper performance and completion of the Work:
  - 1. Providing designated management personnel at the project site on a full-time basis throughout the construction of the project.
  - 2. Preparation and processing of project documentation, including Agreement, Labor Monitoring, Payment Requests, RFI, Change Orders, and other project correspondence;
  - 3. Obtaining all permits, and licenses. Providing copies to the Engineer;
  - 4. Obtaining all required Subcontractor insurance certificates and bonds. Providing copies to the Engineer;
  - 5. Paying taxes, and other miscellaneous fees;
  - 6. Participating in all project meetings;
  - 7. Preparation and implementation of a Health and Safety Plan;
  - 8. Moving onto the site all of the Contractor's equipment and establishing a staging area as required. Including set up, operation and maintenance of all temporary facilities;
  - 9. Developing construction water supply;
  - 10. Providing restroom facilities for construction personnel;
  - 11. Providing potable water facilities as specified. This includes a means by which all on-site Contractor, Subcontractor or supplier personnel can wash their hands with soap. It also includes providing potable drinking water to the construction personnel at the project site;
  - 12. Posting all CAL/OSHA required notices and establishment of safety programs;
  - 13. Furnishing of Construction Schedule, Contract Price Breakdown (Schedule of Values), and Submittal Schedules, and Submittal Documents;
  - 14. Providing office trailer for construction personnel including area Class 2 Base parking and staging area in the vicinity of the Project Trailer.
  - 15. Complying with the Air Pollution Control District Permit Requirements and paying the associated fees;

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16. Complying with the CEQA/NEPA Categorical Exemption and Exclusion Determinations;
17. Providing Project Signs and labor law contract postings;
18. Coordinating with utility purveyors, complying with their requirements, and paying any fees;
19. Maintaining protection of existing utilities, including the coordination with Dig-Alert;
20. Start-Up and implementation of the wastewater facility(ies);
21. Preparation and submittal of the As-Built Drawings;
22. Preparation and submittal of Operation and Maintenance Manuals; and
23. Completion of project close out documentation.
24. Providing Temporary Facilities per Technical Specification Section 01520.

All costs incurred for the mobilization and the associated work and all other work not specifically said nor included in the bid item list shall be included in the Bid Item for the Mobilization cost and no additional compensation shall be provided.

**END OF SECTION**

**SECTION 01520 - TEMPORARY FACILITIES**

PART 1 - GENERAL

1.01 DESCRIPTION

The Owner shall bear no costs of temporary facilities, unless noted otherwise.

It shall be the Contractor's responsibility to provide equipment that is adequate for the performance of the Work under this Contract within the time specified. All equipment shall be kept in satisfactory operating condition, shall be capable of safely and efficiently performing the required Work and shall be subject to inspection and approval by the Owner's representative at any time within the duration of the Contract. All work hereunder shall conform to the applicable requirements of the OSHA Standards for Construction.

1.02 POWER AND LIGHTING

The Contractor shall provide temporary electric power as necessary for the execution of the Work, including that required by all Subcontractors. Contractor shall make the necessary arrangements with utility purveyor to include all permits, applications and fees, and shall bear all costs for these temporary services and shall furnish and install all necessary transformers, metering facilities and distribution centers from branch circuits as may be required.

The Contractor shall provide lighting and outlets in temporary structures throughout the Project as may be required for safety, proper performance and inspection of the Work. If operations are performed during hours of darkness, or if natural lighting is deemed insufficient by Engineer, the Contractor shall provide adequate floodlights, clusters and spot illumination. The use of permanently installed lighting fixtures, lamps and tubes for work shall not be permitted except by special permission of Engineer. The Contractor shall make arrangements with Subcontractors for electrical services and lighting as may be necessary in the performance of their work.

1.03 WATER SUPPLY

- A. General: The Contractor shall provide an adequate supply of water of a quality suitable for all potable, domestic, and construction purposes.
- B. Drinking Water: All drinking water on the site during construction shall be furnished by the Contractor and shall be bottled water or water furnished in approved dispensers. Notices shall be posted conspicuously throughout the site warning the Contractor's personnel that piped water for construction purposes may be contaminated and is not for human consumption.
- C. Water Connections: The Contractor shall not make connection to, or draw water from, any fire hydrant or pipeline without first obtaining permission, in writing, of the authority having jurisdiction over the use of said fire hydrant or pipeline and from the agency owning the water system. For each such connection made the Contractor shall first attach to the fire hydrant or pipeline a valve, backflow preventer and a meter, if required by the said authority, of a size and type acceptable to said authority and agency.
- D. Removal of Water Connections: Before final acceptance of the Work all temporary water connections and piping installed by the Contractor shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the Engineer and to the agency owning the affected utility.
- E. Fire Protection: The Contractor shall provide fire extinguishers and other fire protection equipment to adequately protect new and existing facilities and temporary facilities

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against damage by fire. Hose connections and hose, water casks, chemical equipment or other sufficient means shall be provided for fighting fires in the new, existing and temporary structures and other portions of the Work and responsible persons shall be designated and instructed in the operation of such fire apparatus so as to prevent or minimize the hazard of fire. The Contractor's fire protection program shall conform to the requirements of the OSHA Standards for Construction. The Contractor shall employ every reasonable means to prevent the hazard of fire.

1.04 CONSTRUCTION OFFICE TRAILER

- A. The Contractor shall provide and maintain a temporary Office Trailer at the Project Site that is to be used for the use of construction representatives. The Office Trailer shall have a floor area of at least 480 square feet with a minimum of 100 square feet designated for the sole use of the Engineer. The office trailer shall have a large room to hold project meetings. The office trailer shall be provided with lighting, hot/cold water dispenser, heating, air conditioning, two (2) file cabinets, three (3) desks, six (6) chairs and connections for internet.
- B. The temporary office trailer shall be set and maintained to meet California Building Code Standards as regulated by County of Imperial Planning and Development Services' Building Division and Imperial Irrigation District's power requirements.
- C. All costs related to the Construction Office Trailer shall be borne by the Contractor as mobilization item.

The Contractor shall provide power service, wiring, conduit and electrical service pole in accordance with Imperial Irrigation District requirements. The Contractor shall obtain and pay for all required temporary trailer costs for electrical power from the Imperial Irrigation District Power Division.

The Contractor shall obtain and pay for all required temporary trailer permits through the County of Imperial Planning and Development Services Department.

- D. The Office Trailer shall be moved to the project site's staging area within prior to the commencement of construction activities.
- E. The Office Trailer cannot be utilized as sleeping quarters.

1.05 SANITATION

- A. Toilet Facilities: Portable chemical toilet facilities shall be provided wherever needed for the use of employees. Toilets at Site(s) shall conform to the requirements of Subpart "D", Section 1926.51 of the OSHA Standards for Construction. The Owner's toilet facilities shall not be used by the Contractor. Two (2) toilet facilities shall be positioned at the project site. One (1) toilet facility shall be for men. The other toilet facility shall be for women. Toilet facilities shall be relocated as required and be maintained close to daily work activities. The toilet facilities shall be cleaned and serviced on a weekly basis.
- B. Sanitary and Other Organic Wastes: The Contractor shall establish adequate and regular collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of in a manner satisfactory to the Engineer and in accordance with all laws and regulations pertaining thereto. Contractor may install temporary piping for toilet facilities to discharge into the incoming sewer.

1.06 COMMUNICATIONS

A. Telephone Services: The Contractor shall provide and maintain a phone line.

1.07 FENCE AND BARRICADES

The Contractor shall provide such protective fences and barricades as deemed necessary for public safety and to protect storage areas and the Work in place. The location and appearance of all fences shall be subject to the approval of the Engineer.

1.08 CONTRACTOR PARKING

The Contractor shall not park his equipment, nor allow his personnel to park, in any area except those specifically designated by the Engineer and Owner as a staging area.

1.09 TEMPORARY LIVING QUARTERS

Temporary living quarters shall not be allowed on the Site or on publicly owned properties. In addition, all local zoning codes for the area in question shall be strictly adhered to.

1.10 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

The Contractor shall remove temporary toilets, storage sheds and other temporary construction facilities from the site as soon as, in Engineer's opinion, the progress of Work permits. Contractor shall recondition and restore those portions of the site occupied by the same to a condition equal to or better than it was prior to construction.

END OF SECTION

**SECTION 01530 - PROTECTION OF EXISTING FACILITIES**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall protect all existing utilities, piping and improvements not designated for removal and shall restore damaged or temporarily relocated utilities, piping and improvements to a condition equal to or better than they were prior to such damage or temporary relocation.
- B. The Contractor shall verify the exact locations and depths of all underground piping and utilities shown and not shown and shall make exploratory excavations of all piping and utilities that may interfere with the Work. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities, piping and other improvements that will be encountered during construction operations and verify that such utilities or other improvements are adequately protected from damage due to such operations.
- C. Maintaining in Service: All pipelines, electrical, power, telephone communication cables, gas and water mains shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the Owner. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement the Contractor, after necessary scheduling and approval, shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the Owner of the facility. In all cases of such temporary removal or relocation, the Work shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement to a new condition meeting the specification requirements.
- D. All repairs to a damaged utility or improvement are subject to inspection and approval by a Resident Project Representative before being concealed by backfill or other work.

1.02 RIGHTS-OF-WAY

- A. The Contractor shall refrain from commencing work or entering upon the rights-of-way of any oil, gas, sewer or water pipeline; any telephone or electric transmission line; any fence; or any other structure, until notified by the Engineer that the Owner has secured authority to do so. After authority has been obtained, the Contractor shall give the governing utility proper advanced notice of its intention to begin work.

1.03 RESTORATION OF PAVEMENT AND SIDEWALKS

- A. All paved areas and sidewalks not designated for replacement, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas unless otherwise noted. All sidewalks, curbs and gutters and pavements which are subject to partial removal shall be neatly saw-cut in straight lines. The sidewalk, curb and gutter and pavement shall be constructed in accordance with the Standard Details and Plans of the governing agency.

1.04 UNDERGROUND UTILITIES NOT SHOWN OR INDICATED

- A. If the Contractor damages existing utilities, piping or improvements that are not illustrated or the location of which was not made known to the Contractor prior to excavation and the damage was not due to failure of the Contractor to exercise reasonable care the Contractor shall immediately notify the Engineer. If directed by the Engineer

repairs shall be made by the Contractor under the provisions for changes and extra work contained in the Standard General Conditions.

The Contractor is responsible for notification to California Underground Service Alert (Dig Alert) to identify and locate existing utilities within the project area. Dig Alert must be notified a minimum of two working days prior to the commencement of any digging or excavation.

1.05 NOTIFICATION BY THE CONTRACTOR

- A. Prior to any excavation in the vicinity of any existing underground facilities, including water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications or telecommunication cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way, the Contractor shall notify the respective utility purveyors or agencies or owners responsible for such facilities not less than three (3) working days prior to excavation so that a representative is afforded the opportunity to be present during the excavation work.

**END OF SECTION**

**SECTION 01550 - SITE ACCESS AND STORAGE**

PART 1 - GENERAL

1.01 HIGHWAY AND STREET LIMITATIONS

- A. The Contractor shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits and other limitations affecting transportation and ingress and egress to the Site. It shall be the Contractor's responsibility to construct and maintain any haul roads required for its construction operations or define any alternate routes to the Site due to roadway or bridge restrictions. Per Special Condition Section 12, the contractor shall be required to maintain the 1/2 mile long IID "R" Lateral dirt access roadway from Highway 111 to the Niland WWTP east access gate during the project construction period.
- B. Nothing herein shall be construed to entitle the Contractor to the exclusive use of any public street, utility right-of-way or the Site during the performance of the Work hereunder. The Contractor shall conduct its operations so as not to interfere unnecessarily with the authorized work of utility companies, other agencies, or the Owner's personnel. No street or access shall be closed without first obtaining permission of the Engineer or proper governmental authority. Where excavation is being performed in primary streets or highways one (1) lane in each direction shall be kept open to traffic at all times unless otherwise provided or shown by the Contract Documents. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the Contractor to assure the use of sidewalks, access routes and the proper functioning of all gutters, sewer inlets and other drainage facilities.
- C. Traffic Control: For the protection of traffic in public streets and construction workers at the Site, the Contractor shall provide, place and maintain all necessary barricades, traffic cones, warning signs, lights and other approved safety devices. All barricades, traffic cones, warning signs, lights and other approved safety devices shall be placed according to the agency requirements maintaining jurisdiction, as applicable. The Contractor shall take all necessary precautions for the protection of the Work and the safety of the Owner's personnel and the public. All barricades and obstructions shall be illuminated at night.

1.02 CONTRACTOR'S WORK AND STAGING AREA

- A. The Owner will designate and arrange, for the Contractor's use, a portion(s) of the property on or adjacent to the Site for its exclusive use during the term of the Contract. The area is designated for an office, storage and shop area for construction operations relative to this Contract. The Contractor shall be solely responsible for the security of its tools, supplies and equipment at the site.

**END OF SECTION**

**SECTION 01560 - PROJECT ENVIRONMENTAL CONTROLS**

PART 1 - GENERAL

1.01 EXPLOSIVES AND BLASTING

- A. The use or storage of explosives on the Work or site will not be permitted.
- B. If applicable, controls outlined in the Environmental Report developed for this project shall be implemented throughout the course of construction. A copy of the Environmental Report is included in the Special Conditions, if any.

1.02 DUST ABATEMENT AND RUBBISH CONTROL

- A. The Contractor shall provide under the Contract all necessary measures to prevent its operation from producing dust in amounts damaging to property or causing a nuisance to Owner's personnel and operations or to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for damage resulting from any dust originating from its operations. The dust abatement measures shall be continued throughout the length of the Contract.
- B. During the progress of the Work the Contractor shall keep the Site and other areas used by it in a neat and clean condition and free from any accumulation of rubbish and waste materials. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal and in conformance with all applicable Safety Laws and Health Standards for Construction. The Owner's dumpster shall not be used by the Contractor.
- C. Contractor shall implement regulations set by CAL EPA and the Imperial County Air Pollution Control District for all work activities related to this Project.

1.03 CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval for use by either the U.S. Environmental Protection Agency, the U.S. Department of Agriculture or the local jurisdictional agency. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.04 CULTURAL RESOURCES

- A. The Contractor's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical, architectural, archeological or cultural resources (hereinafter called "cultural resources). If potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:
  - 1. The Contractor shall immediately notify the Engineer.

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2. The Engineer will issue a Field Order directing the Contractor to cease all construction operations at the location of such potential cultural resources find.
  3. Such Field Order shall be effective until such time as a qualified archeologist can be called to assess the value of these potential cultural resources and make recommendations to the California State Historical Society Archeologist.
- B. If the archeologist determines that the potential find is a bona fide cultural resource, at the direction of the California State Historical Society Archeologist, the Contractor shall suspend work at the location of the find under the provisions for changes contained in Articles 4, 8 and 18 of the Standard General Conditions and Supplementary Conditions 4.02, 4.06 and 4.06D.

1.05 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

- A. The requirement of a Stormwater Pollution Prevention Plan (SWPPP) for construction of the project are addressed herein as well as the Special Conditions of the Specifications.
- B. The Contractor shall comply with all requirements of the United States Environmental Protection Agency (USEPA) and the California State Water Resources Control Board (State Water Board) as outlined in the Construction General Permit (GCP) for Region VII in constructing the required items of the Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall complete all required documentation to meet these requirements that include, but are not limited to, filing the Notice of Intent (NOI), inspections, sampling, stabilization practices, structural practices, stormwater management practices, good housekeeping (Best Management Practices), complying with threatened/endangered/sensitive species and critical habitat, and filing the Notice of Termination (NOT).
- The Contractor shall supply the Owner and Agencies with copies of all documentation to meet SWPPP requirements.
- C. The Contractor shall develop a Water Pollution Control Schedule that shall describe the timing of grading/excavation or other work activities that could affect water pollution. The Water pollution Control Schedule shall be updated by the Contractor to reflect any changes in the Contractor's operations that would affect the necessary implementation of water pollution control practices.
- D. The Contractor shall keep one (1) copy of the approved SWPPP and approved amendments at the project site. The SWPPP shall be made available upon request to the Owner, Engineer, State Water Board or USEPA.
- E. The Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting, maintaining, removing and disposing of the water pollution control practices included in the SWPPP and any amendments. Unless otherwise directed by the Owner, the Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of work.
- F. If the Contractor or the Owner identifies a deficiency in any aspect of the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately. If the Contractor fails to correct the identified deficiency, the Contractor shall be in noncompliance, and the Owner may order the suspension of any construction operation which creates water pollution.
- G. The National Weather Service weather forecast shall be monitored and used by the Contractor on a daily basis. An alternative weather forecast proposed by the Contractor

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may be used if approved by the Agency. If precipitation is predicted, additional water pollution control practices shall be deployed prior to the onset of the precipitation to limit storm water pollution during those times.

- H. The Contractor shall perform all necessary tasks to comply with the various Site BMPs set forth in the approved SWPPP.
- I. *The Engineer has prepared a draft of the SWPPP document and is a part of the Special Conditions section of the Plans. The Contractor is to update the SWPPP document, by a Qualified SWPPP Designer.*

**END OF SECTION**

**SECTION 01600 - MATERIALS AND EQUIPMENT**

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

- A. To the greatest extent possible for each unit of work, the Contractor shall provide products, materials or equipment from a single source.
- B. Where more than one choice is available as options for Contractor's selection of a product, material or equipment, the Contractor shall select an option which is compatible with other products, materials or equipment already selected.

1.02 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. The Contractor shall transport, deliver, handle and store products in accordance with supplier's written recommendations and by methods and means which will prevent damage, deterioration and loss including theft. Delivery schedules shall be coordinated to minimize long-term storage of products at the Site and overcrowding of construction spaces. The Contractor shall provide installation coordination to ensure minimum storage times for products recognized to be flammable, hazardous or easily damaged.
- B. Products shall be delivered in a dry, undamaged condition in the supplier's unopened packaging. The Engineer and Owner reserve the right to reject all damaged products, materials and equipment. Rejected products shall be immediately removed from the Site.
- C. Products, materials and equipment shall be stored in accordance with the manufacturer's written instructions, with seals and labels intact and legible. Motors, electrical gear, mechanical equipment with open bearings or moving parts or any product sensitive to the environment shall be stored in weather-tight enclosures with necessary temperature and humidity ranges maintained within the manufacturer's instructions.
- D. Fabricated structural components shall be stored on supports above ground and in a manner to prevent accumulation of water and warping. Products subject to deterioration from atmospheric conditions shall be covered in a manner that will provide adequate ventilation to avoid condensation.
- E. Products, materials and equipment not stored in a manner that will insure the maintaining of a new condition will be rejected by the Engineer. Such rejected products, materials and equipment shall be immediately removed from the Site.

**END OF SECTION 01600**

**SECTION 01660 - MECHANICAL EQUIPMENT -  
INSTALLATION AND START-UP**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section contains general information required for the installation of mechanical equipment as specified within the various individual specifications. The plans and/or performance specifications describe equipment and general layout based on certain commercially available equipment. It shall be the responsibility of the Contractor to ascertain the compatibility of all equipment and utilization of available space based on the Contractor's approved design and/or shop drawings and intent of these Contract Documents.
- B. Included shall be all supervision, labor, materials, tools, equipment and services as required for the furnishing, installation, testing and operation of equipment including the services of manufacturer service engineers, receiving, unloading, storage, protection, installation and complete erection of all mechanical equipment required in these Contract Documents.
- C. Installation shall include, but not be limited to placing, core drilling, shimming, anchoring, grouting, cleaning, painting, lubricating, assembling, testing and adjusting of all mechanical equipment. Installation shall also include providing all required miscellaneous parts and appurtenances.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15380 – Motors

1.03 DESCRIPTION

A. General:

- 1. The Contractor shall be liable for all damage to the equipment which is to be furnished and installed under this Contract, as well as for any damage to the building structures, existing equipment or other property, real or personal, resulting from the movement of equipment or installation work. This liability shall continue until the installed equipment is accepted by the Owner.
- 2. The Contractor shall cause the equipment to be furnished under this division to be the product of firms regularly engaged in the design and manufacture of the type of item specified, possessing the required technical competence, skill, resources and ability to complete the work specified herein with the requisite degree of quality and in a timely and efficient manner. The Contractor shall be prepared to adequately document the qualification of the manufacturers nominated to provide equipment specified under this division. All documentation shall be submitted to the Owner or representative for review and acceptance prior to design, fabrication and shipment of any component specified herein. Nothing contained within these provisions shall be construed as relieving the Contractor of his responsibility for any portion of the work covered by this division.

B. Arrangement:

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1. This arrangement of equipment as described by the specifications is based upon the best information available to the Owner at the time of the preparation of the concept drawings and specifications and is not intended to show exact dimensions peculiar to any specific manufacturer unless otherwise shown or specified. The Conceptual Drawings are, in part, diagrammatic, and, therefore, it is to be expected that the illustrated equipment, if any, be installed be per the Contractor's design and conform adequately to actual equipment installation requirements. The Owner or representative will review all equipment shop drawings, and installations to assure compliance with these requirements. It is to be anticipated that structural supports, equipment pads, foundations, connected piping and valves shown, in part or in whole, may have to be altered in order to accommodate the equipment furnished. Equipment pads shall be increased or reduced in size to properly suit the actual equipment. No additional payment will be made for such changes. All necessary calculations and drawings shall be submitted to the Owner or representative prior to beginning of the construction phase.

1.04 QUALITY ASSURANCE

- A. Equipment and appurtenances shall be designed in conformity with the conceptual documents and performance specifications. Equipment shall be constructed of materials for the conditions of exposure and of such strength to withstand all stress which may occur during testing, installation, all conditions of operation, including start-up, shut-down and power failure.
- B. All equipment shall be installed true and level and to the locations shown on the Plans. All work shall be performed to the satisfaction of the Owner. Precision gauges and levels shall be used in setting all equipment.
- C. The Contractor shall be responsible for installation of the equipment in a manner consistent with the requirements of performance warranties and equipment workmanship of the manufacturer.
- D. Machinery parts shall conform exactly to the dimensions shown on the Shop Drawings. The corresponding parts of identical machines shall be made interchangeable. Clearance shall be provided for repairs, inspection and adjustment.
- E. Exposed surfaces shall be finished in appearance. All exposed welds shall be ground smooth at the corners for personnel protection.
- F. All machinery and equipment shall comply in all respects with the provisions of the Occupational Safety and Health Act of 1970, and other applicable Federal, State and local laws and regulations.
- G. Conformance to Design Criteria and Performance Guarantee.
  1. In submitting a bid, the Contractor shall formally acknowledge receipt of and understanding of the design criteria presented in the Conceptual Drawings and Performance Specifications and guarantees that the equipment to be supplied shall be designed and performs in compliance with the design criteria.
  2. Contractor shall guarantee all equipment provided under this Contract in accordance with the Contract Documents.

1.05 SUBMITTALS AND MISCELLANEOUS REQUIREMENTS

A. General:

1. All mechanical equipment provided under this division shall be submitted for review by the Owner or Representative. The submittal package for each individual equipment or groups of related equipment shall be complete and in accordance with Section 01300 – Submittals/Shop Drawings.

PART 2 - PRODUCTS

2.01 ANCHORS AND SUPPORTS

- A. The Contractor shall furnish, install and protect all guides, bearing plates, anchor and attachment bolts, and all other appurtenances required for the installation of equipment. Anchors and supports shall be of ample size and strength for the purpose intended and shall be approved by the Owner or Representative.
- B. Anchor bolts shall be furnished and set in concrete foundations where required. All anchor bolts, studs and fasteners shall be Class 316 stainless steel.
- C. Anchor bolts, flange bolts, and other fasteners using nuts and threaded bolts shall have no more than 1 ½ to 2 threads extending beyond the nut when fully tightened.
- D. The Contractor shall obtain and use shop drawings and suitable templates when required for installation of equipment.

2.02 LUBRICATION

- A. The Contractor shall thoroughly lubricate all equipment in accordance with the equipment manufacturer's instructions. Lubricating oils and greases shall be of the type and viscosity recommended by the equipment manufacturer.
- B. All lubricants shall be furnished with flushing oils as recommended by the manufacturer. This includes, but is not limited to, all gearing and bearings, regardless of whether they have been shipped with or without oil soluble protective coatings.
- C. Following flushing, oil lubricating systems shall be filled with "run-in" oil as recommended by the equipment manufacturer. The equipment shall be "run-in" at the no load condition for a minimum of two (2) hours. Following "run-in" and inspection, the equipment is to be drained and flushed again with flushing oil and refilled with lubricant as recommended by the manufacturer.
- D. The grease fittings on all mechanical equipment shall be such that they can be serviced with a single type of grease gun. Grease fittings shall be standard zirt type.
- E. Where locally mounted grease fittings would be difficult to service, the fitting shall be extended by adequately sized 316 stainless steel tubing to a point that shall provide accessibility for normal maintenance. Such points shall be located and installed as per the Owner or Representative's directive.

2.03 PROTECTIVE COATING AND PAINTING

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- A. All equipment and materials shall be shop painted. Particular attention shall be directed to wetted surfaces and other areas exposed to corrosive, extreme temperature or other hazardous environments.
- B. Painting shall be in strict accordance with Section 09800 unless otherwise indicated in the detailed equipment specifications. If there is no Section 09800, coating shall be as follows:
  - 1. Ferrous Metals: Exterior Exposure (Non-submerged and non-buried)
    - a. Surface preparation: SSPC-SP 6.
    - b. Product: Devco:
      - (1) Primer: Bar Rust 231 - 2 coats (3-5 mils DFT)
      - (2) Intermediate: Devran 224 HS (4-5 mils DFT)
      - (3) Finish: Devthane 378H - 1 coat (3-5 mils DFT) or approved equal.
    - c. Color to be selected by the Owner.
  - 2. All Piping and Valves that have a factory epoxy coating shall receive a final coating in the field with a product compatible with the existing coating.
    - a. Color to be selected by the Owner.
- C. All machined surfaces and shafting shall be cleaned and protected from corrosion by the proper type and amount of coating necessary to assure a minimum protection for two (2) years after shipment.
- D. Oil lubricated gearing, bearings, and other lubricated components shall be shipped with an oil soluble protective coating as recommended by the manufacturer. The coating shall be selected to provide protection for two (2) years.
- E. Motors, reducers and electric controls shall have the standard factory finish prior to delivery except where specific exception is noted in the individual equipment specifications.
- F. Provide two (2) gallons of paint compatible with the equipment finish coat for field touch-up and provide blend numbers for primer coat and finish coat paints.

2.04 COUPLINGS

- A. Unless otherwise specified, mechanical equipment with a driver greater than ½ horsepower, and where the input shaft of a driven unit is directly connected to the output shaft of the drive, shall have its two shafts connected by a flexible coupling which can accommodate angular misalignment, parallel misalignment and end float, and which cushions shock loads and dampens torsional vibrations. The flexible member shall consist of a tire with synthetic tension members bonded together in rubber. The flexible member shall be attached to flanges by means of clamping rings and cap screws, and the flanges shall be attached to the sub shaft by means of taperlock bushings which shall give the equivalent of a shrunk-on fit. There shall be no metal-to-metal contact between the driver and the driven unit.

- B. Coupling sizes shall be as recommended by the manufacturer for the specific application, considering horsepower, speed of rotation, and type of service, and shall be installed as recommended by the manufacturer.

2.05 GUARDS

- A. All exposed moving parts shall be provided with guards in accordance with the requirements of CAL/OSHA. Guards shall be fabricated of 14 gage steel, ½-13-15 expanded metal screen to provide visual inspection of moving parts without removal of the guard. Guards shall be galvanized after fabrication and shall be designed to be readily removable to facilitate maintenance of moving parts. Reinforced holes shall be provided.

2.06 NAMEPLATES

- A. A nameplate shall be provided on all items of equipment and shall contain approved equipment name or abbreviation and equipment number. Equipment nameplates shall be engraved or stamped on stainless steel and fastened to the equipment in an accessible location with No. 4 or larger oval head stainless steel screws or drive pins. Nameplates for motor-driven equipment shall include capacity, head, horsepower, bearing data, model number and serial number of pump, blower, compressor and motor. The main sewage pump nameplates shall also include the impeller diameter.

2.07 TOOLS AND ACCESSORIES

- A. The Contractor shall supply one (1) complete set of any special wrenches or other special tools necessary for the assembly, adjustment, and dismantling of the equipment. Special tools shall include any type of tool that has been specifically made for use on an item of equipment for assembly, disassembly, repair, and maintenance or is not available in current Snap-On Catalogue or Proto Professional Tools Full-Line Catalogue. When special tools are provided, they shall be marked or tagged, and a list of such tools shall be included with the maintenance and operation manuals describing the use of each marked tool. All wrenches and spanners shall be of best quality, hardened steel forgings with bright, finished heads and with work faces dressed to fit nuts. Each set of tools shall be neatly mounted in a toolbox of suitable design provided with a hinged cover.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Contractor shall cause each item of equipment provided as a part of the Contract Documents to be installed, aligned and tested by skilled workmen to the tolerances recommended by the equipment manufacturer. In addition, the equipment shall be installed, aligned and tested under the direction of installation engineers who have been factory trained by the equipment manufacturer. Upon completion of the Work and as a condition precedent to final acceptance, the Contractor shall furnish written certification from each equipment manufacturer that each item has been installed, aligned and tested correctly and that the installation meets all the manufacturer's requirements for efficient, trouble-free operation. This provision, however, shall not be construed as relieving the Contractor of his overall responsibility for the Work.

3.02 NOISE REQUIREMENTS

- A. All equipment specified shall be tested for noise generation after installation. When tested, equipment shall include the complete driver and driven equipment. Three (3)

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certified copies of the test shall be submitted to the Owner for approval prior to final acceptance.

3.03 SHOP INSPECTION AND SHOP TESTING

- A. The Owner shall be granted reasonable access to the production and shop test areas of the equipment manufacturer's facility during manufacturing and testing.
- B. The Contractor shall notify the Owner in writing, at least ten (10) working days prior to commencement of shop tests, of the time and place of all shop tests.
- C. Inspection by the Owner will not relieve the Contractor of his responsibility for workmanship, materials and Conceptual Drawings and Specification requirements.
- D. Manufacturer's standard test procedures shall be required and the manufacturer shall demonstrate that equipment meets all the requirements of these Conceptual Drawings and Specifications.

3.04 SHIPPING AND IDENTIFICATION

- A. All shipments shall be "tagged" by the Contractor with "wired-on" metal or plastic tag clearly stenciled or lettered with paint or waterproof ink. The information on the tags and cartons shall include Contractor's order number, purchase order number, manufacturer's number, and equipment number. Any expense incurred by the Owner due to the Contractor's failure to do so will be backcharged or deducted from his Contract.
- B. Each piece of equipment shall be provided with a substantial stainless steel nameplate, securely fastened in a conspicuous location and clearly inscribed with the manufacturer's name, year of manufacturer, serial number, principal rating data and equipment item number.
- C. The equipment covered in these Specifications shall be fabricated in the minimum number of sub-assemblies necessary for transportation. Small components or assemblies shall be adequately boxed or crated to prevent damage during shipment.
- D. Each assembly or package shall be identified with a durable shipping tag securely attached and plainly marked with the Contractor's order number, manufacturer's purchase order number and equipment number.
- E. All openings shall be covered with plywood, plastic or wood plugs or shields to prevent debris from entering the assemblies. Each assembly or sub-assembly shall have lifting lugs to facilitate erection and subsequent removal when necessary.

3.05 OPERATION AND MAINTENANCE MANUALS

- A. Operation and Maintenance manuals shall be furnished in accordance with Section 01730.

3.06 OPERATION AND MAINTENANCE INSTRUCTION

- A. The Contractor shall provide instruction time in accordance with the detailed equipment specifications, after the equipment has been accepted by the Owner. The time shall be used to instruct the Owner's personnel in the proper operation and maintenance of the equipment. The manufacturer shall provide technical personnel familiar with the operation and maintenance of the equipment in making this presentation.

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- B. Training shall consist of on-site operation training, classroom training, operational, safety and emergency drills.

3.07 INSTALLATION OF EQUIPMENT

- A. The Contractor's work procedure shall conform to the manufacturer's installation instructions unless expressly directed otherwise by the Owner.
- B. Equipment shall be erected level and plumb on the existing foundations and supports at the locations and elevations shown on the Plans, unless otherwise directed, in writing, by the Owner and Resident Project Representative during installation. Any additional pads, plates and other appurtenances necessary for the installation shall be provided by the Contractor.
- C. The equipment shall be brought to proper level with leveling nuts. After the machine has been leveled and aligned, the nuts on the anchor bolts shall be tightened to anchor the machine firmly into place against the leveling nuts.
- D. The grout shall be installed in accordance with the manufacturer's instructions.
- E. All equipment shall be installed in such a manner as to provide access for routine maintenance and lubrication as specified in Section 2.02 of this specification.
- F. Equipment of a portable nature which requires no installation shall be delivered to a location designated by the Owner.

3.08 MECHANICAL START-UP

- A. Once the equipment has been installed, complete with all auxiliary and support systems, and is ready for operation, the Contractor shall mechanically check out the equipment to verify that the equipment functions correctly under "non-process" conditions. The equipment shall be fine-tuned, adjusted, water tested, where applicable, and completely checked out before the equipment and support systems are considered ready for process start-up.
- B. The Contractor will be responsible for coordinating this effort and providing all support services and facilities necessary for this work effort.
- C. The equipment will not be considered ready for process start-up until the Owner is satisfied that the equipment has been satisfactorily checked out and successfully passed leakage and non-process test runs and appropriate training has been completed per the detailed equipment specifications.

3.09 FIELD SERVICE

It is understood that the Contractor and manufacturer share a joint responsibility in this Work. The Contractor shall provide the Manufacturer's qualified field representative and supporting personnel as required for the equipment furnished and installed under this Contract to perform the following:

- A. Assistance during equipment installation shall be provided to align the equipment or check the alignment of pre-aligned equipment prior to making connections to or anchoring of the equipment.

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- B. Inspection during equipment installation work shall be provided to determine compliance with equipment erection methods and procedures recommended by the manufacturer.
- C. Conduct the process start-up necessary to operate, adjust, calibrate and tune the equipment and systems into operating service in accordance with the design criteria described in each detailed equipment specification.
- D. Conduct performance tests to demonstrate compliance with design criteria and performance guarantee set forth in the Specifications.

3.10 PROCESS START-UP

- A. Once the equipment has been considered ready for process start-up and the support system can deliver the process material, the Contractor shall start up the equipment under process conditions and conduct performance tests to verify compliance with the Specifications. The Contractor shall give the Owner forty-eight (48) hours written notice of his intent to start up equipment under process conditions and conduct performance testing.
- B. The Contractor shall provide the necessary supervision and technical personnel and services required to perform the work. The Owner shall coordinate this phase of the work with the Contractor and provide all necessary support services and facilities to assist the Contractor in performing the work.
- C. The equipment shall be considered ready for a performance test only after the Contractor has demonstrated to the Owner that the equipment can operate continuously, without mechanical interruption under the process flow conditions for up to three (3) days, or such time as may be mutually agreeable to the Owner and Contractor.
- D. After it has been determined that the equipment will operate satisfactorily under process conditions, the performance test shall be made by the Contractor to verify that the equipment can meet the requirements outlined in the Specifications. The performance test shall be based on maintaining the design requirements for a time period mutually agreeable to the Owner and the Contractor, or such period as is stipulated in the General Provisions.

3.11 OWNER FURNISHED EQUIPMENT

- A. The Contractor shall notify the Owner when Owner furnished equipment is completely installed in accordance with the Owner furnished manufacturer's instruction and requirements of the Contract Documents and ready for operation testing. The Owner or Representative will schedule the manufacturer's representative to visit the site of the Work and inspect, check adjust if necessary and approve the equipment installation. If the manufacturer's representative cannot complete the testing and startup services due to the Contractor's negligence in installing the equipment, the Contractor shall be responsible for the costs of the service representatives' revisit to the site of the Work.

3.12 PERFORMANCE TESTS

- A. Performance test procedures shall be prepared by the Contractor and approved (in writing) by the Owner a minimum of fourteen (14) days before performance tests are conducted.
- B. Costs of all inspections, field service, mechanical start-up, run-in work, process start-up and performance tests shall be borne by the Contractor and shall be included in the total price bid for the Work.

- C. The Contractor shall also agree to repay the Owner installation costs for any rejected equipment. The installation costs will be derived by the Owner based on actual costs charged for the installation of the equipment.

3.13 ACCEPTANCE OF EQUIPMENT BY THE OWNER

After all the conditions of the Performance Specifications have been satisfied, the Owner will designate in writing that the equipment is accepted, and at such time the Owner will be responsible for all further maintenance and operation of same. The warranty period for all equipment shall start on the date of final acceptance by the Owner.

**END OF SECTION 01660**

**SECTION 01700 - PROJECT CLOSEOUT**

PART 1 - GENERAL

1.01 FINAL CLEANUP

- A. The Contractor shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment and temporary structures and facilities used during construction. Final acceptance of the Work by the Owner will be withheld until the Contractor has satisfactorily complied with the requirements for final cleanup of the site.

1.02 FINAL SUBMITTALS

- A. The Contractor, prior to requesting final payment shall obtain and submit the following items to the Engineer for transmittal to the Owner:
  - 1. Written guarantees, where required.
  - 2. Operating manuals, technical manuals and instructions. The Contractor's attention is directed to the condition that one percent (1%) of the contract price will be deducted from any monies due the Contractor as progress payments if at the seventy-five percent (75%) construction completion point the approved technical manuals have not been submitted in accordance with Section 01300 - Contractor Submittals. The aforementioned amount will be retained by the Owner as the agreed estimated value of the approved technical manuals. Any such retention of money for failure to submit the approved technical manuals on or before the seventy-five percent (75%) construction completion point shall be in addition to the retention of any payments due to the Contractor as specified in Article 14 of the Standard General Conditions and the Agreement.
  - 3. Manufacturers representatives' installation, testing and startup report.
  - 4. Keying.
  - 5. Maintenance stock items, spare parts and special tools.
  - 6. Completion and Submittal of the As-Builts to the Resident Engineer.
  - 7. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
  - 8. Releases from all parties who are entitled to claims against the subject project, property or improvement pursuant to the provisions of law.
  - 9. Extension of Performance Bond in accordance with Article 5.01A of the Standard General Conditions, if applicable.

1.05 MAINTENANCE AND GUARANTEE

- A. The Contractor shall provide a bond to comply with the guarantee requirements contained in Article 5.01A of the Standard General Conditions.
- B. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Contractor fails to make such repairs or replacements promptly the Owner reserves the right to do the Work and the Contractor and his surety

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shall be liable to the Owner for the cost thereof. Replacement of native material or aggregate fill, backfill or resurfacing where it has settled below the required finish elevations shall be considered as part of such required repair work.

**END OF SECTION**

**SECTION 01722 – SURVEY AND CONSTRUCTION STAKING**

PART 1 - GENERAL

The Contractor is responsible to engage a California-licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying to oversee the land survey work for this project.

1.01 DESCRIPTION

A. Permanent Survey Marker:

1. The Contractor shall be responsible for the preservation of survey monuments and benchmarks. See Special Conditions Section 8 regarding the preparation of Pre-Construction and Post-Construction Monument preservation report forms. At least ten (10) working days before the start of construction, the Contractor shall submit acceptable preconstruction survey tie notes to the Engineer's office. These tie notes shall be prepared by a California-licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying. These survey tie notes will be for all survey markers or benchmarks that may be lost or disturbed due to construction. Lost or disturbed monuments shall be replaced at the Contractor's expense by a California Licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying. Post-construction survey monument ties acceptable to the Engineer shall be submitted to the Engineer's office before the completion of the Work (see "Monuments", Section 8771, Land Surveyors Act, Division 3, Chapter 15 of the Business and Professions Code). The California Licensed Land Surveyor will re-establish the monuments and benchmarks where survey services are provided by the California Licensed Land Surveyor, providing the Contractor protects the preconstruction reference points. In this case, where the monuments are to be removed or damaged by the Contractor, the Contractor shall notify the Engineer in writing ten (10) calendar days before starting the Work.

B. Lot Stakes:

1. The Contractor shall preserve property line and corner survey markers, except where their destruction is unavoidable. The lot stakes shall be replaced per Item A.1 above. Markers that otherwise are lost or disturbed by its operations shall be replaced at the Contractor's expense by the Land Surveyor/Engineer contracted by the Contractor.

C. Survey Services:

1. The California Licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying contracted by the Contractor will perform and be responsible for the survey work at the Site unless otherwise noted on the Plans or Specifications. The Contractor shall preserve construction survey stakes and marks for the duration of their usefulness. If any construction survey stakes are lost or disturbed and need to be replaced, such replacement shall be accomplished by the Contractor's Engineer at the expense of the Contractor.
2. The California Licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying contracted by the Contractor shall establish horizontal and vertical control points for construction. The Contractor shall notify the Engineer in writing at least five (5) full working days before survey services are required in connection with the laying out of any portion of the work. The

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Contractor shall dig all holes necessary for line and grade stakes when requested by the Engineer.

3. The Contractor shall be responsible for their own layout based on the Land Surveyor/Engineer's survey stakes and cut sheets. The Contractor shall allow sufficient time for checking and issuance of cut sheets by the Contractor's Engineer.
4. Unless otherwise specified, stakes will be set and stationed by the Land Surveyor/Engineer for curbs, ribbon gutters, headers, sewer pipelines, water pipelines, storm drains, structures, earth berm and embankments and rough grade. A corresponding cut or fill to finished grade (or flowline) will be indicated on the cut sheet.

D. Line and Grade:

1. The California Licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying contracted by the Contractor shall set alignment and grade stakes only for all on-site pipelines that are three-inches (3") in diameter or larger. The Contractor shall furnish all other lines and grades required for proper execution of the work.
2. After exterior walls have been located for the building, the Contractor shall be responsible for the location of all interior construction including interior piping within the building.
3. All work shall conform to the lines, elevations, and grades illustrated on the Plans.
4. Three consecutive points set on the same slope shall be used together so that any variation from a straight grade can be detected. Any such variation shall be reported to the Engineer in writing. In the absence of such written notification, the Contractor shall be responsible for any error in the grade of the finished work.
5. Grades for underground pipelines will be established by the offset hubs at the surface of the ground. The Contractor shall be responsible for transferring the grades to the bottom of the trench and pipeline.

E. Benchmarks:

1. The Contractor shall use the benchmarks illustrated on the Plans to conduct grading work at the project site. The Contractor shall be allowed to establish temporary benchmarks; however, the Contractor shall establish the temporary benchmarks from the benchmarks illustrated on the Plans. The Contractor shall provide the Design Engineer and Construction Manager with fully prepared Level Notes substantiating the correct elevation of the temporary benchmark.

- F. The Contractor shall provide grade checkers to verify subbase, subgrade and final grade elevations prior to those grades being checked, verified and approved by the Design Engineer or Construction Manager. The Contractor shall provide grade checkers to place bluetop staking in parking lots, basins, roadways, concrete surfaces or other specified locations as required by Drawings. Bluetop stakes are stakes set to grade. The Design Engineer or Construction Manager will verify the grading work after the bluetop stakes have been placed by the grade checkers. The Contractor shall review Section 02200 -

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Earthwork; Section 02221 - Trenching, Backfilling and Compacting and Section 02510 - Asphalt Concrete and Paving, required for any required bluetop staking for this project.

- G. The California Licensed Land Surveyor or Registered Civil Engineer authorized to practice land surveying contracted by the Contractor shall provide two (2) sets of cut sheets to the Contractor, Design Engineer and Construction Manager within 24 hours after completing a staking activity.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 – Earthwork
- B. Section 02221 – Trenching, Backfilling and Compacting
- C. Section 02510 – Asphalt Concrete and Paving

PART 2 - EXECUTION

2.01 CONSTRUCTION STAKING REQUIREMENTS

Following are the minimum construction staking requirements for this project. The contractor may elect to complete additional construction staking items at the project site as the contractor deems appropriate.

2.01.1 Place hubs and lath with flagging 100 foot on center around the perimeter of the Evaporation/Infiltration Pond limits of construction. Place hubs and lath at the project limit corners and angle points. The hubs and lath are to be installed prior to the commencement of earthwork activities at the Evaporation/Infiltration Pond Project Site. The hubs and lath are to be maintained and replaced, as necessary, throughout the construction project.

2.01.2 Provide hubs and lath with flagging at 50 foot on center at an offset determined by the contractor around the interior and exterior toe of slope of the Evaporation/Infiltration Pond berms. Provide cut and fill information to the design toe of slope and slope staking information for the construction of the earth berms. Place hubs at E.C.'s, B.C.'s, ¼ delta and ½ delta points at horizontal curves. Include staking of access roads.

2.01.3 Provide hubs and lath with flagging at an offset to be determined by the contractor from the design toe of slope at 50 foot on center for the improvement of the IID "R" Lateral Access Road south slope improvement. Stake the beginning and end point of the native earth slope improvements. Provide slope staking information for the native earth slope improvement.

2.01.4 Place hubs and lath around the eight piezometers at the Evaporation/Infiltration Basin per plan sheet 14 prior to the commencement of earthwork at the Evaporation/Infiltration Pond Site. The hubs and lath are to be installed prior to the commencement of earthwork activities at the Evaporation/Infiltration Pond Project Site. The hubs and lath are to be maintained and replaced, as necessary, throughout the construction project

2.01.5 Place blue top stakes (stakes placed to finish grade) with stake chasers 100 foot on center along the length of the Evaporation/Infiltration Pond embankment access roads for finish grading purposes and to verify the access roads have been constructed to the finish design grade. Place bluetop stakes at horizontal curve E.C.'s, B.C.'s, ¼ Delta and ½ Delta points.

2.01.6 Place hubs and lath around the Retention Basin perimeter top of slope at an offset required by the contractor 25 foot on center and at BC's, EC's and ½ Delta points. Provide cut and fill information to the design top and toe of slope and slope staking information for the construction of

the Retention Basin earth side slope. Install 25' x 25' bluetop grid stakes at the Retention Basin native earth bottom.

2.01.7 Place offset hubs and lath at an offset required by the contractor along both sides of the Evaporation/Infiltration 4 foot diameter standpipe along an east-west and north-south axis. Provide cut and fill information for the interior finish pcc bottom slab foundation of the standpipe. Provide fill information to the top of the standpipe.

2.01.8 Install hubs and lath at an offset required by the contractor 25 feet on center along the 8 inch diameter sanitary sewer header pipeline extending from the 4 foot diameter pcc stand pipe to the westerly termination point of the 8 inch diameter pipeline. Place a lath and hub at each tee fitting along the 8 inch pipeline from which the inlet piping into the Evaporation/Infiltration Ponds is to extend. Provide cut information to the design flowline of the 8 inch header pipeline.

2.01.9 Install hubs and lath at an offset required by the contractor on the east and west sides of the Evaporation/Infiltration Pond outlet structures at both the north and south ends of the outlet structures. Install a total of four (4) hubs and lath for each of the six (6) outlet structures at the north Evaporation/Infiltration Pond Embankment toe of slope. Provide cut and fill information to the outlet structure top design slab. The north top of slab finish grade is the same elevation as the inlet pipeline flowline.

2.01.10 Install hubs and lath at an offset required by the contractor on the north and south sides of the Evaporation/Infiltration Pond outlet structure at both the east and west end of the outlet structure at the termination point of the Evaporation/Infiltration Pump Station 8 inch overflow pipeline located along the east toe of slope of Evaporation/Infiltration Pond Number 1. Install a total of four (4) hubs and lath for the outlet structure. Provide cut and fill information to the outlet structure top design slab. The east top of slab finish grade is the same elevation as the inlet pump station overflow pipeline flowline.

2.01.11 Install hubs and lath at an offset required by the contractor from the centerlines of the storm water protection earth berms located along the west and south sides of the Evaporation/Infiltration Pond Site. Install hubs and lath at 50 foot on center and at beginning and endpoints. Provide cut and fill information to the top of the earth berms.

2.01.12 Install bluetop hubs (hubs set to finish design grade) and lath on a 25 foot x 25 foot grid in the native earth areas between the exterior Evaporation/Infiltration Pond exterior toe of slopes and the storm water protection earth berms or the IID "R" Canal access road native earth toe of slope. Grade the native earth areas to finish design grade.

2.01.13 Install bluetop hubs (hubs set to finish design grade) and lath on a 50 foot x 50 foot grid in the native earth areas of the Evaporation/Infiltration Pond bottoms. Grade the native earth areas to finish design grade as noted by construction keynote 4 on plan sheets 15, 16 and 17 prior to the pond bottoms being scarified.

2.01.14 Install offset or in-line hubs and lath along the length of the 6 foot chain link fence on the south, west and north sides of the Evaporation/Infiltration Ponds. The contractor shall determine whether offset or in-line hubs are required. The hubs shall be placed 100 foot on center and at all angle and corner points. Hubs shall also be established at each side of gate entrances.

2.01.15 Install hubs and lath 25 feet on center at an offset determined by the contractor along the length of the 30 inch diameter agricultural lateral pipeline. Install offset hubs and lath at the pre-cast concrete drainage and irrigation structure and the 5 foot diameter manhole. Provide cut information to the flowline of the agricultural lateral pipeline, pre-cast concrete drainage and irrigation structure and the 5 foot diameter manhole.

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2.01.16 Install hubs and lath at 25 foot on center, at B.C.'s, E.C.'s, ¼ Delta and ½ Delta curve points and at beginning and end points along both sides of the All Weather Access Road extending from the Niland WWTP Main Entrance Gate at Alcott Road to the Evaporation/Infiltration Pond Number 1 access roadway. The hubs on each side of the road shall be established at an offset determined by the contractor. Cut and Fill information shall be provided to the road edges and centerline of the All Weather Access Road. Install bluetop stakes along the All Weather Access Road centerline and edges at 25 feet on center and at B.C.'s, E.C.'s, ¼ Delta and ½ Delta curve points during the All Weather Access Roadway Finish Grading.

2.01.17 Install hubs and lath at 25 foot on center, at B.C.'s, E.C.'s, ¼ Delta and ½ Delta curve points and at beginning and end points along both sides of the Access Road extending from the east WWTP Entrance Gate to the Chlorination/Dechlorination Structure area. The hubs on each side of the road shall be established at an offset determined by the contractor. Cut and Fill information shall be provided to the road edges and centerline of the Access Roadway. Install bluetop stakes along the Access Road centerline and edges at 25 feet on center and at B.C.'s, E.C.'s, ¼ Delta and ½ Delta curve points during the Access Roadway finish grading.

2.01.18 Install hubs and lath at an offset determined by the contractor around the perimeter boundary of the Construction Trailer and parking area. Place the hubs 25 feet on center and at the parking area corners.

2.01.19 Install hubs and lath at an offset determined by the contractor around the perimeter boundary of the Laboratory Control Building parking area. Place the hubs 25 feet on center and at the parking area corners.

2.01.20 Install in-line hubs and lath at each corner of the potable water system slab (2 hubs at each corner). Place the hubs at an offset determined by the contractor. Cut and Fill information to the finish grade of the pcc water system slab shall be provided.

2.01.20 The Evaporation/Infiltration Pond Pump Station will require several separate staking related items per the below sub- items:

2.01.20.1 Install hubs and lath (4 total hubs) at an offset distance from the pump station center along a north-south and east-west axis. The offset distance shall be determined by the contractor. Cut distances to the pump station top pcc support foundation elevation shall be provided.

2.01.20.2 Install in-line hubs and lath at each corner of the pump station pcc support foundation (2 hubs at each corner). Cut and fill vertical distances to the pump station top of pcc support foundation elevation shall be provided.

2.01.20.3 Install hubs at an offset along the exterior perimeter toe of slope of the pump station class 2 base area. The offset distance shall be determined by the contractor. Install the hubs at 20 foot on center and at all corner points, endpoints, B.C.'s, E.C.'s and ½ Delta points. Cut and Fill information to the design grade toe and top of slope shall be provided.

2.01.20.4 Install in-line hubs and lath at each corner of pump station surface slab (2 hubs at each corner). Place the hubs at an offset determined by the contractor. Cut and Fill information to the finish grade of the pcc surface slab shall be provided.

2.01.21 Install offset stakes for the 6 inch wastewater force main extension terminating at the wastewater storage pond. The offset stake distance shall be determined by the contractor. Stakes shall be placed at 25 feet on center, beginning and end points and angle points. Cut information to the flowline of the 6 inch wastewater force main shall be provided.

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2.01.22 Install offset stakes for the 12 inch gravity effluent pipeline extending from a point downstream of the flowmeter/sampling vault to the Evaporation/Infiltration Pond Pump Station. The offset stake distance shall be determined by the contractor. Stakes shall be placed at 20 feet on center, beginning and end points and angle points. Cut information to the flowline of the 12 inch gravity effluent pipeline shall be provided.

2.01.23 Install offset stakes for the 6 inch effluent force main extending from the Evaporation/Infiltration Pond Pump Station to Evaporation/Infiltration Pond Number 1. The offset stake distance shall be determined by the contractor. Stakes shall be placed at 25 feet on center, beginning and end points and angle points. Cut information to the flowline of the 6 inch effluent force main shall be provided.

2.01.24 Install offset stakes for the 8 inch pump station gravity overflow pipeline extending from the Evaporation/Infiltration Pond Pump Station to Evaporation/Infiltration Pond Number 1. The offset stake distance shall be determined by the contractor. Stakes shall be placed at 25 feet on center, beginning and end points and angle points. Cut information to the flowline of the 8 inch gravity overflow pipeline shall be provided.

2.01.25 Install exterior toe of slope hubs at an offset distance determined by the contractor around the Emergency Wastewater Storage Pond. The offset hubs shall be established at 50 foot on center and at all corners. Two in-line hubs shall be established at each corner. Cut and Fill slope information to finish exterior toe of slope, top of the Emergency Wastewater Storage Pond Access Roadway interior and exterior edges and toe of the interior bottom slope of the Emergency Wastewater Storage Pond shall be provided.

After the wastewater storage pond bottom rough excavation work is completed, bluetop hubs shall be established across a 50 foot x 50 foot grid across the bottom of the wastewater storage pond bottom for the finish grading of the wastewater storage pond bottom. Bluetop stakes shall also be placed at the wastewater storage pond interior toe of slope along the extended 50 foot x 50 foot grid lines.

2.01.26 Install exterior toe of slope hubs at an offset distance determined by the contractor around the Sludge Containment Basin. The offset hubs shall be established at 50 foot on center and at all corners. Two in-line hubs shall be established at each corner. Cut and Fill slope information to finish exterior toe of slope, top of the Sludge Containment Basin Access Road interior and exterior edges and toe of the interior bottom slope of the Sludge Containment Basin shall be provided.

After the Sludge Containment Basin bottom rough excavation work is completed, bluetop hubs shall be established across a 50 foot x 50 foot grid across the bottom of the Sludge Containment Basin bottom for the finish grading of the Sludge Containment Basin pond bottom. Bluetop stakes shall also be placed at the Sludge Containment Basin interior toe of slope along the extended 50 foot x 50 foot grid lines.

2.01.27 Place Chlorination/Dechlorination Basin exterior toe of slope hubs at 15 feet on center. See plan sheet 6. The toe of slope hubs shall be installed at an offset distance from the toe of slope determined by the contractor. Also install toe of slope offset stakes at all corners, B.C.s, E.C.'s and at every 15 foot along curves and at beginning and end points. Provide cut and fill slope staking information to the design toe and top of slope around the Chlorination/Dechlorination Basin perimeter.

After the rough grade top of slope and plateau area grading is completed in the Chlorination/Dechlorination Basin area, as illustrated on plan sheet 6, install blue top hubs with stake chasers on a 10 foot x 10 foot grid across the Chlorination/Dechlorination Basin plateau for the finish grading of the Chlorination/Dechlorination Basin plateau area. Bluetop hubs shall also be placed where the 10 foot x 10 foot grid lines intersect the top of slope.

**END OF SECTION 01722**

**SECTION 01730 - OPERATION AND MAINTENANCE MANUALS**

PART 1 - GENERAL

1.01 DESCRIPTION

The Contractor shall furnish to the Owner's representative six (6) identical sets of operation, maintenance, and technical manuals. The Contractor shall include in the manuals for each item of mechanical, electrical and instrumentation equipment the following:

1. Complete operating instructions, including recommended troubleshooting and start-up procedures; tabulation of proper settings for all pressure relief valves, pressure switches and other related equipment protection devices; detailed test procedures to determine performance efficiency of equipment; list of all electrical relay settings including alarm and contact settings.
2. Preventive maintenance procedures and schedules, including required lubricants, filters, adjustments, and special tools.
3. Parts lists, by generic title and identification number, complete with exploded views of each assembly. Spare parts information shall be included for each mechanical, electrical and instrumentation equipment. The spare parts list shall include the current list price of each spare part. The spare parts list shall be limited to those spare parts which each manufacturer recommends be maintained by the Owner in inventory at the plant site. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet for spare parts to facilitate the Owner in ordering.
4. Disassembly and reassembly instructions, including required special tools.
5. Record drawings including diagrams and schematics as required under the electrical and instrumentation portions of these specifications.

1.02 OPERATIONS AND MAINTENANCE MANUALS

A. General:

1. The "Operating and Maintenance Manual" is a bound compilation of drawings and data required for each project. These manuals, complete with drawings and data, shall be furnished to the Owner.
2. The Contractor has overall responsibility to obtain the necessary data from and compile the data as set forth in this specification, including items or equipment purchased by the Owner and delivered to the Contractor for installation.
3. The number of binders (or "volumes") required for each individual project will depend on the amount of information to be catalogued.
4. All information included shall be legible and sufficiently marked to indicate the exact size, model, type, etc., of equipment furnished and installed.

B. Purpose: The Operating and Maintenance Manual is prepared to provide a ready reference to all important mechanical, electrical, and instrumental equipment components installed at the project. It is also to provide the necessary operating and maintenance data for use by service personnel. It is also to provide information required for checking equipment performance or for planning of plant expansion or redesign.

- C. Quantity and Preparation (Submit through Owner's representative):
1. Operation and Maintenance Manuals shall be prepared for the project.
    - A. Three (3) sets to the Owner's representative.
    - B. Three (3) sets to Owner.
  2. The quantities of drawings, manufacturer's literature, or other data required for these manuals are in addition to those otherwise required for normal distribution for approval during the construction period.

PART 2 - MATERIALS AND METHODS

2.01 PAGE SIZE

- A. All pages shall be standard 8-½ x 11 inches size or approximate multiples (preferably 11 x 17 inches) folded to 8-½ x 11-inch manila pockets, which shall have standard three-ring side punching for insertion in the binders. The equipment name, drawing description and number shall be written on the face of each manila pocket.

2.02 DRAWINGS

- A. All drawings larger than 8-½ x 11" shall be folded and inserted in individual 8-½" x 11" manila pockets, which shall have standard three-ring side punching for insertion in the binders. The equipment name, drawing description and number shall be written on the face of each manila pocket.

2.03 BINDERS

- A. Binders shall be Buckram binders with block lettering for sheet size 8-½ x 11 inches with 2" to 3-½" expandable metal capacity as required for the project. The number of binders, however, shall be based on not filling them beyond 4".
- B. The following information shall appear on the front cover and backbone:
  1. "Operation and Maintenance Manual"
  2. Project Name (Holtville Water System Improvement Project) and volume number if more than one volume
  3. Owner's name
  4. Owner's representative's name
  5. General Contractor's name (need not be printed on the backbone)

2.04 CONTENTS AND INDEXING

- A. Manuals shall contain descriptions of the plant systems in sufficient detail to adequately indicate the type of systems installed and the basic details of their operation.
- B. All purchased equipment data shall be used to designate the sections. Within each section additional indexing of component parts may be required.

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- C. Operation and Maintenance Manuals shall contain to the fullest extent all possible information pertinent to the equipment. The arrangement and type of information to be filed shall be as follows:
1. Copy of purchase order change (if any).
  2. Outline drawings, special construction details, "as built" electrical wiring and control diagrams for all major and supplementary systems.
  3. Manufacturer's test or calculated performance data and certified test curves.
  4. Installation, operating and maintenance instructions, including a complete parts list and sectional drawing with parts identification numbers. Mark with model, size and plan number.
  5. Manufacturer's brochure marked to indicate exact equipment purchased. Brochures on component parts supplied by a manufacturer with his equipment, but not manufactured directly by him, shall also be included.
  6. The serial numbers of each item of equipment installed are to be listed with the model numbers and plan symbols.
  7. Written warranties.
  8. Include a Table of Contents. The contents shall be divided with tabbed index dividers into the following suggested parts:
    - Part I Treatment Plant and System Descriptions
    - Part II Purchased Equipment Data
    - Part III Test Reports and Valve Charts
    - Part IV Start-Up and Operation
    - Part V Preventative Maintenance Recommendations
  9. A copy of the approved submittals for each piece of equipment.
  10. A copy of all testing, adjusting and balancing reports.
  11. Wiring diagrams marked with model and size and plan symbol.
  12. Operating and Maintenance Manuals data for Part I shall be obtained directly from the mechanical and electrical consultants. (All consultant preparation cost.)
  13. The index shall contain the name and address of the manufacturer and, if different, where replacement and repair parts may be obtained.

2.05 EQUIPMENT SUMMARY DATA FORMS INFORMATION SHEET

Equipment Summary Data Forms are intended to provide the Maintenance Department with sufficient information to catalogue newly purchased equipment items installed at the project site. This information is used for inventory purposes as well as for equipment performance tracking purposes. Each item of equipment installed at the facility must be documented on Equipment

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Summary Data Form. Examples of the form are herein. Additional requirements regarding submittal format, quantities, etc, are found elsewhere in this Specification.

1. Equipment item (included industry-accepted nomenclature).
2. Manufacturer address, phone/fax numbers
3. Supplier address (if different than above), phone/fax numbers
4. Equipment serial and model numbers
5. Size
6. Capacity
7. Rated output
8. Drive motor data (as appropriate).

In addition, information specific to the item described shall be provided as indicated on the following form.

**EQUIPMENT SUMMARY  
DATA FORM**

**EQUIPMENT ITEM:** \_\_\_\_\_

**EQUIPMENT COST:** \_\_\_\_\_

**EQUIPMENT SUPPLIER:** \_\_\_\_\_

<b>COMPONENT INFORMATION:</b>	
<b>NAMEPLATE DATE:</b>	<b>MANUFACTURER:</b>
<b>EQUIPMENT MODEL NO.:</b>	<b>EQUIPMENT SERIAL NO.:</b>
<b>EQUIPMENT MODEL DESIGNATION:</b>	<b>TYPE:</b>
<b>SIZE:</b>	<b>RATED OUTPUT:</b>
<b>CAPACITY:</b>	<b>SERVICE:</b>
<b>COMPONENT INFORMATION: DRIVE MOTOR DATA</b>	
<b>MANUFACTURER:</b>	
<b>SERIAL NO.:</b>	<b>HORSEPOWER:</b>
<b>MODEL:</b>	<b>FRAME:</b>
<b>TYPE:</b>	<b>VOLTAGE:</b>
<b>ENCLOSURE:</b>	<b>AMPERAGE:</b>

<b>PHASE:</b>	<b>HERTZ:</b>	<b>SERVICE FACTOR:</b>
<b>LUBRICATION REQUIREMENTS: MOTOR</b>		
<b>COMMENTS:</b>		

2.06 INFORMATION SHEET FOR EQUIPMENT MAINTENANCE SUMMARY FORMS

Equipment Maintenance Summary forms are intended to provide the Maintenance Division with information sufficient to properly diagnose (troubleshoot, repair, check-out, and return an item of equipment to service. Standard information contained in each Form shall be as follows:

In addition, Maintenance information required to troubleshoot, repair, and return electrical/electronic equipment to service (including set point, derivatives, etc.) shall be included as required. The Maintenance Summary Form attached in intended to serve as a (minimum) guide to the information required per item of equipment. Additional requirements regarding submittal format, quantities, etc. are found elsewhere in this Specification.

1. Equipment item (include industry-accepted nomenclature)
2. Manufacturer address, phone/fax numbers
3. Equipment serial number(s)
4. Weight of individual components (over 100 pounds)
5. Nameplate date (including voltage, horsepower, lubrication requirements, speed, etc.)
6. Manufacturer's local representative address, phone/fax numbers
7. Maintenance operation(s) required. Listing shall include (1) Maintenance Operation to be performed. (2) Frequency of said Maintenance Operation based on actual service conditions of installed equipment (i.e., type of duty, environmental factors). Reference shall be made to the appropriate section of the manufacturer's technical literature.
8. Lubricant list. List shall include a primary and two secondary manufacturer-approved lubricants.
9. Spare parts required for a minimum of one (1) year of equipment operation based on anticipated actual service conditions. Also the name, address, and phone number of the recommended source of spare parts shall be included if different than manufacturer's representative.

**TYPICAL MAINTENANCE SUMMARY FORM**

**NOTE:** SUPPLEMENTARY INFORMATION SHALL BE INCLUDED AS APPROPRIATE

1. EQUIPMENT ITEM: \_\_\_\_\_
2. MANUFACTURER: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 TELEPHONE NO.: \_\_\_\_\_ FAX NO.: \_\_\_\_\_
3. EQUIPMENT SERIAL/IDENTIFICATION NUMBERS: \_\_\_\_\_
4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS): \_\_\_\_\_
5. NAMEPLATE DATA: \_\_\_\_\_
6. MANUFACTURER'S LOCAL REPRESENTATIVE: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 TELEPHONE NO.: \_\_\_\_\_  
 FAX NO.: \_\_\_\_\_
7. MAINTENANCE OPERATION(S) REQUIRED: (attach separate sheet if required).

<u>OPERATION</u>	<u>FREQUENCY</u>	<u>COMMENTS</u>

8. LUBRICANT LIST. Provide Reference symbol used in items recommended.

SHELL	STANDARD OIL	GULF	ARCO	EQUAL

9. RECOMMENDED SPARE PARTS LISTS FOR MINIMUM OF ONE (1) YEAR UNINTERRUPTED SERVICE. (Attach separate sheet if required).

ITEM	PART NO.	QUANTITY REQUIRED (per unit)	UNIT COST	COMMENTS

**END OF SECTION 01730**

**SECTION 01783 – AS-BUILT DRAWINGS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. As-Builts are full size drawings (Plans) and Record Project Manual which are marked up during construction to delineate the actual in-place constructed conditions. As-Builts shall be provided by the Contractor for this Project. Requirements for As-Builts, as specified elsewhere, shall supplement the requirements specified herein.
- B. As-Builts shall include all changes in the Plans including those issued as Change Orders, Plan Clarifications, Addenda, Notice to Bidders, responses to Request for Information, Project Site Memos, and any additional details needed for the construction of the Project but not shown on the Plans. Any substructures encountered while excavating that are left in place shall be located by survey, to the satisfaction of the Engineer, shown, and identified on the As-Builts. All substructures including, but not limited to, concrete structures, electrical conduit and duct banks, drains and sanitary sewer pipelines, process piping, water lines, etc, whose installed location differs from that shown on the original Plans shall be precisely located by survey to the satisfaction of the Engineer and recorded on the As-Builts before backfilling.
- C. As-Builts shall be marked with red ink or chemical fluid on one (1) set of full-size prints to produce a record of the complete installation. Any additional drawings that may be required to indicate record conditions shall be prepared on 24" x 36" paper. All additions to the plans shall employ and use drafting standards which are consistent with the drafting standards used in the Contract.
- D. The As-Builts, including those of all Subcontractors, shall be kept by the Contractor in the Contractor's Project Site Office, shall be updated during construction, and shall be available for the Engineer's inspection and copying at all times. The Engineer will review the As-Builts prior to submittal of all Monthly Payment Requests. If, in the opinion of the Engineer, the As-Builts are not current, approval of the Monthly Payment may be withheld until the drawings are made current.
- E. Where the Plans are diagrammatic or lacking precise details, the Contractor shall produce dimensioned full-size sheets as the As-Builts. For installations outside of the structures, the locations shall be given by coordinates and elevations. Where substructures are encased in concrete, the outside dimensions of the encasement shall also be given.
- F. In the case of those Drawings which depict the detail requirements for equipment to be assembled and wired in the factory, the As-Builts shall be updated by indicating those portions which are superseded by final Shop Drawings and by including appropriate reference information describing the Shop Drawings by manufacturer, drawing and revision numbers.
- G. At the Completion of the Work and after Final Inspection, the Contractor shall copy As-Built data, using red ink, onto a new set of Plans provided by the Owner. The Contractor shall certify to the completeness and accuracy of the "as installed" information indicated on the new set of Plans with its signature. The Contractor shall then deliver as a submittal to the Engineer, for review and approval, both the field developed As-Built Plans and the final signed As-Built Plans as a condition precedent to the Owner's release of any retained funds.

**END OF SECTION**

**SECTION 02050 - DEMOLITION AND SALVAGE**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide demolition and removal of existing structural materials, vegetation, exterior fencing, utility facilities, miscellaneous equipment, and facilities within the property boundary of project site in accordance with the requirements of the Contract Documents and as illustrated on the Improvement Plans.

Bidders shall examine the project site thoroughly during the bidding phase to verify the existing facilities to be demolished. Bidders shall immediately notify the Owner if there are any discrepancies between the site conditions and the demolition items to be removed and disposed of by the Contractor, as illustrated on the Improvement Plans. All remaining demolition items not struck through with a line on the Improvement Plans shall be completed by the Contractor.

The demolition operations of the existing structures include a complete demolition of the supporting foundation such as concrete footings, columns and beams, etc. on which the existing structures are mounted on.

- B. The Contractor shall repair or replace, without cost to the Owner and to the satisfaction of the Engineer, existing facilities disturbed or damaged during demolition and removal operations.
- C. Immediately upon removal of demolition items, the Contractor shall legally dispose of demolished items not to be salvaged. Demolished items not to be salvaged shall be removed from the Site within two (2) calendar days of the commencement of demolition activities. *Unless noted in the Plans, the Owner reserves the right to salvage any of the existing material or equipment. The Contractor, upon being notified by the Engineer, shall salvage and relocate to an Owner-designated, on-site storage area any materials or equipment the Owner desires to keep. The cost of the removal and relocation of the items shall be included in the contract price.* No demolished items shall be sold while on the Owner's property.

**END OF SECTION**

**SECTION 02140 - DEWATERING**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Design, furnish, install, maintain, operate and remove complete temporary dewatering system(s) as required to lower and control water levels and hydrostatic pressures during construction and dispose of pumped water.
- B. Obtain necessary permits from governing agencies for the discharge or disposal of the dewatering water.
  - 1. Prior to construction, the Contractor shall obtain a permit from the Regional Water Quality Control Board for dewatering activities. The permit may be conditioned to protect the water quality in the project vicinity. These conditions may include treatment, discharge sampling, monitoring and reporting.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330 – Submittals / Shop Drawings
- B. Section 01520 – Temporary Facilities
- C. Section 02150 – Sheeting, Shoring, and Bracing
- D. Section 02221 – Trenching, Backfilling, and Compacting

1.03 SITE CONDITIONS

Ground water levels are expected to be within ten (10) feet of the existing surface grade.

The Contractor shall engage the services for a Geotechnical firm to provide the level of the ground water at or near the pump lift station. The Geotechnical firm shall perform any additional testing necessary to evaluate engineering properties for the design of a dewatering system, if applicable.

1.04 DEFINITIONS

Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the faces or bottom of the excavation.

1.05 QUALITY ASSURANCE

Before dewatering is commenced, the Contractor shall obtain the acceptance of the Engineer for the method, installation and details of the dewatering system that is proposed to be used. To that end, the Contractor shall submit to the Engineer plans setting forth the details of the proposed dewatering systems. The dewatering system plans shall be in sufficient detail to indicate sizes of pumps, piping, appurtenances, the ultimate disposal point for water and to permit the Engineer to judge the overall completeness and effectiveness of the proposed system.

The control of groundwater shall be such that softening of the bottom of excavations, or formation of “quick” conditions or “boils”, do not occur. Dewatering systems shall be designed and operated so as to prevent removal of the natural soils.

The Contractor shall select the particular method of dewatering to be employed.

1.06 DEWATERING SUBMITTALS

- A. At least thirty (30) days prior to installation of the dewatering system, submit six (6) copies of working informational and scheduling drawings and the following design data:
1. The proposed type of dewatering system, including relief of hydrostatic head and maintenance of the excavations in a dewatered and in a hydrostatically relieved condition.
  2. Arrangement, location and depths of the components of the system.
  3. A complete description of equipment to be used with installation, operation, and maintenance procedures.
  4. Standby equipment and emergency power supply.
  5. Location and size of sumps and discharge lines, including their relation to water disposal sites.
  6. Types and sizes of filters.
  7. Location, types and depths of wells and/or well points and observation wells.
  8. Proposed locations of observation wells.
  9. Design calculations demonstrating adequacy of the selected system and equipment.
  10. Coordination with earth support system design and excavation operations.
- B. Review of dewatering and recharge system by the Engineer shall not relieve the Contractor from the responsibility for the adequacy of these systems to achieve the specified results.

PART 2 - PRODUCTS

2.01 GENERAL

The Contractor shall furnish, install, operate and maintain all machinery, appliances, and equipment to maintain all excavations free from water during construction, and shall dewater and dispose of the water so as not to cause injury to public or private property, or to cause a nuisance or menace to the public.

The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent which would cause damage or endanger adjacent structures.

The static water level shall be drawn down a minimum of three feet (3') below the bottom of the excavation in order to maintain the undisturbed state of the foundation soils and to facilitate the placement of fill or backfill compacted to the required density.

2.02 SUMP PUMPING

Sumps shall be no deeper than four feet (4') and shall be at the low point of excavation. Excavation shall be graded to drain to the sumps.

2.03 WELL POINTS

The annular space between the pipe and the borehole of the well point shall be sealed near the top of the well point to prevent vacuum leaks. Installation shall be carried out in such a way so as not to excessively disturb in situ material.

2.04 DEEP WELLS

Deep wells shall be cased with PVC, steel, or other suitable casing material. The casing shall have a perforated section at the water producing zone. The annular zone between the casing and the borehole may be gravel packed. Installation shall be carried out by any acceptable method.

2.05 VERTICAL SAND DRAINS

Vertical sand drains shall be installed with minimum disturbance to in situ material.

PART 3 - EXECUTION

3.01 GENERAL

One hundred percent (100%) standby pumping capacity shall be available on site at all times and shall be connected to the dewatering system piping to permit immediate use. In addition, standby ancillary equipment and appliances for all ordinary emergencies, and competent workmen for operation and maintenance of all dewatering equipment shall be on site at all times. Standby equipment shall include emergency power generation and automatic switchover to the emergency generator when normal power fails.

Dewatering systems shall not be shut down between shifts, on holidays, on weekends, or during work stoppages.

The Contractor shall control surface water to prevent entry into excavations.

At each excavation, a minimum of four (4) temporary observation wells (piezometers) shall be provided to continuously monitor the groundwater level.

3.02 DRAINAGE OF EXCAVATED AREAS

- A. Collect surface water and seepage which may enter the excavation and divert the water into a sump so that it can be drained or pumped.
- B. Install settling basins or other approved apparatus as required to reduce the amount of fine particles which may be carried by water diverted into the discharge line.
- C. Backfill sumps and settling basins when no longer required with granular material, concrete or other material as approved by the Engineer.

3.03 DISPOSAL

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- A. Dispose of all water in accordance with applicable provisions of all Federal, State, and local regulatory boards having jurisdiction over water discharges. Water containing soil, silt or chemical contaminants shall not be discharged into natural watercourses, municipal drains or sewers.
- B. The Contractor shall obtain the necessary discharge permits from the Regional Water Quality Control Board for proposed ground water dewatering discharges.
- C. The Contractor shall submit to the Engineer copies of all permits obtained for the discharge or disposal of dewatering water. Copies of the permits shall be maintained on the Site at all times.
- D. The Contractor shall be familiar with and shall conform to the requirements of the General Waste Discharge Requirements as they relate to the quantity, quality, testing, reporting, and all other aspects of construction dewatering discharges. The Contractor shall perform all construction dewatering disposal in accordance with the provisions of the General Waste Discharge Requirements.

**END OF SECTION 02140**

**SECTION 02150 - SHEETING, SHORING AND BRACING**

PART 1 - GENERAL

1.01 DESCRIPTION

This section provides requirements for sheeting, shoring, bracing, wales, posts, piling, anchorages and fastenings or other excavation supports, both temporary or permanent, for accomplishment and protection of Work.

1.02 QUALITY ASSURANCE

A. Design Requirements:

In accordance with Section 6500 and Section 6705 of the Labor Code, the Contractor is required to obtain a permit, for the excavation of trench which is five feet (5') or more in depth and into which a person is required to descend, from the Division of Industrial Safety.

The Contractor shall furnish all labor, equipment and materials required to design, construct and remove all sheeting, shoring and bracing or other equivalent method of support for the walls of open excavations required for the construction of this project.

Excavation of any trench, pad area, foundation area, or structure five feet (5') or more in depth shall not commence until the Contractor has received approval from the Engineer of the Contractor's detailed plan for worker protection from the hazards of trench or soil wall collapse/failure.

Such plan shall be submitted at least five (5) days before the Contractor intends to begin excavation and shall show the details of the design of shoring, bracing, sloping or other provisions to be made for worker protection during such excavation. No such plan shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety. The plan shall be prepared and signed by an engineer who is registered as a Civil or Structural Engineer in the State of California.

Prior to the beginning of excavations requiring shoring, the Contractor shall designate in writing to the Engineer, the person responsible to supervise the project safety measures and the person responsible to supervise the installation and removal of sheeting, shoring and bracing.

In addition to shoring the excavations in accordance with minimum requirements of the Industrial Safety Orders, it shall be the Contractor's responsibility to provide any and all additional shoring required to support the sides of the excavation against the effects of loads which may exceed those derived by using the criteria set forth in the Industrial Safety Orders. The Contractor shall be solely responsible for any damages which may result from his failure to provide adequate shoring to support the excavation under any or all of the conditions of grading which may exist, or which may arise during the construction of the project.

B. Material Standards:

Furnish lumber for shores, wales, and sheeting of grading required by the American Lumber Standards for the particular application.

1.03 SUBMITTALS

Contractor shall submit complete calculations of the sheeting system including sizing of sheeting wales, rakers, anchor system, struts, earth anchors, anchor piles, tie rods or any other components pertinent to the design prior to the start of any Work involving sheeting and bracing. All designs submitted shall be stamped and signed by an Engineer with a Civil or Structural designation with an active registration in the State of California.

1.04 JOB CONDITIONS

Buried debris may be found at some locations. Federal and local agency requirements for safety of job personnel and public will apply to work under the Section.

1.05 ALTERNATIVES

The use of application of alternative methods and materials, and the employment of proprietary systems under lease or franchise in lieu of that specified herein, may be allowed. Demonstration of suitability and compliance with these Specifications will be required. The application of alternative methods will be approved by the Engineer.

1.06 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03300 – Cast-In-Place Concrete

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber:

1. Temporary Shores, Wales and Sheeting: Furnish structural grade planks, beams and posts as defined and specified for stress-grade lumber in the American Lumber Standards. Lumber may be rough, untreated, in random lengths, and shall be of standard dimensions.
2. Permanent Sheeting: When permanent sheeting is called for on the Drawings, provide and install planks, beams, posts and timbers of unseasoned, rough, new southern yellow pine or Douglas Fir meeting the requirements of ASTM Standard D25, Class "C". In lieu of the above, lumber dressed to standard dimensions, dried and treated in accordance with Standard T-3 of the American Wood Preservers' Association may be utilized.

B. Fastenings:

Provide fastenings for permanent sheeting as recommended in the National Design Specification for stress-grade lumber and its fastening.

PART 3 - EXECUTION

3.01 INSTALLATION

Install sheeting and bracing for trench and structure excavation progressively as the removal of excavated material requires. Butt planks to exclude groundwater and fines, preventing the erosion of voids outside sheeting. In soft, wet ground drive sheeting to a lower level as excavation

progresses to that sheeting is embedded in undisturbed earth. Bracing sheet piling may be permitted to penetrate the structural concrete only as directed by the Owner. Refer to Section 03300 – Cast-in-Place Concrete. Install wales and struts at close intervals so as to prevent displacement of the surrounding earth and to maintain safe conditions in the Work area. Any damage proven to result from improper installations shall be the responsibility of the Contractor. Temporary sheeting for trench and structure excavation may be removed and reused. Withdraw individual planks alternately as the backfill is raised, maintaining sufficient sheeting and bracing to protect the Work and workmen. Remove bracing completely. Where unstable conditions occur in the underlying strata from any cause, and withdrawal of sheeting will endanger the Work, a portion of the sheeting, including bracing, may be left in place with the approval of the Owner. Remove all wood within a zone extending four feet (4') below finished grade. Leaving such material in place shall not be cause for an increase in the contract price. The use of horizontal strutting below the barrel of a pipe or the use of a pipe as support will not be permitted. Sheet piling and timbers in trench excavations shall be withdrawn in a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe. Trench sheeting below the top of the pipe shall be left in place.

**END OF SECTION 02150**

**SECTION 02200 - EARTHWORK**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Work of this Section includes all earthwork required for construction of the Work. Earthwork shall include, but not be limited to the loosening, removing, loading, transporting, depositing and compacting in its final location of all materials wet and dry, as required for the purposes of completing the work specified in the Contract Documents which shall include, but not be limited to: the sawcutting and removal of A.C. pavement, P.C.C. concrete and underlying material to a subbase design grade indicated on the Plans, the installation of subbase material to a subbase grade beneath A.C. pavement and concrete infrastructure, the excavation of pipeline trenches, the installation of backfill material within pipeline trenches, excavations for above-grade and below-grade structures, backfill requirements for material to be placed beneath above-grade and below-grade structures, backfill requirements for the areas surrounding above-grade and below-grade structures, backfilling of manholes and catch basins, construction of earth embankments, backfilling of depressed areas, abandoned ponds or depressed areas resultant from demolition, the disposal of excess excavated materials, borrow of materials to make up deficiencies for fills; and all other incidental earthwork, all in accordance with the requirements of the Contract Documents.

Principal work items included in this Section are:

1. Site preparation, clearing, and grubbing.
2. Preparation of fill areas.
3. Excavation and controlled fill construction.
4. Structural excavation and backfills.
5. Disposal of surplus and/or unsuitable materials.
6. Dust control and drainage control.
7. Grading
8. Clean-up.

1.02 REFERENCE STANDARDS

ASTM C 131	Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 75	Practice for Sampling Aggregates
ASTM D 422	Method for Particle-Size Analysis of Soils
ASTM D 698	Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49-kg) Rammer and 12-in (304.8-mm) Drop

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ASTM D 1556	Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	Test Method for Moisture-Density Relations of Soils Using Remmer and Drop
ASTM D 1682	Test Method for Breaking Load and Elongation of Textile Fabrics
ASTM D 2419	Test Method for Sand Equivalent Values of Soil and Fine Aggregate
ASTM D 2487	Classification of Soils for Engineering Purposes
ASTM D 2922	Test Method for Density of Soil in Places by Nuclear Methods (Shallow Depth)
ASTM D 3017	Test Method for Water Content of Soil and Rock in Place by Nuclear Methods
ASTM D 3776	Test Method for Mass Per Unit Area (Weight) of Woven Fabric
ASTM D 4253	Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Plate
ASTM D 4254	Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 4751	Test Method for Determining the Apparent Opening Size of a Geotextile
CAL-OSHA	Title 8 General Industry Safety Orders

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02150 - Sheeting, Shoring, and Bracing
- B. Section 02221 - Trenching, Backfilling, and Compacting
- C. Section 02640 - PVC Pipe
- D. Section 02726 - Manhole and Precast Vault Construction

1.04 DEFINITIONS

- A. Site: The property is owned by the Niland County Sanitary Sewer District. The site includes the Niland Wastewater Treatment Plant and New Evaporation Infiltration Pond Site.
- B. Controlled Fill: Compacted suitable fill material in all areas of the site requiring filling to grade as shown on the Plans.
- C. Structural Fill: Compacted suitable fill material which will support a structure or some part of a structure. This includes support material for P.C.C. structures and pads.

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- D. Structural Backfill: Compacted suitable material placed between the wall of a structure and construction excavation slope up to finished grade.
- E. Suitable Material: As specified herein shall be any material imported or excavated from the cut areas that is, in the opinion of the Engineer, suitable for use in constructing fills.
- F. Waste Excavation: Also Surplus Material. Material from project excavations which is not suitable for use in backfill or compacted fills or is in excess of that required to be used for backfill or to construct fills.
- G. Pipe Zone Backfill: Material suitable for placement below or surrounding the pipe to a given vertical distance above the pipe as required by the pipe section.
- H. Pipe Trench Backfill: Material suitable for placement from the pipe zone to finish grade or to pavement subbase material.

1.05 SITE INVESTIGATION

- A. Soil Investigation Report: A Geotechnical Report has been prepared for this project and is included in the Special Conditions Section of the Specifications.
- B. Contractor's Responsibility: The Contractor shall carefully examine the site and make all inspections necessary in order to determine the full extent of the work required to make the completed Work conform to the Plans and Specifications. The Contractor shall satisfy himself/herself as to the nature and location of the Work, conditions, the conditions of the existing ground surface, and the character of equipment and facilities needed prior to and during prosecution of the Work. The Contractor shall satisfy himself/herself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. The Contractor shall review water table conditions. Any inaccuracies or discrepancies between the actual field conditions and the Plans, or between the Plans and Specifications must be brought to the Engineer's attention in order to clarify the exact nature of the Work to be performed.
- C. Existing Elevations: All existing elevations illustrated on the Plans are approximate. The Contractor shall recognize and acknowledge the condition that the bid lump sum price shall include all earthwork activities irrespective of the possible localized difference in contour elevations and actual ground; and that there will be no additional compensation from the Owner for earthwork changes, engineering, or field staking in this regard.

1.06 SAFETY

The Contractor shall familiarize himself/herself with, and shall at all times conform to, the regulations of the "OSHA General Industry Occupational Safety and Health Standards", and "OSHA Safety and Health Regulations for Construction Safety Orders" and "Trench Construction Safety Orders" of the State of California, Department of Industrial Relations, Division of Occupational Health and Safety. A copy of these documents shall be kept on the job site.

1.07 ENVIRONMENTAL SAFEGUARDS AND REGULATIONS

The Contractor shall comply with regulations in force at all times to prevent pollution of air and water.

1.08 GEOTECHNICAL TESTING

*The Contractor is responsible to engage a qualified Geotechnical Engineer to perform the required earthwork geotechnical testing, inspection and observation as specified within the*

*contents of the Contract Documents. The cost for the geotechnical testing, inspection and observation services shall be borne by the Contractor. A copy of all tests and reports shall be forwarded to the Engineer within four (4) days after any specific service is conducted. The Contractor shall bear the cost of retest and re-inspection of re-worked material due to faulty work.*

1.09 STANDARDS FOR SOIL CLASSIFICATION, PROPERTIES AND TESTS

A. Earthwork and Embankment:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.
3. Compaction - Modified Proctor ASTM D 1557-91.

B. Backfill for Trench:

1. Classification - ASTM D 2487.
2. Compaction - Modified Proctor ASTM D 1557-91.
3. Field Density Test - ASTM 1556-82; D 2937-83, D 2922-81 (as approved by Engineer).

C. Structural Fill and Backfill:

1. Classification - ASTM D 2487.
2. Attenberg Limits - PlastiOwner Index and Liquid Limit ASTM D 4318.
3. Compaction - Modified Proctor ASTM D 1557-91.
4. Physical Properties - ASTM D 854, D 2216.
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

D. Controlled Fills:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.
3. Compaction - Modified Proctor ASTM D 1557-91.
4. CBR - ASTM D 1883 (R-Value - ASTM 2844).
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

E. Earth Embankments and Berms:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.

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3. Compaction - Modified Proctor ASTM D 1557-91
4. CBR - ASTM D 1883.
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

F. Borrow:

1. Classification - ASTM D 2487.
2. Other properties - as determined by requirements at point of use.

G. Pipe Trenches:

1. Classification - ASTM D 2487.
2. Physical Properties - ASTM D 854, D 2216.
3. Compaction - Modified Proctor ASTM D 1557-91.
4. CBR - ASTM D 1883.
5. Field Density Test - ASTM D 1556-82, D 2937-83, D 2922-81 (as approved by Engineer).

1.10 COMPACTION

The maximum dry density, optimum moisture content and field density of each soil type used in the controlled compacted fill shall be determined as stated in Section 1.09 above.

1.11 INSPECTION

Observation and compaction tests shall be obtained by the Geotechnical Engineer employed by the Contractor during the filling and compacting operations.

1.12 GUARANTEE

Work required by this Section shall be subject to the guarantee requirements stated in the Conditions of the Contract and included in the Performance/Maintenance Bond.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Controlled Fill Material: Materials for controlled fill shall consist of any material imported or excavated from the *cut areas* that, in the opinion of the Engineer, is appropriate for use in constructing fills. The material shall contain no rocks or hard lumps greater than 12 inches in size and shall contain at least 40 percent of material smaller than ¾-inch in size. Materials greater than 6 inches in size shall be placed by the Contractor in windrows on a clean, over excavated, or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (sand equivalent greater than 30) shall be

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placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversize material should be staggered so that successive strata of oversized material are not in the same vertical plane. No nesting or rocks shall be permitted. No material of a perishable, spongy, or otherwise of an improper nature shall be used in filling.

Material placed within 24 inches of rough grade shall be select material that contains no rocks or hard lumps greater than 6 inches in size and that swells less than 3 percent when compacted as hereinafter specified for compacted fill and when subjected to an axial pressure of 160 PSF, if not specified in the Geotechnical report.

Representative samples of material to be used for fill shall be tested in the laboratory by the Geotechnical Engineer engaged by the contractor in order to determine the maximum density, optimum moisture content, sand equivalent, and classification of the soil. In addition, the Geotechnical Engineer shall determine the approximate bearing value of a recompacted saturated sample by direct shear tests or other tests applicable to the particular soil. If different native materials to be used for fill exist throughout the project site, then a set of the prior noted tests shall be conducted for each different native material. The earth test results shall be forwarded to the engineer for review as submittal documents. Earthwork activities shall not commence until the native earth test submittal documents have been reviewed and approved by the Engineer. The contractor shall bear all expenses for the native earth tests. The costs of the native earth tests shall be incidental to the excavation cost for the project.

During grading operations, soil types other than those analyzed in the report of the soil investigation may be encountered by the Contractor. The contractor shall instruct the Geotechnical Engineer engaged by the contractor to perform tests on the other soil types per the previous paragraph. The Engineer and Design Geotechnical Engineer shall review the varying soil test results during the submittal review process and determine if any of the varying soils is unsuitable to use as fill. The Contractor shall bear the expenses of the Geotechnical investigation and testing.

- B. Structural Fill Material: Materials shall consist of crushed rocks, Class 2 Base, granular sand, decomposed granite, crusher fines, or fine gravel either imported or manufactured from excavated onsite rocky material.

The crushed aggregate, granular sand, decomposed granite (crusher fines) or fine gravel shall be uniformly graded. The following gradations shall apply:

1. Granular Sand:

Clean granular sand free of clay, shale and deleterious material. Sand shall be compacted to 95 percent of maximum density at optimum water content per ASTM D 1557 unless otherwise noted on the Plans. The material shall conform to a sand equivalent of 30 or greater. The maximum amount of material passing the Number 200 sieve shall be 5 percent. The sand shall conform to the following gradation percentages:

<u>SIEVE SIZE</u>	<u>GRANULAR SAND</u> <u>% PASSING</u>
3/8"	100
No. 4	98-90
No. 8	90-75
No. 10	75-60
No. 16	60-50

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No. 30	50-38
No. 40	38-29
No. 50	29-19
No. 100	19-7
No. 200	5-0

The Contractor shall supply a 5-gallon sample of sand material to the material testing laboratory within five (5) days after the Notice to Proceed is issued. The gradation, sand equivalent and maximum density of the sand material shall be determined. The test results shall be forwarded to the Engineer. The cost of testing shall be incurred by the Contractor. The gradation of the granular sand shall be determined and the test results forwarded to the Engineer prior to the delivery of the granular sand material to the Site. Prior to the placement of sand the native subbase grade shall be checked and approved by the Engineer.

Crusher fines shall be allowed to be utilized in lieu of sand if approved by the Engineer.

2. Crusher Fines:

Crusher fines shall consist of decomposed granite indigenous to the Imperial Valley. Crusher fines utilized for this project shall conform to the following gradation requirements:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
5/8"	100
No. 4	80-100
No. 8	50-85
No. 30	30-50
No. 200	4-15

The sand equivalent shall be 20 or greater.

The Contractor shall supply a five-gallon sample of crusher fines material to the material testing laboratory within five (5) days after the Notice to Proceed is issued. The Gradation and Maximum Density of the crusher fines material shall be determined. The test results shall be forwarded to the Engineer for approval prior to the delivery of the material to the Site. The cost of the testing shall be incurred by the Contractor.

3. Fine Gravel:

Clean fine gravel free of clay, shale, and deleterious material. Fine gravel shall be compacted with a plate compactor with one pass in maximum 1-foot lifts. Additional lifts shall not be added until previous lifts shall have been passed over by the plate compactor. The maximum amount of material passing the 1/4" Sieve shall be 2 percent. The fine gravel shall conform to the following gradation percentages:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
3/8"	100
1/4"	0-2

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The Contractor shall supply a five-gallon sample of fine gravel material to the material testing laboratory within five (5) days after the Notice to Proceed is issued. The Gradation and Maximum Density of the fine gravel material shall be determined. The test results shall be forwarded to the Engineer for approval prior to the delivery of the material to the Site. The cost of the testing shall be incurred by the Contractor.

4. Class 2 Base:

The Class 2 Base material shall conform to Caltrans Section 26, Latest Edition, for 25mm maximum base material. The gradation requirements are as follows:

<u>SIEVE SIZE</u>	<u>CLASS 2 BASE % PASSING</u>
1"	100
3/4"	87-100
No. 4	30-65
No. 30	5-35
No. 200	0-12

The sand equivalent shall be 25 or greater. An angular aggregate is to be used. Class 2 Base material shall be compacted to 95 percent of maximum density according to ASTM D 1557, unless otherwise noted on the Plans or Details. The tolerance for the Class 2 Base between design subgrade elevation and actual subgrade elevation as constructed in the field shall be plus or minus 0.02 feet as referenced from the design subgrade. Prior to the placement of Class 2 Base, the native subbase grade shall be checked and approved by the Engineer. The native subbase grade shall be within plus or minus 0.05 feet of native subbase design grade prior to the placement of Class 2 Base.

The Contractor shall supply a 5-gallon sample of the Class 2 Base to the material testing laboratory within four (4) days of the Notice to Proceed. The material shall be delivered to the testing laboratory to determine the maximum density, gradation, R-value, sand equivalent and durability index of the Class 2 Base. A copy of the test results shall be forwarded to the Engineer by the Geotechnical Consultant for review. The gradation of the Class 2 Base shall be determined and the test results forwarded to the Engineer for approval prior to the delivery of the Class 2 Base material to the Site. *Class 2 Base utilizing recycled materials shall not be allowed.*

- C. Structural Backfill Material: Structural Backfill Material shall consist of the same material listed with the Structural Fill Material item above.
- D. Special Crushed Rock Bedding and Structure Foundation: When groundwater is encountered in the excavation and/or where indicated on the Plans, the material in the bottom of the trench or excavation shall be removed to a depth directed by the Geotechnical Engineer and replaced with 3/4-inch maximum crushed rock bedding or 1" round rock bedding. The rock beddings shall be installed and compacted per these Specifications. The 3/4-inch maximum crushed rock and 1" round rock materials shall be approved by the Geotechnical Engineer before use.

The bottom and sidewalls of the trench shall be covered with a geotextile. The geotextile fabric shall extend to the top of the pipe zone material on both sides of the trench excavation, and cover the top of the crushed rock and or 1-inch round rock.

1. 3/4-Inch Maximum Crushed Rock

Crushed rock shall be the product of crushing rock or gravel. Fifty percent (50%) of the particles by weight retained on a 3/8-inch sieve shall have their entire surface area composed of faces resulting from fracture due to mechanical crushing. Not over 5% shall be particles that show no faces resulting from crushing. Less than 10% of the particles that pass the 3/8-inch sieve and are retained on the No. 4 sieve shall be waterworn particles. Gravel shall not be added to the crushed rock. Crushed rock (3/4") shall have the following gradation:

<u>SIEVE SIZES</u>	<u>3/4-INCH MAX. CRUSHED ROCK % PASSING</u>
1"	100
3/4"	90-100
1/2"	30-60
3/8"	0-20
No. 4	0-5
No. 8	-

The 3/4-inch maximum crushed rock shall be compacted with a plate compactor in one pass in maximum 1 foot lifts. Additional lifts shall not be added until previous lifts shall have been passed over by the plate compactor.

The Contractor shall supply a five-gallon sample of the 3/4-inch maximum crushed rock material to the material testing laboratory within four (4) days of the Notice to Proceed. The Gradation and Sand Equivalent of the crushed rock shall be determined. The tests results shall be forwarded to the Engineer for approval prior to the delivery of the material to the Site. The cost of the testing shall be incurred by the Contractor.

2. 1" Round Rock

The 1-inch round rock material shall conform to the following gradation requirements:

<u>SIEVE SIZES</u>	<u>1-INCH ROUND ROCK % PASSING</u>
1-1/2"	100
1"	96
3/4"	79
1/2"	25
3/8"	1

The 1-inch round rock shall be compacted with a plate compactor in one pass in maximum 1 foot lifts. Additional lifts shall not be added until previous lifts shall have been passed over by the plate compactor.

The Contractor shall supply a five-gallon sample of the 1-inch round rock material to the material testing laboratory within four (4) days of the Notice to Proceed. The Gradation of the round rock shall be determined. The tests results shall be forwarded to the Engineer for approval prior to the delivery

of the material to the Site. The cost of the testing shall be incurred by the Contractor.

### PART 3 - EXECUTION

#### 3.01 GENERAL

The Work performed under this Specification shall be constructed to the lines, grades, elevations, slopes and cross-sections indicated on the Plans, specified herein, and/or directed by the Owner. Slopes, graded surfaces, and drainage features shall present a neat uniform appearance upon completion of the Work.

It shall be the Contractor's responsibility (1) to maintain adequate safety measures and working conditions; and (2) to take all measures necessary during the performance of the Work to protect the entire project area and adjacent properties which would be affected by this Work from storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, until final acceptance by the Owner. It shall be the Contractor's responsibility to maintain completed areas until the entire project area is in satisfactory compliance with the job specification.

Utility lines and structures indicated on the Plans which are to remain in service shall be protected by the Contractor from any damage as a result of his/her operation. Where utility lines or structures not shown on the Plans are encountered, the Contractor shall report them to the Owner before proceeding with the Work. The Contractor shall bear the cost of repair or replacement of any utility lines or structures which are broken or damaged by his/her operations.

#### 3.02 REMOVALS, CLEARING AND GRUBBING

- A. Clearing: Clearing consists of the complete removal of objectionable materials and obstructions above and below the ground surface including tree stumps, brush, grass, vegetative matter and other objectionable materials within the project limits. All brush and organic material shall be removed before placing any earth fills. It shall be the Contractor's responsibility to save and protect all trees that lie outside the construction area.
- B. Grubbing: Grubbing consists of the complete removal of stumps, including tap roots or lateral roots 1-1/2 inches or more in diameter, and the removal of brush, grass or weeds to depths below the natural ground as specified herein. Stumps shall be grubbed to a depth of 3 feet and grass or weeds shall be grubbed to a depth of 6 inches below the natural ground surface, or to the depths as determined in the field by the Engineer at the time of construction.
- C. Protection: Existing items not designated to be demolished or removed shall be protected from damage. Any such item damaged by the Contractor shall be restored or replaced immediately at the Contractor's expense.
- D. Debris and Waste Material: All debris and waste material resulting from demolition, clearing and grubbing shall be removed from the site and disposed of by the Contractor.

#### 3.03 DUST CONTROL

The Contractor shall take all steps possible to prevent and reduce dust arising from the construction activity. Section 01560 Project Environmental Controls elaborates on dust control requirements.

#### 3.04 CARE OF DRAINAGE WATER

Contractor shall take care of drainage water from the construction operations, and of stormwater and/or wastewater reaching the construction area from any source, so that damage is not incurred to the excavation, pipe, or structures. The Contractor shall be responsible for any damages to persons or property on or off the Site due to such drainage water or to the interruption or diversion of such stormwater or wastewater on account of his/her operation.

Such grading shall be done as may be necessary to prevent surface water from flowing into excavations, and any water accumulating therein shall be removed by pumping or by other reviewed methods.

Protection of the site during construction shall be the responsibility of the Contractor. Completion of a portion of the project shall not preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete.

3.05 EXCAVATION

- A. General: The Contractor shall perform all excavation necessary or required as illustrated on the Plans. The excavation shall include the removal and disposal of all earth materials of whatever nature encountered, which shall include both rock excavation and common excavation when both are present, and shall include the furnishing, placing, and maintaining of shoring and bracing necessary to safely support the sides of the excavations. See Technical Specifications Section 02150 Sheeting, Shoring, and Bracing.
- B. Excavation for Structures: Structure excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the Work. The removal of such materials shall conform to the lines and grades shown on the Plans and/or herein specified. Temporary structure excavations shall at all times conform to the Requirements of the State of California, Division of Occupational Health and Safety, and pertinent requirements contained in referenced Geotechnical Investigation Report and Specification Section 02150 - Sheeting, Shoring and Bracing.

Continuous wall and isolated footings shall be underlain by a minimum compacted controlled fill thickness to a minimum 1.5 times the footing width or greater if indicated in the referenced Geotechnical Investigation Report or as required by the Plans. This zone of over-excavation, scarification, and recompaction shall extend a minimum of five feet (5') beyond the footing lines unless otherwise illustrated on the Plans. Exposed native surface shall be scarified, brought to optimum moisture content, and compacted to a minimum of 95 percent relative compaction if required by the Geotechnical Investigation Report or the Plans.

All surfaces to receive concrete slabs-on-grade shall be underlain by a minimum compacted controlled fill thickness of 18 inches or greater if indicated in the referenced Geotechnical Investigation Report or as required by the Plans. This shall be accomplished by combination of over-excavation and recompaction to 95% of relative compaction or as required by the Geotechnical Investigation Report or as required by the Plans.

Contingent upon locations, all surfaces to receive compacted fill shall be scarified, brought to near optimum moisture content, and compacted to required percentage of relative compaction as specified herein unless otherwise indicated on the Plans.

Rough grade excavations for structures and footings will be inspected by the Geotechnical Engineer to verify that the excavations extend into satisfactory soils and are free of loose and disturbed materials.

Foundation for tanks, pump vaults or subsurface chambers shall have structural fill material extending 12 inches, minimum, below the structural base slab to native material, which has been scarified and compacted to 95% relative compaction unless otherwise indicated on the Plans.

3.06 CONTROLLED FILL

- A. General: Controlled fill shall consist of native material, granular sand, Class 2 Base, crusher fines or other material as indicated on the Plans. The subbase grade shall be excavated to within plus or minus 0.05 feet of design grade prior to the placement of controlled fill. The design subbase grade shall be field verified and approved by the Engineer prior to the placement of the controlled fill material. The Engineer shall determine the number and location of points to check for the subbase grade elevation compliance. Prior to the Engineer's inspection of the subbase grade, the Contractor shall establish bluetop stakes on a 20-foot by 20-foot grid across the area controlled fill is to be placed.

If the controlled fill consists of native material it shall be placed in maximum 1-foot lifts and compacted to 90 percent of maximum density at optimum water content per ASTM D 1557 unless required otherwise on the plans. Additional native soil lifts shall not be placed until previous lifts have attained the specified compaction requirement and are approved by both the on-site geotechnical representative and the Engineer.

Granular sand, Class 2 Base and crusher fine controlled fill material shall be placed in maximum 8-inch lifts and compacted to 95 percent of maximum density at optimum water content per ASTM D 1557 unless required otherwise on the plans. Additional granular sand, Class 2 Base or crusher fine lifts shall not be placed until previous lifts have attained the specified compaction requirement and are approved by both the on-site geotechnical representative and the Engineer.

- B. Preparing Areas To Be Filled: All vegetation and objectionable material shall be removed by the Contractor from the surface upon which the fill is to be placed and any loose and porous soils shall be removed or compacted to a depth specified by the Geotechnical Engineer. The surface shall then be plowed or scarified to a minimum depth of 6 inches until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal:vertical), horizontal keys and vertical benches shall be excavated into the adjacent slope area. Keying and benching shall be sufficient to provide at least 6-foot wide benches and a minimum of 4 feet vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill shall be placed in an area subsequent to keying and benching until the area has been reviewed by the Geotechnical Engineer. Material generated by the benching operation shall be moved sufficiently away from the bench area to allow for the review of the horizontal bench prior to placement of fill.

After the foundation for the fill has been cleared, plowed or scarified, it shall be disced or bladed by the Contractor until it is uniform and free from large clods, brought to the proper moisture content and compacted as specified.

- C. Placing, Spreading and Compacting Fill Material: The fill material shall be placed by the Contractor in thin layers that when compacted shall not exceed 8 inches for granular sand, Class 2 Base and crusher fines and 12 inches deep for native material unless required otherwise on the plans. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.

When the moisture content of the fill material is below that required by the Geotechnical Engineer, water shall be added by the Contractor until the moisture content is as required for the specified compaction.

When the moisture content of the fill material is above that required by the Geotechnical Engineer, the fill material shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the moisture content is as required for the specified compaction.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to the specified density. Compaction shall be accomplished by sheepsfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers or other types of acceptable compacting equipment. Equipment shall be of such design that it shall be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes over the material to ensure that the desired density has been obtained.

Compacted fill slopes shall be overbuilt and cut back to grade, exposing the firm, compacted inner core. The slopes shall be overbuilt a minimum of five feet (5') or as otherwise required on the plans. If the desired compaction is not achieved, the existing slope shall be overexcavated and reconstructed. The amount of overbuilding shall be increased until the desired compaction is achieved on the slope. The Contractor shall provide thorough mechanical compaction to the outer edge of the overbuilt slope surface. There shall be no excessive loose soil on the slopes.

The Contractor shall provide and maintain adequate erosion control facilities during the construction of the fill areas. The erosion control facilities shall be maintained in optimum condition until the permanent drainage system and vegetation is complete. The facilities shall be inspected following significant rainfall, repairs made and excess sediment removed. It shall be the Contractor's responsibility to prevent the discharge of sediment off-site or to adjacent watercourses.

3.07. STRUCTURE FILL AND STRUCTURE BACKFILL MATERIAL

- A. Placement of Structure Backfill: Before beginning backfilling, all foreign material, including water, shall be removed from the space to be backfilled and the area to be backfilled shall be inspected and approved by the Geotechnical Engineer. Sloping sides of the excavated space shall be stepped to prevent wedging action of the backfill against the structure. No backfill shall be placed around or upon any structure until it is proven that the concrete has attained satisfactory strength in accordance with the Division 3 of Technical Specifications and that the structure as a whole is adequate to receive backfill. The compressive strength shall be determined by tests on representative cylinders cured under conditions similar to those prevailing at the site.
  
- B. General: Structure fill and structure backfill shall consist of granular sand, Class 2 Base, crusher fines or other material as indicated on the Plans. The subbase grade shall be excavated to within plus or minus 0.05 feet of design grade prior to the placement of structure fill and structure backfill. The design subbase grade shall be field verified and approved by the Engineer prior to the placement of the structure fill or structure backfill material. The Engineer shall determine the number and location of points to check for the subbase grade elevation compliance. Prior to the Engineer's inspection of the subbase grade the Contractor shall establish bluetop stakes on a 20-foot by 20-foot grid across the area which structure backfill is to be placed.

Granular sand, Class 2 Base and crusher fine structure fill and structure backfill material shall be placed in maximum 8-inch lifts and compacted to 95 percent of maximum density at optimum water content per ASTM D 1557 unless otherwise noted on the plans. Additional granular sand, Class 2 Base or crusher fine lifts shall not be placed until previous lifts have attained the specified compaction requirement and are approved by both the on-site geotechnical representative and the Engineer.

- C. Placing, Spreading and Compacting Fill Material: The structural fill and structural backfill material shall be placed by the Contractor in thin layers that when compacted shall not exceed 8 inches unless required otherwise on the plans. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.

When the moisture content of the fill material is below that required by the Geotechnical Engineer, water shall be added by the Contractor until the moisture content is as required for the specified compaction.

When the moisture content of the fill material is above that required by the Geotechnical Engineer, the fill material shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the moisture content is as required for the specified compaction.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to the specified density. Compaction shall be accomplished by sheepsfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers or other types of acceptable compacting equipment. Equipment shall be of such design that it shall be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes over the material to ensure that the desired density has been obtained.

Compacted fill slopes shall be overbuilt and cut back to grade, exposing the firm, compacted inner core. The slopes shall be overbuilt a minimum of five feet (5') unless required otherwise on the plans. If the desired compaction is not achieved, the existing slope shall be overexcavated and reconstructed. The amount of overbuilding shall be increased until the desired compaction is achieved on the slope. The Contractor shall provide thorough mechanical compaction to the outer edge of the overbuilt slope surface. There shall be no excessive loose soil on the slopes.

The Contractor shall provide and maintain adequate erosion control facilities during the construction of the fill areas. The erosion control facilities shall be maintained in optimum condition until the permanent drainage system and vegetation is complete. The facilities shall be inspected following significant rainfall, repairs made and excess sediment removed. It shall be the Contractor's responsibility to prevent the discharge of sediment off-site or to adjacent watercourses.

### 3.08 SUITABLE MATERIAL AND WASTE EXCAVATION

- A. General: Suitable material or waste excavation consists of native material. The subbase grade shall be excavated to within plus or minus 0.05 feet of design grade prior to the placement of suitable material or waste excavation material. The design subbase grade shall be field verified and approved by the Engineer prior to the placement of the suitable material or waste excavation material. The Engineer shall determine the number and location of points to check for the subbase grade elevation compliance. Prior to the Engineer's inspection of the subbase grade the Contractor shall establish bluetop stakes

on a 20-foot by 20-foot grid across the area suitable material or waste excavation material is to be placed.

The suitable material or waste excavation material shall be placed in maximum 1-foot lifts and compacted to 90 percent of maximum density at optimum water content per ASTM D 1557. Additional suitable material or waste excavation material lifts shall not be placed until previous lifts have attained the specified compaction requirement and are approved by both the on-site geotechnical representative and the Engineer.

- B. Placing, Spreading and Compacting Suitable Material and Waste Excavation Material:  
The suitable material and waste excavation material shall be placed by the Contractor in 1-foot lifts. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.

When the moisture content of the fill material is below that required by the Geotechnical Engineer, water shall be added by the Contractor until the moisture content is as required for the specified compaction.

When the moisture content of the fill material is above that required by the Geotechnical Engineer, the fill material shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the moisture content is as required for the specified compaction.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to the specified density. Compaction shall be accomplished by sheepsfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers or other types of acceptable compacting equipment. Equipment shall be of such design that it shall be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes over the material to ensure that the desired density has been obtained.

Compacted fill slopes shall be overbuilt and cut back to grade, exposing the firm, compacted inner core. The slopes shall be overbuilt a minimum of five feet (5') unless required otherwise on the plans. If the desired compaction is not achieved, the existing slope shall be overexcavated and reconstructed. The amount of overbuilding shall be increased until the desired compaction is achieved on the slope. The Contractor shall provide thorough mechanical compaction to the outer edge of the overbuilt slope surface. There shall be no excessive loose soil on the slopes.

The Contractor shall provide and maintain adequate erosion control facilities during the construction of the fill areas. The erosion control facilities shall be maintained in optimum condition until the permanent drainage system and vegetation is complete. The facilities shall be inspected following significant rainfall, repairs made and excess sediment removed. It shall be the Contractor's responsibility to prevent the discharge of sediment off-site or to adjacent watercourses.

3.09 ESTABLISHMENT OF SUBBASE GRADE, SUBGRADE OR FINISH GRADE

Finish Grade is defined as the finish surface grade. For instance, the top of an A.C. or P.C.C. paved surface is referred to as finish grade. The top of the class 2 base or native material can also be finish grade for this project.

Subgrade is defined as the grade of the material beneath the finish surface. For instance, the top of Class 2 Base grade beneath an A.C. or P.C.C. paved surface is referred to as subgrade.

Subbase is defined as the grade of the material beneath the base material. For instance, the top of native material beneath the Class 2 Base subgrade material of an A.C. or P.C.C. paved roadway is the subbase grade.

Finish grade surfaces are to be graded to within plus or minus 0.02 feet from design grade as illustrated on the Grading Plans. The Contractor shall place bluetop stakes on a 20-foot x 20-foot grid across the top of the finish grade surface during final grading. A bluetop stake is defined as a stake placed at the finish grade elevation within the tolerance of plus or minus 0.02 feet of finish grade. The Engineer shall obtain elevations across finish grade surfaces at locations determined by the Engineer prior to accepting and approving the finish grade surfaces. The Contractor shall rework areas not conforming to the finish surface grade tolerance as required. Work items to occur after the establishment of finish grade shall not occur until the Engineer has approved the finish grade.

Subgrade surfaces are to be graded to within plus or minus 0.02 feet from design grade as illustrated on the Grading Plans. Bluetop stakes shall be placed on a 20-foot x 20-foot grid pattern across rectangular or square facilities such as parking lots and access roads. The Engineer shall obtain elevations across the subgrade surfaces at locations determined by the Engineer prior to accepting and approving the subgrade surfaces. The Contractor shall rework areas not conforming to the subgrade tolerance as required. Work items to occur after the establishment of subgrade shall not occur until the Engineer has approved the finish grade.

Subbase surfaces are to be graded to within plus or minus 0.05 feet of subbase design grade as illustrated on the Grading Plans. Bluetop stakes shall be placed on a 20-foot x 20-foot grid pattern across rectangular or square facilities such as parking lots, access roads, sludge beds, etc. The Engineer shall obtain elevations across the subbase surfaces at locations determined by the Engineer prior to accepting and approving the subbase surfaces. The Contractor shall rework areas not conforming to the subbase design grade tolerance as required. Work items to occur after the establishment of subbase grade shall not occur until the Engineer has approved the subbase grade.

### 3.10 COMPACTION TEST SCHEDULE

A copy of all tests shall be forwarded to the Construction Manager within four (4) days after the testing is complete. The Geotechnical testing shall include but not be limited to compaction tests on Class 2 Base, granular sand material and crusher fines. Gradation, durability, R-value and sand equivalent tests for Granular Sand, Class 2 Base and crusher fines shall be required during the Submittal process. Compaction testing for the Class 2 Base, Granular Sand and crusher fines shall be required. Compaction testing for the Native Soil shall be required.

A copy of all tests shall be forwarded to the Construction Manager and Engineer within four (4) days after the testing is complete.

The Geotechnical testing shall include but not be limited to compaction tests on Class 2 Base and granular sand material, crusher fines and native soil. Durability, R-value and sand equivalent tests for Granular Sand and Class 2 Base and crusher fines shall be required during the Submittal process. Geotechnical testing for native materials shall include maximum density, optimum moisture content, sand equivalent and classification of the soil. A set of tests are to be prepared for each different type of native material to be used for earth work construction.

1. Class 2 Base All Weather Access Road.
  - 1.1 A compaction test for the Class 2 Base shall be required for every 100 lineal feet along the All Weather Access Road. (18 Class 2 Base Compaction Tests).
2. Class 2 Base Access Road.

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- 2.1 A compaction test for the Class 2 Base shall be required for every 100 lineal feet along the Access Road. (6 Class 2 Base Compaction Tests).
3. Class 2 Base Pad for Construction Trailer.
  - 3.1 A compaction test for the Class 2 Base Construction Trailer pad shall be required for every 500 square feet of pad area. (6 Class 2 Base Compaction Tests).
4. Class 2 Base Parking Area.
  - 4.1 A compaction test for the Class 2 Base Parking Area south of Laboratory Control Building shall be required for every 500 square feet of Class 2 Base Parking Area. (4 Class 2 Base Compaction Tests).
5. Evaporation/Infiltration Pond Pump Station.
  - 5.1 A compaction test for the Class 2 Base shall be required at 3 Locations, Spread evenly, along the Class 2 Base Access Ramp. (3 Class 2 Base Compaction Tests).
  - 5.2 A compaction test for the Class 2 Base shall be required at 4 Locations Spread evenly, at the pump station pad area. (4 Class 2 Base Compaction Tests).
  - 5.3 Granular Sand backfill shall be installed in maximum 1-foot lifts at 95 percent of maximum density. Additional lifts shall not be installed until previous lifts have been tested and attained the specified compaction density. Obtain 1 compaction test for each 1 foot of granular material placed at different locations around the exterior circumference of the pump station as determined by the geotechnical testing representative. (14 Granular Sand Compaction Tests).
  - 5.4 Native soil surface backfill shall be installed in maximum 6-inch lifts at 85 percent of maximum density. The native soil compaction shall be accomplished to the satisfaction of the Geotechnical Representative. No geotechnical tests shall be required for the 6 inch deep native surface material
6. Chlorination / Dechlorination Basin Concrete Wall Demolition and Reconstruction.
  - 6.1. Compact the 3/4 inch crushed rock beneath the concrete replacement slab per Section P-P, Q-Q and R-R with a plate compactor. Place the 3/4 inch rock to the indicated design elevation. (No testing required).
  - 6.2. Compaction test for each 9 inch lift of granular sand backfill at a location determined by the Geotechnical representative on the south of Chlorination / Dechlorination structure per section P-P on plan sheet 7. (14 Granular Sand Compaction Tests).
  - 6.3. Compaction test for each 9 inch lift of granular sand backfill material from elevation 816.05 to elevation 822.05 at a location determined by the Geotechnical Representative on the east side of the Chlorination / Dechlorination Structure per Section R-R on plan sheet 7. (8 Granular Sand Compaction Tests).
7. Sodium Hypochlorite Tank and remaining backfill along the east side of the Chlorination / Dechlorination Structure per Section R-R on plan sheet 7 and Section K-K on plan sheet 10.
  - 7.1 Two (2) compaction and moisture content tests at locations determined by the Geotechnical Representative on the scarified and compacted native material per construction keynote 1 on plan sheet 10. (2 Native Earth Compaction and Moisture Content Tests).
  - 7.2 Two (2) compaction tests for each 9 inch lift of granular sand backfill for the combined Sodium Hypochlorite Tank per Section K-K and construction keynote 2 on plan sheet 10 and the east side of the Chlorination / Dechlorination Basin between elevations 822.50 and 826.42 per keynote 3 of Section R-R on plan sheet 7. (12 Granular Sand Compaction Tests).

8. Sodium Metabisulfite Tank west side of the Chlorination / Dechlorination Structure per Section L-L on plan sheet 10.
  - 8.1 Two (2) compaction and moisture content tests at locations determined by the Geotechnical Representative on the scarified and compacted native material per construction keynote 1 on plan sheet 10. (2 Native Earth Compaction and Moisture Content Tests).
  - 8.2 Two (2) Compaction tests for each 9 inch lift of granular sand backfill for the combined Sodium Metabisulfite Tank and west side of the the Chlorination / Dechlorination Structure per Cross-Section L-L, construction keynote 2. Location of compaction tests shall be determined by the Geotechnical Representative (12 Granular Sand Compaction Tests).
  - 8.3 Four (4) evenly spaced compaction tests for the Sodium Metabisulfite class 2 base side slopes beneath the PCC side slope per plan sheet 9, section L-L on sheet 10 and sections N-N and M-M on plan sheet 44. The Geotechnical Representative shall determine the location of the tests. (4 Class 2 Base Compaction Tests).
  - 8.4 Four (4) evenly spaced compaction tests for the Sodium Metabisulfite class 2 base beneath the PCC side slope support footings per plan sheet 9, section L-L on plan sheet 10 and sections N-N and M-M and sheet 44. The Geotechnical Representative shall determine the location of the tests. (4 Class 2 Base Compaction Tests).
9. Sodium Hypochlorite and Sodium Metabisulfite Eye Wash Stations.
  - 9.1 Compaction and water content test on native material beneath each Eye Wash Station (2 Native Earth Compaction and Water Content Tests).
  - 9.2 Compaction test on class 2 base beneath each Eye Wash Station. (2 Class 2 Base Compaction Tests).
10. Native Earth side slopes on East, North and West sides of the Chlorination / Dechlorination Basin per sections H-H, I-I and J-J. See plan sheets 6 and 44.
  - 10.1 Compaction test on scarified native material beneath side slopes per keynote 2 of sections H-H, I-I and J-J. Obtain 6 evenly spaced compaction tests determined by the Geotechnical Representative. (2 Native Earth Compaction Tests).
  - 10.2 Six evenly distributed compaction tests for each 9" lift of native side slope material placed during the construction of the side slopes per keynote 5 of section H-H, I-I, and J-J on plan sheet 44. The location of the compaction tests shall be determined by the Geotechnical Representatives. (30 Native Earth Compaction Tests).
11. Access Areas between the Chlorination / Dechlorination Basin Structure and top of the slope north, east and west of the Chlorination / Dechlorination Basin. Includes the area between the Chlorination / Dechlorination Basin and Abandoned Chemical Containment Structure and the continuation of the Access Road south of the Sodium Hypochlorite Facility.
  - 11.1 Ten (10) native earth compaction tests throughout the area at locations determined by the Geotechnical Representative. (10 Native Earth Compaction Tests).
  - 11.2 Ten (10) class 2 base compaction tests throughout the area at locations determined by the Geotechnical Representative. (10 Class 2 Base Compaction Tests).

12. Aeration Pond Number 1 – North Embankment removal and replacement for sludge removal and liner replacement
  - 12.1 Two (2) compaction tests for each 9 inch lift of native material placed per keynote 6 of section BB-BB on plan sheet 33. The location of the tests shall be determined by the Geotechnical Representative. (32 Native Earth Compaction Tests).
13. Sludge Containment Basin.
  - 13.1 Two (2) compaction tests on the scarified and compacted native material on the north, east, south and west embankment of the sludge containment basin per keynote 4 of Section A-A on plan sheet 34. Total of 8 compaction Tests. The location of the compaction tests shall be determined by the Geotechnical Representative. (8 Native Earth Compaction Tests).
  - 13.2 Two (2) compaction tests along the north, east, south and west embankments for each 9 inch lift of native earth placed per keynote 5 of section A-A on plan sheet 34. A total of 8 compaction tests per 9 inch lift of native earth embankment material placed. Include 4 compaction tests in the construction of the access ramp. The location of the tests shall be determined by the Geotechnical Representative. (36 Native Earth Compaction Tests).
14. Emergency Bypass Basin.
  - 14.1 Three (3) compaction tests on the scarified and compacted native material on the south and north Emergency Bypass Basin embankments and (7) compaction tests on the scarified and compacted native material on the east and west embankments. See keynote 4 of Sections C-C and D-D on plan sheet 46. The location of the compaction tests shall be evenly spaced along the embankments. The location of the tests shall be determined by the Geotechnical Representative. (20 Native Earth Compaction Tests).
  - 14.2 Three (3) compaction tests on the north and south embankments, and (7) compaction tests on the east and west embankments for each 9 inch lift of native earth placed per keynote 5 of Section A-A on plan sheet 34. A total of 20 compaction tests per 9 inch lift of the native earth embankment material placed. The location of the tests shall be evenly spaced along the earth embankment and shall be determined by the Geotechnical Representative. (100 Native Earth Compaction Tests).
15. Valve, Pipeline Fitting and Piping Removal and Replacement Upstream of Existing Headworks Structure. The 12 inch sanitary sewer pipeline flowline elevation entering the PCC headworks is at elevation 815.63 The exiting native surface grade south of the PCC headworks is at approximately 826.00. The excavation to the base of the excavation will be approximately 11 feet deep. Per sanitary sewer main trench Detail TT on plan sheet 42, 1 foot of sand is to be placed over the pipeline. The compaction tests for the backfilling of the valve, pipeline fittings and piping removal and replacement is as follows.
  - 15.1 Obtain two (2) compaction tests on the granular sand 1 foot over the pipeline and fittings per Detail TT on plan sheet 42. The location of the compaction tests shall be determined by the Geotechnical Representative. (2 Granular Sand Compaction Test)
  - 15.2 One compaction test for each 1 foot lift of native earth material over the granular sand in the pipe zone area per Detail TT on plan sheet 42. The location of the compaction tests shall be determined by the Geotechnical Representative. (9 native earth compaction tests).

16. Preast Concrete Influent Flow Meter Vault Extension Detail D on Plan sheet 12.
  - 16.1 Two (2) compaction tests for each 1 foot of native backfill placed around the PCC flowmeter vault. The location of the compaction tests shall be determined by the Geotechnical Representative. (10 Native Earth Compaction Tests).
17. 6 inch sanitary sewer force main trench from new 6" valve number 4 to the outlet at the Emergency Bypass Basin as illustrated on plan sheet 4.
  - 17.1 One compaction test in the granular pipe zone every 75 lineal feet per Trench Detail CC on plan sheet 26. (4 compaction tests on granular sand backfill).
  - 17.2 One compaction test on native earth backfill every 75 feet for every one (1) foot lift of native earth backfill placed per pipe trench Detail CC on plan sheet 26. Native backfill is (2) feet deep (8 Native Earth Compaction Tests).
18. Backfill valve excavations for valve number 3 replacement and new valve number 4 and 5 installation.
  - 18.1 Backfill 3 foot deep valve excavation for valve number 3 replacement per Trench Detail CC on plan sheet 26. (1 compaction test on granular sand fill). (2 compaction tests on native backfill for each 1-foot lift of native backfill material)
  - 18.2 Backfill 4 foot deep pipeline connection excavation per Detail SS on plan sheet 46 including valves 4 and 5 as illustrated on plan sheet 4 per Trench Detail CC on plan sheet 26. (1 compaction test on granular sand backfill). (3 compaction tests on native backfill for each 1 foot lift of native backfill material).
19. Backfill valve excavations for replacement of existing valves or installation of new valves in the Aeration Ponds Embankments. There are seven (7) separate excavations to be completed for the valve replacement or new installation. Each excavation is 11 to 12 feet deep.
  - 19.1 One (1) compaction test on granular sand trench zone at each of the seven excavations. Total of seven (7) granular sand compaction test. (7 Granular Sand Compaction Tests).
  - 19.2 One (1) compaction test for every other 9" lift of native material placed and compacted. This means 1 compaction test for every 18 inches. There will be 7 compaction tests for native backfill material for each excavation. There will be a total of 49 native backfill compaction tests for all seven (7) valve excavations in the Aeration Pond Area. (49 Native Earth Compaction Tests).
20. New Gravity Sanitary Sewer Pipeline between the Flowmeter / Sampling Vault and Evaporation / Infiltration Pond Pump Station.
  - 20.1 Two (2) compaction tests on granular sand pipe trench zone at locations determined by the Geotechnical Representative. (2 Granular Sand Compaction Tests).
  - 20.2 One (1) compaction test for each 1 foot lift of native material placed at a location determined by the Geotechnical Representative. (7 Native Earth Compaction Tests).
21. 8 inch sanitary sewer pump station overflow pipeline from the Evaporation / Infiltration Pump Station to Evaporation / Infiltration Pond 1. See plan sheet 21.
  - 21.1 Six (6) evenly spaced compaction tests on the granular sand pipe trench zone per trench Detail CC on plan sheet 26. The Geotechnical Representative shall determine the location of the compaction test. (6 Granular Sand Compaction Tests).
  - 21.2 Six (6) evenly spaced compaction tests obtained on every other 6 inch native material lift placed (every foot) along the length of the 8 inch over flow pipeline. The

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Geotechnical Representative shall determine the locations of the compaction tests. The native earth backfill varies from 2' to 3'. (18 Native Earth Compaction Tests).

22. 6 inch sanitary sewer effluent pipeline from the Evaporation / Infiltration Pump Station to the PCC stand pipe at the northeast corner of Evaporation / Infiltration Pond Number 1.

22.1 Six (6) evenly spaced compaction tests on the granular sand pipe trench zone per Trench Detail CC on plan sheet 26. The Geotechnical Representative shall determine the location of the compaction tests. (6 Granular Sand Compaction Tests).

22.2 Six (6) evenly spaced compaction tests obtained on every other 6 inch native material lift placed (every foot) along the length of the 6 inch force main. The Geotechnical Representative shall determine the locations of the compaction tests. The native earth backfill depth varies between 2' and 3'. (18 Native Earth Compaction Tests).

23. Evaporation / Infiltration Pond PCC Standpipe – See Plan Sheet 15 and 26.

23.1 One (1) compaction test for each 1 foot lift of native earth material placed in the area of the PCC stand Pipe. The Geotechnical Representative shall determine the locations of the compaction tests. (2 Native Earth Compaction Tests).

23.2 One (1) compaction test for the 1 foot deep class 2 base backfill placed around the PCC stand pipe. The Geotechnical Representative shall determine the location of the compaction test. (1 Class 2 Base Compaction Test).

24. 8 inch diameter sewer effluent header pipeline along the north embankment of Evaporation / Infiltration Pond Numbers 1 through 3.

24.1 One (1) compaction test on granular sand pipe trench zone for each 1 foot of granular sand material placed for each 75 feet of pipeline installed. The Geotechnical Representative shall determine the locations of the compaction tests. (Obtain 30 Granular Sand Compaction Test).

24.2 Obtain (1) compaction test for each 1 foot of native earth pipe trench backfill material placed for each 75 feet of pipeline installed. The Geotechnical Representative shall determine the locations of the compaction tests. (60 Native Earth Compaction Tests).

25. Evaporation / Infiltration Pond Inlet Pipe Sections.

25.1 Obtain two compaction tests for every 1 foot of native material placed along the pond inlet piping. See detail UU and VV on plan sheet 42. There are six (6) inlet pipelines to the Evaporation Infiltration Ponds. The Geotechnical Representative shall determine the locations of the compaction tests. Obtain two (2) compaction tests for each pond inlet pipeline. (12 Native Earth Compaction Tests).

26. Pond Inlet PCC Outlet Structures.

26.1 Obtain one (1) compaction test on the class 2 base beneath each of the seven PCC outlet structures. (7 Class 2 Base Compaction Tests).

27. Evaporation / Infiltration Pond Number 1 East of the Embankment. The length of the embankment from centerline of access road to centerline of the access road is 650 L.F.

27.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the "Construction of the Evaporation / Infiltration Pond Embankment" notes on plan sheet 18 through 20. (9 native earth compaction tests and moisture tests).

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- 27.2 Compaction tests on native earth pond embankment per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material placed for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (27 native earth compaction tests and moisture tests).
28. Evaporation / Infiltration Pond Number 1 West Embankment – Also the east embankment of Evaporation / Infiltration Pond Number 2. The length of the embankment from centerline of access road to centerline of access road is 650 L.F.
- 28.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. (9 native earth compaction tests and moisture tests).
- 28.2 Compaction tests on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material placed for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (50 native earth compaction tests and moisture tests).
29. Evaporation / Infiltration Pond Number 2 West Embankment – Also the east embankment of Evaporation / Infiltration Pond Number 3. The length of the embankment from centerline of access road to centerline of access road is 650 L.F.
- 29.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. (9 native earth compaction tests and moisture tests).
- 29.2 Compaction tests on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material placed for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (50 native earth compaction tests and moisture tests).
30. Evaporation / Infiltration Pond Number 3 West Embankment – The length of the embankment from centerline of access road to centerline of access road is 650 L.F.
- 30.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. (9 native earth compaction tests and moisture tests).
- 30.2 Compaction tests on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material placed for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (50 native earth compaction tests and moisture tests).

31. Evaporation / Infiltration Pond Number 1 - North Embankment - Length of the North embankment from centerline of access road to centerline of access road – 795 Lineal Feet.

31.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 75 lineal feet of embankment. The Geotechnical Representative shall determine the locations of the compaction tests. (11 native earth compaction tests and moisture tests).

31.2 Compaction test on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (35 native earth compaction tests and moisture tests).

32. Evaporation / Infiltration Pond Number 1 - South Embankment - Length of the South embankment from centerline of access road to centerline of access road – 795 Lineal Feet.

32.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 75 lineal feet of embankment. The Geotechnical Representative shall determine the locations of the compaction tests. (11 native earth compaction tests and moisture tests).

32.2 Compaction test on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (50 native earth compaction tests and moisture tests).

33. Evaporation / Infiltration Pond Number 2 - North Embankment - Length of the North embankment from centerline of access road to centerline of access road – 795 Lineal Feet.

33.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 75 lineal feet of embankment. The Geotechnical Representative shall determine the locations of the compaction tests. (11 native earth compaction tests and moisture tests).

33.2 Compaction tests on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” Notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material placed for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (35 native earth compaction tests and moisture tests).

34. Evaporation / Infiltration Pond Number 2 - South Embankment - Length of the South embankment from centerline of access road to centerline of access road – 795 Lineal Feet.
  - 34.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 75 lineal feet of embankment. The Geotechnical Representative shall determine the locations of the compaction tests. (11 native earth compaction tests and moisture tests).
  - 34.2 Compaction tests on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” Notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (Obtain a total of 50 native earth compaction tests and moisture tests).
35. Evaporation / Infiltration Pond Number 3 - North Embankment - Length of the North embankment from centerline of access road to centerline of access road – 795 Lineal Feet.
  - 35.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 75 lineal feet of embankment. The Geotechnical Representative shall determine the locations of the compaction tests. (11 native earth compaction tests and moisture tests).
  - 35.2 Compaction tests on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” Notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of compaction tests. (35 native earth compaction tests and moisture tests).
36. Evaporation / Infiltration Pond Number 3 - South Embankment - Length of the South embankment from centerline of access road to centerline of access road – 795 Lineal Feet.
  - 36.1 Compaction tests on the 8 inch native earth section at the bottom of the embankment per item 3 of the “Construction of the Evaporation / Infiltration Pond Embankment” notes on plan sheet 18 through 20. Obtain 1 compaction test for each 75 lineal feet of embankment. The Geotechnical Representative shall determine the locations of the compaction tests. (11 native earth compaction tests and moisture tests).
  - 36.2 Compaction tests on native earth pond embankments per item 4 of the “Construction of the Evaporation / Infiltration Pond Embankment” Notes on plan sheet 18 through 20. Obtain 1 compaction test for each 6 inch lift of the native earth material for each 150 foot length of embankment. Stagger the compaction test locations for a distance of approximately 75 feet between each successive 6 inch lift. The Geotechnical Representative shall determine the locations of the compaction tests. (50 native earth compaction tests and moisture tests).

37. Summary of Evaporation / Infiltration Pond Embankment Native Earth Compaction Tests.

<b>Item No.</b>	<b>Item</b>	<b>Compaction Tests – 8” Embankment Bottom Section</b>	<b>Compaction Tests – Embankment Construction</b>
1	Pond 1 – East Embankment	9	27
2	Pond 1 – West Embankment	9	50
3	Pond 2 – West Embankment	9	50
4	Pond 3 – West Embankment	9	50
5	Pond 1 – North Embankment	11	35
6	Pond 1 – South Embankment	11	50
7	Pond 2 – North Embankment	11	35
8	Pond 2 – South Embankment	11	50
9	Pond 3 – North Embankment	11	35
10	Pond 3 – South Embankment	11	50
	Total Native Earth Compaction Tests	102	432
	Total Native Earth Compaction Tests	----- <b>102 + 432 = <u>534</u></b>	

38. Area between the Evaporation / Infiltration Embankment exterior toe of slope and the opposing toe of slope embankment or new earth berm as “called out” by Evaporation / Infiltration Ponds Construction keynote 1 on plan sheet 15,16, and 17. The area consists of 473,795 S.F. or 10.88 Acres.

38.1 Obtain a compaction test for every 20,000 square feet of Area as previously described. The compaction tests shall be distributed evenly over the area. The Geotechnical Representative shall determine the locations of the compaction tests. (24 Native Earth Compaction Tests).

39. Re-Construct native earth slope south of and adjacent to the existing south slope of the IID “R” drain access road per Sections T-T and U-U on plan sheet 19 and Section V-V on plan sheet 20.

39.1 Obtain one (1) compaction test for each 1 foot vertical distance for each 100 foot length of the native earth slope. The Geotechnical Representative shall determine the locations of the compaction tests. (40 Native Earth Compaction Tests).

40. Construct 1 foot high 3,372 foot long earth berm along the south and west sides of the Evaporation / Infiltration Ponds. See storm water drainage berm per Detail II on plan sheet 27.

40.1 Obtain one (1) compaction test at center of the berm every 100 feet. The Geotechnical Representative shall determine the locations of the compaction tests. (34 Native Earth Compaction Tests).

41. Install new precast drainage and irrigation structure, new 852 foot long 30 inch diameter agricultural lateral pipeline and new 60 inch diameter PCC manhole along the east side of Evaporation / Infiltration Pond No. 1 per plan sheet 30.

41.1 Obtain one (1) Compaction test for each 1 foot of native material backfill around the new pre-cast drainage and irrigation structure. The Geotechnical Representative shall determine the locations of the compaction tests. (9 Native Earth Compaction Tests).

41.2 Obtain one (1) compaction test at the top of the granular sand pipe trench material every 100 feet along the length of the agricultural lateral pipeline. The Geotechnical Representative shall determine the locations of the compaction tests. (9 Granular Sand Compaction Tests).

41.3 Obtain one (1) compaction test for each 1 foot lift of native earth backfill material every 100 feet along the length of the agricultural lateral pipeline. The Geotechnical

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Representative shall determine the locations of the compaction tests. (36 Native Earth Compaction Tests).

- 41.4 Obtain one (1) compaction test for each 1 foot of native material backfill around the 5 foot diameter manhole. The Geotechnical Representative shall determine the locations of the compaction tests. (7 Native Earth Compaction Tests).

42. Potable water system as illustrated on plan sheet 5.

42.1 Obtain two (2) compaction and water content tests on the native earth scarified and compacted native material as “called out” by construction keynote 2 on plan sheet 5. The Geotechnical Representative shall determine the locations of the compaction tests. (2 Native Earth Compaction and Water Content Tests).

42.2 Obtain two (2) compaction tests for each 9 inch lift of granular sand material placed per construction keynote 3 on plan sheet 5. The Geotechnical Representative shall determine the locations of the compaction tests. (10 Granular Sand Compaction Tests).

43. 10 inch diameter sanitary sewer pipeline replacement section along Alcott Road 20 feet east of Highway 111 per construction keynote 2 on Caltrans plan sheet 3.

43.1 Obtain one (1) compaction test at the top of the granular sand pipe trench material along the length of the pipeline section. The Geotechnical Representative shall determine the location of the compaction test. (1 Granular Sand Compaction Test).

43.2 Obtain one (1) compaction test for each 1 foot lift of native earth backfill material along the length of the pipeline section. The Geotechnical Representative shall determine the locations of the compaction tests. (6 native earth compaction tests).

\* Testing locations shall be randomly determined at the project site by the Geotechnical Representative.

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3.11. EARTHWORK COMPACTION TEST SUMMARY CHART

Item No.	Sub-Item	Item	Native Earth Compaction Tests	Granular Sand Compaction Test	Class 2 Base Compaction Test	3 /4' Gravel No Compaction Test- Plate Compact	No Test Required
1		Class 2 Base All Weather Access Road					
	1.1				18		
2		Class 2 Base Access Road					
	2.1				6		
3		Construction Trailer Class 2 Base Pad					
	3.1				6		
4		Class 2 Base Parking Area					
	4.1				4		
5		Evaporation/Infiltration Pond Pump Station					
	5.1				3		
	5.2				4		
	5.3			14			
	5.4						X
6		Chlorination/Dechlorination Basin Concrete Wall Demolition and Reconstruction					
	6.1					X	
	6.2			14			
	6.3			8			
7		Sodium Hypochlorite Tank and remaining backfill along the east side of the Chlorination / Dechlorination Structure per Section R-R					
	7.1		2				
	7.2			12			
8		Sodium Metabisulfite Tank west side of the Chlorination / Dechlorination Structure per Section L-L					
	8.1		2				

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	8.2			12			
	8.3				4		
	8.4				4		
9		Sodium Hypochlorite and Sodium Metabisulfite Eye Wash Stations					
	9.1		2				
	9.2				2		
10		Native Earth side slopes on East, North and West sides of the Chlorination / Dechlorination Basin per sections H-H, I-I and J-J.					
	10.1		2				
	10.2		30				
11		Access Areas between the Chlorination / Dechlorination Basin Structure and top of the slope north, east and west of the Chlorination / Dechlorination Basin.					
	11.1		10				
	11.2				10		
12		Aeration Pond Number 1 – North Embankment removal and replacement for sludge removal and liner replacement					
	12.1		32				
13		Sludge Containment Basin.					
	13.1		8				
	13.2		36				
14		Emergency Bypass Basin.					
	14.1		20				
	14.2		100				
15		Valve, Pipeline Fitting and Piping Removal and Replacement Upstream of Existing Headworks Structure					
	15.1			2			
	15.2		9				

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16		Preast Concrete Influent Flow Meter Vault Extension					
	16.1		10				
17		6 inch sanitary sewer force main trench from new 6'' valve number 4 to the outlet at the Emergency Bypass Basin					
	17.1			4			
	17.2		8				
18		Backfill valve excavations for valve number 3 replacement and new valve number 4 and 5 installation.					
	18.1		2	1			
	18.2		3	1			
19		Backfill valve excavations for replacement of existing valves or installation of new valves in the Aeration Ponds Embankments					
	19.1			7			
	19.2		49				
20		New Gravity Sanitary Sewer Pipeline between the Flowmeter / Sampling Vault and Evaporation / Infiltration Pond Pump Station.					
	20.1			2			
	20.2		7				
21		8 inch sanitary sewer pump station overflow pipeline from the Evaporation / Infiltration Pump Station to Evaporation / Infiltration Pond 1					
	21.1			6			
	21.2		18				
22		6 inch sanitary sewer effluent pipeline from the Evaporation / Infiltration Pump Station to the PCC stand pipe at the northeast corner of Evaporation / Infiltration Pond Number 1.					

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	22.1			6			
	22.2		18				
23		Evaporation / Infiltration Pond PCC Standpipe					
	23.1		2				
	23.2				1		
24		8 inch diameter sewer effluent header pipeline along the north embankment of Evaporation / Infiltration Pond Numbers 1 through 3.					
	24.1			30			
	24.2		60				
25		Evaporation / Infiltration Pond Inlet Pipe Sections.					
	25.1		12				
26		Pond Inlet PCC Outlet Structures.					
26.1					7		
27		Evaporation / Infiltration Pond Number 1 East of the Embankment. The length of the embankment from centerline of access road to centerline of the access road is 650 L.F.					
27.1			9				
27.2			27				
28		Evaporation / Infiltration Pond Number 1 West Embankment – Also the east embankment of Evaporation / Infiltration Pond Number 2. length of the embankment from centerline of access road to centerline of the access is 650 L.F.					
28.1			9				
28.2			50				

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29		Evaporation / Infiltration Pond Number 2 West Embankment – Also the east embankment of Evaporation / Infiltration Pond Number 3. The length of the embankment from centerline of access road to centerline of the access road is 650 L.F.					
	29.1		9				
	29.2		50				
30		Evaporation / Infiltration Pond Number 3 West Embankment – The length of the embankment from centerline of access road to centerline of the access road is 650 L.F.					
	30.1		9				
	30.2		50				
31		Evaporation / Infiltration Pond Number 1 - North Embankment - Length of the North embankment from centerline of access road to centerline of the access road – 795 Lineal Feet.					
	31.1		11				
	31.2		35				
32		Evaporation / Infiltration Pond Number 1 - South Embankment - Length of the South embankment from centerline of access road to centerline of the access road – 795 Lineal Feet					
	32.1		11				
	32.2		50				

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33		Evaporation / Infiltration Pond Number 2 - North Embankment - Length of the North embankment from centerline of access road to centerline of the access road – 795 Lineal Feet.					
	33.1		11				
	33.2		35				
34		Evaporation / Infiltration Pond Number 2 - South Embankment - Length of the South embankment from centerline of access road to centerline of the access road – 795 Lineal Feet					
	34.1		11				
	34.2		50				
35		Evaporation / Infiltration Pond Number 3 - North Embankment - Length of the North embankment from centerline of access road to centerline of the access road – 795 Lineal Feet.					
	35.1		11				
	35.2		35				
36		Evaporation / Infiltration Pond Number 3 - South Embankment - Length of the South embankment from centerline of access road to centerline of the access road – 795 Lineal Feet					
	36.1		11				
	36.2		50				

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37		Summary of Evaporation / Infiltration Pond Embankment Native Earth Compaction Tests.	N/A	N/A	N/A	N/A	N/A
38		Area between the Evaporation / Infiltration Embankment exterior toe of slope and the opposing toe of slope embankment or new earth berm as "call out" by Evaporation / Infiltration Ponds Construction keynote 1 on plan sheet 15,16, and 17. The area consists of 473,795 S.F. or 10.88 Acres.					
	38.1		24				
39		Re-Construct native earth slope south of and adjacent to the existing south slope of the IID "R" drain access road per Sections T-T and U-U on plan sheet 19 and Section V-V on plan sheet 20.					
	39.1		40				
40		Construct 1 foot high 3,372 foot long earth berm along the south and west sides of the Evaporation / Infiltration Ponds. See storm water drainage berm per Detail II on plan sheet 27.					
	40.1		34				
41		Install new precast drainage and irrigation structure, new 852 foot long 30 inch diameter agricultural lateral pipeline and new 60 inch diameter PCC manhole along the east side of Evaporation / Infiltration Pond No. 1 per plan sheet 30.					

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	41.1		9				
	41.2			9			
	41.3		36				
	41.4		7				
42		Potable water system as illustrated on plan sheet 5.					
	42.1		2				
	42.2			10			
43		10 inch diameter sanitary sewer pipeline replacement section along Alcott Road 20 feet east of Highway 111 per construction keynote 2 on Caltrans plan sheet 3.					
	43.1			1			
	43.2		6				
			<b>Native Earth Compaction Tests - Total</b>	<b>Granular Sand Compaction Test- Total</b>	<b>Class 2 Base Compaction Test- Total</b>	<b>3 /4' Gravel No Compaction Test- Plate Compact- Total</b>	<b>No Test Required- Total</b>
<b>Summation of Items</b>			1043	139	67		

3.12. CLEAN-UP

Upon completion of Work in this Section, all rubbish and debris shall be removed from the site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a clean, neat, and acceptable condition.

**END OF SECTION 02200**

**SECTION 02221 - TRENCHING, BACKFILLING AND COMPACTING**

PART 1 - GENERAL

1.01 DESCRIPTION

Requirements specified in the Technical and Special Conditions form a part of this Section. The Work of this Section includes all labor, machinery, construction equipment and appliances to perform in a professional manner all trench excavation and backfill work illustrated on the Plans and herein specified.

A. Principal items included:

1. Trench excavation, backfill and compaction.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 – Earthwork
- B. Section 02150 – Sheeting, Shoring and Bracing
- C. Piping & Conduit Work specified in other Sections

1.03 SAFETY

The Contractor shall be familiarized with, and shall at all times conform to all applicable regulations of “Excavations, Trenching, and Shoring” of OSHA Safety and Health Regulations for Construction, “General Construction Safety Orders” and “Trench Construction Safety Orders” of the State of California, Department of Industrial Relations, Division of Occupational Health and Safety.

1.04 INSPECTION AND CONTROL

***The Contractor shall provide inspection and testing by a Geotechnical Engineer approved by the Engineer engaged and paid for by the Contractor.*** In this regard, a Geotechnical Engineer may be engaged by the Owner, who shall act as the direct representative of the Owner in geotechnical work, to perform inspection of the removal and replacement of unsuitable materials, all excavations, and the placement and compaction of all fills and backfills within the limits of earthwork on this Project. Costs for all such inspections and tests will be paid by the Contractor, and Contractor shall bear the cost of retest and re-inspection of reworked fills and backfills due to compaction test failure.

1.05 REQUIREMENTS

A. General:

1. The Work performed under this Specification shall be constructed to the lines, grades, elevations, slopes and cross-sections indicated on the Plans, specified herein, and/or directed by the Engineer in writing. Slopes, graded surfaces, and drainage features shall present a neat, uniform appearance upon completion of the Work.
2. It shall be the Contractor’s responsibility (1) to maintain adequate safety measures and working conditions; and (2) to take all measures necessary during the performance of the Work to protect the entire project area and adjacent properties which would be affected by this Work from storm damage, flood

hazard, caving of trenches, cavings of excavations, and embankments, and sloughing of material, until final acceptance by the Owner. It shall be the Contractor's responsibility to maintain completed areas in good condition until the entire project area is in satisfactory compliance with the Project Specifications.

3. Contractor shall be responsible for the excavation and disposition of unsuitable or surplus material by approved means of conveyance away from the working area.

B. Protection of Existing Utilities:

1. Utilities: Unless otherwise illustrated on the Plans or stated in the Specifications, all utilities, both underground or overhead, shall be maintained in continuous service throughout the entire contract period. The Contractor shall be responsible and liable for any damages to or interruption of service caused by the construction.

If the Contractor desires to simplify his operation by temporarily or permanently relocating or shutting down any utility or appurtenance, he shall make the necessary arrangements, agreements and approvals with the utility purveyor, Owner and Engineer and shall be completely responsible for all costs concerned with the relocation or shutdown and reconstruction. All property shall be reconstructed in its original or new location as soon as possible and to a condition at least as good as its previous condition. This cycle of relocation or shutdown and reconstruction shall be subject to inspection and approval by the Engineer, Owner and the utility purveyor.

The Contractor shall be entirely responsible for safeguarding and maintaining all conflicting utilities that are illustrated on the Plans. This includes overhead wires and cables and their supporting poles whether they are inside or outside of the open trench. If, in the course of work, a conflicting utility line that was not illustrated on the Plans is discovered, it shall be brought to the immediate attention of the Engineer for a determination regarding alternatives to the conflict.

2. Building, Foundations and Structures: Where trenches are located adjacent to buildings, foundations and structures, the Contractor shall take all necessary precaution against damage to them. The Contractor shall be liable for any damage caused by the construction except where authorized in the Special Conditions or in writing by the Engineer. Water settling of backfill material in trenches adjacent to structures will not be permitted.
3. Electronic, Telephonic, Telegraphic, Electrical, Oil and Gas Lines: These underground facilities shall be adequately supported by the Contractor. Support for plastic pipe shall be continuous along the bottom of the pipe. Support for metal pipe and electrical conduit may be continuous or nylon webbing may be used for suspension at no greater than ten foot (10') intervals. The Contractor shall avoid damaging the plastic pipe, pipe ways or conduits during trench backfilling and during foundation and bedding placement.

PART 2 - PRODUCTS

2.01 MATERIALS

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- A. Granular Sand Material: Granular sand material shall consist of imported granular sand complying with Section 02200, of the specifications.
- B. Crusher Fines: Crusher fines material shall consist of imported decomposed granite complying with Section 02200, of the specifications.
- C. Class 2 Base Material: Class 2 Base material shall consist of imported virgin (not recycled) Class 2 Base complying with Section 02200, of the Specifications.
- D. Crushed Rock Bedding: Crushed rock bedding shall consist of imported rock complying with Section 02200, of the Specifications.
- E. 1-inch Round Rock: 1-inch Round Rock material shall consist of import rock material complying with Section 02200, of the Specifications.
- F. Concrete: 5000 PSI compressive strength, minimum, as specified in Division 3, Concrete, of the Specifications.
- G. Pipelines: Use materials shown on the Plans and as specified in other pertinent Sections of the Specifications.

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION

- A. Excavation for Trenches: Shall include the removal of all material of any nature for the installation of the pipe or facility and shall include the construction of trench shoring and stabilization measures, timbering and all necessary installations for dewatering.
- B. Minimum Width of Trench: The minimum width of pipe trenches, measured at the crown of the pipe, shall not be less than 12 inches greater than the exterior diameter of the pipe, exclusive of bells and the minimum base width of such trench shall be not less than 12 inches greater than the exterior diameter of the pipe, exclusive of special structures or connections, and such minimum width shall be exclusive of all trench supports.
- C. Maximum Width of Trench: The maximum allowable width of trench for all pipelines measured at the top of the pipe shall be the outside diameter of the pipe (exclusive of bells or collars) plus 16 inches, and such maximum shall be inclusive of all timbers. A trench wider than the outside diameter plus 16 inches may be used without special bedding if the Contractor, at his expense, furnishes pipe of the required strength to carry the additional trench load. Such modifications shall be submitted for the Engineer's review. Whenever such maximum allowable width of trench is exceeded for any reason, except as provided for on the Plans or in the Specifications, or by the written direction of the Engineer, the Engineer may, at its discretion, require that the Contractor, at his own expense for all labor and materials, cradle the pipe in 5,000 PSI compressive strength concrete, or other approved pipe bedding.
- D. Maximum Length of Open Trench: Except by special permission by the Engineer only that amount of open trench shall be permitted, which shall allow for that amount of pipeline construction, including excavation, construction of pipeline, and backfill in any one location, which can be completed in one day; however, maximum length of open trench shall never exceed 600 feet. This length includes open excavation, pipe laying and appurtenant construction and backfill which has not been temporarily resurfaced.

E. Trench Side Slopes:

1. Temporary trench excavations shall at all times conform to the safety requirements hereinbefore specified in Section entitled "Safety".
2. Loose cobbles or boulders shall be removed from the sides of the trenches before allowing workmen into the excavation, or the trench slopes must be protected with screening or other methods. Trench side slopes shall be kept moist during construction to prevent local sloughing and raveling. Surcharge loads due to construction equipment shall not be permitted within 10 feet of the top of any excavated slope.
3. If the Contractor elects to shore or otherwise stabilize the trench sides, he shall file with the Engineer copies of drawings for same prepared, signed and stamped by a Civil Engineer duly registered in the State of California before commencing excavation.

F. Excess Trench Excavation: If any trench, through the neglect of the Contractor, is excavated below the bottom grade required, it shall be refilled to the bottom grade, at the Contractor's expense for all labor and material, with granular sand material compacted to a firm stable foundation.

3.02 BRACING TRENCHES

The sides of the trenches shall be supported with plank sheeting and bracing in such a manner as to prevent caving of the sides of the trench. Space left by withdrawal of sheeting or shoring shall be filled completely with dry granular material blown or rammed in place. Trench shoring shall be completed per the recommendations of the Geotechnical Report and OSHA Standards.

3.03 PIPING BEDDING

The Contractor shall excavate to four inches (4") below the bells or couplings for the full width of the trench and shall place four inches (4") of granular material upon which the pipe is to be laid, unless indicated otherwise on the Plans. Construct pipe bedding as indicated on the Plans.

At pipe subgrade, if foundation soil in trench is soft, wet, spongy, unstable or does not afford solid foundation for pipe, the Contractor shall excavate as directed by the Engineer and provide stable base by excavating any unsuitable material 18" minimum below the subgrade base or as the Engineer determines is necessary for placement of pipe bedding. A filter fabric shall be placed in the trench bottom and along the trench sidewalls in the pipe zone to the top of the pipe zone material. A crushed rock material shall be placed at the bottom of the trench and sidewalls of the pipe to a point 1 foot above the pipe. The crushed rock material shall be hand tamped in 16-inch lifts along the sidewalls. The crushed rock shall be compacted with a plate compactor in minimum 6 inch lifts beneath the pipe and over the top of the pipe.

Where rock is encountered in the trench, the Contractor shall excavate to a minimum 18 inch depth below subgrade or as the Engineer determines is necessary, and shall construct a base by placing crushed rock bedding upon which a subgrade can be prepared.

Before any pipe is lowered in place, the trench bottom shall be prepared so that each pipe shall be supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of one-half (1/2) of the pipe OD, and a width equal to the trench width. All adjustments in line and grade shall be made by scraping away or filling and tamping in under the barrel of the pipe. Wedging or blocking is not permitted.

The pipe bedding shall be compacted to a minimum of 90 or 95 percent relative compaction as hereinafter specified or as required by the Plans.

3.04 BACKFILLING PIPE TRENCHES

- A. Backfilling Pipe Zone: Backfill material for the pipe zone shall consist of imported granular material or two sack cement/sand slurry as required by the Plans. Place material in the trench simultaneously on each side of the pipe for the full width of the trench and the depth of the pipe zone in layers 6 inches in depth. Each layer shall be thoroughly compacted by tamping. In all cases, backfilling of the pipe zone must be accomplished by hand. Particular attention shall be given to underside of the pipe and fittings to provide a firm support along the full length of the pipe. The pipe zone shall be considered to extend 12 inches above the top of the pipe unless otherwise illustrated on the Plans, and shall be compacted in the trench to a relative compaction of not less than 90 or 95 percent of maximum density per ASTM D 1557 as illustrated on the Plans. Care shall be taken not to damage pipe and fittings or special coatings on the pipe and fittings.
  - 1. Use of material other than those specified shall be reviewed by the Engineer prior to use. The Contractor shall bear all cost of removal of rejected material, its hauling to an authorized disposal site, and cost of providing required material to complete the bedding and backfilling.
  
- B. Backfilling Pipe Trench: After the pipe has been laid in the trench and has been inspected and approved, and backfilling in the pipe zone is complete and compacted, the remainder of the trench may be backfilled. The backfill material shall be granular sand or Class 2 Base as specified in Paragraph 2.01 and illustrated on the Plans. Care shall be taken to ensure that no voids remain under, around or near the pipe.
  - 1. The Contractor shall incur the expense to remove and dispose of the excess trench excavation material displaced by the trench import material and include the costs in the bid.
  
- C. Compaction: The maximum dry density and optimum moisture content of each soil type used in the controlled compacted fill shall be determined by ASTM D 1557-91. Field density tests shall be determined in accordance with ASTM D 1556-82, ASTM D 2937-83 and ASTM D 2922-81.
  
- D. Placement and Compaction of Trench Backfill: The placement and compaction of all trench backfill shall be as follows:
  - 1. Mechanically Compacted Backfill: With approval of the Engineer, backfill shall be mechanically compacted by means of tamping rollers, sheepsfoot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers to 90 or 95 percent relative compaction as illustrated by the Plans. Impact-type pavement breakers (stompers or hydro-hammers) shall not be permitted over any pipe. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements or improvements installed under the Contract. The Contractor shall make his own determination in this regard. Backfill shall be placed in horizontal layers not exceeding eight inches (8"). Each layer shall be evenly spread, the moisture content brought to near optimum condition and then tamped or rolled until the specific relative compaction has been attained. Additional backfill lifts shall not be placed until previous lifts have been satisfactorily compacted and tested and approved by the Engineer.

3.05 CENTRAL PIPELINE INSTALLATION REQUIREMENTS

- A. Depth of Pipe: Unless otherwise illustrated on the Plans, all pipelines shall have coverage of at least 36 inches between the top of the pipe and the finished surface. All gravity line invert elevations and locations illustrated on the Plans are intended to be exact and any change in alignment and grade shall be reviewed in accordance with the Contract Documents to the satisfaction of the geotechnical testing representative and Engineer. All force and gravity mains shall have 1 foot vertical clearance between themselves and all other utilities. At all water main, sewer and stormwater crossings, both gravity and force mains shall have 20 linear feet of concrete encasement centered at the crossing as required by the State of California Department of Health.
- B. Changes in Line and Grade: In the event obstructions not shown on the Plans, are encountered during the progress of the Work, which will require alterations to the Plans, the Engineer shall issue the necessary revisions to the Plans and order the necessary deviation from the line or grade. The Contractor shall not make any deviation from the specified line and grade without prior review and approval by the Engineer. Should any deviations in line and grade be permitted by the Engineer in order to reduce the amount of rock excavation or for other similar convenience to the Contractor, any additional costs for thrust blocks, valves, air and vacuum valve assemblies, blow-off assemblies, extra pipe footage, concrete, sewer structures, or other additional costs shall be borne by the Contractor.
1. Contractor shall include in his Bid provisions to cover any deviation from the invert grade shown on the Plans to facilitate the extra depth required to avoid possible conflicts between existing gravity pipelines and other utilities with new water, stormwater or sewer forcemains.

C. Pipe Installation:

All pipe and fittings, and accessories furnished by the Contractor shall be new material free from rust or corrosion. All piping and fittings shall be cleaned on the inside when installed and the Contractor shall take all necessary precautions to insure that the lines are kept free of any foreign matter and dirt until the work is completed. All pipes shall be carefully placed and supported at the proper lines and grades as shown on the Plans. Piping runs shown on the Plans shall be followed as closely as possible, except for minor adjustments as approved by the Engineer to avoid other piping or structural features. Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe. Hunching of the pipe shall not be allowed. Pipe will be carefully inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it has been laid, it shall be subject to rejection by the Engineer. Any corrective work shall be approved by the Engineer. Pipe shall be laid true to line and grade with uniform bearing under the full length of the barrel of the pipe. Suitable excavation shall be made to receive the bell or collar which shall not bear upon the subgrade or bedding. Any pipe which is not in true alignment or shows any undue settlement after laying shall be taken up and relaid at the Contractor's expense. Pipe shall be laid upgrade with the socket ends of the pipe upgrade unless otherwise authorized by the Engineer. Pipe sections shall be laid and joined in such a manner that the offset of the inside of the pipe at any joint will be held to a minimum at the invert. The maximum horizontal offset at the invert of the pipe shall be 1% of the inside diameter of the pipe or 0.02 feet, whichever is smaller. The vertical grade shall be  $\pm 0.02$  feet of the design invert. In joining socket pipe, the spigot of each pipe shall be so seated in the socket of the adjacent pipe as to give a uniform annular space all around the pipe in the socket.

The following pipe installation items shall be required:

1. No pipe shall be laid which is damaged, cracked, checked or spalled or has any other defect deemed by the Engineer to make it unacceptable, and all such sections shall be permanently removed from the Work.
2. At all times when the Work of installing pipe is not in progress, all openings into the ends of the pipelines shall be kept tightly closed with suitable plywood or sheet metal bulkheads to prevent the entrance of animals and foreign materials and to prevent water from entering the pipe.
3. Keep the pipe trench free from water at all times and take all necessary precautions to prevent the pipe from floating due to water entering the trench from any sources. Any damage is the Contractor's full responsibility. Restore and replace the pipe to its specified conditions and grade if it is displaced due to floating.
4. All pipelines adjoining concrete structures (including manholes) shall have a flexible joint, such as sleeve transition couplings, within 36 inches from the face of such concrete structures. Flexible joints shall be installed on all pipe 4" and larger whether or not a flexible joint is illustrated on the Plans. Where the flexible joint is illustrated on the Plans, install the joint at the location indicated.

3.06 COMPACTION OF PIPE BEDDING AND BACKFILL

Unless specified in the Plans or Earthwork Specification (Technical Specification Section 02200), the following compaction test for piping shall be required.

- A. One (1) compaction test for the granular sand fill pipe bedding along each 100 lineal foot of water, sewer or stormwater pipe placed for each 1 foot lift of material installed.
- B. One (1) compaction test shall be obtained for each 1 foot lift of Class 2 Base material along each 100 foot section of water, sewer or stormwater pipeline installed.
- C. One (1) compaction test shall be required for each 1 foot of vertical sand fill material placed along each 100 feet of water, sewer or stormwater pipeline installed.
- D. One (1) compaction test shall be obtained for each 1 foot lift of native material along each 100 foot section of water, sewer or stormwater pipeline installed.
- E. One (1) compaction test shall be obtained for each 1 vertical foot of native material placed around stormwater or sanitary sewer manholes.
- F. A geotechnical testing representative shall be present at the time the sanitary sewer or stormwater pipeline and sanitary sewer or stormwater manholes are backfilled to monitor the placement of backfill material and complete compaction testing. Additional lifts shall not be installed until previous lifts have attained the specified compaction and is approved by the on-site geotechnical representative and Engineer.

3.07 CLEAN-UP

Immediately upon completion of Work for this Section, all rubbish and debris shall be removed from the Site. All pipe trench areas shall be finish graded with a "blade" or "motor patrol". All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean and acceptable condition.

**END OF SECTION 02221**

**SECTION 02630 - DUCTILE IRON PIPE**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish and install all ductile iron pipe, fittings, transitions, connections and appurtenant work, complete and in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 - Earthwork
- B. Section 02221 - Trenching, Backfilling and Compacting
- C. Section 02650 – Pipe Fittings
- D. Section 02666 – Pressure Pipeline Water Testing
- E. Section 02670 – Disinfection of Potable Water Pipelines
- F. Section 09800 – Protective Coatings

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards:

ANSI/AWWA C 104/A 21.4	Cement-mortar lining for Ductile Iron and Gray Iron Pipe and Fittings for Water.
ANSI/AWWA C 105/A 21.5	Polyethylene Encasement for Gray and Ductile Cast Iron Piping for Water and Other Liquids.
ANSI/AWWA C 110/A 21.10	Fittings, 3-inch through 48-inch for Water and Other Liquids, Gray Iron and Ductile Iron.
ANSI/AWWA C 111/A 21.11	Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings
ANSI/AWWA C 115/A 21.15	Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges.
ANSI/AWWA C 150/A 21.50	Thickness Design of Ductile Iron Pipe.
ANSI/AWWA C 151/A 21.51	Ductile Iron Pipe, Centrifugally Cast, in Metal Molds or Sand-Lined Molds for Water and Other Liquids.
ANSI/AWWA C 209	Cold Applied Coatings for the Exterior of Special Sections, Connections and Fittings for Steel Water Pipelines.

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ANSI/AWWA C 214	Tape Coating Systems for the Exterior of Steel Water Pipelines.
ANSI/AWWA C 600	Water Mains and Appurtenances, Installation of Ductile Iron.
ANSI/ASTM D 1248	Polyethylene Lining Material for Ductile Iron Pipe and Fittings.
ASTM C 150	Specification for Portland Cement.
ASTM A 746	Installation of Ductile Iron Pipe for Gravity Sewers.

1.04 CONTRACTOR SUBMITTALS

- A. The Contractor shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications and as specified in the referenced standards. Certification shall include physical and chemical properties of pipe materials and hydrostatic test reports.
- B. All expenses incurred in sampling and testing for certifications shall be borne by the Contractor.

1.05 QUALITY ASSURANCE

- A. Ductile iron pipe shall be manufactured with the material, have the dimensions, be within the tolerances and meet the testing requirements set forth in ASTM A 746 and ANSI A 21.51. Ductile iron pipe shall be manufactured in nominal 18 foot or 20 foot laying lengths and shall have the lining called for in the Contract Documents.
- B. All pipe shall be subject to inspection at the place of manufacture in accordance with the provisions of the referenced standards, as supplemented by the requirements herein.
- C. In addition to those tests specifically required, the Owner's Representative may request additional samples of any material including lining and coating samples for testing by the Owner. The additional samples shall be furnished at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Mortar lined and polyethylene encased ductile iron pipe shall conform to ANSI/AWWA C 151, C 104, C 105, C 214 and D 1248, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents and all specials and fittings shall be provided as required under the Contract Documents. Any ductile iron pipes used as air lines and connected after the blowers shall have EPDM gaskets.
- B. The pipe shall be handled by use of wide slings, padded cradles or other devices acceptable to the Owner's Representative, designed and constructed to prevent damage to the pipe lining and/or coating. The use of chains, hooks or other equipment which might injure the pipe lining and coating will not be permitted. Stockpiled pipe shall be safely and properly supported to prevent accidental rolling. The Contractor shall be fully liable for the cost of replacement or repair of pipe which is damaged.

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- C. Maximum pipe laying lengths shall be 20 foot with shorter lengths provided as required by the Design.
- D. The pipe shall have a smooth dense interior surface and shall be free from fractures, defects and roughness.

2.02 MATERIALS

- A. Ductile iron pipe materials shall conform to the requirements of ANSI/AWWA C 151/A 21.51.
- B. Fittings for ductile iron pipe shall conform to the requirements of ANSI/AWWA C 110/A 21.10 for diameters 3 inch through 48 inch. Ductile iron fittings larger than 48 inch shall conform to the above-referenced standard with the necessary modifications for the larger size.
- C. Cement for mortar lining shall conform to the requirements of ANSI/AWWA C 104/A 21.4; provided, that cement for mortar lining shall be Type V. A fly ash or pozzolan shall not be used as a cement replacement.
- D. Material for the polyethylene encasement shall conform to the requirements of ANSI/AWWA C 105/A 21.5.
- E. All elastomer gaskets used for ductile iron pipe shall be of neoprene material.
- F. All buried bolts and nuts used in the assembly of ductile iron pipe and fittings shall be 316 stainless steel bolts.

2.03 DESIGN OF PIPE

- A. Ductile iron pipe shall be designed in accordance with the requirements of ANSI/AWWA C 150/A 21.50, as applicable and as modified in this Section. The pipe furnished shall be cement-mortar lined. Buried ductile iron pipe shall be polyethylene encased.
- B. The pipe shall be designed, manufactured, tested, inspected and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C 151.
- C. The pipe and fittings shall be of the diameter shown and shall be of pressure Class 350 for pipe sizes twelve inches and below and pressure Class 250 for pipe fourteen inches to twenty inches and pressure Class 200 for twenty-four inch pipe and pressure Class 150 for thirty inch and above, except that where mechanical couplings are used and the pipe is grooved, the ductile iron pipe shall be of special thickness Class 53.
- D. Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints and restrained joints as required.
  - 1. Mechanical and push-on joints shall conform to ANSI/AWWA C 111/A 21.11.
  - 2. Flanged joints shall conform to ANSI/AWWA C 115/A 21.15.
  - 3. Restrained joints shall be “Lok-Ring” Restrained Joint by American Ductile Iron Pipe, “TR FLEX” Restrained Joint by U.S. Pipe, “Mechanical/Lock Joint” by Pacific States Cast Iron Pipe Company, or equal.

- E. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself will provide watertight joints under all operating conditions when properly installed. The Contractor shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

2.04 CEMENT-MORTAR LINING

- A. Except as otherwise provided herein, interior surfaces of ductile iron pipe, fittings and specials to be furnished with cement-mortar lining shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C 104. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.
- B. The minimum lining thickness shall be as follows:

Nominal Pipe Diameter (inches)	Minimum Lining Thickness (inches)
3-12	1/8
14-24	3/16
30-54	1/4

- C. For all pipe and fittings with plant-applied cement-mortar linings, the Contractor shall provide a polyethylene or other suitable bulkhead on the ends of the pipe and on all special openings. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

2.06 EXTERIOR COATING OF PIPE

- A. The exterior surfaces of ductile iron pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of rust-inhibitive primer conforming to the requirements of Division 9. This exposed piping shall not be coated with the bituminous coating by the manufacturer prior to delivery.
- B. Buried ductile iron pipe shall be polyethylene encased in accordance with the requirements of ANSI/AWWA C 105/A 21.5.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE

- A. All pipe, fittings, etc. shall be carefully handled and protected against damage, impact shocks and free fall. All pipe handling equipment shall be acceptable to the Owner's Representative. Pipe shall not be placed directly on rough ground, but shall be supported in a manner which will protect the pipe against damage whenever stored at the trench site in accordance with Paragraph 2.01, herein. All pipe damaged prior to Substantial Completion shall be repaired or replaced by the Contractor.
- B. The Contractor shall inspect each pipe and fitting prior to installation to ensure that there are no damaged portions of the pipe. No pipe shall be installed where the lining or coating exhibit defects that may be harmful as determined by the Owner's

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Representative. Such damaged lining or coating shall be repaired, or a new undamaged pipe shall be furnished and installed.

- C. The pipe shall be installed in accordance with ANSI/AWWA C 600. Before placement of the pipe in the trench, each pipe or fitting shall be thoroughly cleaned of any foreign substance which may have collected thereon and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the Work. As pipe laying progresses, the Contractor shall keep the pipe interior free of all debris. The Contractor shall completely clean the interior of the pipe of all sand, dirt, rocks and any other debris following completion of pipe laying prior to testing and disinfecting the completed pipeline.
- D. Pipe shall be laid directly on the imported bedding material. No blocking will be permitted and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Bell holes shall be formed at the ends of the pipe to prevent joint loading at the bells or couplings. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.
- E. Where necessary to raise or lower the pipe due to unforeseen obstructions or other cause, the Owner's Representative may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adapters or by the use of additional fittings. However, in no case shall the deflection in the joint exceed the maximum deflection recommended by the pipe manufacturer.
- F. No pipe shall be installed upon a foundation into which frost has penetrated or at any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation. No pipe shall be laid unless it can be established that the trench will be backfilled before the formation of ice and frost occurs.
- G. The openings of all pipe and specials where the pipe and specials have been cement-mortar lined in the shop shall be protected with suitable bulkheads to prevent unauthorized access by persons, animals, water or any undesirable substance. At all times, means shall be provided to prevent the pipe from floating.
- H. Immediately before jointing pipe, the bell end of the pipe shall be thoroughly cleaned and a clean rubber gasket lubricated with an approved vegetable-based lubricant shall be placed in the bell groove. The spigot end of the pipe shall be carefully cleaned and lubricated with a vegetable-based lubricant. The spigot end of the pipe section shall then be inserted into the bell of previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted.

**END OF SECTION 02630**

**SECTION 02640 - PVC PIPE**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish and install all Polyvinyl Chloride (PVC) plastic pipe, fittings, transitions, connections and appurtenant work, complete and in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02150 – Sheeting, Shoring and Bracing
- B. Section 02200 - Earthwork
- C. Section 02221 - Trenching, Backfilling and Compacting
- D. Section 02666 – Pressure Pipeline Water Testing

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards:

ASTM D 1784 and ASTM D 1785	Specifications for Polyvinyl Chloride (PVC) Plastic Pressure Pipe
ASTM D 3034	Specifications for Polyvinyl Chloride (PVC) Plastic Gravity Sewer Pipe
AWWA C 900	Specifications for Polyvinyl Chloride (PVC) Plastic Water Pressure Pipe
ASTM D 2321	Standard Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
NSF / ASNI 61	Drinking Water System Components – Health Effects

1.04 CONTRACTOR SUBMITTALS

- A. Contractor shall submit copies of the manufacturer’s product specifications according to the requirements of Section 01300 - Contractor Submittals.

PART 2 - PRODUCTS

2.01 PVC (POLYVINYL CHLORIDE) PRESSURE PIPE, 4 INCHES AND SMALLER SOLVENT-WELDED

- A. All PVC pressure pipe 4 inches and smaller shall be made from all new rigid unplasticized polyvinyl chloride and shall be Normal Impact Class 12454-B, Schedule 80, to conform to ASTM D 1785, unless otherwise shown. Elbows, tees, and fittings shall be of the same material and schedule as the pipe. Unless otherwise shown, joint design shall be for solvent-welded construction.

2.02 AWWA C 900 WATER PIPELINE WITH BELL AND SPIGOT JOINTS

This Specification designates general requirements for unplasticized polyvinyl chloride (PVC) plastic class water pipe with integral bell and spigot joints for the conveyance of water. Pipe shall meet the requirements of AWWA C 900 “Polyvinyl Chloride (PVC) Water Distribution”.

All pipe shall be suitable for use as pressure conduit, provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a factory installed, solid cross-section elastomeric ring which meets the requirements of ASTM F 477. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall and meet the requirements of AWWA C 900. Sizes and dimensions shall be as shown in this Specification. Joint design shall meet qualification requirements of ASTM F 3139. Each pipe shall be tested to four times the pressure class of the pipe for a maximum of 5 seconds. The integral bell shall be tested with the pipe. Standard laying lengths shall be 20 feet (±1”) for all sizes.

The pipe stiffness using F/ΔY for PVC class water pipe is contained in the table below:

<u>CLASS</u>	<u>DR</u>	<u>FΔy (PSI)</u>
100	25	129
150	18	364
200	14	815

Pipe shall withstand, without failure at 73°F, an impact of a falling missile, TUP C, at the following levels (per ASTM D 2444):

<u>Pipe Size (IN.)</u>	<u>Impact (FT./LBS.)</u>
4	100
6	100
8	100
10	120
12	120

There shall be no visible evidence of shattering or splitting when the energy is imposed.

Randomly selected samples tested in accordance with ASTM D 1599 shall withstand, without failure, pressures listed below when applied in 60-70 seconds.

<u>Class</u>	<u>Minimum Burst Pressure At 73°F (PSI)</u>
100	535
150	755
200	985

Pipe for this Project shall conform with the specifications for AWWA C 900, DR 18 PVC pipe material for diameter sizes 4-inches through 60 inches, unless otherwise indicated on the Plans.

2.03 PVC (POLYVINYL CHLORIDE) GRAVITY PIPE

- A. Pipe shall conform to the requirements of ASTM D 3034 for SDR 26 gravity pipe, unless otherwise indicated on the Plans.

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- B. All pipe joints shall be of the bell and spigot type with electrometric seals and conform to the requirements of ASTM D 3212. Gaskets shall be factory installed and chemically bonded to the bell end of the pipe. Gasket material shall conform to the requirements of ASTM F 477.
- C. All fittings shall be fabricated from pipe meeting the requirements of these standards. Fabricated miter joints shall be reinforced by fusion heat welding. All fittings shall be approved for use by the pipe manufacturer and shall be capable of accepting bell and spigot connections.
  - 1. There shall be no sign of flaking or disintegration when immersed in anhydrous acetone for 20 minutes as described in ASTM D 2152.
- D. All pipe shall be from quality PVC resin, compounded to provide physical and mechanical properties that equal or exceed cell class 12454 as defined in ASTM 1784.
- E. Minimum pipe stiffness at 5 percent deflection shall be 46 PSI for all sizes when tested in accordance with ASTM D 2412, External Loading Properties of Plastic Pipe by Parallel-Plate Loading”.
- F. Each pipe shall be identified with the name of manufacturer, nominal size, cell classification, ASTM designation F 1803, the pipe stiffness designation “PS-46” and manufacturer’s date code.

2.04 NSF / ANSI STANDARD 61

Piping, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61 as being suitable for contact with potable water.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE

- A. All pipe, fittings, etc., shall be carefully handling and protected against damage, impact shocks and free fall. All pipe handling equipment shall be acceptable to the Engineer. Pipe shall not be placed directly on rough ground, but shall be supported in a manner which will protect the pipe against injury whenever stored at the Site. All pipe damaged prior to Substantial Completion shall be repaired or replaced by the Contractor.
- B. The Contractor shall inspect each pipe and fitting prior to installation to ensure that there are no damaged portions of the pipe. Damaged pipe shall be replaced with new undamaged sections of pipe.
- C. Before placement of the pipe in the trench, each pipe or fitting shall be thoroughly cleaned of any foreign substance which may have collected thereon and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the Work. As pipe laying progresses, the Contractor shall keep the pipe interior free of all debris. The Contractor shall completely clean the interior of the pipe of all sand, dirt, rocks and any other debris following completion of pipe laying prior to testing, disinfecting and placing the completed pipeline in service.
- D. Pipe shall be laid directly on the imported bedding material. No blocking will be permitted and the bedding shall be such that it forms a continuous, solid bearing for the

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full length of the pipe. Bell holes shall be formed at the ends of the pipe to prevent joint loading at the bells or couplings.

- E. Where necessary to raise or lower the pipe grade due to unforeseen obstructions or other causes, the Engineer may change the alignment and/or the grades. Such change shall be made by the deflection of joints or by the use of additional fittings. However, in no case shall the deflection in the joint exceed the maximum deflection recommended by the pipe manufacturer.
- F. No pipe shall be installed upon a foundation into which frost has penetrated or any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation. No pipe shall be laid unless it can be established that the trench will be backfilled before the formation of ice and frost occurs.
- G. Immediately before jointing bell and spigot pipe, both the bell and spigot end of the pipe shall be thoroughly cleaned and lubricated with an approved vegetable-based lubricant. The spigot end of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper alignment. Tilting of the pipe to insert the spigot into the bell will not be permitted.
- H. Solvent-welded and heat-fused joints shall be carefully and thoroughly cleaned immediately before jointing the pipe. Particular care shall be taken in making solvent-welded joints to ensure a uniform, homogeneous and complete bond.
- I. Pipe installation shall conform with Technical Specification Section 02221 - Trenching, Backfilling and Compacting. If this installation of pipe section and Section 02221 conflict, the most stringent specification shall apply.

**END OF SECTION 02640**

**SECTION 02650 –  
PIPE FITTINGS, TRANSITION COUPLINGS, AND HARDWARE**

PART 1 - GENERAL

1.01 DESCRIPTION

The Contractor shall provide and install pipe fittings, transition couplings, and hardware for the connection of PVC, ductile iron and other pipeline material. Other connecting items may also be required. This section includes the specifications and requirements for the prior listed pipe connection items. The hardware for this specification section shall include the hardware for pipe or any other fittings or items located along a pipeline. Material shall be new and free from defects.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02630 - Ductile Iron Pipe
- B. Section 02640 - PVC Pipe

1.03 REFERENCE DOCUMENTS

Unless otherwise indicated, the current editions of the following reference standards and specifications apply to the Work described herein, and are considered part of this Specification.

C 104/A 21.4-03	American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
C 105/A 21.5-99	American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
C 110/A 21.10-03	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-In. through 48-In. (76 mm through 1,219 mm), for Water
C 111/A 21.11-00	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
C 115/A 21.15-99	American National Standard for Flanged Ductile Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
C 116/A 21.16-03	American National Standard for Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service
C 153/A 21.53-00	American National Standard for Ductile-Iron Compact Fittings, 3-In. (76 mm) through 64-In. (1,600 mm), for Water Service
ASTM A 536	American Standards for Testing and Materials - High Strength Ductile Iron for Sleeve and Flanges of Transition Coupling and Flanged Coupling Adapter
ASTM A 536-80, Grade 65-45-12	American Standard Testing and Material - Ductile Iron Mechanical Joint Restraint Fitting

UNI-B-13-92 As listed Underwriters Laboratories - Restraining Glands for Mechanical Restrained Joint Fittings

ASTM B 117 American Standard Testing Materials - Salt Spray Testing for Bolts

1.04 CONTRACTOR SUBMITTALS

- A. The Contractor shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications and as specified in the referenced standards. Certification shall include physical and chemical properties of pipe materials and hydrostatic test reports.
- B. All expenses incurred in sampling and testing for certifications shall be borne by the Contractor.

1.05 QUALITY ASSURANCE

- A. Ductile iron fittings shall be manufactured with the material, have the dimensions, be within the tolerances and meet the testing requirements set forth in ANSI A 21.53-00 and ANSI A 21.10-03.
- B. All fittings shall be subject to inspection at the place of manufacture in accordance with the provisions of the referenced standards, as supplemented by the requirements herein.
- C. In addition to those tests specifically required, the Owner's Representative may request additional samples of any material including lining and coating samples for testing by the Owner. The additional samples shall be furnished at no additional cost to the Owner.

PART 2 - PRODUCTS

The Technical Requirements for Ductile Iron Fittings, Transition Couplings, and Hardware follow:

2.01 DUCTILE IRON FITTINGS

Fittings and reducers for the water mains shall be composed of ductile iron. The ductile iron fittings shall conform to ASTM A 536. Mechanical joint fittings shall conform with AWWA C 153 C 350 PSI. Flanged fittings shall conform with AWWA C 110 C 250 PSI. Flange fittings shall have standard wall thickness not compact thickness. The fittings shall be cement-mortar lined in accordance with ANSI/AWWA C 104/A 21.4, Standard for Cement-Mortar Lining for Ductile Iron and Gray Iron Pipe Fittings for Water, latest revision. Asphaltic seal coating shall be applied to the interior and exterior of the below-grade fittings in accordance with ANSI/AWWA C 104/A 21.4, asphaltic seal coating shall be applied to the interior of the above-grade fittings. The exterior surfaces of above-grade ductile iron fittings shall be thoroughly cleaned and then given a shop coat of rust inhibitive primer conforming to the requirements of Division 9. This exposed piping shall not be coated with the bituminous coating by the manufacturer prior to delivery.

2.02 TRANSITION COUPLING

The transition couplings shall be installed as required. The center rings shall be constructed of ductile iron conforming to ASTM A 536-80, Grade 65-45-12. the end rings shall be constructed of ductile iron conforming to ASTM A 536, Grade 65-45-12. Gaskets shall be composed of virgin styrene butadiene rubber (SBR) compounded for water and sewer service in accordance with ASTM D 2000 MBA 810. The coating for the ductile iron transition coupling shall be fusion

bonded epoxy. The transition coupling shall be capable of sustaining a working pressure of 250 PSI.

2.03 RESTRAINED JOINT FITTINGS

Mechanical joint restraint shall be incorporated into the design for the follower gland. The gripping or restraining mechanism shall transmit uniform restraining pressure around the circumference of the pipe, thus avoiding point loading or pipe distortion. This restraining process shall be kept separate from the mechanical joint sealing process and *not* a part of the sealing function. All components shall be manufactured of ductile iron conforming to ASTM A 536-80, Grade 65-45-12.

The restrained twist-off nut bolt system shall have a torque limiting feature designed to break off at 75 to 90 FT-LBS of torque to insure proper actuating of restraining devices. Both the twist-off nut and the removal nut shall be the same size as tee-bolt nut. Hardware shall be composed of 316 stainless steel.

The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C 111/A 21.11, C 110/A 21.10 and C 153/A 21.53 of the latest revision.

The device shall restrain all classes of ductile iron, C 900 PVC, C 905 PVC and high-density polyethylene (HDPE) with the use of a standard mechanical joint gasket. The same device without any field modification shall additionally restrain IPS PVC, IPS steel and IPS HDPE with the use of a transition gasket.

The restraining glands shall have a pressure rating equal to twice (2:1) that of the pipe on which it is used. The restraining glands shall have been tested to UNI-B-13-92, be listed by Underwriters Laboratories and be approved by factory mutual. The mechanical joint restraint device shall be UNI-Bell, EBBA Series 2000, Sigma One-Lock or equal.

Restrained joint fittings shall be placed at all termination points, tees, bends, and angle points. Restrained joint fittings shall be placed for connection points of existing to new pipelines, unless noted in the plans. New pipeline-to-pipeline connections shall not be required to have restrained harness assemblies unless noted in the Plans.

2.04 HARDWARE

Hardware for ductile iron fittings shall conform with ANSI/AWWA C 111/A 21.11-07, Appendix "C", Section C.1 entitled "Bolts and Nuts". The size, length and number of bolts are illustrated in Tables 2 and 3 of ANSI/AWWA C 115/A 21.15.

Hardware for transition couplings and mechanical restrained joint fittings shall comply with the manufacturer's recommendation for steel or ductile iron bolts and nuts.

For above ground and underground, all steel or ductile iron nuts and bolts shall be coated with a flouropolymer using Xylan/014 as a primary coating. The coating shall be electrostatically applied to the hardware after all surfaces are chemically cleaned, abrasive blasted and primed with a nickel phosphate primer. Multiple coats of the Xylan/014 shall be applied to the steel or ductile iron hardware and baked at 425°F for one (1) hour. Hardware protected with this coating system shall exhibit no signs of corrosion after salt spray testing up to 3,000 hours. The coating system shall be a Tripac 2000 Blue or an approved equal.

316 stainless steel hardware shall be used if specified for a given pipe, valve, fitting or other component on the Plans or within the contents of this document.

2.05 POLYETHYLENE ENCASEMENT

All ductile iron or gray iron fittings, transition couplings and coupling adapters shall be polyethylene encased at the time of installation. Polyethylene encasement and installation shall be in accordance with ANSI/AWWA C 105.

PART 3 - EXECUTION

3.01 INSTALLATION OF FITTINGS, TRANSITION COUPLINGS, AND HARDWARE

- A. All fittings, etc. shall be carefully handled and protected against damage, impact shocks and free fall. All fittings, etc. handling equipment shall be acceptable to the Owner's Representative. Fittings, etc. shall not be placed directly on rough ground, but shall be supported in a manner which will protect the fittings, etc. against damage whenever stored at the trench site. All fittings, etc. damaged prior to Substantial Completion shall be repaired or replaced by the Contractor.
- B. If during the course of fastening and securing the hardware (nuts and bolts) for the fittings, etc., the fluoropolymer coated is scratched, chipped or otherwise removed from the hardware surface, then a coating system supplied by the manufacturer shall be applied to the damaged hardware surface. The repair coating system shall be applied prior to the backfilling or covering of the fittings, etc. hardware.

**END OF SECTION 02650**

**SECTION 02666 – PRESSURE PIPELINE WATER TESTING**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall perform flushing and testing of all pipelines and appurtenant piping complete, including conveyance of test water from Engineer-designated source to point of use and disposal thereof after testing, in accordance with the requirements of the Contract Documents. The disposal method of the water shall be reviewed and approved by the Owner's Representative prior to the commencement of the test.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02221 - Trenching, Backfilling and Compaction
- B. Section 02630 - Ductile Iron Pipeline
- C. Section 02640 - PVC Pipe

PART 2 – PRODUCTS

2.01 MATERIAL REQUIREMENTS

- A. All test equipment, fuel, electrical connections, temporary valves, bulkheads, compressors, water pumps, water gauges and other water control equipment support systems and required materials for hydrostatic or pneumatic air testing shall be furnished by the Contractor subject to the Owner's Representative's review.

PART 3 – EXECUTION

3.01 GENERAL

- A. The Contractor shall notify the Owner's Representative at least four (4) days in advance of any planned testing and shall review the testing procedures with the Owner's Representative. The source of testing water and disposal of the testing water shall be reviewed.
- B. Unless otherwise provided herein, water for testing pipelines shall be furnished by the Owner; however, the Contractor shall make all necessary provisions for conveying the water from the Owner-designated source to the points of use. The Contractor shall provide inlet hoses, fittings, pressure gauges pumping equipment, meters, backflow preventers and other required items.
- C. The Contractor shall provide a double bronze service saddle, brass corporation stop, inlet pipeline and outlet pipeline at the beginning and end of the pipeline section to be tested to allow water to be directed into the pipeline and air to be purged from the pipeline while the pipeline is filling with water. The fittings and pipe shall be used during the chlorination and disinfection of the pipeline. After the hydrostatic pipe testing and disinfection of the pipeline are satisfactorily completed remove the corporation stop from the brass service saddle. Place a brass plug in the service saddle inlet.
- D. All pipelines shall be tested. All testing operations shall be performed in the presence of the Owner's Representative.

- E. The disposal or release of test water from pipelines, after testing, shall be acceptable to the Owner's Representative. The conveyance items to dispose of the testing water shall be provided by the Contractor.

3.02 HYDROSTATIC TESTING OF PIPELINES

- A. Prior to hydrostatic testing, all pipelines shall be thoroughly flushed of all sand, dirt and material to the satisfaction of the Owner's Representative. The Contractor shall test all pipelines either in sections or as a unit. The Contractor shall be responsible to insure all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, adjacent pipe or structures. Care shall be exercised to insure that all air vents are open during filling.
- B. The pipeline shall be filled at a rate which will not result in surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity and all the air within the pipeline shall be properly purged. After the pipeline or section thereof has been filled it shall be allowed to stand under a slight pressure for at least 24 hours to allow the concrete or mortar lining, if applicable, to absorb water and allow the escape of air from the pipeline. During this period, bulkheads, valves and connections shall be examined for leaks. If leaks are found, corrective measures shall be initiated and completed to the satisfaction of the Owner's Representative.
- C. The hydrostatic test shall consist of holding the test pressure within the pipeline for a period of 4 hours. The test pressure for pipelines shall be 150 PSI or 1.5 times the rated pipe pressure class which ever is greater. All leaks shall be repaired. The hydrostatic pressure shall be relieved from the pipeline prior to initiating leak repair.
- D. Pipe leaks, as evidenced by water loss from the basin from which water is pumped into the pipeline, shall not be allowed after the test begins. Test pressures shall be held for at least two (2) hours after the test commences without additional pumping and observed for not less than four (4) hours. Approved gauges shall be provided by the Contractor. Gauge range shall not exceed 50 PSI above test pressure. In the event leaks occur after the hydrostatic test commences, the Contractor shall determine the cause of the leakage and take corrective measures necessary to repair the leaks. After the leaks are satisfactorily repaired the pipeline shall be re-tested.

3.03 AIR TESTING OF WATER PIPELINE

In lieu of hydrostatic testing of water pipeline sections within the water treatment plant area, air testing shall be allowed.

- A. The Contractor shall leak test 100% of the pipeline installed. The leak testing shall be accomplished after any required deflection testing of the pipeline is completed.
- B. Pipelines shall be subject to acceptance testing after backfilling has been completed but prior to the placement of the finish surface material (i.e. Class 2 Base, A.C. pavement and P.C.C. concrete).
- C. The cost of repairs or corrections necessary to conform to the testing requirements will be borne by the Contractor at no cost to the Owner.
- D. Air testing will be accomplished by the means of "Low Pressure Air Testing". Tests may be conducted by the Contractor or an independent testing firm. However, acceptance tests shall be made only in the presence of the Owner's Representative.
- E. Test Procedure:

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1. Before testing, the pipe shall be thoroughly cleaned.
2. The Contractor shall seal off the section of pipe to be tested at each pipe beginning and termination point. Test plugs must be securely braced at the beginning and termination points of the pipeline.
3. A minimum of two (2) connection hoses to link the air inlet test plug with an aboveground test-monitoring panel must be provided.
  - a) One (1) hose is to induce air through the test plug and into the test chamber.
  - b) The second hose is for the purpose of monitoring the test pressure from within the enclosed pipe.
4. Under no circumstances are workers to be allowed in the area of the braced pipeline beginning and termination points while pressure testing is being conducted.
5. Add air slowly into the test section. After an internal pressure of 4.0 PSI is obtained, allow internal air temperature to stabilize for a minimum of 2 minutes.
6. After the stabilization period, adjust the internal air pressure to 3.5 PSI, disconnect the air supply and begin timing the test.
7. Refer to the following pipeline air test table to determine the length of time (minutes) the pipeline section being tested must sustain air pressure while not losing in excess of 1 PSI as monitored by the test gauge. If the section of pipeline to be tested includes more than one pipe size, calculate the test time for each size and add the test times to arrive at the total test time for the section.
8. Sections so determined to have lost 1 PSI or less during the test period will have passed the leakage test. Those sections losing in excess of 1 PSI during the test period will have failed the leakage test.
9. Appropriate repairs must then be conducted and re-test the pipe for acceptance.

**PIPELINE AIR TEST TABLE**  
Minimum Test Time for Various Pipe Sizes\*

Nominal Pipe Size, In.	T (Time), Min/100 FT.	Nominal Pipe Size, In.	T (Time), Min/100 FT.
3	0.2	21	3.0
4	0.3	24	3.6
6	0.7	27	4.2
8	1.2	30	4.8
10	1.5	33	5.4
12	1.8	36	6.0
15	2.1	39	6.6
18	2.4	42	7.3

\*The time has been established using the formulas contained in ASTM C 828, Appendix

**END OF SECTION 02666**

**SECTION 02670 - DISINFECTION OF POTABLE WATER PIPELINES**

PART 1 - GENERAL

1.01 DESCRIPTION

Potable pipelines within the water distribution system, Water Treatment Plant, and other areas are to be disinfected prior to being connected to other existing active pipelines and placed in service. The new pipelines are to be isolated from the existing active pipelines (usually by means of a closed valve) until the pipeline has been satisfactorily hydrostatically tested, leak tested (if required) and disinfected. The pipelines shall be hydrostatically, and leak tested as a separate procedure from the pipeline disinfection.

1.02 PURPOSE

The purpose of this standard is to define the minimum requirements for the disinfection of water mains, including the preparation of water mains, application of chlorine, and sampling and testing for the presence of coliform bacteria.

1.03 REFERENCE SECTIONS

Reference sections pertaining to the disinfection testing are as follows:

Section 02630	Ductile Iron Pipe
Section 02640	PVC Pipe
Section 02666	Pressure Pipeline Water Testing
ANSI/AWWA C 651-05	American National Standards Institute/ American Water Works Association
ANSI/AWWA B 300	Hypochlorites
ANSI/AWWA B 301	Liquid Chlorine
AWWA Manual M 12	<i>Simplified Procedures for Water Examination</i> , AWWA: Denver, Colorado

SECTION 2 - PRODUCTS

2.01 GENERAL

A. Construction of Pipeline, Associated Fittings, Valves and Components:

The Contractor shall train pipe crews to be aware of the need to maintain clean pipes, fittings, etc and avoid contamination. While bacteriological testing is used to verify the absence of coliform organisms and is generally accepted as verification that disinfection of the pipeline has been accomplished, following sanitary practices for handling and installation of pipe, valves, fittings, and accessories, coupled with adequate flushing of the line before disinfection, is necessary to ensure that the disinfected pipeline will be ready for connection to the water system. Failure to pass the bacteriological test shall require that the flushing or disinfection process be repeated. The final water quality test is not the primary means for certifying the sanitary condition of a main. The sanitary

handling of materials, the practices during construction, and the continual inspection of the work are the primary means for ensuring the sanitary condition of the water main.

B. Methods of Disinfecting Newly Constructed Water Pipelines and the Acceptable Method of Disinfecting Pipelines:

The three methods of disinfecting newly constructed water mains are the tablet method, the continuous-feed method and the slug method. Factors considered when selecting a method include the length and diameter of the main, type of joints present, availability of materials, equipment required for disinfection, training of the personnel who will perform the disinfection, and safety concerns. This Project shall allow chlorination of pipelines by the continuous feed method. The tablet method and slug method shall not be allowed.

The tablet method shall not be used unless the main can be kept clean and dry. It shall not be used in large-diameter mains if it is necessary for a worker to enter the main to grout joints or perform inspection, because the tablets may release toxic fumes after exposure to moist air. When using the tablet method, the chlorine concentration is not uniform throughout the main, because the hypochlorite solution is dense and tends to concentrate at the bottom of the pipe. The use of the tablet method precludes preliminary flushing. The tablet method is convenient to use in mains having diameters up to 24 inches, and it requires no special equipment.

The continuous-feed method is suitable for general application. Preliminary flushing removes light particulates from the main but not from the pipe-joint spaces. The chlorine concentration is uniform throughout the main.

The slug method is suitable for use in large-diameter mains where the volume of water makes the continuous-feed method impractical and difficult to achieve for short attachments. The slug method results in appreciable savings of chemicals used to disinfect long, large-diameter mains. Also, this method reduces the volume of heavily chlorinated water to be flushed to waste.

C. Forms of Chlorine for Disinfection:

The forms of chlorine that may be used in the disinfection operations are liquid chlorine, sodium hypochlorite solution, and calcium hypochlorite granules or tablets. For this Project, liquid chlorine shall be used unless otherwise approved by the Owner's Representative.

1. **LIQUID CHLORINE:** Liquid chlorine conforming to ANSI/AWWA B301 contains 100 percent available chlorine and is packaged in steel containers usually of 100-lb., 150-lb., or 1-ton net chlorine weight. Liquid chlorine shall be used only (1) in combination with appropriate gas-flow chlorinators and ejectors to provide a controlled high-concentration solution feed to the water to be chlorinated; (2) under the direct supervision of personnel familiar with the biological, chemical and physical properties of liquid chlorine and who are trained and equipped to handle any emergency that may arise; and (3) when appropriate safety practices are observed to protect working personnel and the public.
2. **SODIUM HYPOCHLORITE:** Sodium hypochlorite conforming to ANSI/AWWA B300 is available in liquid form in glass, rubber-lined, or plastic containers typically ranging in size from 1 quart to 5 gallons. Containers of 30 gallons or larger may be available in some areas. Sodium hypochlorite contains approximately 5 percent to 15 percent available chlorine, and the storage conditions and time must be controlled to minimize its deterioration. (Available

chlorine is expressed as a percent of weight when the concentration is 5 percent or less, and usually as a percent of volume for higher concentrations. Percent x 10 = grams of available chlorine per liter of hypochlorite.)

3. **CALCIUM HYPOCHLORITE:** Calcium hypochlorite conforming to ANSI/AWWA B300 is available in granular form or in 5-g tablets, and must contain approximately 65 percent available chlorine by weight. The material should be stored in a cool, dry, and dark environment to minimize its deterioration.

**CAUTION:** Tablets dissolve in approximately 7 hours and must be given adequate contact time. Do not use calcium hypochlorite intended for swimming pool disinfection, as this material has been sequestered and is extremely difficult to eliminate from the pipe after the desired contact time has been achieved.

D. Preventative and Corrective Measures to be Implemented during the Construction of Pipelines:

Heavy particulates (dirt, soil, rocks, etc.) generally contain bacteria and prevent even very high chlorine concentrations from contacting and killing organisms. Therefore, the procedures of this Section shall be stringently implemented by the Contractor and enforced by the Owner's Representative to ensure that water pipelines, fittings, etc., have been thoroughly cleaned before flushing the pipeline for the final disinfection by chlorination. Also, any connection of a new water main to the active distribution system prior to the receipt of satisfactory bacteriological samples constitute a cross-connection in violation of the California Health Department requirements. The new main shall be isolated until bacteriological tests described later in this Section are satisfactorily completed. The Contractor shall complete the following tasks or observe the following precautionary measures during the installation of the water pipeline:

1. The interiors of pipes, fittings and valves shall be protected from contamination by dirt, debris, rocks, concrete residue, water and similar items.
2. Openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Rodent-proof plugs may be used when watertight plugs are not practicable and when thorough cleaning will be performed by flushing or other means.
3. Delay in placement of delivered pipe invites contamination. Pipe delivered to the site shall be covered with tarps. The tarps shall be placed over the pipes and end of the pipes to minimize the entrance of dirt, dust and construction debris.
4. Sealing Materials: No contaminated material or any material capable of supporting growth of microorganisms shall be used for sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water and shall not contribute odors. It shall be delivered to the job in closed containers and shall be kept clean and applied with dedicated, clean applicator brushes.
5. If dirt or other contaminants enter a pipeline, fitting, transition coupling, valve or any other pipeline, it shall be swept from the interior of the pipeline, fitting, etc. The contaminated area shall be wiped clean with an ammonia solution disinfectant. After each pipe section is installed the end of the pipe shall be inspected for the entrance of dirt and other contaminants. If dirt or contaminants

are identified the dirt and contaminants shall be removed prior to the installation of the next pipe length. Correspondingly, the pipe end to be “stabbed” into the previously installed pipe segment shall be checked for dirt contamination and cleaned and disinfected accordingly.

6. Flooding by Storm or Accident during Construction: If the pipeline is flooded during construction, it shall be cleared of the floodwater by draining and flushing with potable water until the main is clean. The section exposed to the floodwater shall then be filled with a chlorinated potable water that, at the end of a 24-hour holding period, shall have a free chlorine residual of not less than 25 mg/L. The chlorinated water shall then be drained or flushed from the main. After construction is completed, the main shall be disinfected for a second time using the continuous-feed method.

### PART 3 - EXECUTION

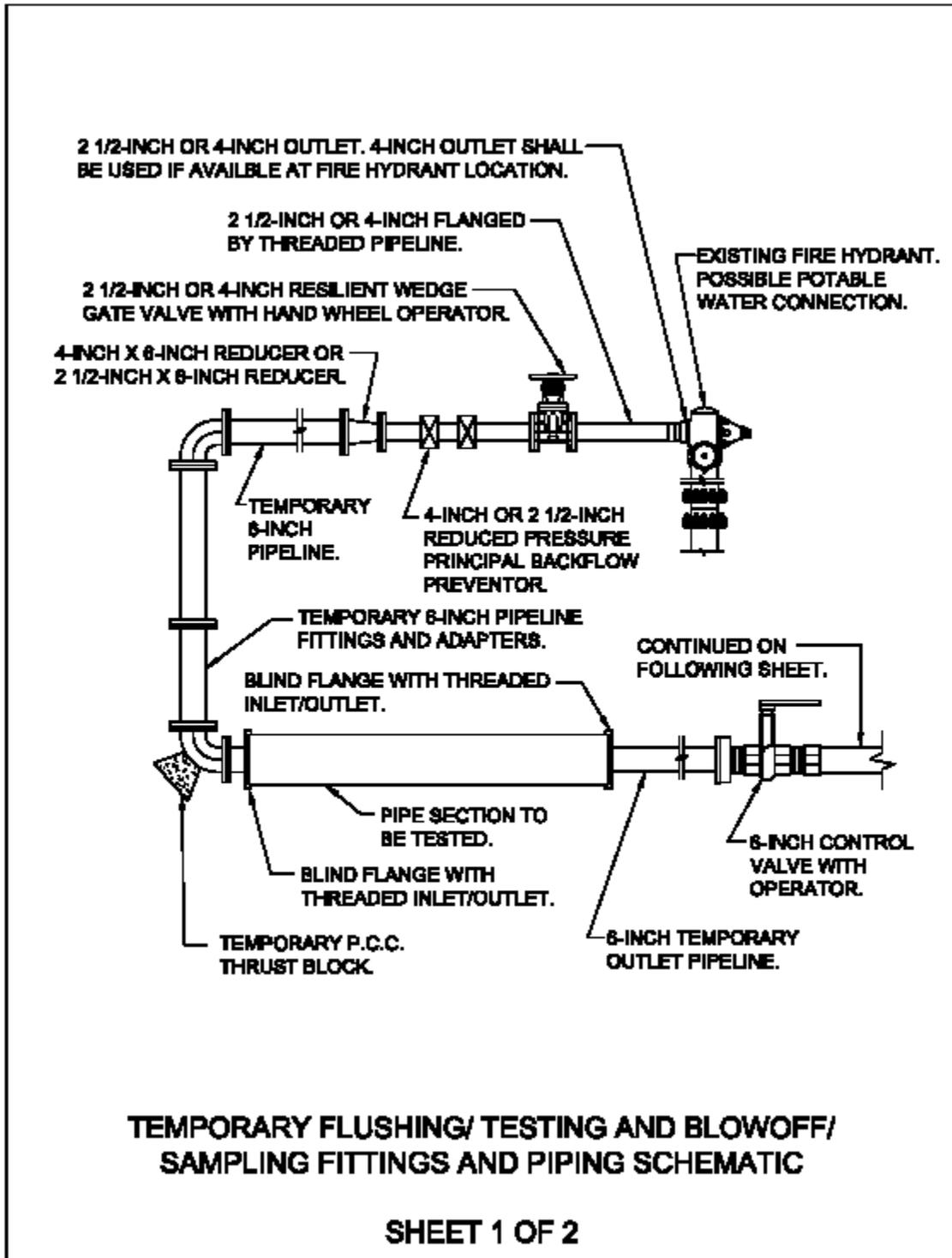
#### 3.01 GENERAL

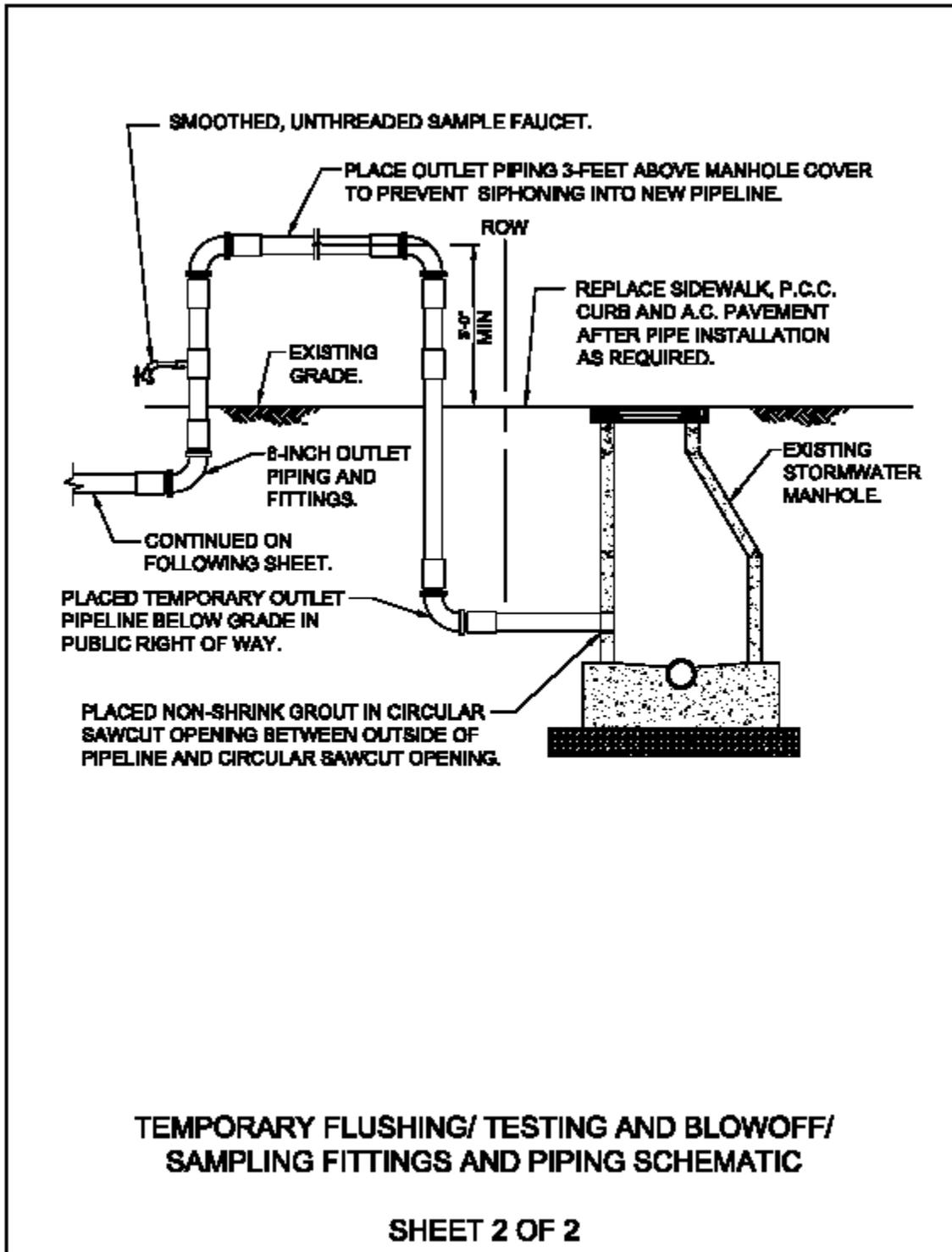
The water pipeline shall be thoroughly flushed with potable water prior to the chlorination of the pipeline. Prior to the flushing of the water pipeline it may be necessary to construct temporary flushing and testing connections at the upstream and downstream ends of the pipelines to be tested. If new pipelines are to be connected to existing in-service pipelines with new valves installed at the connection fittings between the new and existing pipelines which reliably isolate the new pipeline from the existing in-service pipeline, then blowoffs and properly positioned fire hydrants allow for the adequate flushing of the pipeline and allow for the dispersion of chlorine by the continuous-feed method. This method is particularly applicable to new commercial or residential developments which occur within an existing pipe distribution system.

If new pipelines are to be connected to existing in-service pipelines, concrete structures and reservoirs with no reliable valve at the connection point of the new pipeline to isolate the new pipeline from the existing in-service pipelines, concrete structures and reservoirs, then temporary caps or plugs (blind flanges), supply hoses, control valves, backflow devices, discharge/flushing lines and sampling faucets shall be constructed. This pipeline condition often occurs within water treatment plants. The pipelines within water treatment plants in the condition described within this paragraph shall be flushed, chlorinated and tested while physically separated from existing in-service pipelines, reservoirs and concrete structures. The physically separated pipeline section shall be hydrostatically tested prior to the flushing, chlorination and testing of the pipeline section. Potable water from an outside source shall be required to be conveyed to the new pipeline for flushing and disinfecting via a temporary connection supplied and installed by the Contractor. The temporary connection shall be disconnected (physically separated) from the new pipeline during the hydrostatic pressure test. The temporary connection shall include a reducer fitting from the fire hydrant, 4 inch control valve, 4 inch backflow preventer based upon a reduced pressure principal, 4 inch supply hose or pipeline, temporary testing block, blind flange with 4 inch threaded outlet, 4 inch discharge piping, 4 inch discharge control valve and smooth, unthreaded sampling faucet. It shall be necessary for the Contractor to provide all other necessary fittings, adapters, hardware and other components. The discharge pipeline shall extend to a discharge point acceptable to the Owner’s Representative. If the discharge pipeline extends through on-site roadways or into the public right of way then the Contractor shall place the temporary discharge pipeline below grade. The Contractor shall perform all cutting, demolition and replacement of P.C.C. infrastructure as required by Division 1 of the Technical Specifications. The Contractor shall core the side of manholes, install the discharge pipeline to the interior wall face of the manhole and grout the annular space between the exterior circular core and the exterior of the pipeline for the full thickness of the manhole shaft with a non-shrink grout. At the conclusion of the pipeline disinfection all upstream and downstream pipelines, supply hoses, valves, check valves, fittings, blind flanges and components shall be removed from the Project Site. The interior

of any discharge pipeline extending into manholes shall be plugged for the full width of the manhole shaft wall width with a non-shrink grout.

A schematic of the temporary flushing/testing connection and schematic of the discharge blowoff/sampling tap pipeline follows. The schematic drawings are intended to illustrate the concept and major components required for the disinfection of the pipeline. The schematics do not illustrate each fitting, adapter and component required for the flushing/testing connection pipeline or the discharge blowoff/sampling tap pipeline nor do the schematics illustrate the lengths of pipelines required, number of fittings, number of valves, etc. The schematics do not illustrate where the source of water is to be obtained or the discharge point the blowoff pipeline is to extend to. It is the responsibility of the Contractor to determine the source of the potable water, length of the connection pipeline, exact number and type of fittings, valves and adapters, length of the blowoff pipeline, exact number and type of fittings, valves and adapters, paving and concrete demolition and replacement requirements and similar logistical placement, pipe mechanic and civil infrastructure issues. Following are the Temporary Flushing/Testing Connection Schematic and Blowoff Sampling Point Discharge Pipeline Schematic Drawings:





3.02 CHLORINATION PROCEDURE

- A. Pipeline shall be thoroughly flushed prior to the commencement of the introduction of chlorine disinfectant.

Pipelines within a distribution system or a network of pipelines shall be flushed at each hydrant, blowoff, or service pipeline. It shall be necessary to install sampling/blowoff assemblies at the termination ends of pipe segments to allow the extremities of the pipeline to be flushed and for chlorinated water to be dispersed throughout the new water pipeline section in the event blowoffs or fire hydrants are not placed at the extremities of the pipeline to be tested. At least one (1) blowoff/sampling point assembly shall be placed at the extremities of the pipe section to be tested for sampling purposes. Sampling shall not be allowed through fire hydrants or water fittings with threaded ends. The Contractor shall install at least one (1) blowoff/sampling assembly at the end of each pipeline section to be tested; even if the blowoff/sampling assembly is not illustrated on the Plans. The Contractor shall be required to install the blowoff/sampling assembly as a requirement of this pipeline disinfection specification section. The Contractor shall not be compensated for the costs of the blowoff/sampling assembly. The cost of the installation of the blowoff/sampling assembly shall be incidental to the costs of disinfecting the pipeline.

Pipelines physically separated from existing in-service pipelines, reservoirs and concrete structures (as is often the case at Water Treatment Plants), shall be flushed with temporary pipeline connections upstream and downstream of the pipeline section to be disinfected as described in Section 3.01 of this specification.

Flushing of pipelines within a distribution system shall occur through fire hydrants, blowoffs, water services and blowoff/sampling points for a minimum of 10 minutes with the potable water source placed at maximum flow and maximum pressure. Flushing shall continue until no evidence of dirt is evident from the discharge water. Flushing shall be accomplished through fire hydrants or blowoffs if possible. Flushing of the water pipeline shall occur through a blowoff/sampling point assembly as a last resort. The pipeline contractor shall take necessary precautions to avoid damage to existing structures and utilities.

Flushing of physically separated pipelines shall be accomplished for a minimum of 10 minutes with the potable water source placed at maximum flow and maximum pressure. Flushing of the pipeline shall continue until no evidence of dirt is visible from the discharge water entering the downstream deposition point. The pipeline contractor shall take necessary precautions to avoid damage to existing structures and utilities.

- B. After flushing of the water pipelines is satisfactorily accomplished and approved by the Owner's Representative, chlorinated water shall be introduced to the pipeline. The pipelines shall be chlorinated in accordance with AWWA C 651.

The continuous-feed method of chlorine application shall be employed. The use of chlorine tablets or granules shall not be allowed.

Direct-feed chlorinators, which operate solely from gas pressure in the chlorine cylinder, shall not be used for the application of liquid chlorine. (The danger of using direct-feed chlorinators is that water pressure in the main can exceed gas pressure in the chlorine cylinder. This allows a backflow of water into the cylinder, resulting in severe cylinder corrosion and the escape of chlorine gas.) The preferred equipment for applying liquid chlorine is a solution-feed, vacuum-operated chlorinator and a booster pump. The vacuum-operated chlorinator mixes the chlorine gas in solution water; the booster pump injects the chlorine-gas solution into the main to be disinfected. Hypochlorite solutions may be applied to the water main with a fuel or electrically powered chemical-feed pump designed for feeding chlorine solutions. Feed lines shall be made of material capable of

withstanding the corrosion caused by the concentrated chlorine solutions and the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the solution is applied to the pipeline.

Chlorine shall be dispersed through the pipeline at 100 ppm. Chlorine shall be flushed through all fire hydrants, blowoffs, water services and blowoff/sampling assemblies. Chlorine shall continue to be flushed through the above listed items until the chlorine concentration is measured at 100 ppm or greater.

The chlorinated water shall remain in the pipeline for a minimum 24-hour period and not longer than 48 hours. The chlorine residual shall be a minimum of 50 ppm after the 24 hour period; or prior to flushing the heavily chlorinated water from the pipeline. The heavily chlorinated water shall not remain in the pipeline over 48 hours as prolonged exposure to the heavily chlorinated water may damage (corrode) pipelines, fittings, valves and other piping components. The heavily chlorinated water shall be flushed from the pipeline, pipeline fittings, water services, fire hydrants, blowoffs, blowoff/sampling assemblies and all other pipe connections. The heavily chlorinated water shall be flushed until chlorine samples of the flushed water confirm that the chlorine concentration is no higher than the water in the in-service distribution system or the water source used for the disinfection process.

The environment to which the heavily chlorinated water is to be discharged shall be inspected. In the opinion of the Owner's Representative, if there is a possibility that the chlorinated water will result in damage to the environment, then the Owner's Representative shall require a neutralizing chemical be applied to the water to be wasted (prior to discharge) by means of a neutralizing chemical. Neutralizing chemicals may be sulfur dioxide, sodium bisulfite, sodium sulfite, sodium thiosulfate or ascorbic acid. Appendix "C" of ANSI/AWWA C 651-05 lists the neutralizing chemicals and the suggested neutralizing chemical concentrations per 100,000 gallons of water.

The Contractor shall be responsible for the discharging of the heavily chlorinated water. The Contractor shall provide all piping, fittings, etc. to convey the heavily chlorinated water from the disinfected pipeline per Item 3.01 of this Specification.

- C. After final flushing and before the disinfected water pipeline is connected to the distribution system or in-service pipeline system, two (2) consecutive sets of acceptable samples, obtained a minimum of 24 hours apart, shall be collected from the disinfected pipeline.

One (1) set of samples shall be collected from every 1,200 feet of new water pipeline and one (1) set shall be obtained from the end point(s) of the disinfected water pipeline(s). If disinfected water pipelines terminate (dead-end) at cul-de-sacs, a sample shall be obtained from the termination point of the pipelines. As was noted by the previous sections, The Contractor shall install blowoff/sampling point assemblies at pipeline termination points as required.

Samples shall be tested for bacteriological (chemical and physical) quality in accordance with *Standard Methods for the Examination of Water and Wastewater* and shall show the absence of coliform organisms; and chlorine residual. Turbidity, pH, and a standard heterotrophic plate count (HPC) test shall be required. New pipeline does not typically contain coliforms but does typically contain HPC bacteria.

Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate, as required by *Standard Methods for the Examination of Water and Wastewater*. No hose, fire hydrant or threaded fitting outlet shall be used in the collection of samples. There should be no water in the trench up to the connection for

sampling. The sampling pipe must be dedicated and clean and disinfected and flushed prior to sampling.

If sample results from the lab indicate a measured HPC greater than 500 colony-forming units (cfu) per ml, flushing should be resumed and another coliform and HPC set of samples shall be obtained until no coliforms are present and the HPC is less than 500 cfu/ml.

The record of disinfection compliance shall be the bacteriological test results certifying that the water sampled from the disinfected water main is free of coliform bacteria contamination and is equal to or better than the bacteriologic water quality in the distribution system.

If the initial disinfection fails to produce satisfactory bacteriological results or if other water quality is affected, the disinfected pipeline may be reflushed and shall be resampled. If succeeding samples also fail to produce acceptable results, the disinfected pipeline shall be rechlorinated by the continuous-feed method until satisfactory results are obtained, satisfactory results being derived from two (2) consecutive sets of acceptable samples taken 24 hours apart.

The Contractor shall be responsible for all expenses relative to the chlorination and disinfection of the pipelines. The costs of re-testing shall also be borne by the Contractor. The City or District Water Department within which the disinfected pipeline is located shall coordinate obtaining the tests and select the testing laboratory to perform the tests. The Contractor shall be responsible for all expenses relative to the laboratory testing.

The disinfected pipeline shall not be placed in service until evidence that the bacteriological tests have proved negative and successfully met the testing requirements and are presented to the Owner's Representative. The Owner's Representative shall allow the disinfected pipeline(s) to be connected to the in-service pipeline after the evidence is presented to him/her by the Contractor. The evidence shall consist of the original laboratory report document certifying the laboratory test results comply with the disinfection requirements of this document.

3.03 FINAL CONNECTION PIPE SEGMENT DISINFECTION REQUIREMENTS

If approved by the Owner's Representative, final connection pipe segments (measuring 18.5 feet or less) located between the existing in-service pipeline and the valve or temporary termination point of a successfully disinfected pipe section may be spray disinfected or swabbed with a minimum 1-5 percent solution of chlorine prior to final installation. The installation of the final connection pipe segment shall be witnessed by the Owner's Representative. If dirt, debris or any contaminating substances enter the pipe section between the disinfection process and installation process the pipe section shall be removed and re-disinfected. The Contractor shall immediately remove the pipe section from the pipe trench and re-disinfect the pipe section if required by the Owner's Representative. The disinfection of the pipeline shall require that all dirt, construction residue, dust and contaminants be thoroughly pressure washed from the interior of the pipeline, valve, fitting, transition coupling and other pipe component interior surfaces. The interior surfaces shall be dried clean with a cloth or paper towels. The interior surfaces shall then be disinfected with the minimum 1-5 percent solution of chlorine. The pipe section shall not be allowed to be set in place for connection to the existing in-service pipeline until the Owner's Representative approves the witnessed disinfection of the pipeline section.

**END OF SECTION 02670**

**SECTION 02680 - TESTING OF HYDRAULIC STRUCTURES**

PART 1 - GENERAL

1.01 DESCRIPTION

Test all concrete tanks, hydraulic channels, sumps, pump wet wells, basins and other structures designed to contain water, after concrete has reached the design strength, prior to back-filling and application of any coating system. Test by filling structure with water. The Contractor shall perform all cleaning, flushing, testing and appurtenant work, including conveyance of test water from Owner-designated source to point of use, and including all disposal thereof, complete and acceptable, for hydraulic structures and appurtenant piping all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03300 - Cast-In-Place Concrete
- B. Section 02666 - Pressure Pipeline Water Testing
- B. Section 02726 – Manhole and Precast Vault Construction

PART 2 - PRODUCTS

2.01 MATERIALS REQUIREMENTS

- A. Temporary hoses to convey water to the structures, temporary bulkheads, water plugs, electrical circuitry, pumps, fuel, suction hoses, discharge hoses and any other ancillary materials.

PART 3 - EXECUTION

3.01 GENERAL

- A. Prior to testing, all hydraulic structures shall be thoroughly cleaned and all surfaces hosed down with a high-pressure hose and nozzle. All water, dirt and foreign material accumulated in this cleaning operation shall be removed from the structure and disposed of by the Contractor.
- B. All hydraulic structures and appurtenant piping shall be tested for leaks. All testing operations shall be conducted in the presence of the Engineer.
- C. The Contractor shall notify the Engineer at least four (4) days in advance of any planned testing and shall review the testing procedures with the Engineer. The source of water, conveyance of water and disposal of water shall be reviewed.
- D. Water for testing will be furnished by the Owner; however, the Contractor shall make all necessary provisions for conveying the water from the Owner-designated source to the points of use. The Contractor shall be responsible for removing the water from the structure at the conclusion of the testing and locating an acceptable point of discharge approved by the Engineer.

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- E. If industrial paint finishes or other protective coatings are to be applied to the interior surfaces of the hydraulic structure, such coatings shall be applied after all testing operations have been completed.
- F. All evaporation and level measuring devices required shall be provided by the Contractor.
- G. All pumps, power, piping, fuel and any other equipment, fittings and accessories required to make all connections necessary to fill the structure with water prior to testing and emptying the structure of water after testing.
- H. Contractor shall fill the structure with water to the extreme high operating water surface level or to overflow weir level. The fill level shall be determined by the Engineer.
- I. Maintain full for 48 hours before beginning the test period to permit concrete absorption and adjustment of valves, slidegates or temporary bulkheads.
- J. At completion of tests remove all temporary piping and connections. Dispose of testing water to a location acceptable to the Engineer.

3.02 TESTING PERIOD AND PROCEDURE

- A. Test Period: Five (5) consecutive 24 hour periods totaling 5 days. Contractor shall obtain daily measurements of air and water temperature, rainfall and water level.
- B. Test Procedure:
  - 1. After test period, Contractor shall measure water level at each side of the tank to determine leakage and loss from evaporation. Engineer shall observe and verify measurements and evaporation loss.
  - 2. Contractor shall determine evaporation loss, using a standard 48 inch evaporation pan and level measuring device located adjacent to the tank. Engineer shall observe the evaporation loss procedure.
  - 3. Contractor shall mark all running or dripping leaks on exposed surfaces that have not healed autogenously during the test. Contractor shall repair all identified areas to the satisfaction of the Engineer.
  - 4. If leakage from the structure exceeds 0.25% of the storage capacity of the concrete structure, then Contractor shall identify the location of the leaks and repair the leaks. Obtain measurements on a daily basis. If the water loss exceeds the 5 day allowable leakage after a daily reading, then leakage repair shall immediately commence.
  - 5. Complete repair work in accordance with Division 3 - Concrete Specifications. Repairs by painting or surface treatment will not be acceptable.
  - 6. Continue the test and repair leaks iteratively until the structure satisfies both the leakage calculation requirement and the visible leakage requirement.

3.03 CLEAN UP AND POST-TESTING ITEMS

- A. Upon completion of all work performed under this Section, remove from the site all excess materials, storage facilities and temporary facilities. Smooth and remove off

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debris from areas which were used or occupied during concrete construction and leakage testing.

- B. Remove all testing water from the concrete structures. After clean-up items are satisfactorily accomplished, backfilling of the concrete structures and coating operations shall be allowed to proceed.

**END OF SECTION 02680**



2.01 GRANULAR BASE

- A. Granular base shall conform to Sections 02200 - Earthwork; and 02221 - Trenching, Backfilling and Compacting.

2.02 CONCRETE

- A. Ready-mixed, conforming to ASTM C 94, Alternate B. The concrete class for manhole bases and vault shall be 560-C-3250. The concrete class for manhole and precast vault walls and top shall be 560-C-3250. Maximum size of aggregate shall be 1.5 inches. Slump shall be between 2 and 5 inches. The concrete shall attain 5,000 PSI compressive strength after 28 days.

2.03 FORMS

- A. Exterior exposed surfaces shall be plywood. Others shall be matched boards, plywood, or other approved material. Provide forms on all vertical surfaces. Formwork shall comply with Section 03100 - Concrete Formwork. Trench walls, large rock, or native material will not be approved as form material.

2.04 REINFORCING STEEL

- A. Conform to ASTM A 615, Grade 40, deformed bars.

2.05 POURED-IN-PLACE MANHOLES

- A. Poured-in-place type manholes may be used provided all details of construction are accepted by the Engineer.

2.06 PRECAST MANHOLE SECTIONS

- A. Precast manhole sections shall be a minimum of 48 inches in diameter, conforming to any details illustrated on the Plans and to ASTM C 478. Minimum wall thickness shall be 5 inches for reinforced sections and 5 1/2 inches for unreinforced sections. Provide eccentric cones for all manholes. Cones shall have same wall thickness and reinforcement as manhole section. Top and bottom of all sections shall be parallel. Manholes shall be provided without steps. Joints shall be tongue-and-groove with rubber gaskets conforming to ASTM C 443. The Contractor's attention is directed to specification for mortar hereinafter.
- B. Prior to the delivery of precast manhole and vault sections to the Site, yard tests shall be conducted at the point of manufacture. The precast sections to be tested will be selected at random from the stockpiled material which is to be supplied for the job. All test specimens will be mat tested, and shall meet the permeability test requirements of ASTM C 14.

2.07 PRECAST BASE SECTIONS AND BASES

- A. At the option of the Contractor, precast base sections or manhole and vault bases may be used provided all details of construction are approved by the Engineer. Base sections shall have the base slab integral with sidewalls. Base slab shall be constructed in accordance with the details illustrated on the Plans or Standard Details of the governing agency. Tie reinforcing steel to wall steel.

2.08 MANHOLE AND VAULT EXTENSIONS

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- A. Concrete grade rings for extensions shall be a maximum of 11 inches high and shall be approved by the Engineer before installation.
- B. In general, manhole and vault extensions will be used on all manholes in roads or streets or in other locations where a subsequent change in existing grade may be likely. Extensions will be limited to a maximum height of 11 inches unless otherwise approved by the Engineer. Finish grade for manhole covers shall conform to finished ground or street surface level, unless otherwise directed by the Engineer. Manhole covers and frames shall be placed 3 inches below the finished pavement surface prior to the installation of A.C. pavement. After A.C. pavement installation is successfully completed the manhole covers and frames shall be placed to the level of the finished pavement surface. A 1-foot wide, 1 foot deep P.C.C. collar shall be placed around the manhole frame and cover 3/8 inches below the level of the finished pavement surface.

2.09 MORTAR

- A. Standard premixed mortar conforming to ASTM C 387 or proportion 1 part Portland cement to 2 parts clean, well-graded sand which will pass a 1/8 inch screen. Admixtures may be used not exceeding the following percentages of weight of cement: Hydrated lime, 10 percent; diatomaceous earth or other inert materials, 5 percent. Consistency of mortar shall be such that it will readily adhere to the pipe when using the standard tongue-and-groove type joint. If the Keylock type joint is used, the consistency shall be such that excess mortar shall be forced out of the groove and support is not provided for the next precast manhole section to be placed. Mortar mixed for longer than 30 minutes shall not be used.

2.10 PREFORMED PLASTIC GASKETS

- A. Preformed plastic gaskets may be used in lieu of mortar type joints and shall be Kent-Seal No. 2 manufactured by Hamilton Kent Manufacturing Company, Kent, OH; Ram-Nek, manufactured by K.T. Snyder Company, Inc., Houston, TX; or approved equal, meeting all requirements of Federal Specification SS-S-00210.

2.11 PIPE STUBOUTS FOR FUTURE SEWER OR STORMWATER CONNECTIONS

- A. Pipe stubouts shall be the same type as approved for use in lateral, main, or trunk pipeline construction. Strength classifications shall be the same class as in adjacent trenches. Where there are two different classes of pipe at a manhole, the higher strength pipe will govern strength classification. Rubber gasketed watertight plugs shall be furnished with each stubout adequately braced against all hydrostatic or air test pressures.

2.12 PRECAST CONCRETE VAULT AND CATCH BASINS

- A. The precast concrete vault shall be precast with a 28 day, 5000 psi minimum compressive strength concrete and designed for AASHTO H-20 loading. Minimum dimensions shall be as illustrated on the Plans. Provide openings for pipes and grating as illustrated on the Plans.

2.13 STORMWATER VAULT STEPS

- ~~A. Stormwater vault steps shall be made of minimum 3/4 inch galvanized steel bar conforming to ASTM A 36. Steps shall be 12 inch wide minimum, center to center of legs, and shall be drop pattern with a 2 inch drop. Bends shall be made around a 1 inch radius minimum, 2 inch radius maximum mandrel. There shall be 3 inch minimum embedment in precast concrete stormwater vault sections and 4-1/2 inch minimum projection from the face of concrete at point of embedment to the center of the step.~~

~~There shall be a 2 inch hook on the embedment end. Galvanizing shall conform to ASTM A 123 and shall be accomplished after bending.~~

- B. The installed steps shall be located so as to provide a continuous ladder with steps equally spaced vertically in the assembled stormwater vault at 12 inches  $\pm$   $\frac{3}{4}$  inch. The steps shall be capable of withstanding a force of 350 pounds, applied at any place on the step and in any direction which projects from the point of application through a diameter of the step cross-section at that point, with no permanent deformation resulting. Steps shall be cast in stormwater vault sections by the manufacturer.

#### 2.14 MANHOLE FRAMES AND COVERS

- A. Cast iron or ductile iron of size and shape illustrated on the Plans shall be provided. Covers shall have the word "SEWER" or "STORMWATER", as appropriate in 2 inch raised letters. Castings shall be tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and all defects, and shall conform to ASTM A 48, Class 30B. Plane or grind bearing surfaces to ensure flat, true surfaces. Covers shall be true and seat within ring at all points. Frames shall have a minimum opening of 24 inches for a 4 foot diameter manhole and 30 inches for 5 foot diameter manholes.

### PART 3 - EXECUTION

#### 3.01 EXCAVATION AND BACKFILL

- A. Conform to applicable portions of Section 02200 - Earthwork, and Section 02221 - Trenching, Backfilling and Compacting. Backfill around manholes and vaults.

#### 3.02 GRANULAR BASE

- A. Remove water from the excavation. Unless specified in the Plans, place a minimum of 18 inches of Class 2 Base or 1 inch rock and thoroughly compact with a mechanical or power vibrating tamper.

#### 3.03 CONCRETE BASE

- A. Construct concrete base in conformance with the details illustrated on the Plans. Vibrate to densify the concrete and screed so that the first precast manhole section to be placed has a level, uniform bearing for the full circumference.
- B. Deposit sufficient mortar on base to assure watertight seal between base and manhole wall or place the first precast section of manhole in concrete base before concrete has set (preferred). First section shall be properly located and plumbed at 90-degree angles.
- C. If material in bottom of trench is unsuitable for the manhole, excavate below the flow line as directed by Engineer, and backfill to required grade with 1 inch rock. Place a filter fabric material in the excavation above the level of the concrete base prior to installing the 1 inch rock.

#### 3.04 PLACING PRECAST MANHOLE SECTIONS

- A. Clean ends of sections of foreign materials. Thoroughly wet joint with water prior to placing mortar. Place mortar on groove of lower section. Set next section in place. Fill joint completely with mortar of the proper consistency. Trowel interior and exterior

surfaces smooth on standard tongue-and-groove joints. Wipe or otherwise clean the excess mortar from the inside of the Keylock joint.

- B. When a Keylock joint is used, it is the intent that the void between the tongue-and-groove be completely filled with mortar, and that the interior and exterior end faces of the section to be placed seat fully on the previously placed section.
- C. Prevent mortar from drying out and cure by applying an approved curing compound or comparable approved method. Chip out and replace all cracked or defective mortar. Completed manholes shall be rigid and watertight.

3.05 PREFORMED PLASTIC GASKETS

- A. Carefully inspect precast manhole sections to be joined. Sections with chips or cracks in the tongue shall not be used. Preformed plastic gaskets shall be installed in strict conformance with the manufacturer's recommendations. Only pipe primer furnished by the gasket manufacturer will be approved.

3.06 MANHOLE INVERT

- A. Construct manhole inverts in conformance with details illustrated on the Plans, and with smooth transitions to ensure an unobstructed flow through the manhole. Remove all sharp edges or rough sections which tend to obstruct flow. Where a full section of pipe is laid through a manhole, break out the top section as indicated and cover exposed edge of pipe completely with mortar. Trowel all mortar surfaces smooth.

3.07 FLEXIBLE JOINTS

- A. Provide joints in all pipe not more than 1.5 feet from manhole walls. Lay pipes entering manholes on firmly compacted granular sand backfill or rock to undisturbed native earth. Granular sand backfill or rock shall be as specified hereinbefore.
- B. Where the last joint of the installed pipeline up to the manhole is more than 1.5 feet from the manhole base, a 6 inch concrete encasement shall be constructed around the entire pipe from the manhole base to within 1.5 feet of the pipe joint. The pipe encasement shall be constructed monolithically with the manhole base. Pipes installed out of the manhole shall be shortened to ensure the first joint is no more than 1.5 feet from the manhole base.

3.08 PIPE STUBOUTS FOR FUTURE SEWER AND STORMWATER CONNECTIONS

- A. Install stubouts in manholes for future sewer and stormwater connections as illustrated on the Plans or as required by the Engineer. Maximum length shall be 1.5 feet outside the manhole wall. Grout pipes in precast walls or manhole base to provide watertight seal around pipes. Construct invert channels in accordance with details shown on the Plans. Provide compacted granular sand or 1 inch rock as specified hereinbefore to undisturbed earth under all stubouts.
- B. Install semi-permanent plugs at the end of stubouts with gasket joints similar to sewer and stormwater pipe being used. Plugs shall be capable of withstanding all internal or external pressures without leakage. All plugs to be braced to prevent blowoffs.

3.09 PERMANENT PLUGS

- A. Clean interior contact surfaces of all pipes to be cut off or abandoned as illustrated on the Plans. Construct concrete plugs at the end of all pipes 18 inches or less in diameter.

Minimum length of concrete plugs shall be 8 inches. For pipe 21 inches and larger, the plugs may be constructed of common brick or concrete block. Plaster the exposed face of block or brick plugs with mortar. All plugs shall be watertight and capable of withstanding all internal and external pressures without leakage.

3.10 MANHOLE EXTENSIONS

- A. Install extensions in conformance with the details illustrated on the Plans, and to a maximum height of 12 inches unless a larger height is approved by the Engineer. Lay grade rings in mortar with sides plumb and tops level. Seal joints with mortar as specified for manhole sections. Extensions shall be watertight.

3.11 MANHOLE FRAMES AND COVERS

- A. Install frames and covers on top of manholes to positively prevent all infiltration of surface or groundwater into manholes. Frames shall be set in a bed of mortar with the mortar carried over the flange of the ring as shown in the Manhole Details on the Plans. Set frames so that tops of covers are flush with surface of adjoining pavement or ground surface, unless otherwise illustrated or directed by the Engineer except within A.C. pavement surfaces. A 1 foot wide, 1 foot deep P.C.C. collar shall be placed around all manhole rings and covers. The concrete ring and manhole frames and covers in A.C. pavement areas shall be placed 3/8 inch lower than the finished A.C. pavement surface. The manhole frame and cover shall be lowered 3 inches below the finished A.C. pavement surface prior to the installation of the A.C. pavement.

3.12 MANHOLES OVER EXISTING SEWERS AND STORMWATER

- A. Construct manholes over existing operating sewer and stormwater lines at locations illustrated on the Plans. Perform necessary excavation work as required to break into the existing sewer and stormwater pipeline and construct the manhole. Comply with previously-noted specifications.
- B. Maintain flow through existing sewer and stormwater pipelines at all times, and protect new concrete and mortar work for a period of 7 days after concrete has been placed. Advise Engineer of plans for diverting wastewater flow and obtain Engineer's approval before starting. Engineer's approval will not relieve Contractor of responsibility for maintaining adequate capacity for flow at all times and adequately protecting new and existing work.
- C. Construct the new base under the existing sewer and stormwater and the precast sections as specified herein.
- D. Break out the existing pipe within the new manhole, cover the edges with mortar, and trowel smooth.

3.13 SPECIAL MANHOLES

- A. Construct special manholes in conformance with applicable parts of these Specifications and as illustrated on the Plans.

3.14 PRECAST CONCRETE VAULT

- A. Install precast concrete vaults at the locations illustrated on the Plans. Provide necessary excavation and backfill as specified herein and as specified by Section 02200 - Earthwork and Section 02221 - Trenching, Backfilling and Compacting.

3.15 HYDROSTATIC TESTING

- A. Hydrostatic testing of manholes and vaults shall be completed in conformance with Section 02730 - Sanitary Sewer and Stormwater Gravity Pipeline System Testing.

3.16 MANHOLES - INTERIOR COATING SYSTEM

The interior of all manholes, including the manhole base surfaces and grade rings shall be coated according to the provisions of this specification:

- A. Install a low temperature 100 percent solids acrylated epoxy primer system designed to provide positive cure down to 20°F and extremely rapid room temperature cure unless otherwise specified on the plans. The solids acrylated epoxy is to be applied as a primer material to the interior of the manhole surfaces. Apply the polyurethane system over the primer system within the surface interior of the P.C.C. manhole per the manufacturer’s recommendations. The interior surface of the P.C.C. manhole shall be primed with a 1- to 3 mil thickness of 100 percent solids acrylated epoxy primer system to the abrasive grit blasted ring and to all concrete surfaces, including into the invert down to the low flow water line. Allow the primer to tack up (sticky to the touch). A 125 mil thickness polyurethane coating system shall be applied to the primer and all interior surfaces of the P.C.C. manhole after the primer has attained the required consistency.

Prior to the application of the 100 percent solids acrylated epoxy primer and polyurethane protective lining, the manhole shall be thoroughly cleaned by high water pressure blast at pressures of 34.5 MPA (5,000 PSI), minimum to 68.9 MPA (10,000 PSI) maximum. Debris from cleaning shall not be allowed to enter the pipeline system. The Contractor shall provide the necessary debris containment devices while maintaining pipeline flow. The Contractor shall remove and dispose of all debris collected from the cleaning operation per 500 1.4 of the *Greenbook* specifications.

The cured polyurethane lining shall be spark tested for pinholes with a spark tester set at 15,000 volts minimum. All pinholes shall be repaired as specified in the *Greenbook* Specification 500 2.4.9.

All pinholes in the protective lining shall be marked off on surface areas containing pinholes to a point 6 inches beyond all pinholes, primed with epoxy, and re-coated with polyurethane to a minimum additional thickness of 30 mils. Blisters, uncured lining and surface imperfections shall be completely removed and the areas re-coated with epoxy primer and polyurethane lining to a point 6 inches beyond the repair areas at a minimum thickness of 100 mils.

The epoxy primer and polyurethane lining shall meet or exceed the requirements specified in *Greenbook* Specification 303-2 and *Greenbook* Table 500 2.4.10(A) as follows:

**TABLE 500-2.4.10(A)**

	<b>POLYURETHANE</b>	<b>EPOXY</b>
Tensile Strength ASTM D 638, Type IV, MPA (PSI)	13.8 (2,000)	41.4 (6,000)
Elongation at Break, % ASTM D 638, Type IV	50	5
Wear Resistance, MG. Wt. Loss Taber Abrasion, S-17	60	100
Hardness, Shore D,		

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Durometer ASTM D 2240	55	75
Tear Resistance, KG/MM (PPI) ASTM D 903	2.7 (150)	N/A
Peel Strength, Concrete, G/MM (PLI) ASTM D 903	125 (7) 1	125 (7) 1
Adhesive Strength, KPA (PSI) ASTM C 190 (Modified Briquet)	2760 (400) 1	2760 (400) 1

Test results shall be verified on a per-project basis or as required by the Engineer.

The coating system shall be approved as a submittal. The coating system shall be applied per the manufacturer's recommendations.

**END OF SECTION 02726**

**SECTION 02737 - CURED-IN-PLACE PIPE (CIPP)**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

**A. Scope**

1.1 This section covers the work necessary to furnish and install, complete in place, a cured-in-place pipe (CIPP) for rehabilitation of existing sanitary sewers as specified herein. The Contractor shall provide all materials, labor, equipment, and services necessary for bypass pumping of sewage flows in mains and services; or vacuum truck sewage flow removal, transportation and disposal; cleaning and pre-television inspection of sewer to be lined; complete installation, inversion, and curing process of cured-in-place pipe; re-connection of service laterals; pipe sealing at manholes; and final television inspection and testing of the lined pipe sewer system. Cured-in-place pipe shall be as specified herein and installed at the locations shown on the Drawings.

**B. Process Description**

- 1.1 The rehabilitation of existing sanitary sewer lines by Cured-In-Place process includes reconstruction of the existing lines by forming a new pipe within the existing, structurally deteriorated pipe which has generally maintained its original shape. Installation of the Cured-In-Place Pipe shall be accomplished by the use of an inversion process or a winched-in application. The reconstruction of the existing line shall be accomplished by installing a flexible tube which is first impregnated with a thermosetting resin. The tube is either inverted into the pipeline by using hydrostatic head (water pressure), compressed air pressure or some other approved inversion method, or pulled into the pipeline from manhole to manhole using mechanical equipment (winch). After full insertion, the tube is cured by circulating hot water or introducing controlled air or steam throughout the length of the tube to cure it into a hard, impermeable pipe. This "pipe" shall extend the full length of the original sewer, and shall provide a structurally sound, joint less, tight-fitting, water-tight pipe within a pipe.
- 2.1 Cleanup and Restore Existing Surface Condition and structures.
- 3.1 Repair Defective Work per Engineer's Final Inspection.
- 4.1 The Contractor is responsible for proper and accurate installation of the new sewer pipe regardless of the method described in this section and the following subsections. The Contractor shall ensure that the new pipe's vertical and horizontal alignment is as indicated on the plans and in accordance with these specifications.
- 5.1 Supplying all labor, materials, equipment, and apparatus not specifically mentioned herewith or noted on the plans, but which are incidental and necessary to complete the work specified.

## 1.2 APPLICABLE PUBLICATION

- A. The following documents form a part of these specifications to the extent stated herein and shall be the latest edition thereof. Where differences exist between codes and standards, the one affording the greatest protection shall apply.

American Society for Testing and Materials (ASTM):

ASTM D 256	Standard Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials.
ASTM D 543	Resistance of Plastics to Chemical Reagents.
ASTM D 638	Tensile Properties of Plastics
ASTM D 732	Standard Test Method for Shear Strength of Plastics by Punch Tool.
ASTM D 790	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
ASTM F 1216	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin-Impregnated Tube (1991 Revision).
ASTM D 2990	Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics.

Federal Water Pollution Control Act of 1972 (FWPCA): As Amended.

National Association of Sewer Service Companies (NASSCO):  
Recommended Specifications for Sewer Collection System Rehabilitation.

## 1.3 WARRANTY AND QUALITY ASSURANCE

A. General Bid Requirements:

1. The curing and installation methods of the liner shall be described and included with the Bid. The Contractor shall demonstrate that the method is applicable and that his/her experience in using the method is proven.
2. The bidder, or his/her Sub-contractor, shall be properly licensed and trained to a cured-in-place pipe lining process.
3. Thirty (30,000) lineal feet of successful installation in the United States within the last 2 years, in pipelines ranging from 4 to 48 inches. Documentation of the licensing and details of two years minimum training of the on-site foreman of the Contractor, or his/her CIPP Sub-contractor, who will perform the actual lining process, shall be provided.

- B.** The Contractor shall provide to the Owner a warranty to be in force and effect for a period of ONE (1) year from the date of acceptance by the Owner. The warranty shall cause the Contractor to repair or remove and replace the liner should failure result from faulty materials or installation.
- C.** Correction of failed liner or liner pipe deemed unacceptable, as a result of the post video inspection and/or test reports for structural values, thickness, chemical resistance, etc., shall always be the responsibility of the Contractor, at no extra cost to the Owner. Method of correction/repair shall be approved by the Owner with prior field demonstration, if required. It shall be understood that minimum criteria of the specification shall not be lowered to compromise with lower than the required test values, unless approved in writing.
- D.** The finished liner shall be continuous over the entire length of run between two manholes and shall be free from visual defects. The finished liner shall meet or exceed the requirements of Section 2.01-D.2 of this specification, "Finished and Cured Liner Properties."
- E.** Wrinkles in the finished liner pipe which exceed 5% of the pipe diameter are unacceptable; Contractor shall remove either the liner or the wrinkled segments which exceed 5% of the pipe diameter. Repair of the removed sections shall be proposed by the Contractor and approved by the Engineer.
- F.** The Contractor shall carry out the operations in strict accordance with all applicable OSHA regulations. Particular attention is called to those safety requirements involving work on an elevated platform and entry into a confined space.
- G.** Delivery, Storage and Handling

  - 1. Transport, handle, and store pipe and fittings as recommended by manufacturer.
  - 2. If pipe and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the Engineer at the Contractor's expense, before proceeding further.
  - 3. Deliver, store, and handle other materials as required to prevent damage.
- H.** Only those tools designed for the aforementioned procedures and approved by the pipe manufacturer or supplier and the ENGINEER, shall be used for assembly of pipe fittings to ensure proper installation.
- I.** The CONTRACTOR shall televise the installed pipe after existing services have been reconnected and manhole work has been completed. The original television inspection video tape shall be provided to the ENGINEER. The CONTRACTOR shall repair all damages found during the reviewing of these final TV inspection video tapes. The damages shall include but not limited to sags, leaks, cracks, unsecure joints, visual defects, and others which in the opinion of the ENGINEER are not acceptable and would impair the serviceability of the new piping system.

#### 1.4 SUBMITTALS

- A. The Contractor shall submit for approval by the Engineer the following information:
- B. Certification by the manufacturer that all pipe and fittings furnished under this specification were manufactured, sampled, tested, and inspected in accordance with ASTM F1216-91. Certification shall be signed by an authorized agent of the manufacturer. Verification of product conformance with the chemical resistance and physical testing requirements of the latest edition of Green Book, Section 210-2.3.3 AND 500-1.4.2 - ASTM test methods D638, D790 and D2990) shall also be provided to the Engineer for approval a minimum of 15 days prior to the commencement of the scheduled work. A report of test results shall be furnished for the Engineer's review. The date the pipe was manufactured shall be included in the Certification.
- C. Manufacturer's recommendations for the installation of the CIPP including resin application, curing process details (including temperature control), storage procedures, service connection methods, trimming and finishing, and quality control measures to be used for cured-in-place pipelining of main-lines and services.
- D. Certification from the Manufacturer(s) that the installer is licensed to perform the work.
- E. Certification from the manufacturer(s) that the resin material complies with the required application, meets the intended service condition, and that the resin will meet the physical requirements set forth in this specification. Information from the resin manufacturer shall include specifications, characteristics and properties of the resin, methods of application, curing temperatures, and duration of temperature (step cooking temperatures/hours at each and final stages).
- F. Grout and design mixes and grout testing reports.
- G. Recommended grout and equipment to seal any open area in the reconnected (cut) service laterals AND the annular space between the cured-in-place pipe and the existing pipe at the manholes.
- H. Television inspection reports and video tapes made prior to and after pipe insertion.
- I. The CONTRACTOR shall submit a sewage bypass pumping and/or diversion plan for review by the ENGINEER at least 10 days prior to pipe installation. The sewage bypass pumping and/or diversion plan shall include an emergency response plan to be followed in the event of a failure of the bypass pumping and/or diversion system. The CONTRACTOR shall notify the ENGINEER 72 hours prior to commencing the bypass pumping operation. The CONTRACTOR'S plan for sewage bypass pumping and/or diversion shall be satisfactory to the ENGINEER before the CONTRACTOR shall be allowed to commence sewage bypass pumping and/or diversion. The CONTRACTOR'S plan for sewage bypass pumping and/or diversion in the State of California Department of Transportation (Caltrans) Right of Way shall be approved by Caltrans before the CONTRACTOR shall be allowed to commence sewage bypass pumping and/or diversion.
- J. The Owner for this project also Owns and Operates the Niland County Sanitary Sewer District Wastewater Treatment Plant. The cleaning of the host sanitary sewer pipelines prior to televising the host sanitary sewer lines shall be accomplished by forcing the buildup material within the host sanitary sewer pipeline to a downstream manhole with all pipelines exiting the manhole being plugged. The contractor shall employ vactor trucks to remove the solids and debris resultant from the cleaning of the host sanitary sewer pipeline at the

- downstream manhole. The vactor trucks shall transport the collected solids and debris to the Niland County Sanitary Sewer District Wastewater Treatment Plant which is located close to the host sanitary sewer pipelines. The collected solids and debris shall be deposited in Aeration Pond Number 1 at the Niland Wastewater Treatment Plant as required by the Wastewater Treatment Plant Operators. The Contractor shall submit a plan for the removal of solids and debris resulting from the cleaning of the host sanitary sewer pipelines and transporting the solids and debris to the Niland Wastewater Treatment Plant. The operating hours of the Niland Wastewater Treatment Plant is to be factored into the plan.
- K.** The Contractor shall submit to the Engineer a detailed plan of construction including the installation procedures, equipment set-up, and the locations of the proposed access points for approval. The Contractor shall have an approved plan of construction prior to commencing any construction. The Contractor prepared detailed plan shall include all Caltrans Encroachment Permit requirements for work completed within State of California Department of Transportation Right of Way.

## 1.5 JOB CONDITIONS

- A. Note and conform to conditions and requirements within these Specifications.
- B. Contractor shall conduct operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians and to adjacent property owners or tenants.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. The liner pipe material shall be designed for use in gravity sanitary sewers and shall be in strict conformance with all applicable sections of ASTM F1216 specifications. All materials and procedures used in the cured-in-place pipe rehabilitation process shall be equal to or exceed the manufacturer's standards.
- B. **Tube:** The liner tube shall be fabricated to meet performance requirements as specified in section 1.03.04, Finished and Cured Liner Properties, of this specification. Two different types of systems shall be considered for cured-in- place pipe rehabilitation:

#### 1. Fiber Felt Tube System:

- a. The felt tube shall be a thermoplastic polyester or acrylic tube consisting of one or more layers of flexible needled felt or an equivalent woven and/or non-woven material capable of carrying resin, and with sufficient needling and cross lapping and strength to withstand the installation pressures and curing temperatures. The felt tube to be furnished shall be compatible with the resin and catalyst systems to be utilized.
- b. The tube shall be free of tears, holes cuts, foreign materials and other defects and will be subject to inspection by the Owner.
- c. The finished lining shall consist of inner polyurethane and outer polyester felt layer (or layers) impregnated with a thermosetting resin and fabricated to fit tight against the existing pipe wall. An allowance shall be made for circumferential stretching during inversion.
- d. Contractor shall determine the minimum tube length necessary to effectively span the designated run between manholes, unless otherwise specified. Contractor shall field verify the lengths in the field prior to impregnation of the tube with resin, to insure that the tube will have sufficient length to extend the entire length of run.

**OR**

#### 2. Fiberglass Mat System:

- a. The tube shall be composed of a high strength, fiberglass mat system

capable of retaining resin, contained within a system of polyethylene film. The tube shall have sufficient needling and cross lapping to yield a minimum burst strength of 800 pounds per square inch in transverse directions (hoop stress), and strength to withstand the installation pressures and curing temperatures. The tube shall be free from tears, holes cuts, foreign materials and other defects, and will be subject to inspection by the Owner.

**C. Resin/Catalyst**

1. The resin used shall be compatible with the rehabilitation process used, and designed for a wastewater environment. The resin shall be able to cure in the presence or absence of water, and the initiation temperature for cure shall be as recommended by the resin manufacturer and approved by the Engineer. The resin shall have sufficient thixotropic properties to obtain non- draining characteristics when impregnated into the fiber fabric.
2. Unless otherwise specified or approved by the Engineer, the resin shall be an epoxy vinyl ester system and shall be able to meet the service conditions specified for the tube system.
3. The Engineer shall also be informed in advance, for verification and inspection of the resin material at the “wet out” of the tube. The inspection shall be at the discretion of the Engineer, which shall not relieve the Contractor of his/her responsibilities. The wet-out procedure shall utilize the resin and catalyst in sufficient quantities to ensure complete impregnation of the liner and provide the properties specified in Section, Finished and Cured Liner Properties.
4. The catalyst system shall be compatible with the resin and other materials to be utilized in the rehabilitation process. Quantity and type of catalyst shall be selected based on the curing conditions and recommendations of the resin manufacturer.

**D. Liner Design Criteria**

1. The Cured-In-Place Pipe thickness shall be calculated and designed upon the following physical conditions of the existing pipe to be rehabilitated:
  - a. All pipes shall be considered fully deteriorated.
  - b. All pipes shall be subjected to a soil load of 120 lbs./cu. Ft., with applicable live load, and water table two (2) feet below the top of the ground.
  - c. Pipes in good condition shall have a minimum of 2% ovality in the circumference. A higher value of ovality shall be used if the pipe is deteriorated.
  - d. Factor of safety (N) of 2.0 shall be used for calculations.

- e. The Contractor shall measure the inside diameter of the existing pipe in the field so that the liner can be lined in a tight fitted condition.
  - f. Conditions (a) and/or (b) above may change after the initial TV report, if approved by the Engineer. The Engineer shall have the right to modify/change the required liner thickness, depending upon field conditions evident from the video tape(s).
  - g. **The minimum material wall thickness derived using design criteria for the Owner shall be equivalent to SDR-34.** The calculated wall thickness derived using the above design criteria shall be compared to the specified (bidded) pipe thickness (SDR-34). The Engineer then has the right to either keep the specified pipe thickness (SDR-34) or change to the calculated pipe thickness for installation. Material cost shall be adjusted accordingly.
2. Finished and Cured Liner Properties
- a. The finished cured-in-place pipe liner shall fit tightly and neatly against the existing pipe walls. The liner shall be fabricated from materials which, when cured, will be suitable for continuous service in sewerage environments containing hydrogen sulfide, carbon monoxide, carbon dioxide, methane, dilute (10%) sulfuric acid at an average wastewater temperature of 80°F, dilute (10%) phosphoric acid, petroleum hydrocarbons, gasoline, vegetable oil, tap water (pH 6.5 - 9), up to 1 hour per day exposure to 5 percent sodium hydroxide up to a pH of 11, moisture saturation, and external exposure to soil bacteria and chemical attack which may be due to materials in the surrounding ground or sewage within.

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The cured-in-place pipe system shall conform to and comply with the requirements above and with the minimum standard physical properties as follows:

<b>STRUCTURAL/ MECHANICAL PROPERTY</b>	<b>ASTM TEST METHOD</b>	<b>ASTM MINIMUM SHORT TERM</b>	<b>ASTM MINIMUM LONG TERM VALUE</b>
Tensile Strength (@ yield)	D-638	4,000 psi.	
Tensile Modulus	D-638	250,000 psi.	125,000 psi.
Flexural Strength	D-790	5,000 psi.	
Flexural Modulus	D-790	300,000 psi.	150,000 psi.
Shear Strength	D-732	5,5000 psi.	
Impact Strength	D-256	1.9 in. -lb.	

The initial stiffness factor shall conform to the following table:

<b>Nominal ID of Original Pipe (inches)</b>	<b>Stiffness Factor (EI)<sup>1</sup> (in<sup>3</sup>-lbf/in<sup>2</sup>)</b>	<b>Maximum Allowable Depth of Groundwater Above Invert .2 (Feet)</b>
6	328	238
8	328	96
10	328	48
12	328	27
12	1109	96
15	1109	48
18	1109	27
18	2628	67

Stiffness factor shall be determined in accordance with ASTM D2412.

- E.** Liner pipe material shall be homogeneous throughout and free of:
1. Serious abrasion, cutting, or gouging of the outside surface extending to more than 10 percent of the wall thickness in depth.
  2. Cracks
  3. Kinking (generally due to excessive or abrupt bending)
  4. Flattening
  5. Holes
  6. Blisters

7. Other injurious defects

Liner Material shall be uniform in color, opacity, density, and other physical properties. Any pipe and fittings not meeting these criteria shall be rejected.

**2.2 SANITARY SEWER LATERALS**

- A.** Contractor shall verify location and diameter of all active laterals.
- B.** Sanitary sewer lateral shall be installed to conform to the Owner's Standard Details or modified herein as shown in the Contract Drawings. Lateral to main connections shall be performed using strap-on wye rubber saddles.
- C.** Lateral to main connection shall be backfilled with controlled density fill to provide concrete support to strap-on wye rubber saddle.
- D.** Connections to the existing sewer house connection pipe shall be made using sleeved stainless steel flexible couplings. All flexible couplings shall conform to ASTM C425 and be manufactured by Fernco Joint Sealer Co., DFW Plastics, Inc. or approved equal.
- E.** The sewer lateral connection shall have a slope equal to the existing or a minimum of two-percent.
- F.** For laterals shown to be constructed using pipe bursting method, the Contractor shall conform to details specified under Section 02734, Pipe Bursting. For laterals shown to be constructed using open cut method, the Contractor shall conform to Specification Section 02730 Sanitary Sewers.

**2.3 SANITARY SEWER CLEANOUTS**

- A.** Install sanitary sewer cleanouts per project details and specifications.
- B.** Wye branches and risers for sanitary sewer cleanouts shall conform to the Owner's project details.
- C.** Cleanout box shall be Christy concrete type F08 Curb Valve Box with F08R lid marked "SEWER" when installed in location not subject to vehicular loading.
- D.** When installed in location subject to vehicular loading, cleanout box shall be Christy concrete type G05T Traffic Valve Box with G05CT Traffic Lid marked "SEWER" and shall be provided with 8" concrete base.

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A.** This section is intended to provide the Contractor with general guidance on the methods to be used to install the sewer pipe using cured in place pipe lining rehabilitation method. Nothing contained herein shall relieve the Contractor from completing the pipe rehabilitation in the most feasible, efficient and safe manner, using required materials to the lines and grades shown on the plans and to the requirements of these specifications.

### **3.2 SITE INVESTIGATION**

- A.** Prior to pipe rehabilitation, the Contractor shall perform a careful site investigation to locate and record possible surface obstructions, locate and mark active and inactive sewer laterals; and formulate and submit plans to replace the pipe, to reconnect all sewer laterals, and to restore all structures and plants that would be damaged by the project work. *The contractor shall verify the diameter size of the host pipelines during the site investigation. The existing manholes to be rehabilitated as a part of this project are in poor condition. It is difficult to access the manholes and difficult to determine the host pipe diameter size.*

### **3.3 PREPARATION**

**A.** Preliminary Site Work

1. Installation of by-pass pumping equipment shall be complete and operational. Layout of a temporary by-pass pumping system to isolate the working area should consider the location of pumps and pipes, possible pump failure contingency and avoidance of blocking entrances to homes, driveways, bus stops, side streets etc. Equipment used should be selected to give minimum noise levels and emission of fumes. All costs for this time are included in the bid price per linear foot of replacement.
2. Verification of all active and in-active house connection laterals shall be completed before the insertion of the new pipe. Manhole positions along the line of insertion shall be used to check progress as the liner passes these points.
3. Any heavy concrete reinforcement present along the line of insertion shall be broken out prior to the operation to allow steady and free passage of the liner.
4. Support equipment used to perform the work shall be located away from buildings so as not to create a noise impact. Provide silencers or other devices to reduce machine noise as required to meet local requirements.

**B.** By-Pass Sewage or Intercepting and transporting sanitary sewer flow via Vac trucks to the Niland WWTP

1. The Contractor shall furnish, install, and operate pumps, plugs, conduits, and other equipment to divert sanitary sewer flow around the pipeline reach in which work is to be performed within the County of Imperial right of way. The plug shall be provided with a tag line. The pumping system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during a rainstorm. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum. Standby pumps shall be provided as required. Pumping shall be completed by the Contractor in such manner as will not damage public or private property or create a nuisance or health menace. The contractor shall monitor the bypass pumping on a 24 hour per day, seven day a week basis including holidays. The pumped sewage shall be in an enclosed hose or pipe and shall be reinserted into the sanitary sewer system. Hose or pipes extending across alleys, side streets or other vehicular traffic traveled ways shall be placed below grade in an encasement. Sawcutting, removal and replacement of the pavement in accordance with the Owner's or Caltrans requirements shall be accomplished and included within the bypass sewage costs. Sewage shall not be

allowed to free flow in gutters, streets or over sidewalks, etc. Above grade sanitary sewer discharge hose shall be placed between two 1 foot high Dirt berms place 2 feet apart overlain with heavy duty 4 mil plastic sheeting. The sanitary sewer discharge hose shall be placed on top of the plastic sheeting between the dirt berms to intercept and drips or minor leaks from the sanitary sewer discharge hose. Sewage shall not be allowed to flow into the storm inlets or conduits. Fines imposed by Caltrans, the Regional Water Quality Control Board, EPA, the County of Imperial Environmental Health Department and similar agencies shall be paid by the contractor. After the work has been completed, flow shall be restored to normal.

By-passing sewage in the State of California Department of Transportation (Caltrans) Right of Way, if approved, shall conform to Caltrans requirements. The contractor shall include all costs to prepare environmental documents, plans, bypass pumping requirements, monitoring requirements including reports and all other Caltrans requirements in addition to the Caltrans Encroachment Permit requirements. The contractor shall include the costs of all Caltrans requirements in addition to the Encroachment Permit requirements in the proposal costs to perform the cured-in-place pipe installation.

If the contractor deems the bypass sanitary sewer flow requirements imposed by Caltrans too expensive or if Caltrans will not allow sanitary sewer flow bypassing in it's right of way then the contractor shall plug the upstream wastewater flow at an upstream manhole or manholes, from the reach to receive CIPP, for an approximate 6 hour period of time or until the wastewater flow is within 3 foot of the most upstream manhole rim and cover. The average daily flow Niland Collection System total wastewater flow is 64,000 gallons per day or 44 gallons per minute or 2,640 gallons per hour. Peak flows are estimated to be twice (2 x) the average daily flow and low flows are estimated to be ½ (0.50 x) the average daily flow. After approximately 6 hours or until the wastewater flow is within 3 foot of the most upstream manhole rim and cover the wastewater flow shall be removed from the upstream manhole with a vactor truck. The upstream manhole shall serve as a wet well for the removal of sanitary sewer from the manhole. The vactor truck shall haul the sanitary sewer to the Niland Wastewater Treatment Plant. The vactor truck shall place the transported sanitary sewer volume in Aeration Pond Number 1 at the wastewater treatment plant according to the requirements of the wastewater treatment plant operators. There will be no cost for discharging the sanitary sewer vactor truck volume to the Niland Wastewater Treatment Plant. The contractor shall block and transport the wastewater flow upstream of the pipeline reach to receive CIPP until a given CIPP work task is performed, The CIPP work tasks are as follows:

- 1.1 Initial cleaning of the CIPP pipeline reach
- 2.1 Closed Circuit TV inspection of the CIPP pipeline reach.
- 3.1 Required pipeline point repairs.
- 4.1 CIPP installation.
- 5.1 Sealing at manholes and sewer house lateral connections.
- 6.1 Field testing after CIPP installation.
- 7.1 Final cleaning and close circuit television inspection (CCTV) requirements.
- 8.1 Any other CIPP required items.

The contractor shall determine the number of prior noted CIPP work tasks that can be

performed during a given sanitary sewer flow blockage. If wastewater flow is directed through the downstream pipe reach prior to the completion of all required work tasks then the CIPP pipeline reach shall be pressure washed and cleaned after the next wastewater flow upstream blockage occurs before the next CIPP work task commences.

2. The Contractor shall be responsible for continuity of sanitary sewer service (i.e. building laterals) to each facility connected to the section of sewer during the execution of the work. **Building laterals shall not be disconnected or plugged overnight.** Continuing service on the laterals should not be interrupted during the peak flow period from 5 P.M. the day before to 9 A.M. the next day. **Plugging of laterals is therefore allowed only from 9 A.M. to 5 P.M. of the same day.**

**C. Cleaning of Sanitary Sewer Host Pipeline**

1. Prior to pipe rehabilitation, the Contractor shall perform an initial sewer cleaning and closed circuit television (CCTV) inspection according to Section 02732 of this Specification to determine the general condition of the sewer, to remove any obstruction, tree roots and debris, to determine defective pipe sections for point repairs, to log the location of all house laterals and to verify location of active house laterals.
2. The contractor is responsible to obtain and pay for the costs of cleaning water. Cleaning water can be obtained from the local Niland water purveyor, Golden State Water Company or another source as the Contractor prefers. Golden State Water Company's local office is located in Calipatria, California, approximately 8 miles south of Niland. The Golden State Water Company Calipatria Operations Superintendent is David Godsey and can be contacted at (760) 348-5331, Extension 103.
3. The Contractor shall perform cleaning operations with appropriate safety and technical personnel overseeing the operation as well as proper safety equipment available to all personnel. Confined space requirements shall be observed and complied with during the cleaning operation.
4. The contractor shall complete the cleaning of the interior of the host piping with a pressure washing equipment with water pressure at the nozzle ranging from 1,000 psi to 3,000 psi pressure.
5. The material within the host piping section undergoing cleaning shall be flushed to the next downstream manhole. The downstream manhole exit piping shall be blocked. The downstream manhole shall act as a sump. A vactor truck shall remove the contents in the manhole. The vactor truck shall transport the collected pressure cleaning material to the Niland Wastewater Treatment Plant. The vactor truck contents shall be discharged to Aeration Pond Number 1 per the requirements of the Niland Wastewater Treatment Plant Operators.
6. For the first cleaning of a host pipe reach, the material pressure washed from the host pipe to a downstream manhole shall be removed by vactor truck for disposal at the Niland Wastewater Treatment Plant. Subsequent cleanings of the same host pipe shall allow the cleaned material to be passed on to the next downstream pipeline section.
7. The cost of repairing any damage to the host pipe due to overly aggressive cleaning

shall be borne by the contractor.

**D. CCTV Television Inspection and Documentation**

The host pipe shall be CCTV inspected prior to cleaning to determine the existing condition of the host pipe. A second CCTV inspection shall be performed after successful completion of cleaning and prior to liner pipe installation to verify that the host pipe is prepared for the liner pipe installation. A third CCTV inspection shall be performed following the successful completion of liner pipe installation and the reconnection of all laterals prior to grouting the annular space. A final CCTV inspection shall be performed after successful completion of grouting of the annular space, as applicable.

1. CCTV Equipment:
2. Camera: Remote-controlled, focus from 6” to infinity. Resolution at 350 lines per inch, minimum. During the reinstatement of laterals, only use “rotating lens” or “pan and tilt” cameras.
3. Footage counter: Accurate within plus or minus 1%. Include the real time counter measurement as a caption on the recorded tape. Use maintenance hole stations and maintenance hole numbers as references.
4. Television monitor: Color, minimum 350 lines per inch resolution.
5. Lighting: Adequate to fully illuminate the pipeline and positioned to not produce glare.
6. Mobility: Capable of steadily traveling with or against the flow. The maximum speed while inspecting and recording is 30 feet per minute.
7. Quality of Inspection Record of Final CCTV Inspection (per Article 3.03B above):  
The recorded video image must clearly show the full circumference of the pipeline, in focus, with adequate lighting to see detail, with uniform and steady travel, and depicting the date and time of inspection, footage of travel, street, project title, and pipe size. At laterals, service connections and pipe defects, provide a closer, more detailed examination and document the orientation, location, and size. The written records must further describe those laterals, service connections and pipe defects and index them to their location on the video record.
8. If debris is encountered, retrieve the CCTV unit, re-clean the pipeline and resume CCTV inspection.
9. For any CCTV inspection which shows that the CONTRACTOR has not successfully completed any portion of the work performed prior to the CCTV inspection, such CCTV inspection shall be performed again after the CONTRACTOR makes the necessary corrections. The CONTRACTOR shall perform both the corrections and the

additional CCTV at the CONTRACTOR's expense.

10. Results for CCTV inspections shall be submitted as color DVDs. All CCTV inspection DVDs shall clearly show the entire periphery of the pipeline above the water surface without any visual obstructions due to a submerged camera, steam in the pipe, water on the lens or any other conditions as determined by the ENGINEER. Those portions of any CCTV inspection that are visually obstructed will be rejected by the ENGINEER and shall be televised again by the CONTRACTOR as directed by the ENGINEER at no additional cost to the Owner.
11. After completion of the work, all CCTV inspection videos and records shall become the property of the ENGINEER. All costs associated with the CCTV inspections of the host pipe including all other appurtenant work shall be included in the appropriate bid item in the Schedule of Work and Prices.
12. Within twenty-four (24) hours after the pre-liner installation CCTV inspection of the host pipe is complete, the CONTRACTOR shall deliver the pre-liner installation DVDs to the ENGINEER for review.
13. Locations of laterals are approximate only. The CONTRACTOR shall determine exact locations prior to installation of the pipe liner.
14. Immediately following cleaning or pipe installation, inspect the pipe by CCTV at the next expected low flow. Verify the host pipe condition and effectiveness of cleaning, proofing, or installation operations. Record the inspection using a DVD recorder. Deliver the original DVDs, audio commentary, log sheets, and reports to the ENGINEER at the close of each working day. As desired, the CONTRACTOR may produce duplicates for the CONTRACTORS own use.

**E. Point Repairs**

1. Point repairs are work required to prepare defective sections of the existing sewer lines for rehabilitation.
2. Work shall be performed per Technical Condition Sections 02221, 02640 and 02650. The work shall include verifying the location of the point repair, locating all interfering utilities, temporary bypassing wastewater flow, traffic control, excavation, shoring, dewatering, pipe repairs or replacement, backfilling, and surface restoration. Point

repairs shall be approved by the Engineer. The Contractor shall be compensated for point repairs by means of a positive change order.

### **3.4 INSTALLATION**

- A.** The Contractor shall retain the services of a licensed installer of the manufacturer of the cured-in-place pipe rehabilitation system to assist the Contractor during preparation and installation of the system to certify that the work has been performed in accordance with the manufacturer's recommendations. The Contractor shall obtain detailed installation instruction and procedures from the manufacturer for the actual installation of the cured-in-place liner system.
- B.** The host pipeline shall be cleaned and televised. The outside diameter of the tube being inserted shall be properly sized to allow for expansion so that the CIPP liner can fit tightly against the host pipe.
- C.** The tube shall be installed through the existing manholes, in accordance with the manufacturer's recommendations and procedures. The finished pipe on mainline reaches shall be continuous over the entire length between manholes. A seal, recommended by the installer, shall be installed at the entrance to each manhole between the tube and the existing pipe. All manholes along the CIPP pipeline rehabilitation length are required to be rehabilitated. The manholes shall be rehabilitated prior to the commencement of CIPP work.
- D.** During the curing process, the Contractor shall keep logs, charts and/or graphs of the liner temperatures at the upstream and downstream manholes to insure that proper temperatures and cure times have been achieved. These documents may be required by the Engineer at any time during and after the curing process.
- E.** Immediately after curing of the cured-in-place pipe and after testing, within the same working day, the Contractor shall reinstate all existing active service connection per Owner standard details. Rough edges, string or other pipe defects that would prevent solids from free flowing shall be removed.
- F.** The Contractor shall also have a remote control cutting and grouting device on site to reinstate house lateral connections. There will be no initial relief hole; all cut shall be finish cut to the approximate original size and shape of the service lateral. Rough edges, strings or other pipe defects that would prevent solids from free flowing shall be removed. The Contractor shall have a back-up remote control cutting device on site in case of malfunction.
- G.** Any evidence of infiltration between the service connection and the existing pipe shall be corrected by the Contractor. The method of correction shall be submitted and approved by the Engineer.
- H.** The beginning and end of the cured-in-place pipe shall be cut flush at the inlet and outlet points in the manhole by using a rotary cutter, and the ends shall be sealed to the rehabilitated pipeline. The sealing material shall be compatible with the cured-in-place liner pipe and shall provide a watertight seal.

### **3.5 SEALING AT MANHOLES**

- A.** The cured-in-place CIPP shall make a tight seal at the manhole opening with no annular gaps.

Under all circumstances, the liner shall be sealed to the manhole and host pipe with appropriate type of sealant. The sealing material shall be compatible with the cured-in-place liner pipe and shall provide a watertight seal.

### **3.6 SEWER HOUSE CONNECTIONS**

- A.** All active laterals shall be verified. Sanitary sewer lateral shall be installed to conform to the Owners Standard Details. See Technical Conditions Sections 02221, 02640 and 02650 for more details regarding lateral installation.

### **3.7 FIELD TESTING**

- A.** Sanitary sewer systems including laterals, and sanitary sewer mains shall be tested for tightness after completion of all backfilling and prior to request for final inspection. Contractor shall notify the Engineer at least 72 hours in advance of proposed testing dates. Tests of gravity sewers shall be made from end or manhole to manhole unless grades are flat enough to permit testing two or more sections at one time. Sections which fail to pass the tests shall be repaired or replaced, and the section retested until it falls within specified allowances.
- B.** All water for sanitary sewer testing shall be provided and the tests performed by the Contractor in conformance with the following requirements:
  - 1. Mandrell Test
    - a.** Pipes shall be tested for deflection by passing a mandrel through the pipe without obstruction.
    - b.** The size of the mandrel shall be set at 92.5% of the base inside diameter of the pipe, as defined in ASTM 3034.
- C.** Air Leakage Tests shall be performed in conformance with SSPWC Section 306-1.4.4, latest edition.

**3.8 FIELD SAMPLING, LABORATORY TESTING and ACCEPTANCE TESTING**

- A.** The physical properties of the installed CIPP shall be verified through field sampling and laboratory testing, as approved by the Engineer. Following the curing and cooling of the installed pipe, the Contractor with or without the aid of the independent lab field personnel hired by the Owner, shall remove pipe samples at locations determined by the Engineer. The samples shall be clearly labeled with the date, time of day, duration of curing, and location of the sample. The sample shall be tested by an independent third party testing laboratory hired by the Owner and compensated by the Contractor for the following parameters:

Average Outside Diameter  
ASTM D 2122

Average Inside Diameter  
ASTM D 2122

Minimum Wall Thickness  
ASTM D 2122

Pipe Stiffness at 5%  
ASTM D 2412

Tensile Strength at Yield  
ASTM D 638

Tensile Modulus  
ASTM D 638

Flexural Strength  
ASTM D 790

Flexural Modulus  
ASTM D 790

Impact Strength  
ASTM D 256

The Lab shall provide the Engineer for approval, with certified test results of the short term properties of the CIPP pipe liner material from the actual installed liner at a minimum of two samples taken at a random locations, and with no more than three (3) samples, per each project area of lining set-up. Locations of sample shall be as directed by the Engineer.

CIPP liner pipe samples shall be submitted to a certified laboratory which has been approved by the Engineer and tested to confirm that the liner pipe conforms to the requirements of the latest edition of Green Book , Section 500-1.4.2, 210-2 and ASTM F1216.

- B.** Field sample preparation for Cured-In-Place lining method shall be according to ASTM F-1216, item 8.1.1.

- C. The testing costs are to be paid by the Contractor and included in the bid. If the work should fail to pass the tests, it is the Contractor's responsibility to correct the work and re-test at the Contractor's expense. The Owner shall not pay for re-installations and re-tests.
- D. If within the warranty period, any section of the sewer system is not acceptable due to subsequent excessive leakage or any other defects, although originally accepted, the Contractor shall repair or replace the affected portion at no cost to the Owner. It is understood that if the Contractor fails to do such work as required, the Surety shall be liable for said costs of repair or replacement.

### **3.9 MANHOLE INSPECTION**

- A. Manholes will be inspected after CIPP completion and within the guarantee period. Leakage and other defects that were a result of the Contractor's work shall be eliminated and repaired by the Contractor as required by the Engineer, at the Contractor's expense.

### **3.10 FINAL CLEANING AND CLOSE CIRCUIT TELEVISION INSPECTION (CCTV) REQUIREMENTS**

- A. Upon completion of the cured-in place sewer lining operations, all lines, manholes, and other structures shall be thoroughly cleaned of dirt, rubbish, debris and obstructions of any kind to the satisfaction of the Engineer, and the entire work site shall be cleaned of all waste, rubbish, and construction debris of any nature.
- B. Prior to acceptance of any rehabilitated sanitary sewer line, a closed circuit television (CCTV) inspection shall be performed using Wincan Version 8 inspection software, or approved equal, recorded digitally to an external drive.
- C. Defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, infiltration points and debris in lines shall be corrected to the satisfaction of the Engineer. For joint separations, low spots and chipped ends, the following maximum acceptable limits will apply for 6-12 inch pipes:

Joint separations	1/2 inch
Low spots	1 inch maximum depth
Chipped ends	1/4 inch

- D. For pipe larger than 12 inch, maximum limits will be specified by the Engineer for each project.
- E. The complete job is ready for television inspection when the following work has been completed:
  1. All sewers pipelines are installed and backfilled.
  2. All structures are in place, all channeling is complete and pipelines are accessible from structures.
  3. All other underground facilities, utility piping and conduits are installed.
  4. Final street grading is complete and ready for asphaltic concrete surfacing.

5. Pipelines to be inspected have been preliminarily balled and flushed or cleaned by a high pressure cleaner.
  6. Final leakage test has been completed and approved.
  7. Flood and drain the sewer system just prior to video inspection.
- E.** When the above work is completed, the Contractor shall arrange with the Engineer for close circuit television (CCTV) inspection.
- F.** The Contractor shall repair or replace failed sections as required by the Engineer.
- G.** Those portions of the pipeline system that have been corrected must be re- televised.

\* \* \*

**SECTION 02770 - HDPE LINER**

PART 1 - GENERAL

1.01 SCOPE

The following describes parameters for the manufacture, supply, and installation of polyethylene geomembranes. All procedures, operations, and methods shall be in strict accordance with the specifications and Plans.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 - Earthwork
- B. Section 02221 - Trenching, Backfilling and Compacting
- C. Section 07900 – Sealants and Caulking

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards:

ASTM D 792	Specific gravity (relative density) and density of plastics by displacement
ASTM D 1004	Initial tear resistance of plastic sheeting
ASTM D 1238	Flow rates of thermoplastics by extrusion plastometers
ASTM D 1505	Density of plastics by the Density-Gradient technique
ASTM D 1603	Carbon black in olefin plastics
ASTM D 1898	Sampling of plastics
ASTM D 3895	Test method for oxidative induction time of polyolefins by thermal analysis
ASTM D 4833	Index Puncture Resistance of geotextiles, geomembranes and related products
ASTM D 5199	Test method for measuring nominal thickness of geotextiles and geomembrane
ASTM D 5323	Determination of 2% secant modulus for polyethylene geomembranes
ASTM D 5397	Procedure to perform a single point notched constant tensile load - Appendix (SP-NCTL) test
ASTM D 5596	Test method for microscopic evaluation of the dispersion of carbon black in polyolefin geosynthetics
ASTM D 5617	Multi-axial tension test for geosynthetics

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ASTM D 5721	Practice for air-oven aging of polyolefin geomembranes
ASTM D 5885	Test method for oxidative induction time of polyolefin geosynthetics by high pressure differential scanning calorimetry
ASTM D 5994	Test method for measuring the core thickness of textured geomembranes
ASTM D 6392	Determining the integrity of nonreinforced geomembrane seams produced using thermo-fusing methods
ASTM D 6693	Determining tensile properties of nonreinforced polyethylene and nonreinforced flexible polypropylene geomembranes
GRI GM 10	Specification for the stress crack resistance of geomembrane sheet
GRI GM 11	Accelerated weathering of geomembranes using a florescent UVA-condensation exposure device
GRI GM 12	Measurement of the asperity height of textured geomembranes using a depth gauge
GRI GM 19	Seam strength and properties of thermally bonded polyolefin geomembranes
NSF / ASNI 61	Drinking Water System Components – Health Effects

1.04 QUALIFICATIONS OF CONTRACTOR WORK ACTIVITIES

A. Manufacturing:

The manufacturer shall have at least five (5) years continuous experience in manufacturing polyethylene geomembrane and/or experience totaling 10,000,000 square feet of manufactured polyethylene geomembrane.

B. Installation:

The Installation Contractor shall be the manufacturer or a dealer trained to install the manufacturer's geomembrane.

Installation shall be performed under the constant direction of a field installation supervisor who shall remain on site and be responsible, throughout the liner installation, for liner layout, seaming, testing, repairs, and all other activities by the Installer. The field installation supervisor shall have installed or supervised the installation of a minimum of 2,000,000 square feet of polyethylene geomembrane. Seaming shall be performed under the direction of a master seamer (who may also be the field installation supervisor) who has seamed a minimum of 2,000,000 square feet of polyethylene geomembrane, using the same type of seaming apparatus specified for this project. The field installation supervisor and/or master seamer shall be present whenever seaming is performed.

1.05 SUBMITTALS

A. Manufacturer:

## Niland County Sanitation District Wastewater Treatment Plant and Collection System

The manufacturer shall provide the following information after Contract Award, as a part of submittal information prior to liner installation:

1. List of material properties.
2. Manufacturing quality control program.
3. Copy of quality control certificates issued by the resin supplier.
4. Copy of quality control certificates for the geomembranes in conformance with Section 2.06.

### B. Installation Contractor:

The installer shall provide the following written information through the Contractor prior to commencement of installation:

1. A list of completed facilities totaling a minimum of 2,000,000 square feet, which the installer has installed polyethylene geomembrane. For each installation, the following information shall be provided:
  - a) Name and purpose of facility, location, and date of installation.
  - b) Name of owner, design engineer, manufacturer, and name and telephone number of contact at the facility who can discuss the project.
  - c) Thickness and quantity of the installed geomembrane.
2. Proposed installation panel layout.
3. Resume of the field installation supervisor and master seamer.

### 1.06 WARRANTY

A written Warranty shall be obtained from the manufacturer (for material) and the installation contractor (for workmanship). These documents shall warrant both the quality of the material and workmanship for a period of seven (7) years.

## PART 2 - MATERIAL SPECIFICATIONS

### 2.01 MATERIALS

- A. The geomembrane shall be High-Density Polyethylene (HDPE) or Linear Low Density Polyethylene (LLDPE).
- B. Gasket material shall be neoprene, closed cell medium, ¼ inch thick, 2 inches wide with adhesive on one side, or other compatible gasket materials as required.
- C. Metal battens or banding and hardware shall be 316 stainless steel.
- D. Water cut-off mastic shall be Neoprene Flashing Cement.
- E. Sealant shall be per Specification Section 07900 – Sealants and Caulking.

2.02 GEOMEMBRANE RAW MATERIALS

The geomembrane shall be manufactured of polyethylene resins produced in the United States and shall be compounded and manufactured specifically for the intended purpose. The resin manufacturer shall certify each lot for the following properties.

The natural polyethylene resin without the carbon black shall meet the following requirements:

Property	Test Method	HDPE Requirements	LLDPE Requirements
Density, g/cc	ASTM D 1505 or ASTM D 792	0.935 – 0.940	0.915 -0.926
Melt Index, g/10 min.	ASTM D 1238 Condition E	<0.4	<0.6

2.03 ROLLS

The geomembrane shall be a minimum 23.0 ft seamless width. Carbon black shall be added to the resin if the resin is not compounded for ultra-violet resistance.

The surface of the smooth geomembrane shall not have striations, roughness, pinholes, or bubbles.

The geomembrane shall be supplied in rolls. Labels on each roll shall identify the thickness of the material, the length and width of the roll, lot and roll numbers, and name of manufacturer.

The geomembrane rolls shall meet the following specifications:

**Smooth HDPE Geomembrane (English units):**

Property	Test Method	Minimum Average Values			
		40 mil	60 mil	80 mil	100 mil
Thickness, mils	ASTM D 5199	40	60	80	100
Minimum average					
Lowest Individual reading		36	54	72	90
Sheet Density, g/cc	ASTM D 1505/ D 792	0.940	0.940	0.940	0.940
Tensile Properties <sup>1</sup>	ASTM D 6693				
1. Yield Strength, lb/in		84	126	168	210
2. Break Strength, lb/in		152	228	304	380
3. Yield Elongation, %		12	12	12	12
4. Break Elongation, %		700	700	700	700
Tear Resistance, lb	ASTM D 1004	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	72	108	144	180

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Stress Crack Resistance <sup>2</sup> , hrs	ASTM D 5397	300	300	300	300
Carbon Black Content <sup>3</sup> , %	ASTM D 1603	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0
Carbon Black Dispersion	ASTM D 5596	Note 4	Note 4	Note 4	Note 4
Oxidative Induction Time (OIT) Standard OIT, minutes	ASTM D 3895	100	100	100	100
Oven Aging at 85°C High Pressure OIT - % retained after 90 days	ASTM D 5721 ASTM D 5885	80	80	80	80
UV Resistance <sup>5</sup> Standard OIT <sup>6</sup> - % retained after 1600 hrs	GRI GM 11 ASTM D 5885	50	50	50	50
Seam Properties 1. Shear Strength, lb/in 2. Peel Strength, lb/in - Hot Wedge - Extrusion Fillet	ASTM D 6392 (@ 2 in/min)	80 60 52	120 91 78	160 121 104	200 151 130
Roll Dimensions 1. Width (feet): 2. Length (feet) 3. Area (square feet): 4. Gross Weight (pounds, approx.)		23 750 17,250 3,470	23 500 11,500 3,470	23 375 8,625 3,470	23 300 6,900 3,470

- 1 Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction. Yield elongation is calculated using a gauge length of 3.0 inches; break elongation is calculated using a gauge length of 2.0 inches.
- 2 The yield stress used to calculate the applied load for the SP-NCTL test should be the mean value via MQC testing.
- 3 Other methods such as ASTM D 4218 or microwave methods are acceptable if an appropriate correlation can be established.
- 4 Carbon black dispersion for 10 different views: Nine in Categories 1 and 2 with one allowed in Category 3.
- 5 The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.
- 6 UV resistance is based on percent retained value regardless of the original HP-OIT value.

**Textured HDPE Geomembrane (English Units)**

Property	Test Method	Minimum Average Values			
		40 mil	60 mil	80 mil	100 mil
Thickness, mils					

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Minimum average	ASTM D 5199	38	57	76	95
Lowest Individual of 8 of 10 readings		36	54	72	90
Lowest individual of 10 readings		34	51	68	85
Asperity Height <sup>1</sup> , mils	GRI GM 12	10	10	10	10
Sheet Density, g/cc	ASTM D 1505/ D 792	0.940	0.940	0.940	0.940
Tensile Properties <sup>2</sup>	ASTM D 6693				
1. Yield Strength, lb/in		84	126	168	210
2. Break Strength, lb/in		60	90	120	150
3. Yield Elongation, %		12	12	12	12
4. Break Elongation, %		100	100	100	100
Tear Resistance, lb	ASTM D 1004	28	42	56	70
Puncture Resistance, lb	ASTM D 4833	60	90	120	150
Stress Crack Resistance <sup>3</sup> , hrs	ASTM D 5397 (App.)	300	300	300	300
Carbon Black Content <sup>4</sup> , %	ASTM D 1603	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0
Carbon Black Dispersion	ASTM D 5596	Note 5	Note 5	Note 5	Note 5
Oxidative Induction Time (OIT) Standard OIT, minutes	ASTM D 3895	100	100	100	100
Oven Aging at 85°C	ASTM D 5721				
High Pressure OIT - % retained after 90 days	ASTM D 5885	80	80	80	80
UV Resistance <sup>6</sup>	GRI GM 11				
High Pressure OIT <sup>7</sup> - % retained after 1600 hrs	ASTM D 5885	50	50	50	50
Seam Properties	ASTM D 6392 (@ 2 in/min)				
1. Shear Strength, lb/in		80	120	160	200
2. Peel Strength, lb/in					
- Hot Wedge		60	91	121	151
- Extrusion Fillet		52	78	104	130
Roll Dimensions					
1. Width (feet):		23	23	23	23
2. Length (feet)		750	500	375	300
3. Area (square feet):		17,250	11,500	8,625	6,900
4. Gross Weight (pounds, approx.)		3,500	3,500	3,470	3,470

1. Of the 10 readings, 8 must be  $\geq 7$  mils and lowest individual reading must be  $\geq 5$  mils.

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2. Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction. Yield elongation is calculated using a gauge length of 1.3 inches; break elongation is calculated using a gauge length of 2.0 inches.
3. The yield stress used to calculate the applied load for the SP-NCTL test should be the mean value via MQC testing.
4. Other methods such as ASTM D 4218 or microwave methods are acceptable if an appropriate correlation can be established.
5. Carbon black dispersion for 10 different views: Nine in Categories 1 and 2 with one allowed in Category 3.
6. The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.

2.04 QUALITY CONTROL SPECIFICATIONS

A. Raw Materials:

1. Resin: All resins for use in geomembrane must pass a candidate pre-approval process before being eligible for use. Each incoming railcar shall be sampled by compartment with the following testing performed and compared to the manufacturer's specifications:

1. Density: ASTM D 1505
2. Melt Index: ASTM D 1238
3. Oxidative Induction Time (OIT): ASTM D 3895

- B. Additives: All incoming materials are to be tested and approved prior to use with the following testing performed and compared to the manufacturer's specifications:

1. Carbon Black Content: ASTM D 1603.
2. Oxidative Induction Time (OIT): ASTM D 3895.

2.05 FINISHED PRODUCT: DURING PRODUCTION

- A. Inspection: Performed on each roll during manufacturing.

1. Appearance: Sheet surface appearance shall be monitored for flaws.
2. Thickness: A full width sample shall be cut from the end of each roll for thickness measurement.

- B. Roll Identification: Four tags per roll shall be used.

1. Outside the core.
2. On the core plug.
3. On the roll surface.

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4. On the production roll sample.
- C. **Out-of-Spec. Material:** Any roll not meeting the specification for any of the above inspections shall be separated from other rolls and placed on hold.

2.06 **MANUFACTURER’S QUALITY CONTROL AND QUALITY ASSURANCE TESTING**

- A. **Sampling:** Full width samples shall be taken as retains from the end of each roll to the manufacturer’s laboratory.
- B. **Testing:** The geomembrane quality control testing shall meet the following frequency requirements:

<b>Property</b>	<b>Test Method</b>	<b>Testing Frequency (min.)</b>
Thickness (smooth sheet) (textured sheet)	ASTM D 5199 ASTM D 5994	per roll
Asperity Height (textured sheet only) Alternate the measurement side for double-sided textured sheet	GRI GM 12	every second roll
Sheet Density	ASTM D 1505/ D 792	200,000 lb (90,000 kg)
Tensile Properties 1. Yield Strength 2. Break Strength 3. Yield Elongation 4. Break Elongation	ASTM D 6693	20,000 lb (9,000 kg)
2% Modulus (LLDPE only)	ASTM D 5323	per each formulation
Tear Resistance	ASTM D 1004	45,000 lb (20,000 kg)
Puncture Resistance	ASTM D 4833	45,000 lb (20,000 kg)
Axi-Symetric Break Strain (LLDPE only)	ASTM D 5617	per each formulation
Stress Crack Resistance (HDPE only)	ASTM D 5397 (App.)	per GRI GM 10
Carbon Black Content	ASTM D 1603	20,000 lb (9,000 kg)
Carbon Black Dispersion	ASTM D 5596	45,000 lb (20,000 kg)
Oxidative Induction Time (OIT) Standard OIT	ASTM D 3895	200,000 lb (90,000 kg)

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Oven Aging at 85°C High Pressure OIT	ASTM D 5721 ASTM D 5885	per each formulation
UV Resistance High Pressure OIT	GRI GM 11 ASTM D 5885	per each formulation

C. Welding Rod: A sample of welding rod shall be tested at the frequency of once per 25 rolls of welding rod. The following tests shall be performed on the sample:

1. Diameter: ASTM D 5199
2. Density: ASTM D 1505
3. Melt Index: ASTM D 1238
4. Carbon Black Content: ASTM D 1603

D. Reporting: Results from the testing shall be reviewed by the quality control manager. Material that does not meet specifications shall be identified and placed on hold. The test data shall then be transferred to the product data file for roll certification.

PART 3.0 - GEOMEMBRANE INSTALLATION

3.01 MATERIALS LOGISTICS

A. The geomembrane rolls shall be shipped by flatbed trailer to the job site. The geomembrane shall be stored so as to be protected from puncture, dirt, grease, moisture and excessive heat. Damaged material shall be stored separately for repair or replacement. The rolls shall be stored on a prepared smooth surface (not wooden pallets) and should not be stacked more than two rolls high.

3.02 EARTHWORK

A. General: The Owner’s Representative shall inspect the subgrade preparation. Prior to liner installation the subgrade shall be compacted in accordance with the project specifications. Weak or compressible areas which cannot be satisfactorily compacted should be removed and replaced with properly compacted fill. All surfaces to be lined shall be smooth, free of all foreign and organic material, sharp objects, or debris of any kind. The subgrade shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Standing water or excessive moisture shall not be allowed.

The installer, on a daily basis, shall approve the surface on which the geomembrane will be installed. After the supporting soil surface has been approved, it shall be the installer’s responsibility to indicate to the Owner’s Representative any changes to its condition that may require repair work.

B. Anchor Trench: The anchor trench shall be excavated to the line, grade, and width shown on the Plans, prior to liner system placement. Slightly rounded corners shall be provided in the trench to avoid sharp bends in the geomembrane.

3.03 METHOD OF PLACEMENT

A. The rolls shall be deployed using a spreader bar assembly attached to a loader bucket or by other methods approved by the Owner’s Representative.

The installer shall be responsible for the following:

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1. Equipment or tools shall not damage the geomembrane during handling, transportation and deployment.
  2. Personnel working on the geomembrane shall not smoke or wear damaging shoes.
  3. The method used to unroll the panels shall not cause scratches or crimps in the geomembrane and shall not damage the supporting soil.
  4. Adequate loading (e.g., sand bags or similar items that will not damage the geomembrane) shall be placed to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).
- B. Weather Conditions: Geomembrane deployment shall proceed between ambient temperatures of 32° F and 104° F. Placement can precede below 32° F only after it has been verified by the inspector that the material can be seamed according to the specification. Geomembrane placement shall not occur during any precipitation, in the presence of excessive moisture (e.g., fog, rain, dew) or in the presence of excessive winds, as determined by the installation supervisor.

### 3.04 FIELD SEAMING

Approved seaming processes are fusion and extrusion welding. On side slopes, seams shall be oriented in the general direction of maximum slope, i.e., oriented down, not across the slope. In corners and odd-shaped geometric locations, the number of field seams shall be minimized.

No base T-seam shall be closer than 5 feet from the toe of the slope. Seams shall be aligned with the least possible number of wrinkles and “fishmouths”. If a fishmouth or wrinkle is found, it shall be relieved and cap-stripped.

- A. Seam Overlap: Geomembrane panels must have a finished minimum overlap of 4 inches for fusion welding and 6 inches for extrusion welding.

Cleaning solvents may not be used unless the product is approved by the liner manufacturer.

- B. Test Seams: Field test seams shall be conducted on the liner to verify that seaming conditions are satisfactory. Test seams shall be conducted at the beginning of each seaming period and at least once every 4 hours, for each seaming apparatus and personnel used that day.

All test seams shall be made in contact with the subgrade. Welding rod used for extrusion welding shall have the same properties as the resin used to manufacture the geomembrane. The test seam samples shall be 10 feet long for fusion welding and 3 feet long for extrusion welding with the seam centered lengthwise. Three specimens shall be cut from each end of the test seams by the Owner’s Representative. The Owner’s Representative shall use a tensiometer to test 3 specimens for shear and 3 specimens for peel. Each specimen shall be one inch wide with a grip separation of 4 inches plus the width of the seam. The seam shall be centered between the clamps. The rate of grip separation shall be 2 inches per minute.

- C. Assessment of Seam Test Results: For both smooth and textured seams the strength of two out of three 1.0 inch (25 mm) wide strip specimens should meet or exceed values given in this specification. The third must meet or exceed 80% of the given values. The shear percent elongation should exceed 50%. The assumed gauge length is considered to

be the unseamed sheet material on either side of the welded area. Elongation measurements should be omitted for field testing. In addition, the peel separation should not exceed 25% based on the proportion of area of separated bond to the area of the original bonding. Regarding the locus-of-break patterns of the different seaming methods in shear and peel, the following are unacceptable break codes per their description in the ASTM D 6392. In this regard, SIP is an acceptable break code.

1. Unacceptable Break Codes:

Hot Wedge: AD and AD-BRK > 25%

Extrusion Fillet: AD1, AD2 and AD-Weld (unless strength is achieved)

D. Non-Destructive Seam Testing: The installer shall non-destructively test all field seams over their full length.

1. Vacuum Box Testing: Equipment for testing extrusion seams shall be comprised of the following:

a. A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.

b. Soapy solution in a plastic bucket with a mop.

The following procedures shall be followed by the installer:

a. Excess sheet overlap shall be trimmed away.

b. Wet a strip of geomembrane approximately 12 inches wide by the length of box with the soapy solution.

c. Place the box over the wetted area and compress.

d. Create a vacuum of 3 - 5 PSI.

e. Ensure that a leak tight seal is created.

f. For a period of approximately 10 seconds, examine the geomembrane through the viewing window for the presence of animated soap bubbles.

g. If no animated bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inches overlap and repeat the process.

h. All areas where animated soap bubbles appear shall be marked, repaired and then retested.

The following procedures shall apply to locations where seams cannot be non-destructively tested.

a. If the seam is accessible to testing equipment prior to final installation, the seam shall be non-destructively tested prior to final installation.

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- b. If the seam cannot be tested prior to final installation, the seams shall be spark tested according to the spark tester manufacturer's procedures.
2. Air Pressure Testing (For Double Fusion Seams Only): Equipment for testing double fusion seams shall be comprised of the following:
- a. An air pump equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 PSI.
  - b. A pressure gauge equipped with a sharp hollow needle.

The following procedures shall be followed by the installer:

- a. Seal one end of the seam to be tested.
  - b. Insert needle or other approved pressure feed device through the sealed end of the channel created by the double wedge fusion weld.
  - c. Energize the air pump to verify the unobstructed passage of air through the channel.
  - d. Seal the other end of the channel.
  - e. Energize the air pump to a pressure between 25 and 30 psi, close valve, allow 2 minutes for the injected air to come to equilibrium in the channel, and sustain pressure for approximately 5 minutes.
  - f. If loss of pressure exceeds 4 psi, or pressure does not stabilize, locate faulty area, repair and retest.
  - g. If pressure does not drop below the acceptable value after five minutes, cut the air channel open at the opposite end from the pressure gauge. The air channel should deflate immediately indicating that the entire length of the seam has been tested.
- E. Destructive Seam Testing: Destructive seam testing should be minimized to preserve the integrity of the liner. The installer shall provide the Owner's Representative with one destructive test sample per project specifications (usually once per 500 feet of seam length) from a location specified by the Owner's Representative.
1. Sampling Procedure: In order to obtain test results prior to completion of liner installation, samples shall be cut by the installer as the seaming progresses. The installer shall also record the date, location, and pass or fail description. All holes in the geomembrane resulting from obtaining the seam samples shall be immediately patched and vacuum tested.
  2. Size and Disposition of Samples: The samples shall be 12 inches wide by 36 inches long with the seam centered lengthwise. The sample shall be cut into three equal-length pieces, one to be given to the Owner's Representative, one to be given to the Owner and one to the installer.
  3. Field Laboratory Testing: The Owner's Representative shall test ten 1-inch wide specimens from his sample, five specimens for shear strength and five for peel strength.

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4. Independent Laboratory Testing: The Owner, at its discretion and expense, may send seam samples to a laboratory for testing. The test method and procedures to be used by the independent laboratory shall be the same as used in field testing.
  5. Procedures for Destructive Test Failure: The following procedures shall apply whenever a sample fails the field destructive test:
    - a. The installer shall cap strip the seam between the failed location and any passed test locations.
    - b. The installer can retrace the welding path to an intermediate location (usually 10 feet from the location of the failed test), and take a sample for an additional field test. If this test passes, then the seam shall be cap stripped between that location and the original failed location. If the test fails, then the process is repeated.
    - c. Over the length of seam failure, the installer shall either cut out the old seam, reposition the panel and reseam, or add a cap strip.
- F. Defects and Repairs: All seams and non-seam areas of the geomembrane shall be inspected by the Owner's Representative for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection.
1. Evaluation: Each suspect location in seam and non-seam areas shall be non-destructively tested as appropriate in the presence of the Owner's Representative. Each location that fails the non-destructive testing shall be marked by the Owner's Representative, and repaired accordingly.
  2. Repair Procedures:
    - a. Defective seams shall be cap stripped or replaced.
    - b. Small holes shall be repaired by extrusion welding a bead of extrudate over the hole. If the hole is larger than ¼-inch, it shall be patched.
    - c. Tears shall be repaired by patching. If the tear is on a slope or an area susceptible to stress and has a sharp end it must be rounded prior to patching.
    - d. Blisters, large cuts and undispersed raw materials shall be repaired by patches.
    - e. Patches shall be completed by extrusion welding. The weld area shall be ground no more than 10 minutes prior to welding. No more than 10% of the thickness shall be removed by grinding. Grinding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted. The welding shall restart by grinding the existing seam and rewelding a new seam.

Patches shall be round or oval in shape, made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects.

3. Verification of Repairs: Each repair shall be non-destructively tested. Repairs that pass the non-destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved.

The Owner's Representative shall keep daily documentation of all non-destructive and destructive testing. This documentation shall identify all seams that initially failed the test and include evidence that these seams were repaired and successfully retested.

### 3.05 BACKFILLING OF ANCHOR TRENCH

The geomembrane in the anchor trench shall be covered as soon as possible. The covering operation shall not damage the geomembrane. The cover soil material shall be free of foreign and organic material, sharp objects, or debris of any kind, which could potentially damage the geomembrane. No construction equipment or machinery shall operate directly on the geomembrane. The use of lightweight machinery (i.e., generator, etc.) with low ground pressure is allowed.

The anchor trench shall be backfilled by the Earthwork Contractor. Trench backfill material shall be placed and compacted in accordance with the project specifications.

Care shall be taken when backfilling the trenches to prevent any damage to the geomembrane. If damage occurs, it shall be repaired prior to backfilling.

### 3.06 GEOMEMBRANE ACCEPTANCE

The installer shall retain all ownership and responsibility for the geomembrane until accepted by the Owner's Representative.

Final acceptance is when all of the following conditions are met:

- A. Installation is finished.
- B. Verification of the adequacy of all field seams and repairs, including associated testing, is complete.

**END OF SECTION 02770**

**SECTION 02780 - GEOTEXTILE FABRIC**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Geotextile to prevent mixing of a subgrade soil and an aggregate cover material (subbase, base, select embankment, etc.). The separation application is appropriate for pavement structures constructed over soils with a California Bearing Ratio (CBR) equal to or greater than 3 ( $CBR \geq 3$ ) (shear strength greater than approximately 90 kPa) or as illustrated on the Plans. This specification also applies to situations other than beneath pavements and concrete structures where separation of two dissimilar materials is required but where water seepage through the geotextile is not a critical function.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02140 - Dewatering
- B. Section 02200 - Earthwork

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. AASHTO Standards:

- 1. T88 - Particle Size Analysis of Soils
- 2. T90 - Determining the Plastic Limit and Plasticity Index of Soils
- 3. T99 - The Moisture-Density Relations of Soils Using a 5.5 lb (2.5 kg) Rammer and a 12-inch (305mm) Drop
- 4. M288-96: - Geotextile Specification for Highway Applications

B. American Society for Testing and Materials (ASTM):

- 1. D 123 - Standard Terminology Relating to Textiles
- 2. D 276 - Test Method for Identification of Fibers in Textiles
- 3. D 3786 - Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics
- 4. D 4354 - Practice for Sampling of Geosynthetics for Testing
- 5. D 4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
- 6. D 4439 - Terminology for Geotextiles
- 7. D 4491 - Test Methods for Water Permeability of Geotextiles by Permittivity
- 8. D 4533 - Test Method for Index Trapezoid Tearing Strength of Geotextiles
- 9. D 4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

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10. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles
  11. D 4751 - Test Method for Determining Apparent Opening Size of a Geotextile
  12. D 4759 - Practice for Determining the Specification Conformance of Geosynthetics
  13. D 4833 - Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
  14. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles
  15. D 5141 - Test Method to Determine Filtering Efficiency and Flow Rate for Silt Fence Applications Using Site Specific Soils
- C. Federal Highway Administration (FHWA): Geosynthetic Design and Construction Guidelines, Publication No. FHWA HI-95-038, May 1995
- D. American Association of Laboratory Accreditation (A2LA)
- E. Geosynthetic Accreditation Institute (GAI) - Laboratory Accreditation Program (LAP)
- F. National Transportation Product Evaluation Program (NTPEP)

1.04 CONTRACTOR SUBMITTALS

- A. The Contractor shall provide to the Engineer a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the manufacturer.

Minimum Average Roll Value (MARV): Property value calculated as typical minus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.

1.05 QUALITY ASSURANCE

- A. Geosynthetic Accreditation Institute (GAI) - Laboratory Accreditation Program (LAP).
- B. American Association for Laboratory Accreditation (A2LA).

1.06 DELIVERY, STORAGE AND HANDLING

- A. Geotextiles labeling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.
- B. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.
- C. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical property values of the geotextile.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. The geotextile shall be manufactured with fibers consisting of long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins or polyesters. They shall form a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.
- B. The geotextile shall meet the requirements of Table 1. All numeric values in Table 1 except AOS represent MARV in the weakest principal direction. Values for AOS represent maximum average roll values.
- C. Table 1 - Separation Geotextile

Property	Test Method	Units	Elongation < 50% <sup>1</sup>
Grab Tensile Strength	ASTM D 4632	N (lbs)	1100 (247)
Sewn Seam Strength <sup>2</sup>	ASTM D 4632	N (lbs)	990 (222)
Tear Strength	ASTM D 4533	N (lbs)	400 (90)
Puncture Strength	ASTM D 4833	N (lbs)	500 (112)
Burst Strength	ASTM D 3786	kPa (PSI)	3500 (507)
Permittivity	ASTM D 4991	sec <sup>-1</sup>	0.02
Apparent Opening Size	ASTM D 4751	mm (US Sieve)	0.60 max (30)
Ultraviolet Stability (after 500 hrs)	ASTM D 4355	%	50

<sup>1</sup>A measured in accordance with ASTM D 4632.

<sup>2</sup>When sewn seams are required. Refer to Section 3 - Execution for overlap/seam requirements.

**2.02 QUALITY CONTROL**

- A. Manufacturing Quality Control: Testing shall be performed at a laboratory accredited by GAI-LAP and A2LA for tests required for the geotextile, at frequency meeting or exceeding ASTM D 4354.
- B. Geotextile properties, other than Sewn Seam Strength, Burst Strength, and Ultraviolet Stability, shall be tested by NTPEP to verify conformance with this Specification.
- C. Sewn Seam Strength shall be verified based on testing of either conformance samples obtained using Procedure A of ASTM D 4354, or based on manufacturer’s certifications and testing of quality assurance samples obtained using Procedure B of ASTM D 4354. A lot size for conformance or quality assurance sampling shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.

- D. Ultraviolet Stability shall be verified by an independent laboratory on the geotextile or a geotextile of similar construction and yarn type.

2.03 MANUFACTURERS

- A. Product: MIRAfi 600X  
 Mirafi Construction Products  
 365 South Holland Drive  
 Pendergrass, GA 30567  
 1-888-795-0808 1-706-593-2226 1-706-693-2083, FAX  
[www.mirafi.com](http://www.mirafi.com)
- B. Product: GEOTEX 250 ST  
 Propex, Inc.  
 6025 Lee Highway, Suite 425  
 P. O. Box 22788  
 Chattanooga, TN 37422  
 1-800-621-1273 1-423-890-0444 1-423-899-7619, FAX  
[www.geotextile.com](http://www.geotextile.com)
- C. Or an approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The installation site shall be prepared by clearing, grubbing, and excavation or filling the area to the design grade. This includes removal of topsoil and vegetation.

3.02 INSTALLATION

- A. The geotextile shall be laid smooth without wrinkles or folds on the prepared subgrade in the direction of construction traffic. Adjacent geotextile rolls shall be overlapped, sewn or joined per manufacturer’s recommendations or as listed in the table below, the more stringent shall apply when conflicting. See table below for overlap requirements.

Soil CBR	Method of Joining
Greater than 3	300 - 450 mm (12 - 18 in) overlap
1 - 3	600 - 1000mm (24 - 40 in) overlap
0.5 - 1	1000mm (40 in) overlap or sewn
Less than 0.5	Sewn
All roll ends	1000mm (40 in) overlap or sewn

- B. On curves, the geotextile may be folded or cut to conform to the curves. The fold or overlap shall be in the direction of construction and held in place by pins, staples, or piles of fill or rock.
- C. Prior to covering, the geotextile shall be inspected by a certified inspector of the Engineer to ensure that the geotextile has not been damaged during installation. Damaged geotextiles, as identified by the Engineer, shall be repaired immediately. Cover the damaged area with a geotextile patch which extends an amount equal to the required overlap beyond the damaged area.
- D. The subbase shall be placed by end dumping onto the geotextile from the edge of the geotextile, or over previously placed subbase aggregate. Construction vehicles shall not

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be allowed directly on the geotextile. The subbase shall be placed such that at least the minimum specified lift thickness shall be between the geotextile and equipment tires or tracks at all times. Turning of vehicles shall not be permitted on the first lift above the geotextile.

- E. On subgrades having a CBR value of less than 1, the subbase aggregate should be spread in its full thickness as soon as possible after dumping to minimize the potential of localized subgrade failure due to overloading of the subgrade.
- F. Any ruts occurring during construction shall be filled with additional subbase material, and compacted to the specified density.
- G. If placement of the backfill material causes damage to the geotextile, the damaged area shall be repaired as previously described above. The placement procedure shall then be modified to eliminate further damage from taking place.

**END OF SECTION 02780**

**SECTION 03100 - CONCRETE FORMWORK**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide concrete formwork, bracing, shoring, supports, and false work, in accordance with the Contract Documents.
- B. Work included in this Section: Principal items are:
  - 1. Furnishing, erection, and removal of forms.
  - 2. Shoring and bracing of formwork.
  - 3. Setting of embedded items and pipe sleeves for mechanical and electrical work under direction of respective trade.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. The Work of the following Sections apply to the Work of this Section. Other Sections, not referenced below, shall also apply to the extent required for proper performance of the Work.
  - 1. Section 03200 - Reinforcement Steel
  - 2. Section 03290 - Joints in Concrete Structures
  - 3. Section 03300 - Cast-in-Place Concrete
  - 4. Section 03315 - Grout

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Except as otherwise indicated in this Section of the Specifications, the Contractor shall comply with the latest adopted edition of the Standard Specifications for Public Works Construction (SSPWC), together with the latest adopted editions of the Regional Amendments.
- B. The current edition of the Uniform Building Code (UBC) of International Conference of Building Officials (ICBO).
- C. Except as otherwise indicated, the current editions of the following apply to the Work of this Section:
  - 1. PS 1 U.S. Product Standard for Concrete Forms, Class 1
  - 2. PS 20 American Softwood Lumber Standard
  - 3. ACI 117 Standard Tolerances for Concrete Construction and Materials
  - 4. ACI 347 Recommended Practice for Concrete Formwork

1.04 CONTRACTOR SUBMITTALS

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- A. The Contractor shall, in accordance with the requirements in the Specification Section 01300 – Contractor Submittals, submit detailed drawings of the false work proposed to be used. Such drawings shall be in sufficient detail to indicate the general layout, sizes of members, anticipated stresses, grade of materials to be used in the false work, means of protecting existing construction which supports false work, and typical soil conditions.
- B. The Contractor shall, in accordance with the requirements in the Specification Section 01300 – Contractor Submittals, submit the following:
  - 1. Form ties and all related accessories, including taper tie plugs, if taper ties are used.
  - 2. Form gaskets.
- C. The Contractor shall provide concrete construction joints and expansion joints of the types and locations indicated on the Plans. The Contractor shall submit shop drawings showing the proposed location and type of required construction for any joints not shown on the Plans, and the sequence of forming and concrete placing operations.
- D. Forms and false work to support the roof and floor slabs shall be designed for the total dead load, plus a live load of 50 PSF (minimum). The minimum design load for combined dead and live loads shall be 100 PSF.
- E. The Contractor shall design formwork prior to fabrication, placing the order, or use on the jobs.
- F. The Contractor shall design joints in forms to remain mortar-tight and withstand placing pressures without bulging outward or creating surface patterns.
- G. Calculations shall be signed and sealed by a Professional Civil or Structural Engineer registered in the State of California for both the forming system and the stresses induced on the form system.
- H. Suitable and effective means shall be provided for holding adjacent edges and end panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets or similar surface defects in the finished concrete. The forms shall be tight so as to prevent the loss of water, cement, and fines during placing and vibrating of the concrete.

1.05 QUALITY ASSURANCE

- A. The Contractor shall comply with the requirements of California Division of Occupational Health and Safety Construction Safety Orders Section 1717 and OSHA Part 1926, Section 1926.701 that apply to the Work of this Section. The Contractor shall prepare and maintain at least one copy of the required Plans at the site. Design of the structures shown on the Plans does not include any allowance or consideration for imposed construction loads. The Contractor shall provide forms, shoring and false work adequate for imposed live and dead loads, including equipment, height of concrete drop, concrete and foundation pressures, stresses, lateral stability, and other safety factors during construction.
- B. Tolerances: The Contractor shall employ formwork complying with ACI 347 Guide to Formwork for Concrete, except as exceeded by the requirements of regulatory agencies, or as otherwise indicated or specified. The Contractor shall design and construct formwork to produce finished concrete conforming to tolerances given in ACI 117.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Except as otherwise expressly accepted by the Engineer, all lumber brought on the Site for use as forms, shoring, or bracing shall be new material. All forms shall be smooth surface forms and shall be of the following materials:

Walls:	Steel or plywood panel
Columns:	Steel, plywood or fiberglass
Roof and Floor:	Plywood
All Other Work:	Steel panels, plywood or tongue and groove lumber

- B. Form materials which may remain or leave residues on or in the concrete shall be classified as acceptable for potable water use by the Environmental Protection Agency within 30 days of application or use.

2.02 FORM AND FALSE WORK MATERIALS

- A. Materials for concrete forms, formwork, and false work shall conform to the following requirements:

1. Lumber shall be Douglas Fir or Southern Yellow Pine, construction grade or better, in conformance with U.S. Product Standard PS 20.
2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Yellow Pine plywood manufactured especially for concrete formwork and shall conform to the requirements of PS 1 for Concrete Forms, Class I, and shall be edge sealed.
3. Form materials shall be metal, wood, plywood, or other approved material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade shown. Metal forms shall be an approved type that will accomplish such results. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Ext. Grade.

2.03 FORM TIES

- A. Form ties with integral waterstops shall be provided with a plastic cone or other suitable means for forming a conical hole to ensure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 1-1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming. Form ties shall be Burke Penta-Tie System by The Burke Company; Richmond Snap-Tys by the Richmond Screw Anchor Company; or equal.
- B. Form ties for water-retaining structures shall have integral waterstops. Removable taper ties may be used when approved by the Engineer. A preformed neoprene or polyurethane tapered plug sized to seat at the center of the wall shall be inserted in the hole left by the removal of the taper tie. Use Burke Taper-Tie System by The Burke Company; Taper-Ty by the Richmond Screw Anchor Company; or equal.

2.04 FORM COATING

- A. Non-grainrising and nonstaining resin or polymer type that will not leave residual matter on surface of concrete or adversely effect bonding to concrete of paint, plaster, mortar,

protective coatings, waterproofing or other applied materials. Coatings containing mineral oils, paraffins, waxes or other nondrying ingredients, are not permitted. For concrete surfaces contacting potable stored water, use only coatings and form-release agents that are completely nontoxic.

2.05 FORM JOINT SEALERS

- A. For joints between form panels, use resilient foam rubber strips, non-hardening plastic-type caulking compound free of oil, or waterproof pressure-sensitive plastic tape of minimum 8 mil thickness and 2 inches width. For form tie holes, use rubber plugs, plastic caulking compound, or equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The Contractor shall assume full responsibility for the adequate design of all forms, and any forms which are unsafe or inadequate in any respect shall promptly be removed from the Work and replaced at no increased cost to the Owner. The Contractor shall provide worker protection from protruding reinforcement bars in accordance with applicable safety codes. A sufficient number of forms of each kind shall be provided to permit the required rate of progress to be maintained. The design and inspection of concrete forms, false work, and shoring shall comply with applicable local, state and Federal regulations. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement, the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.
- B. Concrete forms shall conform to the shape, lines, and dimensions of members as called for on the Drawings, and shall be substantial, free from surface defects, and sufficiently tight to prevent leakage. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly placed concrete. If adequate foundation for shores cannot be secured, trussed supports shall be provided.
- C. Unless otherwise indicated, exterior corners in concrete members shall be provided with  $\frac{3}{4}$  inch chamfers. Re-entrant corners in concrete members shall not have fillets unless otherwise indicated.
- D. The Contractor shall notify the Engineer at least 48 hours prior to concrete placement so the completed formwork can be inspected.
- E. Final inspection will be made only after all formwork, embeds, blowouts, screeds, ties, final adjustments, and related work have been completed by the Contractor.
- F. The Contractor shall correct defective work identified by the Engineer, prior to delivery of the concrete.
- G. Neither the review of the Contractor's drawings nor inspection of forms by the Engineer shall relieve the Contractor of responsibility for the adequacy of the forms nor from the necessity for remedying all defects which may develop or become apparent with use. The Engineer may at any time condemn any section or sections of the forms found deficient. The Contractor shall promptly remove the condemned forms from the Work and replace them.

3.02 FORM DESIGN

A. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. Suitable and effective means shall be provided on all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects in the finished concrete. Plywood, 5/8 inch and greater in thickness, may be fastened directly to studding if the studs are spaced close enough to prevent visible deflection marks in the concrete. The forms shall be tight so as to prevent the loss of water, cement and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1- to 1-1/2 inch diameter polyethylene rod held in position to the underside of the wall form. Adequate clean-out holes shall be provided at the bottom of each lift of forms. The size, number, and location of such clean-outs shall be as acceptable to the Engineer. Whenever concrete cannot be placed from the top of a wall form in a manner that meets the requirements of the Contract Documents, form windows shall be provided in the size and spacing needed to allow placement of concrete to the requirements of Section 03300 - Cast-in-Place Concrete. The size, number, and location of such form windows shall be as acceptable to the Engineer.

B. Wall Forms:

1. All walls shall be formed by methods acceptable to the Engineer and to the correct elevations and location illustrated on the Plans.

2. Pouring Openings:

- a) The minimum pouring opening size shall be 18" x 18".
- b) The bottom of the lower openings shall be no more than 48 inches from the top of the wall-footing.
- c) The horizontal centerline distance between such openings shall not exceed 96 inches nor shall the distance between the nearest opening and the bulkhead for the vertical joint exceed 36 inches.
- d) The vertical centerline distance between horizontal rows of openings shall not exceed 96 inches.
- e) Under no circumstances shall forming be such that the drop of concrete in the forms will exceed 4 feet in any one place.

3.03 CONSTRUCTION

A. Vertical Surfaces: All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is shown. Not less than 1 inch of concrete shall be added to the thickness of the concrete member as shown where concrete is permitted to be placed against trimmed ground in lieu of forms. Such permission will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

B. Construction Joints: Concrete construction joints will not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. Pipe stubs and anchor bolts shall be set in the forms where required.

C. Form Ties:

1. Embedded Ties: Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before being filled with non-shrink grout as specified for "Finish of Concrete Surfaces" in Section 03315 - Grout. Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1 inch back from the formed face or faces of the concrete.

2. Removable Ties: Where taper ties are approved for use, the larger end of the taper tie shall be on the wet side of walls in water retaining structures. After the taper tie is removed, the hole shall be thoroughly cleaned and roughened for bond. A precast neoprene or polyurethane tapered plug shall be located at the wall centerline. The hole shall be completely filled with non-shrink grout for water bearing and below-grade walls. The hole shall be completely filled with non-shrink or regular cement grout for above-grade walls which are dry on both sides. Exposed faces of walls shall have the outer 2 inches of the exposed face filled with a cement grout which shall match the color and texture of the surrounding wall surface.

D. Embedded Items:

1. Before the placement of concrete within the forms, each trade having embedded items, including waterstops within the forms and affected by the pour, shall certify that all items are properly located and braced. This certification shall be provided by the Contractor to the Engineer at least 48 hours in advance of placement.

### 3.04 EMBEDDED PIPING AND ROUGH HARDWARE

A. The Contractor shall consult with all trades which require openings for the passage of pipes, conduits and other inserts, and properly and accurately install the necessary pipe sleeves, anchors, or other required inserts, and properly size the equipment pads. The Contractor shall reinforce openings as indicated and required. The Contractor shall locate conduits or pipes so as not to reduce the strength of the construction, and in no case, place pipes, other than conduits in a slab 4-1/2 inches or less in thickness. The Contractor shall not embed conduit having an outside diameter greater than 1/3 of the thickness of the slab in a concrete slab, nor place conduit below bottom reinforcing steel or over top reinforcing steel. Conduits may be embedded in walls, provided they are not larger in outside diameter than 1/3 the thickness of the wall, are not spaced closer than three diameters on center, and do not impair the strength of the structure. The Contractor

shall support embedded pipes and conduits independently from reinforcing steel in a manner to prevent metallic contact, and thereby, prevent electrolytic deterioration. The Contractor shall place embedded pipes and conduits as nearly as possible to the centerline of the concrete section. The Contractor shall submit all conduit, piping and other wall penetrations, reinforcements and anchor bolt sizing and locations for review and approval.

3.05 REMOVAL OF FORMS

- A. Careful procedures for the removal of forms shall be strictly followed, and this Work shall be accomplished with care so as to avoid injury to the concrete. No heavy loading on green, insufficiently cured concrete will be permitted. In the case of roof slabs and above-ground floor slabs, forms for supported slab, but not shoring, shall remain in place until test cylinders for the roof concrete attain a minimum compressive strength of 75 percent of the 28 day strength specified in Section 03300 - Cast-in-Place Concrete; provided, that no forms shall be disturbed or removed under an individual panel or until before the concrete in the adjacent panel or unit has attained 75 percent of the specified 28 day strength and has been in place for a minimum of 7 days. The time required to establish said strength shall be as determined by the Engineer from several test cylinders obtained by the Contractor for this purpose from concrete used in the first group of roof panels placed. If the time so determined is more than the 7-day minimum, then that time shall be used as the minimum length of time. Forms for all vertical walls and columns shall remain in place at least 2 days after the concrete has been placed. Forms for all parts of the Work not specifically mentioned herein shall remain in place for periods of time as determined by the Engineer.
- B. The Contractor shall not backfill against walls until the top slab is in place and all concrete has obtained compressive strength equal to the specified 28-day compressive strength.
- C. Immediately upon removal of the forms, the concrete surfaces shall be thoroughly wetted and shall be kept wet until the curing compound is applied, or other curing procedure made effective, in accordance with the specification requirements.
- D. The Contractor shall assume responsibility for damage resulting from improper and premature removal of forms.

3.06 REUSE OF FORMS

- A. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on all exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view. In the case of forms for the inside wall surfaces of hydraulic/water retaining structures, unused tie rod holes in forms shall be filled with non-shrink grout.

3.07 MAINTENANCE OF FORMS

- A. Forms shall be maintained at all times in good condition, particularly as to size, shape, strength, rigidity, tightness, and smoothness of surface. Forms, when in place, shall conform to the established alignment and grades. Before concrete is placed, the forms shall be thoroughly cleaned. The form surfaces shall be treated with a non-staining mineral oil or other lubricant acceptable to the Engineer. Any excess lubricant shall be satisfactorily removed before placing the concrete. Where field oiling of forms is required, the Contractor shall perform the oiling at least 2 weeks in advance of their use.

Care shall be exercised to keep oil off the surfaces of steel reinforcement and other metal items to be embedded in concrete.

3.08 FALSE WORK

- A. The Contractor shall be responsible for the design, engineering, construction, maintenance, and safety of all false work, including staging, walkways, forms, ladders, and similar appurtenances, which shall equal or exceed the applicable requirements of the provisions of the OSHA Safety and Health Standards for Construction, and the requirements of the California Division of Industrial Safety.

3.09 REMOVAL OF SHORING AND FALSE WORK

- A. The Contractor shall not remove shoring and false work until 21 days after concrete placement, or concrete has attained at least 90 percent of the 28-day design compressive strength as demonstrated by control test cylinders, but not sooner than 14 days. If testing is competed to review the 90 percent compressive strength, the Contractor shall incur the cost.

3.10 LOAD RESTRICTION

- A. The Contractor shall not impose construction, equipment or permanent loads on columns, supported slabs, or supported beams until concrete has attained the 28-day design compressive strength.

**END OF SECTION 03100**

**SECTION 03200 - REINFORCEMENT STEEL**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide concrete reinforcement steel, welded wire fabric, couplers, concrete inserts, wires, clips, supports, chairs, spacers, and other accessories, complete, all in accordance with the Contract Documents.
- B. Work Included in this Section: Principal items are:
  - 1. Furnishing and placing bar and mesh reinforcing for cast-in-place concrete.
  - 2. Furnishing reinforcing steel bars for masonry, including delivery to the site.
  - 3. Submittals.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. The Work of the following Sections apply to the Work of this Section. Other Sections, not referenced below, shall also apply to the extent required for proper performance of this Work.
  - 1. Section 03100 - Concrete Formwork
  - 2. Section 03300 - Cast-in-Place Concrete
  - 3. Section 03315 - Grout
  - 4. Section 03400 – Precast Concrete

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Except as otherwise indicated in this Section of the Specifications, the Contractor shall comply with the latest adopted edition of the Standard Specifications for Public Works Construction (SSPWC), together with the latest adopted editions of the Regional Amendments.
- B. The current edition of the Uniform Building Code (UBC) of International Conference of Building Officials (ICBO).
- C. Commercial Standards (Current Edition):
  - 1. ACI 315                      Details and Detailing of Concrete Reinforcement
  - 2. ACI 318                      Building Code Requirements for Structural Concrete
  - 3. CRSI MSP                    Concrete Reinforcing Steel Institute Manual of Standard Practice
  - 4. CRSI PRB                    Concrete Reinforcing Steel Institute Placing Reinforcing Bars
  - 5. WRI                            Manual of Standard Practice for Welded Wire Fabric

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6. AWS D 1.4 Structural Welding Code - Reinforcing Steel
7. ACI 117 Standard Tolerance for Concrete Construction Materials

D. ASTM Standards in Building Codes (Current Edition):

1. ASTM A 82: Specification for Steel Wire, Plain, for Concrete Reinforcement
2. ASTM A 185: Specification for Welded Steel Wire Fabric, Plain, for Concrete Reinforcement
3. ASTM A 615: Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
4. ASTM A 706: Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement
5. ASTM A 775: Specification for Epoxy-Coated Reinforcing Steel Bars

E. National Sanitation Foundation

1. NSF / ANSI 61: Drinking Water System Components – Health Effects

1.04 CONTRACTOR SUBMITTALS

- A. The Contractor shall furnish shop bending diagrams, placing lists, and drawings of all reinforcement steel before fabrication in accordance with the requirements of the Specification Section 01300 – Contractor Submittals.
- B. Details of the concrete reinforcement steel and concrete inserts shall be submitted at the earliest possible date after receipt of the Notice to Proceed. Details of reinforcement steel for fabrication and erection shall conform to ACI 315 and the requirements indicated. The shop bending diagrams shall show the actual lengths of bars, to the nearest inch, measured to the intersection of the extensions (tangents for bars of circular cross-section) of the outside surface. The shop drawings shall include bar placement diagrams which clearly indicate the dimensions of each bar splice.
- C. Where mechanical couplers are required or permitted to be used to splice reinforcement steel, the Contractor shall submit manufacturer's literature including instructions and recommendations for installation for each type of coupler used; certified test reports which verify the load capacity of each type and size of coupler used; and shop drawings which show the location of each coupler with details of how they are to be installed in the formwork.
- D. If reinforcement steel is spliced by welding at any location, the Contractor shall submit mill test reports which shall include the information necessary for the determination of the carbon equivalent as specified in AWS D 1.4. The Contractor shall submit a written welding procedure for each type of weld for each size of bar which is to be spliced by welding; a mere statement that AWS procedures will be followed will not be acceptable.

1.05 QUALITY ASSURANCE

- A. If requested by the Engineer, the Contractor shall furnish samples from each heat of reinforcement steel delivered in a quantity adequate for testing. Costs of initial tests will

be paid by the Contractor. Costs of additional tests due to material failing initial tests shall also be paid by the Contractor.

- B. If reinforcement steel is spliced by welding at any location, the Contractor shall submit certifications of procedure qualifications for each welding procedure used and certification of welder qualifications, for each welding procedure, and for each welder performing the Work. Such qualifications shall be as specified in AWS D 1.4.
- C. If requested by the Engineer, the Contractor shall furnish samples of each type of welded splice used in the Work in a quantity and of dimensions adequate for testing. At the discretion of the Engineer, radiographic testing of direct butt welded splices will be performed. The Contractor shall provide assistance necessary to facilitate testing. The Contractor shall repair any weld which fails to meet the requirements of AWS D 1.4. The costs of testing will be paid by the Contractor. The costs of all tests which fail to meet specified requirements shall also be paid by the Contractor.

## PART 2 - PRODUCTS

### 2.01 MATERIAL REQUIREMENTS

- A. Materials which may remain or leave residues on or within the concrete shall be classified as acceptable for potable water use by the Environmental Protection Agency within 30 days of application or use.

### 2.02 REINFORCEMENT STEEL

- A. Reinforcement steel for all cast-in-place reinforced concrete construction shall conform to the following requirements:
  - 1. Bar reinforcement shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel Reinforcement or as otherwise indicated.
  - 2. All welded reinforcement, specifically detailed or otherwise indicated, shall be low-alloy Grade 60 deformed bars conforming to the requirements of ASTM A 706.
  - 3. Welded wire fabric reinforcement shall conform to the requirements of ASTM A 185 and the details indicated; provided, that welded wire fabric with longitudinal wire of W4 size wire and smaller shall be either provided in flat sheets or in rolls with a core diameter of not less than 10 inches; and provided further, that welded wire fabric with longitudinal wires larger than W4 size shall be provided in flat sheets only.
  - 4. Spiral reinforcement shall be cold-drawn steel wire conforming to the requirements of ASTM A 82.
  - 5. Tie wire shall be Annealed Steel, 14 gauge minimum.
- B. Accessories:
  - 1. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement. All bar supports shall meet the requirements of the CRSI Manual of Standard Practice, Chapter 3, including special requirements for supporting epoxy-coated reinforcing bars. Wire bar supports shall be CRSI

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Class 1 for maximum protection with a 1/8 inch minimum thickness of plastic coating which extends at least ½ inch from the concrete surface. Plastic shall be gray in color.

2. Concrete blocks (dobies), used to support and position reinforcement steel, shall have the same or higher compressive strength as specified for the concrete in which it is located. Wire ties shall be embedded in concrete block bar supports.
- C. Epoxy coating for reinforcing and accessories, where indicated, shall conform to ASTM A 775.

### 2.03 MECHANICAL COUPLERS

- A. Mechanical couplers shall be provided where indicated and where approved by the Engineer. The couplers shall develop a tensile strength which exceeds 125 percent of the yield strength of the reinforcement bars being spliced at each splice.
- B. Where the type of coupler used is composed of more than one component, all components required for a complete splice shall be supplied. This shall apply to all mechanical splices, including those splices intended for future connections.
- C. The reinforcement steel and coupler used shall be compatible for obtaining the required strength of the connection. Straight threaded type couplers shall require the use of the next larger size reinforcing bar or shall be used with reinforcing bars with specially forged ends which provide upset threads which do not decrease the basic cross-section of the bar.

### 2.04 WELDED SPLICES

- A. Welded splices shall be provided where indicated and where approved by the Engineer. All welded splices of reinforcement steel shall develop a tensile strength which exceeds 125 percent of the yield strength of the reinforcement bars which are connected.
- B. Provided materials shall be capable of conforming to the Weld Splice requirements of AWS D 1.4.

### 2.05 EPOXY GROUT

- A. Epoxy for grouting reinforcing bars shall be specifically formulated for such application, for the moisture condition, application temperature, and orientation of the hole to be filled. Epoxy grout shall be in conformance with Section 03315 - Grout.

### 2.06 MANUFACTURERS

- A. Couplers/welded splices shall be manufactured by one of the following or equal:
  1. Lenton Form Saver by Erico Products
  2. Dowel Bar Splicer System by Richmond Screw Anchor Company

### 2.07 NSF / ANSI STANDARD 61

- A. All cementitious material, admixtures, curing compounds, and other industrial produced materials used in concrete, or for curing or repairing of concrete, that can contact potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61.

PART 3 - EXECUTION

3.01 GENERAL

- A. All reinforcement steel, welded wire fabric, couplers, and other appurtenances shall be fabricated, and placed in accordance with the requirements of the Uniform Building Code and the supplementary requirements indicated herein.

3.02 FABRICATION AND DELIVERY

- A. The Contractor shall conform to CRSI MSP, Chapters 6 and 7, except as otherwise indicated or specified. The Contractor shall bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and storage at the site so as not to damage material. The Contractor shall keep a sufficient supply of tested, approved, and proper reinforcement at the site to avoid delays.
- B. Bending and Forming: The Contractor shall bend bars of indicated size and accurately form in accordance with the requirements of ACI 315 and ACI 318 to shapes and lengths indicated on the Plans and required by methods not injurious to materials. The Contractor shall not heat reinforcement for bending. Bars with kinks or bends not conforming with approved shop drawings will be rejected.
- C. Fabricating Tolerance: All fabrication of reinforcing bars shall meet the requirements of ACI 117.
- D. Reinforcing Bars for Masonry: The Contractor shall detail and fabricate bars at the shop, ready for installation by masons.

3.03 PLACING

- A. Reinforcement steel shall be accurately positioned and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcement steel shall be supported by concrete, plastic or metal supports, spacers or metal hangars which are strong and rigid enough to prevent any displacement of the reinforcement steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the Contractor shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.
- B. Limitations on the use of bar support materials shall be as follows:
  - 1. Concrete Dobies: Permitted at all locations except where architectural finish is required.
  - 2. Wire Bar Supports: Permitted only at slabs over dry areas, interior dry wall surfaces, and exterior wall surfaces.
  - 3. Plastic Bar Supports: Permitted at all locations except on grade.
- C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

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- D. Bars additional to those shown which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at no additional cost to the Owner.
- E. Unless otherwise specified, reinforcement placing tolerances shall be within the limits specified in Section 7.5 of ACI 318 except where in conflict with the requirements of the UBC.
- F. Bars may be moved as necessary to avoid interference with other reinforcement steel, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be subject to the approval of the Engineer.
- G. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters. Slab bolsters shall be spaced not more than 30 inches on center, shall extend continuously across the entire width of the reinforcement mat, and shall support the reinforcement mat in the plane indicated.
- H. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on center in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be allowed.
- I. Epoxy-coated reinforcing bars shall be stored, transported, and placed in such a manner as to avoid chipping of the epoxy coating. Non-abrasive slings made of nylon and similar materials shall be used. Specially coated bar supports shall be used. All chips or cracks in the epoxy coating shall be repaired with a compatible epoxy repair material prior to placing concrete.
- J. Accessories supporting reinforcing bars shall be spaced such that there is no deflection of the accessory from the weight of the supported bars. When used to space the reinforcing bars from wall forms, the forms and bars shall be located so that there is no deflection of the accessory when the forms are tightened into position.

3.04 SPLICES

- A. Splicing shall be in accordance with ACI 318, unless otherwise noted on the Plans.
- B. Vertical Bars: Except as specifically detailed or otherwise indicated, splicing of vertical bars in concrete is not permitted, except at the indicated or approved horizontal construction joints or as otherwise specifically detailed.
- C. Horizontal Bars: Except as specifically detailed or otherwise indicated, splicing of horizontal bars in concrete is not permitted.
- D. Mechanical Couplers: Unless otherwise indicated or approved by the Engineer, use of mechanical couplers is not permitted.
- E. Welding: Except as specifically detailed or otherwise indicated, welding of reinforcing bars is not permitted.

3.05 ADDITIONAL REINFORCING

- A. The Contractor shall provide additional reinforcing bars at sleeves and openings as indicated on the Plans.

3.06 WELDED WIRE MESH

- A. The Contractor shall install necessary supports and chairs to hold the wire mesh in place during concrete pours. The Contractor shall straighten mesh to lay in a flat plane and bend mesh as shown or required to fit work. The Contractor shall provide laps of no less than one complete mesh, unless otherwise detailed, and shall tie every other wire at laps. Roll mesh is not acceptable.

3.07 EMBEDMENT OF DRILLED REINFORCING STEEL DOWELS

A. Hole Preparation:

1. The hole diameter shall be as recommended by the epoxy manufacturer but shall be no larger than 0.25 inch greater than the diameter of the outer surface of the reinforcing bar deformations.
2. The depth of the hole shall be as recommended by the epoxy manufacturer to fully develop the bar but shall not be less than 12 bar diameters, unless noted otherwise.
3. The hole shall be drilled by methods which do not interfere with the proper bonding of epoxy.
4. Existing reinforcing steel in the vicinity of proposed holes shall be located prior to drilling. The location of holes to be drilled shall be adjusted to avoid drilling through or nicking any existing reinforcing bars.
5. The hole shall be blown clean with clean, dry compressed air to remove all dust and loose particles.
6. Epoxy shall be injected into the hole through a tube placed to the bottom of the hole. The tube shall be withdrawn as epoxy is placed but kept immersed to prevent formation of air pockets. The hole shall be filled to a depth that ensures that excess material will be expelled from the hole during dowel placement.
7. Dowels shall be twisted during insertion into the partially filled hole so as to guarantee full wetting of the bar surface with epoxy. The bar shall be inserted slowly enough to avoid developing air pockets.

3.08 CLEANING AND PROTECTION

- A. Reinforcing steel delivered to the jobsite shall be suitably stored off the ground and protected from oils, mud, concrete splatter and all conditions conducive to corrosion until embedded in concrete.
- B. The surfaces of all reinforcement steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcement shall be reinspected and, if necessary, recleaned.

**END OF SECTION 03200**

**SECTION 03300 - CAST-IN-PLACE CONCRETE**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide finished structural concrete, complete, in accordance with the Contract Documents.
- B. The following types of concrete are covered in this Section:
  - 1. STRUCTURAL CONCRETE: Normal weight (145 PCF) concrete to be used in all cases except where noted otherwise in the Contract Documents.
  - 2. LEAN CONCRETE: Concrete to be used for thrust blocks, anchor blocks, pipe trench cut-off blocks and cradles, where the preceding items are detailed on the Plans as unreinforced. Concrete to be used as protective cover for dowels intended for future connection.
- C. The term “hydraulic structure” used in these Specifications refers to environmental engineering concrete structures for the containment, treatment, or transmission of water, or other fluids.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. The Work of the following Sections applies to the Work of this Section. Other Sections, not referenced below, shall also apply to the extent required for proper performance of this Work.
  - 1. Section 03100 - Concrete Formwork
  - 2. Section 03200 - Reinforcement Steel
  - 3. Section 03290 - Joints in Concrete Structures
  - 4. Section 03315 – Grout

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Except as otherwise indicated in this Section, the Contractor shall comply with the latest adopted edition of the Standard Specifications for Public Works Construction (SSPWC), together with the latest adopted editions of the Regional Amendments.
- B. The current edition of the Uniform Building Code (UBC) of International Conference of Buildings Officials (ICBO).
- C. National Sanitation Foundation
  - 1. NSF / ANSI 61: Drinking Water System Components – Health Effects
- D. Federal Specifications:
  - 1. UU-B-790A(1)(2): Building Paper, Vegetable Fiber (Kraft, Water-Proofed, Water Repellant and Fire Resistant)
- E. Commercial Standards:

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1. ACI 117: Standard Tolerances for Concrete Construction and Materials
2. ACI 214: Recommended Practice for Evaluation of Strength Test Results of Concrete
3. ACI 301: Specifications for Structural Concrete for Buildings
4. ACI 309: Consolidation of Concrete
5. ACI 315: Details and Detailing of Concrete Reinforcement
6. ACI 318: Building Codes Requirements for Reinforced Concrete
7. ACI 350R: Environmental Engineering Concrete Structures

F. ASTM Standards in Building Codes:

1. ASTM C 31: Practice for Making and Curing Concrete Test Specimens in the Field
2. ASTM C 33: Specification for Concrete Aggregates
3. ASTM C 39: Test Method for Compressive Strength of Cylindrical Concrete Specimens
4. ASTM C 40: Test Method for Organic Impurities in Fine Aggregates for Concrete
5. ASTM C 42: Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
6. ASTM C 88: Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
7. ASTM C 94: Specification for Ready-Mixed Concrete
8. ASTM C 136: Test Method for Sieve Analysis of Fine and Coarse Aggregates
9. ASTM C 138: Test Method for Unit Weight, Yield, and Air Content of Concrete
10. ASTM C 143: Test Method for Slump of Hydraulic Cement Concrete
11. ASTM C 150: Specification for Portland Cement
12. ASTM C 156: Test Method for Water Retention by Concrete Curing Materials
13. ASTM C 157: Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete
14. ASTM C 192: Practice for Making and Curing Concrete Test Specimens in the Laboratory

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15. ASTM C 231: Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
16. ASTM C 260: Specification for Air-Entraining Admixtures for Concrete
17. ASTM C 289: Test Method for Potential Reactivity of Aggregates (Chemical Method)
18. ASTM C 309: Specification for Liquid Membrane-Forming Compounds for Curing Concrete
19. ASTM C 494: Specification for Chemical Admixtures for Concrete
20. ASTM C 107: Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
21. ASTM D 1751: Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types)
22. ASTM D 2419: Test Method for Sand Equivalent Value of Soils and Fine Aggregate
23. ASTM E 119: Method for Fire Tests of Building Construction and Materials

1.04 CONTRACTOR SUBMITTALS

- A. Mix Designs: Before starting the Work and within 14 days of the Notice to Proceed, the Contractor shall submit to the Engineer, for review, preliminary concrete mix designs which shall illustrate the proportions and gradations of all materials proposed for each class and type of concrete specified herein in accordance with Specification Section 01300 – Contractor Submittals. The mix designs shall be checked and certified to conform to these Specifications by an independent testing laboratory acceptable to the Engineer to be in conformance with these Specifications. All costs related to such checking and testing shall be borne by the Contractor at no cost to the Owner.
- B. Delivery Tickets: Where ready-mix concrete is used, the Contractor shall furnish delivery tickets at the time of delivery of each load of concrete. Each ticket shall show the state-certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate added at the batching plant, and the amount of water allowed to be added at the site for the specific design mix. In addition, each ticket shall state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to the times when the batch was dispatched, when it left the plant, when it arrived at the site, when unloading began, and when unloading was finished.
- C. The Contractor shall provide the following submittals in accordance with ACI 301:
  1. Mill tests for cement.
  2. Admixture certification. Chloride ion content must be included.
  3. Aggregate gradation and certification.
  4. Materials and methods for curing.

- D. The Contractor shall provide catalog cuts and other manufacturer's technical data demonstrating compliance with the requirements indicated and specified herein for all admixtures used in the concrete mix design.

1.05 QUALITY ASSURANCE

A. GENERAL

1. Tests on component materials and for compressive strength and shrinkage of concrete will be performed as specified herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.
2. The cost of all laboratory tests requested by the Engineer for cement, aggregates, and concrete, will be borne by the Contractor. The laboratory must meet or exceed the requirements of ASTM C 1077.
3. Concrete for testing shall be supplied by the Contractor at no cost to the Owner and the Contractor shall provide assistance to the independent testing laboratory acceptable to the Engineer in obtaining samples, and disposal and clean up of excess material.
4. A minimum of one (1) set of concrete cylinders and a slump test shall be obtained for every major concrete placement. A minimum of one (1) set of concrete cylinders shall be obtained for all concrete structures, foundations and slabs. One (1) set of cylinders shall be obtained for every forty (40) yards of concrete placed for a particular pour. For instance, if the walls of a structure require eighty (80) yards of concrete; then two (2) sets of concrete cylinders shall be required. If concrete cylinders for compression testing and a slump test are not required, then the delivery tickets accompanying the concrete vendor's truck shall be forwarded to the Construction Manager.

B. Field Compression Tests:

1. Compression test specimens will be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the Engineer to ensure continued compliance with these Specifications. Each set of test specimens will consist of four (4) cylinders.
2. Compression test specimens for concrete shall be made in accordance with Section 9.2 of ASTM C 31. Specimens shall be 6-inch diameter by 12-inch high cylinders.
3. Compression tests shall be performed in accordance with ASTM C 39. One (1) test cylinder will be tested at 7 days and two (2) at 28 days. The remaining cylinder will be held to verify test results, if needed.

C. Evaluation and Acceptance of Concrete:

1. Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 318, Chapter 5, "Concrete Quality", and as specified herein.
2. A statistical analysis of compression test results will be performed according to the requirements of ACI 214. The standard deviation of the test results shall not

exceed 640 PSI, when ordered at equivalent water content as estimated by slump.

3. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected.
  4. When the standard deviation of the test results exceeds 640 PSI, the average strength for which the mix is designed shall be increased by an amount necessary to satisfy the statistical requirement that the probability of any test being more than 500 PSI below or the average of any three (3) consecutive tests being below the specified compressive strength is 1 in 100. The required average strength shall be calculated by Criterion No. 3 of ACI 214 using the actual standard deviation.
  5. All concrete which fails to meet the ACI requirements and these Specifications is subject to removal and replacement at no cost to the Owner.
- D. Construction Tolerances: Set and maintain concrete forms and perform finishing operations so as to ensure that the completed Work is within the tolerances specified herein. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the specified permissible variation from lines, grades, or dimensions shown. Where tolerances are not stated in the Specifications, permissible deviations will be in accordance with ACI 117.
1. The following construction tolerances are hereby established and apply to finished walls and slab unless otherwise illustrated:

<u>Item</u>	<u>Tolerance</u>
Variation of the constructed linear outline from the established position in plan.	In 10 feet: ¼ inch In 20 feet or more: ½ inch
Variation from the level or from the grades shown.	In 10 feet: ¼ inch In 20 feet or more: ½ inch
Variation from the plumb.	In 10 feet: ¼ inch In 20 feet or more: ½ inch
Variation in the thickness of slabs and walls.	Minus ¼ inch; Plus ½ inch
Variation in the locations and sizes of slabs and wall openings.	Plus or minus ¼ inch

- E. Floor Slab Surface Hardener:
1. Job Mockup: In a location designated by the Engineer, place a minimum 100 square feet floor mockup using materials and procedures proposed for use in the Project. Revise materials and procedures as necessary to obtain acceptable finish surface. Maintain the same controls and procedures used in the acceptable mockup throughout the Project.
  2. Field Service: During job mockup and initial period of installation, the manufacturer of the surface hardener shall furnish the service of a trained, full-time representative to advise on proper use of the product. Notify surface hardener manufacturer at least three (3) days before initial use of the product.

3. Installer Qualifications: Installer shall have a minimum of three (3) years experience and shall be specialized in the application of dry shake surface hardeners.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. General:

1. All materials specified herein shall be classified by the Environmental Protection Agency as acceptable for potable water use within 30 days of application.
  2. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Only one (1) brand of cement shall be used. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.
- B. All materials furnished for the Work shall comply with the requirements of Sections 201, 203, and 204 of ACI 301, as applicable.
- C. Storage of materials shall conform to the requirements of Section 2.5 of ACI 301 or the SSPWC.
- D. Materials for concrete shall conform to the following requirements:
1. Cement shall be standard brand Portland Cement conforming to ASTM C 150 for Type V. A minimum of 85 percent of cement by weight shall pass a 325 screen. A single brand of cement shall be used throughout the Work, and before its use, the brand shall be acceptable to the Engineer. The cement shall be suitably protected from exposure to moisture until used. Cement that has become lumpy shall not be used. Sacked cement shall be stored in such a manner so as to permit access for inspection and sampling. Certified mill test reports, including fineness, for each shipment of cement to be used shall be submitted to the Engineer if requested regarding compliance with these Specifications.
  2. Water for mixing and curing shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts and other impurities. The water shall be considered potable, for the purposes of this Section, only if it meets the requirements of the local governmental agencies. Agricultural water with high total dissolved solids concentration (over 1,000 mg/l) shall not be used.
  3. Aggregates shall be obtained from pits acceptable to the Engineer, shall be nonreactive, and shall conform to ASTM C 33. Maximum size of coarse aggregate shall be as specified herein. Lightweight sand for fine aggregate will not be permitted.
    - a) Coarse aggregates shall consist of clean, hard, durable gravel, crushed gravel, crushed rock or a combination thereof. The coarse aggregates shall be prepared and handled in two or more size groups for combined aggregates with a maximum size greater than ¾ inch. When the aggregates are proportioned for each batch of concrete the two size

groups shall be combined. See the Paragraph in Part 2 entitled “Trial Batch and Laboratory Tests” for the use of the size groups.

- b) Fine aggregates shall be natural sand or a combination of natural and manufactured sand that are hard and durable. When tested in accordance with ASTM D 2419, the sand equivalency shall not be less than 75 percent for an average of three samples, nor less than 70 percent for an individual test. Gradation of fine aggregate shall conform to ASTM C 33, with 15 to 30 percent passing the number 50 screen and 5 to 10 percent passing the number 100 screen. The fineness modulus of sand used shall not be over 3.00.
  - c) Combined aggregates shall be well graded from coarse to fine sizes, and shall be uniformly graded between screen sizes to produce a concrete that has optimum workability and consolidation characteristics. Where a trial batch is required for a mix design, the final combined aggregate gradations will be established during the trial batch process.
  - d) When tested in accordance with ASTM C 33, the ratio of silica released to reduction in alkalinity shall not exceed 1.0.
  - e) When tested in accordance with ASTM C 33, the fine aggregate shall produce a color in the supernatant liquid no darker than the reference standard color solution.
  - f) When tested in accordance with ASTM C 33, the coarse aggregate shall show a loss not exceeding 42 percent after 500 revolutions, or 10.5 percent after 100 revolutions.
  - g) When tested in accordance with ASTM C 33, the loss resulting after five cycles shall not exceed 10 percent for fine or coarse aggregate when using sodium sulfate.
4. Ready-mix concrete shall conform to the requirements of ASTM C 94.
5. Admixtures: All admixtures shall be compatible and by a single manufacturer capable of providing qualified field service representation. Admixtures shall be used in accordance with manufacturer’s recommendations. If the use of an admixture is producing an inferior end result, discontinue use of the admixture. Admixtures shall not contain thiocyanates nor more than 0.05 percent chloride ion, and shall be nontoxic after 30 days.
- a) Set controlling and water reducing admixtures: Admixtures may be added at the Contractor’s option to control the set, affect water reduction, and increase workability. The addition of an admixture shall be at no increase in cost to the Owner. The use of an admixture shall be subject to acceptance by the Engineer. Concrete containing an admixture shall be first placed at a location determined by the Engineer. Admixtures specified herein shall conform to the requirements of ASTM C 494. The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used.
    - 1) Concrete shall not contain more than one water-reducing admixture. Concrete containing an admixture shall be first placed at a location determined by the Engineer.

- 2) Set controlling admixture shall be either with or without water-reducing properties. Where the air temperature at the time of placement is expected to be consistently over 80°F, a set retarding admixture such as Plastocrete by Sika Corporation; Pozzolith 300R by Master Builders; Daratard by W. R. Grace; or equal shall be used. Where the air temperature at the time of placement is expected to be consistently under 40°F, a noncorrosive set accelerating admixture such as Plastocrete 161FL by Sika Corporation; Pozzutec 20 by Master Builders; Daraset by W. R. Grace; or equal shall be used.
- 3) Normal range water reducer shall conform to ASTM C 494, Type A, WRDA 79 by W. R. Grace; Pozzolith 322-N by Master Builders; Plastocrete 161 by Sika Corporation; or equal. The quality of admixture used and the method of mixing shall be in accordance with the manufacturer's instructions and recommendations.
- 4) High range water reducer shall conform to ASTM C 494, Type F or G. Daracem 100 or WDRA 19 by W. R. Grace; Sikament FF or Sikament 86 by Sika Corporation; Rheobuild 1000 or Rheobuild 716 by Master Builders; or equal. High range water reducer shall be added to the concrete after all other ingredients have been mixed and initial slump has been verified. No more than 14 ounces of water reducer per sack of cement shall be used. Water reducer shall be considered as part of the mixing water when calculating water cement ratio.
- 5) If the high range water reducer is added to the concrete at the job site, it may be used in conjunction with the same water reducer added at the batch plant. Concrete shall have a slump of 3 inches + ½ inch before adding the high range water reducing admixture at the job site. The high range water-reducing admixture shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician. A standby system shall be provided and tested before each day's operation of the job site system.
- 6) Concrete shall be mixed at mixing speed for a minimum of 30 mixer revolutions after the addition of the high range water reducer.
- 7) Flyash: Flyash shall not be used.

2.02 CURING MATERIALS

- A. Materials for curing concrete as specified herein shall conform to the following requirements and ASTM C 309:
  1. All curing compounds shall be white pigmented and resin based. Sodium silicate compounds shall not be allowed. Concrete curing compound shall be Spartan Cote Cure-Seal Hardener by the Burke Company; Super Rez Seal by Euclid Chemical Company; MB-429 as manufactured by Master Builders; or equal. Water-based resin curing compounds shall be used only where local air

quality regulations prohibit the use of a solvent-based compound. Water-based curing compounds shall be Aqua Resincure by the Burke Company; Aqua-Cure by Euclid Chemical Company; Masterkure-W by Master Builders; or equal.

2. Polyethylene sheet for use as a concrete curing blanket shall be white, and shall have a nominal thickness of 6 mils. The loss of moisture when determined in accordance with the requirements of ASTM C 156 shall not exceed 0.055 grams per square centimeter of surface.
3. Polyethylene-coated water proof paper sheeting for use as concrete curing blanket shall consist of white polyethylene sheeting free of visible defects, uniform in appearance, having a nominal thickness of 2 mils and permanently bonded to waterproof paper conforming to the requirements of Federal Specification UU-B-790A(1)(2). The loss of moisture, when determined in accordance with the requirements of ASTM C156, shall not exceed 0.055 gram per square centimeter of surface.
4. Polyethylene-coated burlap for use as concrete curing blanket shall be 4 mils thick, white opaque polyethylene film impregnated or extruded into one side of the burlap. Burlap shall weigh not less than 9 ounces per square yard. The loss of moisture, when determined in accordance with the requirements of ASTM C 156, shall not exceed 0.055 gram per square centimeter of surface.
5. Curing mats for use in Curing Method 6 as specified herein, shall be heavy shag rugs or carpets or cotton mats quilted at 4 inches on center. Curing mats shall weigh a minimum of 12 ounces per square yard when dry.
6. Evaporation retardant shall be a material such as Confilm as manufactured by Master Builders; Eucobar as manufactured by Euclid Chemical Company; or equal.

#### 2.03 NONWATERSTOP JOINT MATERIALS

- A. Materials for nonwaterstop joints in concrete shall conform to the following requirements:
  1. Preformed joint filler shall be a nonextruding, resilient, bituminous type conforming to the requirements of ASTM D 1751.
  2. Mastic joint sealer shall be a material that does not contain evaporating solvents; that will tenaciously adhere to concrete surfaces; that will remain permanently resilient and pliable; that will not be affected by continuous presence of water and will not in any way contaminate potable water; and that will effectively seal the joints against moisture infiltration even when the joints are subject to movement due to expansion and contraction. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable mastic substance containing no volatile oils or lubricants and shall be capable of meeting the test requirements set forth hereinafter, if testing is required by the Engineer.

#### 2.04 MISCELLANEOUS MATERIALS

- A. Damp-proofing agent shall be an asphalt emulsion, such as Hydrocide 600 by Sonneborn; Damp-proofing Asphalt Coating by Euclid Chemical Company; Sealmastic by W. R. Meadows Inc., or equal.

- B. Bonding agents shall be epoxy adhesives conforming to the following products for the applications specified:
1. For bonding freshly-mixed, plastic concrete to hardened concrete, Sikadur 32 Hi-Mod Epoxy Adhesive, as manufactured by Sika Corporation; Concsive Liquid (LPL), as manufactured by Master Builders; BurkEpoxy MV as manufactured by The Burke Company; or equal.
  2. For bonding hardened concrete or masonry to steel, Sikadur 31 Hi-Mod Gel as manufactured by Sika Corporation; BurkEpoxy NS as manufactured by The Burke Company; Concsive Paste (LPL) as manufactured by Master Builders; or equal

2.05 CONCRETE DESIGN REQUIREMENTS

A. Mix Design:

1. General: Concrete shall be composed of cement, admixtures, aggregates and water. These materials shall be of the qualities specified. The exact proportions in which these materials are to be used for different parts of the Work will be determined during the trial batch. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. In mix designs, the percentage of sand of the total weight of fine and coarse aggregate shall not exceed 41 for hydraulic structures or 50 for all other structures, unless noted otherwise. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever necessary or desirable to meet the required results at no additional cost to the Owner. All changes shall be subject to review by the Engineer.
2. Water-Cement Ratio and Compressive Strength: The minimum compressive strength and cement content of concrete shall be not less than that specified in the following table:

<u>Type of Work</u>	Min. 28-Day Compressive Strength (PSI)	Max Size Aggregate (in)	Minimum Cement Per CU YD (lb)	Minimum Fibermesh Per CU YD (lb)	Max W/C Ratio (by weight)
Structural Concrete:	5,000	3/4	658	1.5	0.45
Normal weight reinforced concrete (145 pcf)	5,000	3/4	658	1.5	0.45
Lean Concrete	4,500	3/4	611	1.5	0.45

NOTE: The Contractor is cautioned that the limiting parameters specified above are not a mix design. Additional cement or water-reducing agent may be required to achieve workability demanded by the Contractor's construction methods and aggregates. The Contractor is responsible for any costs associated with furnishing concrete with the required workability.

3. Adjustments to Mix Design: The mixes used shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability, and surface finish and the Contractor shall be entitled to no additional compensation because of such changes.

B. Consistency:

1. The quantity of water entering into a batch of concrete shall be just sufficient, with a normal mixing period, to produce a concrete which can be worked properly into place without segregation, and which can be compacted by the vibratory methods herein specified to give the desired density, impermeability and smoothness of surface. The quantity of water shall be changed as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. The slumps shall be as follows:

<u>Part of Work</u>	<u>Slump (in)</u>
All concrete, unless noted otherwise	4 inches
With high range water reducer added	5 inches

C. Trial Batch and Laboratory Tests:

1. Before placing any concrete, a testing laboratory approved by the Engineer will prepare a trial batch of each class of structural concrete, based on the preliminary concrete mixes submitted by the Contractor. During the trial batch the aggregate proportions may be adjusted by the testing laboratory using the two coarse aggregate size ranges to obtain the required properties. If one size range produces an acceptable mix, a second size range need not be used. Such adjustments shall be considered refinements to the mix design and shall not be the basis for extra compensation to the Contractor. All concrete shall conform to the requirements of this Section, whether the aggregate proportions are from the Contractor's preliminary mix design, or whether the proportions have been adjusted during the trial batch process. The trial batch will be prepared using the aggregates, cement and admixture proposed for the project. The trial batch materials shall be of a quantity such that the testing laboratory can obtain 3 drying shrinkage, and six compression test specimens from each batch. The cost of not more than three laboratory trial batch tests for each specified concrete strength will be borne by the Contractor. The Contractor shall furnish and deliver the materials in steel drums to the approved testing laboratory. Any additional trial batch testing required shall be performed by the testing laboratory at no additional cost to the Owner.
2. The determination of compressive strength will be made by testing 6-inch diameter by 12 inch high cylinders; made, cured and tested in accordance with ASTM C 192 and ASTM C 39. Three compression test cylinders will be tested at 7 days and 3 at 28 days. The average compressive strength for the three cylinders tested at 28 days for any given trial batch shall not be less than 125 percent of the specified compressive strength.

3. A sieve analysis of the combined aggregate for each trial batch shall be performed according to the requirements of ASTM C 136. Values shall be given for percent passing each sieve.
4. In lieu of trial batch and laboratory tests specified in this Section, the Contractor may submit previously-designed, tested, and successfully-used concrete mixes, using materials similar to those intended for this project, together with a minimum of three certified test reports of the 28 day strength of the proposed concrete mix.

D. Shrinkage Limitation:

1. The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21 day drying age or at 28 day drying age shall be 0.036 percent or 0.042 percent, respectively. Use a mix design for construction that has first met the trial batch shrinkage requirements. Shrinkage limitations apply only to structural concrete.
2. The maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25 percent.
3. If the required shrinkage limitation is not met during construction, take any or all of the following actions, at no additional cost to the Owner for securing the specified shrinkage requirements. These actions may include changing the source of aggregates, cement and/or admixtures; reducing water content; washing of aggregate to reduce fines; increasing the number of construction joints, modifying the curing requirements; or other actions designed to minimize shrinkage or the effects of shrinkage.

E. Measurement of Cement and Aggregate:

1. The amount of cement and of each separate size of aggregate entering into each batch of concrete shall be determined by direct weighing equipment acceptable to the Engineer.
2. Weighing Tolerances:

<u>Material</u>	<u>Percent of Total Weight</u>
Cement	1
Aggregates	3
Admixtures	3

F. Measurement of Water:

1. The quantity of water entering the mixer shall be measured by a suitable water meter or other measuring device of a type acceptable to the Engineer and capable of measuring the water in variable amounts within a tolerance of one percent. The water feed control mechanism shall be capable of being locked in position so as to deliver constantly any specified amount of water to each batch of concrete. A positive quick-acting valve shall be used for a cut-off in the water line to the mixer. The operating mechanism must be such that leakage will not occur when the valves are closed.

2.06 READY-MIXED CONCRETE

Niland County Sanitation District Wastewater Treatment Plant and Collection System

- A. At the Contractor's option, ready-mixed concrete may be used meeting the requirements as to materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94, including the following supplementary requirements.
- B. Ready-mixed concrete shall be delivered to the site of the Work, and discharge shall be completed within one and one-half hour (90 minutes) after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first.
- C. Truck mixers shall be equipped with electrically-actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type, and shall be mounted in the driver's cab. The counters shall be actuated at the time of starting mixers at mixing speeds.
- D. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolution of mixing.
- E. Truck mixers and their operation shall be such that the concrete throughout the mixed batch as discharged is within acceptable limits of uniformity with respect to consistency, mix, and grading. If slump tests taken at approximately the one-quarter (1/4) and three-quarter (3/4) points of the load during discharge give slumps differing by more than one inch (1") when the specified slump is 3 inches or less, or if they differ by more than 2 inches when the specified slump is more than 3 inches, the mixer shall not be used on the Work unless the causing condition is corrected and satisfactory performance is verified by additional slump tests. All mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit, and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.
- F. Each batch of ready-mixed concrete delivered at the job site shall be accompanied by a delivery ticket furnished to the Engineer in accordance with Subsection 03300-1.04B.
- G. The use of nonagitating equipment for transporting ready-mixed concrete will not be permitted. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted. The quality and quantity of materials used in ready-mixed concrete and in batch aggregates shall be subject to continuous inspection at the batching plant by the Engineer.

2.07 FLOOR HARDENER (SURFACE APPLIED)

- A. Surface hardener shall be a light reflective nonoxidizing metallic aggregate dry shake surface hardener.
  - 1. Surface hardener shall be premeasured, premixed and packaged at the factory.
  - 2. Apply surface hardener at the rate of 1.8 to 2.5 lb per square foot.
  - 3. Surface hardener shall be Alumiplate®, by Master Builders, Inc., or equal.
- B. Curing Compound shall meet the moisture retention requirements of ASTM C 309 and surface hardener manufacturer's recommendations.

- C. Monomolecular Film: Evaporation retarder shall be used to aid in maintaining concrete moisture during the early placement stages of plastic concrete. Evaporation retarder shall be as recommended by surface hardener manufacturer.

2.08 NSF / ANSI STANDARD 61

- A. All cementitious material, admixtures, curing compounds, and other industrial produced materials used in concrete, or for curing or repairing of concrete, that can contact potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61.

PART 3 - EXECUTION

3.01 PROPORTIONING AND MIXING

- A. Proportioning: Proportioning of the concrete mix shall conform to the requirements of Chapter 3, "Proportioning" of ACI 301.
- B. Mixing: Mixing of concrete shall conform to the requirements of Chapter 7 of said ACI 301 Specifications.
- C. Slump: Maximum slumps shall be as specified herein.
- D. Retempering: Retempering of concrete or mortar which has partially hardened shall not be permitted.

3.02 PREPARATION OF SURFACES FOR CONCRETING

- A. General: Earth surfaces shall be thoroughly wetted by sprinkling, before the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.
- B. Joints in Concrete: Concrete surfaces upon or against which concrete is to be placed, where the placement of the concrete has been stopped or interrupted so that, as determined by the Engineer, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bond. The joint surfaces shall be cleaned of all laitance, loose or defective concrete, foreign material, and roughened to a minimum of ¼ inch amplitude. Such cleaning and roughening shall be accomplished by hydroblasting or sandblasting (exposing aggregate) followed by thorough washing. All pools of water shall be removed from the surface of construction joints, and the joint surface shall be coated with an epoxy-bonding agent, unless indicated otherwise, before the new concrete is placed.
- C. Placing Interruptions: When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means, that will secure proper union with subsequent Work; provided that construction joints shall be made only where acceptable to the Engineer.
- D. Embedded Items: No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the Engineer at least 4 hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with

dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.

- E. All inserts or other embedded items shall conform to the requirements herein.
- F. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms where illustrated on the Plans or by approved shop drawings and shall be acceptable to the Engineer before any concrete is placed. Accuracy of placement is the responsibility of the Contractor.
- G. Casting New Concrete Against Old: Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydroblasting or sandblasting (exposing aggregate). The joint surface shall be coated with an epoxy bonding agent unless indicated otherwise by the Engineer.
- H. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the Work. No concrete shall be deposited underwater nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the Engineer.
- I. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported before placement of concrete that there will be a minimum of 2 inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.
- J. Openings for pipes, inserts for pipe hangars and brackets, and the setting of anchors shall, where practicable, be provided for during the placing of concrete.
- K. Anchor bolts shall be accurately set, and shall be maintained in position by templates while embedded in concrete.
- L. Cleaning: The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

### 3.03 HANDLING, TRANSPORTING AND PLACING

- A. General: Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section. No aluminum materials shall be used in conveying any concrete.
- B. Nonconforming Work or Materials: Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the Work. Concrete which is not placed in accordance with these Specifications, or which is of inferior quality, shall be removed and replaced at no additional expense to the Owner.
- C. Unauthorized Placement: No concrete shall be placed except in the presence of duly authorized representative of the Engineer. The Contractor shall notify the Engineer in writing at least 48 hours in advance of placement of any concrete.

- D. Placement in Wall Forms: Concrete shall not be dropped through reinforcement steel or into any deep form, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints except where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in forms shall not exceed 5 feet of vertical rise per hour. Sufficient illumination shall be provided in the interior of all forms so that the concrete at the places of deposit is visible from the deck or runway.
- E. Conveyor Belts and Chutes: All ends of chutes, hopper gates, and all other points of concrete discharge throughout the Contractor's conveying, hoisting and placing system shall be so designed and arranged that concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyor belts, if used, shall be of a type acceptable to the Engineer. Chutes longer than 50 feet will not be permitted. Minimum slopes of chutes shall be such that concrete of the specified consistency will readily flow in them. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyor belts and chutes shall be covered.
- F. Placement in Slabs: Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement. As the Work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screeded in an up-slope direction.
- G. Temperature of Concrete: The temperature of concrete when it is being placed shall be not more than  $90^{\circ}F$  nor less than  $55^{\circ}F$  for sections less than 12 inches thick nor less than  $50^{\circ}F$  for all other sections. Concrete ingredients shall not be heated to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. When the temperature of the concrete is  $85^{\circ}F$  or above, the time between the introduction of the cement to the aggregates and discharge at the Site shall not exceed 45 minutes. If concrete is placed when the weather is such that the temperature of the concrete would exceed  $90^{\circ}F$ , the Contractor shall employ effective means, such as precooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below  $90^{\circ}F$ . The Contractor shall be entitled to no additional compensation on account of the foregoing requirements.
- H. Cold Weather Placement:
1. Placement of concrete shall conform to ACI 306.1 - Standard Specification for Cold Weather Concreting, and the following.
  2. Remove all snow, ice and frost from the surfaces, including reinforcement, against which concrete is to be placed. Before beginning concrete placement, thaw the subgrade to a minimum depth of 6 inches. All reinforcement and embedded items shall be warmed to above  $32^{\circ}F$  before concrete placement.

3. Maintain the concrete temperature above  $50^{\circ}F$  for at least 3 days after placement.

I. Hot Weather Placement:

1. Placement of concrete shall conform to ACI 305R - Hot Weather Concreting, and the following.
2. Only set retarding admixture shall be used in concrete when air temperature is expected to be consistently over  $80^{\circ}F$ .
3. The maximum temperature of concrete shall not exceed  $90^{\circ}F$  immediately before placement.
4. From the initial placement to the curing state, concrete shall be protected from the adverse effect of high temperature, low humidity, and wind.

3.04 PUMPING OF CONCRETE

- A. General: If the pumped concrete does not produce satisfactory end results, discontinue the pumping operation and proceed with the placing of concrete using conventional methods.
- B. Pumping Equipment: The pumping equipment must have two (2) cylinders and be designed to operate with one (1) cylinder only in case the other one is not functioning. In lieu of this requirement, the Contractor shall maintain a standby pump on the site during pumping.
- C. The minimum diameter of the hose (conduits) shall be in accordance with ACI 304.2R.
- D. Pumping equipment and hoses (conduits) that are not functioning properly, shall be replaced.
- E. Aluminum conduits for conveying the concrete shall not be permitted.
- F. Field Control: Concrete samples for slump, air content, and test cylinders will be taken at the placement (discharge) end of the line.

3.05 ORDER OF PLACING CONCRETE

- A. The order of placing concrete in all parts of the Work shall be acceptable to the Engineer. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints. The placing of units shall be accomplished by placing alternate units in a manner such that each unit placed shall have cured at least 7 days for hydraulic structures and 3 days for all other structures before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the two (2) adjacent wall panels have cured at least 14 days for hydraulic structures and 7 days for all other structures.
- B. The surface of the concrete shall be level whenever a run of concrete is stopped. To ensure a level, straight joint on the exposed surface of walls, a wood strip at least  $\frac{3}{4}$  inch thick shall be tacked to the forms on these surfaces. The concrete shall be carried about  $\frac{1}{2}$  inch above the underside of the strip. About one (1) hour after the concrete is placed, the strip shall be removed and any irregularities in the edge formed by the strip shall be leveled with a trowel and all laitance shall be removed.

3.06 TAMPING AND VIBRATING

- A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement. Vibrators shall be Group 3 (per ACI 309) high speed power vibrators (8,000 to 12,000 rpm) of an immersion type in sufficient number and with (at least one) standby units as required. Group 2 vibrators may be used only at specific locations when accepted by the Engineer.
- B. Care shall be exercised in placing concrete around waterstops. The concrete shall be carefully worked by rodding and vibrating to make sure that all air and rock pockets have been eliminated. Where flat-strip type waterstops are placed horizontally, the concrete shall be worked under the waterstops by hand, making sure that all air and rock pockets have been eliminated. Concrete surrounding the waterstops shall be given additional vibration, over and above that used for adjacent concrete placement to assure complete embedment of the waterstops in the concrete.
- C. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the results herein specified within 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall be kept from contact with the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.07 FINISHING CONCRETE SURFACES

- A. General: Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions shown are defined as tolerances and are specified in Part 1, herein. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.
- B. Formed Surfaces: No treatment is required after form removal except for curing, repair or defective concrete, and treatment of surface defects. Where architectural finish is required, it shall be as specified or as shown.
  - 1. Surface holes larger than ½ inch in diameter or deeper than ¼ inch are defined as surface defects in basins and exposed walls.
- C. Unformed Surfaces: After proper and adequate vibration and tamping, all unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools. Immediately after the concrete has been screeded, it shall be treated with a liquid evaporation retardant. The retardant shall be used again after each Work operation as necessary to prevent drying shrinkage cracks. The classes of finish specified for unformed concrete surfaces are designated and defined as follows:
  - 1. FINISH U1 - Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch. No further special finish is required.

2. FINISH U2 - After sufficient stiffening of the screeded concrete, surfaces shall be float finished with wood or metal floats or with a finishing machine using float blades. Excessive floating of surfaces while the concrete is plastic and dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted. Floating shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Surface irregularities shall not exceed 1/4-inch. Joints and edges shall be tooled where shown or as determined by the Engineer.
3. FINISH U3 - After the floated surface (as specified for Finish U2) has hardened sufficiently to prevent excess of fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples, and trowel marks. The finish shall be smooth and free of all irregularities.
4. FINISH U4 - Steel trowel finish (as specified for Finish U3) without local depressions or high points. In addition, the surface shall be given a light hairbroom finish with brooming perpendicular to drainage unless otherwise shown. The resulting surface shall be rough enough to provide a nonskid finish.

D. Unformed surfaces shall be finished according to the following schedule:

UNFORMED SURFACE FINISH SCHEDULE

<u>Area</u>	<u>Finish</u>
Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with grouted tile or topping grout	U2
Slabs which are water bearing with slopes 10 percent and less	U4
Sloping slabs which are water bearing with slopes greater than 10 percent	U4
Slabs not water bearing	U4
Slabs to be covered with built-up roofing	U2
Interior slabs and floors to receive architectural finish	U3
Top surface of walls	U4

E. Floor Hardener (Surface Applied) - Required

1. Provide concrete with the following additional requirements:
  - a) Maximum slump of 4 inches when peak ambient temperatures are expected to be more than 65°F, and no more than 3 inches when ambient temperatures are below 65°F.
  - b) Maximum air content of 3 percent.

- c) Do not use calcium chloride or set-accelerating admixtures containing calcium chloride.
  - d) Do not use admixtures that increase bleeding.
  - e) Do not use fly ash.
2. After the concrete has been leveled and as soon as the concrete will support an operator and machine without disturbing the level or working up excessive fines, float the surface of the slab with a mechanical float fitted with float shoes. Following floating, apply 1/2 to 2/3 of the total amount of dry shake surface hardener so that a uniform distribution of surface hardener is obtained. The use of a mechanical spreader is recommended. Once the shake has absorbed sufficient moisture (indicated by the darkening of the shake), float the surface. Immediately apply the remaining 1/3 to 1/2 of the shake and allow to absorb moisture. Do not place dry shake on concrete surface when bleed water is present.
  3. Use finishing machines with detachable float shoes. Compact surface by a third mechanical floating if time and setting characteristics of the concrete will allow. Do not add water to the surface.
  4. As surface further stiffens, indicated by loss of sheen, hand or mechanically trowel with blades set relatively flat. Remove all marks and pinholes in the final raised trowel operation.
  5. Follow all application instructions of the floor surface hardener manufacturer.
  6. Cure finished floors using fill-forming curing compound recommended by surface hardener manufacturer. Uniformly apply curing compound over the entire surface at a coverage that will provide moisture retention in excess of the requirements of ASTM C 309. Maintain ambient temperature of 50°F or above during the curing period.
  7. Keep floors covered and free of traffic and loads for a minimum of 14 days after completion.

3.08 ARCHITECTURAL FINISH

- A. General: Architectural finishes shall be required only where specifically called out on the Plans. In all other cases, the paragraph above, entitled “Finishing Concrete Surfaces”, shall apply.
  1. Immediately after the forms have been stripped, the concrete surface shall be inspected and any poor joints, voids, rock pockets, or other defective areas shall be repaired and all form-tie holes filled as indicated herein.
  2. Architectural finishes shall not be applied until the concrete surface has been repaired as required and the concrete has cured at least 14 days.
  3. All architecturally treated concrete surfaces shall conform to the accepted sample required herein in texture, color, and quality. It shall be the Contractor’s responsibility to maintain and protect the concrete finish.
- B. Smooth Concrete Finish:

1. The concrete surface shall be wetted, and a grout shall be applied with a brush. The grout shall be prepared by mixing one (1) part Portland Cement and one (1) part of fine sand that will pass a No. 16 sieve with sufficient water to give it the consistency of thick paint. The cement used in said grout shall be 1/2 gray and 1/2 white Portland Cement, as determined by the Engineer. White Portland Cement shall be Atlas White or equal. Calcium chloride in the amount of 5 percent by volume of the cement shall be used in the brush coat. The freshly applied grout shall be vigorously rubbed into the concrete surface with a wood float filling all small air holes. After all surface grout had been removed with a steel trowel, the surface shall be allowed to dry and, when dry, shall be vigorously rubbed with burlap to remove completely all surface grout so that there is no visible paint-like film of grout on the concrete. The entire cleaning operation for any area shall be completed the day it is started, and no grout shall be left on the surface overnight.
2. Cleaning operations for any given day shall be terminated at panel joints. It is essential that the various operations be carefully timed to secure the desired effect which is a light-colored concrete surface of uniform color and texture without any appearance of a point or grout film.
3. In the event that improper manipulation results in an inferior finish, rub such inferior areas with carborundum bricks.
4. Before beginning any of the final treatment on exposed surfaces, treat in a satisfactory manner a trial area of at least 200 square feet in some inconspicuous place selected by the Engineer and preserve said trial area undisturbed until the completion of the job.

C. Sandblasted Concrete Finish:

1. Sandblasting shall be done in a safe manner acceptable to local authorities and per OSHA requirements. The sandblasting shall be a light sandblast to remove laitance and to produce a uniform fine aggregate surface texture with approximately 1/32 to 1/16 inch of surface sandblasted off. Corners, patches, form panel joints, and soft spots shall be sandblasted with care.
2. A 3 square foot sample panel of the sandblasted finish shall be provided by the Contractor for acceptance by the Engineer before starting the sandblasting Work. The sample panel shall include a corner, plugs, and joints and shall be marked after approval. All other sandblasting shall be equal in finish to the sample panel.
3. Protection against sandblasting shall be provided on all surfaces and materials not requiring sandblasting but within or adjacent to areas being sandblasted. After sandblasting, the concrete surfaces shall be washed with clean water and excess sand removed.

3.09 CURING AND DAMP-PROOFING

- A. General: All concrete shall be cured for not less than 14 days after placing, in accordance with the methods specified herein for the different parts of the Work, and described in detail in the following paragraphs:

<u>Surface To Be Cured or Damp-proofed</u>	<u>Method</u>
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Niland County Sanitation District Wastewater Treatment Plant and Collection System

Unstripped forms	1
Wall sections with forms removed	6
Construction joints between footings and walls, and between floor slab and columns	2
Encasement concrete and thrust blocks	3
All concrete surfaces not specifically provided for elsewhere in this Paragraph	6
Floor slabs on grade	6
Slabs not on grade	6

- B. Method 1: Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removed. If steel forms are used the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 14 days of placing the concrete, curing shall be continued in accordance with Method 6, herein.
- C. Method 2: The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.
- D. Method 3: The surface shall be covered with moist earth not less than 4 hours, nor more than 24 hours, after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.
- E. Method 4: The surface shall be sprayed with a liquid curing compound.
1. It shall be applied in accordance with the manufacturer's printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.
  2. Where the curing compound method is used, care shall be exercised to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the new application of additional curing compound over the damaged portion.
  3. Wherever curing compound may have been applied by mistake to surfaces against which concrete subsequently is to be placed and to which it is to adhere, said compound shall be entirely removed by wet sandblasting just before the placing of new concrete.
  4. Where curing compound is specified, it shall be applied as soon as the concrete has hardened enough to prevent marring on unformed surfaces, and within 2 hours after removal of forms from contact with formed surfaces. Repairs required to be made to formed surfaces shall be made within the said 2 hour period; provided, however, that any such repairs which cannot be made within the said 2 hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has

been applied, the area involved shall first be wet-sandblasted to remove the curing compound, following which repairs shall be made as specified herein.

5. At all locations where concrete is placed adjacent to a panel which has been coated with curing compound, the previously coated panel shall have curing compound reapplied to an area within 6 feet of the joint and to any other location where the curing membrane has been disturbed.
6. Before final acceptance of the Work, all visible traces of curing compound shall be removed from all surfaces in such a manner that does not damage surface finish.

F. Method 5:

1. Until the concrete surface is covered with curing compound, the entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed. The concrete shall be given a coat of curing compound in accordance with Method 4, herein. Not less than 1 hour nor more than 4 hours after the coat of curing compound has been applied, the surface shall be wetted with water delivered through a fog nozzle, and concrete-curing blankets shall be placed on the slabs. The curing blankets shall be polyethylene sheet, polyethylene-coated waterproof paper sheeting or polyethylene-coated burlap. The blankets shall be laid with the edges butted together and with the joints between strips sealed with 2 inch wide strips of sealing tape or with edges lapped not less than 3 inches and fastened together with a waterproof cement to form a continuous watertight joint.
2. The curing blankets shall be left in place during the 14 day curing period and shall not be removed until after concrete for adjacent Work has been placed. Should the curing blankets become torn or otherwise ineffective, replace damaged sections. During the first 3 days of the curing period, no traffic of any nature and no depositing, temporary or otherwise, of any materials shall be permitted on the curing blankets. During the remainder of the curing period, foot traffic and temporary depositing of materials that impose light pressure will be permitted only on top of plywood sheets 5/8 inch minimum thickness, laid over the curing blanket. Add water under the curing blanket as often as necessary to maintain damp concrete surfaces at all times.

G. Method 6: This method applies to both walls and slabs.

1. The concrete shall be kept continuously wet by the application of water for a minimum period of at least 14 consecutive days, beginning immediately after the concrete has reached final set or forms have been removed or until the concrete surface is covered with the curing medium. The entire surface shall be kept damp by applying water using nozzles that atomize the flow so that the surface is not marred or washed.
2. Heavy curing mats shall be used as a curing medium to retain the moisture during the curing period. The curing medium shall be weighted or otherwise held in place to prevent being dislodged by wind or any other causes and to be substantially in contact with the concrete surface. All edges shall be continuously held in place.
3. The curing blankets and concrete shall be kept continuously wet by the use of sprinklers or other means both during and after normal working hours. The

concrete shall be maintained in a cool condition from the heat of hydration and the solar heat of the sun.

4. Immediately after the application of water has terminated at the end of the curing period, the curing medium shall be removed, any dry spots shall be rewetted, and curing compound shall be immediately applied in accordance with Method 4, herein.
  5. Dispose of excess water from the curing operation to avoid damage to the Work.
- H. Damp-proofing: The exterior surface of all buried roof slabs shall be damp-proofed as follows:
1. Immediately after completion of curing the surface shall be sprayed with a damp-proofing agent consisting of an asphalt emulsion. Application shall be in two (2) coats. The first coat shall be diluted to 1/2 strength by the addition of water and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon of dilute solution. The second coat shall consist of an application of the specified material, undiluted, and shall be sprayed on so as to provide a maximum coverage rate of 100 square feet per gallon. Damp-proofing material shall be as specified herein.
  2. As soon as the asphalt emulsion, applied as specified herein, has taken an initial set, the entire area thus coated shall be coated with whitewash. Any formula for mixing the whitewash may be used which produces a uniformly coated white surface and which so remains until placing of the backfill. Should the whitewash fail to remain on the surface until the backfill is placed, apply additional whitewash.

### 3.10 PROTECTION

- A. Protect all concrete against injury until final acceptance by the Owner.
- B. Fresh concrete shall be protected from damage due to rain, hail, sleet, or snow. Provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.

### 3.11 CURING IN COLD WEATHER

- A. Water curing of concrete may be reduced to 6 days during periods when the mean daily temperature in the vicinity of the worksite is less than 40°F; provided that, during the prescribed period of water curing, when temperatures are such that concrete surfaces may freeze, water curing shall be temporarily discontinued.
- B. Concrete cured by an application of curing compound will require no additional protection from freezing if the protection at 50°F for 72 hours is obtained by means of approved insulation in contact with the forms or concrete surfaces; otherwise the concrete shall be protected against freezing temperatures for 72 hours immediately following 72 hours protection at 50°F. Concrete cured by water curing shall be protected against freezing temperatures for 3 days immediately following the 72 hours of protection at 50°F.
- C. Discontinuance of protection against freezing temperatures shall be such that the drop in temperature of any portion of the concrete will be gradual and will not exceed 40°F in 24 hours. In the spring, when the mean daily temperature rises above 40°F for more than 3 successive days, the specified 72 hour protection at a temperature not lower than 50°F

may be discontinued for as long as the mean daily temperature remains above 40°F; provided, that the concrete shall be protected against freezing temperatures for not less than 48 hours after placement.

- D. Where artificial heat is employed, special care shall be taken to prevent the concrete from drying. Use of unvented heaters will be permitted only when unformed surfaces of concrete adjacent to the heaters are protected for the first 24 hours from an excessive carbon dioxide atmosphere by application of curing compound; provided, that the use of curing compound for such surfaces is otherwise permitted by these Specifications.

### 3.12 TREATMENT OF SURFACE DEFECTS

- A. As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the Engineer. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall have them repaired as specified herein. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced. All repairs and replacements herein specified shall be promptly executed by the Contractor at its own expense.
- B. Defective surfaces to be repaired shall be cut back from trueline in a minimum depth of ½ inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of all laitance or soft material, and not less than 1/32 inch depth of the surface film from all hard portions, by means of an efficient sandblast. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar so that while the repair material is being applied, the surfaces under repair will remain moist, but not so wet as to overcome the suction upon which a good bond depends. The material used for repair proposed shall consist of a mixture of 1 sack of cement to 3 cubic feet of sand. For exposed walls, the cement shall contain such a proportion of Atlas White Portland Cement as is required to make the color of the patch match the color of the surrounding concrete.
- C. Holes left by tie-rod cones shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. These holes then shall be repaired in an approved manner with dry-packed cement grout. Holes left by form-tying devices having a rectangular cross-section, and other imperfections having a depth greater than their least surface dimension, shall not be reamed but shall be repaired in an approved manner with dry-packed cement grout.
- D. All repairs shall be built up and shaped in such a manner that the completed Work will conform to the requirements of this Section, as applicable, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures. Surfaces of said repairs shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.
- E. Before filling any structure with water, all cracks that may have developed shall be “vee’d” and filled with construction joint sealant for water-bearing structures conforming to the materials and methods specified in Section 03290 - Joints in Concrete Structures. This repair method shall be accomplished on the water bearing face of members. Before backfilling, faces of members in contact with fill, which are not covered with a waterproofing membrane, shall also have cracks repaired as specified herein.

3.13 PATCHING HOLES IN CONCRETE

A. Patching Small Holes:

1. Holes which are less than 12 inches in their least dimension and extend completely through concrete members, shall be filled as specified herein.
2. Small holes in members which are water-bearing or in contact with soil or other fill materials, shall be filled with nonshrink grout. Where a face of the member is exposed to view, the nonshrink grout shall be held back 2 inches from the finished surface. The remaining 2 inches shall then be patched according to the paragraph in Part 3 entitled - Treatment of Surface Defects.
3. Small holes through all other concrete members shall be filled with nonshrink grout, with exposed faces treated as above.

B. Patching Large Holes:

1. Holes which are larger than 12 inches in their least dimension, shall have a keyway chipped into the edge of the opening all around, unless a formed keyway exists. The holes shall then be filled with concrete as specified.
2. Holes which are larger than 24 inches in their least dimension and which do not have reinforcing steel extending from the existing concrete, shall have reinforcing steel set in grout in drilled holes. The reinforcing added shall match the reinforcing in the existing wall unless required otherwise by the Improvement Plans or approved shop drawings.
3. Large holes in members which are water bearing or in contact with soil or other fill, shall have a bentonite type waterstop material placed around the perimeter of the hole as specified in the Section 03290 - Joints in Concrete Structures, unless there is an existing waterstop in place.

3.14 CARE AND REPAIR OF CONCRETE

- A. The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the Owner. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time before the final acceptance of the completed Work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete at the Contractor's expense.

**END OF SECTION 03300**

**SECTION 03315 - GROUT**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide grout in accordance with the Contract Documents.
- B. The following types of grout shall be covered in this Section:
  - 1. Cement Grout
  - 2. Packaged Grout
    - A. Nonshrink Grout: This type of grout is to be used wherever grout is illustrated in the Contract Documents unless another type is specifically referenced.
    - B. Epoxy Grout
    - C. Pump and Motor Grout
  - 3. Topping Grout and Concrete Fill

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. The Work of the following Sections apply to the Work of this Section. Other Sections, not referenced below, shall also apply to the extent required for proper performance of this Work.
  - 1. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Commercial Standards:
  - 1. CRD-C 621 Corps of Engineers Specification for Non-Shrink Grout
- B. National Sanitation Foundation
  - 1. NSF / ANSI 61: Drinking Water System Components – Health Effects
- C. ASTM Standard in Building Codes:
  - 1. ASTM C 109: Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in or 50-mm Cube Specimens)
  - 2. ASTM C 531: Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts, and Monolithic Surfacing
  - 3. ASTM C 579: Test Methods for Compressive Strength of Chemical Resistant Mortars, Grouts, and Monolithic Surfacing
  - 4. ASTM C 827: Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixture

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5. ASTM C 881: Specification for Epoxy-Resin-Base Bonding System for Concrete
6. ASTM C 882: Standard Test for Bond Strength of Epoxy-Resin Systems Used with Concrete
7. ASTM C 884: Standard Test Method for Thermal Compatibility between Concrete and an Epoxy-Resin Overlay
8. ASTM D 638: Standard Test Methods for Tensile Properties of Plastics
9. ASTM D 696: Test Method for Coefficient of Linear Thermal Expansion of Plastics
10. ASTM D 2471: Standard Test Methods for Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins

1.04 CONTRACTOR SUBMITTALS

- A. The Contractor shall submit certified test results verifying the compressive strength, shrinkage, and expansion requirements indicated herein; and manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of nonshrink and epoxy grout used in the Work in accordance with the requirements of the Specification Section 01330 – Submittals/Shop Drawings.

1.05 QUALITY ASSURANCE

A. Field Tests:

1. Compression test specimens will be taken during construction from the first placement of each type of grout, and at intervals thereafter as selected by the Owner's Representative to ensure continued compliance with these Specifications. The specimens will be prepared by a Geotechnical Consultant/Laboratory to be compensated by the Contractor. The Owner's Representative shall approve the Geotechnical Consultant/Laboratory firm.
2. Compression tests and fabrication of specimens for cement grout and nonshrink grout shall be performed as specified in ASTM C 109 at intervals during construction as determined by the Owner's Representative. A set of three (3) specimens will be prepared for testing at 7 days, 28 days, and each additional time period as appropriate. The Contractor shall bear the expenses related to this item.
3. Compression tests and fabrication of specimens for epoxy grout shall be performed as specified in ASTM C 579, Method B, at intervals during construction as determined by the Owner's Representative. A set of three (3) specimens will be prepared for testing at 7 days, and each earlier time period as appropriate. The Contractor shall bear the expenses relative to this item.
4. Placed grout, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.
5. The cost of all laboratory tests on grout will be borne by the Contractor. The Contractor shall assist the approved Geotechnical Consultant/Laboratory Firm in

obtaining specimens for testing. The Contractor shall also be responsible, without additional cost to the Owner, for additional tests and investigation on work performed which is non-compliant with the Specifications. The Geotechnical Consultant/Laboratory Firm shall supply all materials necessary for fabricating the test specimens.

- B. Construction Tolerances: Construction tolerances shall be as specified in the Section 03300 - Cast-in-Place Concrete, except as modified herein or elsewhere in the Contract Documents.

## PART 2 - PRODUCTS

### 2.01 CEMENT GROUT

- A. Cement Grout: Cement grout shall be composed of one part cement, three parts sand, and the minimum amount of water necessary to obtain the desired consistency. Where needed to match the color of adjacent concrete, white Portland Cement shall be blended with regular cement as needed. The minimum compressive strength at 28 days shall be 5,000 PSI.
- B. Cement grout materials shall be as specified in Section 03300 - Cast-in-Place Concrete.

### 2.02 PREPACKAGED GROUTS

- A. Nonshrink Grout:
1. Nonshrink grout shall be a prepackaged, inorganic, nongas-liberating, nonmetallic, cement-based grout requiring only the addition of water. The manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of nonshrink grout indicated herein shall be that recommended by the manufacturer for the particular application.
  2. Class A nonshrink grouts shall have a minimum 28 day compressive strength of 6,000 PSI; shall have no shrinkage (0.0 percent) and a maximum 4.0 percent expansion in the plastic state when tested in accordance with ASTM C 827; and shall have no shrinkage (0.0 percent) and a maximum of 0.2 percent expansion in the hardened state when tested in accordance with CRD-C 621.
  3. Class B nonshrink grouts shall have a minimum 28-day compressive strength of 5,000 PSI and shall meet the requirements of CRD-C 621.
  4. Application:
    - a) Class A nonshrink grout shall be used for the repair of all holes and defects in concrete members which are water bearing or in contact with soil or other fill material, grouting under all equipment base plates, and at all locations where grout is indicated; except, for the applications of Class B nonshrink grout and epoxy grout indicated herein. Class A nonshrink grout may be used in place of Class B nonshrink grout for all applications.

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- b) Class B nonshrink grout shall be used for the repair of all holes and defects in concrete members which are not water bearing and not in contact with soil or other fill material, grouting under all base plates for structural steel members, and grouting railing posts in place.

B. Epoxy Grout:

1. Epoxy grout shall be a pourable, nonshrink, 100 percent solids system. The epoxy grout system shall have three components: resin, hardener, and specially blended aggregate, all premeasured and prepackaged. The resin component shall not contain any nonreactive diluents. Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturer's instructions shall be printed on each container in which the materials are packaged. Epoxy grout shall be BurkEpoxy Anchoring Grout by The Burke Company, Sika or an approved equal.
2. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application.
3. The mixed epoxy grout system shall have a minimum working life of 45 minutes at 75°F.
4. The epoxy grout shall develop a compressive strength of 5,000 PSI in 24 hours and 10,000 PSI in 7 days when tested in accordance with ASTM C 579, Method B. There shall be no shrinkage (0.0 percent) and a maximum 4.0 percent expansion when tested in accordance with ASTM C 827.
5. The epoxy grout shall exhibit a minimum effective bearing area of 95 percent. This shall be determined by a test consisting of filling a 2 inch diameter by 4 inch high metal cylinder mold covered with a glass plate coated with a release agent. A weight shall be placed on the glass plate. At 24 hours after casting, the weight and plate shall be removed and the void area in the plate measured. The surface of the grout shall be probed with a sharp instrument to locate all voids.
6. The peak exotherm of a 2-inch diameter by 4 inch high cylinder shall not exceed 95°F when tested with 75°F material at laboratory temperature. The epoxy grout shall exhibit a maximum thermal coefficient of  $30 \times 10^{-6}$  inches/inch/degree F when tested according to ASTM C 531 or ASTM D 696.
7. Application: Epoxy grout shall be used to embed all anchor bolts and reinforcing steel required to be set in grout, and for all other applications in the Contract Documents where grout type is not specifically indicated.
8. For crack repair, the Contractor shall use pressure injection epoxy grout as recommended by the manufacturer and approved by the Owner's Representative.

C. Grout for Pumps and Motors

1. Grout for pumps and motors shall be epoxy grouts meeting the following minimum requirements:
  - a) Creep shall be less than 0.005 in/in when tested by ASTM C 881 method. The test shall be at 70°F and 140°F with a load of 400 PSI.

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- b) Linear shrinkage shall be less than 0.080 percent and thermal expansion less than  $17 \times 10^{-6}$  in/in/degree *F* when tested by ASTM C 531.
  - c) The compressive strength shall be a minimum of 12,000 PSI in 7 days when tested by ASTM C 579 Method 8, modified.
  - d) Bond strength of grout to Portland Cement concrete shall be greater than 2,000 PSI when using ASTM C 882 test method.
  - e) Grout shall pass the thermal compatibility test when overlaid on Portland Cement concrete using test method ASTM C 884.
  - f) Tensile strength and modulus of elasticity shall be determined by ASTM D 638. The tensile strength shall not be less than 1,700 PSI and the modulus of elasticity shall not be less than  $1.8 \times 10^6$  PSI.
  - g) Gel time and peak exothermic temperature shall be determined by ASTM D 2471. Peak exothermic temperature shall not exceed  $110^{\circ} F$  when a specimen 6 inches in diameter by 12 inches high is used. Gel time shall be at least 150 minutes.
  - h) The grout shall be suitable for supporting precision machinery subject to high impact and shock loading in industrial environments while exposed to elevated temperatures as high as  $150^{\circ} F$ , with a load of 2,000 PSI.
2. Primer, if required, shall conform to the written recommendations of the grout manufacturer.
3. Surface preparations shall conform to the written recommendations of the grout manufacturer.
4. Placement and Curing:
- a) Placement and curing procedures shall be in accordance with the written recommendations of the grout manufacturer.
  - b) A grouting performance demonstration/training session shall be conducted by the grout manufacturer's representative prior to foundation and base plate preparation and the first grouting on site. This training session shall demonstrate proper preparation and installation methods and that the grouting material meets the strength requirements.
5. Grout shall be Escoweld, Chockfast Red Epoxy Grout as manufactured by Philadelphia Resin Corp.; Five Star DP Epoxy Grout as manufactured by Five Star Products, Inc.; or equal.

2.03

TOPPING GROUT AND CONCRETE FILL

- A. Grout for topping of slabs and concrete fill for built-up surfaces of tank, channel, and basin bottoms shall be composed of cement, fine aggregate, coarse aggregate, water, and admixtures proportioned and mixed as specified herein. All materials and procedures specified for normal concrete in Section 03300 - Cast-in-Place Concrete, shall apply except as noted otherwise herein.

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- B. Topping grout and concrete fill shall contain a minimum of 564 pounds of cement per cubic yard with a maximum water cement ratio of 0.45. Where concrete fill is thicker than 3 inches, sitework concrete, as specified in Section 03300 - Cast-in-Place Concrete, may be used when accepted by the Owner's Representative.
- C. Coarse aggregate shall be graded as follows:

<u>U.S. Standard Sieve Size</u>	<u>Percent by Weight Passing</u>
1/2"	100
3/8"	90 - 100
No. 4	20 - 55
No. 8	5 - 30
No. 16	0 - 10
No. 30	0

- D. Final mix design shall be as determined by trial mix design under supervision of the approved testing laboratory.
- E. **Strength:** Minimum compressive strength of topping grout and concrete fill at the end of 28 days shall be 4,000 PSI.

2.04 CURING MATERIALS

- A. Curing materials shall be as specified in Section 03300 - Cast-in-Place Concrete for cement grout and as recommended by the manufacturer of prepackaged grouts.

2.05 MEASUREMENT OF INGREDIENTS

- A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurement shall not be allowed.
- B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

2.06 NSF / ANSI STANDARD 61

- A. All cementitious material, admixtures, curing compounds, and other industrial produced materials used in concrete, or for curing or repairing of concrete, that can contact potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61.

PART 3 - EXECUTION

3.01 GENERAL

- A. All surface preparation, curing, and protection of cement grout shall be as indicated in Section 03300 - Cast-in-Place Concrete. The finish of the grout surface shall match that of the adjacent concrete.
- B. The manufacturer of Class A nonshrink grout and epoxy grout shall provide on-site technical assistance to Contractor upon request.

- C. Base concrete or masonry must have attained its design strength before grout is placed, unless authorized by the Owner's Representative.
- D. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as indicated herein for the particular application.
- E. The slump for topping grout and concrete fill shall be adjusted to match placement and finishing conditions but shall not exceed 4 inches.

3.02 GROUTING PROCEDURES

- A. Prepackage Grouts: All mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be accomplished according to the instructions and recommendations of the manufacturer.
- B. Base Plate Grouting:
  - 1. For base plates, the original concrete shall be blocked out or finished off a sufficient distance below the plate to provide for a minimum 1 inch thickness of grout or a thickness as indicated on the Plans.
  - 2. After the base plate has been set in position at the proper elevation by steel wedges or double nuts on the anchor bolts, the space between the bottom of the plate and the original pour of concrete shall be filled with non-shrink-type grout. The mixture shall be of a trowelable consistency and tamped or rodded solidly into the space between the plate and the base concrete. A backing board or stop shall be provided at the back side of the space to be filled with grout. Where this method of placement is not practical or where required by the Owner's Representative, alternate grouting methods shall be submitted for acceptance by the Owner's Representative.
- C. Topping Grout and Concrete Fill:
  - 1. All mechanical, electrical, and finish Work shall be completed prior to placement of topping or concrete fill. The base slab shall be given a roughened textured surface by sandblasting or hydroblasting exposing the aggregates to ensure bonding to the base slab.
  - 2. The minimum thickness of grout topping and concrete fill shall be one inch (1") unless otherwise specified by the Plans. Where the finished surface of concrete fill is to form an intersecting angle of less than 45° with the concrete surface it is to be placed against, a key shall be formed in the concrete surface at the intersection point. The key shall be a minimum of 3-1/2 inches wide by 1-1/2 inches deep.
  - 3. The base slab shall be thoroughly cleaned and wetted prior to placing topping or concrete fill. No topping or concrete fill shall be placed until the slab is free from standing pools, ponds of water. A thin coat of neat Type II cement grout shall be broomed onto the surface of the slab just before topping or concrete fill placement. The topping or concrete fill shall be compacted by rolling or tamping, brought to established grade, and floated. Grouted concrete fill for tank and basin bottoms where scraping mechanism are to be installed shall be

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screeded by blades attached to the revolving mechanism of the equipment in accordance with the procedures outlined by the equipment manufacturer after the grout is brought to the established grade.

4. Topping grout placed on sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement.
5. The surface shall be tested with a straight edge to detect high and low spots which shall be immediately eliminated. When the topping or concrete fill have hardened sufficiently, it shall be steel troweled to a smooth surface free from pinholes and other imperfections. An approved type of mechanical trowel may be used to assist in this operation, but the last pass over the surface shall be by hand-troweling. During finishing, no water, dry cement or mixture of dry cement and sand shall be applied to the surface.

### 3.03 CONSOLIDATION

- A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

**END OF SECTION**

**SECTION 03400 - PRECAST CONCRETE**

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to complete the precast concrete work in accordance with the Contract Documents.
- B. This Section covers the design, fabrication, delivery, and installation of all plant precast concrete units, including connections, complete, in place, as shown and specified.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03315 - Grout
- B. Section 07900 – Sealants and Caulking

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with reference standards of the General Requirements.
- B. Comply with the current provisions of the following Codes and Standards, as applicable:
  - 1. Commercial Standards:

ACI 301	Specifications for Structural Concrete
ACI 304	Guide for Measuring, Mixing, Transporting and Placing Concrete
ACI 311	Guide for Concrete Plant Inspection and Testing of Ready-Mixed Concrete
ACI 315	Details and Detailing of Concrete Reinforcement
ACI 318	Building Code Requirements for Reinforced Concrete
ACI 347	Guide to Formwork for Concrete
AWS A5.4	Welding Rods and Electrodes
AWS D1.1	Welding and Cutting
AWS D1.4	Structural Welding Code – Reinforcing Steel
ASTM A 184	Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A 185	Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement
ASTM A 193	Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service

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ASTM A 194	Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
ASTM A 351	Specification for Steel Castings, Austenitic, for High-Temperature Service
ASTM A 497	Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement
ASTM A 580	Specification for Stainless and Heat-Resisting Steel Wire
ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 666	Specification for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar for Structural Applications
ASTM A 775	Specifications for Epoxy-Coated Reinforcing Steel Bars
ASTM C 33	Specification for Concrete Aggregates
ASTM C 67	Method for Sampling and Testing Brick and Structural Clay Tile
ASTM C 127	Test Method for Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	Test Method for Specific Gravity and Absorption of Fine Aggregate
ASTM C 150	Specification for Portland Cement
ASTM C 173	Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 204	Test Method for Fineness of Portland Cement by Air Permeability Apparatus
ASTM C 231	Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	Specification for Air-Entraining Admixtures for Concrete
ASTM C 311	Method for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 494	Test Method for Shear Fatigue of Sandwich Core Materials

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ASTM D 2240	Test Method for Rubber Property -- Durometer Hardness
AWS B2.1	Specification for Welding Procedure and Performance Qualification
PCI MNL-116	Manual for Quality Control for Plants and Production of Structural Precast Concrete Products
PCI MNL-117	Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products
PCI MNL-121	Manual for Structural Design of Architectural Precast Concrete

2. Government Standards:

CSS Caltrans Standard Specifications.

1.04 CONTRACTOR SUBMITTALS

A. Submittals shall be made in accordance with the General Requirements.

B. Shop Drawings:

1. Shop drawings shall provide details in accordance with ACI 315 and ACI 318 including installation details.
2. Shop drawings, including design computations, shall be stamped and signed by a Civil or Structural Engineer registered in the State of California and shall be approved by the Owner's Representative.
3. Shop drawings shall indicate precast unit identification marks, location of units in the Work, elevations, fabrication details, welding details, reinforcement, connections, dimensions, interface with adjacent members, and special handling instructions in sufficient detail to cover manufacture, handling, and erection. Shop drawings shall include erection drawings. Shop drawings shall also include design computations for above-mentioned drawings.
4. Shop drawings shall be divided into complete separate submittals for each structure. Each complete submittal shall consist of a panel schedule and shop drawings.
  - a. Panel Schedule: Showing all exterior elevations of the structure, including all precast concrete enclosure faces exposed to view, in its associated shop drawing submittal. Elevations at a minimum scale of 1/8" = 1'-0" shall be drawn, identifying the type and location of each panel by a number which corresponds to the panel number appearing on an associated shop drawing; this same number shall be permanently marked on the back of each panel as they are fabricated.
  - b. Shop Drawings: Showing all elevations, dimensions, horizontal and vertical sections, openings, inserts, reinforcing, anchorage devices, pick-up points, details, design computations, and other requirements for each different type of panel to be incorporated into the portion of the project

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covered by the submittal. Drawings shall be 24 inches x 36 inches maximum.

- c. For bridge structures, shop drawings for precast concrete piles shall conform to Section 49-3 of the CSS.

C. Small Samples:

1. Unless otherwise specified on the contract documents, two 72 inch by 72 inch samples of precast concrete unit finish shall be submitted, as required for the project. Each sample shall show matrix color, surface color, surface texture, and panel back finish.
2. When so requested by the Owner's Representative, submit samples of cast-in gaskets, anchorages and other attachments and accessories.
3. The face of each sample shall contain at least two areas of approved size and shape which have been chipped out and then patched and repaired and one form joint; the color, texture and appearance of patched areas and form joint shall match that of adjacent surface.
4. Samples will be inspected for color and texture match to the samples selected by the Owner's Representative, uniformity of color and texture throughout the panel and acceptability of patching and joint treatment. Exposed face of samples shall be tested for efflorescence in accordance with ASTM C 67; rating shall not be more than "slightly effloresced."
5. If the Owner's Representative rules a sample, or samples, to be unacceptable, the Contractor shall fabricate and resubmit additional samples at no additional cost to the Owner.
6. When approved, one sample will be kept at the Owner's Representative's office and the other shall be picked up by the Contractor and returned to the manufacturing plant. These sample panels will be used as a comparison to judge acceptability of the full-size panel samples and, where necessary, the production precast units.

D. Full-Size Panel Samples at Manufacturing Plant:

1. After the small samples and shop drawings have been approved, and prior to fabricating panels for the project, a full-size panel of specified color and each finish shall be produced and erected at the manufacturing plant for inspection and approval by the Owner's Representative.
2. The full-size panels shall be fabricated utilizing tools, forms, materials and techniques proposed and the dimensions, profile cross section, color and texture required for the project. Panels will be inspected for color and texture to match approved samples, uniformity of color and texture throughout the panel, accuracy and sharpness of shape, acceptability of patched and repaired areas, and form joint treatment.
3. If the Owner's Representative rules a sample to be unacceptable, the Contractor shall fabricate additional revised panel(s) at no additional cost to the Owner. When approved, panels shall be preserved, remain at the plant, and become the job standard against which all panels will be compared as they come off the production line.

- E. Full-Size Panel Samples at Project Site: From the first loads of acceptable panels for the Project, the Owner's Representative will select one panel of each texture which is scheduled to be erected in a prominent location. If the Owner's Representative chooses, panels may be selected from a later load. The selected panel(s) together with the Small Sample from Section 1.4.C kept at the Owner's Representative's office, will become the Site standard against which all panels will be compared.
- F. Mix Proportions: Prior to commencing operations, including fabrications of the precast concrete for any mock-up, a statement shall be submitted giving the nominal maximum aggregate size and proportions of all ingredients that will be used in the manufacture of concrete. The statement shall include test results from an approved testing laboratory, with certification stamp and signature by a Civil or Structural Engineer registered in the State of California. No substitutions shall be made in materials used in the concrete mix without approval and additional tests to verify that the concrete properties are satisfactory. A copy shall be submitted of concrete mix with each set of samples.
- G. Test Reports: Tests for compressive strength of concrete shall be performed by an approved independent commercial testing laboratory at no cost to the Owner. Copies of test reports including all test data and all test results shall be submitted for review and approval of the Owner's Representative.
- H. Certificates of Compliance: Certificates of compliance shall be submitted attesting that materials and products meet or exceed specified requirements.
- I. Manufacturer's Qualifications: Prior to commencing operations, a statement shall be submitted giving the qualifications of the precast concrete Manufacturer, and evidence that the Manufacturer and plant are PCI certified.

1.05 QUALITY ASSURANCE

- A. General Requirements: Design precast members under direct supervision of a Professional Structural Engineer experienced in design of precast concrete units, registered in the State of California and conforming to requirements of PCI MNL-121 and to ACI 318.
  - 1. Precast Manufacturer and erectors shall be qualified in accordance with PCI MNL-117 and MNL-116.
  - 2. Welding shall be in accordance with AWS D 1.1, AWS D 12.1, AWS B 2.1, and AWS A 5.4.
  - 3. Manufacture, Transportation and Installation: The Manufacturer shall specialize in providing precast products and services normally associated with precast concrete construction with high quality architectural finishes similar to that indicated on the Plans, using procedures complying with PCI MNL-116 and MNL-117, and PCI plant certified for at least 5 years.
  - 4. Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the Work of this Section.

B. Sample:

1. Prebid samples representing the color, surface, texture and panel back finish specified and required for this project can be viewed at the Owner's Representative's office, by bidders and precast concrete Manufacturers prior to submitting bids.
2. It shall be the Contractor's responsibility to assure that all precast architectural concrete conforms to specified requirements for quality and appearance. The only appearance criterion is that all precast architectural finishes provided for this project conform in appearance, when viewed from a distance of 20 feet, to the design, color, and texture as represented by the prebid sample except that closeup inspection shall not exhibit any evidence of "bugholes" on exposed surfaces exceeding 1/8 inch and in quantity not more than 2 average per square foot.

C. Sample Construction (Building structures only):

1. A typical precast concrete combination sectioned wall and related perimeter window assembly shall be constructed and provided by the Contractor. This sample construction, after approval, shall serve for comparison as a sample of construction requirements for the rest of the building.
2. The precast concrete units shall structurally support the window assemblies and include anchorage inserts for windows as indicated. Use of drilled-in anchorage inserts for window supports and anchorage of other items is prohibited. Sample construction shall be sealed and finished as required for completed wall.
3. The sample construction shall demonstrate precast concrete units and window framing, sealants, anchorage, and other elements of construction. The sample construction will be inspected and judged for compliance with requirements and visual appearance including, but not limited to, uniformity of color and texture, acceptability of patching and repair, and conformance to required tolerances. If the sample does not provide an acceptable window assembly or meet visual appearance or tolerance requirements as determined by the Owner's Representative, the Contractor shall modify, repair, or reconstruct the sample at no additional cost.
4. At the Owner's Representative's request, the Contractor shall dispose of the sample at no cost to the Owner.

1.06 DESIGN REQUIREMENTS

- A. General: The precast concrete panel and connection designs shown hereon represent minimum precast construction requirements. The Manufacturer shall verify the panel and connection designs for all handling, erection, and service conditions, and shall provide any additional materials necessary to meet the design conditions.
- B. Standards and Loads (Building Structures only): The precast panel and connection design and construction shall conform to all applicable codes and AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. The precast or prefabricated, nonbearing, nonshear wall panels and connections which are attached to or enclose the exterior, shall resist, in addition to initial handling and erection loads and dead loads, the following forces:

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1. Wind pressure and load combinations relative to panel design in accordance with the latest edition of the California Building Code.
  2. Seismic loads relative to panel design in accordance with the latest edition of the California Building Code.
  3. The design shall be based on a differential temperature of  $50^{\circ}F$  between interior and exterior faces of the units and  $80^{\circ}F$  (40 degrees from erected temperature) average panel temperature differential.
  4. Stresses due to restrained volume changes caused by shrinkage and temperature differentials shall be accounted for.
- C. Connections (Building Structures only): Prior to submitting shop drawings, the Contractor shall verify the precast connection designs shown against the aforementioned and following design criteria and provide any additional materials necessary to meet the design conditions.
1. The panel joints shall be designed to accommodate an in-plane movement between stories of 0.005 times the story height in inches but not less than  $\frac{3}{4}$  inch.
  2. Panel connections shall accommodate building movement and permit panels to move freely so as not to resist in plane deformation of the main frame structural system. Adjustment shall be provided to accommodate misalignment of structure without permanent distortion, damage to components, racking of joint connection, breakage of seals, or moisture penetration.
- D. Concrete Mix: The concrete mix shall be designed by the Manufacturer, with certification stamp and signature by a Civil or Structural Engineer registered in the State of California, and approved by the Owner's Representative, using the materials and quantities specified to meet all of the requirements of this specification.
1. Proportioning of Concrete Mixes: Mixes shall be proportioned by weight except water and admixtures may be batched by volume if desired. Trial mixes and testing to meet requirements of the strengths of concrete specified is the Contractor's responsibility. Design mix shall contain similar materials as those proposed for use in the Work.
  2. Admixtures: Concrete shall contain an air entraining admixture in proportion so as to provide 4 percent plus or minus 1 percent total air in the concrete as determined by ASTM C 173 or C 231. Set retarding admixtures may be used provided cement content is not reduced. Water reducing admixtures may be used provided they are used in the mix design studies. High-range water reducers (superplasticizers) shall be used only where specifically called for in this Section, otherwise superplasticizers shall not be used without written approval from the Owner's Representative. No admixture may contain chlorides, bromides, or fluorides.
  3. Water: Clean, potable water. The Contractor shall provide tests to assure that no more than 200 parts per million total aggregated content of chlorides, bromides, and fluorides are present.
  4. If a variance from the Local Authority is required for the precast concrete mix design, the Contractor shall be responsible for submitting and obtaining the 5,000 PSI precast concrete mix variance. The admixtures used in the mix design shall be used in approved combinations and proportions in accordance with the local requirements.

- E. Formwork: Formwork shall be designed to withstand high-frequency vibration and to ensure finished units.
- F. Pickup Points and Boxouts: Pickup points, boxouts, and inserts on panel faces and surfaces to be exposed are prohibited except as approved by the Owner's Representative.

1.07 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver precast concrete units to the job-site in such quantities and at such times as to assure the continuity of construction. Precast members shall be handled to position consistent with their shape and design; they shall be lifted and supported from design incorporated support points and provided with strong backs and other devices as required. Lifting or handling equipment shall be capable of maintaining units during manufacture, storage, transportation, erection, and in position for fastening.
- B. Blocking and supports, lateral restraints and protective materials during transport and storage shall be clean, nonstaining, without causing harm to exposed surfaces, including temporary support to prevent bowing and warping. Lateral restraints shall be provided to prevent undesirable horizontal movement. Edges and exposed faces of members shall be protected to prevent straining, chipping, or spalling of concrete.
- C. Units shall be marked with date of production and final position in structure in location not visible after erection.
- D. Precast units shall be stored off the ground in a manner to keep markings visible, and to prevent cracking, distortion, warping, staining or other physical damage, and they shall be protected from weather, marring, and overload.
- E. Stainless Steel Hardware: Stainless steel hardware shall be transported, handled, stored, and protected in wood crates.

PART 2 – PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: ASTM C 150, Type V, "low alkali," white color. "Low alkali" requirement may be waived if not reactive as defined in Appendix to ASTM C 33. Submit laboratory test reports.
- B. Aggregate: ASTM C 33, ½ inch maximum coarse aggregate size fine aggregate ratio to total aggregate volume = 0.35 min, 0.55 max.
  - 1. Water Absorption, Coarse Aggregate: ASTM C 127.
  - 2. Water Absorption, Fine Aggregate: ASTM C 128.
- C. Reinforcing Steel: ASTM A 615, Grade 60, deformed epoxy coated in accordance with ASTM A 775.
- D. Welded Wire Fabric:

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1. Plain: ASTM A 185, epoxy coated.
  2. Deformed Steel: ASTM A 497, epoxy coated.
  3. Fabricated Steel Bar or Rod Mats: ASTM A 184, epoxy coated.
- E. Tie Wire: ASTM A 580, Type 316L, cold finished annealed, Huntington Alloy Co. "Monel", "Inconel", or an approved equal.
- F. Air Entrainment Admixture: ASTM C 260.
- G. Water Reducing or Retarding Admixtures: ASTM C 494, Type C, D, or F/G, with no chloride, bromide, and fluoride ingredients. Use Pozzolith 300-R manufactured by Master Builders, Plastiment manufactured by Sika Chemical Corp., or an approved equal.
- H. Silica Fume Slurry Admixture: 45 to 50 percent silica fume, water, and superplasticizer as dispersant. Silica Fume: 85 percent amorphous silicon dioxide in accordance with ASTM C 311; loss on ignition shall not exceed 6 percent and moisture shall not exceed 3 percent in accordance with ASTM C 311. Surface area not less than 10,000 square meters per kilogram at bed porosity of 0.50 in accordance with ASTM C 204.
- Reduce water in mix by 5.6 to 9.5 lbs. for each gallon of slurry added to mix, as recommended by slurry Manufacturer used.
- Add Owner-approved slurry to concrete mix to achieve 7.5 percent dry silica fume by weight of cement. Mixing procedures as recommended by silica fume slurry manufacturer. Sika "Sikacrete 950"; W.R. Grace "Force 10,000" or approved equal. Submit applicable Owner-approved Research Report with shop drawing submittal.
- I. Pigment: Pure mineral type, color-resistant to alkalis, nonfading. Color as required to produce finished concrete matching color and appearance of prebid sample and the 72 inch by 72 inch sample at the Owner's Representative's office.

2.02 SUPPORT DEVICES

Unless otherwise specified on the Plans, the following requirements shall apply:

- A. Connecting and Support Devices: ASTM A 666, Type 316L stainless steel.
- B. Bolts: ASTM A 193, Grade B8M (Type 316).
- C. Nuts and Washers: ASTM A 194, Grade 8M (Type 316).
- D. Weld Filler Metal for Stainless Steel: Stainless steel to stainless steel; AWS A5.4, Grade 316L filler metal; stainless steel to carbon steel, AWS A5.4, Grade 309 filler metal, 3/32 inch diameter.
- E. Primer: Zinc-dust, zinc oxide primer in a phenolic resin spar varnish vehicle, TT-P-641 Type III (for galvanized surfaces).

2.03 ACCESSORIES

Unless otherwise specified on the Plans, the following requirements shall apply:

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- A. Plates, Angles, Anchors, and Studs: ASTM A 666, Type 316L stainless steel. Austenitic Steel Castings for Embedments and Anchorage Assemblies: ASTM A 351, Type CF3M, with Type 316 stainless steel bolts, nuts, and washers.
- B. Reglets: Plastic, shaped and flanged to remain in place once cast; tape closed to prevent concrete intrusion.
- C. Bearing Pads: Neoprene, molded to size or cut from molded sheet, 70-80 Type A durometer, ASTM D 2240.
- D. Sealant: Specified in Section 07900 – Sealants and Caulking.
- E. Gaskets: ASTM C 509, preformed, firm, cellular, neoprene, sized to be under constant compression at the joints, and manufactured in lengths to minimize field splices.
- F. For bridge structures, expansion and fixed joints and bearings shall conform with CSS Section 51-1.12.

2.04 FORMS AND MOLDS

- A. Forms: Manufacturer's standard with smooth, hard, dense, and rigid casting surface; without bow, warpage, oil canning, or other imperfections. Comply with PCI MNL 117, Division V, Section 2, Article 5.2.1.
- B. Form Release Agent: Manufacturer's standard, nonstaining, nonpetroleum based; compatible with concrete surface sealer.
- C. Surface Sealer: Clear, flat, penetrating, nonyellowing, nonclouding solution; high concentration of organosilane in an aqueous alcoholic vehicle which is designed to provide water repellent concrete surfaces from which graffiti can be easily removed. Oil-type silicones, paraffins, waxes, vinyls, modified urethanes, or acrylics shall not be used. Sealant shall be tested by Manufacturer and proved compatible with surface sealer.
- D. Molds: Fabricate using steel, concrete, fiberglass, reinforced plastic or wood.
  - a. Selection of materials for molds shall be at manufacturer's option, except that wood shall not be used without specific prior approval of the Owner's Representative.
  - b. Cast elements in molds of rigid construction, accurate in detail with precise corners and arises, and designed to provide close control of dimensions, radii, and details as indicated on the Plans.
  - c. Prior to casting of precast elements, molds shall have surface joints, radii, and corners filled, ground, filed, straightened, or otherwise removed to provide finished concrete surface that is smooth and dense, free of honeycombing, air pockets, offsets, sinkages, or other irregularities.
  - d. Mold Release Agents: Synthetic resin or organic compound containing no wax, oil, silicates, or varnish, and compatible with specified coatings, sealants, fresh concrete, curing process, and adhesives.
  - e. Cast molds with release agents to facilitate removal of elements from molds.

2.05 MIX

Silica Fume Concrete: Minimum 5,000 PSI (unless noted otherwise on the project plans), 28 day compressive strength; aggregate 3/8 inch max; water - 305 lbs per cu yd; cement - 750 lbs per cu yd; w/c ratio 0.40 max; slump range 3 inches to 5 inches with silica fume slurry; air entrainment 4 percent plus or minus 1 percent; 7.5 percent dry silica fume by weight of cement, provided through specified silica fume slurry; add superplasticizer to achieve desired working slump for precast concrete as may be required by silica fume slurry Manufacturer. Add colorant as required to achieve match with Engineer's sample. Moist cure by spray mist.

2.06 FABRICATION

- A. General: Precast concrete units shall be fabricated by a licensed shop in accordance with ACI 318, PCI MNL-116 (structural features), PCI MNL-117 (nonstructural features, surface treatments, patching, and tolerances). Plant records and quality control program shall be maintained during production of precast units. Records and access to plant shall be available to the Owner's Representative upon request.

Rigid molds shall be used, constructed to maintain precast unit uniform in shape, size, and finish, free from castings and dents, gouges, oil canning, or other irregularities that will adversely affect appearance or strength of units. Consistent quality shall be maintained during manufacture.

Equipment for handling epoxy-coated reinforcing bars shall have protected contact areas. Bundles of coated bars shall be lifted at multiple pickup points to prevent bar-to-bar abrasion from sags in the bundles. Coated bars or bundles of coated bars shall not be dropped or dragged. Coated bars shall be stored on protective cribbing. The maximum amount of damage shall not exceed 2 percent of the surface area of each bar.

Reinforcing steel, anchors, inserts, plates, angles, and other cast-in-place items shall be embedded as indicated on shop drawings. Reinforcement shall be fabricated and placed in conformance with ACI 318. No tack welding of or to reinforcement permitted. Welding when allowed shall conform to AWS D 1.4 requirements. No carbon steel chairs, spacers, nails or tie wire shall be used in positioning reinforcing and embedments.

Adequate reinforcing steel shall be provided to control cracking. Maximum permissible crack width:

Surfaces exposed to weather: 0.005 inch.

Surfaces exposed to view but not weather: 0.01 inch

Connecting devices, plates, angles, items fit to steel framing members, inserts, bolts, and accessories shall be fabricated to permit initial placement and final attachment.

Anchors, inserts, lifting devices, and other accessories shall be placed and embedded in accordance with approved shop drawings, accurately positioned in their designed location and anchored to prevent dislocation during panel construction. Do not use powder actuated fasteners for surface attachment of accessory items except as specifically approved by the Owner's Representative and specifically accepted by the precast unit manufacturer. Flashing reglets shall be placed and embedded continuous and straight, with lifting devices to permit removal after erection.

Units shall be moist cured with water mist to develop concrete quality and to minimize surface drying and appearance blemishes such as nonuniformity, staining, or surface cracking.

Precast units shall be removed from formwork using procedures conforming to PCI MNL-117. Minor patching in plant acceptable, providing structural adequacy and appearance of units are not impaired. Each precast unit shall be identified with corresponding code on erection drawings, in location not visible to finished work.

Repair of damaged epoxy coating, when required, shall be made with patching material conforming to ASTM A 775. Repair shall be in accordance with the material Manufacturer's recommendations.

- B. Fabrication and Tooling of Stainless Steel Connections and Embedments: All tools used during fabrication shall be made of stainless steel. Use of carbon steel tools is prohibited.

Welding of stainless steel shall conform to AWS A 5.4, AWS B 2.1 and AWS D1.1, using tungsten inert gas procedures and 316L filler metal for stainless steel to stainless steel and 309 filler metal for stainless steel to carbon steel. Surfaces shall be sanded smooth (do not grind), and oxidized discoloration removed (blue heat tint). Threaded parts of stainless steel bolts shall be lubricated with graphite suspended in alcohol (Neo-Lube) every time that nut is run on or off the threads. No other lubricant is acceptable.

Erection slings, cables, blocking, hardware and restraints shall be nonmetallic or stainless steel. Cribbing or crating shall be wood.

## 2.07 FINISH OF PRECAST UNITS

- A. Backs and Sides (Unexposed Edges): Smooth, dense, uniform surface free from blemishes. Defects in backs and sides (unexposed edges) shall be repaired as approved.
- B. Faces: Appearance, color, and texture finish of all panels shall match appearance, color and texture of the approved sample panels constructed by the Contractor. Panels that do not match shall be rejected. Repairs will be acceptable only if structural adequacy and appearance of product are not impaired and the repair and surrounding area match the approved sample panels at the Owner's Representative's office.

Mechanical finishing of panels at precast plant shall be at essentially the same age (or strength) of concrete to assure finished appearance is uniform from panel to panel.

To reduce possibility of stains occurring during transportation and erection, sealer shall be applied at the plant as recommended by Manufacturer and the precaster and shall be guaranteed in writing that sealer will not alter or yellow the original precast concrete color in any way and that it is compatible with the joint sealants to be used on the project. Seal finish surfaces of precast units to be exposed in completed Work as follows: apply a uniform coat of surface sealer in accordance with Manufacturer's written instructions. Apply sealer by method and in quantity required to provide coverage specified by sealer Manufacturer. Forty-eight (48) hours after application of sealer, apply water to face of each panel in sufficient quantity to determine if full sealer coverage was achieved. Panels not fully sealed shall be resealed and retested. A second coat shall be applied at the Site after erection and cleanup in accordance with the Manufacturer's instructions.

## 2.08. PRECAST PRESTRESSED CONCRETE SLAB BRIDGES

Precast prestressed concrete slab bridges shall conform to the provisions in Section 51, "Concrete Structures," of the CSS and these specifications.

Forms for providing the circular voids in the slabs shall be watertight and shall be constructed of an approved material that will resist breakage or deformation during the placement of the concrete

and will not materially increase the dead load of the span. The forms shall be properly supported and tied and shall remain in correct position at all times during the placement of the concrete.

Except where otherwise shown on the Plans, the top surface of the slab shall be given a coarse texture by brooming with a stiff bristled broom or by other suitable devices which will result in uniform transverse scoring, in advance of curing operations. The requirements of the seventh paragraph of Section 51-1.17, "Finishing Bridge Decks," of the CSS shall not apply.

When slab spans with concrete deck are shown on the Plans, the top surfaces shall be cleaned as specified for construction joints in Section 51-1.13, "Bonding," of the CSS. 5. When slab spans with an asphalt concrete overlay are shown on the Plans, the removal of laitance and curing compound from the top surfaces will not be required.

After the concrete slabs are in final position, the anchor dowel holes shall be filled with mortar.

## 2.09 PRECAST PRESTRESSED CONCRETE BRIDGE MEMBERS

Precast reinforced concrete girders shall conform to the provisions in Section 51, "Concrete Structures," of the CSS.

The top surface of the member shall be given a coarse texture by brooming with a stiff bristled broom or by other suitable devices that will result in uniform transverse scoring, in advance of curing operations. That portion of the top surface of box girders that is to be covered by expanded polystyrene shall be given a wood float finish. Remaining portions of the surface of the girders shall be given the coarse textured finish. The requirements of the seventh paragraph of Section 51-1.17, "Finishing Bridge Decks," of the CSS shall not apply.

When box girders with a concrete deck are shown on the plans, surfaces noted to be given a coarse broom finish shall be cleaned of surface laitance and curing compound before placing deck concrete. Exposure of clean aggregate will not be required.

When Double T girders with concrete deck are shown on the Plans, surfaces noted to be given a coarse broom finish shall be cleaned of surface laitance and curing compound before placing deck concrete. Exposure of clean aggregate will not be required.

## 2.10 NSF / ANSI STANDARD 61

- A. All cementitious material, admixtures, curing compounds, and other industrial produced materials used in concrete, or for curing or repairing of concrete, that can contact potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Examination: The Contractor shall verify that the structure, anchors, devices, and openings are ready to receive Work of this Section. Beginning of installation means acceptance of existing condition.
- B. Preparation: The Contractor shall provide for erection procedures and induced loads, during erection, maintain temporary bracing in place until final support is provided, provide necessary hoisting equipment and safety and protective devices.

- C. Erection: The units shall be erected in accordance with approved shop/erection drawings without damage to shape or finish or adjacent work. Damaged panels shall be replaced or repaired. Unless otherwise shown, members shall be erected level and plumb within allowable tolerances.

The Contractor shall align and maintain uniform horizontal and vertical joints as erection progresses, provide approved shims and wedges as required, and when members required adjustment beyond design or tolerance criteria, discontinue affected work. Units shall be secured in place and field welds, scratches and otherwise damaged steel surfaces shall be touched up.

Field fabrication and erection of stainless steel shall conform to the procedures outlined in the paragraph entitled "Fabrication and Tooling of Stainless Steel Connectors and Embedments."

The vertical units shall be set dry, without grout, attaining joint dimension with lead or plastic shims and spacers.

Pickup points, boxouts, inserts, bearing surfaces, and open spaces at connections and joints shown shall be grouted with non-shrink grout system(s) recommended by the manufacturer of the precast units, in accordance with Section 03315 - Grout. The color and texture of concrete surfaces of adjacent areas shall be finished to match in the same plane. Provide forms or other acceptable method to retain the grout in place until it is sufficiently hard to support itself. Pack spaces with stiff grout material, tamping voids completely full. Place the grout in a manner to finish smooth, plumb, and level with adjacent concrete surfaces. Keep grouted surfaces damp for not less than 24 hours after grout has taken its initial set. Promptly remove grout material from exposed surfaces before its hardens.

- D. Tolerances: In accordance with requirements of PCI MNL-117 unless otherwise indicated.
1. Variation from Plane of Location: ¼ inch in 10 feet and 3/8 inch in 100 feet maximum, compensating not cumulative.
  2. Offset from True Alignment between Two Connecting Members: ¼ inch maximum.
  3. Out of Square: 1/8 inch in 10 feet maximum, noncumulative.
  4. Variation in Dimensions Indicated in Shop Drawings: Plus or minus 1/8 inch.
  5. Misalignment of Anchors, Inserts, Openings: 1/8 inch, maximum.
  6. Bowing or Warpage of Units: 1/700 of panel dimension.
  7. Exposed Joint Dimension: ¾ inch plus or minus 1/8 inch.
  8. Location of Reglets: ¼ inch from true position.
- E. Joint Sealing: Specified in Section 07900 – Sealants and Caulking.

3.02 CLEANING

- A. No sooner than 72 hours after joints are sealed, faces and other exposed surfaces of precast units shall be cleaned using a cleaning detergent recommended by the sealer manufacturer and water applied with a soft bristle brush, and thoroughly rinsed using clean water or other approved procedures.
- B. Units shall be cleaned when temperature and humidity conditions are such that surfaces dry rapidly (e.g., 70°F and rising, 50 percent Relative Humidity or less).
- C. Discolorations which cannot be removed by these procedures shall be considered defective work, and repaired or replaced as directed by the Owner's Representative.
- D. Just before final acceptance by the Owner's Representative, clean precast units to remove dirt and stains.

3.03 PROTECTION

Adjacent surfaces shall be protected from damage during sealing and cleaning operations and against damage, disfiguration or discoloration from subsequent operations. Noncombustible shielding shall be used during welding operations.

3.04 PRECAST PRESTRESSED CONCRETE SLAB BRIDGES

Transverse connections for precast deck units shall conform to the following requirements:

- A. After the deck units are in final position, the anchor bars shall be mortared in and the mortar between the ends and in the keyways between the members shall be placed.
- B. No equipment or other loads shall be allowed on spans that have mortar between the deck units or in the anchor bar holes that has been in place less than 72 hours.
- C. Deck shear connector rods, shown as tie rods on the Plans, shall conform to the following:
  - 1. Bolts, rods, nuts, and plate or beveled washers shall be structural steel; lock washers shall be ANSI heavy duty spring washers; and all metal shall be hot-dip galvanized after fabrication in conformance with the provisions in Section 75-1.05, "Galvanizing," of the CSS.
  - 2. Openings for transverse connections shall be accurately placed and shall conform to the details shown on the Plans.
  - 3. Nuts shall be tightened to a snug fit after the deck units are positioned and prior to placing mortar in the keyways.
  - 4. Nuts shall be tightened after the mortar in the keyways between the units has been in place at least 24 hours. Threads at the ends of bolts or rods shall be burred to prevent loosening of the nut.
  - 5. Where the ends of transverse rods will be exposed, the nuts and ends of rods shall be recessed so that all metal will be at least 1" inside the surface of the member. After the nuts have been tightened, the recess shall be filled with mortar.

3.05 PRECAST PRESTRESSED CONCRETE BRIDGE MEMBERS

Temporary lateral bracing shall be provided for precast girders. The bracing shall be installed at each end of each girder, except notched ends, prior to the release of the erection equipment from the girder and shall remain in place until 2 days after the concrete diaphragms have been placed. The bracing shall be adequate to prevent overturning of the girders prior to completion of the Work and as a minimum shall be capable of resisting a lateral force of 15 PSF of girder side area applied laterally in either direction to the top of the girder. Girder erection shall not be started until the temporary lateral bracing proposed for use by the Contractor has been approved by the Owner's Representative.

Keyways shall be filled with Class 1 concrete, conforming with CSS Section 90-1, produced from aggregate with a 1 inch, maximum grading. The penetration of the concrete shall be near the lower limit of the specified nominal penetration. Keyways shall be mortar-tight before placing concrete. The concrete shall be thoroughly consolidated.

No equipment or other loads will be allowed on spans until at least 72 hours after the last mortar has been placed in the anchor dowel holes or the last concrete has been placed in the keyways.

Deck shear connector rods, shown as tie rods on the Plans, shall conform to the following:

- A. Bolts, rods, nuts and plate or beveled washers shall be structural steel; lock washers shall be ANSI heavy duty spring washers; and all metal shall be hot-dip galvanized after fabrication in conformance with the provisions in Section 75-1.05, "Galvanizing," of the CSS.
- B. Openings for transverse connections shall be accurately placed and shall conform to the details shown on the Plans.
- C. Nuts shall be tightened to a snug fit after the deck units are positioned and prior to placing mortar in keyways.
- D. Nuts shall be tightened after the mortar in the keyways between the units has been in place at least 24 hours. Threads at the ends of bolts or rods shall be burred to prevent loosening of the nut.
- E. Where the ends of transverse rods will be exposed, the nuts and ends of rods shall be recessed so that all metal will be at least 1" inside the surface of the member. After the nuts have been tightened, the recess shall be filled with mortar.

The anticipated deflection and method to accommodate deflection of precast prestressed concrete girders, prior to the time the deck concrete is placed, shall be shown on the Plans in conformance with the provisions in General Requirements. The deflection shall include the following:

- i. Anticipated upward deflection caused by the prestressing forces.
- ii. Downward deflection caused by the dead load of the girder.
- iii. Deflection caused by the creep and shrinkage of the concrete for the time interval between the stressing of the girders and the planned placement of the deck.

Such deflection shall be substantiated by calculations that consider the ages of the girder concrete at the time of stressing and the Contractor's planned placement of the deck. All deflection calculations shall be based on the concrete producer's estimate of the modulus of elasticity at the applicable concrete age.

Adjustments to accommodate girder deflections, which occur prior to the time the deck concrete is placed, may include revisions in bearing seat elevations, but any such adjustments shall be limited by the following conditions:

- A. The minimum permanent vertical clearance under the structure as shown on the Plans shall not be reduced.
- B. The profile grade and cross slope of the deck shall not be changed.
- C. A minimum of 1 inch of deck slab concrete between the top of the precast girders and the deck slab reinforcement shall be maintained.
- D. A minimum of 1 inch of deck slab concrete between the top of the expanded polystyrene in the area between the girder webs and the deck slab reinforcement shall be maintained.

Girders with unanticipated girder deflection and which cannot comply with conditions A, B, and C will be rejected in conformance with the provisions in General Requirements.

Adjustments to accommodate girder deflections will not be considered a change in dimensions. Full compensation for increases in the cost of construction, including increases in the quantity of deck or bearing seat concrete, resulting from adjustments to accommodate girder deflections shall be considered as included in the Contract price paid for the various items of work involved and no additional compensation will be allowed therefore.

**END OF SECTION 03400**

**SECTION 05120- STRUCTURAL STEEL**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide structural steel beams, columns, bracings, galvanizing, and appurtenances, complete, in accordance with the Contract Documents.

1.02 RELATED SECTIONS

- A. The Work of the following Sections apply to the Work of this Section. Other Sections, not referenced below, shall also apply to the extent required for proper performance of the Work.
- B. Related Work Specified in Other Sections:
1. Section 03200 - Reinforcement Steel.
  2. Steel supports, hangars, brackets and other miscellaneous items accessory to the mechanical and electrical installations.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. The current edition of the Uniform Building Code (UBC) of International Conference of Building Officials (ICBO).
- B. Commercial Standards (Current Edition):
1. AISC M 011 Manual of Steel Construction for Shop and Field Welding.
  2. AISC S 326 Design, Fabrication and Erection of Structural Steel for Buildings.
  3. AWS B 3.0 Welding Procedures and Performance Qualifications.
  4. AWS D 1.1 Structural Welding Code - Steel.
  5. AWS W 1 Welding Metallurgy
- C. ASTM Standards in Building Code (Current Edition):
1. ASTM A 6 General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
  2. ASTM A 36 Structural Steel (Except "W" rolled shapes)
  3. ASTM A 283 Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars
  4. ASTM A 325 High Strength Bolts for Structural Steel Joints
  5. ASTM A 490 Heat-Treated Structural Steel Bolts
  6. ASTM A 992 High Strength Structural Steel ("W" rolled shapes)

7. ASTM A 500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

1.04 CONTRACTOR SUBMITTALS

- A. The Contractor shall furnish submittals to the Engineer for review in accordance with the Specification Section 01300 – Contractor Submittals.
- B. Shop Drawings and Erection Drawings: The shop drawings shall provide a materials and specification list, construction and fabrication details, layout and erect diagrams, and the method of anchorage to adjacent construction. The shop drawings shall give the location, type, size and extent of welding and bolted connections, and clearly distinguish between shop and field connections. Before submittal of the shop drawings, the Contractor shall coordinate the shop drawings and related trades to ensure proper mating of assemblies. All work shall conform to the approved shop drawings.
- C. Test Reports: The Contractor shall furnish certified physical and chemical mill test reports for material used for structural members. All tests shall be performed in accordance with applicable ASTM Standards.

1.05 DELIVERY

- A. The Fabricator shall deliver the fabricated material to the job site in the sequence as approved by the Engineer.
- B. All shipped material to be piece-marked for erection with metal tags or other appropriate method approved by the Engineer.
- C. All material shipments shall include sufficient bolts for erection, plus at least the following extra bolts:
1. Add a minimum of 5% for unfinished bolts.
- D. The Engineer reserves the right to inspect fabricated material at Fabricator’s shop. The Engineer’s expenses for shop inspections shall be borne by the Contractor. In the event the Engineer identifies faulty materials or workmanship in fabricated material at the Fabricator’s shop, the materials shall be re-fabricated at no cost to the Owner. The Engineer shall be notified at least 7 days before the shipment of material. Shipments of material shall not be delayed if the Engineer does not require inspection.
- E. Material damaged in shipment shall be replaced or repaired at the Contractor’s expense at no additional cost to the Owner.

1.06 QUALITY ASSURANCE

- A. The Contractor shall fabricate and erect structural steel work in accordance with the latest edition of AISC “Specification for the Design, Fabrication and Erection of Steel for Buildings”, and “Code of Standard Practice for Steel Buildings and Bridges”, except whenever there is a discrepancy between the Plans and this Section, the Plans will govern.
- B. Continuous Inspections:

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1. The Contractor shall perform all welding and high strength bolting of structural steel assemblies under continuous inspection of the Engineer. Should such fabrication be performed in the shop of a licensed Fabricator approved by the Engineer, only the field welding and high strength bolting of structural steel assemblies will be required to be performed under continuous inspection of the Engineer.
2. The Contractor shall notify the Engineer at least 48 hours in advance of the needed inspection.
3. The Contractor shall provide copies of inspection reports to the Engineer and Building Department, if applicable.

1.07 WARRANTY

- A. The Fabricator shall furnish a warranty to the Owner to replace or repair all defective material and workmanship within 18 months of shipment, or 12 months of plant startup, whichever occurs first, excluding defects due to normal usage.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: All materials shall be new, sound and conform to the requirements herein. Unless otherwise indicated, structural steel shall be coated per Technical Specification - Division 9 requirements.
- B. Structural Steel: Rolled shapes, plates and bars shall conform to the latest edition of the AISC "Manual of Steel Construction", and shall also conform to current ASTM Designation A 36. All "W" rolled shapes shall conform to A 992.
- C. Pipe: Pipe shall conform to ASTM A 53, Grade B seamless galvanized as required, Schedule 40, except as otherwise shown on the Plans.
- D. Tubes: Tubes shall conform to ASTM A 500 Grade B.
- E. Welding Electrodes: The Contractor shall use steel electrodes conforming with AWS D 1.1, except that E7024 rods or electrodes shall not be used.

2.02 FABRICATION

- A. Fabrication shall be in accordance with AISC S 326 and indicated requirements. All structural steel welding in off-site fabrication shops shall be continuously inspected by the Engineer with the inspection cost of the Engineer to be borne by the Contractor. The continuous inspection will be waived if the work is done in a shop certified by the Council of American Building Officials (CABO), or listed by the International Conference of Building Officials (ICBO) Evaluation Services, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General:
1. Structural assemblies and shop and field welding shall meet the requirements of AISC M 011 and AISC S 326.
  2. Measurements and dimensions shall be verified by the Contractor at the site.
  3. Bolt holes shall be 1/16 inch larger than the nominal size of bolts. Where thick metals are indicated, holes shall be sub-punched and drilled, or reamed.
  4. Dissimilar metals shall be protected from galvanic corrosion by means of pressure tapes, coatings or isolators.
  5. Bolts shall not be permitted to drift, and holes shall not be enlarged to correct misalignment. In the event of mismatching of holes, new materials shall be provided.

6. Structural steel completely encased in concrete shall not be galvanized or painted, and shall have a clean surface for bonding to concrete.
  7. Damaged structural steel shall be replaced. Use of salvaged, reprocessed, or scrap materials shall not be permitted.
- B. Welding: Welding shall be performed by operators who have been qualified by tests as prescribed by AWS-W1 Section 7, to perform the type of welding indicated. Welding shall comply with AWS Code for Arc Welding in Building Construction, Section 4, Workmanship. Electrodes shall be matching per AWS.
- C. Coating: The Contractor shall coat structural steel in accordance with Technical Specification - Division 9 requirements.

3.02 INSPECTION

- A. The Engineer reserves the right to inspect all materials and workmanship covered in this Specification. However, such inspection shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with the Contract requirements. If inspection indicates a weld or part of the material is defective, the Contractor shall remove and replace it at the Contractor's expense.
- B. Shop inspection may include, but not be limited to, the following:
1. Verification of conformance of materials with this Specification and the Plans. The limits of acceptability and repair of surface imperfections for structural steel shall be in accordance with ASTM A 6.
  2. Visual and dimensional inspection of shop-fabricated structural steel members and assemblies shall be in conformance with this Specification and the Plans.
  3. Verification of welding procedures, welding operations and welder and tacker certificates of qualification shall be in accordance with this Specification and AWS D 1.1.

**END OF SECTION 05120**

**SECTION 05220 - CONCRETE BOLTS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide concrete anchor bolts, inserts, complete, in accordance with the Contract Documents. Principal items are anchor bolts placed in concrete, adhesive anchors, expansion bolts, and drilled anchors.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Except as otherwise indicated in this Section of the Specifications, the Contractor shall comply with the latest adopted edition of the Standard Specifications for Public Works Construction (SSPWC), together with the latest adopted editions of the Regional Amendments.

- B. The current edition of the Uniform Building Code (UBC) of International Conference of Building Officials (ICBO).

C. Federal Specifications:

1. MIL-A-907E Antiseize Thread Compound, High Temperature

D. Commercial Standards (Current Edition):

1. American Welding Society AWS A 5 Series.
2. ANSI/AWS B 3.0 Welding Procedure and Performance Qualifications
3. ANSI/AWS D 1.1 Specification for Welding Code - Steel
4. ANSI/AWS D 1.3 Specification for Welding Sheet Steel in Structure
5. AISC American Institute of Steel Construction - Manual of Steel Construction

E. ASTM Standards in Building Codes (Current Edition):

1. ASTM A 36 Specification for Structural Steel
2. ASTM A 123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
3. ASTM A 153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
4. ASTM A 193 Specifications for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service
5. ASTM A 194 Specifications for Carbon and Alloy Steel Nuts for Bolts and High Pressure and High Temperature Service
6. ASTM A 307 Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile

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- 7. ASTM A 320 Specification for Alloy Steel Bolting Materials for Low-Temperature Service
- 8. ASTM A 563 Specification for Carbon and Alloy Steel Nuts

1.04 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Shop drawings of all concrete bolts shall be submitted to the Owner's Representative for review in accordance with the Specification Section 01330 – Submittals/Shop Drawings.
- B. An International Conference of Building Officials (ICBO) report listing the ultimate load capacity in tension and shear for each size and type of adhesive and expansion concrete anchor used shall be submitted for review. The Contractor shall submit manufacturer's recommended installation instructions and procedures for all adhesive and expansion anchors for review and approval. The Contractor shall follow approved procedures during installation of concrete anchors.
- C. No substitution for the indicated adhesive anchors will be considered unless accompanied with ICBO report verifying strength and material equivalency, including temperature at which load capacity is reduced to 90 percent of that determined at 75°F.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Anchor Bolts: Anchor bolts shall be fabricated of materials complying with SSPWC Subsections 206-1.4.1 and 209-2.2, and as follows:
  - 1. Steel bolts: ASTM A 307 Grade A.
  - 2. Fabricated steel bolts: ASTM A 36.
  - 3. Stainless steel bolts, nuts, washers: ASTM A 320, Type 316.
- B. Standard Service Bolts (not Buried or Submerged): Except where otherwise indicated, all bolts, anchor bolts, and nuts shall be steel, galvanized after fabrication as indicated herein unless the bolts are for pipe fittings, transition couplings, mechanical restrained joint fittings, flanged coupling adapters or other piping or piping fittings. The bolts and hardware for these items are specified in Section 02650. Threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing. Except as otherwise indicated, steel for bolts, anchor bolts and cap screws shall be in accordance with the requirements of ASTM A 307, Grade A or B, or threaded parts of ASTM A 36.
- C. Buried or Submerged Bolts: Unless other corrosion-resistant bolts are indicated, all bolts, anchor bolts, nuts and washers which are buried, submerged, or below the top of the wall inside any hydraulic structure shall be Type 316 stainless steel conforming to ASTM A 193 for bolts, and to ASTM A 194 for nuts, unless the bolts are for pipe fittings, transition couplings, mechanical restrained joint fittings, flanged coupling adapters or other piping or piping fittings. The bolts and hardware for these items are specified in Section 02650. All threads on stainless steel bolts shall be protected with an antiseize lubricant suitable for submerged stainless steel bolts, to meet government specification MIL-A-907E.

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- 1, Antiseize lubricant shall be classified as acceptable for potable water use.
2. Antiseize lubricant shall be "PURE WHITE" by Anti-Seize Technology, Franklin Park, IL, 60131; AS-470 by Dixon Ticonderoga Company, Lakehurst, NJ, 08733, or equal.

D. Bolt Requirements:

- 1, The bolt and nut material shall be free-cutting steel.
2. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads, and nuts shall be Heavy Hexagon Series.
3. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case, more than ½ inch beyond the nut.

E. Adhesive Anchors: Unless otherwise indicated, all drilled, concrete or masonry anchors shall be adhesive anchors. No substitutions will be considered unless accompanied with ICBO report verifying strength and material equivalency.

- 1, Epoxy adhesive anchors are required for drilled anchors where exposed to weather, in submerged, wet, splash, overhead, and corrosive conditions, and for anchoring handrails, pumps, mechanical equipment, and reinforcing bars. Epoxy anchor grout shall comply with Section 03315 - Grout. Threaded rod shall be stainless steel Type 316.
2. Unless otherwise indicated, glass capsule, polyester resin adhesive anchors will be permitted in locations not indicated above, and shall be Hilti HVA, or equal. Threaded rod shall be galvanized steel.

F. Expanding-Type Anchors: Expanding-type anchors, if indicated or permitted, shall be steel expansion-type ITW Ramset/Redhead "Trubolt" anchors; McCullock Industries "Kwick-Bolt"; or equal. Lead caulking anchors will not be permitted. Size shall be as indicated. Expansion-type anchors, which are to be embedded in grout, may be steel. Nonembedded buried, or submerged anchors shall be stainless steel.

G. Powder-Driven Pins: Powder-driven pins for installation in concrete shall be heat-treated steel alloy. If the pins are not inherently sufficiently corrosion-resistant for the conditions to which they are to be exposed, they shall be protected in an acceptable manner. Pins shall have capped or threaded-heads capable of transmitting the loads the shanks are required to support.

H. Impact Anchor: Impact anchors shall be an expansion-type anchor in which a nail-type pin is driven to produce the expansive force. It shall have a zinc sleeve with a mushroom-style head and stainless steel nail pin. Anchors shall be Metal Hit Anchors, manufactured by Hilti, Inc.; Rawl Zamac Nailin, manufactured by the Rawlplug Company, or equal.

2.02 GALVANIZING

- A. Iron and Steel: ASTM A 123, with average weight per square foot of 2.0 ounces, and not less than 1.8 ounces per square foot.

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- B. Ferrous Metal Hardware Items: ASTM A 153 with average coating weight of 1.3 ounces per square foot.
- C. Touch-Up Material For Galvanized Coatings: Repair galvanized coatings marred or damaged during erection or fabrication by use of DRYGALV, as manufactured by the American Solder and Flux Company, Galvalloy, Galvion, Rust-Oleum 7085 Cold Galvanizing Compound, or equal, applied in accordance with the manufacturer’s instructions.

2.03 WELDING ELECTRODES

- A. Steel Electrodes: Use welding electrodes conforming with AWS D 1.1, except E7024 rods or electrodes shall not be used.
- B. Aluminum Electrodes: Contingent upon alloys being welded, use only inert gas-shielded arc or resistant-welding process with filler alloys conforming to UBC Standard No. 28, Table 28-1-C. Use no process requiring a welding flux.
- C. Stainless Steel Electrodes: Perform welding of stainless steel with electrodes and techniques as contained in pertinent AWS A5 series specification, and as recommended in Welded Austenitic Chromium-Nickel Stainless Steel Techniques and Properties as published by the International Nickel Company, Inc., New York, New York.

PART 3 - EXECUTION

3.01 FABRICATION AND INSTALLATION REQUIREMENTS

- A. Fabrication and Installation: Except as otherwise indicated, the fabrication and installation of anchor bolts shall conform to the requirements of the American Institute of Steel Construction “Manual of Steel Construction”.
- B. Install adhesive expansion and drilled anchor bolts in accordance with method specified in ICBO for manufacturer product.
- C. Powder-Driven Pins: Powder-driven pins shall be installed by a craftsman who is certified by the manufacturer as being qualified to install the manufacturer’s pins. Pins shall be driven in one initial movement by an instantaneous force that has been carefully selected to attain the required penetration. Driven pins shall conform to the following requirements where “D” = Pin’s shank diameter:

Material Penetrated by Pin	Material’s Minimum Thickness	Pin’s Shank Penetration in Supporting Material	Minimum Space From Pin’s CL to Edge of Penetrated Material	Minimum Pin Spacing
Concrete	16D	6D minimum	14D	20D

3.02 WELDING

- A. Perform all welding in accordance with the “Structural Welding Code-Steel”, AWS D 1.1, and current revisions. Use only welders qualified by tests in accordance with AWS B 3.0.

3.03 GALVANIZING

- A. Bolts, anchor bolts, nuts and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A 153. Field repairs to galvanizing shall be made using “Galvinox”, “Galvo-Weld”, or equal.

3.04 INSPECTION

- A. The Owner’s Representative reserves the right to inspect all materials and workmanship covered in this Section. Such inspections will not relieve the Contractor’s responsibility to furnish materials and workmanship in accordance with the Specifications. If inspections indicate that materials or workmanship are defective, the Contractor shall remove and replace the defective work at no additional cost to the Owner.

**END OF SECTION 05220**

**SECTION 05650 - PRE-ENGINEERED SHADE STRUCTURE**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Install Pre-Engineered Shade Structure per dimensions and type illustrated in the Plans.
- B. **PRODUCT DESIGN LOADS:** To meet governing Building Department requirements. Soil loading and seismic design criteria to be obtained from project specific Geotechnical Report. Minimal Building Department requirements shall be used when no specific Geotechnical Report is provided.
- C. **DESIGN METHOD:** Per applicable building code. Note: Manufacturer to use three-dimensional structural analysis to determine member load and forces.
- D. The pre-engineered package shall be a pre-cut and pre-fabricated package that shall include powder coated structural frame members, roof material, fasteners, and trim as well as the installation instructions. The structure shall be shipped knocked down for minimum shipping charges. Field labor will be kept to a minimum by pre-manufactured parts. No onsite welding will be permitted. Connection bolts shall be concealed within the tubing where possible.
- E. Where possible, tube column to concrete base will be surface mounted with all anchor bolts hidden within the column.
- F. Where possible, the structure will have a moment connection at the top of the column and a pinned connection at the base of the column to ensure a clean connection at the base, reduce the size of the concrete base, and provide for one-step concrete installation process.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03300 – Cast-In-Place Concrete

1.03 REFERENCES

- A. American Institute of Steel Construction (AISC)
- B. American Iron and Steel Institute (AISI) Specifications for Cold Formed Members.
- C. American Society of Testing and Materials (ASTM)
- D. American Society for Quality (ASQ)
- E. American Welding Society (AWS)
- F. California Building Code (CBC)
- G. International Building Code (IBC)
- H. Leadership in Energy and Environmental Design (LEED)

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- I. Lightning Protection Institute (LPI)
  - J. National Fire Protection Association (NFPA)
  - K. OSHA Steel Erection Standard 29 CFR 1926 Subpart R-Steel Erection
  - L. Steel Structures Painting Council (SSPC) SSPC-SP10 Near White Blast Cleaning
- 1.04 SUBMITTALS
- A. Submit 3 set shop drawings and 2 sets structural calculations wet signed and sealed by a Professional Engineer licensed in the State of California.
- 1.05 QUALITY ASSURANCE:
- Provide evidence of commitment of quality craftsmanship as demonstrated by the following:
- A. SUPPLIER QUALIFICATIONS:
    - 1. The product shall be designed, produced, and finished at a facility owned and directly supervised by the supplier who has at a minimum of ten years under same ownership making steel frame pre-manufactured structures. Cumulative experience in fabrication will not be an acceptable alternative.
    - 2. The product shall be shipped from a single source.
    - 3. Membership in American Institute of Steel Construction.
    - 4. Membership for American Society of Quality.
    - 5. Membership in American Welding Society.
    - 6. Membership in Chemical Coaters Association International.
    - 7. Membership in Construction Specifications Institute.
    - 8. Full time on-staff Licensed Engineer.
    - 9. Full time on-staff Quality Assurance Manager.
    - 10. Published Quality Management System.
    - 11. Full time on-staff AWS Certified Welding Inspector.
    - 12. Continued certification by an independent inspection agency.
    - 13. Control of finishing quality by in-house shot blast, pretreatment, primer and powder coating.
- 1.06 PRODUCT STORAGE AND HANDLING
- A. Comply with the requirements of Section 01600 – Materials and Equipment.
- 1.07 WARRANTY

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- A. Supply manufacturer's standard 10 year limited warranty on frame and 10 years limited warranty on paint system.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. USA SHADE & Fabric Structures,  
Ph: 800-966-5005  
[www.usa-shade.com](http://www.usa-shade.com)
- B. Pre-Fab Builders  
1364 East Valencia Drive  
714-575-9265  
[www.prefabinc.org](http://www.prefabinc.org)
- C. Substitutions must be approved a minimum of ten (10) days before bid. All approved manufacturers shall be notified in writing before the bid date and shall not be allowed to bid without written notification.
- D. Alternate suppliers must meet the qualifications and provide proof of certifications listed.
- E. Alternate suppliers must provide equivalency to paint system.
- F. Alternate suppliers must provide proof that their designs do not infringe on patents or copyrights.

2.02 MATERIALS

- A. STRUCTURAL FRAMING: structural steel tube minimum ASTM A500 grade B, "I" beams; tapered columns, open channels, or wood products shall not be accepted for primary beams.
- B. COMPRESSION RING: structural channel or welded plate minimum ASTM A36 or COMPRESSION TUBE: structural steel tube minimum ASTM A500 grade B.
- C. STRUCTURAL FASTENERS: ASTM A325 high strength bolts and A563 high strength nuts, ASTM A307 anchor bolts.
- G. "R" PANEL/MULTI-RIB METAL ROOFING: Multi-rib roofing shall be 24 gauge ribbed galvalume steel sheets with ribs 1 3/16" high and 12" on center. Roof surface shall be painted with Kynar 500 to the manufacturer's standard color. Ceiling surface shall be white. Roof panels are factory precut to size and angle to provide one-step installation.
  - 1. Metal roofing trim shall match the color of the roof and shall be factory made of 26 gauge Kynar 500 painted steel. Trim shall include panel ridge caps, eave trim, splice channels, roof peak cap, and corner trim as applicable for model selected., reference drawings for additional information. Painted screws and butyl tape are included.
  - 2. Ridge Caps shall be performed with a single central bend to match the roof pitch and shall be hemmed on the sides.

2.03 ACCESSORIES / OPTIONAL

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- A. ELECTRICAL ACCESS AND BOX CUTOUPS: Electrical access to be provided per manufacturer's electrical access sheet. Electrical cut outs shall be marked as height above finish floor and size of cutout required.
- B. Electrical access at compression shall be provided.
- C. Electrical access up through columns to be provided.

2.04 FABRICATION

- A. All steel fabrication of tubes and plates shall be factory controlled under a documented Quality Management System. All parts shall be permanently etched with identification numbers. Fabrication facility will be experienced for a minimum of ten years in precision tube and plate fabrication. Cumulative experience in fabrication will not be an acceptable alternative.
- B. Certified AWS welders, shall make all welded connections in accordance with AWS Specifications and trained by an AWS Certified Welding Inspector.

2.05 FINISH STEEL

- A. For quality control purposes, steel shall be cleaned, pretreated and finished at a facility owned and directly supervised by the manufacturer. Steel shall be shot blasted to SSPC-SP10 near-white blast cleaning. SSPC-SP2 hand tool cleaning will not be an acceptable alternative. Parts shall be pretreated in a 3 stage iron phosphate or equal washer. Epoxy primer powder coat to be applied to parts for superior corrosion protection. Top powder coat of Super Durable TGIC Powder Coat to color selected from manufacturer's standard color chart. For environmental purposes, finish shall allow no VOC emissions. Sample production parts shall have been tested and meet the following criteria:
  - 1. Salt spray resistance per ASTM B 117/ ASTM D 1654 to 5000 hours with no creep from scribe line and rating of 10.
  - 2. Humidity resistance per ASTM D2247-02 to 3000 hours with no loss adhesion or blistering.
  - 3. Color/UV resistance per ASTM G154-04 to 2000 hours exposure, alternate cycles with results of (a) no chalking (b) 75% color retention (c) Color variation maximum 3.0 E variation CIE formula (before and after 2000 hours exposure).

PART 3 - ERECTION

- A. Footings: The structure shall be set on prepared footings designed by the Shade Structure Manufacturer. Anchor bolts shall also be provided by Shade Structure Manufacturer. Concrete slab (if required) is to be provided by others.
- B. The contractor must use appropriate construction practices for the specific site conditions.
- C. Install all components according to manufacturer's installation instructions and these specifications.

**END OF SECTION 05650**

**SECTION 07110 – SHEET MEMBRANE WATERPROOFING**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The General Conditions, Supplementary Condition, and Division 1 are a part of this Section and the Contract for this Work and apply to this Section as fully as if repeated herein.
- B. This Section covers the work necessary to furnish and install a complete sheet membrane waterproofing system for indicated buried exterior concrete surfaces, as shown on the Plans and specified herein. All concrete structures located below groundwater level shall receive this waterproofing treatment on buried exterior concrete surfaces.

1.02 RELATED WORK SPECIFICED ELSEWHERE

- A. Section 03300 - Cast-in-Place Concrete

1.03 QUALITY ASSURANCE

- A. Manufacturer's Details: If manufacturer's details vary from the details indicated on the Contract Documents, follow manufacturer's details as necessary to comply with warranty requirements. Provide changes in details at no additional cost to Owner.
- B. Manufacturer's Qualifications:
  - 1. Manufacturer shall have not less than five (5) years experience in manufacturing of sheet membrane waterproofing systems of the type specified for this Project.
  - 2. Manufacturer shall obtain primary waterproofing materials from a single manufacturer. Manufacturer's name shall appear on all containers.
  - 3. Manufacturer shall provide secondary materials as recommended by the manufacturer of primary materials.
  - 4. Manufacturer's qualified technical representative will be required to visit Site to advise Installer of procedures and precautions for installation of waterproofing materials and to verify warranty requirements.
  - 5. Manufacturer's technical representative will be required to be at the project periodically during installation, during flood testing, and immediately prior to installation of protection board system to ensure waterproofing has been properly installed and warranty requirements have been met.
- C. Applicator Qualifications: The applicator shall be licensed, approved, or certified by a waterproofing materials manufacturer, and shall have a minimum of five (5) years experience in the application of sheet membrane waterproofing.

1.04 SUBMITTALS

- A. Submittals during construction shall be made in accordance with Division 1, General Requirements.
  - 1. Product Data:

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- a) Submit manufacturer's literature including recommended instructions for installation.
- b) Submit list of projects of similar nature by both manufacturer and applicator which have been installed during the last five (5) years.
- c) Submit sample warranty, clearly indicating compliance with warranty for this Project.

2. Shop Drawings:

- a) Clearly indicate details at expansion joints, penetrations, substrate cracks, control joints, drains and terminations.
- b) Provide shop drawings signed by authorized representative of the waterproofing membrane manufacturer stating that submittal details meet manufacturer's warranty requirements for this specific Project.

3. Samples: Submit 12" x 12" samples of the actual membrane that is to be used on this Project for Engineer's file.

4. Certificates:

- a) Submit manufacturer's certification stating that materials ordered and supplied are compatible with each other, are suited for the locale and purpose intended, and are shipped in sufficient quantity to ensure proper and timely installation.
- b) Submit manufacturer's project registration form indicating that manufacturer has reviewed Project and will issue a warranty upon successful completion of the installation.
- c) Submit manufacturer's approval of installer.
- d) Submit installer's experience record.
- e) Certify materials shipped to Site meet membrane manufacturer's published performance standards and requirements of this Specification.

1.05 STANDARDIZATION

- A. Like items of equipment specified herein shall be the end products of one (1) manufacturer in order to achieve standardization for operation, maintenance, spare parts and manufacturer's service.

1.06 SUPPLIER'S/MANUFACTURER'S SERVICES

- A. A supplier's and/or manufacturer's representative for the equipment specified herein shall be present at the job site for a minimum of two (2) man-days, travel time excluded, for installation assistance, inspection, and certification of the installation.

1.07 PROJECT CONDITIONS

- A. Install waterproofing materials under conditions where the following criteria can be met:

1. Rain is not anticipated within 24 hours of outdoor application.
  2. Substrate surface temperatures are above 40°F and below 90°F. Use special cold weather membrane and installation procedures for temperatures between 20°F and 40°F.
- B. Do not work or walk on exposed waterproofing membrane. Install temporary or permanent protection board as necessary to protect membrane during subsequent work operations.
- C. Do not apply membrane waterproofing on damp or frozen surfaces.
- D. Coordinate time of application to ensure that earth backfill is installed within 90 days after completion of waterproofing and protection systems.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original sealed containers with labels clearly identifying manufacturer, material name, and date of manufacture. Do not remove materials from containers until ready for installation.
- B. Store material in a clean, dry space with a temperature range between 50°F and 90°F. Do not store materials in direct sunlight.

1.09 WARRANTY

- A. Provide a warranty for the completed installation. A single document signed by manufacturer, applicator and Contractor shall warrant against defects of materials and workmanship for a period of five (5) years from date of Substantial Completion of the Project.

1.10 PRODUCT IDENTIFICATION

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers will be considered in accordance with the General Conditions.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. The sheet membrane waterproofing system shall be one of the two products specified below. No substitutions shall be permitted:
1. Jiffy Seal Products as manufactured by Protecto Wrap Company, 2255 South Delaware Street, Denver, Colorado 80223 (Telephone: 303/777-3001; Fax: 303/777-9273). Note: Product references in this Specification Section pertain to Jiffy Seal.
  2. Bituthene System 4000 as manufactured by W.R. Grace Company, 62 Whitmore Avenue, Cambridge, MA 02140 (Telephone: 866/333-3726; Fax: 617/498-4311). Note: Though not named in this Specification, equivalent Bituthene products to the named Jiffy Seal Products will be approved by the Engineer.

2.02 MATERIALS

A. Sheet Membrane Waterproofing: Sheet membrane waterproofing shall have the following characteristics:

1. Material: Premium grade bituminous resin modified with synthetic resins.
2. Thickness: 60 mils.
3. Color: Black.
4. Roll Size: Maximum width and length shall be as determined by Project conditions.
5. Reinforcing: Stitch spun bond polyester reinforcing laminated in center of bituminous sheet material.
6. Physical Properties:

<u>Property</u>	<u>Value</u>	<u>Test Method</u>
Membrane Tensile Strength	425 PSI	ASTM D 412
Reinf. Tensile Strength	3200 PSI min	ASTM D 412
Puncture Resistance	80 PSI	ASTM D 154
Elongation Rubberized Asphalt	500%	ASTM D 882
Water Absorption	0.23	ASTM D 1228
Permeance	0.003	ASTM D 96 Method B
UV Exposure Without Effect	3 months	ASTM D 146-78A
Pliability 180 Bend Over a 1” Madrel at -55°F	Passed	
Resistance to Hydrostatic Head (Ft. of Water)	150	
Exposure to Fungi in Soil for 16 Weeks	Unaffected	GSA-PBS 07115
Cycling Over Crack at -15°F (100 cycles)	No cycles	

B. Products:

1. General: Product shall be Jiffy Seal 140/60, as manufactured by Protecto Wrap Company, or an approved equal.
2. Primer: Primer shall be No. 100 Primer, or an approved equal, high tack rubber-based primer in soluble solution, and shall be compatible with the specified waterproofing system.
3. Flashing Material:
  - a) Flashing material shall be 60 mil thick, unreinforced comformable sheet used for detailing around drains, penetrations, corners, footings, and non-uniform surfaces.
  - b) Product shall be Jiffy Seal #500, or an approved equal, as manufactured by Protecto Wrap Company.

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4. Sealing Mastic: Sealing mastic shall be No. 160H, or an approved equal, and shall be a rubberized blend of bituminous and synthetic resins used for sealing detail cuts and membrane terminations.
5. Protection Board: Protection board shall one of two types:
  - a) For Horizontal Surfaces: Protection board shall be Sealtight PC-3 Protection Course as manufactured by W.R. Meadows Company (Elgin, Illinois), or approved equal.
  - b) For Vertical Surfaces: Protection board shall be Amocor PB-4 Protection Board as manufactured by Amoco Foam Products Company (Atlanta, Georgia), or an approved equal.
- C. Waste Slab: Contractor shall provide a waste slab as required to provide a suitable surface for application of the sheet membrane waterproofing system to horizontal surfaces. Contractor shall provide a waste slab whether or not it is indicated on the Plans, at no additional cost to the Owner. The minimum thickness of the concrete slab shall be 4 inches or as otherwise indicated on the Plans. A thicker waste slab may be provided at Contractor's option (at no additional cost to the Owner), to accommodate his/her construction procedures. A waste slab shall be provided for Jiffy Seal or similar types of waterproofing membranes as recommended by the product manufacturer for installation of the specified waterproofing membrane beneath a structure base slab.
- D. HDPE Membrane: For the Bituthene System 4000 alternative, Contractor may install in lieu of the waste slab, a product by W.R. Grace identified as Pre-Prufe 300R (which is an 50 mil HDPE membrane), or an approved equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Concrete:
  1. Ensure that the concrete has cured for minimum of 7 days and is clean and dry.
  2. Verify that horizontal concrete surfaces have smooth wood float finish. Broom finishes are not acceptable.
  3. Ensure that fins, sharp protrusions, loose aggregate, dust, form release agents, curing compounds, and other items that will inhibit adhesion of membrane to substrate are removed prior to waterproofing installation.
  4. Verify that outside corners are chamfered and inside corners have epoxy mortar, latex modified cementitious mortar, or urethane sealant cants.
- B. Metal Surfaces: Metal surfaces shall be dry, clean, free of grease, oil, dirt, rust, corrosion, other coatings and contaminants which could affect adhesion of membrane system. Metal surfaces shall be without sharp edges or offsets at joints. Clean all copper surfaces with a solvent wipe prior to application of primer.
- C. Unsatisfactory Conditions: Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

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- A. General: Remove fins and loose material. Fill or finish holes and cracks flush with mortar or plastic cement.
- B. Penetrations: Seal pipes, conduit, anchors and other items that are penetrating the waterproofing with Jiffy Seal #500, or an approved equal, formed to fit tightly to protrusion and substrate. Ensure penetrations are watertight.
- C. Primer:
  - 1. Do not thin No. 100 primer, or an approved equal. Close container when not in use.
  - 2. Apply No. 100 primer, or an approved equal, with roller or brush as recommended by manufacturer for horizontal and vertical surfaces.
  - 3. Ensure primed surfaces are free from runs, puddles, or excessive primer.
  - 4. Primer only as much surface as can be covered with membrane within 8 hours. If primed areas are not covered within 8 hours, apply new primer over existing.
  - 5. Protect primed surfaces from dust.
  - 6. Do not apply membrane until primer is tacky, but not wet.
  - 7. Follow manufacturer's special priming instructions when ambient temperature is between 20°F and 40°F.
- D. Construction Joints, Control Joints and Cracks: For joints and cracks less than ¼ inch wide with movement less than 25%, place 12-inch-wide strip of Jiffy Seal 140/60 membrane material, or an approved equal, over crack or joint.
- E. Expansion Joints: For expansion joints (i.e., joints larger than ¼ inch or with movement greater than 25%), do the following:
  - 1. Install closed cell backer rod and sealant material into joint.
  - 2. Place 12-inch-wide strip of Jiffy Seal 140/60 membrane material, or an approved equal, face down over joint with release film in place to create a slip plane over the joint. Install in accordance with manufacturer's details.

3.03 APPLICATION

- A. General:
  - 1. Apply Jiffy Seal 140/60, or an approved equal, in accordance with manufacturer's printed instructions.
  - 2. Overlap membrane joints 2 inch minimum.
  - 3. Place 12-inch-wide Jiffy Seal #500 unreinforced flashing material, or an approved equal, at inside corners and at the intersections of footings and walls.
  - 4. Center Jiffy Seal #500 flashing material, or an approved equal, in corners and intersections so that 6-inch legs extend in each direction.

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5. Form Jiffy Seal #500 flashing material, or an approved equal, to substrate irregularities. Remove release film immediately prior to Jiffy Seal 140/60 waterproofing membrane, or an approved equal, installation.
6. Provide troweled bead of No. 160H mastic, or an approved equal, to T-joints and detail cuts on the same day as installation.
7. Seal all protrusions and penetrations with Jiffy Seal #500, or an approved equal, formed to the substrate, thereby making a positive seal with the primed penetrating member.

B. Vertical Application of Membrane:

1. Install Jiffy Seal 140/60 waterproof membrane, or an approved equal, beginning at top of wall, extending down and onto footing.
2. Terminate membrane past edge of footing 4 inch minimum, well adhered to flashing material.
3. Remove “Zip Strip” from preceding sheet and overlap subsequent sheet 2 inch minimum.
4. Roll entire surface, as each sheet is installed, to eliminate wrinkles and air spaces, with particular emphasis on overlap areas.
5. Apply Jiffy Seal 140/60 membrane, or an approved equal, with the top edge terminating within 1 inch of finish grade; seal with troweled bead of No. 160H mastic, or an approved equal, extending at least 1 inch into wall and 2 inches onto membrane. Seal termination edges of membrane with trowel bead of No. 160H mastic, or an approved equal.
6. Provide Jiffy Seal 140/60 membrane, or an approved equal, over 6-inch wide Jiffy Seal #500 flashing material, or an approved equal, around protrusions through wall; seal with No. 160H mastic, or an approved equal.
7. Rolling: Use heavy hand pressure and seal roller on all patches, seams and edges.
8. Double cover outside corners and joints with Jiffy Seal 140/60 membrane, or an approved equal, by applying initial 12-inch strip centered along axis of corner of joint and then covered by regular application of Jiffy Seal 140/60 membrane, or an approved equal.

C. Horizontal Application of Membrane:

1. Apply Jiffy Seal 140/60 membrane, or an approved equal, with tack side down, from low point to high point so that laps shed water on horizontal surfaces.
2. Immediately repair misaligned or damaged membrane.
3. Terminate by turning edge up and pressing firmly to vertical surface. Seal with troweled bead of No. 160H mastic, or an approved equal.
4. Roll Jiffy Seal 140/60 membrane, or an approved equal, to ensure full contact with substrate and to avoid wrinkles, fishmouths and entrapped air.

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5. Remove “Zip Strip” prior to installation of subsequent sheet and overlap the joint by 2 inches minimum. Overlap end laps 4 inches minimum. Roll lap areas.

D. Protection Board:

1. Protect Jiffy Seal 140/60 membrane waterproofing, or an approved equal, from damage during backfill operations by removing release sheet and adhering protection board over waterproofed surfaces.
2. Neatly fit boards around pipes and projections.
3. Use No. 160H mastic, or an approved equal, 1/8 inch thick on approximate 24-inch centers if necessary to adhere board.
4. Apply protection board the same day that the membrane is applied.
5. Apply protection board with joints tightly butted and end laps offset 6 inches in succeeding courses.
6. Seal laps with trowel application of No. 160H mastic, or an approved equal.
7. Complete backfilling as soon as possible after application of protection board, within 7 days maximum.
8. Protect from damage until backfill is placed.

- E. Sealing of Pipe/Wall Penetrations: Contractor shall fabricate a “boot” per manufacturer’s recommendations that is adhered to the wall surface and is also securely banded to the pipe, to create a watertight joint at each pipe/wall penetration.

3.04 FIELD QUALITY CONTROL

A. Flood Testing:

1. Perform flood test prior to installation of protection board.
2. Plug drains on horizontal surfaces.
3. Use sandbags or other means to restrict runoff.
4. Flood deck with water to depth of 2 inches from top of membrane.
5. Allow to stand for 24 hours.
6. Repair leaks and retest.

- B. Inspection: Visually inspect surfaces for fishmouths, blisters, or ruptures and make necessary repairs.

C. Repairs:

1. Clean areas where membrane needs repair and lightly primer with #100 primer, or an approved equal.

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2. Provide patch with new Jiffy Seal 140/60 membrane waterproofing sheet, or an approved equal, to cover repair area.
3. Install and roll firmly.
4. Apply trowel bead of No. 160H mastic, or an approved equal, to edges of membrane patch.

3.05 CLEANING

- A. Clean stains from adjacent surfaces with cleaning fluid recommended by manufacturer. Remove foreign matter from finished membrane surface.

**END OF SECTION 07110**

**SECTION 07900 - SEALANTS AND CAULKING**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide caulking, sealing, moisture protection, and appurtenant Work for sealing joints in non-water-bearing surfaces, complete and in accordance with the Contract Documents.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Except as otherwise indicated in this Section of the Specifications, the Contractor shall comply with the latest adopted edition of the Standard Specifications for Public Works Construction (SSPWC), together with the latest adopted editions of the Regional Amendments.
- B. The current edition of the Uniform Building Code (UBC) of International Conference of Building Officials (ICBO).
- C. Except as otherwise indicated, the current editions of the following apply to the Work of this Section:

1. Federal Specifications:

TT-S-001543A	Sealing Compound, Silicone Rubber Base, (For Caulking, Sealing and Glazing in Buildings and Other Structures)
A-A-1556	Sealing Compound, Elastomeric Type, Single Component (For Caulking, Sealing, and Glazing in Buildings and Other Structures)
TT-S-00227E (3)	Sealing Compound, Elastomeric Type, Multi-Component (For Caulking, Sealing and Glazing in Buildings and Other Structures)
SS-S-200E (2)	Sealant, Joint, Two Component, Cold Applied, for Portland Cement Pavement

2. ASTM Standards in Building Codes:

ASTM C 557	Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing
ASTM C 834	Specification for Latex Sealing Compounds
ASTM C 919	Practice for Use of Sealants in Acoustical Applications
ASTM C 920	Specification for Elastomeric Joint Sealants
ASTM D 41	Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing

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ASTM D 226	Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
ASTM D 312	Specification for Asphalt Used in Roofing
ASTM D 1752	Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

- D. Manufacturer's Standards: In addition to the standards listed above, the sealants and caulking products and their application shall be in accordance with the manufacturer's published recommendations and specifications.

1.03 CONTRACTOR SUBMITTALS

- A. The Contractor shall provide submittals in accordance with the Specification Section 01330 – Submittals/Shop Drawings.
- B. Samples: The Contractor shall submit samples (including color samples) of all the caulking and sealant materials and other moisture protection materials proposed for use on the Work. The samples shall be clearly marked with the manufacturer's name and product identification.
- C. Technical Data: The Contractor shall submit a complete materials list along with the manufacturer's technical data and literature, specifications, joint width and depth tables, and installation instructions.
- D. Certificates: The Contractor shall submit, if requested by the Owner's Representative, certificates from an independent testing laboratory approved by the Owner's Representative, certifying that the submitted materials meet all the requirements of the ASTM and Federal Specifications cited.
- E. Warranty: The Contractor shall provide a 5 year written warranty of the entire sealant installation against faulty and/or incompatible materials and workmanship, together with a statement that it agrees to repair or replace, to the satisfaction of the Owner Representative, at no additional cost to the Owner, any such defective areas which become evident within said 5 year warranty period.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials: Manufactured materials shall be delivered in original, unbroken packages or containers bearing the manufacturer's label. Packages or containers shall be delivered to the site with seals unbroken.
- B. Shelf Life: Materials whose shelf life dates have expired shall not be used in the Work. Such materials shall be promptly removed from the project site.
- C. Storage: All materials shall be carefully stored in accordance with the manufacturer's instructions, in an area that is protected from deleterious elements, and in a manner that will prevent damage to the product.

PART 2 - PRODUCTS

2.01 SEALANTS AND CAULKING MATERIALS

- A. Caulking and sealing materials shall conform to the following requirements:
1. Significant Movement Sealants (+25% Movement Capability):
    - a) Expansion wall joints; control joints; interior and nontraffic horizontal joints:
      - 1) Two-component, nonsag, polyurethane or polysulfide sealant conforming to Federal Specification TT-S-00227E (3), Class A, Type II, and ASTM C 920; Type M; Class 25; Grade NS.
        - (a) Products Research & Chemical Corp. ARC-2.
        - (b) Progress Unlimited “Iso-Flex 2000”; or approved equal.
      - 2) One component, nonsag, low modulus, polyurethane or polysulfide sealant conforming to Federal Specification A-A-1556, Class A, Type II, and ASTM C 920; Type S; Class 25; Grade NS.
        - (a) Products Research & Chemical Corp., “RC-1”.
        - (b) Tremco “Dymonic”; or approved equal.
      - 3) One component, nonsag, medium modulus, neutral cure, silicone sealant conforming to Federal Specification TT-S-001543A, Class A, and ASTM C 920; Type S; Class 25; Grade NS.
        - (a) Products Research & Chemical Corp. “PRC-4000”.
        - (b) Dow Corning “795”; or approved equal.
    - b) Horizontal Joints:
      - 1) Two component, self-leveling, polyurethane or polysulfide sealant conforming to Federal Specification TT-S-00227E(3), Class A, Type I, and ASTM C 920; Type M; Class 25; Grade P.
        - (a) Products Research & Chemical Corp. “RC-2SL”.
        - (b) Bostic “Chem-Calk 550”; or approved equal.
      - 2) One component, self-leveling, polyurethane or polysulfide sealant conforming to Federal Specification A-A-1556, Class A, Type I, and ASTM C 920; Type S; Class 25; Grade P.
        - (a) Products Research & Chemical Corp. “6006”.
        - (b) Mameco “Vulkem 45”; or approved equal.

3.01 INSTALLATION REQUIREMENTS

- A. Manufacturer's Recommendations: All work under this Section and all testing, where applicable, shall be performed in accordance with manufacturer's printed recommendations, specifications, and installation instructions except where more stringent requirements are indicated herein; and, except where project conditions require extra precautions or provisions to assure performance of the waterproofing system.
- B. Authorized Installers: Caulking, sealants, and moisture protection shall be complete systems, and installed only by installers authorized and approved by the respective material manufacturers.

3.02 SEALANT FILLED JOINTS

- A. Manufacturer's Representative: The Contractor shall furnish the on-site services of the sealant manufacturer's representative (before starting sealant work) for inspection of the joints to be sealed and for instructing the installer in the proper use of the materials.
- B. Surface Preparation: Joints and spaces to be sealed shall be clean, dry, and free of dust, loose mortar, and other foreign materials. Ferrous metal surfaces shall be cleaned of all rust, mill scale, and other coatings by wire brush, grinding, or sandblasting. Oil and grease shall be removed by cleaning in accordance with sealant manufacturer's printed recommendations. Protective coatings shall be removed from all aluminum surfaces against which caulking or sealing compound is to be placed. Bituminous or resinous materials shall be removed from surfaces to receive caulking or sealants.
- C. Sealant Depth: Sealant depth in joints shall be 1/2 the width of joint, but not less than 1/8 inch deep and 1/4 inch wide nor more than 1/2 inch deep and 1 inch wide. All joints shall have a rigid filler material installed to proper depth prior to application of sealant.
- D. Joints in Porous Materials: Where required by the manufacturer, sides of joints of porous materials shall be primed immediately prior to caulking or sealing.
- E. Applications: A full bead of sealant shall be applied into the joint under sufficient pressure, with the nozzle drawn across sealant, to completely fill the void space and to ensure complete wetting of contact area to obtain uniform adhesion. During application the tip of the nozzle shall be kept at the bottom of the joint thereby forcing the sealant to fill from the bottom to the top. Sealants shall be tooled immediately after exposure with caulking tool or soft bristled brush moistened with solvent. The finished sealant filled joint shall be slightly concave unless otherwise indicated.
- F. Cleaning: After application of sealant and caulking materials, adjacent materials which have been soiled shall be cleaned and left in a neat, clean, undamaged or unstained condition. On porous surfaces, excess sealant shall be removed per sealant or caulking manufacturer's printed instructions.

**END OF SECTION 07900**

**SECTION 09800 - PROTECTIVE COATINGS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to complete the protective coating of all specified surfaces not specifically included under the requirements of Section 09900 - Painting, including all surface preparation, pretreatment, coating application, touch-up of factory-coated surfaces, protection of surfaces not to be coated, cleanup, and appurtenant work, all in accordance with the requirements of the Contract Documents.
- B. The following surfaces shall not be protective coated hereunder unless shown or specified herein, or elsewhere in the Contract Documents.
  - 1. Concrete
  - 2. Stainless steel
  - 3. Machined surfaces
  - 4. Grease fittings
  - 5. Glass
  - 6. Equipment nameplates
  - 7. Maintenance hole frames and covers
  - 8. Platform gratings, stair treads, door thresholds, and other walk surfaces
- C. The coating system schedules summarize the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the Plans are used to show exceptions to the schedules, to show or extend the limits of coating systems, or to clarify or show details for application of the coating systems. Items to be coated for this Project include the following, at a minimum.
  - 1. The sluice gates, wall thimbles, shear mixer, shade structure, support channel, and exterior concrete wall at the Flash Mix Basin shall be surface prepared and coated.
  - 2. The above grade piping, fittings, gate valves, check valves, pipe supports, vertical pumps, pump motors, all other ferrous metal above grade items, and exterior concrete wall at the Raw Water Pump Station shall be surface prepared and coated.
  - 3. The clarifier/filter units and above grade piping, fittings, butterfly valves, check valves, pipe supports, shade structure and all other ferrous metal above grade items at the Clarifier/Filter Package Unit shall be surface prepared and coated. The above grade PVC piping and fittings shall also be surface prepared and coated.
  - 4. The above grade piping, fittings, gate valves, check valves, pipe supports, vertical pumps, pump motors, all other ferrous metal above grade items and exterior concrete wall at the Finish Water Pump Station shall be surface prepared and coated. The above grade rubber expansion joint fittings shall also be surface prepared and coated.

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5. The above grade piping, fittings and pipe supports above grade at the Relocated Clarifier/Filter Units Backwash Pump Station shall be surface prepared and coated.
6. The above grade piping, fittings, gate valves, check valves, butterfly valves, pipe supports, centrifugal pumps, pump motors, pumps skid mount frame, shade structure and all other ferrous metal above grade items at the High Service Pump Station shall be surface prepared and coated. The above grade rubber expansion joint fittings shall also be surface prepared and coated.
7. The above grade piping, fittings, plug valves and all other ferrous metal above grade items at the Sludge Drying Beds shall be surface prepared and coated.
8. The piping, fittings, check valves, submersible pumps and other ferrous metal items within backwash basin and recycled backwash water pump station wet wells as well as electrical control panels at the Spent Filter Pump Station shall be surface prepared and coated.
9. The incline settling plate clarifier unit and above grade piping, fittings, butterfly valve, plug valve, check valve, electric motors and all other ferrous metal above grade items at the Incline Settling Plate Clarifier shall be surface prepared and coated. The above grade rubber expansion joint fittings shall also be surface prepared and coated.

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1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 09900 - Painting

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. References herein to "SSPC Specifications" or "SSPC" shall mean the published standards of the Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh, PA 15213.
- B. References herein to "NACE" shall mean the published standards of the National Association of Corrosion Engineers, P.O. Box 986, Katy, TX 77450.
- C. Comply with the reference specifications of the General Requirements - Division 1.
- D. Comply with the current provisions of the following Codes and Standards.

1. Commercial Standards:

ANSI A 13.1	Scheme for Identification of Piping Systems
ANSI/AWWA C 105	Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids
ANSI/AWWA C 203	Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape-Hot-Applied
ANSI/AWWA D 102	Painting Steel Water-Storage Tanks
NSF / ANSI 61:	Drinking Water System Components – Health Effects

2. Federal Specifications:

TT-P-28F	Paint, Aluminum, Heat Resisting (1200F)
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1.04 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with the General Requirements.
- B. Samples: The Contractor shall submit samples of all paint, finishes, and other coating materials specified herein, in accordance with the General Requirements. Paint or coating samples shall be submitted on 8-1/2 inch by 11 inch sheet metal. Each sample shall be completely coated over its entire surface with one protective coating material, type, and color.
- C. Coating Materials List: The Contractor shall provide 8 copies of a coating materials list which indicates the manufacturer and the coating number, keyed to the coating systems herein, prior to or at the time of submittal of samples.
- D. Paint Manufacturer's Information: For each paint system to be used the Contractor shall submit the following listed data at least 30 days prior to painting.
1. Paint manufacturer's data sheet for each product used, including statements on the suitability of the material for the intended use.

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2. Paint manufacturer's instructions and recommendations on surface preparation and application.
  3. Colors available for each product (where applicable).
  4. Compatibility of shop and field applied coatings (where applicable).
  5. Material safety data sheet for each product used.
  6. Two sets of color samples to match each color selected by the Engineer from the manufacturer's standard color sheets. If custom mixed colors are required by this Section, the color samples shall be made using color formulations prepared to match the color samples furnished by the Engineer. The color formula shall be shown on the back of each color sample.
- E. Manufacturer's Certification: For submerged and severe service coating systems, the Contractor shall require the paint manufacturer to certify to the following:
1. The manufacturer's representative has provided at least 6 hours of on-site instruction in the proper surface preparation, use, mixing, application, and curing of the coating systems.
  2. The manufacturer's representative has personally observed the start of surface preparation, mixing, and application of the coating materials.
- F. The Contractor shall submit all such certificates to the Engineer within 7 days of completion of each paint system.
- G. Applicator's Certificate and Report: For submerged and severe service coating systems, the Contractor shall require the applicator of the protective paint coatings to certify to the following:
1. Immediately before painting, surfaces conformed to the specified preparation; they were in the specified condition; and were clean, dry, and free of dust, rust, and mill scale.
  2. Surface preparation and coating use, mixing, application, and curing were accomplished in accordance with the current printed instructions and recommendations of the protective coating manufacturer, and these Specifications.
  3. The products specified were used and a listing of the names of the products and their manufacturer.
  4. The products were used within the shelf-life dates, stating the shelf-life dates of each container of each product used.
  5. The specified dry film thickness of coatings are on the items.
  6. The quantities of each product used with copies of paint manufacturer's invoice.
  7. Compatible paints were used where shop or field applied coatings are applied over previously-applied coatings.
  8. The applicator's certificate shall list the dates and locations that the coating work was completed for the various surfaces coated, and shall also list the dry film thickness obtained for each coat. The Contractor shall submit said paint

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applicator's certificates to the Engineer within 7 days after completion of each paint system.

1.05 QUALITY ASSURANCE

- A. General: The Contractor shall give the Engineer a minimum of three (3) days advance notice of the start of any field surface preparation work of coating application work, and a minimum of seven (7) days advance notice of the start of any shop surface preparation work.
- B. All such work shall be performed only in the presence of the Engineer, unless the Engineer has granted prior approval to perform such work in its absence.
- C. Inspection by the Engineer, or the waiver of inspection of any particular portion of the work, shall not relieve the Contractor of its responsibility to perform the work in accordance with these Specifications.
- D. Where protective coatings are to be performed by a subcontractor, said subcontractor must possess a valid state license as required for performance of the painting and coating work called for in this specification and must provide 5 references which show that the painting subcontractor has previous successful experience with the specified or comparable coating systems. Include the name, address, and the telephone number for the owner of each installation for which the painting subcontractor provided the protective coating.
- E. Scaffolding shall be erected and moved to locations where requested by the Engineer to facilitate inspection. Additional illumination shall be provided to cover all areas to be inspected.
- F. Inspection Devices: The Contractor shall furnish, until final acceptance of such coatings, inspection devices in good working condition for the detection of holidays and measurement of dry-film thicknesses of protective coatings. Dry-film thickness gauges shall be made available for the Engineer's use at all times while coating is being accomplished, until final acceptance of such coatings. The Contractor shall provide the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the Engineer.
- G. Holiday Testing: The Contractor shall holiday test all coated ferrous surfaces inside a steel reservoir, or other surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures and surfaces coated with any of the submerged and severe service coating systems. Areas which contain holidays shall be marked and repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.
  - 1. Coatings With Thickness Exceeding 20 Mils: For surfaces having a total dry film coating thickness exceeding 20 mils: pulse-type holiday detector such as Tinker & Razor Model AP-W, D.E. Stearns Co. Model 14/20, or equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.
  - 2. Coatings With Thickness of 20 Mils or Less: For surfaces having a total dry film coating thickness of 20 mils or less: Tinker & Razor Model M1 non-destructive type holiday detector, K-D Bird Dog, or equal shall be used. The unit shall operate at less than 75 volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flo, or equal, shall be added to the water prior to wetting the detector sponge.
- H. Film Thickness Testing: On ferrous metals, the dry film coating thickness shall be measured

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in accordance with the SSPC "Paint Application Specification No. 2" using a magnetic-type dry film thickness gauge such as Mikrotest model FM, Elcometer model 111/1EZ, or equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.

- I. Surface Preparation: Evaluation of blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the standard samples available from the NACE, using NACE standard TM-01-70.
- 1.06 MANUFACTURER REPRESENTATIVE
- A. The Contractor shall require the protective coating manufacturer to furnish a qualified technical representative to visit the Site for technical support as specified in the paragraph entitled "Manufacturer's Certification", herein, and as may be necessary to resolve field problems attributable or associated with the manufacturer's products furnished under this Contract or the application thereof.
- 1.07 MAINTENANCE
- A. Warranty Inspection: A warranty inspection shall be conducted during the eleventh month following completion of all coating and painting work. The Contractor and a representative of the coating material manufacturer shall attend this inspection. All defective work shall be repaired in accordance with these Specifications and to the satisfaction of the Owner. The Owner may, by written notice to the Contractor, reschedule the warranty inspection, or may cancel the warranty inspection altogether. If a warranty inspection is not held the Contractor is not relieved of its responsibilities under the Contract Documents.

## PART 2 - PRODUCTS

### 2.01. GENERAL

The Contractor shall furnish all labor, materials and equipment and perform all operations necessary for the cleaning, sandblasting and coating of all metallic surfaces, plastic surfaces and concrete surfaces as indicated on the drawings and specifications.

- A. Definitions: The term "paint", "coatings", or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat. The term "DFT" means minimum dry film thickness.
- B. General: Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use.
- C. The Contractor shall use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.
- D. Compatibility: In any coating system only compatible materials from a single manufacturer shall be used in the Work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the approval of the Engineer, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.
- E. Colors: All colors and shades of colors of all coats of paint shall be as selected or specified

by the Engineer. Each coat shall be of a slightly different shade, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples by the Owner. Finish colors shall be custom mixed to match color samples furnished by the Owner.

- F. Protective Coating Materials: Products shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions. Where requested, the Contractor shall provide the Engineer with the names of not less than 10 successful applications of the proposed manufacturer's products demonstrating compliance with this specification requirement.
- G. Substitute or "Or-Equal" Submittals: Unless otherwise specified, materials are from the catalogs of the companies listed herein. Materials by other manufacturers are acceptable provided that they are established as being compatible with and of equal quality to the coatings of the companies listed. The Contractor shall provide satisfactory documentation from the firm manufacturing the proposed substitute or "or-equal" material that said material meets the specified requirements and is equivalent or better than the listed materials in the following properties:
1. Quality
  2. Durability
  3. Resistance to abrasion and physical damage
  4. Life expectancy
  5. Ability to recoat in future
  6. Solids content by volume
  7. Dry film thickness per coat
  8. Compatibility with other coatings
  9. Suitability for the intended service
  10. Resistance to chemical attack
  11. Temperature limitations in service and during application
  12. Type and quality of recommended undercoats and topcoats
  13. Ease of application
  14. Ease of repairing damaged areas
  15. Stability of colors
- H. The cost of all testing and analyzing of the proposed substitute materials that may be required by the Engineer shall be paid by the Contractor. If the proposed substitution requires changes in the contract work, the Contractor shall bear all such costs involved and the costs of allied trades affected by the substitution.

2.02 INDUSTRIAL COATING SYSTEMS

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A. Material Sources: Each of the following manufacturers is capable of supplying many of the industrial coating materials specified herein. Where manufacturers and paint numbers are listed, it is to show the type and quality of coatings that are required. Proposed substitute materials must be shown to satisfy the material descriptions and to equal or exceed the properties of the listed materials as required in the paragraph entitled "Substitute or Or-Equal Submittals" herein.

1. Ameron
2. Carboline Coatings Company
3. Cook Paint and Varnish Company
4. Engard Coatings Corporation
5. Glidden Coatings and Resins
6. Koppers Company, Inc.
7. Pittsburgh Paints
8. Tnemec Company

B. System 1 - Alkyd Enamel: High quality, gloss or semi-gloss, medium long oil alkyd finish shall have a minimum solids content of 49 percent by volume. Primer shall be as recommended by manufacturer.

1. Prime coat (DFT = 3 mils) Engard 126 HS, Tnemec P4-55, or approved equal.
2. Finish coats (two or more, DFT = 3 mils), Engard 222 HS, Tnemec 2H, or an approved equal.
3. Total system DFT = 6 mils.

C. System 2: Not Used

D. System 3 - Aluminum Silicone Resin: Aluminum silicone resin material shall be suitable for a service temperature of up to 1,000 degrees F, and shall comply with Federal Specification TT-P-28.

1. Prime coat and finish coat (2 or more, DFT = 3 mils), Rust-Oleum 4315, Engard 240, Koppers B-969-E-66, Tnemec Series 39, or equal.
2. Total system DFT = 3 mils.

E. System 4 - Epoxy/Aliphatic Polyurethane: Two component aliphatic acrylic or polyester polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering and with a minimum solids content of 58 percent by volume. Primer shall be a rust inhibitive two component epoxy coating with a minimum solids content of 70 percent by volume.

1. Prime coat (DFT = 4 mils), Amercoat 400, Carboline D890, Engard 480, Tnemec 104, or equal.
2. Finish coat (one or more, DFT = 3 mils), Amersfield, Carboline 133 HB, Engard

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428 HS, Tnemec 73, or equal.

3. Total system DFT = 7 mils.
  4. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.
- F. System 5 - Inorganic Zinc/Epoxy/Polyurethane: The inorganic zinc primer shall be a water or solvent based, self-curing, zinc silicate 2-component inorganic coating which contains at least 85 percent of metallic zinc by weight in the dried film, and is recommended by the coating manufacturer as a primer for this system. The intermediate coat shall be a high-build two component epoxy with a solids content of at least 70 percent by volume. Finish coats shall be a 2-component aliphatic acrylic or polyester polyurethane coating material that provides superior color and gloss retention, resistance to chemical fumes and severe weathering, and a minimum solids content of 58 percent by volume.
1. Prime coat (DFT = 2 mil), Dimetcote 12, Carbo Zinc 11, Engard 511, Tnemec 90-92, or equal.
  2. Intermediate coat (DFT = 4 mils), Ameron 400, Carboline D890, Engard 480, Tnemec 104, or equal.
  3. Finish coats (one or more, DFT = 3 mils), Amershield, Carboline 133HB, Engard 428 HS, Tnemec 73, or equal.
  4. Total system DFT = 9 mils.
  5. Intermediate coat shall be applied in excess of 4 mils DFT or in more than one coat as necessary to completely cover the inorganic zinc primer and prevent application bubbling of the polyurethane finish coat.
  6. More than one finish coat shall be applied as necessary to produce a finish with uniform color and texture.
- G. System 6 - Inorganic Zinc, Water Based: Water based, self curing, ethyl silicate shall be a two component inorganic coating material that contains at least 85 percent of metallic zinc by weight in the dried film.
1. Prime coat and finish coat (one, DFT = 3 mils), Dimetcote 12, Engard 511, Koppers P-1500, Tnemec 90-92, or equal.
  2. Total system DFT = 3 mils.
- H. System 7 - Acrylic Latex: Single component, water based acrylic latex with a fungicide additive shall have a minimum solids content of 35 percent by volume. Prime coat shall be as recommended by manufacturer. The coating material shall be available in the ANSI safety colors.
1. Prime coat (DFT = 2 mils), as recommended by manufacturer.
  2. Finish coats (2 or more, DFT = 6 mils), Amercoat 2104, Carboline 3300, Engard 230, or equal.
  3. Total system DFT = 8 mils.
- I. System 8 - Not Used

- J. System 9 - Not Used
- K. System 10 - Acrylic, Concrete: High molecular weight acrylic coating material shall have a minimum solids content of 35 percent by volume. Prime coat shall be an acrylic filler and sealer for concrete surfaces.
1. Prime coat (Filler/sealer), Engard 132, Koppers Block Sealer, Tnemec 54-560, or equal.
  2. Finish coats (2 or more, DFT = 3 mils), Engard 230, Koppers 600, Tnemec 6, or equal.
- L. System 11 - Aliphatic Polyurethane, Concrete: Two component aliphatic polyester polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, and resistance to chemical fumes and severe weathering, and with a minimum solids content of 58 percent by volume. Filler-sealer compound shall be a two-component epoxy material used to provide a smooth surface for the epoxy intermediate coat. The filler-surfacer is applied to the entire concrete surface and worked into the concrete surface with a wide blade putty knife or squeegee. The intermediate coat shall be a high-build polyamide epoxy coating with a minimum solids content of 70 percent by volume.
1. Prime coat (Filler-sealer), NU-Klad 114, Engard 481, Tnemec 63-1500, or equal.
  2. Intermediate coat (DFT = 4 mils), Amercoat 400, Engard 480, Tnemec 104, or equal.
  3. Finish coats (2 or more, DFT = 3 mils), Amershield, Engard 428 HS, Tnemec P71, or equal.
- M. System 12 - Aliphatic Polyurethane, Fiberglass: Two-component aliphatic polyurethane coating material shall provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, and resistance to chemical fumes and severe weathering. A primer, tie coat, or mist coat shall be used as recommended by the manufacturer.
1. Prime coat (Tie coat), Amercoat 185, Engard 420, Tnemec P66, or equal.
  2. Finish coats (2 or more, DFT = 3 mils), Amershield, Engard 428 HS, Tnemec 73, or equal.

2.03 SUBMERGED AND SEVERE SERVICE COATING SYSTEMS

- A. Materials Sources: The manufacturers' products listed in this paragraph are materials which satisfy the material descriptions of this paragraph and have a documented successful record for long term submerged or severe service conditions. If proposed materials are not listed below, the requirements of the paragraph entitled "Substitute or Or-Equal Submittals" apply. In addition, the Contractor shall submit for consideration a list of at least 10 installations with similar service conditions for which the proposed substitute or "or-equal" products have shown satisfactory performance for at least several years including the name, address, and phone number of the owner of each installation.
- B. System 100 - Amine Cured Epoxy: High build, amine cured, straight epoxy resin shall have a solids content of at least 80 percent by volume, and shall be suitable for long-term immersion service in potable water. The material shall conform to Food and Drug Administration regulations for food additives.

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1. Prime coat and finish coats (3 or more, DFT = 16 mils), Amercoat 395, Engard 480, Tnemec 104, or equal.
- C. System 101 - Not Used
- D. System 102 - Not Used
- E. System 103 - Coal Tar Epoxy: High build, 2-component amine cured coal tar epoxy shall have a solids content of at least 68 percent by volume, suitable for long term immersion in wastewater and for coating of buried surfaces, and conforming to DOD-P-23236, Class 2, or to SSPC Paint 16. Prime coats are for use as a shop primer only. Prime coat shall be omitted when both surface preparation and coating are to be performed in the field.
1. Prime coat (DFT = 1.5 mils), Amercoat 71, Engard 422, Koppers 654, Tnemec P66, or equal.
  2. Finish coats (2 or more, DFT = 16 mils), Amercoat 78 HB, Engard 464, Koppers 300-M, Tnemec 46 H-413, or equal.
  3. Total system DFT = 17.5 mils.
- F. System 104 - Coal Tar Epoxy, Concrete: High build, 2-component amine cured coal tar epoxy, shall have a solids content of at least 74 percent by volume, suitable for long term immersion in wastewater and for coating of buried surfaces and conforming to DOD-P-23236, Class 2, or to SSPC Paint 16. Filler-surfacer compound shall be a 2 component epoxy material used to fill voids and rough areas. The seal coat provides a smooth surface for the application of the coal tar epoxy. The seal coat is a two-component epoxy material with 100 percent solids and is applied to the entire concrete surface and worked into the concrete surface with a wide blade putty knife or a squeegee.
1. Seal coat, Nu-Klad 114, Engard 491, or equal.
  2. Intermediate coat (DFT = 4 mils), Amercoat 78 HB, Engard 464, or equal.
  3. Finish coats (2 or more, DFT = 16 mils), Amercoat 78 HB, Engard 464, or equal.
- G. System 105 - Inorganic Zinc/Epoxy:
1. Inorganic Zinc Primer: Water or solvent based, self-curing 2 component inorganic coating shall contain a minimum of 85 percent metallic zinc by weight in the dried film and is recommended by the coating manufacturer as a primer for the epoxy material.
  2. Polyamide Cured Epoxy: High build polyamide cured epoxy coating shall have a solids content of at least 70 percent by volume and a finish coat color of white. The material shall be capable of achieving at least 4 mils dry film thickness per coat.
  3. Amine Cured Epoxy: High build amine cured epoxy coating shall have a solids content of at least 80 percent by volume and with a finish coat color of white or ivory. The material shall be capable of achieving at least 5 mils dry film thickness per coat.
  4. The epoxy coating material shall be a straight epoxy resin and shall be either a polyamide-cured epoxy or an amine-cured epoxy suitable for long-term immersion service in potable water. The material shall conform to Food and Drug

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Administration regulations for food additives and state and local health regulations and policies for service in potable water reservoirs. The Contractor shall submit a written certification that the proposed materials meet the above regulatory agency standards and policies. The material shall be applied with a primer if recommended by the coating manufacturer.

5. Part A: Products shall be as listed, or equal:
- a. Pre-coating, prior to erection. (DFT = 3 mils) Dimetecote 12, Carbo Zinc D11-HS, Engard 511, Tnemec 90-92. See Note (1) under Paragraph f.
  - b. Touch up, following erection. (DFT = 3 mils)  
See Note (2) under Paragraph f.
  - c. Difficult-to-coat areas, following erection.  
Amercoat 395, Carbo-line 191, Engard 480, Tnemec 139. See Note (3) under Paragraph f.
  - d. Finish Coats (2 or more) (DFT = 8 mils)  
Amercoat 395, Carbo-line 191, Engard 480, Tnemec 139.
  - e. Total system DFT = 11 mils
  - f. Notes:
    - (1) All lap roof plate edges are to be pre-coated. If necessary, zinc primer exposed on exterior of roof may be removed prior to welding.
    - (2) Touch-up coating shall be accomplished for areas damaged during erection, or areas not pre-coated. The Contractor shall spot sandblast to SSPC-SP-5 before application of coating. Material used for touch-up shall be a compatible solvent based inorganic or organic zinc primer recommended by the manufacturer.
    - (3) All edges, nuts, bolts, lap joints, weld seams and the roof rim angle shall receive one brush-applied coat prior to the application of the complete spray coat.
6. Part B: Products shall be as listed, or equal:
- a. Difficult-to-coat areas. Amercoat 395, Carbo-line 191, Engard 480, Tnemec 139. See Note (1) under Paragraph d.
  - b. Finish coats (2 or more). (DFT = 12 mils) Amercoat 395, Carbo-line 191, Engard 480; Tnemec 139. See Note (1) under Paragraph d.
  - c. Total system DFT = 12 mils.
  - d. Notes:
    - 1) All edges, nuts, bolts, lap joints, and weld seams shall receive one brush-applied coat prior to the application of the first complete spray coat.

7. Curing Period: Prior to immersion, the completed system shall be subjected to at least 240 hours of curing time with the metal temperature at a minimum of 70 degrees F, or 480 hours at a minimum of 60 degrees F, both conditions at a maximum relative humidity of 50 percent and under the forced ventilation conditions required by the paragraph entitled "Curing of Coatings, herein. More curing time or a higher temperature shall be provided if recommended by the epoxy coating manufacturer. If the environmental conditions do not provide the necessary minimum temperature, use heated air to provide the necessary heat for curing. Other combinations of curing time and temperature may be used if the coating manufacturer presents satisfactory documentation and test results to substantiate that the degree of curing is equal or greater than curing for 240 hours at 70 degrees F.
  8. Volatile Organic Compound Testing: *The completed interior reservoir coating system shall be tested for volatile organic compounds as specified herein.*
- H. System 106 - Fusion Bonded Epoxy: The coating material shall be a 100 percent powder epoxy applied in accordance with the ANSI/AWWA C 213 "AWWA Standard for Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines", except that the surface preparation shall be as specified in the coating system schedule of this Section. The coating shall be applied using the fluidized bed process.
1. Liquid Epoxy: For field repairs or where, as confirmed by the Engineer, it would be impossible to use the powder epoxy method without causing damage to the item, the use of a liquid epoxy will be permitted, applied in not less than 3 coats to provide a DFT of 15 mils. The liquid epoxy shall be a 100 percent solids epoxy recommended by the powder epoxy manufacturer.
  2. Coating (DFT = 16 mils), Scotchkote 206N, Miccron 650, Miccron 651, or equal.
  3. Total system DFT = 16 mils.
- I. System 107 - Chemical Resistant Sheet Lining:
1. Materials: The Contractor shall use natural rubber, chlorobutyl, or neoprene sheet lining materials as specified herein. The shop drawing submittal shall contain technical information that confirms the suitability of the lining material system for long-term immersion in each chemical to be stored. The service temperatures are expected to be up to 150 degrees F.
  2. Neoprene sheet lining material shall be synthetic rubber formulated for steam curing at atmospheric pressure. The minimum lining thickness shall be 3/16 inch. The lining material shall be B.F. Goodrich compound 59688, or equal.
  3. Chlorobutyl sheet lining material shall be synthetic rubber formulated for steam curing at atmospheric pressure. The minimum lining thickness shall be 3/16 inch. The lining material shall be B.F. Goodrich compound 60924, or equal.
  4. Natural rubber (soft) sheet lining material shall be soft natural rubber formulated for steam curing at atmospheric pressure. The minimum lining thickness shall be 3/16 inch. The lining material shall be B.F. Goodrich compound 83160, or equal.
  5. Natural rubber (hard) sheet lining material shall be a hard, natural rubber resistant to oxidizing agents and formulated for autoclave curing. The minimum lining thickness shall be 3/16 inch. The lining material shall be, or equal, B.F. Goodrich compound 8631, or equal.

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6. Primers, adhesives, activators, accelerators and other necessary materials shall be as specified by the sheet material manufacturer.
  7. Metal Surface Preparation: Prior to abrasive blast cleaning the base metal shall be prepared as specified by the sheet lining material manufacturer's installation instructions. If the instructions differ from these specifications the highest degree of cleaning and surface preparation shall be provided. Abrasive blast cleaning shall be done in accordance with this Section.
  8. Installation of lining materials shall be in accordance with the material manufacturer's written installation instructions. All interior surfaces shall be lined, including all piping, vents, fittings, flange faces, maintenance hole covers and blind flanges.
  9. The lining system shall be holiday tested in accordance with this Section before and after curing.
  10. The lining system shall be cured by steam using the time and temperature as specified by the material manufacturer.
  11. Extended Maintenance: The Contractor shall promptly repair any defects in the lining system for a period of two years after the lining has been placed into service. Such maintenance shall include repair of the chemical tank and any equipment or facilities damaged by the corrosive action of the chemicals.
- J. System 108 - Not Used
- K. System 109 - Epoxy - Phenolic: Epoxy-phenolic amine cured resin with a solids content of at least 55 percent by volume, and suitable for long-term immersion in wastewater and exposure to the effects of hydrogen sulfide gas where there is the probability of sulfuric acid formation on the surfaces.
1. Prime coat and finish coats (3 or more, DFT = 12 mils), Plasite 7122, Amercoat 346, or equal.
- L. System 110 - Epoxy - Phenolic, Concrete: Epoxy-phenolic amine cured resin with a solids content of at least 55 percent by volume, and suitable for long-term immersion in wastewater and exposure to the effects of hydrogen sulfide gas where there is the probability of sulfuric acid formation on the surfaces. The filler-sealer shall be a 100 percent solids amine cured epoxy material with silica and inert fillers. A 100 percent solids epoxy surfacer shall be used to fill holes and patch the concrete surfaces after abrasive blasting.
1. Prime coat (filler-sealer), applied in two coats to the entire surface using a squeegee to achieve a smooth, void-free surface, Plasite 9028M1, Nu-Klad 105 followed by Nu-Klad 114, or equal.
  2. Finish coats (2 or more, DFT = 12 mils), Plasite 7122, Amercoat 346, or equal. On stairways and in walking and working areas use Plasite 7122 HAR, or use Amercoat 346 with Amercoat 886 non-skid additive in the final coat.
- M. System 111 - Vinyl Ester: Vinyl ester resin coating material with an inert flake pigment suitable for immersion service in 30 percent hydrochloric acid and 30 percent sulfuric acid solutions.
1. Two or more coats (DFT = 40 mils), Plasite 4100, Engard 436, or equal. Use a

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prime coat as recommended by the material manufacturer.

- N. System 112 - Vinyl Ester-Concrete: Vinyl ester resin coating material with an inert flake pigment suitable for immersion service in hydrochloric acid and sulfuric acid solutions. The filler-sealer shall be a 100 percent solids amine-cured epoxy or vinyl ester material with silica and inert fillers. The filler-sealer is applied to the entire concrete surface. A 100 percent solids epoxy or vinyl ester surfacer shall be used to fill holes and patch the concrete surface after abrasive blasting.
1. Prime coat (filler-sealer), applied in two coats using a squeegee to achieve a smooth void-free surface, Plasite 9028 MI, Engard 490, or equal.
  2. Finish coats (two or more, DFT = 40 mils), Plasite 4100, Engard 436, or equal.

#### 2.04 SPECIAL COATING SYSTEMS

- A. System 200 - PVC Tape: Prior to wrapping the pipe with PVC tape, the pipe and fittings first shall be primed using a primer recommended by the PVC tape manufacturer. After being primed, the pipe shall be wrapped with a 20 mil adhesive PVC tape, half-lapped, to a total thickness of 40 mils.
- B. System 201 - Rich Portland Cement Mortar: Rich Portland Cement mortar coating shall have a minimum thickness of 1/8 inch, followed by enclosure in an 8 mil thick polyethylene sheet with all joints and edges lapped and sealed with tape.
- C. System 203 - Epoxy Surfacing: Two-component epoxy floor surfacing shall be formulated to resist many acids, alkalies, and solvents. Material shall be resistant to liquid alum, sodium hydroxide, and 50 percent sulfuric acid. Products shall be as follows, or equal:
1. Ameron Alternative: Prime coat Nu-Klad 105; finish coat Nu-Klad 110 (1/4-inch thick).
  2. Engard Alternative: Prime coat Engard 491; finish coat Engard 481 (1/4-inch thick).
- D. System 204 - Waterproofing: Two coats of a clear, non-staining, silane-modified-siloxane masonry waterproofing material. The Waterproofing System 204 after application shall be provided with not less than a five-year warranty on the performance of the product.
1. Where EPA Allows Solvents: Chemstop, "Heavy Duty Masonry Waterproofing"; Rainguard, "XS"; or equal.
  2. Where EPA Prohibits Solvents: Chemstop, "Barricade"; Rainguard's "Blok-Lok"; Rainproof's "Chem-Trete #45"; or equal.

Surfaces shall be cleaned with a chemical (approved by waterproofing manufacturer) cleaner and power wash. Surfaces shall be clean and dry before application of waterproofing. Method and rate of application shall be in accordance with manufacturer's published instructions. A manufacturer's representative shall be present during applications if necessary for warranty.

- E. System 205 - Polyethylene Encasement: Application of polyethylene encasement shall be in accordance with ANSI/AWWA C 105 using Method C.
- F. System 206 - Cement Mortar Coating: A 1-1/2 inch minimum thickness mortar coating reinforced with 3/4 inch galvanized welded wire fabric shall be provided. The cement mortar

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shall contain no less than one part Type V cement to 3 parts sand. The cement mortar shall be cured by a curing compound meeting the requirements of "Liquid Membrane-Forming Compounds for Curing Concrete" ASTM C 309-81, Type II, white pigmented, or by enclosure in an 8 mil thick polyethylene sheet with all joints and edges lapped by at least 6-inches.

- G. System 207 - Non-Slip Surfacing: Coating shall have one coat of Epoxo as manufactured by American Abrasive Metals Co., Inc., or one coat of Ameron Nu-Klad 100 with Amercoat 886 additive, or equal. The coating shall be gray in color. Application shall be by means of a roller and not more than 60 sq ft per gallon of non-slip coating shall be applied. Primer shall be as recommended by the coating manufacturer.
- H. System 208 - Aluminum Metal Isolation: A wash primer (0.5 mils) shall be applied, followed by one coat of heavy bodied bituminous paint, such as Koppers Super Service Black, Tnemec 46-465, or equal (8 mils). Total thickness of system (8.5 mils).

### 2.05 NSF / ANSI STANDARD 61

- A. All coating materials and coating systems that can contact potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61.

## PART 3 - EXECUTION

### 3.01 STORAGE, MIXING, AND THINNING OF MATERIALS

- A. Manufacturer's Recommendations: Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed. The Contractor shall supply the Engineer with copies of each manufacturer's instructions in accordance with the General Requirements.
- B. All protective coating materials shall be used within the manufacturer's recommended shelf life.
- C. Storage and Mixing: Coating materials shall be protected from exposure to cold weather, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together.

### 3.02 PREPARATION FOR COATING

- A. General: All surfaces to receive protective coatings shall be cleaned as specified herein prior to application of said coatings. The Contractor shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application.
- B. Protection of Surfaces Not to be Coated: Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations.
- C. All hardware, lighting fixtures, switch plates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating

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operations. Openings in motors shall be masked to prevent entry of coating or other materials.

- D. Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The Contractor shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.
- E. Protection of Painted Surfaces: Cleaning and coating shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly-coated surfaces.

### 3.03 SURFACE PREPARATION STANDARDS

- A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification:
  - 1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.
  - 2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mill scale, and loose paint to degree specified, by hand chipping, scraping, sanding, and wire brushing.
  - 3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mill scale, and loose paint to degree specified by power tool chipping, descaling, sanding, wire brushing, and grinding.
  - 4. White Metal Blast Cleaning (SSPC-SP5/NACE1): Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning by wheel or nozzle (dry or wet) using sand, grit, or shot.
  - 5. Commercial Blast Cleaning (SSPC-SP6/NACE3): Blast cleaning until at least two-thirds of each element of surface area is free of all visible residues.
  - 6. Brush-Off Blast Cleaning (SSPC-SP7/NACE4): Blast cleaning of all except tightly adhering residues of mill scale, rust, and coatings, exposing numerous evenly distributed flecks of underlying metal.
  - 7. Near-White Blast Cleaning (SSPC-SP10/NACE2): Blast cleaning nearly to White Metal Cleanliness, until at least 95 percent of each element of surface area is free of all visible residues.
- B. The Contractor shall note that the definition of Near White Metal Blast Cleaning, SSPC-SP10, is from the 1995 version of the SSPC standard, and requires that 95 percent of "each element" of surface area be free of all visible residues. The other surface preparation standards shall be the most recent versions published by the SSPC.

### 3.04 METAL SURFACE PREPARATION (UNGALVANIZED)

- A. The minimum abrasive blasting surface preparation shall be as specified in the coating system schedules included at the end of this Section. Where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.
- B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this Section. Blast cleaned surfaces shall match the standard samples

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available from the National Association of Corrosion Engineers, NACE Standard TM-01-70.

- C. All oil, grease, welding fluxes and other surface contaminants shall be removed by solvent cleaning per SSPC-SP1 prior to blast cleaning.
- D. All sharp edges shall be rounded or chamfered and all burrs, and surface defects and weld splatter shall be ground smooth prior to blast cleaning.
- E. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions.
- F. The abrasive shall not be reused unless otherwise approved by the Engineer. For automated shop blasting systems, clean oil-free abrasives shall be maintained.
- G. The Contractor shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.
- H. Compressed air for air blast cleaning shall be supplied at adequate pressure from well maintained compressors equipped with oil/moisture separators which remove at least 95 percent of the contaminants.
- I. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming or another approved method prior to painting.
- J. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.
- K. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.
- L. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, then SSPC-SP2, hand tool cleaning or SSPC-SP3, power tool cleaning, may be used.
- M. Shop applied coatings of unknown composition shall be completely removed before the specified coatings are applied. Valves, castings, ductile or cast iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by solvent cleaning per SSPC-SP1 before the abrasive blast cleaning work has been started.
- N. Shop primed equipment shall be solvent cleaned in the field before finish coats are applied.

### 3.05 SURFACE PREPARATION FOR GALVANIZED FERROUS METAL

- A. Galvanized ferrous metal shall be alkaline cleaned per SSPC-SP1 to remove oil, grease, and other contaminants detrimental to adhesion of the protective coating system to be used.
- B. Pretreatment coatings of surfaces shall be in accordance with the printed recommendations of the coating manufacturer.

### 3.06 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS

- A. General: All grease, oil, heavy chalk, dirt, or other contaminants shall be removed by solvent or detergent cleaning prior to abrasive blast cleaning. The generic type of the existing coatings shall be determined by laboratory testing.

- B. Abrasive Blast Cleaning: The Contractor shall provide the degree of cleaning specified in the coating system schedule for the entire surface to be coated. If the degree of cleaning is not specified in the schedule, deteriorated coatings shall be removed by abrasive blast cleaning to SSPC-SP10 - Near-White Blast Cleaning. Areas of tightly adhering coatings shall be cleaned to SSPC-SP7, Brush-off Blast Cleaning, as approved by the Engineer, with the remaining thickness of existing coating not to exceed 3 mils. The resultant sand from the sandblasting operations shall be removed and disposed of by the Contractor. The Contractor shall pay for all cost associated with the disposal of the residue.
- C. Incompatible Coatings: If coatings to be applied are not compatible with existing coatings the Contractor shall apply intermediate coatings per the paint manufacturer's recommendation for the specified coating system or shall completely remove the existing coating prior to abrasive blast cleaning. A small trial application shall be conducted for compatibility prior to painting large areas.
- D. Unknown Coatings: Coatings of unknown composition shall be completely removed prior to application of new coatings.
- E. Water Abrasive or Wet Abrasive Blast Cleaning: Where specified or where job site conditions do not permit dry abrasive blasting for industrial coating systems due to dust or air pollution considerations, water abrasive blasting or wet abrasive blasting may be used. In both methods, paint-compatible corrosion inhibitors shall be used, and coating application shall begin as soon as the surfaces are dry. Water abrasive blasting shall be accomplished using high-pressure water with sand injection. In both methods, the equipment used shall be commercially produced equipment with a successful service record. Wet blasting methods shall not be used for submerged and severe service coating systems unless specified.

3.07 CONCRETE AND CONCRETE BLOCK MASONRY SURFACE PREPARATION

- A. Surface preparation shall not begin until at least 30 days after the concrete or masonry has been placed.
- B. All oil, grease, and form release and curing compounds shall be removed by detergent cleaning per SSPC-SP1 before abrasive blast cleaning.
- C. Concrete, concrete block masonry surfaces and deteriorated concrete surfaces to be coated shall be abrasive blast cleaned to remove existing coatings, laitance, deteriorated concrete, and to roughen the surface equivalent to the surface of the No. 80 grit flint sandpaper.
- D. If acid etching is required by the coating application instructions the treatment shall be made after abrasive blasting. After etching, rinse surfaces with water and test the pH. The pH shall be between neutral and 8.
- E. Surfaces shall be clean and as recommended by the coating manufacturer before coating is started.
- F. Unless required for proper adhesion, surfaces shall be dry prior to coating. The presence of moisture shall be determined with a moisture detection device such as Delmhorst Model DB, or equal.

3.08 PLASTIC, FIBERGLASS AND NON-FERROUS METALS SURFACE PREPARATION

- A. Plastic and fiberglass surfaces shall be sanded or brush off blast cleaned prior to solvent cleaning with a chemical compatible with the coating system primer.
- B. Non-ferrous metal surfaces shall be solvent-cleaned SSPC-SP1 followed by sanding or

brush-off blast cleaning SSPC-SP7/NACE4.

- C. All surfaces shall be clean and dry prior to coating application.

3.09 ARCHITECTURAL CONCRETE BLOCK MASONRY SURFACE PREPARATION

- A. The mortar surfaces shall be cured at least 14 days before surface preparation work is started.
- B. Dust, dirt, grease, and other foreign matter shall be removed prior to abrasive blasting.
- C. The masonry surfaces shall be prepared in accordance with the material manufacturer's printed instructions.

3.10 WORKMANSHIP

- A. Skilled craftsmen and experienced supervision shall be used on all work.
- B. Clean drop cloths shall be used. All damage to surfaces resulting from the work hereunder shall be cleaned, repaired, and refinished to their original condition.
- C. All coatings shall be applied under dry and dust-free conditions. Coating shall be accomplished in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure that they have been thoroughly cleaned and that they receive an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to insure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other approved precautionary measures.

3.11 SHOP COATING REQUIREMENTS

- A. All items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the specified or approved color. The methods, materials, application equipment and all other details of shop painting shall comply with this section. If the shop primer requires topcoating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.
- B. All items of equipment, or parts and surfaces of equipment which are submerged or inside an enclosed hydraulic structure when in service, with the exception of pumps and valves, shall have all surface preparation and coating work performed in the field.
- C. The interior surfaces of steel reservoirs shall have all surface preparation and coating work performed in the field.
- D. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switchgear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the specified quality in the field. Such equipment shall be shop primed and finish coated and touched up in the field with the identical material after installation. The Contractor shall require the manufacturer of each such piece of equipment to certify as part of its shop drawings that the surface preparation is in accordance with these specifications. The coating material data sheet shall be submitted with the shop drawings for the equipment.

- E. For certain small pieces of equipment the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.
- F. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 6 months before topcoated, or less time if recommended by the coating manufacturer.
- G. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturers printed instructions.
- H. The Contractor shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment shop drawings.

3.12 APPLICATION OF COATINGS

- A. The application of protective coatings to steel substrates shall be in accordance with "Paint Specification No. 1, (SSPC-A-1)", Steel Structures Painting Council.
- B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The Contractor shall schedule such inspection with the Engineer in advance.
- C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.
- D. Coatings shall be applied in accordance with the manufacturer's instructions and recommendations, and this Section, whichever has the most stringent requirements.
- E. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe painting for these areas.
- F. Special attention shall be given to materials which will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.
- G. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.
- H. Coatings shall not be applied under the following conditions:
  - 1. Temperature exceeding the manufacturer's recommended maximum and minimum allowable.
  - 2. Dust or smoke laden atmosphere.
  - 3. Damp or humid weather.
  - 4. When the substrate or air temperature is less than 5 degrees F above dewpoint.

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5. When air temperature is expected to drop below 40 degrees F or less than 5 degrees F above the dewpoint within 8 hours after application of coating.
- I. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Dept. of Commerce, Weather Bureau psychrometric tables.
- J. Steel piping shall be abrasive blast cleaned and primed before installation.
- K. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust free.

3.13 CURING OF COATINGS

- A. The Contractor shall provide curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the highest requirement, prior to placing the completed coating system into service.
- B. In the case of enclosed areas, forced air ventilation, using heated air if necessary, may be required until the coatings have fully cured.
- C. Forced Air Ventilation of Steel Reservoirs and Enclosed Hydraulic Structures: Forced air ventilation is required for the application and curing of coatings on the interior surfaces of steel reservoirs and enclosed hydraulic structures. During curing periods continuously exhaust air from a maintenance hole in the lowest shell ring, or in the case of an enclosed hydraulic structure, from the lowest level of the structure using portable ducting. After all interior coating operations have been completed provide a final curing period for a minimum of 10 days, during which the forced ventilation system shall operate continuously. For additional requirements, refer to the specific coating system being used in the paragraph entitled "Submerged and Severe Service Coating Systems" herein.

3.14 TESTING FOR VOLATILE ORGANIC COMPOUNDS IN POTABLE WATER RESERVOIRS

- A. General: The Contractor shall provide the following services to ensure that the interior reservoir coatings or linings do not convey volatile organic compounds to the potable water.
- B. Selection of Coating or Lining Material: The Contractor shall provide a coating or lining system that has a successful record in meeting the national, regional, and local regulations and policies pertaining to leaching of volatile organic compounds into potable water.
- C. Before the coating or lining materials are used, the Contractor shall by letter notify the regulatory agency having jurisdiction. The letter shall describe the proposed materials, including brand names, catalog numbers, catalog technical data, application and curing instructions, and material safety data sheets.
- D. The Contractor shall provide curing time, temperature and ventilations as specified by the manufacturer or this Section, whichever is the highest requirement. In some cases, the Contractor may find it necessary to extend the curing time or ventilation time beyond the requirements in order to comply with the regulatory agency requirements or to reduce the leached organic compounds to the required levels. All costs in connection with any extended curing times shall be borne by the Contractor.
- E. Following the curing or ventilation period, the Contractor shall clean, disinfect and fill the reservoir as specified.
- F. *A 7 day soaking period shall follow initial filling to determine the presence of any leached organics.* Before the tank is placed into service, samples of the water in the tank will be

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taken by the Engineer and analyzed by a laboratory approved by the State or the EPA. Analyses will be for volatile organic compounds by EPA Method 624 or equivalent (this test includes TCE, PCE, xylenes, toluene, ketones, carbon tetrachloride, and similar compounds). The costs of testing shall be borne by the Contractor.

- G. If the tests results are above either (1) 0.005 mg/l for TCE, 0.004 mg/l for PCE, 0.62 mg/l for xylenes, 0.10 mg/l for toluene, 0.75 mg/l for methyl-ethyl ketone (to be used as representative for all ketone compounds), 0.005 mg/l for carbon tetrachloride, or (2) the regulatory agency's recommended Action Level Limits, whichever is less, the Contractor shall drain the water from the tank and flush, refill, and retest at no additional cost to the Owner. The Contractor shall provide as many curing, soaking, and flushing cycles as necessary to reduce the leached volatile organic compounds to levels below the requirements.

3.15 IDENTIFICATION OF PIPING

- A. Identification of piping shall be in accordance with Section 15780 – Treatment Plant Piping Identification Systems.
- B. Every valve or connection, where it may be possible for a worker to be exposed to a hazardous substance, shall be labeled per General Industry Safety Orders, Article 112 OSHA Occupational Safety and Health Standards 29 CFR 1910.
- C. All unburied pipe in structures and in chemical pipe trenches shall be color-code painted. Colors shall be as specified in Section 15780 – Treatment Plant Piping Identification Systems, as selected by the Engineer, or as shown.
- D. All unburied chemical pipes, including chemical pipes in structures and chemical pipe trenches shall be color-code painted. Colors shall be as specified in Section 15780 – Treatment Plant Piping Identification Systems, as selected by the Engineer, or as shown.

3.16 PROJECT SPECIFIC COATING SYSTEM SCHEDULES

The following items shall be coated as specified. Any item not specified shall be coated in accordance with applicable Coating System Schedule as follows:

Item Designation	System No.	Surface
FM-1	5.	Steel, Cast Iron and Ductile Iron. This includes the Flash Mix Basin including the Shade Structure, Raw Water Pump Station, Clarifier/Filter Package Unit, Finish Water Pump Station, Clarifier/Filter Units Backwash Pump Station, High Service Pump Station including the Shade Structure, Sludge Drying Beds, Spent Filter Pump Station and Incline Settling Plate Clarifier as previously described in this section.
NFM-4	7.	Above grade PVC piping and fittings, and rubber expansion joint fittings. This includes the Clarifier/Filter Package Unit, Finish Water Pump Station, High Service Pump Station and Incline Settling Plate Clarifier, Sodium Hypochlorite System, Polyferric Sulfate Chemical System, and Polymer Chemical System.

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FM-14	106.	All ferrous surfaces of sluice gates, flap gates, and shear gates including wall thimbles. This includes the Flash Mix Basin.
FM-3	100.	Surfaces of equipment and ferrous surfaces submerged or intermittently submerged in potable water or utility water, including all surfaces lower than 2 feet above high water level and all surfaces inside enclosed hydraulic structures and vents (excluding shop-coated valves, couplings, pumps). This includes the Clarifier/Filter Package Unit.
NFM-5	12.	Fiberglass surfaces. This included the Clarifier/Filter Units and Incline Settling Plate Clarifier.
C-2	110.	Exterior concrete surfaces, with exception of above grade surface, of the Flash Mix Basin Wet well, Raw Water Intake Pump Wet well, and Finish Water Transfer Pump Station Wet well.

A. Coating System Schedule, Ferrous Metal - Not Galvanized:

<b>ITEM DESIGNATION</b>	<b>ITEM</b>	<b>SURFACE PREPARATION</b>	<b>SYSTEM NO.</b>
FM-1	All exposed surfaces indoors and outdoors.	Commercial Blast Cleaning SSPC-SP6/NACE3	(1) alkyd enamel
FM-1	All exposed surfaces indoors and outdoors.	Commercial Blast Cleaning SSPC-SP6/NACE3	(4) aliphatic polyurethane
FM-1	All exposed surfaces indoors and outdoors, and exterior surfaces of Steel Reservoirs.	Near-White Metal Blast cleaning SSPC-SP10/NACE2	(5) inorganic zinc/epoxy/ polyurethane
FM-2	Surfaces in chlorination room, chlorine storage room.	Commercial Blast Cleaning SSPC-SP6/NACE3	(100) amine-cured epoxy
FM-3	Surfaces of equipment and ferrous surfaces submerged or intermittently submerged in potable water or utility water, including all surfaces lower than 2-feet above high water level and all surfaces inside enclosed hydraulic structures and vents (excluding shop-coated valves, couplings, pumps).	White Metal Blast Cleaning SSPC-SP5/NACE1	(100) amine-cured epoxy

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FM-4	Surfaces of equipment and ferrous surfaces submerged or intermittently submerged in wastewater, including all surfaces lower than 2-feet above high water level and all surfaces inside enclosed hydraulic structures (excluding shop-coated valves, couplings, pumps).	White Metal Blast Cleaning SSPC-SP5/NACE1	(103) coal tar epoxy
FM-5	Surfaces exposed to high temperature (between 150 and 600 degrees F).	Near-White Metal Blast Cleaning SSPC-SP10/NACE2	(6) inorganic zinc,water- based
FM-6	Surfaces exposed to high temperature (between 600 and 1000 degrees F).	Near-White Metal Blast Cleaning SSPC-SP10/NACE2	(3) aluminum silicone resin
FM-7	Buried small steel pipe.	Removal of dirt, grease, oil	(200) PVC tape
FM-8	Buried pipe couplings, valves, and flanged joints (where piping is plastic).	Removal of dirt, grease, oil	(201) rich portland cement mortar
FM-9	Buried pipe couplings, valves, and flanged joints (where piping is not plastic, or tape-coated, or mortar-coated steel), including epoxy-coated surfaces.	As specified by reference specification	(205) polyethylene encasement
FM-10	Buried pipe couplings, valves, and flanged joints (where piping is mortar-coated steel or reinforced concrete), including epoxy-coated surfaces.	Removal of dirt, grease, oil	(206) cement-mortar coating
FM-11	Ferrous surfaces in water passages of all valves 4-inch size and larger, exterior surfaces of submerged valves.	White Metal Blast Cleaning SSPC-SP5/NACE1	(100) amine-cured epoxy
FM-12	Where shown or specified, ferrous surfaces in water passages and submerged surfaces of all pumps which have a discharge size of 4-inches or larger.	White Metal Blast Cleaning SSPC-SP5/NACE1	(106) fusion-bonded epoxy
FM-13	Ferrous surfaces of sleeve-couplings.	White Metal Blast Cleaning SSPC- SP5/NACE1	(106) fusion-bonded epoxy
FM-14	All ferrous surfaces of sluice gates, flap gates, and shear	White Metal Blast Cleaning SSPC-SP5/NACE1	(106) fusion-bonded epoxy

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gates, including wall thimbles.

FM-15	Buried surfaces that are not specified to be coated	Near-White Metal Blast Cleaning SSPC-SP10/NACE2	(103) coal tar epoxy
FM-16	Indoor sheet metal, flashings, exposed ducts.	Commercial Blast Cleaning SSPC-SP6/NACE3	(1) alkyd enamel
FM-17	Interior surfaces of all chemical tanks, except caustic soda tanks, including tank nozzles, manholes, nozzle necks, flange faces.	White Metal Blast Cleaning SSPC-SP5/NACE1	(107) chemical-resistant sheet lining
FM-18	Surfaces of indoor equipment.	Commercial Blast Cleaning SSPC-SP6/NACE3	(1) alkyd enamel
FM-19	Existing ferrous equipment or surfaces of exterior steel reservoirs which are required to be re-coated as part of this Work.	Near-White Metal Blast Cleaning - SSPC - SP10/NACE2	(5) inorganic zinc/epoxy/ polyurethane

- B. Coating System Schedule, Ferrous Metal - Galvanized: Pretreatment coatings, barrier coatings, or washes shall be applied as recommended by the coating manufacturer. All galvanized surfaces shall be coated. All galvanized surfaces except for the following items shall be coated unless coating is required by other Sections: (1) Floor gratings and frames, (2) Handrails, (3) Stair treads, (4) Chain link fencing and appurtenances, (5) Engineer selected items.

<b>ITEM DESIGNATION</b>	<b>ITEM</b>	<b>SURFACE PREPARATION</b>	<b>SYSTEM NO.</b>
FMG-1	All exposed surfaces indoors and outdoors, except those included below.	Alkaline Cleaning SSPC-SP1	(1) alkyd enamel
FMG-1	All exposed surfaces indoors and outdoors, except those below.	Alkaline Cleaning SSPC-SP1	(4) epoxy/aliphatic polyurethane
FMG-2	Surfaces in chlorinator room, chlorine storage room.	Alkaline Cleaning SSPC-SP1	(100) amine-cured epoxy
FMG-3	Buried small steel pipe.	Removal of dirt, grease, oil	(200) PVC tape
FMG-4	Surfaces buried or submerged in wastewater.	Alkaline Cleaning SSPC-SP1 followed by Brush-Off Grade Blast Cleaning SSPC-SP7/NACE4	(103) coal tar epoxy
FMG-5	Buried miscellaneous surfaces,	Removal of dirt, grease, oil	(201)

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	couplings, valves, and flanged joints.		rich portland cement mortar
FMG-6	Indoor sheet metal flashings, exposed ducts.	Alkaline Cleaning SSPC-SP1	(1) alkyd enamel

C. Coating System Schedule, Steel Reservoir Interior: For steel reservoir exterior coating system, see "Coating System Schedule, Ferrous Metal-Not Galvanized". The interior surfaces of steel reservoirs shall have all surface preparation and coating work performed in the field.

<u>ITEM DESIGNATION</u>	<u>ITEM</u>	<u>SURFACE PREPARATION</u>	<u>SYSTEM NO.</u>
SR-1	All interior surfaces beginning one foot above high water level, including all plates, roof structural members, fittings, and vents.	White Metal Blast Cleaning SSPC-SP5/NACE1	(105) Part A, inorganic zinc/epoxy
SR-2	Underside of column bases, floor under column bases before columns set in place, submerged contact surfaces that are not accessible after erection.	White Metal Blast Cleaning SSPC-SP5/NACE1	(105) Part B, inorganic zinc/epoxy
SR-3	Interior surfaces exclusive of surfaces in SR-1 and SR-2 above, including overflow, drain and other piping out to the first valve or coupling.	White Metal Blast Cleaning SSPC-SP5/NACE1	(105) Part B, inorganic zinc/epoxy

D. Coating System Schedule, Steel Digester Floating Covers and Digester Gasholders:

<u>ITEM DESIGNATION</u>	<u>ITEM</u>	<u>SURFACE PREPARATION</u>	<u>SYSTEM NO.</u>
SD-1	All ferrous surfaces submerged in water or sludge, including rim plate.	White Metal Blast Cleaning SSPC-SP5/NACE1	(103) coal tar epoxy
SD-2	All ferrous surfaces exposed to digester gas.	White Metal Blast Cleaning SSPC-SP5/NACE1	(103) coal tar epoxy
SD-3	All interior ferrous surfaces of gasholder shell, including top angle.	White Metal Blast Cleaning SSPC-SP5/NACE1	(103) coal tar epoxy
SD-4	All ungalvanized interior surfaces inside digester roof, between and including the ceiling plate and the roof deck.	Near-White Metal Blast Cleaning SSPC-SP10/NACE2	(6) inorganic zinc, water-based
SD-5	Exposed, outdoors.	Commercial Blast Cleaning SSPC-SP6/NACE3	(4) epoxy/aliphatic

polyurethane

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3.17 COATING SYSTEM SCHEDULE, NON-FERROUS METAL, PLASTIC, FIBERGLASS

- A. Where isolated non-ferrous parts are associated with equipment or piping, the Contractor shall use the coating system for the adjacent connected surfaces. Do not coat handrails, gratings, frames or hatches. Only primers recommended by the coating manufacturer shall be used.

<b>ITEM DESIGNATION</b>	<b>ITEM</b>	<b>SURFACE PREPARATION</b>	<b>SYSTEM NO.</b>
NFM-1	All exposed surfaces, indoors and outdoors, except those included below.	Solvent Cleaned SSPC-SP1	(1) alkyd enamel
NFM-1	All exposed surfaces, indoors and outdoors, except those included below.	Solvent Cleaned SSPC-SP1	(4) epoxy/aliphatic polyurethane
NFM-2	Chlorination room, chlorine storage room.	Solvent Cleaned SSPC-SP1	(100) amine-cured epoxy
NFM-3	Aluminum surfaces in contact with concrete, or with any other metal except galvanized ferrous metal.	Solvent Cleaned SSPC-SP1	(208) aluminum metal isolation
NFM-4	Polyvinyl chloride plastic piping, indoors and outdoors, or in structures, not submerged.	Solvent Cleaned SSPC-SP1	(7) acrylic latex
NFM-5	Fiberglass surfaces.	Per Section 3.08	(12) aliphatic polyurethane fiberglass
NFM-6	Buried non-ferrous metal pipe.	Removal of dirt, grease, oil	(200) PVC tape

3.18 COATING SYSTEM SCHEDULE-CONCRETE

<b>ITEM DESIGNATION</b>	<b>ITEM</b>	<b>SURFACE PREPARATION</b>	<b>SYSTEM NO.</b>
C-1	Exposed indoors and outdoors, as shown.	Per Section 3.07	(10) acrylic, concrete
C-2	Submerged in wastewater including surfaces up to 2-feet above high water line and down to 2-feet below low water line and all surfaces in an enclosed structure, as shown.	Per Section 3.07	(104) coal tar epoxy, concrete
C-2	Submerged in wastewater	Per Section 3.07	(110)

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	including surfaces up to 2-feet above high water line and down to 2-feet below low water line and all surfaces in an enclosed structure, as shown.		epoxy-phenolic, concrete
C-3	Floor slab, exposure to chemicals, as shown.	Per Section 3.07	(203) epoxy surfacing
C-4	Floor slab, non-slip surface, as shown.	Per Section 3.07	(207) non-slip surfacing
C-5	Interior surfaces of sewer manholes, including sidewalls, bottom, and metal appurtenances, for manholes shown.	Per Section 3.07	(104) coal tar epoxy, concrete
C-5	Interior surfaces of sewer manholes, including sidewalls, bottom, and metal appurtenances, for manholes shown.	Per Section 3.07	(110) epoxy-phenolic, concrete
C-6	Walls, exposure to chemical splash, washdown, as shown.	Per Section 3.07	(11) aliphatic polyurethane, concrete

3.19 COATING SYSTEM SCHEDULE-CONCRETE BLOCK MASONRY

<u>ITEM DESIGNATION</u>	<u>ITEM</u>	<u>SURFACE PREPARATION</u>	<u>SYSTEM NO.</u>
CBM-1	Exposed, indoors and outdoors, as shown.	Per Section 3.09	(10) acrylic, concrete
CBM-2	Submerged in wastewater, including all vertical masonry surfaces above waterline as shown.	Per Section 3.09	(104) coal tar epoxy, concrete
CBM-2	Submerged in wastewater, including all vertical masonry surfaces above waterline as shown.	Per Section 3.09	(110) epoxy-phenolic concrete
CBM-3	Exterior surfaces, above grade.	Per Section 3.09	(204) waterproofing

3.20 COATING OVERSPRAY ON VEHICLES

Contractor shall issue that all vehicles in the vicinity of the project site are relocated away from

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any coating overspray areas prior to initiation of coating activities. Contractor shall be responsible for any damage of vehicles caused by coating overspray. Contractors or Contractor insurance company shall promptly evaluate and asses any complaints regarding coating overspray rectify and remedy any damages resultant from coating overspray in an expeditious fashion.

**END OF SECTION 09800**

**SECTION 11300 - PUMPS, GENERAL**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish and install all tools, equipment, materials, and supplies and shall perform all labor necessary for the installation, testing, and placing into operation of all pumps and pumping appurtenances, complete and operable, in accordance with the requirements of the Contract Documents.
- B. The provisions of this Section shall apply to all pumps and pumping equipment specified, except where otherwise specified in the Contract Documents.
- C. The Contractor shall assign to a single manufacturer full responsibility for the furnishing and functional operation of the complete pump system including the pumps, drives, drive motors, speed control equipment (where variable speed drives are required) and accessories. The designated single manufacturer, however, need not manufacture more than one part of the unit (pump, or motor and drive), but shall coordinate the design, assembly, testing, and erection of the unit(s) as specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Divisions 2 and 15 as applicable, Piping.
- B. Section 01660 – Mechanical Equipment – Installation and Start-Up
- C. Section 05500 - Miscellaneous Metals
- D. Section 09800 - Protective Coating
- E. Section 11000 - Equipment General Provisions
- F. Section 11034 - Pressure Gauges
- G. Section 16000 - General Electrical Requirements
- H. Section 16481 - Motor Control Centers (MCC)
- I. Section 15380 - Motors
- J. Section 16310 - Variable Frequency Drive Units
- J. Division 17 - Instrumentation

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the applicable reference specifications as specified in the General Requirements.
- B. Commercial Standards:
  - ANSI B 16.1 Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
  - ANSI B 16.5 Pipe Flanges and Flanged Fittings, Steel

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	Nickel Alloy and Other Special Alloys
ANSI/ASME B 31.1	Power Piping
ANSI/ASME B 73.1M	Specifications for Horizontal End Suction Centrifugal Pumps for Chemical Process
ANSI/ASME B 73.2M	Specifications for Vertical In-Line Centrifugal Pumps for Chemical Process
ANSI/AWWA E 101	Deep Well Vertical Turbine Pumps - Line Shaft and Submersible Types
ANSI/IEEE 112	Test Procedure for Polyphase Induction Motors and Generators
ANSI/IEEE 115	Test Procedure for Synchronous Machines
ASTM A 48	Specification for Gray Iron Castings
ASTM A 470	Specification for Vacuum-Treated Carbon and Alloy Forgings for Turbine Rotors and Shafts

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ASTM A 536	Specification for Ductile Iron Castings
ASTM E 448	Recommended Practice for Scleroscope Hardness Testing of Metallic Materials
ASTM B 62	Specification for Composition Bronze or Ounce Metal Castings
Latest Edition	Hydraulic Institute Standards for Centrifugal, Rotary, and Reciprocating Pumps

1.04 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with the General Requirements.
- B. The following submittals and specific information shall be provided:
  - 1. Pump name, identification number and specification number.
  - 2. Performance curve and pump data.
  - 3. The Contractor shall require the manufacturer to indicate points on the H/Q curves, and the limits recommended for stable operation between which the pumps may be operated without surge, cavitation and vibration. The stable operating range shall be as wide as possible based on the pumps actual hydraulic and mechanical tests.
  - 4. Pump detailed description and specification.
  - 5. Electrical data including control and wiring diagrams.
  - 6. Assembly and installation drawings including shaft size, seal, coupling, anchor bolt plan, part nomenclature, material list, outline dimensions and shipping weights. Manufacturer shall also be required to supply calculations, signed by a registered California Professional Engineer, to establish the number, type size, length, embedment, etc. of anchor bolts needed to meet the Seismic requirements of the individual project location.
  - 7. Pump drive and motor in accordance with Division 16 – Electrical and the Electrical Plans.
  - 8. Bearing life calculations.
- C. Certification: The Contractor shall obtain written certification from the pump manufacturer, addressed to the Owner, stating that the equipment will efficiently and thoroughly perform the required functions in accordance with these Specifications and as shown, and that the pump manufacturer accepts joint responsibility with the Contractor for coordination of all equipment, including motors, variable frequency drives, controls, and services required for proper installation and operation of the completely assembled and installed pumps. The Contractor shall submit all such certificates to the Engineer.
- D. Technical Manuals: Prior to startup the Contractor shall furnish the Owner complete operations and maintenance manuals.
- D. Tools: Special tools necessary for maintenance and repair of the pumps and one pressure

grease gun for each type of grease required for pumps and motors shall be furnished to the Owner as a part of the work hereunder; such tools shall be suitably stored in metal tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.

- E. Spare Parts: The Contractor shall obtain and submit from the manufacturer a list of recommended spare parts for each piece of equipment. After approval, Contractor shall furnish such spare parts suitably packaged, identified with the equipment number, and labeled. Contractor shall also furnish the name, address, and telephone number of the nearest distributor for each piece of equipment. All spare parts are intended for use by the Owner, only, after expiration of the guaranty period. Any spare parts which the Engineer permits the Contractor to use for startup activities shall be replaced by the Contractor prior to the Owner's acceptance of beneficial use of the equipment.
1. During the term of this Contract the Contractor shall notify the Engineer in writing about any manufacturer's modification of the approved spare parts, such as part number, interchangeability, model change or others. If the Engineer determines that the modified parts are no longer applicable to the supplied equipment, the Contractor at its expense shall provide applicable spare parts.
- G. Field Procedures: Instructions for field procedures for erection, adjustments, inspection, and testing shall be provided prior to installation of the pumps.

1.05 QUALITY ASSURANCE

- A. Performance Curves: All centrifugal pumps shall have a continuously rising curve. In no case shall the required horsepower at any point on the performance curve exceed the rated horsepower of the motor or engine.
- B. Equipment Testing: The Contractor shall be responsible for the coordination of the following tests of each pump, drive, and motor:
1. General: Tests shall be performed in accordance with the Test Code for Centrifugal Pumps of the Standards of the Hydraulic Institute, Inc. Tests shall be performed on the actual assembled unit from shut-off head condition to 125 percent of the required maximum design capacity. Prototype model tests will not be acceptable. Pumps and motors shall be factory-tested, as defined herein.
2. Factory Tests of Pumps: All pumps and motors of sizes 10 to 125 hp (inclusive) shall be factory-tested in accordance with the above specifications. Six (6) sets of Certified test data shall be submitted to the ENGINEER. This data shall include, but not be limited to the following:
- a. Hydrostatic test with data recorded.
- b. Hydraulic test with a minimum of 5 readings between shut-off head and 125 percent of the maximum design capacity, recorded on data sheets as defined by the Hydraulic Institute, signed, dated, and certified.
- c. Certified pump curves showing head/flow, bhp, efficiency, curves.
- d. Certification that the pump hp demand will not exceed the rated motor hp beyond the 1.0 service rating at any point on the curve.
3. Factory Tests of Motors: All motors of sizes 10 hp and larger, shall be assembled, tested, and certified at the factory and the working clearances checked to insure that

all parts are properly fitted. The tests shall be in accordance with ANSI/IEEE 112 and ANSI/IEEE 115 standards, including heat run and efficiency tests. All computations shall be recorded and 7 certified and dated copies of the test results shall be furnished to the Engineer.

4. Factory Witnessed Tests: All pumps, variable speed drives, and motors, 150 hp and larger, shall be factory-tested as complete, assembled units, as specified above, and witnessed by the Engineer and the Manufacturer's Inspector. The manufacturer shall give the Engineer a minimum of 2 weeks notification prior to the test. All costs for Manufacturer's Inspector and Engineer shall be borne by the Contractor and included in the bid price. Such costs shall include travel and subsistence for 2 people but shall exclude any salaries. Test results in triplicate shall be submitted to the Engineer and no equipment shall be shipped until the test data have been approved by the Engineer and the Manufacturer's Inspector.
  5. Acceptance: In the event of failure of any pump to meet any of the above requirements or efficiencies, the Contractor shall make all necessary modifications, repairs, or replacements to conform to the requirements of the Contract Documents and the pump shall be re-tested at no additional compensation, until found satisfactory.
- C. Field Tests: All pumping units shall be field tested after installation, in accordance with the Contract Documents, to demonstrate satisfactory operation, without causing excessive noise, vibration, cavitation, and overheating of the bearings. The field testing shall be performed in the presence of an experienced field representative of the manufacturer of each major item of equipment, who shall supervise the following tasks and shall certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation:
1. Start-up, check, and operate the equipment over the entire speed range. Any vibration shall be within the amplitude limits recommended in the Hydraulic Institute Standards and it shall be recorded at a minimum of 4 pumping conditions defined by the Engineer.
  2. Pump performance shall be documented by obtaining concurrent readings, showing motor voltage, amperage, pump suction head, and pump discharge head, for at least 4 pumping conditions at each pump rpm. Each power lead to the motor shall be checked for proper current balance.
  3. Bearing temperatures shall be determined by a contact-type thermometer. A running time of at least 20 minutes shall be maintained for this test, unless liquid volume available is insufficient for a complete test.
  4. Electrical and instrumentation testing shall conform to applicable sections of these Specifications.
  5. The field testing shall be witnessed by the Engineer and the Manufacturer's Representative. In the event any of the pumping equipment fails to meet the above test requirements, it shall be modified and retested in accordance with the requirements of these Specifications. The Contractor shall then certify in writing that the equipment has been satisfactorily tested, and that all final adjustments thereto have been made. Certification shall include date of final acceptance test, as well as a listing of all persons present during tests, and resulting test data. The costs of all work performed in this Paragraph by factory-trained representatives shall be borne by the Contractor. The Owner will pay for costs of power and water. When available, the Owner's operating personnel will provide assistance in the

field testing.

1.06 MANUFACTURER'S SERVICE REPRESENTATIVE

- A. Erection and Startup Assistance: Service and instruction assistance by the manufacturer's engineering representative for each pump 10 hp and larger shall be provided by the Manufacturer during the following periods:
  - 1. During erection.
  - 2. During startup.
- B. Instruction of Owner's Personnel: The Contractor shall provide for the services of a factory service representative to instruct the Owner's personnel in the operation and maintenance of the equipment. This service shall consist of a 2 day visit to the plant for each type of similar pumps.

1.07 GUARANTEES, WARRANTIES

- A. After completion, the Contractor shall furnish to the Owner the manufacturer's written guarantees, that the pumping equipment will operate with the published efficiencies, heads, and flow ranges and meet these Specifications. The Contractor shall also furnish the manufacturer's warranties as published in its literature and as specified.

1.08 DELIVERY, STORAGE AND HANDLING

- A. The manufacturer/supplier shall be responsible for the delivery of pump(s) to the Project Site. The equipment shall be delivered to the Project Site, Freight on Board, within 6 weeks of receiving an approved submittal.
- B. The Contractor shall be responsible for unloading pump(s).
- C. The delivery, storage, and handling of all plates, supports, members, and miscellaneous parts shall be packaged for shipment in such manner to prevent damage and abrasion of scratching of the finish coating.
- D. The Contractor is responsible of the safe storage and protection of material and equipment associated with construction of pump(s).

PART 2 - PRODUCTS

2.01 GENERAL

- A. The Contractor shall furnish and install only such pumping equipment as the designated single manufacturer certifies is suitable for use with its equipment and the service conditions.
- B. All manufactured items provided under this Section shall be new, of current manufacture, and shall be the products of reputable manufacturers specializing in the manufacture of such products; such manufacturers shall have had previous experience in such manufacture and shall furnish the names of not less than 5 successful installations of its equipment of comparable nature to that offered under this contract.
- C. All combinations of manufactured equipment which are provided under these Specifications shall be entirely compatible, and the Contractor and the designated single manufacturer shall be responsible for the compatible and successful operation of the various components of the

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units conforming to specified requirements. Each unit of pumping equipment shall incorporate all basic mechanisms, coupling, electric motor or engine drive and unit mounting. All necessary mountings and appurtenances shall be included.

- D. Where 2 or more units of the same type and/or size of pumping equipment are required, such units shall all be produced by the same manufacturer.

### 2.02 MATERIALS

- A. All materials furnished as part of the pumping equipment shall be suitable for its intended use and service. Materials not specifically called for shall be high-grade, standard commercial quality, free from all defects and imperfection that might affect the serviceability of the product for the purpose for which it is intended, and shall conform to the following requirements:
1. Cast iron pump casings and bowls shall be of close-grained gray cast iron, conforming to ASTM A 48, or equal.
  2. Bronze pump impellers shall conform to ASTM B 62.
  3. Stainless steel pump shafts shall be of Type 400, Series. Miscellaneous stainless steel parts shall be of Type 316 stainless steel.
  4. All anchor bolts, nuts and washers shall be Type 316 stainless steel, unless otherwise specified in individual pumping equipment specifications. Buried or submerged bolts, nuts and washers shall be of Type 316 stainless steel, unless otherwise specified by the Engineer.

### 2.03 PUMP APPURTENANCES

- A. Nameplates: Each pump shall be equipped with a stainless steel nameplate indicating rated head and flow, impeller size, pump speed, and manufacturer's name and model number.
- B. Solenoid Valves: The pump manufacturer shall furnish and install solenoid valves on the water or oil lubrication lines and on all cooling water lines. Solenoid valve electrical rating shall be compatible with the motor control voltage and shall be furnished complete with all necessary conduit and wiring installation from control panel to solenoid.
- C. Pressure Gauges: All pumps (except sample pumps, sump pumps, and hot water circulating pumps) shall be equipped with pressure gauges installed at pump suction and discharge lines. Pressure gauges shall be located in a representative location, where not subject to shock or vibrations, in order to achieve true and accurate readings. Pressure gauges shall be furnished in accordance with the manufacturer's recommendations.
- D. Pump suctions shall be equipped with compound gauges. Where subject to shock or vibrations, the pressure gauges shall be provided with snubber and wall-mounted or attached to galvanized channel floor stands and connected by means of flexible connectors.
- E. Variable Frequency Drives: Variable frequency drives, drive motors, speed control equipment, and accessories shall be furnished in accordance with applicable Division 11, 16 and 17 sections.

### 2.04 PUMP REQUIREMENTS

- A. Flanges: Suction and discharge flanges shall conform to ANSI standard B 16.1 or B 16.5 dimensions.

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- B. Lubrication: Vertical pump shafts shall be product water-lubricated, unless otherwise specified. Deep-well pumps and pumps with dry barrels shall have water- or oil-lubricated bearings and seals.
- C. Handholes: Handholes on pump casings shall be shaped to follow the contours of the casing to avoid any obstructions in the water passage.
- D. Vortex Suppressors: Vertical pumps with insufficient submergence shall be furnished with vortex suppressors.
- E. Drains: All gland seals, air valves, and cooling water drains, and drains from variable frequency drive equipment shall be piped to the nearest floor sink, or drain, with galvanized steel pipe or copper tube, properly supported with brackets at the expense of the Contractor.
- F. Grease Lubrication: For all vertical propeller, mixed-flow, and turbine pumps, other than deep well pumps, of bowl sizes 10 inch and larger, the Contractor shall provide a stainless steel tube attached to the column for grease lubrication of bottom bearing.
- G. Stuffing Boxes: Where stuffing boxes are specified for the pump seal, they shall be of the best quality, using the manufacturer's suggested materials best suited for the specific application. For sewage, sludge, drainage, and liquids containing sediments, the seals shall be fresh-water flushed, using lantern rings. If fresh water is not available, the seal shall be flushed with product water cleaned by means of a solids separator as specified in the individual pump specifications. Unless otherwise specified, the packing material shall be interlaced Teflon braiding, containing 50 percent ultrafine graphite impregnation to satisfy the following specification:
- |              |   |                     |
|--------------|---|---------------------|
| Shaft speeds | - | up to 2500 rpm      |
| Temperature  | - | up to 500 degrees F |
| pH range     | - | 0-14                |
- H. Mechanical Seals: Unless otherwise specified mechanical seal designs shall be selected for highest reliability and for rugged service. Mechanical seals shall be provided and they shall be water-flushed, unless otherwise specified. Water flushing shall be as described above. The pump manufacturer shall furnish the appropriate and best quality mechanical seals available.
- I. For all seal arrangements, a buffer fluid must be circulated a minimum 20 PSI above suction pressure, or as required by manufacturer, in order to maintain reliable seal performance.
- J. Preferred seals for all services other than chemicals and corrosives should be equipped with non-clogging, single coil springs and non-sliding, internal, secondary elastomers. Metal parts are to be of 300 series, corrosion-resistant materials.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Pumping equipment shall be installed in accordance with approved procedures submitted with the shop drawings and as shown, unless otherwise approved by the Engineer.
- B. Alignment: Equipment shall be field tested to verify proper alignment, operation as specified, and freedom from binding, scraping, vibration, shaft runout, or other defects. Pump drive shafts shall be measured just prior to assembly to ensure correct alignment. Equipment shall be secured in position and fixed neatly in appearance.
- C. Lubricants: The installation work shall include furnishing the necessary oil and grease for initial operation.

3.02 PROTECTIVE COATING

- A. All exposed materials, except corrosion-resistant metals which have not been shop painted, shall be field coated as specified in Section 09800 - Protective Coatings. Shop painted items which suffered damage to the shop coating shall be touched up as specified in Section 09800 - Protective Coatings.

**END OF SECTION 11300**

**SECTION 11440- PUMP SKID SYSTEM**

Part I – GENERAL

1.01 DESCRIPTION

A. WORK INCLUDED

A. Variable Speed Packaged Pumping System

**SYSTEM DESIGN PARAMETERS**

MPC E2CME5-4 System Model Number	67 GPM System Design Flow Rate	145 PSI System Design Pressure	2 INCH System Piping Size
FLOODED Minimum Suction Pressure	415 VAC System Electrical Voltage		3 PHASE 60 HZ System Electrical Phase and Frequency
CME5-4 Pump Model Number	24.8 GPM Pump Capacity (GPM)		145 FEET Pump Total Head (Feet)
2 HP Pump Horsepower	3480 RPM Pump RPM	9.1 AMPS System Full Load Amperage	

1.02 REFERENCE STANDARDS

The work in this section is subject to the requirements of applicable portions of the following standards:

- A. Hydraulic Institute
- B. ANSI – American National Standards Institute
- C. ASTM – American Society for Testing and Materials
- D. IEEE – Institute of Electrical and Electronics Engineers
- E. NEMA – National Electrical Manufacturers Association
- F. NEC – National Electrical Code
- G. ISO – International Standards Organization
- H. UL – Underwriters Laboratories, Inc.

1.03 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The floating spray equipment shall operate continuously, all day and all night, using three-phase 415VAC as the power source.
- B. No Visual Defects. The potable water pumping system equipment shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Qualified Manufacturer/Supplier. The manufacturer of the equipment shall have extensive experience in the production and installation of such equipment. Manufacturer shall submit evidence of at least five (5) years experience and five (5) previous installations with site contact information.

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- D. Factory Startup Services. Delivery, installation, and startup services shall be included in the bid. For factory delivery and installation, services shall be performed by full-time factory employees experienced in the operation of this equipment and who have completed OSHA safety trainings applicable to this type of installation.
- E. Within 30 days following installation, the manufacturer shall provide an installation report detailing as described in Section 1.04 - Submittals.
- F. Warranty. The potable water pumping system equipment shall be warranted to be free of defects in materials and workmanship for a period of 2 years. See Performance Warranty Conditions in Part 3 following.

1.04 SUBMITTALS

- A. Submittals shall be made in accordance with Section 1300 – Submittals and the General Requirements herein.
- B. The awarded Bidder shall provide [3] copies of the following documents.
  - 1. A qualification statement demonstrating compliance with Section 1.03.
  - 2. Shop drawings for the installed equipment in accordance with Section 1300 – Submittals.
  - 3. Manufacturer’s literature, illustrations and specification sheets defining materials of construction, dimensions, and weights.
- C. Final submittals shall include:
  - 1. A complete installation, operation, and maintenance manual in conformance with Section 01730.

1.05 FIELD SERVICES

- A. Startup and Training. Startup and training to be performed by full-time factory employees trained in the operation of the potable water pumping system in accordance with Sections 1660 and of the Specifications.
- B. Training. The contractor shall provide at least eight (8) hours of training.
- C. Safety Equipment. Installation personnel shall be equipped with job-specific safety equipment to complete the installation of all potable water pumping system equipment following all OSHA safety regulations. Safety equipment shall include confined space, fall protection, rescue, decontamination, and communication tools such as (air monitor, ventilation fan, tripod, winches, FBH’s, retractable, ropes, lanyards, descenders, radios, hard hats, step pools, disinfectant sprayer, etc.)

Part 2 – PRODUCTS

2.01 VARIABLE SPEED PACKAGED PUMPING SYSTEM

- A. Furnish and install a pre-fabricated and tested variable speed packaged pumping system to maintain constant water delivery pressure.
- B. The packaged pump system shall be a standard product of a single pump manufacturer. The entire pump system including pumps and pump logic controller, shall be designed and built by the same manufacturer.
- C. The complete packaged water booster pump system shall be certified and listed by UL (Category QCZJ – Packaged Pumping Systems) for conformance to U.S. and Canadian Standards.

2.02 PUMPS

- A. All pumps shall be ANSI/NSF 61 approved for drinking water.
- B. The pumps shall be of the in-line vertical multi-stage design.
- C. The head-capacity curve shall have a steady rise in head from maximum to minimum flow within the preferred operating region. The shut-off head shall be a minimum of 20% higher than the head at the best efficiency point.
- D. Large In-line Vertical Multi-Stage Pumps (Nominal flows from 130 to 500 gallons per minute) shall have the following features:

- 1. The pump impellers shall be secured directly to the smooth pump shaft by means of a split cone and nut design.
- 2. The suction/discharge base shall have ANSI Class 125 or Class 250 flange connections in a slip ring (rotating flange) design as indicated in the drawings or pump schedule.
- 3. Pump Construction.

a. Suction/discharge base, pump head	Ductile Iron (ASTM 65-45-12)
b. Shaft couplings, flange rings:	Ductile Iron (ASTM 65-45-12)
b. Shaft	431 Stainless Steel
c. Motor Stool	Cast Iron (ASTM Class 30)
d. Impellers, diffuser chambers, outer sleeve:	304 Stainless Steel
e. Impeller wear rings:	304 Stainless Steel
f. Intermediate Bearing Journals:	Tungsten Carbide
g. Intermediate Chamber Bearings:	Leadless Tin Bronze
h. Chamber Bushings:	Graphite Filled PTFE
I. O-rings:	EPDM

- 4. The shaft seal shall be a single balanced metal bellows cartridge with the following construction:
 

a. Bellows:	904L Stainless Steel
b. Shaft Sleeve, Gland Plate, Drive Collar:	316 Stainless Steel
c. Stationary Ring:	Carbon
d. Rotating Ring:	Tungsten Carbide
e. O-rings:	EPDM
- 5. Shaft seal replacement shall be possible without removal of any pump components other than the coupling guard, motor couplings, motor and seal cover. The entire cartridge shaft seal shall be removable as a one piece component. Pumps with motors equal to or larger than 15 hp (fifteen horsepower) shall have adequate space within the motor stool so that shaft seal replacement is possible without motor removal.

2.03 VARIABLE FREQUENCY DRIVES (Panel Mount)

- A. The VFD shall convert incoming fixed frequency single-phase or three-phase AC power into a variable frequency and voltage for controlling the speed of three-phase AC induction motors. The VFD shall be a six-pulse input design, and the input voltage rectifier shall employ a full wave diode bridge; VFD's utilizing controlled SCR rectifiers shall not be acceptable. The output waveform shall closely approximate a sine wave. The VFD shall be of a PWM output design utilizing current IGBT inverter technology and voltage vector control of the output PWM waveform.
- B. The VFD shall include a full-wave diode bridge rectifier and maintain a displacement power factor of near unity regardless of speed and load.

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- C. The VFD shall produce an output waveform capable of handling maximum motor cable distances of up to 1,000 ft. (unshielded) without tripping or derating.
- D. The VFD shall utilize an output voltage-vector switching algorithm, or equivalent, in both variable and constant torque modes. VFD's that utilize Sine-Coded PWM or Look-up tables shall not be acceptable.
- E. VFD shall automatically boost power factor at lower speeds.
- F. The VFD shall be able to provide its full rated output current continuously at 110% of rated current for 60 seconds.
- G. An empty pipe fill mode shall be available to fill an empty pipe in a short period of time, and then revert to the PID controller for stable operation.
- H. Switching of the input power to the VFD shall be possible without interlocks or damage to the VFD at a minimum interval of 2 minutes.
- I. Switching of power on the output side between the VFD and the motor shall be possible with no limitation or damage to the VFD and shall require no additional interlocks.
- J. The VFD shall have temperature controlled cooling fans for quiet operation, minimized internal losses, and greatly increased fan life.
- K. VFD shall provide full torque to the motor given input voltage fluctuations of up to +10% to -15% of the rated input voltage.
- L. The VFD shall provide internal DC link reactors to minimize power line harmonics and to provide near unity power factor. VFD's without a DC link reactor shall provide a 5% impedance line side reactor.
- M. VFD to be provided with the following protective features:
  - 1. VFD shall have input surge protection utilizing MOV's, spark gaps, and Zener diodes to withstand surges of 2.3 times line voltage for 1.3 msec.
  - 2. VFD shall include circuitry to detect phase imbalance and phase loss on the input side of the VFD.
  - 3. VFD shall include current sensors on all three-output phases to detect and report phase loss to the motor. The VFD will identify which of the output phases is low or lost.
  - 4. VFD shall auto-derate the output voltage and frequency to the motor in the presence of sustained ambient temperatures higher than the normal operating range, so as not to trip on an inverter temperature fault. The use of this feature shall be user-selectable and a warning will be exported during the event. Function shall reduce switching frequency before reducing motor speed.
  - 5. VFD shall auto-derate the output frequency by limiting the output current before allowing the VFD to trip on overload. Speed can be reduced, but not stopped.
  - 6. The VFD shall have the option of an integral RFI filter. VFD enclosures shall be made of metal to minimize RFI and provide immunity.
- N. VFD to be provided with the following interface features:
  - 1. VFD shall provide an alphanumeric backlit display keypad, which may be remotely mounted using standard 9-pin cable. VFD may be operated with keypad disconnected or removed entirely. Keypad may be disconnected during normal operation without the need to stop the motor or disconnect power to the VFD.

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2. VFD shall display all faults in plain text; VFD's, which can display only fault codes, are not acceptable.
3. All VFD's shall be of the same series, and shall utilize a common control card and LCP (keypad/display unit) throughout the rating range. The control cards and keypads shall be interchangeable through the entire range of drives used on the project.
4. VFD keypad shall be capable of storing drive parameter values in non-volatile RAM uploaded to it from the VFD, and shall be capable of downloading stored values to the VFD to facilitate programming of multiple drives in similar applications, or as a means of backing up the programmed parameters.
5. A red FAULT light, a yellow WARNING light and a green POWER-ON light shall be provided. These indications shall be visible both on the keypad and on the VFD when the keypad is removed.
6. A start guide menu with factory preset typical parameters shall be provided on the VFD to facilitate commissioning.
7. VFD shall provide full galvanic isolation with suitable potential separation from the power sources (control, signal, and power circuitry within the drive) to ensure compliance with PELV requirements and to protect PLC's and other connected equipment from power surges and spikes.
8. All inputs and outputs shall be optically isolated. Isolation boards between the VFD and external control devices shall not be required.
9. There shall be three programmable digital inputs for interfacing with the systems external control and safety interlock circuitry. An additional digital input is preprogrammed for start/stop.
10. The VFD shall have two analog signal inputs. One dedicated for sensor input and one for external set point input.
11. One programmable analog output shall be provided for indication of a drive status.
12. The VFD shall provide two user programmable relays with selectable functions. Two form 'C' 230VAC/2A rated dry contact relay outputs shall be provided.
13. The VFD shall store in memory the last 5 faults with time stamp and recorded data.
14. The VFD shall be equipped with a standard RS-485 serial communications port for communication to the multi-pump controller. The bus communication protocol for the VFD shall be the same as the controller protocol.

O. VFD service conditions:

1. Ambient temperature operating range, -10 to 45°C (14 to 113°F).
2. 0 to 95% relative humidity, non-condensing.
3. Elevation to 1000 meters (3,300 feet) without derating.
4. VFD's shall be rated for line voltage of 525 to 690VAC, 380 to 480VAC, or 200 to 240VAC; with +10% to -15% variations. Line frequency variation of  $\pm 2\%$  shall be acceptable.
5. No side clearance shall be required for cooling of the units.

2.04 PUMP SYSTEM CONTROLLER

- A. The pump system controller shall be a standard product developed and supported by the pump manufacturer.

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- B. The controller shall be microprocessor based capable of having software changes and updates via personal computer (notebook). The controller user interface shall have a VGA display with a minimum screen size of 3-1/2" x 4-5/8" for easy viewing of system status parameters and for field programming. The display shall have a back light with contrast adjustment. Password protection of system settings shall be standard.
- C. The controller shall provide internal galvanic isolation to all digital and analog inputs as well as all fieldbus connections.
- D. The controller shall display the following as status readings from a single display on the controller (this display shall be the default):
- Current value of the control parameter, (typically discharge pressure)
  - Most recent existing alarm (if any)
  - System status with current operating mode
  - Status of each pump with current operating mode and rotational speed as a percentage (%)
- E. The controller shall have as a minimum the following hardware inputs and outputs:
- Three analog inputs (4-20mA or 0-10VDC)
  - Three digital inputs
  - Two digital outputs
  - Ethernet connection
  - Field Service connection to PC for advanced programming and data logging
- F. Pump system programming (field adjustable) shall include as a minimum the following:
- Water shortage protection (analog or digital)
  - Transducer Settings (Suction and Discharge Analog supply/range)
  - PI Controller (Proportional gain and Integral time) settings
  - High system pressure indication and shut-down
  - Low system pressure indication and shut-down
  - Low suction pressure/level shutdown (via digital contact)
  - Low suction pressure/level warning (via analog signal)
  - Low suction pressure/level shutdown (via analog signal)
  - Flow meter settings (if used, analog signal)
- G. The system controller shall be able to accept up to seven programmable set-points via a digital input, (additional input/output module may be required).
- H. The controller shall have advanced water shortage protection. When analog sensors (level or pressure) are used for water shortage protection, there shall be two indication levels. One level is for warning indication only (indication that the water level/pressure is getting lower than expected levels) and the other level is for complete system shut-down (water or level is so low that pump damage can occur). System restart after shut-down shall be manual or automatic (user selectable).
- I. The system pressure set-point shall be capable of being automatically adjusted by using an external set-point influence. The set-point influence function enables the user to adjust the control parameter (typically pressure) by measuring an additional parameter. (Example: Lower the system pressure set-point based on a flow measurement to compensate for lower friction losses at lower flow rates).
- J. The controller shall be capable of receiving a remote analog set-point (4-20mA or 0-10 VDC) as well as a remote system on/off (digital) signal.
- K. The pump system controller shall store up to 24 warning and alarms in memory. The time, date and duration of each alarm shall be recorded. A potential-free relay shall be provided for alarm notification to the building management system. The controller shall display the following alarm conditions:

High System Pressure	Low system pressure
Low suction pressure (warning and/or alarm)	Individual pump failure
VFD trip/failure	Loss of sensor signal (4-20 mA)
Loss of remote set-point signal (4-20mA)	System power loss

- L. The pump system controller shall be mounted in a UL Type 3R rated enclosure. A self-certified NEMA enclosure rating shall not be considered equal. The entire control panel shall be UL 508 listed as an assembly. The control panel shall include a main disconnect, circuit breakers for each pump and the control circuit and control relays for alarm functions.
- M. The controller shall be capable of receiving a redundant sensor input to function as a backup to the primary sensor (typically discharge pressure).
- N. The controller shall have a pump “Test Run” feature such that pumps are switched on during periods of inactivity (system is switched to the “off” position but with electricity supply still connected). The inoperative pumps shall be switched on for a period of two to three (2-3) seconds every 24 hours, 48 hours or once per week (user selectable).
- O. The controller shall be capable of displaying instantaneous power consumption (Watts or kilowatts) and cumulative energy consumption (kilowatt-hours).
- P. The actual pump performance curves (5<sup>th</sup> order polynomial) shall be loaded (software) into the pump system controller.

#### 2.05 SEQUENCE OF OPERATION

- A. The system controller shall operate equal capacity variable speed pumps to maintain a constant discharge pressure (system set-point). The system controller shall receive an analog signal [4-20mA] from the factory installed pressure transducer on the discharge manifold, indicating the actual system pressure. As flow demand increases the pump speed shall be increased to maintain the system set-point pressure. When the operating pump(s) reach 96% of full speed (adjustable), an additional pump will be started and will increase speed until the system set-point is achieved. When the system pressure is equal to the system set-point all pumps in operation shall reach equal operating speeds. As flow demand decreases the pump speed shall be reduced while system set-point pressure is maintained. When all pumps in operation are running at low speed the system controller shall switch off pumps when fewer pumps are able to maintain system demand.
- B. The system controller shall be capable of switching pumps on and off to satisfy system demand without the use of flow switches, motor current monitors or temperature measuring devices.
- C. All pumps in the system shall alternate automatically based on demand, time and fault. If flow demand is continuous (no flow shut-down does not occur), the system controller shall have the capability to alternate the pumps every 24 hours, every 48 hours or once per week. The interval and actual time of the pump change-over shall be field adjustable.

#### 2.06 LOW FLOW STOP FUNCTION

The system controller shall be capable of stopping pumps during periods of low-flow or zero-flow without wasting water or adding unwanted heat to the liquid. Temperature based no flow shut-down methods that have the potential to waste water and add unwanted temperature rise to the pumping fluid are not acceptable.

If a low or no flow shut-down is required (periods of low or zero demand) a bladder type diaphragm tank shall be installed with a pre-charge pressure of 70% of system set-point. The tank shall be piped to the discharge manifold or system piping downstream of the pump system. When only one pump is in operation the system controller shall be capable of detecting low flow (less than 10% of pump nominal flow) without the use of additional flow sensing devices. When a low flow is detected, the system

controller shall increase pump speed until the discharge pressure reaches the stop pressure (system set-point plus 50% of programmed on/off band). The pump shall remain off until the discharge pressure reaches the start pressure (system set-point minus 50% of programmed on/off band). Upon low flow shut-down a pump shall be restarted in one of the following two ways:

- A. Low Flow Restart: If the drop in pressure is slow when the start pressure is reached (indicating the flow is still low), the pump shall start and the speed shall again be increased until the stop pressure is reached and the pump shall again be switched off.
- B. Normal Flow Restart: If the drop in pressure is fast (indicating the flow is greater than 10% of pump nominal flow) the pump shall start and the speed shall be increased until the system pressure reaches the system set-point.

2.07 SYSTEM CONSTRUCTION

- A. The suction and discharge manifolds shall be constructed of 316 stainless steel. Manifold connection sizes shall be as follows:
  - 3 inch and smaller: Male NPT threaded
  - 4 inch through 8 inch: ANSI Class 150 rotating flanges
  - 10 inch and larger: ANSI Class 150 flanges
- B. Pump Isolation valves shall be provided on the suction and discharge of each pump. Isolation valve sizes 2 inch and smaller shall be nickel plated brass full port ball valves. Isolation valve sizes 3 inch and larger shall be a full lug style butterfly valve. The valve disk shall be of stainless steel. The valve seat material shall be EPDM and the body shall be cast iron, coated internally and externally with fusion-bonded epoxy.
- B. A spring-loaded non-slam type check valve shall be installed on the discharge of each pump. The valve shall be a wafer style type fitted between two flanges. The head loss through the check valve shall not exceed 5 psi at the pump design capacity. Check valves 1-1/2" and smaller shall have a POM composite body and poppet, a stainless steel spring with EPDM or NBR seats. Check valves 2" and larger shall have a body material of stainless steel or epoxy coated iron (fusion bonded) with an EPDM or NBR resilient seat. Spring material shall be stainless steel. Disk shall be of stainless steel or leadless bronze.
- C. For systems that require a diaphragm tank, a connection of no smaller than 3/4" shall be provided on the discharge manifold. The system shall be provided with a non-ASME code epoxy coated steel shell bladder tank with FDA approved butyl rubber diaphragm, 150 PSI rated, sized at 86 gallon size by manufacturer for proper operation of pump system.
- D. A pressure transducer shall be factory installed on the discharge manifold (or field installed as specified on plans). Systems with positive inlet gauge pressure shall have a factory installed pressure transducer on the suction manifold for water shortage protection. Pressure transducers shall be made of 316 stainless steel. Transducer accuracy shall be +/- 1.0% full scale with hysteresis and repeatability of no greater than 0.1% full scale. The output signal shall be 4-20 mA with a supply voltage range of 9-32 VDC.
- E. A bourdon tube pressure gauge, 2.5 inch diameter, shall be placed on the suction and discharge manifolds. The gauge shall be liquid filled and have copper alloy internal parts in a stainless steel case. Gauge accuracy shall be 2/1/2 %. The gauge shall be capable of a pressure of 30% above its maximum span without requiring recalibration.
- F. Systems with a flooded suction inlet or suction lift configuration shall have a factory installed water shortage protection device on the suction manifold.
- G. The base frame shall be constructed of corrosion resistant 304 stainless steel. Rubber vibration dampers shall be fitted between each pumps and baseframe to minimize vibration.
- H. Depending on the system size and configuration, the control panel shall be mounted in one of the following ways:

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On a 304 stainless steel fabricated control cabinet stand attached to the system skid.  
On a 304 stainless steel fabricated skid, separate from the main system skid  
On its own base (floor mounted with plinth)

2.08 TESTING

- A. The entire pump station shall be factory performance tested as a complete unit prior to shipment. Job-site programming shall be entered into the controller prior to shipment (details of installation requirements shall be communicated to the pump system manufacturer). A verified performance test report shall be made available from the system manufacturer.
- B. The system shall undergo a hydrostatic test of 350 psig for a minimum of 15 minutes prior to shipment.

2.09 WARRANTY

- A. The warranty period shall be a non-prorated period of 24 months from date of installation, not to exceed 30 months from date of manufacture.

**END OF SECTION 11440**

**SECTION 11510 –SUBMERSIBLE PUMP**

**PART 1 – GENERAL**

1.01 DESCRIPTION

- A. Specifications are for the packaged sewage pump system which comprises two submersible recessed impeller sewage pumps, a duplex control panel, and ancillary equipment, pipe, and fittings.
- B. Furnish, install, and field test two centrifugal, solids handling impeller, submersible, rail mounted, sewage pumps and submersible motors installed, and a factory-built duplex control panel, with all required appurtenances specified herein and as necessary for a complete operating installation.
- C. All items specified herein shall be provided by the contractor. The contractor is responsible for ensuring all equipment required is provided, and that it is compatible and suitable for the application, and that it functions together to make a complete and working installation.
- D. The specifications describe the system, but do not purport to cover all required details. Provide all appurtenances required, whether specifically noted herein or not, at no additional cost to the owner.
- E. All electrical work shall be performed in compliance with the NEC.
- F. Package pump system supplier shall be Barrett engineered pumps, San Diego, 619-232-7867, or equal.

1.02 CONTRACTOR SUBMITTALS

- A. Submit data completely describing products including plan and section views and listings of all components and their materials of construction.
- B. Certified head/capacity, efficiency, and horsepower curves for the pump.
- C. Complete information on the rail mounting system including dimensional drawings, piping, valves, fittings, base elbow, and all appurtenances.
- D. Control panel interior layout drawings, bill of materials, equipment cut sheets, and control diagrams.
- E. Electrical conduit, wire, cable, panels, boxes, and all associated materials for installation of electrical equipment.

**PART 2 – PRODUCTS**

2.01 4" SUBMERSIBLE SOLIDS HANDLING IMPELLER SEWAGE PUMPS

A. GENERAL

Contractor shall furnish all labor, materials, equipment, and incidentals required to provide 3" solids handling submersible vortex sewage pumps as specified herein.

B. OPERATING CONDITIONS

Each pump shall be rated 7.5 hp lower tank / 3 hp upper tank, 208-230/460 volts, 3 phase, 60 hertz, and 1750 RPM. The unit shall produce a minimum of 410 U.S. GPM at 33'TDH.

The pump shall be capable of handling a 4" spherical solid. The pump shall be non-overloading through the entire range of operation without employing service factor. The pump shall reserve a minimum service factor of 1.20. The performance curve submitted for approval shall state in addition to head and capacity performance, the pump efficiency, solid handling capacity and reflect motor service factor.

C. MATERIALS

1. Pump Case: Cast Iron, ASTM A48, Class 35B
2. Motor Housing: Cast Iron, ASTM A48, Class 35B
3. Impeller: Cast Iron, ASTM A48, Class 35B
4. Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B
5. Discharge Base Elbow: Cast Iron, ASTM A48, Class 35B
6. Pump/Motor Shaft: Stainless Steel, ASTM A276 Type 316
7. O-Rings: Nitrile Rubber (NBR)
8. Fasteners (Including Impeller Fastener): Stainless Steel, ASTM A276 Type 316
9. Lower Seal Faces: Silicon Carbide/Silicon Carbide
10. Upper Seal Faces: Ceramic /Carbon
11. Guide Rails and Guide Support Brackets: Stainless Steel schedule pipe guides
12. Lifting Chain: Stainless Steel, ASTM A276 Type 316
13. Power/Control Cable Jacket: Neoprene with non-wicking fillers

D. ACCESSORIES

1. POWER CABLE

Provide 40 ft of power/control cable with each pump, suitable for submersible wastewater application, sized in accordance with NEC requirements. Provide cable terminal box on side of motor housing, with cable entry sealed to ensure that no entry of moisture is possible into the high-voltage motor/ terminal area even if the cable is damaged or severed below water level. The cable shall be a plug-in design, easily removable from the pump and replaced in the field without the need for electrical connections or special tools. A union nut shall be provided on the plug for tightening to the matching receptacle on the pump.

2. TEMPERATURE PROTECTION

Furnish temperature monitoring devices in motor windings for use in conjunction with and supplemental to external motor overload protection. Arrange controls to shut down pump should any of the monitors detect high temperature and automatically reset once motor temperature returns to normal. Set temperature monitors at levels recommended by pump manufacturer.

3. SEAL FAILURE PROTECTION

Furnish seal failure monitoring devices in seal chamber for use by control panel. Arrange controls to shut down pump should any of the monitors detect seal failure and activate alarm.

E. FABRICATION

1. GENERAL

Provide pumps capable of handling raw unscreened wastewater. Design pumps to allow for removal and reinstallation without removal of bolts, nuts, or other fasteners.

Provide a pump which connects to a permanently mounted discharge elbow by simple downward motion, without rotation, guided by at least two non-load-bearing guides. Pump guide pipes shall be mounted to cast hubs on the discharge elbow. A flexible gasket shall be furnished on the pump discharge so that final connection shall insure zero leakage between pump and discharge connection flange.

All exposed cast iron and ferrous surfaces shall be cleaned of dirt and grease, sandblasted to near white finish, and coated with powder coat epoxy.

2. MAJOR COMPONENTS

Furnish major components (pump case, impeller, intermediate housing, motor housing) of cast material as specified with smooth surfaces devoid of blow holes and other irregularities. The pump case design shall incorporate a centerline discharge for stability when mounted on the base elbow. The entire rotating assembly (motor and impeller) shall be easily removable from the volute casing for inspection and cleaning. The motor and volute shall be securely held together by a stainless-steel clamp, removal shall require only the release of a single clasp on a stainless-steel clamp.

3. SINGLE CHANNEL IMPELLER

The impeller shall be a solids handling design capable of passing at minimum a 3" spherical solid. All vertical edges forming the single flow channel shall be formed on an angle and carefully contoured with no right-angle corners where rags could easily collect. Statically and dynamically balance the impeller. Provide a wear ring system at the interface between the volute suction and the impeller lower shroud to minimize recirculation and maximize efficiency.

4. SHAFT

Provide common pump/motor shaft of sufficient size to transmit full driver output with a maximum deflection of 0.002 inches measured at the lower mechanical seal. Machine the shaft of stainless steel and isolate the shaft from the pumped media.

5. SHAFT SEAL

The two mechanical seals shall be installed in tandem, totally enclosed within a common stainless-steel cylinder. The cylinder with both seals shall be located entirely within an oil-filled chamber with drain and inspection plug (with positive anti-leak seal) for easy access from external to the pump. All seals and seal springs shall be located completely inside of the seal oil chamber where they cannot be fouled by rags or other stringy material. Provide seals requiring neither routine maintenance nor adjustment, but capable of being easily inspected and replaced.

6. BEARINGS

Furnish upper and lower bearings as needed to provide a b10 life of, at minimum, 100,000 hours at all anticipated axial and radial loadings. Provide sealed/shielded (permanently lubricated) bearings. Lower (primary) bearing shall be double row angular contact type, upper (support) bearing shall be single row ball design.

7. MOTOR

Provide a motor which is squirrel cage, induction in design, housed in a completely watertight and air or oil filled chamber, with a min 1.15 service factor. The motor shall be adequately sized and rated for continuous operation at a maximum fluid temperature of 104° F (40° C) insulate the motor stator with, at minimum, Class H insulation rated for 180 degrees C. Motor insulation shall fulfill NEMA MG1 part 31 requirements for frequency convertor duty. The motor and pump set complete shall be designed and manufactured by the same company. Provide temperature protection and seal leak detection as described above. Provide adequately rated motor with sufficient surface area for ambient only cooling suited for the intermittent mode of operation in wastewater applications, submerged or partially submerged, without damage.

8. SERVICEABILITY

The complete rotating assembly shall be capable of being removed from the volute without disturbing the suction piping, discharge piping, and volute. The motor housing, seal housing with seal plate and impeller still attached to the shaft shall be capable of being lifted out of the volute case from the top as one assembly.

9. TESTING

Field testing shall be required and include the following:

The pump shall be visually inspected to confirm that it is built in accordance with the specification as to the hp, voltage, phase, and hertz.

Pump shall be allowed to run dry to check for proper rotation.

Discharge piping shall be attached, the pump submerged in water, and amp readings shall be taken in each leg to check for operation within pump capability.

10. PAINT

The pump shall be painted with waterborne hybrid acrylic/alkyd paint. This custom engineered, quick dry paint shall provide superior levels of corrosion and chemical protection.

2.03 STAINLESS STEEL RAIL MOUNTING SYSTEM

- A. The stainless-steel dual rail system shall include a discharge base elbow, hydraulic sealing flange, guide rail connector, piping, float mounting bracket, lifting cable, and control equipment.
- B. The design of the rail mounting system shall be such that the pumping units shall be automatically connected to the discharge piping when lowered into place on the discharge connection. The pump shall be easily removable for inspection or service without the need for removal of nuts, bolts, or other fasteners.
- C. A discharge base elbow shall be furnished for each pump and shall rest squarely on the floor of the pump well and be securely anchored to the floor. The base elbow shall be equivalent to 3” steel piping in size and be designed to mate with a mating flange connected to the discharge port of the pump.

- D. Dual stainless steel guide rails shall be used to direct the pump in proper alignment with the stationary discharge piping. Each rail shall be one piece and connected between the access frame and the base elbow.
- E. Each pumping unit shall be provided with a 316 stainless steel lifting chain or cable. The lifting chain or cable shall be of sufficient length. The access frame shall provide a hook to attach the lifting chain or cable when not in use.
- F. A 316 stainless steel float mounting bracket shall be provided. The float mounting bracket shall provide strain relief to hold level control cords and allow adjustment of level controls to desired pumping and alarm levels. Continuous cords are to run from pumps and level controls to control panel. No splices shall be made in wiring. The float mounting bracket shall be fabricated from 316 stainless steel.
- G. The pipe and fittings shown in the drawings shall schedule 80 PVC piping with common 4-inch discharge, equipped with cast iron full swing check valves and plug style shutoff valves on the discharge piping of each pump.

2.04 THREE PHASE DUPLEX CONTROL PANEL

A. GENERAL

- 1. Contractor shall furnish all labor, materials, equipment, and incidentals required to provide a duplex motor control panel as specified herein.
- 2. The motor control panel shall be assembled and tested by a controls system manufacturer (sje-rhombus or pre-approved equal) meeting the standards of UL 508a for industrial controls and be UL labeled and serialized accordingly. The motor control panel shall be assembled and tested by the manufacturer so as to ensure suitability in matching controls to motors and to insure single source responsibility for the equipment.
- 3. The panel shall contain all components required by the pump manufacturer for starting and protecting the motor as well as features required by the pump manufacturer for warranty of the pumps. Items such as thermal overload detection or seal failure detection shall be included when required.
- 4. Incoming pump power shall be 3 phase, 60 hz, 480 volts AC.
- 5. The control panel shall incorporate a submersible level transducer for primary control and level control floats for backup control.

B. CONSTRUCTION

- 1. The controls for the pump shall be housed in a stainless-steel enclosure meeting NEMA 4X requirements with a hinged door and neoprene gasket. The enclosure shall have provisions for a padlock.
- 2. A nameplate shall be permanently affixed to the panel. A ratings label shall include the model number, voltage, phase, frequency, ampere rating and horsepower rating and shall be affixed to the inside of the enclosure. A warning label against electric shock shall be permanently affixed to the outer door. The interior of the enclosure shall have a clear envelope with "as built" schematics located within.
- 3. A removable aluminum back plate shall be provided for mounting all circuit breakers, motor starters, etc. All components mounted to the back plate shall be secured by type 25,

self-tapping screws in extruded holes. Rivets shall not be acceptable for securing any component to the backplate.

C. PUMP CONTROLLER

1. A microprocessor-based pump controller shall be provided to receive a single analog process variable input signal and provide user-selectable pump-up (fill mode) or pump-down (empty mode) control. The controller shall be user-configuration for simplex, duplex, or triplex operation. The controller shall be a PRIMEX MODEL PC-3000XC.
2. The controller shall be off-the-shelf, preprogrammed, and dedicated to pump control. Systems using one of a kind, custom-programmed generic PLCs do not meet the intent of these specifications and are not acceptable.
3. Operator interface (OI): the OI shall consist of a text/graphical display, dedicated alarm and pump status indicators, operator navigation buttons and rotary selector wheel providing intuitive navigation. The display shall be capable of showing all alarm and status information as well as configurable parameters.
  - A. The OI shall have a display area of not less than 2.7" with 64 x 256-pixel resolution.
  - B. The display shall be based on OLED technology offering increased energy savings and wide viewing angles.
  - C. The controller shall be configured with a main (home) display that shows the analog process variable in engineering units and as a dynamic vertical bar graph. The process variable display shall contain up to four digits with decimal place. The main display will also provide indication of lead pump, active alarm indication and show the most current active alarm text message.
4. Inputs/Outputs (I/O): the controller shall come standard with predefined inputs and outputs having a total I/O compliment of 11 discrete inputs, 6 discrete outputs, 1 analog input and 1 analog output.
5. The controller shall be capable of accepting the following inputs as a minimum:
  - A. Pump 1, 2, 3 running or disabled (selectable)
  - B. Pump 1, 2, 3 seal failure.
  - C. Pump 1, 2, 3 overtemperature
  - D. High level float
  - E. Alarm horn silence/reset
6. The controller shall provide outputs for pump activation and alarms. Outputs shall be contact closures rated 250 vac @ 3 amps. The controller shall be capable of providing the following outputs as a minimum:
  - A. Pump 1, 2, 3 call.
  - B. Common alarm (e.g.: horn and/or light)
  - C. High level
  - D. Low level
7. The controller shall monitor a 4-20 ma input signal representing the process variable. The analog input shall have 14-bit resolution or higher.
  - A. The controller shall include a 24 VDC power supply for powering an external loop-powered process transmitter.
  - B. The controller shall provide a 4-20 mA output that is scalable to reflect the process level. The output resolution shall be fully scalable and not less than 12-bit.

8. Primary/backup control
  - A. The primary control shall be via submersible level transducer and plc control as explained earlier.
  - B. Backup control shall be via 2 level control floats and secondary plc controller. Backup control shall be activated by upper float activation and shall require manual pushbutton reset. Backup control shall provide for lead/lag/alternating control via a combination of floats and time delay relays.
9. The magnetic motor starters shall be IEC rated for the pump horsepower and include a contractor with a minimum mechanical life of 5,000,000 operations and a minimum contact life of 1,000,000 operations. a motor protective switch shall be used to provide adjustable overload protection, protect from line faults, and disconnect the pump from the incoming power. motor protective switches shall be adjustable to meet NEC requirements for motor controls.
10. A high-level alarm condition shall activate the main alarm light (red, mounted on the top of the panel). The alarm light shall remain illuminated until the problem is corrected.
11. Control/alarm voltage shall be 120 VAC and shall be accomplished by means of a transformer with primary and secondary fusing.
12. Wire ties shall be used to maintain panel wiring in neat bundles for maintenance and to prevent interference with operating devices. all grounding conductors shall be securely connected to assure a proper ground.
13. The alternator shall consist of an alternating circuit which alternately switches pumps upon the next pumping cycle. The alternation circuitry shall be integrated into the pump controller.
14. Provide pump run elapsed time meters for each pump. run time meters shall be non-resettable and record up to 99,999 hours to the nearest tenth or hundredth.
15. Provides pump seal fail and heat sensor alarm systems with indicator lights for the seal fail systems.

## **PART 1 – EXECUTION**

### **3.1 INSTALLATION**

- A. The Floating Aerator System shall be installed in accordance with approved procedures according to the manufacturer's recommendations, submitted with the shop drawings, and as shown, unless otherwise approved.

### **3.2 PUMP STATION FIELD TESTING**

1. Field tests shall be performed by the contractor under the instruction of the pump manufacturer's field service representative.
2. A minimum of one (1) day of field service shall be provided by an authorized factory trained representative of the package pump station manufacturer. Service shall include but not be limited to inspection of the completed installation to ensure it has been performed in accordance with the manufacturer's instructions and recommendations, and supervision of all field testing, and activation

of the manufacturer's warranty. The contractor shall be responsible for coordinating the required field services with the pump manufacturer.

3. Field testing shall verify that the pumps, and the control panel, operate as specified under high level, low level, and pump fail conditions. Pump testing shall verify that automatic pump alternation occurs.

**END OF SECTION 11510**

**SECTION 11540 - CHEMICAL METERING PUMPS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish and install preassembled chemical dosing pump skids, together with all piping, valves, controls, as illustrated on the Plans and in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330 – Submittals / Shop Drawings
- B. Section 11610 - Chemical Feeding Equipment, General.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the applicable reference specifications as specified in the General Requirements.

1.04 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with Section 01330 – Submittals / Shop Drawings.
- B. Shop Drawings: Complete fabrication, assembly, foundation, and installation drawings, together with detailed specifications and data covering materials used, power drive assemblies, parts, devices, pumps, supports, and other accessories forming the skid equipment as well as schematics, diagrams, and skid layouts, shall be submitted for review.
- C. Certification: The Contractor shall obtain written certification from the manufacturer, addressed to the Owner, stating that the equipment will provide the capability to handle the design chemical efficiently and thoroughly perform the required functions in accordance with these Specifications and as indicated on the Plans, and that the manufacturer accepts joint responsibility with the Contractor for coordination of all equipment, including pumps, controls, and services required for proper installation and operation of the completely assembled and installed unit. The Contractor shall submit all such certificates to the Owner’s Representative.
- D. Technical: Prior to start-up the Contractor shall furnish to the Owner complete operations and maintenance manuals in accordance with Technical Manuals of the General Requirements.

1.05 QUALITY ASSURANCE (NOT USED)

PART 2 - PRODUCTS

2.01 GENERAL

- A. The pumps shall be of corrosion-resistant construction and diaphragm and seals shall be a suitable material for the chemicals indicated at maximum temperature of 125 degrees F. Each pump shall be complete with pump base, motor driven diaphragm, check valves, back-pressure valve, internal relief valve, pulsation dampener, union, and any other items

as shown on the plans. A complete set of extra diaphragms and seals shall be furnished with each pump. Size and characteristics of the pumps shall be as specified herein.

2.02 CONSTRUCTION

- A. General: The chemical metering pumps shall be of the positive displacement, diaphragm dosing type pumps with variable speed drive (stepper motor) with microprocessor control. All metering pumps shall be the product of a single manufacturer. Parts coming into contact with the liquid shall be selected to ensure optimum corrosion resistance to the liquid being pumped. The liquid being pumped is a 4 percent Sodium Hypochlorite.
- B. Type and Range: Each metering pump shall be of the stepper motor driven mechanically actuated diaphragm type. Solenoid driven or hydraulically actuated diaphragm pumps are not acceptable. Peristaltic pumps are acceptable. The capacity range up to 4.5 GPH.
- C. All pumping functions set, or in progress shall be displayed on the graphical display. Metering pump electronics shall be enclosed in a glass fiber reinforced plastic housing, mounted to the rear of the chemical metering pump. The housing shall be rated Nema 4X and shall be shock resistant.
- D. The metered liquid shall enter the metering head at the bottom and exit at the top through gravity seating double ball check valves. These valves shall be free-seating type with valve seats and shall be guided to accurately control vertical and sideways motion. Check valves shall be threaded union type to eliminate clamping bars and other metal parts subject to corrosion. Plastic parts shall be molded and stress relieved for strength.
- E. The pump mechanism shall be sealed from direct contact with the outside atmosphere and suitable for operation in ambient conditions to 113 degrees F (104 degrees F for PVC) and fluid temperatures to 95 degrees F for PVC, 140 degrees F for Polypropylene, and 176 degrees F for PVDF and 316SS.
- F. Materials of construction for the pump include a (PVC) pump head and check valves, glass ball checks, (Viton) seals and a PTFE-coated EPDM diaphragm.
- G. An integral multi-language, easy-logic menu control system with graphical display guidance shall be available as standard. A North American power cord shall be prewired.
- H. Four multifunctional keys below the graphical display shall operate the menu structure. The respective function of each key shall be visualized at the bottom of the display. Time, date (including day of week, month, year) and language shall be fully programmable. Graphical display shall indicate units of capacity over a period of time. These units of capacity can be programmed as gallons, liters, or milliliters. Units of dosing time can be programmed as per day, hour or minute. Dosing pumps that do not display flow rate in units of flow (gallons, liters), that rely on external controllers or those without a menu control system with graphical interface are not acceptable.
- I. The pump shall be capable of achieving its full flow range by stroke speed adjustment with up to 150 strokes per minute (depending on model). The metering pump shall offer the following operating modes: Manual, analog input, pulse input, or batch mode. The operating mode of the pump shall be clearly displayed as an easy to recognize icon as well as text representation on the main display.
- J. Automatic capacity control from a 4-20 mA analog signal or pulse signal shall be available.

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- K. The control unit shall have the capability to log all disturbance messages with a date, time and error code.
- L. To prevent unauthorized main menu access, a “release code” can be programmed. This password can be a series of 4 numbers, each selectable between 0 and 9.
- M. Variable Frequency Drive controlled pumps shall be equipped with a variable speed controller and able to receive 4 - 20 mA signal as generated by a PLC.

2.04 CONFIGURATION

- A. The design shall consist of two (2) 2 pump (duty and standby) chemical dosing skids for 12.5% sodium hypochlorite and 38% sodium metabisulfite. Each skid will be mounted to the P.C.C. concrete slab and aluminum panel supports. Each skid shall contain 2 junction boxes for power and control.

2.05 PUMP ACCESSORIES

- A. Mounting and Connections: Unless otherwise shown, all metering pumps shall be mounted within the skid and they shall be provided with corrosion-resistant pulsation dampeners, sample valves, pressure gages with diaphragm seals, shut-off valves, check valves, relief valves, valves and graduated calibration tanks in pump suction. All pipe connections to feeders must be firmly supported from a floor-mounted, galvanized, structural steel frame, to avoid any stress on the feeder or on the piping system.

2.06 SPARE PARTS

- A. All chemical feeders shall be furnished with a complete set of one year's manufacturer suggested spare parts, such as seals, packing, gaskets, belts, and any other parts subject to wear. Where applicable, one set of spare bearings shall be furnished with each piece of equipment.

2.07 MANUFACTURER

- A. Manufacturer's Experience: The chemical feeding equipment shall be the product of a manufacturer who has designed and manufactured similar equipment and has a record of at least 5 years of successful operation of this type of process. The Contractor may be required to submit evidence to this effect together with a representative list of installations. The pump manufacturer shall maintain a permanent, local service department and a spare parts department.

B. Manufacturers:

1. Model: Encore 700 Simplex Metering Pump  
UGSI Chemical Feed  
1695 National Avenue  
San Diego, CA 92113  
Ph: 619-232-7867
2. Model: DMH Series  
Grundfos Alldos  
Barrett Engineered Pumps  
1695 National Avenue  
San Diego, CA 92113

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Ph: 619-232-7867

3. Or equal.
- C. Unit Responsibility: The Contractor shall assign to a single manufacturer full responsibility for the furnishing and functional operation of the chemical feeder system along with all related tanks, mixers, pumps, piping, valves and controls. The designated single manufacturer, however, need not manufacture more than one part of the system. The designated manufacturer shall coordinate the design, assembly, testing, and erection of the system as specified.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Pumping equipment shall be installed in accordance with approved procedures submitted with the shop drawings and as shown, unless otherwise approved.
- B. General Installation requirements shall be as specified in Section 11000 – Equipment – General Provisions.

**END OF SECTION 11540**

**SECTION 11550 – FLASH MIXER**

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish and install a flash mixer together with all components necessary for a complete and operable system in accordance with the requirements of the Contract Documents. Said components include, but are not limited to, shafts, impellers, motors, supports, and controls.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section [11000] Equipment General Provisions.
- B. Division [16] Electrical.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Comply with the applicable reference specifications as specified in the General Requirements.

1.04 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The flash mixer equipment shall operate continuously, all day and all night.
- B. No Visual Defects. The flash mixer equipment shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Factory Startup Services. Delivery, installation, and startup services shall be included in the bid. For factory delivery and installation, services shall be performed by full-time factory employees experienced in the operation of this equipment and who have completed OSHA safety training applicable to this type of installation.
- D. Warranty. The flash mixer equipment shall be warranted to be free of defects in materials and workmanship for a period of 2 years.

1.05 SUBMITTALS

- A. Submittals shall be made in accordance with Section 1300 – Submittals and the General Requirements herein.
- B. Final submittals shall include:
  - 1. A complete installation, operation, and maintenance manual in conformance with Section 01730.

1.06 FIELD SERVICES

- A. Startup and Training. Startup and training to be performed by full-time factory employees trained in the operation of the Flash Mixer.
- B. Training. The contractor shall provide at least four (4) hours of training.

- C. Safety Equipment. Installation personnel shall be equipped with job-specific safety equipment to complete the installation of all potable water pumping system equipment following all OSHA safety regulations. Safety equipment shall include confined space, fall protection, rescue, decontamination, and communication tools such as (air monitor, ventilation fan, tripod, winches, FBH's, retractable, ropes, lanyards, descenders, radios, hard hats, step pools, disinfectant sprayer, etc.)

## **PART 2 -- PRODUCTS**

### 2.1 GENERAL

- A. The Contractor shall furnish and install a complete Flash Mixer assembly. The Flash Mixer assembly shall be MixMor Mixer manufactured or approved equal by the engineer.

### 2.2 CONSTRUCTION

#### A. EQUIPMENT

Equipment furnished and installed under this section shall be assembled and placed in proper operating condition by the contractor in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer as approved by the engineer.

The contractor shall furnish and install each mixer complete with:

- a) all supports.
- b) all mechanical equipment required for proper operation, including complete drive units.
- c) all steel, iron, and other materials of construction indicated in the drawings.
- d) all electrical equipment, including but not limited to, starters, controls, motors, etc.
- e) any additional materials of construction required by the manufacturer's design. Equipment shall be of U.S. manufacture.

#### B. ELECTRIC MOTOR

The electric drive motor shall be connected to the speed reducer through a flexible coupling. The unit shall have stainless steel side frames and weatherproof stainless-steel housing with dust- and water-tight fittings in accordance with NEMA 4X standard. The mechanical mixer shall have a TEFC motor, and the gear motor shall be of the TENV type, with permanent magnet for continuous duty. All wetted parts of the equipment shall be made of materials suitable for service with polymers having a pH between 4 and 12.

#### C. SPEED REDUCER

##### GENERAL

The speed reducer shall be designed for the fluid force extremes and overhung loads normally experienced in a fluid mixing environment. In order to ensure that the equipment will be of the highest quality, the speed reducer shall be manufactured by the mixer supplier who will control the design, material acquisition and manufacturing phases.

General maintenance, specifically including replacement of tank sealing devices, all anti-friction bearings, all oil seals, and lubricant maintenance shall not require removal of the speed reducer housing from its foundation. The speed reducer shall have a ductile iron housing and be provided with lifting lugs.

##### GEARINGS AND BEARINGS

All drives shall be parallel shaft, triple reduction helical/bevel gear reducer with an output speed of 138 RPM and a service factor of 2.58 based on motor horsepower to ensure maximum efficiency coupled with the convenience of mounting, maintenance, and installation. All gearing shall be AGMA Quality 10 as a minimum. Worm gears, belt and/or chain drives are not acceptable.

The speed reducer shall be suitable for 24 hr/day continuous operation in an outdoor environment. The mechanical rating of the speed reducer shall be at least 1.5 times the motor nameplate horsepower at full speed. The speed reducer shall bear an AGMA nameplate. The thermal rating of the speed reducer shall exceed the design mechanical rating to eliminate the need for external cooling. External cooling devices are not allowed.

All reducer bearings shall be of the lower self-aligning spherical roller type, shall be oil lubricated and have a minimum L-10 bearing rating of 100,000 hours based on load. All bearings shall be submerged in the lubricating oil to ensure positive lubrication.

#### LUBRICATION

The speed reducer shall be lubricated with synthetic oil with an oil level such that at least 90% of the gear box volume contains oil. All gearing must be immersed completely in lubricant. The lubrication system shall allow a maximum mixer mounting angle of 10° from horizontal. Oil pumps will not be allowed. The lubrication shall be such that start-up in highly variable climates, or extremely cold climates, shall require no priming, heaters, or other special effort or equipment.

A single oil drain shall be provided at the low point of the speed reducer to allow oil drainage and leave a maximum residual of oil of no more than 1/4" in the drive housing.

Oil changes following the initial run-in period shall not be required at less than one-year intervals.

The low-speed output shaft shall include an oil leakage chamber to prevent any possible leakage through the quadrilip seal. No oil seals shall be permitted below the operating oil level for rotating elements.

All gears and bearings shall be protected from rusting during storage by the application of a shop-applied protective coating.

#### SHAFT

The mixer shaft shall be connected to the output shaft of the speed reducer by means of a removable coupling accessible from outside the tank and located above the mounting surface. The rigid coupling shall be designed to minimize runout to less than 1/4" per 10' of shaft length.

The design rotating speed of the shaft and turbine assembly shall not exceed 80% of the first critical speed of the shaft and impeller assembly when stabilizing devices are used. When stabilizing devices are not used, the design rotating speed of the shaft and impeller assembly shall not exceed 50% of the first critical speed of the shaft and impeller assembly. The shaft supporting the turbine shall be removable from the reducer without disturbing the internals of the speed reducer. Steady bearings will not be allowed.

### 2.3 CONTROLS

- A. Each unit shall be equipped with all necessary controls, interwired, to provide the following minimum functions:
  - 1. Any other controls shown on electrical and instrumentation drawings.

### 2.4 POWER SUPPLY

- A. Each unit shall have adequate power supply as shown on Section 2.6, contract documents, drawings, and manufacturer operation and maintenance manuals. The power supply shall have a maximum power input of 10 amps, and thermal overload protection with manual reset.

2.5 SPARE PARTS

- A. All flash mixers shall be furnished with a complete set of the manufacturer's suggested spare parts, such as seals, packing, gaskets, O-rings, and any other parts subject to wear. Where applicable, one set of spare bearings shall be furnished with each piece of equipment.

2.6 MANUFACTURER:

A. **MixMor Mixers**

MOTOR HORSEPOWER:	5 hp
MOTOR ELECTRICAL VOLTAGE:	480 Volts
MOTOR RPM:	1150 rpm
MOTOR PHASE AND FREQ:	3 phase, 60 Hz
SHAFT LENGTH:	100 inches
SHAFT DIAMETER:	7/8 inches
IMPELLER DIAMETER:	20 inches max

- B. Or approved equal.

**PART 3 -- EXECUTION**

1.1 INSTALLATION

- A. The Flash Mixer shall be installed in accordance with approved procedures according to the manufacturer's recommendations, submitted with the shop drawings, and as shown, unless otherwise approved.

**END OF SECTION 11550**

**SECTION 11560 – FLOATING AERATOR**

**PART 1 – GENERAL**

1.01 DESCRIPTION

- A. The Contractor shall furnish and install a Floating Aerator System with all components necessary for it to be determined a complete and operable system in accordance with the requirements of the Contract Documents. Said components include, but are not limited to, float, propeller, motor, supports, and controls.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01600 Materials and Equipment
- B. Section 01660 Mechanical Equipment – Installation and Start-Up
- C. Electrical Design Plans

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Comply with the applicable reference specifications as specified in the General Requirements.

1.04 QUALITY ASSURANCE

- A. Continuous Operation Equipment. The Floating Aerator System equipment shall be able to operate continuously, all day and all night.
- B. No Visual Defects. The Floating Aerator System equipment shall have no visual defects, and shall have high quality welds, assembly, and corrosion resistant finish.
- C. Factory Startup Services. Delivery, installation, and startup services shall be included in the bid. For factory delivery and installation, services shall be performed by full-time factory employees experienced in the operation of this equipment and who have completed OSHA safety training applicable to this type of installation.
- D. Warranty. The Floating Aerator System equipment shall be warranted to be free of defects in materials and workmanship for a period of 2 years. See Performance Warranty Conditions in Part 3 following.

1.05 SUBMITTALS

- A. Submittals shall be made in accordance with Section 1300 – Submittals and the General Requirements herein.
- B. Final submittals shall include:
  - 1. A complete installation, operation, and maintenance manual in conformance with Section 01730.

## PART 2 – PRODUCTS

### 2.1 GENERAL

The Floating Aerator System furnished and installed under this section shall be manufactured by \_\_\_ or an approved equal by the engineer and be assembled and placed in proper operating condition by the contractor in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer as approved by the engineer.

The contractor shall furnish and install each aerator complete with:

- a) all supports.
- b) all mechanical equipment required for proper operation, including complete drive units.
- c) all steel, iron, and other materials of construction indicated in the drawings.
- d) all electrical equipment, including but not limited to, starters, controls, motors, etc.
- e) any additional materials of construction required by the manufacturer's design. Equipment shall be of U.S. manufacture.

### 2.2 CONSTRUCTION

#### A. EQUIPMENT

The Floating Aerator System equipment shall be constructed primarily of Type 316 Stainless Steel Metal for strength and superior corrosion resistance. The unit shall be Weatherproof rated with dust- and water-tight fittings in accordance with NEMA 4X standard. The Floating Aerator System equipment shall operate normally without the need of scheduled lubrication of any system components including motor. No spare part shall be required to be kept on hand.

If applicable, all construction materials shall comply with NSF / ANSI Standard 61 for the unit to be in safe direct contact with potable water.

#### B. ELECTRIC MOTOR

The Floating Aerator System shall be mechanically operated by a submersible motor that meets the following criteria:

1. Direct Drive, with no gearbox and no lubrication maintenance required.
2. Designed for submersible operation.
3. Designed for Continuous Operation without overheating or compromising motor life expectancy.
4. Requires three-phase 480 volts AC, 60Hz power requirement, and circuit breakers or fuses sized accordingly to 7.5HP model, following NEC requirements.

The Motor Housing shall be Series 300 Stainless Steel and shall have a permanent series 300 stainless steel electrical hub welded on the side of the housing to allow electrical cable entry.

The Motor shall contain a Series 316 Stainless Steel shaft incorporating a permanent, split phase capacitor run on single phase. The rotor shall be dynamically balanced and run in a ball bearing supported system. The stator windings shall be double dipped and baked with a Class F insulation, designed for oil immersion operation. The oil shall be a highly refined mineral oil of food grade quality, specially formulated for lubrication. It shall meet FDA regulations. The oil shall provide continuous lubrication of bearings and internal seals and further function as an efficient heat transfer medium, allowing the motor to operate at 1800 RPM, at relatively low temperatures. The motor shall be contained in the motor housing by a series 300 stainless steel top plate.

A Submersible Motor Protection device, such as Franklin Sub-monitor or equivalent is highly recommended for 3-phase powered Floating Aerator System equipment.

C. UNDERWATER POWER CABLE AND ACCESSORIES

The Underwater Power Cable shall be UL Listed and specifically designed for underwater use. The conductors are flexible, stranded copper wire sized for the amp draw and length of run. The conductors shall be resistant to oil, water, and cracking. Power cable shall be fitted with a cable strain relief device, located within five feet of motor housing, capable of being attached to the latch mounted on the motor housing band clamp. This will ensure that no potential damage can occur to any cable connections, due to tension on the cable.

The Underwater Power Cable Disconnect shall be located approximately three feet from the motor housing. It is a two-piece molded assembly made of thermoplastics, meeting UL 778 requirements. The cap end shall be permanently connected to the underwater pin and socket connector. The body end of the disconnect shall be permanently attached to the underwater power cable and sealed with an approved compound. This is intended to prevent water entry if damage should occur to the cable. The disconnect shall be sealed with an internal O-ring and by an external series 300 stainless steel clamp ring, which can be easily opened.

The Underwater Pin and Socket Connector shall consist of a Series 900 IP68 pin and socket connector. It shall be of a 4-pin configuration rated 32 amps at 600 volts AC. The pin end shall be potted into a series 300 stainless steel 90° adapter elbow with an approved ridged epoxy. This assembly shall be permanently attached to the series 300 stainless steel hub that is welded onto the side of the series 300 stainless steel motor housing. The socket end shall be attached to a 36" piece of UL Listed underwater power cable. It shall be permanently secured to the UL Listed power cable by means of an integrated clamp and series 300 stainless steel screws. It shall be completely epoxied to prevent entry of water or any other foreign matter. The other end of this assembly is permanently attached to the cap end of the underwater cable disconnect. It is sealed with a flexible potting compound.

D. OTHER COMPONENTS

The Float shall be a one-piece component made of Series 300 Stainless Steel material. The float shall be filled with closed-cell polyurethane foam for structural stability.

The Propeller shall be precision machined and formed using 316 Stainless Steel. The propeller shall be connected and secured in place to the motor shaft. The propeller shall be enclosed by a Series 300 Stainless Steel Intake Screen/Cone,

2.3 CONTROLS

- A. Each unit shall be equipped with all necessary controls, interwired, to provide the following minimum functions:
  - 1. Any other controls shown on electrical and instrumentation drawings.

2.4 POWER SUPPLY

- A. Each unit shall have adequate power supply as shown on Section 2.6, contract documents, drawings, and manufacturer operation and maintenance manuals. The power supply shall have a maximum power input of 10 amps, and thermal overload protection with manual reset.

2.5 SPARE PARTS

- A. All Floating Aerator Systems shall be furnished with a complete set of the manufacturer's suggested spare parts, such as seals, packing, gaskets, O-rings, and any other parts subject to wear. Where applicable, one set of spare bearings shall be furnished with each piece of equipment.

2.6 MANUFACTURER:

A. **Aqua-Aerobic Systems, Inc.**

MOTOR HORSEPOWER:	7.5 hp
MOTOR ELECTRICAL VOLTAGE:	480 Volts
MOTOR RPM:	1800 rpm
MOTOR PHASE AND FREQ:	3 phase, 60 Hz

B. Or approved equal.

**PART 3 – EXECUTION**

3.1 FIELD SERVICES

- A. The Floating Aerator System shall be installed in accordance with approved procedures according to the manufacturer's recommendations, submitted with the shop drawings, and as shown, unless otherwise approved.

3.2 FIELD SERVICES

- A. Startup and Training. Startup and training to be performed by full-time factory employees trained in the operation of the Floating Aerator System.
- B. Training. The contractor shall provide at least four (4) hours of training.
- C. Safety Equipment. Installation personnel shall be equipped with job-specific safety equipment to complete the installation of all potable water pumping system equipment following all OSHA safety regulations. Safety equipment shall include confined space, fall protection, rescue, decontamination, and communication tools such as (air monitor, ventilation fan, tripod, winches, FBH's, retractable, ropes, lanyards, descenders, radios, hard hats, step pools, disinfectant sprayer, etc.)

**END OF SECTION 11560**

**SECTION 13320 - HIGH DENSITY CROSSLINKED POLYETHYLENE TANKS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. General: The Contractor shall furnish all labor, equipment, materials, tools, supplies, fittings, and appurtenances required for the fabrication, support, installation, anchorage, hook-up, lining, protective coating, and testing of double wall high density crosslinked polyethylene tank(s), and all appurtenant work, for a complete and workable installation as specified herein, in accordance with the requirements of the Contract Documents.
- B. All plastic tanks shall be manufactured of material suitable for the chemicals they serve, and shall be certified for such use on the shop drawings. Tanks shall be designed and checked for all loads to be incurred during service, including, but not limited to, wind, temperature stress and earthquake loads by a registered (California) engineer with a minimum of five (5) years experience in high density crosslinked polyethylene tanks. All designs and calculations shall be signed by the registered engineer and submitted to the Owner for approval.
- C. The manufacturer shall have been regularly engaged in the design and manufacture of High Density Polyethylene Tanks such as specified herein for at least five (5) years. The tank manufacturer's experience shall include at least five (5) tank installations, of equal or larger capacity than specified herein, that have been in operation for at least five (5) years. Manufacturer shall submit references for a minimum of five (5) installations where the equipment has been used to store the specified chemicals for at least five (5) years.
- D. The tank shall be warranted for five (5) years to be free of defects in material and workmanship. The tank shall be warranted for five (5) years for the storage of the specified chemical.
- E. UL Listed Tanks: Manufacturer shall have the capability of manufacturing UL Listed "Above Ground Chemical Storage Tanks" and UL Classified ANSI/NSF61 potable water storage tanks. The tanks as specified herein shall be UL Labeled.
- F. NSF / ANSI STANDARD 61  
  
Piping, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61 as being suitable for contact with potable water.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. The Work of the following Sections applies to the Work of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.
- B. Section 11000 - Equipment General Provisions.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the reference specifications of the General Requirements.
- B. Comply with the current provisions of the following codes and standards.

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1. Commercial Standards:

ASTM D 638	Test Method for Tensile Properties of Plastics
ASTM D 695	Test Method for Compressive Properties of Rigid Plastics
ASTM D 746	Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D 883	Definitions of Terms Relating to Plastics
ASTM D 1998	Standard Specification for Polyethylene Upright Storage Tanks (Type I Tanks)
ASTM D 1505	Test Method for Density of Plastics by the Density-Gradient Technique
ASTM D 1525	Test Method for Vicat Softening Temperature of Plastics
ASTM D 1693	Test Method for Environmental Stress-Cracking of Ethylene Plastics
NSF / ANSI 61	Drinking Water System Components – Health Effects
UL Listed	Above Ground Chemical Storage Tanks

When two or more of the above regulations are applicable, the more stringent requirement shall be met.

1.04 CONTRACTOR SUBMITTALS

- A. Shop Drawings: The Contractor shall furnish shop drawings of all items and accessories in accordance with the General Requirements.
- B. Data Requirements: The drawings and data submitted shall include the following:
1. Dimensions including anchor bolt layouts.
  2. Nozzle schedule including size, mark, thickness, and rating.
  3. Details of structural supports and anchor systems.
  4. Tank capacity (gallons).
  5. Design specific gravity of 1.50
  6. Wall thickness calculations.
  7. Seismic calculations in accordance with the current Uniform Building Code.
  8. Chemical resistant data.

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- 9. Installation and repair manual.
- 10. Manufacturer’s warranty statement.
- C. NSF /ANSI Standard 61: Documentation illustrating manufacturer’s certification of NSF / ANSI Standard 61 – Drinking Water System Components.
- D. Factory Test: Data submitted shall include the following:
  - 1. Visual Inspection
  - 2. Gel Testing
  - 3. Hydrostatic Testing

1.05 QUALITY ASSURANCE

- A. Quality Assurance shall be in accordance with Section 11000 - Equipment General Provisions.
- B. Tank shall be manufactured from material certified to NSF / ANSI Standard 61 for chemical storage.

PART 2 - PRODUCTS

2.01 HIGH DENSITY CROSSLINKED POLYETHYLENE TANKS

- A. General: The Contractor shall furnish and install tanks of capacity and dimensions as illustrated on the Plans.
- B. Standards: Construction of tanks shall be in accordance with ASTM standards listed herein.
- C. Design: High Density Polyethylene tanks shall be rotationally molded of High-Density Crosslinked Polyethylene (XLPE), double wall, flat bottom and domed top.

The tank(s) is to be designed for above ground, vertical installation and storage of chemical (as noted in the Plans). The XLPE resin shall contain 1/2 to 1 percent ultraviolet stabilizer. Where black tanks are specified, the XLPE resin shall contain 1/2 to 1 percent carbon black as blended by the XLPE resin manufacturer. The tanks shall be able to operate at ambient temperatures of 40°F - 150°F in the outdoors without deformation or degradation. The XLPE resin properties shall meet or exceed the following:

<u>PROPERTY</u>	<u>ASTM TEST</u>	<u>VALUE</u>
Density (gm/cc)	D 1505	0.93-0.944
Tensile Strength Ultimate, 2"/min (psi)	D 638	2600
Elongation at Break, 2"/min (%)	D 638	400
ESCR, Condition A, F50, (hrs)	D 1693	> 1000
Vicat Softening Temperature (deg F)	D 746	230
Brittleness Temperature (deg F)	D 746	> 180
Flexural Modulus (psi)	D 790	100,000

***HIGH DENSITY CROSSLINKED  
POLYETHYLENE TANKS  
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- D. Connections: Tank connections shall be installed by manufactured per size, location and type as specified in the tank connection schedule below and as illustrated on the Plans. Gasket material shall be XLPE. Refer to the tank drawing for tank connections size and location.

Inlet, Outlet, Drain And Overflow	PVC Flange Connection - Donker Bolt Fitting with hastelloy-C studs and internal polyethylene injection molded encapsulated heads and external PVC flange - location as illustrated on the Plans.
Vent	Self-aligning dome-top PVC fitting with fiberglass screen between 2 flanges - location as illustrated on the Plans.
Level Probe	1-1/4" PVC FNPT connection - located on the top.
Level Indication	An ultrasonic level indicator (transmitter) shall be provided.  An ultrasonic level indicator shall be suitable for service in a non-hazardous and hazardous environment. The ultrasonic level transducer shall be provided with a 50 feet wiring and be controlled from the pertaining chemical's Control Panel.  The ultrasonic level indicator shall provide a 4 – 20 mA signal output.  The ultrasonic level transmitter shall meet the requirements of the technical specifications.
Maintenance Manhole	24" Integrally Molded with hinged cover - - located on the top.

- E. Testing: The manufacturer shall furnish proof indicating that the following factory tests have been performed on the tanks, and specified test results have been achieved.

Gel Test - Gel test shall be performed in accordance with ASTM D1998 Section 11.4. Test results shall indicate that the innermost 1/8" of wall thickness shall be no less than 65 percent gel, the outermost 1/8" of wall thickness shall be no less than 80 percent gel, and the total wall thickness shall be no less than 75 percent gel.

Visual – Inspection for confirmation accurate fitting location, or defects of the tank.

Low Temperature Impact Test - Low temperature impact test shall be performed in accordance with ASTM D 1998, Section 11.3.

Hydrostatic Leak Test: Manufacturer shall have the capability of hydrostatically testing the tank and factory installed fittings with water.

The hydrostatic test shall incorporate the use of a standpipe to compensate for the difference in density of water and the chemical for which service of tank is specified. Test results shall indicate that no leakage has occurred over a 12 hour test duration.

2.02 BOLTS, ANCHOR BOLTS, WASHERS, SUPPORTS, AND HOLD DOWN LUGS

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- A. The Contractor shall provide all bolts, anchor bolts, nuts, washers, and supports as required for all the plastic tanks specified in this Section, and in accordance with the requirements of the manufacturers of the plastic tanks. All bolts, anchor bolts, washers, in connection with this Section shall be of Type 316 stainless steel. The lateral tank restraint system shall be designed for Seismic forces in accordance with the current edition of the Uniform Building Code. Restraint system components shall be Type 316 stainless steel.

2.03 MANUFACTURERS

- A. Core-Rosion Products  
3300 E. 19<sup>th</sup> Street  
Signal Hill, CA 90755  
1-562-986-5238  
www.core-rosion.com
- B. Polyprocessing  
8055 S. Ash Street  
French Camp, CA 95231  
1-877-325-3142  
www.polyprocessing.com
- C. Assmann Corporation  
300 North Taylor Road  
Garrett, IN 46738  
1-888-357-3181  
www.assmann-usa.com
- D. Or an approved equal.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

- A. The tank shall be shipped upright or lying down on their sides with blocks and slings to keep them from moving.
- B. All fittings shall be installed and, if necessary, removed for shipping and shipped separately unless otherwise noted by the Contractor.
- C. Upon arrival at the destination, inspect the tank(s) and accessories for damage in transit. If damage has occurred, Manufacturer/Supplier is to be notified immediately.

3.02 INSTALLATION

- A. All high density crosslinked polyethylene tanks shall be installed in accordance with manufacturer instructions. All pipes and equipment connecting to the tanks shall be firmly supported, to prevent stresses on the tank.

3.03 FIELD INSPECTION

A. The field inspection shall include the following:

1. A hydrotest of at least 24 hours shall be performed. The tank shall be filled with water to the overflow level and be observed for leaks. If leaks are observed, the tank shall be repaired or replaced at the Engineer's discretion at no cost to the Owner.

**END OF SECTION 13320**

**SECTION 13480 - ALUMINUM ACCESS HATCH**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish and install aluminum access hatch(s) and all appurtenant work, complete and operable, all in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCE, SPECIFICATIONS, CODES AND STANDARDS

- A. ASTM A 36-93a: Standard Specification for Structural Steel.

1.04 CONTRACTOR SUBMITTALS

- A. Product Data: Provide manufacturer's product data for all materials in this Specification.
- B. Shop Drawings: Show profiles, accessories, location and dimensions.
- C. Samples: Manufacturer to provide upon request; sized to represent material adequately.
- D. Contract Closeout: Aluminum access door manufacturer shall provide the manufacturer's warranty prior to the contract closeout.

1.05 QUALITY ASSURANCE

Not used.

1.06 DELIVERY, STORAGE AND HANDLING

- A. All materials shall be delivered in manufacturer's original packaging.
- B. Store materials in a dry, protected, well-vented area. The Contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.
- C. Remove protective wrapping immediately after installation.

1.07 WARRANTY/GUARANTEE

- A. Manufacturer's Standard Warranty: Materials shall be free of defects in material and workmanship for a period of twenty-five (25) years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.01 GENERAL

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- A. Verify that other trades with related work are complete before installing aluminum access door(s).
- B. Mounting surfaces shall be straight and secure; substrates shall be of proper width.
- C. Refer to the construction documents, shop drawings and manufacturer's installation instructions.
- D. Observe all appropriate OSHA safety guidelines for this work.

2.02 ACCESS DOOR

- A. Furnish and install aluminum access hatch as illustrated on Plans. Length denotes hinge side. The vault access door shall be single leaf. The vault access door shall be pre-assembled from the manufacturer.

2.03 MANUFACTURER

- A. Product: Type J-5AL.

The BILCO Company  
P. O. Box 1203  
New Haven, CT 06505  
1-203-934-6363  
1-203-933-8478 - FAX  
Web: [www.bilco.com](http://www.bilco.com)

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East Jordan Iron Works, Inc.  
301 Spring Street  
P. O. Box 434  
East Jordan, MI 49727  
1-800-874-4100  
1-231-536-4458, FAX  
Web: [www.ejin.com](http://www.ejin.com)

B. Performance Characteristics:

1. Cover: Shall be reinforced to support a minimum live load of 300 PSF with a maximum deflection of 1/150<sup>th</sup> of the span.
2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
3. Operation of the cover shall not be affected by temperature.
4. Entire door, including all hardware components, shall be highly corrosion resistant. Please consult the manufacturer when doors are to be installed in unusually harsh environments or extremely corrosive conditions.

C. Cover: Shall be ¼ inch aluminum diamond pattern.

D. Frame: Channel frame shall be ¼ inch extruded aluminum with bend down anchor tabs around the perimeter. A continuous EPDM gasket shall be mechanically attached to the aluminum frame to create a barrier around the entire perimeter of the cover and significantly reduce the amount of dirt and debris that may enter the channel frame.

E. Hinges: Shall be specifically designed for horizontal installation and shall be through bolted to the cover with tamperproof Type 316 stainless steel lock bolts and shall be through bolted to the frame with Type 316 stainless steel bolts and locknuts.

F. Lifting Mechanisms: Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the cover when closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe fastened to a formed ¼ inch gusset support plate.

G. A removable exterior turn/lift handle with a spring loaded ball detent shall be provided to open the cover and the latch release shall be protected by a flush, gasketed, removable screw plug.

H. Hardware:

1. Hinges: Heavy forged aluminum hinges, each having a minimum ¼ inch diameter Type 316 stainless steel pin, shall be provided and shall pivot so the cover does not protrude into the channel frame.
2. Cover shall be equipped with a hold open arm which automatically locks the cover in the open position.

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3. Cover shall be fitted with the required number and size of compression spring operators. Springs shall have an electrocoated acrylic finish. Spring tubes shall be constructed of a reinforced nylon 6/6 based engineered composite material.
4. A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of the cover.
5. Hardware: Shall be Type 316 stainless steel.
6. Finishes: Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Submit product design drawings for review and approval to the Engineer before fabrication.
- B. The Contractor shall check as-built conditions and verify the manufacturer's aluminum access hatch details for accuracy to fit the application prior to fabrication. The Contractor shall comply with the aluminum access hatch manufacturer's installation instruction.
- C. The Contractor shall furnish mechanical fasteners consistent with the aluminum access door manufacturer's instructions.

3.02 INSPECTION

- A. Verify that the vault access door installation will not disrupt other trades. Verify that the substrate is dry, clean, and free of foreign matter. Report and correct defects prior to any installation.

**END OF SECTION 13480**

**SECTION 15615 - VALVES**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall provide all tools, supplies, materials, equipment, and labor necessary for furnishing, epoxy coating, installing, adjusting, and testing of all valves, resilient wedge gate valve, check valves, plug valves, combination air and vacuum release valves and appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents. Where buried valves are illustrated on the Plans, the Contractor shall furnish and install valve boxes to grade, with covers, extensions, and position indicators.
- B. The provisions of this Section shall apply to all valves and valve operators specified in the various Sections of Divisions 2, 13, 15 and 17 of these Specifications except where otherwise specified in the Contract Documents. Valves and operators in particular locations may require a combination of units, sensors, limit switches, and controls specified in other sections of these Specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Divisions 2 and 15, applicable sections, Pipe, Fittings, and Valves
- B. Section 09900 - Protective Coatings
- C. Division 16 - Electrical, applicable sections

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the reference specifications of the General Requirements.
- B. Comply with the current provisions of the following Codes and Standards.

ANSI B 16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
ANSI B 16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys
ANSI/ASME B 1.20.1	General Purpose Pipe Threads (inch)
ASTM A 36	Specification for Structural Steel
ASTM A 48	Specification for Gray Iron Castings
ASTM A 126	Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 536	Specification for Ductile Iron Castings
ASTM B 61	Specification for Steam or Valve Bronze Castings
ASTM B 62	Specification for Composition Bronze or Ounce Metal Castings

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ASTM B 148	Specification for Aluminum-Bronze Castings
ASTM B 584	Specification for Copper Alloy Sand Castings or General Applications
ANSI/AWWA C 111	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
ANSI/AWWA C 500	Gate Valves for Water and Sewage Systems
ANSI/AWWA C 504	Rubber-Seated Butterfly Valves
ANSI/AWWA C 506	Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valves Types
ANSI/AWWA C 507	Ball Valves 6 inches through 48 inches
AWWA C 508	Swing-Check Valves for Waterworks Service, 2 inches Through 24 inches NPS
ANSI/AWWA C 509	Resilient-Seated Gate Valves for Water and Sewage Systems
ANSI/AWWA C 517	Resilient-Seated Cast-Iron Eccentric Plug Valves
AWWA C 550	Protective Interior Coatings for Valves and Hydrants
SSPC-SP-5	White Metal Blast Cleaning
MSS-SP-70	Manufacturers Standardization Society of the Valve and Fitting Industry; Cast Iron Gate Valves. Flanged and Threaded Ends
NSF / ANSI 61:	Drinking Water System Components – Health Effects

1.04 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with General Requirements. In addition to product information, the Contractor shall submit for approval lay-out drawings showing valve locations within the piping system, supports, and identification numbers.
- B. The following submittals and specific information shall be provided.
  - 1. Shop Drawings: Shop drawings of all valves and operators including associated wiring diagrams and electrical data, shall be furnished as specified in General Requirements. Submit for approval the following:
    - a. Manufacturer's literature, illustrations, paint certifications, specifications, detailed drawings, data and descriptive literature on all valves and appurtenances.
    - b. Deviations from Contract Documents
    - c. Engineering data including dimensions, materials, size and weight.
    - d. Fabrication, assembly and installation drawings.

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- e. CV values, head loss curves, and as required, calculations.
- f. Special tools list.
- 2. Valve Labeling: The Contractor shall submit a schedule of valves to be labeled indicating in each case the valve location and the proposed wording for the label. Complete nameplate data of valves and actuators is required.
- 3. Operation and Maintenance Manuals:
  - a. Submit complete installation, operation and maintenance manuals including test reports, maintenance data and schedules, description of operation, and spare parts information.
  - b. Furnish Operation and Maintenance Manuals in conformance with the requirements of the General Requirements.
- 4. Shop Tests: Hydrostatic tests shall be performed, when required by the valve specifications included herein.
- 5. Certificates: Where specified or otherwise required by Engineer, submit Test Certificates and Certificates of Compliance with AWWA standards and other specifications, especially where it concerns the suitability of the materials of construction for the particular application.

1.05 QUALITY ASSURANCE

- A. Valve Testing: Valves shall be shop tested per manufacturer's recommendations and applicable AWWA/ANSI specifications prior to shipment. Manufacturer's certification that valves have been shop tested shall be submitted for approval 30 days prior to scheduled shipment.
- B. Bronze Parts: Where specified, all interior bronze parts of valves shall conform to the requirements of ASTM B 62, or, where not subject to dezincification, to ASTM B 584.
- C. Shop Inspection: Shop inspection of valve construction, testing and coating shall be witnessed and approved by the ENGINEER. All valves will be shop inspected unless otherwise waived in writing by the Engineer.
- D. The Contractor shall demonstrate that each valve installed as a part of a piping system will operate under field conditions in a manner consistent with the design of the system. All testing of valves shall be witnessed and approved by the Engineer.
- E. For all pneumatic, hydraulic, and electric motor operators and controls, it shall be the responsibility of the Contractor to provide a qualified representative of the valve manufacturer to perform all field adjustments to set operator limit switches for the required functions. The cost of providing a qualified representative of the valve manufacturer for field adjustments shall be included in the Contractor's bid. All wiring of motor operators shall be identified with a unique number unlike any other wiring identification. It is the responsibility of the Contractor to coordinate the requirements of this section with those involving both specifications of Division 16, "Electrical" and Division 17, "Instrumentation."
- F. All adjustments, calibration, and/or testing shall be done in the presence of the Engineer.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site to ensure uninterrupted progress of the Work. Deliver anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to not delay the Work.
- B. All boxes, crates and packages shall be inspected by Contractor upon delivery to the site. Contractor shall notify Engineer if any loss or damage exists to equipment or components. Replace loss and repair damage to new condition, in accordance with manufacturer's instructions.
- C. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- D. Provide full-face protectors of waterproof material fastened to each side of the valve body to protect joints and the valve interior.

PART 2 - PRODUCTS

2.01 GENERAL VALVE REQUIREMENTS

- A. General: The Contractor shall furnish all valves, operators, actuators, valve-operating units, stem extensions, and other accessories as shown or specified. All valves shall have the name of the manufacturer and the site of the valve cast on the body or bonnet or shown on a permanently attached plate in raised letters. All valves shall be new and of current manufacture. All valves, 6 inch and larger, shall have operators with position indicators. Where buried, these valves shall be provided with valve boxes and covers containing position indicators, and valve extensions.
- B. Valve Flanges: The flanges of valves shall be in accordance with Divisions 2 and 15.
- C. Valve Stems: Except where otherwise specified, valves with motorized operators shall have stems conforming to ASTM A 276 Type 316 stainless steel with minimum tensile strength of 95,000 psi, and a minimum yield point of 75,000 PSI, and elongation of 25% in 2 inches. Manually operated valves shall have silicon-bronze stems conforming to ASTM B 584-875, having minimum tensile strength of 60,000 PSI, a minimum yield point of 24,000 PSI, and elongation of 16% in 2 inches. Where subject to dezincification, manually operated valve stems shall be of bronze conforming to ASTM B 62, containing no more than 5% zinc, nor more than 2% aluminum.
- D. Protective Coating: Except where otherwise specified, ferrous surfaces, exclusive of stainless steel surfaces, in the water passages of all valves 4 inch and larger, as well as the exterior surfaces of all submerged, buried or aboveground valves and operators, shall be fusion bonded epoxy. Flange faces of valves shall not be coated. The valve manufacturer shall certify in writing that such coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications.
- E. Valve Operators:
  - 1. Valve operators shall be provided for specific valves as required by the specification section.
  - 2. When one, or more, underground valve is installed, an adjustable valve key shall be provided to the Owner.

- G. Nuts and Bolts: All nuts and bolts on valve flanges and supports shall be coated with a flouropolymer as manufactured by Tripac (Tripac 2000 Blue), or an approved equal. All bolts on valve bonnets and exterior valve hardware shall be Type 316 stainless steel.

## 2.02 RESILIENT SEATED GATE VALVES

Resilient seated gate valves shall conform to AWWA C 509, latest edition. The wedge shall be fully encapsulated in the elastomer, including the guides. The brass stem nut shall be rigidly enclosed in the wedge to maintain alignment. The valve body shall be composed of ductile iron.

The stem shall have two (2) O-rings and a wiper above the collar and one (1) O-ring below the collar. Stem seals must be replaceable with the valve under pressure.

The stem material shall be standard bronze. Stainless steel (ANSI-420) shall also be acceptable for use as an alternative.

The waterway shall be full size to allow for tapping use; no cavities or depressions shall be permitted in the seat area.

Valve body and bonnet shall be electrostatically applied, fusion bonded, epoxy coated both inside and out by the valve manufacturer. The coating shall meet the requirements of AWWA C 550, latest edition. Coating shall be applied only at the valve manufacturer's facilities. Exterior hardware shall be composed of Type 316 stainless steel.

The bonnet bolts shall not be exposed to the environment.

O-ring style seals shall be used as gaskets on the bonnet and on the stuffing box. The below grade valves shall be supplied with a standard 2 inch operating nut. All valves shall be wrapped with a polyethylene material.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering resilient wedge gates valves which may be incorporated into the work are:

- a. AFC
- b. Clow
- c. M&H Valve Company
- d. Mueller
- e. Or Equal.

## 2.03 BUTTERFLY VALVES

### A. General:

All butterfly valves shall be of the rubber-seated tight-closing type. They shall meet or exceed AWWA Standard C 504.

Both valve ends shall be mechanical-joint (or other, as available) per AWWA Standard C 111. Accessories (bolts, glands and gaskets) shall be supplied by the valve manufacturer.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering butterfly valves which may be incorporated into the work are:

- a. Bray
- b. Pratt
- c. Dezurik

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- d. Clow
- e. Or Equal.

All valves must use full AWWA C 504 Class 150B valve shaft diameter, and full Class 150B underground-service-operator torque rating throughout entire travel, to provide capability for operation in emergency service. All valves shall be NSF approved.

B. Valve:

Valve body shall be composed of ductile iron with 18-8 Type 304 stainless steel body seat. Valve vane shall be ductile iron, having rubber seat mechanically secured with an integral 18-8 stainless steel clamp ring and 18-8 stainless steel self-locked screws.

Rubber seat shall be a full-circle 360 degree seat not penetrated by the valve shaft. For valves 4" - 12", the valve shaft shall be one piece, extending full size through the entire valve. Valve shaft shall be 304 stainless steel. Packing shall be O-ring cartridge designed for permanent duty in underground service. For 14 inches and larger valve shaft shall be 18-8 stainless steel stub shaft design keyed to the vane with stainless steel taper pins.

Body Type: All butterfly valves shall be of the rubber-seated tight-closing type. They shall meet or exceed AWWA Standard C 504.

Valve ends shall be: As noted in the Plans.

Wafer: Suitable for installation between 125# or 150# ASA flanges (available 4 inch through 20 inch).

Flanged: Short body valves per Table 2 of AWWA Spec C 504. Flanges shall be 125# ANSI (available all sizes). Also flanged by MJ in 6 inch, 8 inch and 16 inch sizes.

Mechanical Joint: Both ends of valve shall be "MJ" per AWWA C 111. "MJ" accessories (bolts, glands, gaskets) must be supplied by valve manufacturer (available all sizes - also flanged by MJ in 6 inch, 8 inch, 12 inch and 16 inch sizes). Both ends of valve shall be "MJ" per AWWA C111. "MJ" accessories (bolts, glands, gaskets) shall be supplied by valve manufacturer (available all sizes - also flanged by MJ in 6 inch, 8 inch, 12 inch and 16 inch sizes).

C. Operator:

Valve operator shall be of the traveling-nut type, sealed, gasketed, and lubricated for underground service. It shall be capable of withstanding an overload input torque of 450 ft. lbs at full-open or full-closed position without damage to the valve or valve operator. It shall be designed for submergence in water to 25 feet head pressure for up to 72 hours.

Valve shall be capable of easy closure by one man using standard valve key, even under emergency line-break conditions as severe as those that would cause a valve maximum opening torque requirement of as much as two times AWWA Class 150B.

All valves shall open left (clockwise to close), and be equipped with 2 inch AWWA operating nut.

Crank, Handwheel or Chainwheel: All manual operators for service other than underground shall have position indicator and shall be totally enclosed and permanently lubricated. In any event, a maximum pull of 80 pounds on the crank or wheel shall

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produce full Table 1 output torque throughout entire travel. Operators shall full-closed positions without damage to valve or operator. Operators shall be of the “traveling-nut” type. All valves shall open left (clockwise to close).

Cylinder: Cylinder operator shall be of the base mounted configuration. Cylinder barrel shall be of molybdenum-disulfide lined glass fiber reinforced epoxy tubing, to provide a corrosion-free, self-lubricated high strength barrel. Rod seal shall be of urethane, molybdenum-disulfide filled, to provide a self-lubricated, long life seal.

Piston rod shall be of hard chromium plated 18-8 stainless steel, and shall be top and bottom guided in a heavy cast iron mechanism housing for positive alignment. Guiding shall be accomplished by bronze bearings at ends of housing straddling all side loads improved in operation. Entire operator including piston rod shall be fully enclosed. Operator shall produce full AWWA Standard C 504 Table 1 output torque throughout entire travel for Class (25A) (25B) (75B) (150B) with a minimum supply pressure of PSI (water) (air) (oil).

Electric Valve Actuators: Actuators shall be provided as called out in the improvement Plans. The actuator shall be compact and low profile to minimize space requirements. The actuator shall operate over 90°. The actuator shall provide easy access for field wiring and adjustment. The actuator shall be built to withstand line vibration and shock without failure.

The enclosure shall be die-cast aluminum for environmental protection. The waterproof enclosure shall be certified to UL, CSA and CE NEMA 4 waterproof standards. The waterproof/explosion proof enclosure shall be certified to UL NEMA 4 hazardous locations. The enclosure shall be provided with captive cover bolts to prevent loss of cover bolts when cover is removed. The enclosure shall have two conduit connections (one for power wiring and one for control signal wiring) in either NPT or metric threads as specified. The actuator enclosure shall be provided with a high visibility valve position display prominently labeled and color coded to indicate the valve position throughout the full range of travel.

The motor shall be a single phase, permanent split capacitor reversible induction type with Class F or better insulation. The motor shall contain a built-in UL approved automatic reset thermal overload protector set at 275° F (135°C) embedded in the motor windings. Motors shall be 24 VAC, 120 VAC 50/60 Hz or 240 VAC 50/60 Hz as specified on the Electrical and or Instrumentation Plans.

The actuator shall have a self-locking gear train system consisting of a worm and worm gear output drive mechanism which will hold the valve in the desired position without the need for an electro-mechanical braking system. The spur gear train shall have precision cut multi-staged gears which will withstand locked rotor conditions and are permanently lubricated at the factory.

Mechanical stainless-steel travel stops shall be provided and located outside the actuator enclosure for ease of adjustment. Stainless steel lock nuts to hold the travel stops in position and o-ring seals for waterproof protection shall be provided. The mechanical travel stops shall be capable of limiting the travel of the actuator in either direction from full closed to full open.

The actuator shall be equipped with a manual override handwheel to rotate the valve without electrical power. The manual override system shall ensure positive and efficient manual operation without the use of extra tools or levers.

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An automatic power cutout switch shall be provided to cut power to the motor when the actuator manual override is engaged. This cutout shall also function as a safety emergency power shutdown device and shall be accessible from outside the actuator enclosure.

All travel switches shall be:

- Single Pole, Double Throw Form C Type
- UL Listed and CSA Approved
- 10A at 125/250 VAC and 1/2A at 125 VDC

The actuator switches shall be pre-wired to a terminal block for ease of access and all internal wiring shall range from 12-22 AWG. The travel limit switches shall limit the actuator travel in both the open and closed direction of travel. Cams for each travel limit switch shall be infinitely adjustable by finger touch or screw driver.

Actuators shall be designed for electric operation for the following service conditions:

- Temperature ranges of -40°F (-40°C) to +150°F (+65°C)
- Duty Cycle: 25% for Intermittent Operation
- 100% for Continuous Operation

All actuators shall be factory tested to ensure proper operation.

All actuators shall mount directly to the valve mounting flange and stem without the need for any brackets or couplings.

The actuator shall be designed to accept any of the following optional accessories if specified during the submittal review process:

- A. Torque Limiting System:
  - Shall include a 2 SPDT mechanical switches and 2 factory calibrated adjusting screws.
  - The switches, in response to a predetermined load on the actuator output shaft, shall interrupt power to the motor.
  - The switches shall operate at any point and in both directions of actuator level.
- B. Heater:
  - Shall include a self-regulating temperature control to prevent condensation build-up.
  - Shall be pre-wired to the terminal block for ease of connection to external source.
  - Rated output shall be 15W at 120 or 220 VAC.
- C. Microprocessor Servo:
  - Shall provide precise modulating control of the valve position in response to an analog input signal.
  - Shall have an analog output signal proportional to the actual valve position and the signal shall be configurable to either current or voltage output.
  - Voltage spike protection shall be provide on all input terminals.
  - Independent adjustments shall be provided for Deadband and for both open and closed Speed Control of the actuator.
  - Input signals shall be:
    - 4-20 mADC 250 Ohm Input Impedance

0-10 VDC 2.1k Ohm Input Impedance  
 2-10 VDC  
 10k Ohm or great potentiometer

- Calibration shall be accomplished by pressing a single button to initiate the calibration routine.
- Control characteristics shall be linear and duty cycle shall be 100%.
- Internal feedback shall be by means of a 10k Ohm potentiometer.
- Retransmission outputs shall be:
  - 4-20 mAADC
  - 0-5 VDC
  - 0-10 VDC
  - 2-10 VDC
- Separate Speed Control adjustments shall be provided for adjustment of open and close travel speeds.
- Inputs for the control box, handwheel, LED status indicators and self-diagnostic capability shall also be provided.
- DeviceNet Servos shall also be available if specified.

D. Local Control Station:

- For local electrical operation of the actuator.
- Shall flush mount to the actuator and include:
  - a local/off/remote control switch
  - an open/stop/close switch
  - two lights which indicate open and closed valve position
- Enclosure shall be aluminum and waterproof (NEMA 4, 4X, IP 65)

D. Coating:

Standard coating shall be universal primer. Coating shall be applied to entire valve body and vane before final assembly.

Valve body shall be electrostatically applied, fusion bonded, epoxy coated to all surfaces of valve body and vane to an average minimum film thickness of 5 mils, conforming to AWWA C 550 Standard. Coating shall be applied only at the valve manufacturer's facilities. Exterior valve hardware shall be composed of Type 316 stainless steel hardware for butterfly valve flanges shall consist of flouropolymer coated hardware as manufactured by Tripac (Tripac 2000 Blue) or an approved equal.

E. Tests:

All valves shall be tested bottle-tight at rated working pressure by the manufacturer as follows:

4" through 12"	200 PSI
14" Up	150 PSI

In addition, a hydrostatic test with vane partially open shall be given to the assembled valve as follows:

4"	400 PSI
14" Up	300 PSI

2.04 SWING CHECK VALVES

The check valves shall be manufactured of gray cast iron in conformance with ASTM A 126 Grade B. The swing check valves shall comply with AWWA C 508, latest revision. The check valve shall be provided with flanges in accordance with ANSI B 16.1, Class 125.

The valve design shall be full flow equal to nominal pipe diameter at all points through the valve. The valve shall be capable of passing 3-inch diameter sphere. The seating surface shall be on a 45-degree angle to minimize disc travel. A threaded port with pipe plug shall be provided on the bottom of the valve to allow for field installation of a backflow actuator, without special tools or removing the valve from the line.

The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids content. A threaded port with plug shall be provided in the access cover to allow for field installation of a mechanical, disc position indicator.

The disc shall be of one-piece construction, precision molded with an integral O-ring type sealing surface and contain alloy steel and nylon reinforcement in the flexible hinge area. The flex portion of the disc shall be warranted for 25 years. Non-slam closing characteristics shall be provided through a short 35-degree disc stroke and a memory disc return action.

The valve body and cover shall be constructed of ductile iron per ASTM A 536 Grade 65-45-12.

The disc shall be precision molded Buna N (NBR), ASTM D 2000-BG.

The exterior and interior of the valve shall be coated with an ANSI/NSF 61 approved fusion bonded epoxy coating.

## 2.05 SILENT CHECK VALVES

The Silent Check Valve shall be globe style. The check valve shall be the silent operating type that begins to close as the forward flow diminishes and fully closes at zero velocity preventing flow reversal and resultant water hammer.

The valves shall be constructed for potable water service use and shall be certified to NSF/ANSI 61, Drinking Water System Components – Health Effects, and certified to be Lead-Free in accordance with NSF/ANSI 372. The manufacturer shall have a quality management system that is certified to conform with ISO 9001 by an accredited, certifying body. The Globe Style valves shall be supplied with 125- or 150-pound flanges.

The valve design shall incorporate a center guided, spring loaded disc and having a short linear stroke that generates a flow area equal to the nominal valve size. The operation of the valve shall not be affected by the position of the installation. The valve shall be capable of operating in horizontal or vertical positions with the flow up or down. All component parts shall be field replaceable without the need of special tools. Globe style valves shall be provided with a replaceable guide bushing held in position by the spring. The spring shall be designed to withstand 100,000 cycles without failure and provide a cracking pressure of 0.50 psi. The globe disc shall be concave to the flow direction providing for disc stabilization, maximum strength, and a minimum flow velocity to open the valve. The valve disc and seat shall have a seating surface finish of 16 micro-inch or better to ensure positive seating at all pressures. A resilient seal shall be provided on the seat to provide zero leakage at both high and low pressures without overloading or damaging the seal. The seal design shall provide both a metal to metal and a metal to resilient seal.

The valves shall be hydrostatically tested at 1.5 times their rated cold working pressure (CWP) and seat tested at the valve CWP. The manufacturer shall provide the test certificates, dimensional

drawings, parts list drawing and operation and maintenance manuals with each valve. The exterior of the valve shall be coated with a universal alkyd primer.

Valve interiors and exteriors shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550. The valve body shall be constructed of ASTM A126 Class B Cast Iron. The globe style valve seat and disc shall be ASTM A351 Grade CF8M stainless-steel. The compression spring shall be ASTM A313 Type 316 SS with ground ends.

## 2.06 PLUG VALVES

Plugs shall be solid one-piece, Cast-Iron ASTM A126 Class B or Ductile Iron ASTM 536 Grade 65-45-12. The plug shall have a cylindrical seating surface eccentrically offset from the center of the shaft. Plug shall not contact the seat until at least 90% closed. Resilient plug facing shall be Chloroprene (CR). Spherical shaped plugs are not acceptable.

Bodies and covers shall be Cast Iron ASTM A126 Class B. Ports shall be rectangular. Round ports are not acceptable. Bearings shall be sleeve type and made of sintered, oil impregnated permanently lubricated type 316 stainless steel for sizes 4-18" (100-450mm) and ASTM A743 Grade CF8M for sizes 20-36" (500-800mm). In valves larger than 36" (900mm), the upper and lower plug journals shall be fitted with ASTM A240 type 316 stainless sleeves with body bearings of ASTM B30, Alloy C95400 aluminum bronze.

Seats shall be 1/8" thick welded overlay of not less than 95% pure nickel. Seat shall be at least 1/2" wide, 1/8" thick through entire width and raised. The raised surface shall be completely covered with nickel to ensure that the resilient plug face contacts only the nickel seat. Adjustable packing shall be Acrylonitrile-Butadiene (NBR) multiple V-ring type, with a packing gland follower. Packing gland shall permit inspection, adjustment or complete replacement of packing without disturbing any part of the valve or actuator assembly, except the gland follower. Non-adjustable packing or packing requiring actuator removal to replace the packing, is not acceptable.

Pressure ratings shall be 175 psi (1210 kPa) on valve sizes through 12" (300mm) and 150 psi (1035 kPa) for 14" (350mm) and larger. Every valve shall be given a certified hydrostatic shell test and seat test, with test reports being available upon request.

All valves larger than 6" shall be installed with worm gear actuators. All gearing shall be enclosed in a cast iron housing, with outboard seals to protect the bearings and other internal components. The actuator shaft and gear quadrant shall be supported on permanently lubricated bronze bearings. Buried actuators shall be 90% grease filled. Input shaft and fasteners shall be stainless steel. Actuator mounting brackets shall be totally enclosed. Other actuators to be installed according to drawings or customer specifications.

End connections shall meet or exceed the latest revisions of AWWA C517 and other applicable standards. End Connections shall be Flanged drilled per ASME B16.1 and/or Mechanical Joint per AWWA C111. When specified, valves shall be NSF/ANSI 372 certified lead-free and NSF/ANSI 61 certified for drinking water.

## 2.07 VALVE RISER AND VALVE COVER

A 6-inch diameter cast iron valve riser and ductile iron cover shall be placed over each below grade valve. The 6-inch diameter cast iron valve riser and cover shall be manufactured by Star Pipe Products, or an approved equivalent of equal substance and function.

Place an 8 inch deep, 8-inch-wide PCC collar concentric with the exterior of the valve extension riser. Place the top of the riser 0.10-feet above the finish grade.

Two (2) 6-foot valve keys for operating of gate valves shall be furnished by the Contractor to the Owner prior to completion of the project.

PART 3 - EXECUTION

3.01 VALVE INSTALLATION

- A. General: All valves, operating units, controls, stem extensions, valve boxes, and accessories shall be handled in a manner to prevent any injury to any part of the valve. Valves shall be installed in accordance with the manufacturer's written instructions and as shown and specified. All valves shall be adequately braced to prevent warpage and bending under the intended use. Valves shall be firmly supported to avoid undue stresses on the pipe. All valves shall be installed so that the valve stems are plumb.
- B. Access: All valves shall be installed to provide easy access for operation, removal, and maintenance and to avoid conflicts between valve operators and structural members or handrails.
- C. Valve Accessories:
  - 1. Where combinations of valves, sensors, switches, and controls are specified, it shall be the responsibility of the Contractor to properly assemble and install these various items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on Shop drawing submittals.
  - 2. Valve operators and controls are to be installed where specified and designated on the Plans. The Contractor is responsible for installation of the correct valve operator and control as specified to provide a complete piping system as specified.
- D. All valves shall be field tested following installation to demonstrate that the valve operates under field conditions in a manner consistent with the design of the system.
- E. All testing of valves shall be witnessed and approved by the Engineer.
- F. The Contractor shall demonstrate that each valve operator and control installed as a part of a piping system will operate under field conditions as designed and in the manner for which the operator was specified.

**END OF SECTION 15615**

**SECTION 15707 - CHEMICAL PIPING**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. It shall be the responsibility of the CONTRACTOR to furnish and install all chemical piping systems specified herein and as illustrated in the Drawings. Each system shall be installed complete with all applicable fittings, hangers, supports, anchors, expansion joints, flexible connections, valves, and accessories to provide a functional system as designed. In addition, all insulation, lining and coating, heat tracing, testing, disinfection, excavation, backfill and encasement shall be the responsibility of the CONTRACTOR.
- B. The CONTRACTOR shall provide all tools, equipment, materials, and supplies necessary and shall perform all labor necessary to complete the work specified herein and as illustrated in the Drawings. The CONTRACTOR shall provide any equipment necessary for inspection of and testing of piping systems specified.
- C. Piping shown on drawings and specified herein is intended to define the general layout, configuration, routing, required method of support, pipe size and type only. It is the responsibility of the CONTRACTOR to provide a complete system in accordance with the Drawings and requirements set forth herein. All details necessary to provide a complete system as specified herein are the responsibility of the CONTRACTOR. The CONTRACTOR shall provide all spools, spacers, adapters, connectors, and supports necessary to provide a complete and functional system. The CONTRACTOR shall furnish pipe supports, hangers, anchors, etc., in addition to those illustrated on the Drawings, when necessary to provide a system as specified herein. The CONTRACTOR shall provide lay-out drawings of all piping systems prior to installation showing all piping, equipment, accessories, supports, etc.

1.02 RELATED WORK SPECIFIED ELSEWHERE (NOT USED)

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the reference specifications of the GENERAL REQUIREMENTS.
- B. Commercial Standards:
  - ASTM D1784 Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC).
  - ASTM D1785 Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120.
  - ASTM D2467 Specification for Socket-Type Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
  - ASTM D2564 Specification for Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings

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ASTM D4101	Specification for Polypropylene Injection and Extrusion Materials.
PPI Technical Report TR 3/4	Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials
AWWA Manual M23	PVC Pipe - Design and Installation

1.04 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall complete shop drawings of all chemical piping systems, equipment, accessories, and supports. The shop drawings shall include all necessary dimensions and details on pipe joints, fittings, fitting specials, valves, appurtenances, design calculations, and material lists. The submittals shall include detailed layout, spool, or fabrication drawings which show all pipe spools, spacers, adapters, connectors, fittings, and pipe supports necessary to accommodate the equipment and valves provided in a complete and functional system. The CONTRACTOR shall submit detailed drawings of all systems for approval prior to starting installation. Drawings shall include all dimensions and spacings for pipe joints, fittings, fitting specials, valves, appurtenances, connectors, adapters, supports, hangers, anchors, etc. necessary to provide a complete and functional system as specified herein.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All pipes, fittings, and appurtenances shall be furnished as specified herein.
- B. Pipe Supports: All pipes shall be adequately supported.

2.02 ~~STAINLESS STEEL CHEMICAL PIPING~~

- ~~A. Stainless steel piping, fittings and valves shall be provided in accordance with Section 15740: Stainless Steel Pipe, Fittings and Valves.~~

2.03 CHEMICAL PIPING

- A. Secondary Containment/Chemical Casing Pipe: Schedule 80 Polyvinyl Chloride (PVC) Pipe and Fittings:
- a. Pipe: ASTM D1785, Schedule 80, PVC 1120, with NSF seal.
- B. Injection Tubing: Chemical injection piping shall conform to NSF51/61:
1. Material:
- a. High Density Polyethylene (HDPE)
  - b. Polytetrafluoroethylene (PTFE)
  - c. Viton
  - d. Polyvinylidene Fluoride (PVDF)
  - e. Ultra-High Molecular Weight Polyethylene (UHMWPE)
1. Tubing: 1/4" Inside Diameter, 1/16" minimum wall thickness
2. Minimum working pressure 151 psi at 73 degrees F.

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3. Color: clear, black or natural
  4. Solid non-jointed, no splicing allowed
- C. All chemical piping shall be installed so that lines are readily accessible for cleaning.
- D. Chemical piping bends shall not exceed 45 Degrees.
- E. At all exposed changes in direction in chemical piping, elbows shall be provided with extra threaded openings plugged to facilitate cleaning.
1. Thread tape or thread sealer shall be applied to the threads of all plugs to facilitate ease of removal.
- F. The assembled double-containment system secondary pipe shall be constructed of poly-vinyl chloride (PVC) pipe for outdoor applications. These systems shall be joined to provide a minimum of 150 psig at 73<sup>o</sup> F leak-free seals.
1. All assembled double-containment piping and fittings shall be supplied by the same source to insure material and system compatibility. The carrier and containment pipe and fittings shall be Schedule 80 and shall be factory assembled with centralizing and anchoring devices installed.
- G. The co-extruded one-piece double containment pipe system shall conform to the following:
1. Material: Pipe and fittings shall be schedule 80 pvc type.
  2. Pipe and Fittings - Construction: Pipe shall be co-extruded one piece double containment pipe. The primary pipe shall be integral with the secondary pipe via connecting ribs which are continuous down the entire length of each section of pipe. Fittings shall be a molded unitary double wall fitting. Permanent alignment of the inner and outer fittings shall be maintained via molded-in ribs.
  3. Factory Welded Joints: Joining shall be by means of solvent cement.
  4. Installation: Installation shall be in accordance with the drawings, the manufacturer's recommendations. The entire installation shall be installed in proper alignment and free of stress.
  5. Testing: The system shall be tested in accordance with the manufacturer's recommendations.
- H. Secondary containment shall be adequately sized to contain 100 percent of the volume of the service pipe.
- I. Drip shields shall be installed beneath all elevated chemical piping in areas subject to pedestrian traffic to contain and transport leakage to an approved disposal area.

PART 3 - EXECUTION

3.01 GENERAL

- A. All piping and appurtenances shall be installed in accordance with the requirements of all applicable and related Divisions of these specifications.

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- B. Any deviation from lines, grades, or elevations shown on the Contract Drawings must be approved in writing by the Owner's Representative.

3.02 CUTTING PIPE

- A. Cutting of carrier pipe shall be done in a neat manner, without damage to the pipe, pipe lining, or pipe coating.
- B. Cuts shall be smooth, straight, and at right angles to the pipe axis.
- C. Splicing of the chemical feed tubing is not permitted.

3.03 CLEANING

- A. The interior of all pipe and fittings shall be thoroughly cleaned of all foreign matter prior to installation, and shall be kept clean until the work has been accepted.
- B. Before jointing, all joint contact surfaces shall be wire brushed, wiped clean, and kept clean until the jointing is completed.
- C. Flange faces shall be wire brushed and cleaned to remove all oil, grease, loose primer, mill scale, or any other foreign matter which could effect the proper seating of the gasket.
- D. Prior to testing, pipe shall be thoroughly cleaned and/or purged in accordance with these specifications.

3.04 PIPE SLEEVES

- A. Unless otherwise specified or indicated on the contract drawings, pipes passing through concrete or masonry shall be installed through Type 316 stainless steel sleeves installed before concrete is placed or masonry is laid.
- B. The CONTRACTOR shall be responsible for coordinating the installation of sleeves for all piping.

3.05 PIPE INSTALLATION

- A. All piping shall be installed as specified, as indicated on the contract drawings and in a manner acceptable to the Owner's Representative.
- B. The CONTRACTOR shall provide pipe cut from measurements made at the job site, and not from the contract drawings.
- C. Provisions shall be made in laying out all piping throughout to provide for expansion and contraction.
- D. Piping shall not obstruct openings or passageways.
- E. Pressure piping shall not be installed above electrical panels or cabinets.
- F. All piping serving metering equipment shall be uniformly graded so that air traps are eliminated and complete venting is provided.
- G. Taps for pressure gage connections on the suction and discharge sides of pumping units shall be provided with a nipple and an approved shutoff valve.

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1. Drilling and tapping of pipe walls for installation of pressure gages or switches will not be permitted.
  2. Taps shall be provided by factory threaded taps or a factory welded boss.
- H. All branch connections in horizontal runs of air, gas, or steam piping shall be made from the top of the pipe.

3.06 PIPE JOINTS

- A. Pipe joints shall be provided as recommended by the manufacturer.
- B. Solvent cement connection for sodium hypochlorite PVC pipeline shall be per ASTM D 2564.

**END OF SECTION 15707**

**SECTION 15740 - STAINLESS STEEL PIPE, FITTINGS AND VALVES**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to complete the work as illustrated on the Plans and specified herein.
- B. This Section covers furnishing and installing stainless steel pipeline, fittings, flanges, and valves, complete, in place, in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 2: As applicable
- B. Section 15707 - Chemical Piping
- C. Section 09800 - Protective Coatings

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the reference specifications of the General Requirements.
- B. Comply with the current provisions of the following Codes and Standards.

1. Commercial Standards:

ANSI/ASME B 16.5	Pipe Flanges and Flanged Fittings NPS ½ inch through NPS 24 inch.
ANSI/ASME B 16.9	Factory-Made Wrought Butt-welding Fittings
ANSI//ASME B 16.11	Forged Fittings, Socket-Welding and Threaded
ANSI/ASME B 16.47	Large Diameter Steel Flanges NPS 26-Inch through NPS 60-Inch
ANSI/ASME B 18.22.1	Plain Washers
ANSI/ASME B 31.1	Power Piping
ANSI/AWWA C 606	Grooved and Shouldered Joints
ASTM A 182	Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
ASTM A 193	Specification for Alloy-Steel and Stainless Steel Bolting Materials for High

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	Temperature or High Pressure Service and Other Special Purpose Applications
ASTM A 194	Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
ASTM A 269	Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM A 312	Specification for Seamless and Welded Austenitic Stainless Steel Pipe
ASTM A 351	Specification for Castings, Austenitic, for Pressure-Containing Parts
ASTM A 403	Specification for Wrought Austenitic Stainless Steel Piping Fittings
ASTM F 1387	Standard Specification for Performance of Piping and Tubing Mechanically Attached Fittings
NSF / ANSI 61	Drinking Water System Components – Health Effects

1.04 CONTRACTOR SUBMITTALS

- A. Shop Drawings: The Contractor shall submit shop drawings of pipe, fittings, flanges, valves, and appurtenances.
- B. Certifications: The Contractor shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, as specified in the referenced standards and the following supplemental requirements:
  - 1. Hydrostatic proof test reports.
  - 2. Sustained pressure test reports.
  - 3. Burst strength test reports.
- D. All expenses incurred in making samples for certification of tests shall be borne by the Contractor.

1.05 QUALITY ASSURANCE

- A. The Contractor is to comply with the provisions of this specification and all other applicable sections of this specification, standards, codes, and regulations.
- B. In addition to any other markings specified herein, each length of pipe and each special section provided under this specification shall be legibly marked by paint stenciling, die stamping, or hot-roll marking to show the following:
  - 1. Manufacturer's name or mark.
  - 2. Size and weight of the pipe or special section.
  - 3. Type of steel from which the pipe or if applicable special section was made.
- C. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of this Section of the Specifications, as specified in the referenced standards, as applicable.
- D. The Contractor shall perform said material tests in accordance with the requirements of the Contract Documents. The Engineer shall have the right to witness all testing conducted by the Contractor provided that the Contractor's schedule is not delayed for the convenience of the Engineer.
- E. In addition to those tests specifically required, the Engineer may request additional samples of any material for testing by the Engineer. The additional samples shall be furnished at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All pipes, fittings, flanges, and valves shall be carefully examined for cracks and other defects prior to shipment. All defective pipes, fittings, flanges, and valves shall be rejected and replaced.
- B. All pipes and equipment shall be supported.

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- C. Coating: All underground pipes, fittings, flanges, and valves shall be provided with coating in accordance with Section 09800 - Protective Coatings.
- D. Stainless steel piping systems shall have design pressure limit of 150 psig and temperature limit of 300 degree F, unless otherwise noted.
- E. Insulating connections: Protection shall be provided at all dissimilar metal connections.
  - 1. General: Insulating gaskets, sleeves, washers, bushings, unions, couplings, or flanges, as appropriate, shall be used for joining pipes of dissimilar metals, and for piping systems where corrosion control and cathodic protection are required regardless of whether or not illustrated on the Plans.
  - 2. Material: Insulating connections shall be in accordance with the manufacturer's requirements.

2.02 PIPE AND TUBING

- A. Pipe:
  - 1. Sizes 1/2" - 2 1/2"
    - a. Schedule 40S, Stainless Steel ASTM A 312 Type 316L, Seamless, Plain Ends.
    - b. Pipe Nipples: Schedule 40S, Stainless Steel ASTM A 312 Type 316L, Seamless, Plain Ends or Threaded Ends.
    - c. Swage Nipples: Schedule 40S, Stainless Steel ASTM A 403 Grade WP316L, Seamless, Plain Ends or Threaded Ends.
  - 2. Sizes 3" - 24":
    - a. Schedule 40S, Stainless Steel ASTM A 312 Type 316L, Seamless, Beveled Ends.
  - 3. Sizes 26" - 36"
    - a. 0.312" pipe wall thickness, Stainless Steel ASTM A 312 Type 316L, Seamless, Beveled Ends.
- B. Tubing:
  - 1. Sizes 1/4" - 3/8":
    - a. 0.065" tube wall thickness, Fully Annealed, Stainless Steel ASTM A 269 Grade TP316L, Seamless.
  - 2. Sizes 1/2" - 7/8"
    - a. 0.083" tube wall thickness, Fully Annealed, Stainless Steel ASTM A 269 Grade TP316L, Seamless.
  - 3. Sizes 1" - 1 1/2":

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- a. 0.120" tube wall thickness, Fully Annealed, Stainless Steel ASTM A 269 Grade TP316L, Seamless.

2.03 FITTINGS

A. Threaded Fittings:

1. Sizes 1/2" - 2 1/2":
  - a. Class 3000 ANSI/ASME B 16.11, Stainless Steel ASTM A 182 Type 316, Threaded.

B. Socket Weld Fittings:

1. Sizes 1/2" - 2 1/2":
  - a. Class 3000 ANSI/ASME B 16.11, Stainless Steel ASTM A 182 Type 316L, Socket weld.

C. Butt Weld Fittings:

1. Sizes 3" - 24":
  - a. Schedule 40S, ANSI/ASME B 16.9, Stainless Steel ASTM A 403 Grade WP316L, Seamless, Butt Weld.
2. Sizes 26" - 36":
  - a. 0.312" pipe wall thickness ANSI/ASME B 16.9, Stainless Steel ASTM A 403 Grade WP316L, Seamless, Butt weld.

D. Pipe Couplings:

1. Grooved Couplings, sizes 3/4" - 18", for stainless steel pipe shall be per ANSI/AWWA C 606 and shall be furnished for use on radius cut or standard roll grooved pipe ends. Couplings shall be Type 316 Stainless Steel ASTM A 351, Grade CF8M.
2. Gaskets: Materials of gaskets shall be Viton.
3. Fasteners: All bolts, nuts, and washers shall be made of Type 316 stainless steel.

E. Tube Fittings:

1. Sizes 1/4" - 1 1/2":
  - a. Compression Type, 316 Stainless Steel with 316 Stainless Steel Ferrules.

2.04 PIPE FLANGES

A. Flanges:

1. Sizes 1/2" - 2 1/2":

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- a. Class 300 ANSI/ASME B 16.5, Stainless Steel ASTM A 182 Grade F316L, Raised Face, Socketweld, Schedule 40S Bore.
- 2. Sizes 3" - 24":
  - a. Class 300 ANSI/ASME B 16.5, Stainless Steel ASTM A 182 Grade F316L, Raised Face, Weldneck, Schedule 40S Bore.
- 3. Sizes 26" - 36":
  - a. Class 300 ANSI/ASME B 16.47, Stainless Steel ASTM A 182 Grade F316L, Raised Face, Weldneck, Schedule 40S Bore.
- B. Blinds Flanges
  - 1. Sizes 1/2" - 24":
    - a. Class 300 as needed ANSI/ASME B 16.5, Stainless Steel ASTM A 182 Grade F316L, Raised Face.
  - 2. Sizes 26" - 36":
    - a. Class 300 as needed ANSI/ASME B 16.47, Stainless Steel ASTM A 182 Grade F316L, Raised Face.
- C. Orifice Flanges
  - 1. Sizes 1" - 24":
    - a. Class 300 ANSI/ASME B 16.5 with 1/2" Screwed Taps, Stainless Steel ASTM A 182 Grade F316L, Raised Face, Weldneck, or Schedule 40 Bore.
    - b. Mating Flanges shall be Class 300 ANSI/ASME B 16.5, Stainless Steel ASTM A 182 Grade F316L, Raised Face, Weldneck, Schedule 40S Bore.
- D. Gaskets:
  - 1. Sizes 1/2" - 24":
    - a. Spiral Wound Type, 316 Stainless Steel with Graphite Filler, 1/8" Thick Centering Ring, drilling per Class 150 ANSI/ASME B 16.5.
  - 2. Sizes 26" - 36":
    - a. Spiral Wound Type, 316 Stainless Steel with Graphite Filler, 1/8" Thick Centering Ring, drilling per Class 150 ANSI/ASME B 16.47.
- E. Bolts:
  - 1. Studs: 16 Stainless Steel ASTM 193 Grade B8M.
  - 2. Nuts: 316 Stainless steel ASTM 194 Grade 8M.
  - 3. Washers: 316 Stainless Steel ANSI B 18.22.1.

4. Assemble with anti-seize compound.

2.05 VALVES

A. General:

1. All valves shall be furnished and installed as illustrated on the Plans.
2. Valves with pneumatic, hydraulic, and electric motor operators and controls shall be in accordance with Division 17.
3. Valves with manual operators shall be as specified herein.

B. Fasteners: All bolts, nuts, and washers shall be made of Type 316 stainless steel.

C. Ball Valves:

1. Sizes 1/2" - 2 1/2":
  - a. Class: 900 PSI, Screwed.
  - b. Type: Full port.
  - c. Body: 316 Stainless Steel ASTM A 351.
  - d. Ball: 316 Stainless Steel.
  - e. Seat: Reinforced PTFE Fire Safe.
  - f. Stem: 316 Stainless Steel.
  - g. Operator: Manual, Lever.
2. Sizes 3" - 4":
  - a. Class: 150 psi, 150 Raised Face Flanged.
  - b. Type: Full port.
  - c. Body: 316 Stainless Steel ASTM A 351.
  - d. Ball: 316 Stainless Steel.
  - e. Seat: Reinforced PTFE Fire Safe.
  - f. Stem: 316 Stainless Steel.
  - g. Operator: Manual, Lever.

D. Butterfly Valves:

1. Sizes 3" - 6":
  - a. Class: 150 PSI, 150 Raised Face.

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- b. Type: Lug style, High Performance Bubble-Tight Shutoff.
  - c. Body: 316 Stainless Steel ASTM A 351.
  - d. Disc: 316 Stainless Steel ASTM A 351.
  - e. B/U Ring: Viton.
  - f. Seals: PTFE.
  - g. Shaft: 316 Stainless Steel.
  - h. Operator: Manual, Lever.
2. Sizes 8" - 36":
- a. Class: 150 PSI, 150 Raised Face.
  - b. Type: Lug style, High Performance Bubble-Tight Shutoff.
  - c. Body: 316 Stainless Steel ASTM A 351.
  - d. Disc: 316 Stainless Steel ASTM A 351.
  - e. B/U Ring: Viton.
  - f. Seals: PTFE.
  - g. Shaft: 316 Stainless Steel.
  - h. Operator: Manual, Worm gear with handwheel.
- E. Check Valves:
1. Sizes 1/2" - 2 1/2":
- a. Class: 800 PSI, Socket weld.
  - b. Type: Horizontal, Piston Lift
  - c. Body: 316L Stainless Steel ASTM A 182.
  - d. Trim: 316 Stainless Steel.
  - e. Bonnet: Bolted.
  - f. Gasket: Spiral Wound, Graphite Filler.
2. Sizes 3" - 6":
- a. Class: 150 PSI, 150 Raised Face Flanged.
  - b. Type: Ball Check.
  - c. Body: 316 Stainless Steel ASTM A 351.

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- d. Ball: 316 Stainless Steel ASTM A 351.
  - c. Trim: 316 Stainless Steel.
  - d. Bonnet: Bolted.
  - e. Gasket: Spiral Wound, Graphite Filler.
3. Sizes 3" - 24":
- a. Class: 150 PSI.
  - b. Type: Wafer, Dual Flapper.
  - c. Body: 316 Stainless Steel ASTM A351.
  - d. Trim: 316 Stainless Steel.
  - e. Seal: Viton or PTFE.
  - f. Gasket: Spiral Wound, Graphite Filler.

F. Knife Gate Valves:

1. Sizes 2" - 18":
- a. Class: 150 PSI, 150 Raised Face.
  - b. Type: Wafer Style
  - c. Body and Knife: 316 Stainless Steel.
  - d. Stem & Yoke: 316 Stainless Steel.
  - e. Seat: 316 Stainless Steel, Metal to Metal.
  - f. Connector: 316 Stainless Steel.
  - g. Packing: PTFE.
  - h. Operator: Manual, Worm gear with handwheel.

G. Plug Valves:

1. Sizes 1/2" – 2 1/2":
  - a. Class: 600 PSI, Socket weld.
  - b. Type: Lubricated Plug.
  - c. Body: 316 Stainless Steel ASTM A 351.
  - d. Plug: 316 Stainless Steel ASTM A 351.
  - e. Cover: Bolted.
  - f. Gasket: Manufacturer's Standard.
  - g. Operator: Manual, Lever.
2. Sizes 3" - 4":
  - a. Class: 150 PSI, 150 Raised Face Flanged.
  - b. Type: Lubricated Plug.
  - c. Body: 316 Stainless Steel ASTM A 351.
  - d. Plug: 316 Stainless Steel ASTM A 351.
  - e. Cover: Bolted.
  - f. Gasket: Manufacturer's Standard.
  - g. Operator: Manual, Lever.

2.06 NSF / ANSI STANDARD 61

Piping, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61 as being suitable for contact with potable water.

PART 3 - EXECUTION

3.01 GENERAL

- A. All laying, jointing, testing for defects and for leakage shall be performed in the presence of the Engineer, and shall be subject to his approval before acceptance. All material found during the progress to have defects will be rejected and the Contractor shall promptly remove such defective materials from the site of the Work.

3.02 HANDLING AND STORAGE

- A. Handling: All pipes, fittings, flanges, valves and accessories shall be carefully inspected before and after installation and those found defective shall be rejected. Pipe and fittings shall be free from fins and burrs. Before being placed in position, pipe, fittings, and accessories shall be cleaned, and shall be maintained in a clean condition. Proper

facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe, fittings or any other material be dropped or dumped into trenches.

- B. Storage: All pipes, fittings, flanges, valves and accessories should be stored, if possible, at the job site in unit packages provided by the manufacturer. Caution should be exercised to avoid compression damage or deformation to piping. Gaskets should be stored in a cool, dark place out of the direct rays of the sun, preferably in original cartons.

3.03 TRENCHING AND BACKFILL

- A. Trench excavation and backfill shall be as illustrated in the Plans and as specified herein. The minimum backfill compaction in the pipe zone shall be 90 percent of maximum density per ASTM D 1557.

3.04 PIPING INSTALLATION AND JOINTS

- A. All piping and appurtenances shall be installed in accordance with the manufacturer's requirements and all applicable and related Divisions of these Specifications.
- B. Pipe shall be supported at its proper elevation and grade, care being taken to secure firm and uniform support. Wood support blocking will not be permitted. The full length of each section of pipe and fittings shall rest solidly on the pipe bed, with recessed excavation to accommodate bells, joints, and couplings. Anchors and supports shall be provided where necessary and where indicated on the Plans for fastening work into place. Fittings shall be independently supported.
- C. Welding shall conform to these specifications and the requirements contained in ASME B 31.1, Power Piping, as last revised.

END OF SECTION 15740

3.05 CLEANING AND FINISHING

- A. The interior of all pipe and fittings shall be thoroughly cleaned of all foreign matter prior to installation, and shall be kept clean until the work has been accepted.
- B. Before jointing, all joint contact surfaces shall be wire brushed, wiped clean, and kept clean until the jointing is completed.
- C. Flange faces shall be wire brushed and cleaned to remove all oil, grease, loose primer, mill scale, or any other foreign matter which could affect the proper seating of the gasket.
- D. Cleaning of weld joints and weld joint areas of stainless steel piping system, both before and after welding, shall conform to ASTM A 380. Use only stainless steel brushes or stainless steel wool.
- E. Finishing: Following fabrication of stainless steel piping connections, all weld areas shall be pickled to remove all mill scale, weld inclusions, and color, and passivated inside and out in conformance to ASTM A 380.
- F. Contractor shall submit the cleaning and passivation procedure of stainless steel piping system in compliance with the above requirements for Engineer's review and approval.

3.06 FIELD TESTING AND DISINFECTION

- A. Field testing and disinfection of fresh or potable water pipe installations shall conform to AWWA Standards and NSF 61 Standards.

3.07 PIPE SUPPORTS

- A. All pipes shall be adequately supported.

3.08 PROTECTIVE COATING

- A. Protective coating for piping systems shall be provided in accordance with the requirements of Section 09800 - Protective Coatings.

**END OF SECTION 15740**

**SECTION 15830 - MISCELLANEOUS VALVES**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish and install miscellaneous valves as shown and as specified herein, complete, and operable including accessories and, where designated, operators, in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 2 - Sitework.
- B. Section 11000 – Equipment General Provisions.
- C. Division 15 - Mechanical.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the reference specifications of the General Requirements.
- B. NSF / ANSI STANDARD 61: Piping, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61 as being suitable for contact with potable water.

1.04 CONTRACTOR SUBMITTALS

- A. Submittals shall be made in accordance with Section 01300 - Contractor Submittals.

1.05 QUALITY ASSURANCE

- A. QUALITY ASSURANCE shall comply with the quality requirements specified in RELATED WORK SPECIFIED ELSEWHERE above.
- B. All valves shall be tested in accordance with manufacturer's recommendation and applicable AWWA/ANSI specifications

PART 2 - PRODUCTS

2.01 COMBINATION AIR-VACUUM VALVES

- A. Combination Air and Vacuum Valves: Combination air valves shall combine the characteristics of air and vacuum valves and air release valves by exhausting accumulated air in systems under pressure and releasing or re-admitting large quantities of air while a system is being filled or drained, respectively. They shall be of the size shown, with flanged or screwed ends to match piping. Bodies, the float, seat, and all moving parts shall be constructed of Type 316 stainless steel. Seat washers and gaskets shall be of a material insuring water tightness with a minimum of maintenance. Valves shall be designed for a minimum of 150 PSI water-working pressure, unless otherwise shown.

2.02 BACKFLOW PREVENTER VALVES

- A. General: Backflow preventers shall work on the reduced pressure principle. They shall consist of two (2) spring-loaded check valves, automatic differential pressure relief valve, drain valves, and shut-off valves. The body material shall be bronze or cast iron for a working pressure of not less than 150 PSI, with bronze or stainless-steel trim. Drain lines with air gaps shall be provided.
- B. Manufacturers, or Equal:
  - 1. Model: 4000B  
AMES Fire & Waterworks  
1427 North Market Boulevard, Suite #9  
Sacramento, CA 95854  
916-928-0123  
916-928-9333: FAX
  - 2. Model: 850V  
FEBCO  
4381 North Brawley, Suite 102  
Fresno, CA 93722  
559-441-5300  
559-441-5301: FAX
  - 3. Or Equal.

2.03 SMALL PRESSURE REDUCING VALVES (Air, Chemical and Water Systems)

- A. General: Small air and water pressure reducing valves shall be of the spring-loaded diaphragm type with a minimum pressure rating of 250 PSI, with bronze body, nickel alloy or stainless-steel seat, and threaded ends. Each valve shall be furnished with built-in or separate strainer and union ends.
- B. Small chemical (i.e., ammonium hydroxide, sodium bisulfite, and sodium hypochlorite) pressure reducing valves shall be of the spring-loaded diaphragm type with Teflon body, Hastelloy or Teflon trim material, and Teflon seat material. Valve body shall be flanged.

2.04 LARGE WATER PRESSURE REDUCING VALVES

- A. General: Large water pressure reducing valves shall be of the piston-type or diaphragm-actuated globe type, with cast iron body and stainless-steel trim. Unless otherwise shown or specified, the valves shall have a pressure rating of not less than 150 PSI, shall have 125 lb flanges, and shall have an adjustable downstream pressure range with a downstream setting as required.

2.05 PRESSURE RELIEF VALVES

- A. Pressure Relief Valves for chemical piping systems shall be in-line pattern with three ports. Excess pressure shall be relieved through the port in the bottom of the valve. The valve materials shall be as described in Table 2.1. For the diaphragm material, Teflon or other suitable material may be substituted for EPDM.

TABLE 2-1 RELIEF VALVE MATERIALS FOR CHEMICAL SYSTEMS

ITEM	Systems					
	Ammonium Hydroxide	Scale Inhibitor	Sodium Bisulfite	Polymer	Sodium Hypochlorite	Sulfuric Acid
Relief Valves (Body) (Diaphragm)	PVC or Teflon EPDM	PVC EPDM	PVC or Teflon EPDM	PVC or Teflon Teflon	PVC or Teflon Teflon	PVDF or Teflon Teflon

2.06 CORPORATION STOPS

- A. Unless otherwise shown, corporation stops shall be made of solid brass for key operation, with screwed ends with corporation thread or iron pipe thread, as required.
- B. Manufacturer, or Equal:
  - 1. James Jones.
  - 2. Mueller.
  - 3. Or equal.

2.07 SOLENOID VALVES

- A. Solenoid valves shall be of the size, type, and class shown and shall be designed for not less than 150 PSI water-working pressure. Valves for water, air, or gas service shall have brass or bronze body with screwed ends, stainless steel trim and spring, Teflon or other resilient seals with material best suited for the temperature and fluid handled. Solenoid valves in corrosive environment shall have stainless steel bodies. For chemicals and all corrosive fluids, solenoid valves with Teflon bodies and springs or other suitable materials shall be used. General purpose enclosures for indoors shall be NEMA type 2. For explosion proof, corrosive, special purpose, or outdoor locations NEMA type 4, 7, 8, 9, 9E, 9F, or 9G enclosures shall be used, as applicable. All coil ratings shall be for continuous duty. For electrical characteristics see electrical drawings or specifications.

2.08 STAINLESS STEEL VALVES

- A. General:
  - 1. All valves shall be furnished and installed as illustrated on the Plans.
  - 2. Valves with pneumatic, hydraulic, and electric motor operators and controls shall be in accordance with Division 17.
- B. Fasteners: All bolts, nuts, and washers shall be made of Type 316 stainless steel.
- C. Ball Valves:
  - 1. Sizes 1/2" - 2 1/2":

- a. Class: 900 PSI, Screwed.
- b. Type: Full port.
- c. Body: 316 Stainless Steel ASTM A 351.
- d. Ball: 316 Stainless Steel.
- e. Seat: Reinforced PTFE Fire Safe.
- f. Stem: 316 Stainless Steel.
- g. Operator: Manual, Lever.

2.10 WELL SERVICE AIR VALVE

The well service air valves shall be fully automatic float operated valves designed to exhaust air which is present in the pump column on pump startup and allow air to re-enter the column on pump shutdown or should a negative pressure occur. The dual port throttling device shall provide adjustable control of the exhaust rate and allow free flow into the valve through a separate inlet port.

The valves shall be manufactured and tested in accordance with AWWA Standard C512. The manufacturer shall have a quality management system that is certified to ISO 9001 by an accredited certifying body. The valves shall have full size NPT inlets and outlets equal to the nominal valve size. The body inlet connection shall be hexagonal for a wrench connection. The valves shall have two additional NPT connections for the addition of Air Release Valves, gauges, testing and draining.

The valve body shall provide a through flow area equal to the nominal valve size. A bolted cover with alloy screws and flat gasket shall be provided to allow for maintenance and repair. Floats shall be unconditionally guaranteed against failure including pressure surges. The float shall have a hexagonal guide shaft supported in the body by circular bushings to prevent binding from debris. The float shall be protected against direct water impact by an internal baffle. The resilient seat shall provide drop tight shut off to the full valve pressure rating.

Valves 3 inches (75mm) and smaller will be equipped with a *dual port throttling device* to control the discharge of air from the valve and allow full vacuum flow through a separate port. The device shall have an externally adjustable screw and locknut for adjusting the discharge control disc. The disc shall be sized to allow a 5% flow area when fully throttled. The vacuum port shall be equipped with a spring-loaded disc to allow flow into the valve during negative pressure conditions. Throttling devices with a common exhaust and vacuum port are not acceptable. The material of the body shall be consistent with the Well Service Air Valve. The spring shall be ASTM A313 Type 316 SS. The dual port throttling device shall be mounted on the inlet of the well service air valve to allow free air flow in and restricted flow out of the valve to reduce valve pressure surges. The device shall be a flanged, globe pattern, with a center guided disc and seat assembly. The disc shall have threaded holes to provide adjustment of the flow rate through the valve. The material of the body shall be consistent with the well service air valve. The seat and disc shall be Bronze ASTM B584, alloy C83600.

The well service air valve body, cover and baffle shall be constructed of ASTM A126 Class B cast iron for Class 125 valves. The float, guide shafts and bushings shall be constructed of Type 316 SS. Non-metallic guides and bushings are not acceptable. Resilient seats shall be Buna-N. The valve interior shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550. The exterior of the valve shall be coated with a universal alkyd primer. The valve manufacturer shall provide test certificates, dimensional drawings, part list drawings and operation and maintenance manuals.

2.10 FLAPPER VALVES

The flap valve shall have a cast iron body and cover. The seat and disc ring shall be bronze, and the hinge pin and cotter pins shall be stainless steel. The valve shall be constructed with a 10-degree offset from vertical to ensure positive closure. The weighted flap valve shall have a weight attached to the lid and allow for minor sensitivity adjustment. The valve lid shall have a mechanical stop to ensure the lid cannot over rotate.

The flange shall be drilled using an ANSI 125# template. All iron parts shall be coated in TNEMEC 2-part epoxy with 3-4 mils dry film thickness to prevent rusting or corrosion. The valve shall be machined, assembled, and tested in the USA for quality assurance. The manufacturer shall show proof of ISO 9001 certification. Valve and accessories shall be manufactured by Troy Valve, Model A2540 or approved equal.

2.11 NSF / ANSI STANDARD 61

Piping, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in NSF / ANSI Standard 61 as being suitable for contact with potable water.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Backflow preventers shall be installed in all potable water lines and as illustrated in the Plans.
- B. All valves shall be installed in accordance with the Manufacturer's printed recommendations.
- C. Field testing of valves shall be performed in accordance with manufacturer's recommendations.
- D. All field testing shall be witnessed and approved by the Engineer.

**END OF SECTION 15830**



ADDENDUM #2

COUNTY OF IMPERIAL
NILAND COUNTY SANITATION DISTRICT - WASTE WATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS
IMPERIAL COUNTY PROJECT NO. 6582NSD

PROJECT DESCRIPTION

THE NILAND WASTEWATER TREATMENT PLANT (WWTP) HAS A LONG HISTORY OF EFFLUENT DISCHARGE VIOLATIONS DATING BACK TO 2003. THE MAJORITY OF THE VIOLATIONS WERE THE RESULT OF NPDES DISCHARGE PERMIT VIOLATIONS FOR COPPER AND THALLIUM. A 2016 PRELIMINARY ENGINEERING REPORT (PER) PREPARED BY THE HOLT GROUP, INC. REVIEWED THE NILAND WWTP EFFLUENT VIOLATIONS AND ALTERNATIVE IMPROVEMENTS TO ADDRESS THE VIOLATIONS. THE ALTERNATIVE SELECTED TO ADDRESS THE DISCHARGE VIOLATIONS WAS TO CONSTRUCT EVAPORATION PONDS FOR THE ULTIMATE DISPOSAL OF THE TREATED EFFLUENT WASTEWATER. THE EVAPORATION PONDS WILL ALLOW FOR THE ELIMINATION OF THE POINT DISCHARGE TO THE IMPERIAL IRRIGATION DISTRICT "R" DRAIN AND THE NPDES DISCHARGE PERMIT WASTEWATER EFFLUENT REQUIREMENTS. A WASTE DISCHARGE REQUIREMENT (WDR) PERMIT WILL BE REQUIRED FOR THE NILAND WWTP AND EVAPORATION POND SYSTEM IN LIEU OF THE NPDES DISCHARGE PERMIT. IN ADDITION TO THE CONSTRUCTION OF EVAPORATION PONDS, IMPROVEMENTS TO THE GRAVITY SANITARY SEWER PIPELINE COLLECTION SYSTEM UPSTREAM OF THE WWTP ARE TO BE ACCOMPLISHED. THE IMPROVEMENTS TO THE GRAVITY SANITARY SEWER PIPELINE COLLECTION SYSTEM (INCLUDING COPPER AND THALLIUM) INTO THE COLLECTION SYSTEM AND WWTP. THE EXISTING WWTP WILL REMAIN OPERATIONAL TO TREAT THE INFLUENT RAW WASTEWATER TO A SECONDARY EFFLUENT CONDITION PRIOR TO DIRECTING THE SECONDARY EFFLUENT TO THE EVAPORATION PONDS. CAPITAL IMPROVEMENTS TO THE EXISTING WWTP COMPONENTS (RESULTANT FROM AGED TREATMENT PLANT INFRASTRUCTURE) WILL ALSO BE ACCOMPLISHED TO INSURE THE EXISTING WASTEWATER TREATMENT PLANT COMPONENTS ARE SATISFACTORILY FUNCTIONING.

THE THREE (3) PRIMARY NILAND WWTP AND COLLECTION SYSTEM PROJECT COMPONENTS CONSIST OF THE FOLLOWING ITEMS:

- 1. EXISTING WWTP IMPROVEMENTS.
2. CONSTRUCTION OF EVAPORATION PONDS AND EFFLUENT CONVEYANCE SYSTEM.
3. COLLECTION SYSTEM IMPROVEMENTS.

SEE SPECIAL CONDITION SECTION 1 FOR A COMPLETE DESCRIPTION OF THE MAJOR ITEMS ASSOCIATED WITH EACH OF THE THREE (3) COMPONENTS.

GENERAL NOTES

STREET IMPROVEMENT GENERAL NOTES

- 1. COUNTY ENCROACHMENT PERMIT CONDITIONS AND PROVISIONS SHALL TAKE PRECEDENCE OVER THE APPROVED PLANS AND SPECIFICATIONS FOR ANY CONFLICTS.
2. THE STRUCTURAL SECTIONS SHALL BE IN ACCORDANCE WITH IMPERIAL COUNTY STANDARDS (OR CALTRANS IF IN STATE ROW) AND AS APPROVED BY THE PUBLIC WORKS DIRECTOR (OR CALTRANS).
3. APPROVAL OF THESE IMPROVEMENT PLANS, AS SHOWN, DOES NOT CONSTITUTE APPROVAL OF ANY CONSTRUCTION OUTSIDE THE PROJECT BOUNDARY.
4. ALL UNDERGROUND UTILITIES WITHIN THE STREET RIGHT-OF-WAY SHALL BE CONSTRUCTED, CONNECTED AND TESTED PRIOR TO CONSTRUCTION OF BERM, CURB, CROSS-GUTTER AND PAVING.
5. THE EXISTENCE AND LOCATION OF EXISTING UNDERGROUND FACILITIES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO OTHER EXISTING FACILITIES EXCEPT AS SHOWN ON THESE PLANS. HOWEVER, THE CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT ANY EXISTING FACILITY SHOWN HEREON AND ANY OTHER WHICH IS NOT OF RECORD OR NOT SHOWN ON THESE PLANS.
6. LOCATION AND ELEVATIONS OF IMPROVEMENTS TO BE MET BY WORK TO BE DONE SHALL BE CONFIRMED BY FIELD MEASUREMENTS PRIOR TO CONSTRUCTION OF NEW WORK. CONTRACTOR WILL MAKE EXPLORATORY EXCAVATIONS AND LOCATE EXISTING UNDERGROUND FACILITIES SUFFICIENTLY AHEAD OF CONSTRUCTION TO PERMIT REVISIONS TO PLANS IF REVISIONS ARE NECESSARY BECAUSE OF ACTUAL LOCATION OF EXISTING FACILITIES.
7. UTILITIES COORDINATION
NO LESS THAN 3 WORKING DAYS PRIOR TO ANY EXCAVATION OR TRENCHING, EACH CONTRACTOR DOING SUCH WORK SHALL CONTACT THE FOLLOWING AGENCIES SO THAT EXISTING UNDERGROUND UTILITIES MAY BE LOCATED. THE AGENCY MAY REQUIRE AN INSPECTOR TO BE PRESENT.

- A. COUNTY OF IMPERIAL, DEPARTMENT OF PUBLIC WORKS, 333 WATERMAN AVENUE, EL CENTRO, CA 92524, PHONE: (760) 482-3926, CONTACT: IGNACIO ROMO
B. GOLDEN STATE WATER CO., 1000 BARBONVILLE, CALIFORNIA, CA 92523, PHONE: (760) 312-3889, CONTACT: ISMAEL DOMEZ, P.E.
C. SPECTRUM, 1029 SECOND STREET, EL CENTRO, CA 92524, PHONE: (760) 482-3926, CONTACT: DANIEL GARCIA
D. SOUTHERN CALIFORNIA GAS COMPANY-PLANNING, P.O. BOX 500, 1851 W. LACONIA AVENUE, REDLANDS, CA 92373, PHONE: (909) 339-7272, CONTACT: ANTONIO MORALES
E. SOUTHERN CALIFORNIA GAS COMPANY, 605 EAST ROSS AVENUE, EL CENTRO, CA 92524, PHONE: (760) 371-0000, CONTACT: ENRIQUE CUEVAS

8. EXISTING UNDERGROUND UTILITIES
BEFORE EXCAVATING FOR THIS CONTRACT, VERIFY LOCATION OF UNDERGROUND UTILITIES, THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS HAS BEEN OBTAINED FROM AVAILABLE RECORDS ONLY AND MAY NOT REFLECT ALL EXISTING UTILITIES. LOCATION OF ALL EXISTING UTILITIES SHALL BE CONFIRMED BY FIELD MEASUREMENTS BY CONTRACTOR PRIOR TO CONSTRUCTION OF WORK.

CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN HEREON AND ANY OTHER EXISTING LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.

ACCURATE VERIFICATIONS AS TO SIZE, LOCATION AND DEPTH OF EXISTING UNDERGROUND SERVICES SHALL BE THE CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL NOTIFY THE SOUTHERN CALIFORNIA GAS COMPANY, AT&T, IMPERIAL JOURNAL, THE COUNTY OF IMPERIAL, AND ANY OTHER AGENCY THAT HAS JURISDICTION OVER UTILITIES PRIOR TO STARTING WORK NEAR SUCH UTILITY FACILITIES AND SHALL COORDINATE WORK WITH UTILITY REPRESENTATIVES FOR LOCATION OF UNDERGROUND UTILITIES AND APPURTENANCES. CONTACT "UNDERGROUND SERVICE ALERT" AT 811.

9. IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO CONTACT THE UTILITY AGENCIES, ADVISE THEM OF THE PROPOSED IMPROVEMENTS AND BEAR THE COST OF RELOCATIONS, IF NEEDED.

10. NO PAVING SHALL BE COMPLETED UNTIL EXISTING POWER POLES ARE RELOCATED OUTSIDE THE AREAS TO BE PAVED.

11. PRIVATE ROAD IMPROVEMENTS SHOWN HEREON ARE FOR INFORMATION ONLY. COUNTY OFFICIALS SIGNATURE HEREON DOES NOT CONSTITUTE APPROVAL OR RESPONSIBILITY OF ANY KIND FOR THE DESIGN OR CONSTRUCTION OF THESE PRIVATE IMPROVEMENTS.

12. ALL SIGNS TO BE ALUMINUM WITH 3M HIGH INTENSITY TYPE REFLECTIVE FACE OR EQUIVALENT.

13. CONTRACTOR WILL BE RESPONSIBLE FOR THE REPLACEMENT OF ANY STRIPING, PAVEMENT MARKERS, OR LEGENDS OBLITERATED BY THE CONSTRUCTION OF THIS PROJECT.

14. THE CONTRACTOR SHALL COMPLETE ALL NEW STRIPING AND SANDBLASTING OF REDUNDANT OR EXISTING STRIPING.

15. THE CONTRACTOR SHALL BE RESPONSIBLE TO SECURE AN ENCROACHMENT PERMIT FROM THE COUNTY OF IMPERIAL, DEPARTMENT OF PUBLIC WORKS FOR ANY EXCAVATION OR CONSTRUCTION WITHIN COUNTY ROAD RIGHT-OF-WAY. FOR INSPECTIONS, 48 HOUR MINIMUM NOTICE IS REQUIRED. (760) 482-4462. ADDITIONALLY, UNDERGROUND SERVICE ALERT (USA) MUST BE CALLED TWO WORKING DAYS BEFORE THE CONTRACTOR MAY EXCAVATE. THE USA CONTACT NUMBER IS 811. ALL WORK AND MATERIALS ARE SUBJECT TO THE INSPECTION AND APPROVAL FROM THE COUNTY DEPARTMENT OF PUBLIC WORKS OR THEIR REPRESENTATIVE.

16. NO REVISIONS OF ANY KIND SHALL BE MADE TO THESE PLANS WITHOUT THE PRIOR WRITTEN APPROVAL OF BOTH THE COUNTY ENGINEER (OR HIS REPRESENTATIVE) AND THE ENGINEER OF RECORD. A REPRODUCIBLE AS-BUILT PLAN SET WILL BE PROVIDED TO THE PUBLIC WORKS DEPARTMENT AS A CONDITION OF SUBSTANTIAL CONSTRUCTION COMPLETION AND PRIOR TO PROJECT ACCEPTANCE.

17. ALL WORK AND MATERIALS SHALL CONFORM TO THESE PLANS AND SPECIFICATIONS, THE IMPERIAL COUNTY DEPARTMENT OF PUBLIC WORKS STANDARDS AND ENCROACHMENT PERMIT CONDITIONS, ANY REFERENCED STANDARDS AND SPECIFICATIONS AND THE SPECIFICATIONS & THE REQUIREMENTS OF THE AGENCIES REFERRED TO HEREIN. ALL WORK SHOWN OR INDICATED BY THESE PLANS SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARDS, POLICIES AND REGULATIONS OF IMPERIAL COUNTY, WHERE, OR IF, CONFLICTS OCCUR, THE IMPERIAL COUNTY REQUIREMENTS SHALL GOVERN.

18. UNLESS SPECIFICALLY INDICATED OTHERWISE, METHODS EMPLOYED AND MATERIAL USED IN THE CONSTRUCTION OF ALL OFF-SITE IMPROVEMENTS SHALL CONFORM TO THE APPLICABLE PROVISIONS OF THE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION SPECIFICATIONS DATED MAY 2010. ALL WORK IS SUBJECT TO INSPECTION AND APPROVAL AS REQUIRED.

19. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN AN EXCAVATION PERMIT FROM THE STATE OF CALIFORNIA DIVISION OF SAFETY AND TO ADHERE TO ALL PROVISIONS OF THE STATE CONSTRUCTION SAFETY ORDERS AND STANDARDS.

20. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A GENERAL CONSTRUCTION ACTIVITY STORM WATER PERMIT FROM THE STATE WATER RESOURCES CONTROL BOARD DIVISION OF WATER QUALITY. CONTACT "STATE WATER RESOURCES CONTROL BOARD, DIVISION OF WATER QUALITY, ATTENTION: STORM WATER PERMIT UNIT, P.O. BOX 1977, SACRAMENTO, CALIFORNIA, 95812."

21. CONSTRUCTION PROJECTS DISTURBING MORE THAN ONE ACRE MUST OBTAIN A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT. OWNERS/OWNERS ARE REQUIRED TO FILE A NOTICE OF INTENT (NOI) WITH THE STATE WATER RESOURCES CONTROL BOARD, PREPARE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND MONITORING PLAN FOR THE SITE.

22. EXISTING STORM DRAIN PIPES/CULVERTS, WHETHER TO BE CONNECTED TO, EXTENDED, ADJUSTED, DRAINED TO, OR JUST IN PROJECT VICINITY SHALL BE REPAIRED AND/OR CLEANED TO MAKE THEM FUNCTIONAL AND ACCEPTABLE AS DIRECTED BY THE PUBLIC WORKS DIRECTOR.

23. TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) OR AS DIRECTED BY THE IMPERIAL COUNTY TRAFFIC ENGINEER.

- 24. ANY EXISTING SURVEY MONUMENTS OR COUNTY RECOGNIZED BENCHMARKS SHALL BE PROTECTED BY THE CONTRACTOR. SHOULD ANY SUCH MONUMENTS OR BENCHMARKS BE REMOVED, DAMAGED, OBLITERATED OR ALTERED BY THE CONTRACTOR'S OPERATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER RESETTLEMENT OF THE SAME AS PER THE SUBDIVISION MAP ACT, THE PROFESSIONAL LAND SURVEYORS ACT AND THE SATISFACTION OF THE COUNTY SURVEYOR/DIRECTOR OF PUBLIC WORKS. SUCH POINTS SHALL BE REFERENCED AND REPLACED WITH APPROPRIATE MONUMENTATION BY A LICENSED LAND SURVEYOR OR A REGISTERED CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING, A CORNER RECORD OR RECORD OF SURVEY AS APPROPRIATE SHALL BE FILED BY THE LICENSED LAND SURVEYOR OR REGISTERED CIVIL ENGINEER.
25. DUST SHALL BE CONTROLLED BY THE CONTRACTOR IN ACCORDANCE WITH ALL IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT (APCD) FUGITIVE DUST RULES AND REGULATIONS AND SHALL COMPLY WITH THEIR PERMITTING REQUIREMENTS, IF APPLICABLE.
26. THE NOTES LISTED ABOVE ARE A MINIMUM LIST. THIS DOES NOT RELIEVE THE ENGINEER FROM COMPILING ADDITIONAL NOTES THAT MAY BE REQUIRED FOR THE PROJECT.

GRADING PLAN GENERAL NOTES

- 1. APPROVAL OF THIS GRADING PLAN DOES NOT CONSTITUTE APPROVAL OF VERTICAL OR HORIZONTAL ALIGNMENT OF ANY PRIVATE ROAD SHOWN HEREON FOR COUNTY ROAD PURPOSES.
2. FINAL APPROVAL OF THESE GRADING PLANS SUBJECT TO FINAL APPROVAL OF THE ASSOCIATED IMPROVEMENT PLANS WHERE APPLICABLE. FINAL CURB GRADE ELEVATIONS MAY REQUIRE CHANGES IN THESE PLANS.
3. IMPORT MATERIAL SHALL BE OBTAINED FROM A LEGAL SITE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO SECURE AN ENCROACHMENT PERMIT FROM THE COUNTY OF IMPERIAL DEPARTMENT OF PUBLIC WORKS FOR ANY EXCAVATION OR CONSTRUCTION WITHIN COUNTY ROAD RIGHT-OF-WAY. FOR INSPECTIONS, 48 HOUR MINIMUM NOTICE IS REQUIRED. (760) 482-4462. ADDITIONALLY, UNDERGROUND SERVICE ALERT (USA) MUST BE CALLED TWO WORKING DAYS BEFORE THE CONTRACTOR MAY EXCAVATE. THE USA CONTACT NUMBER IS 811. ALL WORK AND MATERIALS ARE SUBJECT TO THE INSPECTION AND APPROVAL OF THE COUNTY DEPARTMENT OF PUBLIC WORKS.
5. THE CONTRACTOR SHALL VERIFY THE EXISTENCE AND LOCATION OF ALL UTILITIES BEFORE COMMENCING WORK. NOTICE OF PROPOSED WORK SHALL BE GIVEN TO THE AGENCIES LISTED ON SECTION 7 OF THE STREET IMPROVEMENT GENERAL NOTES.
6. A SOILS REPORT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT AND/OR GRADING PLAN APPROVAL.

7. APPROVAL OF THESE PLANS BY THE DIRECTOR OF PUBLIC WORKS DOES NOT AUTHORIZE ANY WORK OR GRADING TO BE PERFORMED UNTIL THE PROPERTY OWNER'S PERMISSION HAS BEEN OBTAINED AND VALID GRADING PERMIT HAS BEEN ISSUED BY THE COUNTY PLANNING DEPARTMENT.

8. THE DIRECTOR OF PUBLIC WORKS' APPROVAL OF THESE PLANS DOES NOT CONSTITUTE COUNTY BUILDING OFFICIAL APPROVAL OF ANY FOUNDATION FOR STRUCTURES TO BE PLACED ON THE ITEMS COVERED BY THESE PLANS, INCLUDING ANY ONSITE OR PERIMETER SCREEN OR RETAINING WALLS.

9. ALL MAJOR SLOPES SHALL BE ROUNDED INTO EXISTING TERRAIN TO PRODUCE A CONTOURED TRANSITION FROM CUT OR FILL FACES TO NATURAL GROUND AND ABUTTING CUT OR FILL SURFACES.

10. NOTWITHSTANDING THE MINIMUM STANDARDS SET FORTH IN THE GRADING ORDINANCE AND NOTWITHSTANDING THE APPROVAL OF THESE GRADING PLANS, THE PERMITTEE IS RESPONSIBLE FOR THE PREVENTION OF DAMAGE TO ADJACENT PROPERTY. NO PERSON SHALL EXCAVATE ON LAND SO CLOSE TO THE PROPERTY LINE AS TO ENDANGER ANY SUCH PROPERTY FROM SETTLING, CRACKING, EROSION, SILTING, SCOUR OR OTHER DAMAGE, WHICH MIGHT RESULT FROM THE GRADING DESCRIBED ON THE PLAN. THE COUNTY WILL HOLD THE PERMITTEE RESPONSIBLE FOR CORRECTION OF NON-DEDICATED IMPROVEMENTS WHICH DAMAGE ADJACENT PROPERTY.

11. SPECIAL CONDITION: IF ANY ARCHEOLOGICAL RESOURCES ARE DISCOVERED ON THE SITE OF THIS GRADING, SUCH OPERATION WILL CEASE IMMEDIATELY AND THE PERMITTEE WILL NOTIFY THE DIRECTOR OF THE PLANNING DEPARTMENT AND THE DISCOVERY GRADING OPERATION WILL NOT RECOMMENCE UNTIL THE PERMITTEE HAS RECEIVED WRITTEN AUTHORITY FROM THE DIRECTOR OF PLANNING TO DO SO.

12. THE CONSTRUCTION OF ONE PCC STANDARD DRIVEWAY PER LOT. LOCATION TO BE DETERMINED IN THE FIELD BY ENGINEER OF WORK AND APPROVED BY COUNTY PUBLIC WORKS INSPECTOR. PCC SURFACING OF DRIVEWAY TO EXTEND FROM CURB TO PROPERTY LINE.

13. ALL GRADING SHALL CONFORM TO THE UNIFORM BUILDING CODE APPENDIX CHAP. 33, AS AMENDED BY TITLE 9 LAND USE ORDINANCE.

14. ALL PROPERTY CORNERS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION AND/OR GRADING.

15. DURING ROUGH GRADING OPERATIONS AND PRIOR TO THE CONSTRUCTION OF ANY PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL SHALL BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO CONTIGUOUS PROPERTIES.

16. DUST SHALL BE CONTROLLED IN ACCORDANCE WITH THE APPROVED PM10 PLAN. APPROVAL SHALL BE BY IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT.

17. NO FILL SHALL BE PLACED ON EXISTING GROUND UNTIL THE EXISTING GROUND HAS BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL AND OTHER DELETERIOUS MATERIAL.

18. THE MAXIMUM ALLOWABLE CUT AND FILL SLOPES ARE 3:1, AS NOTED ON THE PROJECT GEOTECHNICAL REPORT.

19. A 5' WIDE BY 1' HIGH BERM, OR EQUIVALENT, SHALL BE CONSTRUCTED ALONG THE TOP OF ALL FILL SLOPES OVER 5' IN VERTICAL HEIGHT. ALL SLOPES LESS THAN OR EQUAL TO 5' SHALL HAVE A BERM TO PREVENT DRAINAGE FROM ERODING SAME.

20. A BROW DITCH DESIGNED TO HANDLE THE FLOWS (Q) FROM A 100-YR. STORM EVENT SHALL BE CONSTRUCTED ALONG THE TOP OF ALL CUT SLOPES.

21. NO OBSTRUCTION OF FLOOD PLAINS OR NATURAL WATER COURSES WILL BE PERMITTED.

22. ALL EXISTING DRAINAGE COURSES ON THE PROJECT SITE MUST CONTINUE TO FUNCTION DURING STORM CONDITIONS. PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT CONTIGUOUS PROPERTIES DURING GRADING OPERATIONS.

23. THE FINISHED GRADE SHALL BE SLOPED AWAY FROM ALL EXTERIOR BUILDING WALLS AT NOT LESS THAN 4% (1/2" PER FOOT) FOR A MINIMUM OF 3 FEET, UNLESS A SOIL REPORT PROVIDES ALTERNATE RECOMMENDATIONS.

24. A SUITABLY QUALIFIED AND REGISTERED PROFESSIONAL SHALL SUBMIT A WRITTEN CERTIFICATION TO THE PUBLIC WORKS DEPARTMENT THAT THE FINAL GRADING HAS BEEN COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS FOR ALL GRADING DESIGNATED AS "ENGINEERED GRADING". AS-BUILT PLANS SHALL BE PROVIDED PRIOR TO FINAL ACCEPTANCE.

25. THE CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT AT LEAST 48 HOURS IN ADVANCE OF REQUESTING A FINISH LOT GRADE AND DRAINAGE INSPECTION. THIS INSPECTION MUST BE APPROVED PRIOR TO THE BUILDING PERMIT FINAL INSPECTION BY PUBLIC WORKS FOR EACH LOT.

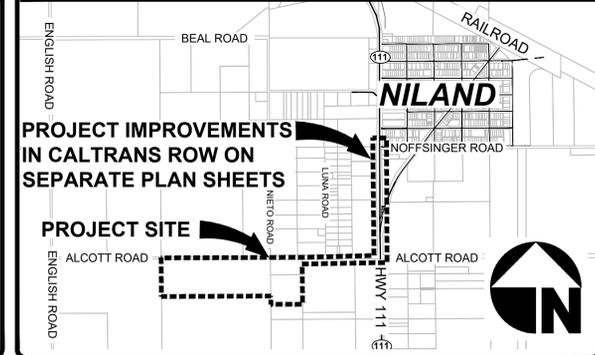
26. THE CONTRACTOR SHALL NOTIFY "UNDERGROUND SERVICE ALERT" AT 811 A MINIMUM OF TWO DAYS PRIOR TO THE COMMENCEMENT OF ANY DIGGING OR EXCAVATION.

27. THE CONTRACTOR SHALL POSSESS A CALIFORNIA CONTRACTOR'S LICENSE, CLASS A, AT THE TIME THIS CONTRACTOR IS AWARDED.

VICINITY MAP



LOCATION MAP



SHEET INDEX

Table with 2 columns: SHEET NO. and SHEET TITLE. Lists 50 sheets including Title Sheet, Project Site Map, Hydraulic Profile, Wastewater Treatment Plant Improvement Site Plan, etc.

GEOTECHNICAL ENGINEER'S STATEMENT

I STATE THAT I HAVE REVIEWED THESE PLANS AND FIND THAT THEY SUBSTANTIALLY CONFORM TO THE RECOMMENDATIONS SET FORTH IN REPORT NO. LE18206 DATED NOVEMBER 29, 2018 PREPARED IN OUR OFFICE. PETER E. LABRUCHERIE, P.E., LANDMARK CONSULTANTS, INC., 780 N. 4TH STREET, EL CENTRO, CALIFORNIA 92524, PHONE: (760) 337-1100

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF THE WORK OF THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. JAMES G. HOLT, THE HOLT GROUP, INC., 1601 N. IMPERIAL AVENUE, (760) 337-3883

REVISION table with columns for REVISION, DATE, and COMMENTS.

Professional Engineer seals for James G. Holt and John A. Gay, and text: PREPARED UNDER THE DIRECT SUPERVISION OF: JAMES G. "JACK" HOLT, 10/18/2023

COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY: JOHN GAY, P.E., DIRECTOR OF PUBLIC WORKS, 09/30/25

COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT EL CENTRO, CALIFORNIA. PROJECT TITLE: NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS. TITLE SHEET. REFERENCE: THG #542.089. SHEET 1 OF 50.

CUUsers\jcastro\HOLT\LEGION\WIN10-18-2023 - 542.08904 - CAD & PDF DRAWINGS\10-18-2023 - Set of Plans\542.089 - SHEET\_1 Title Sheet.dwg, 01/16/2024 09:02





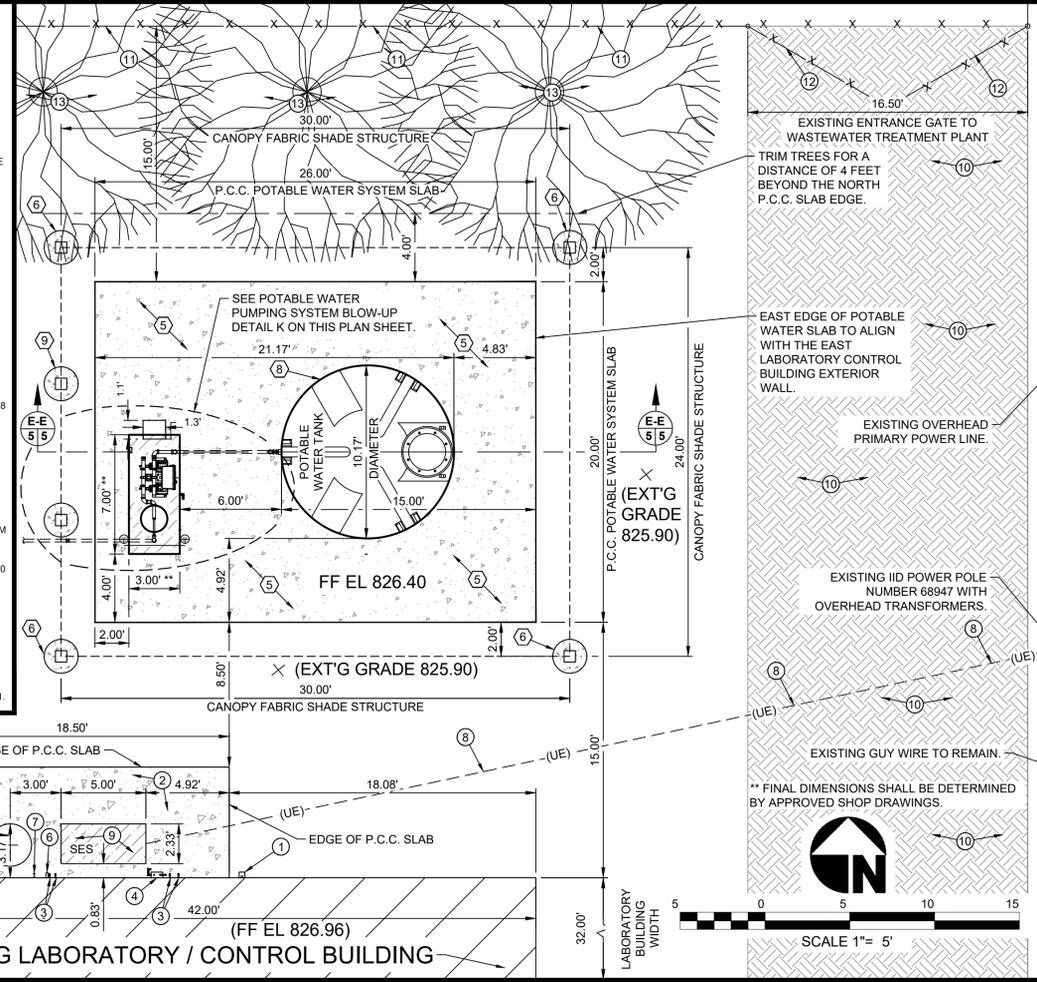


**EXISTING KEYNOTES FOR (DETAIL H AND SECTION E-E)**

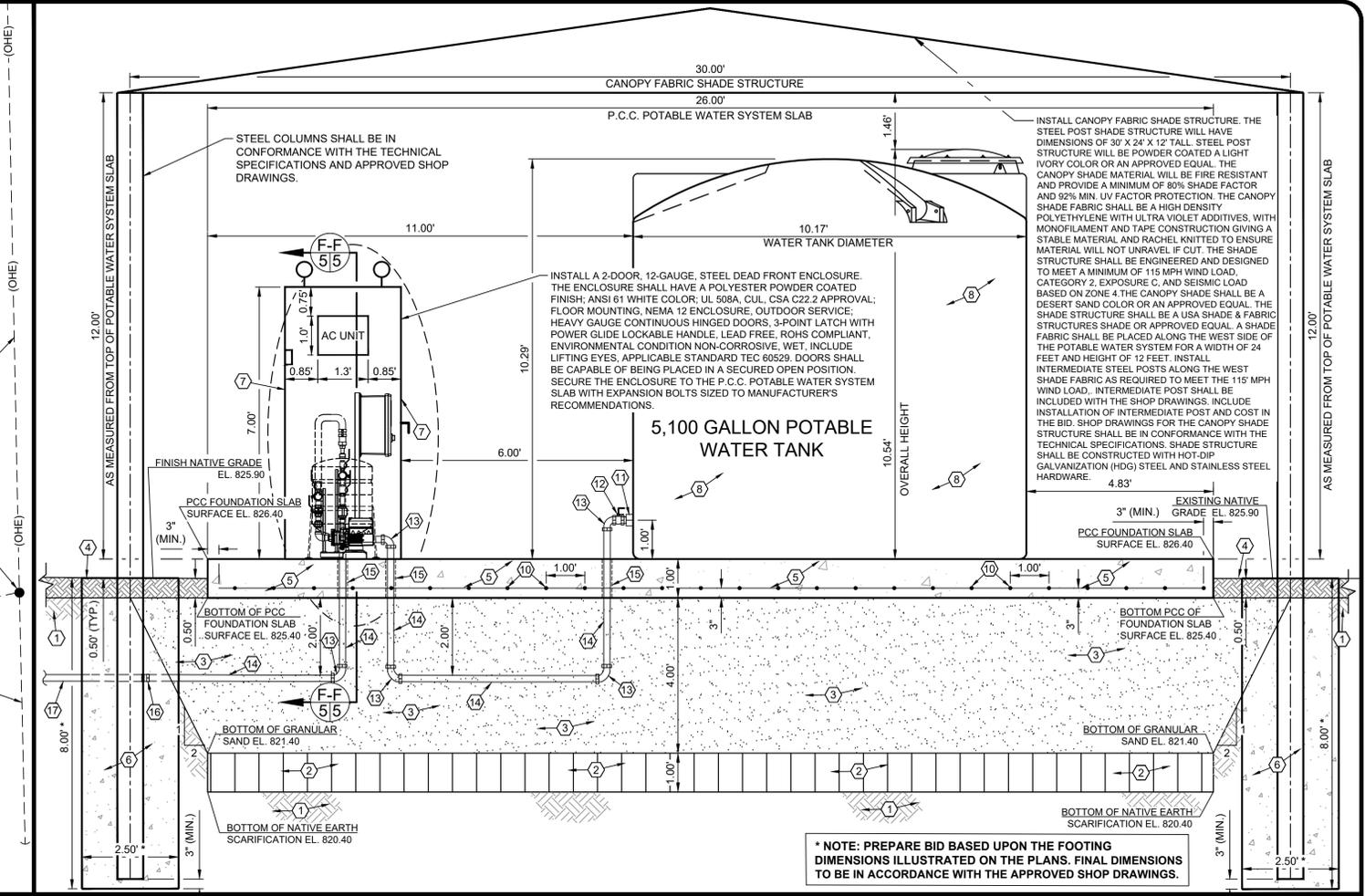
- EXISTING DUPLEX WEATHERPROOF GFCI RECEPTACLE TO REMAIN.
- EXISTING P.C.C. SLAB TO REMAIN.
- EXISTING 1/2-INCH PVC STUB OUT PIPES EXPPELLING CONDENSATE FROM A/C UNITS ON THE ROOF TO REMAIN.
- EXISTING ELECTRICAL DISCONNECT SWITCH FOR ROOF MOUNTED A/C UNIT TO REMAIN.
- EXISTING 100-GALLON, 30-INCH DIAMETER, 36-INCH TALL "OASIS" ELEVATED POTABLE WATER TANK TO REMAIN.
- EXISTING ELECTRICAL CONDUIT FITTING FOR ELECTRICAL CIRCUITRY FROM THE ELECTRICAL SERVICE ENTRANCE SECTION (SES) TO THE ELECTRICAL MCC INSIDE THE LABORATORY BUILDING TO REMAIN.
- EXISTING 1/2-INCH NON-POTABLE WATER PIPELINE WITH WATER FAUCET TO REMAIN. THE 1/2-INCH NON-POTABLE WATER PIPELINE SUPPLIES WATER TO THE INTERIOR OF THE LABORATORY BUILDING.
- EXISTING UNDERGROUND SECONDARY ELECTRICAL CONDUIT AND CONDUCTORS TO REMAIN. EXACT LOCATION AND DEPTH OF SECONDARY ELECTRICAL CIRCUITS UNKNOWN.
- EXISTING ELECTRICAL SERVICE ENTRANCE SECTION (SES) TO REMAIN.
- EXISTING NATIVE EARTH ACCESS ROAD.
- EXISTING 6-FOOT TALL CHAIN LINK FENCE TO REMAIN.
- EXISTING CHAIN LINK FENCE SWING GATE TO BE REPLACED WITH A 20-FOOT WIDE ENTRANCE GATE.
- EXISTING TREES TO REMAIN.

**CONSTRUCTION KEYNOTES (DETAIL H AND SECTION E-E)**

- EXISTING NATIVE SOIL TO REMAIN.
- SCARIFY AND MOISTURE CONDITION EXISTING NATIVE MATERIAL FOR A DEPTH OF 1 FOOT. COMPACT SCARIFIED AND MOISTURE CONDITIONED NATIVE SOIL AT PLUS 4 TO 8 PERCENT OF OPTIMUM WATER CONTENT TO 90 PERCENT OF MAXIMUM DENSITY PER ASTM D1557.
- INSTALL GRANULAR SAND MATERIAL IN MAXIMUM 9 INCH LIFTS. COMPACT GRANULAR SAND MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY AT MINUS 2 TO PLUS 4 PERCENT OF OPTIMUM WATER CONTENT PER ASTM D1557. SUCCESSIVE LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE REQUIRED COMPACTION DENSITY.
- INSTALL 6-INCH OF NATIVE MATERIAL TO FINISH NATIVE GRADE AROUND THE EXTERIOR OF THE P.C.C. POTABLE WATER SYSTEM SLAB AT THE CONCLUSION OF CONSTRUCTION ACTIVITIES. COMPACT NATIVE MATERIAL TO 90 PERCENT OF MAXIMUM DENSITY AT OPTIMUM WATER CONTENT PER ASTM D1557.
- INSTALL 12-INCH P.C.C. POTABLE WATER SYSTEM SLAB. THE P.C.C. SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS OF CURING.
- INSTALL SHADE STRUCTURE FOOTING PER DETAIL J ON PLAN SHEET 35. P.C.C. CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS CURING.
- INSTALL 3-FOOT X 7-FOOT X 7-FOOT METAL DEAD FRONT ENCLOSURE TO CONTAIN POTABLE WATER PUMPING SYSTEM AND BLADDER TANK. EXACT DIMENSIONS SHALL DEPEND UPON THE ENCLOSURE MANUFACTURER PER THE APPROVED SHOP DRAWINGS.
- INSTALL 5,100 GALLON POTABLE WATER TANK WITH INLETS, OUTLETS, VENTS, MANWAYS, SEISMIC BRACING, AND APPURTENANCES PER DETAIL J ON PLAN SHEET 11.
- INSTALL INTERMEDIATE STEEL POST AND P.C.C. FOOTING PER APPROVED SHADE STRUCTURE SHOP DRAWINGS.
- INSTALL #5 REINFORCING BARS 1'-0" O.C. EACH WAY.
- INSTALL 2-INCH 316 STAINLESS STEEL NIPPLE CONNECTED TO WATER TANK OUTLET.
- INSTALL 2-INCH STAINLESS STEEL BALL VALVE WITH TEE HANDLE.
- INSTALL 2-INCH 316 STAINLESS STEEL PIPELINE ELBOWS AS REQUIRED.
- INSTALL 2-INCH 316 STAINLESS STEEL PIPELINE. DETERMINE EXACT PIPELINE LENGTH AT THE TIME OF INSTALLATION.
- INSTALL 2-INCH 316 STAINLESS STEEL PIPING THROUGH A 3-INCH SCHEDULE 40 PVC SLEEVE EXTENDING THROUGH THE P.C.C. SLAB. FILL THE ANNULAR AREA WITH GRANULAR SAND.
- INSTALL 2-INCH ADAPTER FITTING FROM 316 STAINLESS STEEL TO SCHEDULE 80 PVC.
- INSTALL 2-INCH SCHEDULE 80 PVC POTABLE WATER PIPELINE. INSTALL NEW 2-INCH SCHEDULE 80 PVC PIPELINE TO THE EXISTING WATER PIPELINE POINT OF CONNECTION AS ILLUSTRATED ON PLAN SHEET 4.



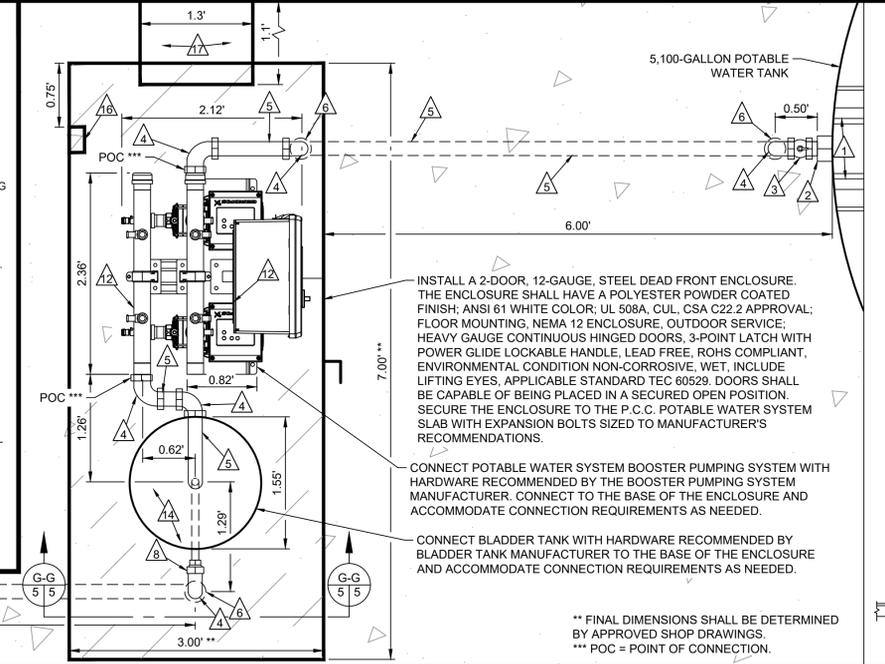
**POTABLE WATER SYSTEM PLAN VIEW DETAIL**  
SCALE 1" = 5'



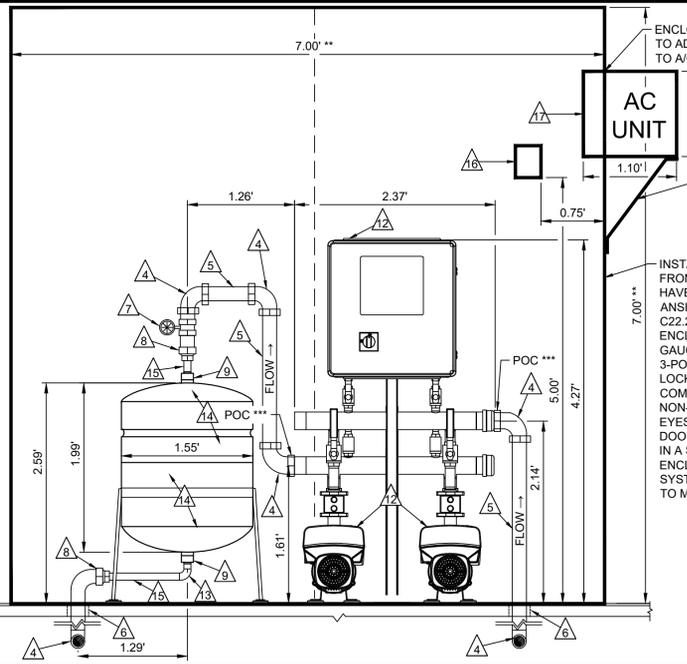
**POTABLE WATER SYSTEM ELEVATION VIEW SECTION**  
SCALE 1" = 2'

**POTABLE WATER PIPING CONSTRUCTION KEYNOTES (DETAIL K AND SECTIONS F-F AND G-G)**

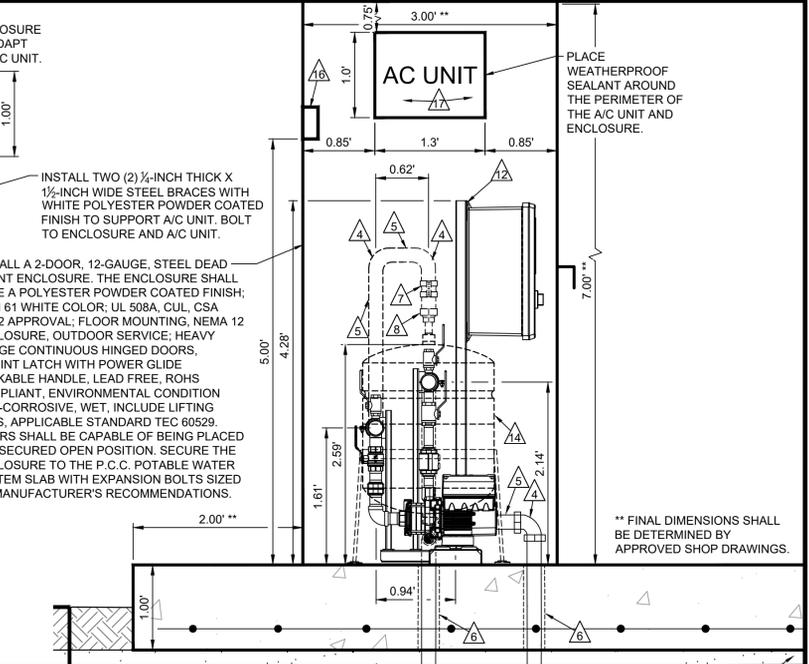
- INSTALL 5,100-GALLON POTABLE WATER TANK PER SECTION E-E ON THIS PLAN SHEET.
- INSTALL 2-INCH 316 STAINLESS STEEL NIPPLE CONNECTED TO WATER TANK.
- INSTALL 2-INCH STAINLESS STEEL BALL VALVE WITH TEE HANDLE.
- INSTALL 2-INCH 316 STAINLESS STEEL PIPELINE ELBOWS AS REQUIRED.
- INSTALL 2-INCH 316 STAINLESS STEEL PIPELINE. DETERMINE EXACT PIPELINE LENGTH AT THE TIME OF INSTALLATION.
- INSTALL 2-INCH 316 STAINLESS STEEL PIPING THROUGH A 3 INCH SCHEDULE 40 PVC SLEEVE EXTENDING THROUGH THE P.C.C. SLAB. FILL THE ANNULAR AREA WITH GRANULAR SAND.
- INSTALL PRESSURE GAUGE WITH 0 TO 100 PSI RANGE.
- INSTALL 1-INCH X 2-INCH 316 STAINLESS STEEL REDUCER FITTING.
- INSTALL 1-INCH 316 STAINLESS STEEL PIPE NIPPLE TO BE CONNECTED TO DIAPHRAGM (BLADDER) TANK.
- INSTALL 2-INCH ADAPTER FITTING FROM 316 STAINLESS STEEL TO SCHEDULE 80 PVC.
- INSTALL 2-INCH SCHEDULE 80 PVC PIPELINE.
- INSTALL BOOSTER POTABLE WATER SYSTEM. THE 15 GPM @ 162 FEET TDH DUPLEX PUMPING SYSTEM SHALL BE EQUIPPED WITH VARIABLE FREQUENCY DRIVE UNITS. THE PUMP MOTORS SHALL BE 2 HP, 480 VOLTS, 3 PHASE. THE BOOSTER PUMPING SYSTEM SHALL BE PREFABRICATED ON A SKID WITH PUMPS, SUCTION AND DISCHARGE PIPING, AND ELECTRICAL CONTROL PANEL. THE SKID MOUNTED PUMPING SYSTEM SHALL BE A GRUNDFOS MODEL HYDRO MPC E2CM5-4 OR APPROVED EQUAL. SEE TECHNICAL SPECIFICATIONS.
- INSTALL 1-INCH 316 STAINLESS STEEL PIPELINE ELBOW.
- INSTALL A 14-GALLON BLADDER TANK. THE BLADDER TANK SHALL BE AN AMTROL THERM-X-TROL MODEL NO. ST-30V WITH SUPPORT OR APPROVED EQUAL. SEE TECHNICAL SPECIFICATIONS.
- INSTALL 1-INCH 316 STAINLESS STEEL PIPELINE. DETERMINE EXACT PIPELINE LENGTH AT THE TIME OF INSTALLATION.
- INSTALL DUPLEX 110 VOLT, 1 PHASE WEATHER PROOF ELECTRICAL RECEPTACLE FOR A/C UNIT
- INSTALL A TOSHIBA 6,000-BTW, 115-VOLT, 1-PHASE, WINDOW AIR CONDITIONER UNIT OR AN APPROVED EQUAL WITH REMOTE CONTROLLER. THE DIMENSIONS OF THE A/C UNIT ARE 12.05 INCHES TALL, 15.99 INCHES WIDE, AND 13.19 INCHES DEEP.



**POTABLE WATER PUMPING SYSTEM PLAN VIEW BLOW-UP DETAIL**  
SCALE 1" = 1'

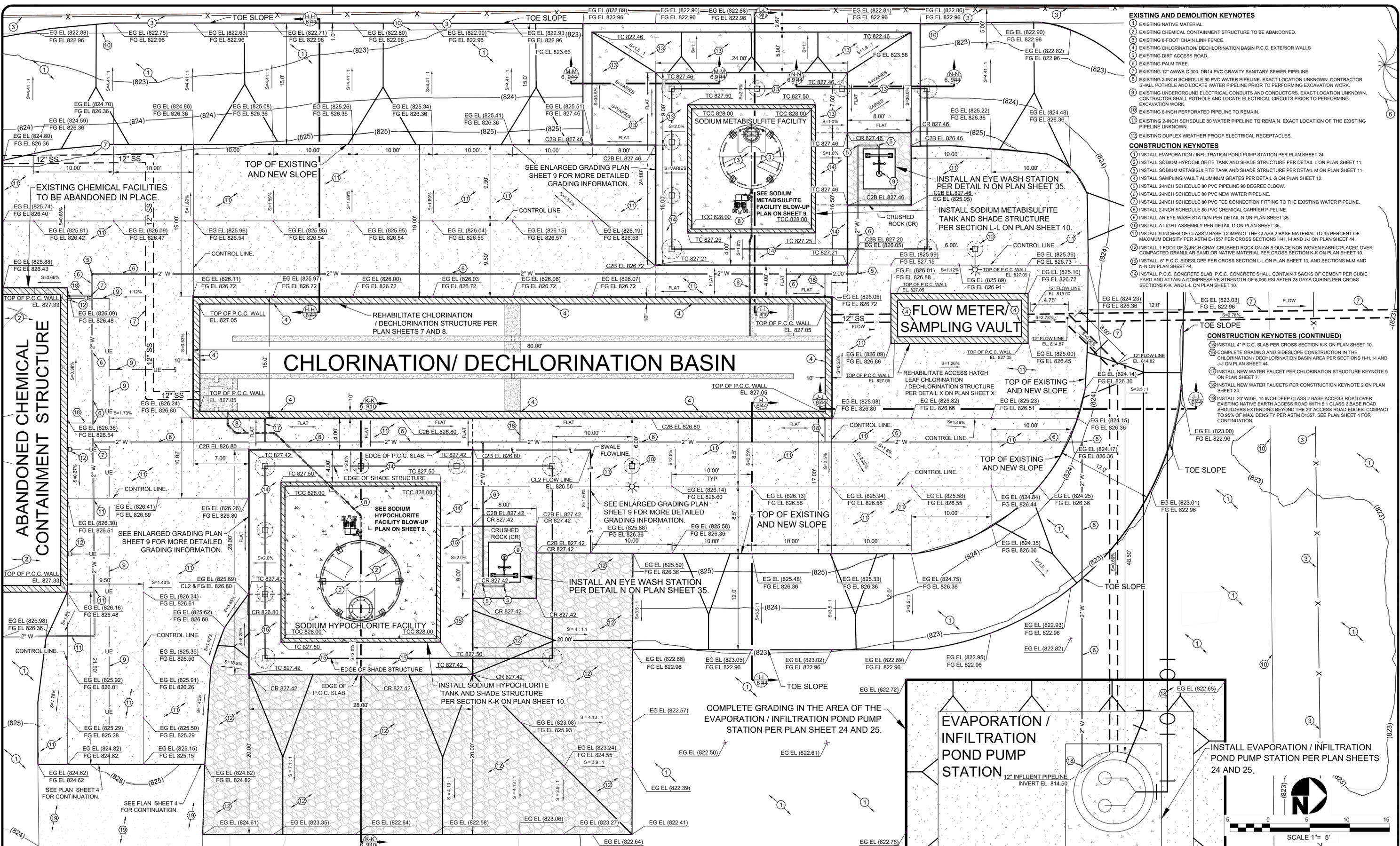


**POTABLE WATER PUMPING SYSTEM SECTION**  
SCALE 1" = 1'



**POTABLE WATER PUMPING SYSTEM BLOW-UP SECTION**  
SCALE 1" = 1'

<table border="1"> <thead> <tr> <th>REVISION</th> <th>DATE</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISION	DATE	COMMENTS											<p>PREPARED UNDER THE DIRECT SUPERVISION OF:</p> <p><i>JAMES G. JACK HOLT</i></p> <p>10/18/2023 DATE</p>	<p>31773 R.C.E. No.</p> <p>12/31/24 REG. EXP.</p>		<p>COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT</p> <p>APPROVED FOR CONSTRUCTION BY:</p> <p>JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS</p> <p>DATE</p>	<p>62028 R.C.E. No.</p> <p>09/30/25 REG. EXP.</p>	<p>PUBLIC WORKS DEPARTMENT</p> <p><b>COUNTY OF IMPERIAL</b></p> <p>EL CENTRO, CALIFORNIA</p>	<p>DATE: 10/18/2023</p> <p>DRAWN: RS</p> <p>DESIGNED: RS</p> <p>SCALE: N/A</p> <p>CHECKED: JGH</p>	<p>PROJECT TITLE</p> <p><b>COUNTY OF IMPERIAL</b></p> <p><b>NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS</b></p> <p><b>WASTEWATER TREATMENT PLANT POTABLE WATER SYSTEM DETAILS AND SECTIONS</b></p>	<p>REFERENCE</p> <p>THG #542.089</p>	<p>SHEET 5 OF 50</p>
REVISION	DATE	COMMENTS																					



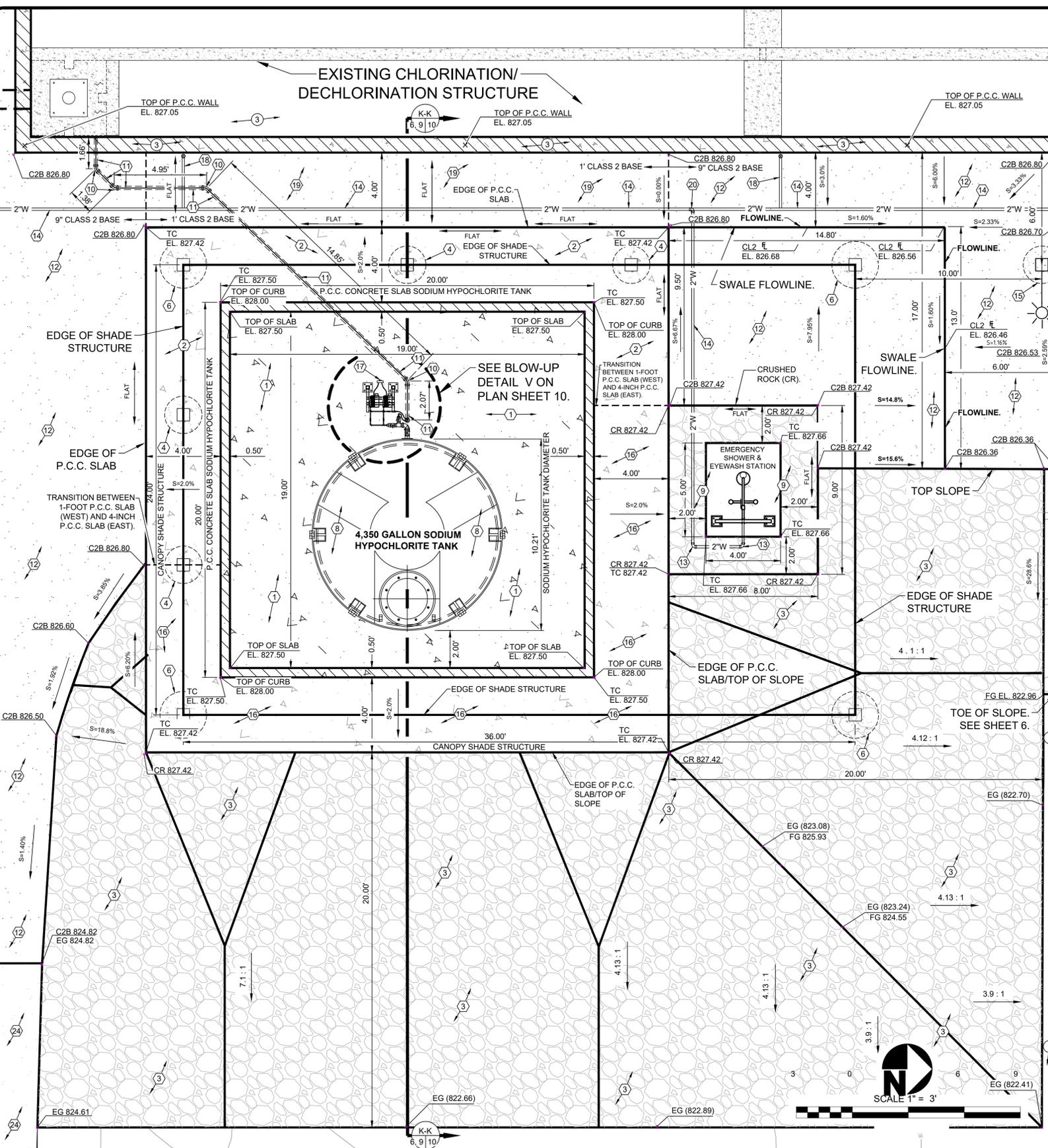
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	PREPARED UNDER THE DIRECT SUPERVISION OF:  <b>JAMES G. HOLT</b> 10/18/2023 DATE	31773 R.C.E. No. 12/31/24 REG. EXP.	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:  <b>JOHN GAY, P.E.</b> DIRECTOR OF PUBLIC WORKS DATE	62028 R.C.E. No. 09/30/25 REG. EXP.		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT <b>COUNTY OF IMPERIAL</b> EL CENTRO, CALIFORNIA	DATE: 10/18/2023 DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JGH	PROJECT TITLE <b>COUNTY OF IMPERIAL          NILDAD COUNTY SANITATION DISTRICT - WASTEWATER          TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS          CHLORINATION/DECHLORINATION          STRUCTURE AND CHEMICAL CONTAINMENT          STRUCTURE GRADING PLAN</b>	REFERENCE THG #542.089 SHEET 6 OF 50
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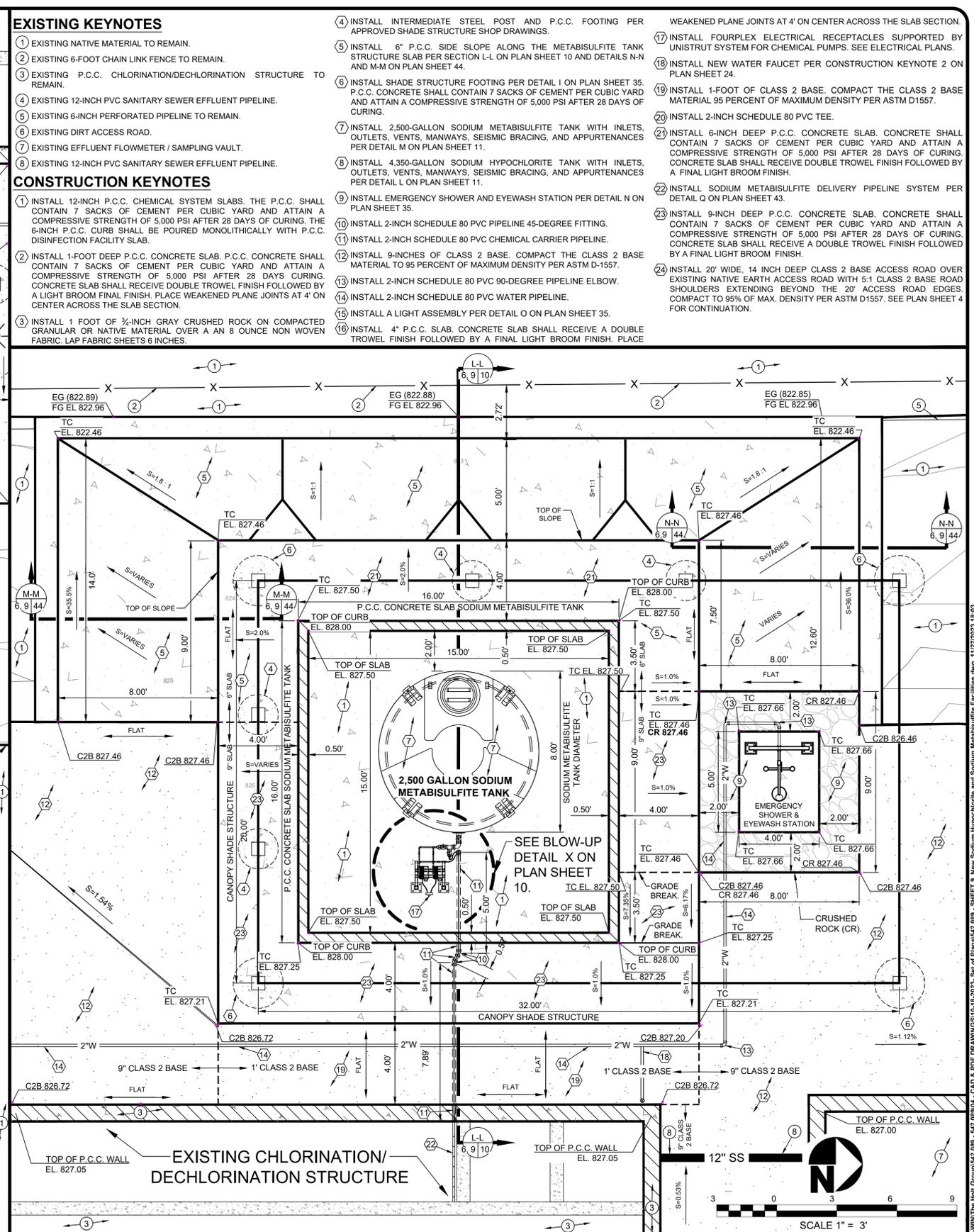






NEW 4,350-GALLON SODIUM HYPOCHLORITE TANK BLOW-UP PLAN

SCALE 1" = 3'



NEW 2,500-GALLON SODIUM METABISULFITE TANK BLOW-UP PLAN

SCALE 1" = 3'

**EXISTING KEYNOTES**

- 1 EXISTING NATIVE MATERIAL TO REMAIN.
- 2 EXISTING 6-FOOT CHAIN LINK FENCE TO REMAIN.
- 3 EXISTING P.C.C. CHLORINATION/DECHLORINATION STRUCTURE TO REMAIN.
- 4 EXISTING 12-INCH PVC SANITARY SEWER EFFLUENT PIPELINE.
- 5 EXISTING 6-INCH PERFORATED PIPELINE TO REMAIN.
- 6 EXISTING DIRT ACCESS ROAD.
- 7 EXISTING EFFLUENT FLOWMETER / SAMPLING VAULT.
- 8 EXISTING 12-INCH PVC SANITARY SEWER EFFLUENT PIPELINE.

**CONSTRUCTION KEYNOTES**

- 1 INSTALL 12-INCH P.C.C. CHEMICAL SYSTEM SLABS. THE P.C.C. SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS OF CURING. THE 6-INCH P.C.C. CURB SHALL BE POURED MONOLITHICALLY WITH P.C.C. DISINFECTION FACILITY SLAB.
- 2 INSTALL 1-FOOT DEEP P.C.C. CONCRETE SLAB. P.C.C. CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS OF CURING. CONCRETE SLAB SHALL RECEIVE DOUBLE TROWEL FINISH FOLLOWED BY A LIGHT BROOM FINAL FINISH. PLACE WEAKENED PLANE JOINTS AT 4' ON CENTER ACROSS THE SLAB SECTION.
- 3 INSTALL 1 FOOT OF 3/4-INCH GRAY CRUSHED ROCK ON COMPACTED GRANULAR OR NATIVE MATERIAL OVER A AN 8 OUNCE NON WOVEN FABRIC. LAP FABRIC SHEETS 6 INCHES.

- 4 INSTALL INTERMEDIATE STEEL POST AND P.C.C. FOOTING PER APPROVED SHADE STRUCTURE SHOP DRAWINGS.
- 5 INSTALL 6" P.C.C. SIDE SLOPE ALONG THE METABISULFITE TANK STRUCTURE SLAB PER SECTION L-L ON PLAN SHEET 10 AND DETAILS N-N AND M-M ON PLAN SHEET 44.
- 6 INSTALL SHADE STRUCTURE FOOTING PER DETAIL L ON PLAN SHEET 35. P.C.C. CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS OF CURING.
- 7 INSTALL 2,500-GALLON SODIUM METABISULFITE TANK WITH INLETS, OUTLETS, VENTS, MANWAYS, SEISMIC BRACING, AND APPURTENANCES PER DETAIL M ON PLAN SHEET 11.
- 8 INSTALL 4,350-GALLON SODIUM HYPOCHLORITE TANK WITH INLETS, OUTLETS, VENTS, MANWAYS, SEISMIC BRACING, AND APPURTENANCES PER DETAIL L ON PLAN SHEET 11.
- 9 INSTALL EMERGENCY SHOWER AND EYEWASH STATION PER DETAIL N ON PLAN SHEET 35.
- 10 INSTALL 2-INCH SCHEDULE 80 PVC PIPELINE 45-DEGREE FITTING.
- 11 INSTALL 2-INCH SCHEDULE 80 PVC CHEMICAL CARRIER PIPELINE.
- 12 INSTALL 9-INCHES OF CLASS 2 BASE. COMPACT THE CLASS 2 BASE MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 13 INSTALL 2-INCH SCHEDULE 80 PVC 90-DEGREE PIPELINE ELBOW.
- 14 INSTALL 2-INCH SCHEDULE 80 PVC WATER PIPELINE.
- 15 INSTALL A LIGHT ASSEMBLY PER DETAIL O ON PLAN SHEET 35.
- 16 INSTALL 4" P.C.C. SLAB. CONCRETE SLAB SHALL RECEIVE A DOUBLE TROWEL FINISH FOLLOWED BY A FINAL LIGHT BROOM FINISH. PLACE

- 17 WEAKENED PLANE JOINTS AT 4' ON CENTER ACROSS THE SLAB SECTION.
- 18 INSTALL FOURPLEX ELECTRICAL RECEPTACLES SUPPORTED BY UNISTRUT SYSTEM FOR CHEMICAL PUMPS. SEE ELECTRICAL PLANS.
- 19 INSTALL NEW WATER FAUCET PER CONSTRUCTION KEYNOTE 2 ON PLAN SHEET 24.
- 20 INSTALL 2-INCH SCHEDULE 80 PVC TEE.
- 21 INSTALL 1-FOOT OF CLASS 2 BASE. COMPACT THE CLASS 2 BASE MATERIAL 95 PERCENT OF MAXIMUM DENSITY PER ASTM D1557.
- 22 INSTALL SODIUM METABISULFITE DELIVERY PIPELINE SYSTEM PER DETAIL Q ON PLAN SHEET 43.
- 23 INSTALL 6-INCH DEEP P.C.C. CONCRETE SLAB. CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS OF CURING. CONCRETE SLAB SHALL RECEIVE A DOUBLE TROWEL FINISH FOLLOWED BY A FINAL LIGHT BROOM FINISH.
- 24 INSTALL 20" WIDE, 14 INCH DEEP CLASS 2 BASE ACCESS ROAD OVER EXISTING NATIVE EARTH ACCESS ROAD WITH 5:1 CLASS 2 BASE ROAD SHOULDERS EXTENDING BEYOND THE 20" ACCESS ROAD EDGES. COMPACT TO 95% OF MAX. DENSITY PER ASTM D1557. SEE PLAN SHEET 4 FOR CONTINUATION.

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
**JAMES G. JACK HOLT**  
 10/18/2023  
 DATE

31773  
 R.C.E. No.  
 12/31/24  
 REG. EXP.

COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:

**JOHN GAY, P.E.**  
 DIRECTOR OF PUBLIC WORKS  
 DATE

62028  
 R.C.E. No.  
 09/30/25  
 REG. EXP.



DATE: 10/18/2023  
 DRAWN: RS  
 DESIGNED: RS  
 SCALE: N/A  
 CHECKED: JGH

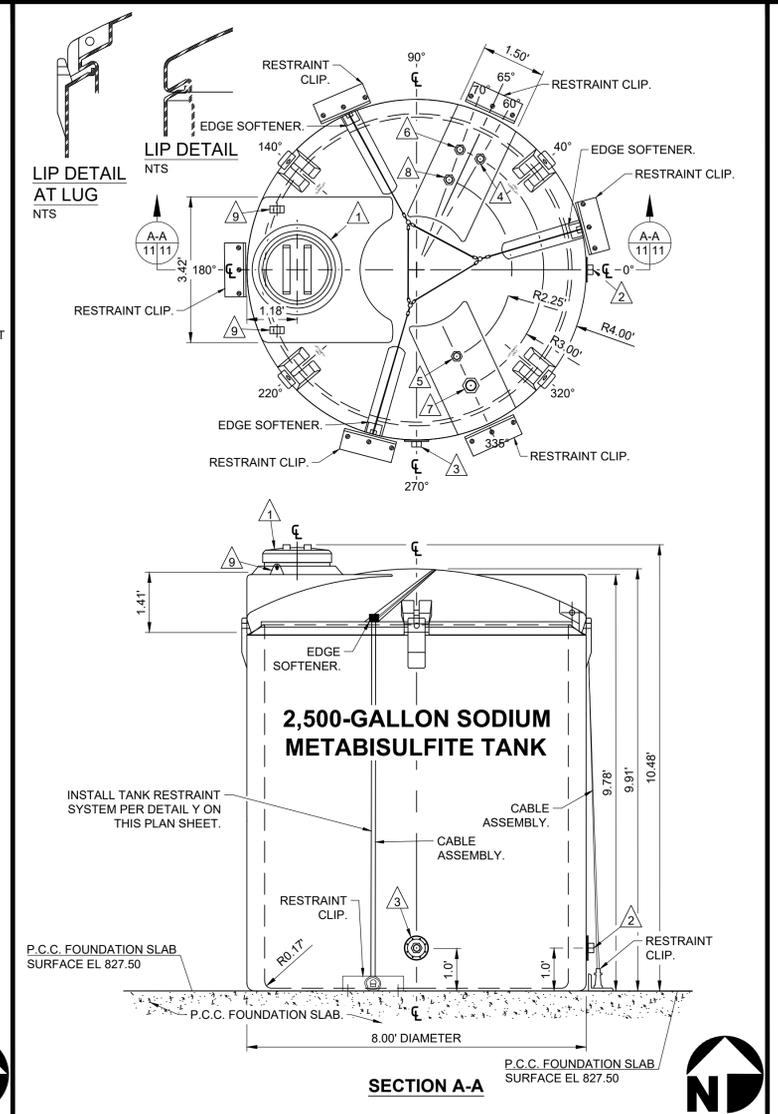
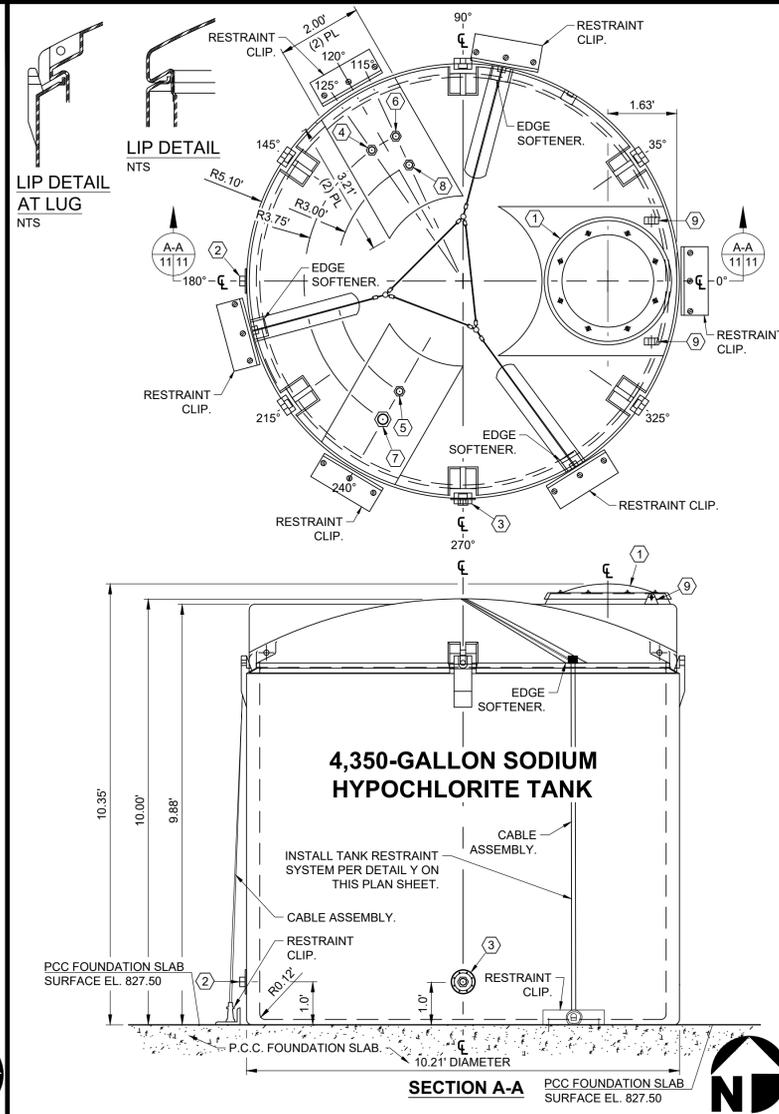
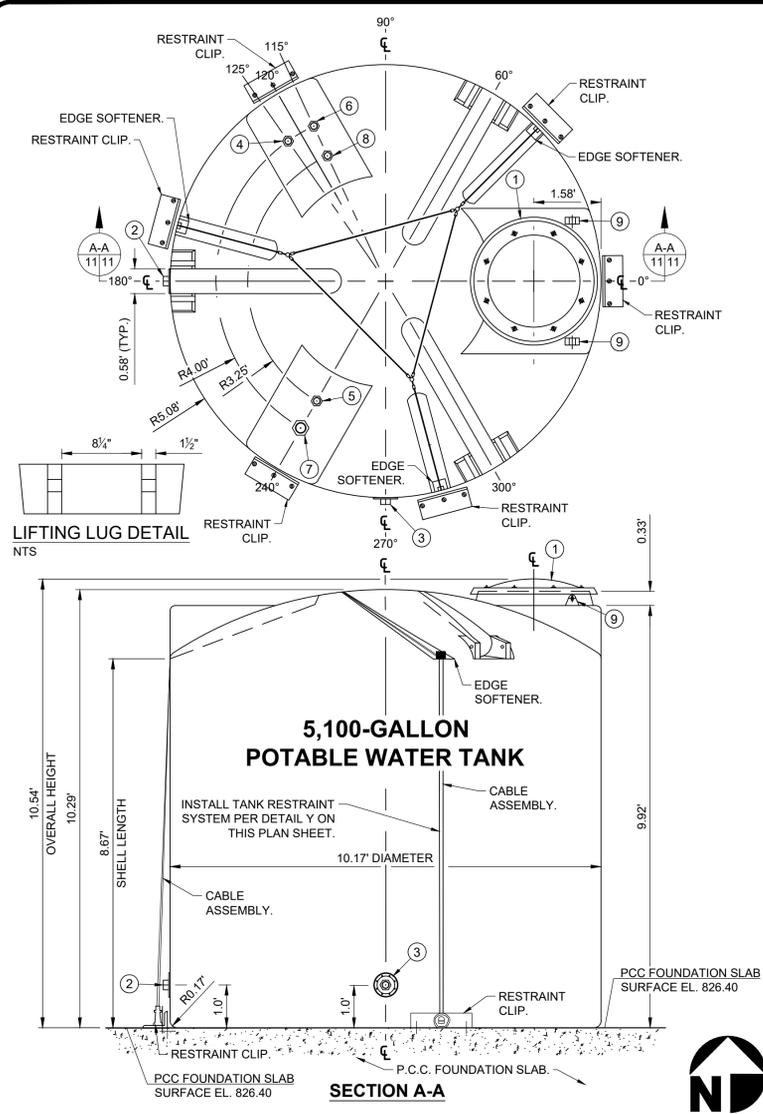
PROJECT TITLE:  
**COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**

**SODIUM HYPOCHLORITE AND SODIUM  
 METABISULFITE FACILITIES ENLARGED GRADING PLAN**

REFERENCE: THG #542.089  
 SHEET 9 OF 50

C:\Users\jcarro\OneDrive\Desktop\11-2023\11-2023-08-2023-Set of Plans\42.089 - SHEET 9 - New Sodium Hypochlorite and Sodium Metabisulfite Facilities.dwg 11/27/2023 18:30





**5,100-GALLON POTABLE WATER SYSTEM**

**NOZZLE SCHEDULE & ACCESSORIES**

SERVICE	MK.	STOCK NO.	SIZE	FITTING	DEG.	ELEV.
CAP	(1)	3218 *	24"	24-INCH MANWAY WITH 8-INCH VENT	0°	836.94
OUTLET	(2)	9743 *	2"	2-INCH PRIMARY TANK OUTLET	180°	827.40
DRAIN	(3)	9743 *	2"	2-INCH CONTAINMENT DRAIN	270°	827.40
INLET	(4)	7117 *	2"	2-INCH INLET WITH FILL LINE ASSEMBLY	125°	836.32
INLET	(5)	7117 *	2"	2-INCH REVERSE LEVEL FLOAT GAUGE	240°	836.32
INLET	(6)	7117 *	2"	2-INCH LEVEL CONTROL	115°	836.32
INLET	(7)	7122 *	3"	3-INCH SPARE	240°	836.32
INLET	(8)	7117 *	2"	2-INCH VENT	115°	836.32
LADDER	(9)	N/A	N/A	FRP LADDER WITH HANDRAIL AND PLATFORM PER DETAIL Z ON PLAN SHEET 47	180°	836.32

**4,350-GALLON SODIUM HYPOCHLORITE TANK**

**NOZZLE SCHEDULE & ACCESSORIES**

SERVICE	MK.	STOCK NO.	SIZE	FITTING	DEG.	ELEV.
CAP	(1)	3218 *	24"	24-INCH MANWAY WITH 8-INCH VENT	0°	837.85
OUTLET	(2)	9743 *	2"	2-INCH PRIMARY TANK OUTLET	180°	828.50
DRAIN	(3)	9743 *	2"	2-INCH CONTAINMENT DRAIN	270°	828.50
INLET	(4)	7117 *	2"	2-INCH INLET WITH FILL LINE ASSEMBLY	125°	837.38
INLET	(5)	7117 *	2"	2-INCH REVERSE LEVEL FLOAT GAUGE	240°	837.38
INLET	(6)	7117 *	2"	2-INCH LEVEL CONTROL	115°	837.38
INLET	(7)	7122 *	3"	3-INCH SPARE	240°	837.38
INLET	(8)	7117 *	2"	2-INCH VENT	115°	837.38
LADDER	(9)	N/A	N/A	FRP LADDER WITH HANDRAIL AND PLATFORM PER DETAIL Z ON PLAN SHEET 47	180°	837.50

**2,500-GALLON SODIUM METABISULFITE TANK**

**NOZZLE SCHEDULE & ACCESSORIES**

SERVICE	MK.	STOCK NO.	SIZE	FITTING	DEG.	ELEV.
CAP	(1)	4558 *	17"	17-INCH MANWAY	180°	837.98
OUTLET	(2)	9743 *	2"	2-INCH PRIMARY TANK OUTLET	0°	828.50
DRAIN	(3)	9743 *	2"	2-INCH CONTAINMENT DRAIN	270°	828.50
INLET	(4)	7117 *	2"	2-INCH INLET WITH FILL LINE ASSEMBLY	60°	837.28
INLET	(5)	7117 *	2"	2-INCH REVERSE LEVEL FLOAT GAUGE	335°	837.28
INLET	(6)	7117 *	2"	2-INCH LEVEL CONTROL	70°	837.28
INLET	(7)	7122 *	3"	3-INCH SPARE	335°	837.28
INLET	(8)	7117 *	2"	2-INCH VENT	70°	837.28
LADDER	(9)	N/A	N/A	FRP LADDER WITH HANDRAIL AND PLATFORM PER DETAIL Z ON PLAN SHEET 47	180°	837.28

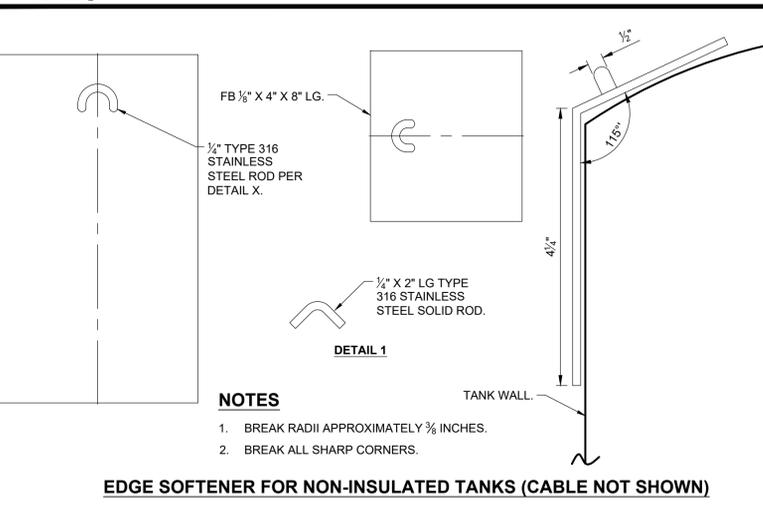
\* PER POLY PROCESSING

**NOTE**

TANK RESTRAINT SYSTEM SUBMITTAL DOCUMENTS TO BE APPROVED PRIOR TO CONSTRUCTION OF P.C.C. DISINFECTION SYSTEM SLAB. THIS PROJECT REQUIRES 6 ANGLE CLIPS AND 3 WAY CABLES.

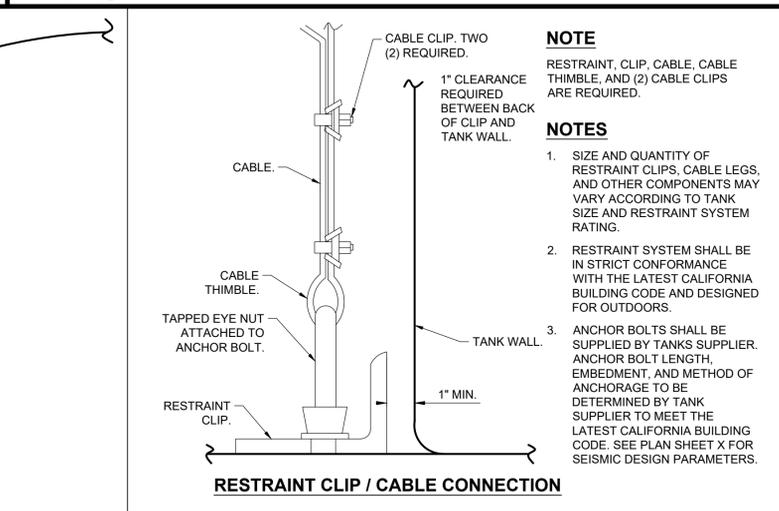
**5,100-GALLON POTABLE WATER SYSTEM 3-WAY CABLE / 3 RESTRAINT CLIP DETAIL**

SCALE 1/2" = 1'



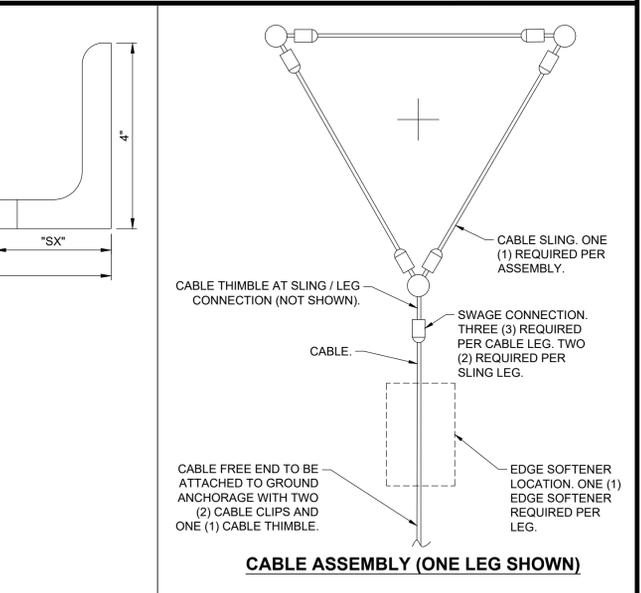
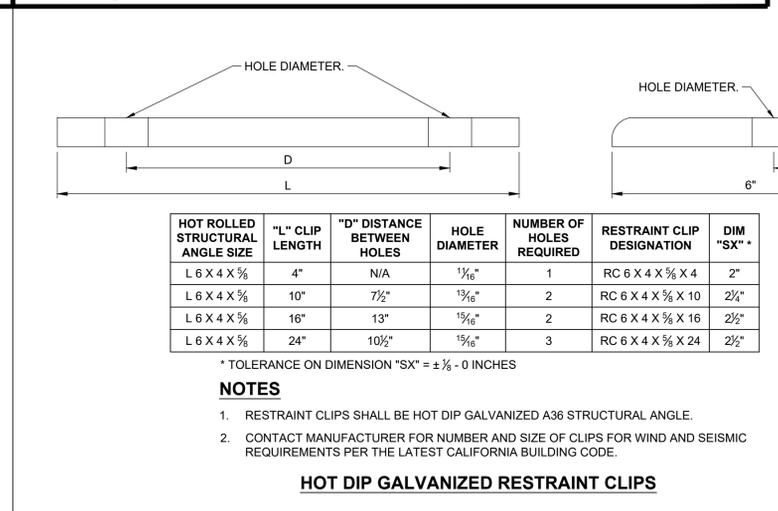
**4,350-GALLON SODIUM HYPOCHLORITE TANK 3-WAY CABLE / 3 RESTRAINT CLIP DETAIL**

SCALE 1/2" = 1'



**2,500-GALLON SODIUM METABISULFITE TANK 3-WAY CABLE / 3 RESTRAINT CLIP DETAIL**

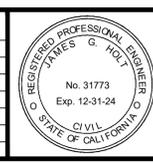
SCALE 1/2" = 1'



**TANK RESTRAINT SYSTEM DETAIL**

NOT TO SCALE

REVISION	DATE	COMMENTS

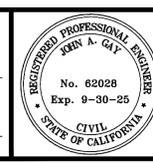


PREPARED UNDER THE DIRECT SUPERVISION OF:

JAMES G. "JACK" HOLT

31773 R.C.E. No.

12/31/24 REG. EXP.



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT

APPROVED FOR CONSTRUCTION BY:

JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS

62028 R.C.E. No.

09/30/25 REG. EXP.

PUBLIC WORKS DEPARTMENT

COUNTY OF IMPERIAL

EL CENTRO, CALIFORNIA

DATE: 10/18/2023

DRAWN: RS

DESIGNED: RS

SCALE: N/A

CHECKED: JGH

PROJECT TITLE:

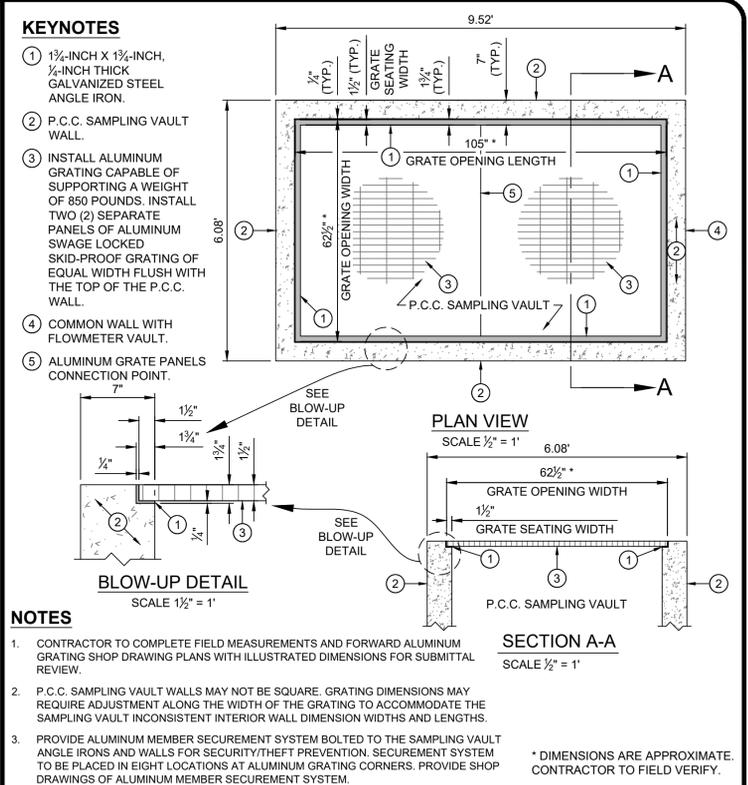
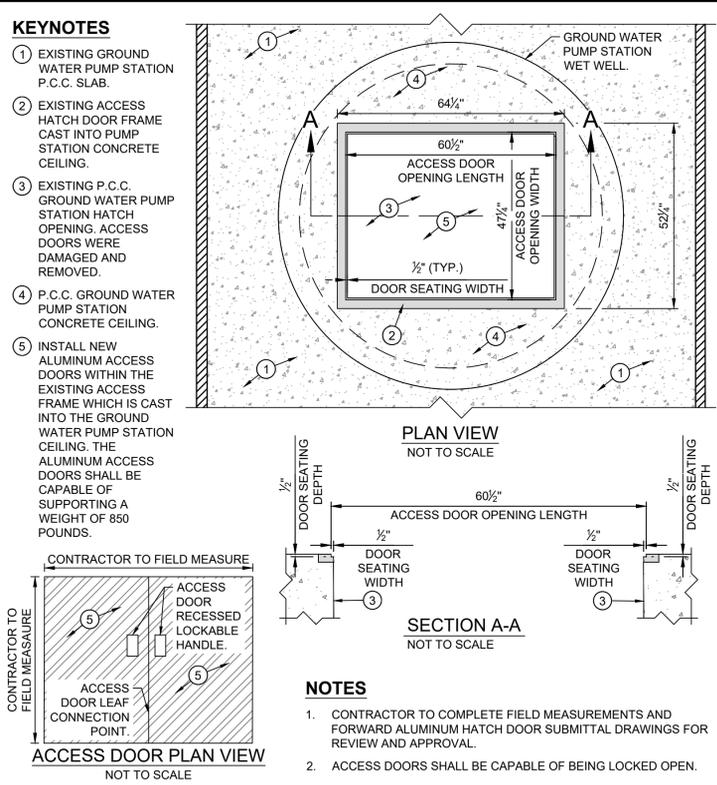
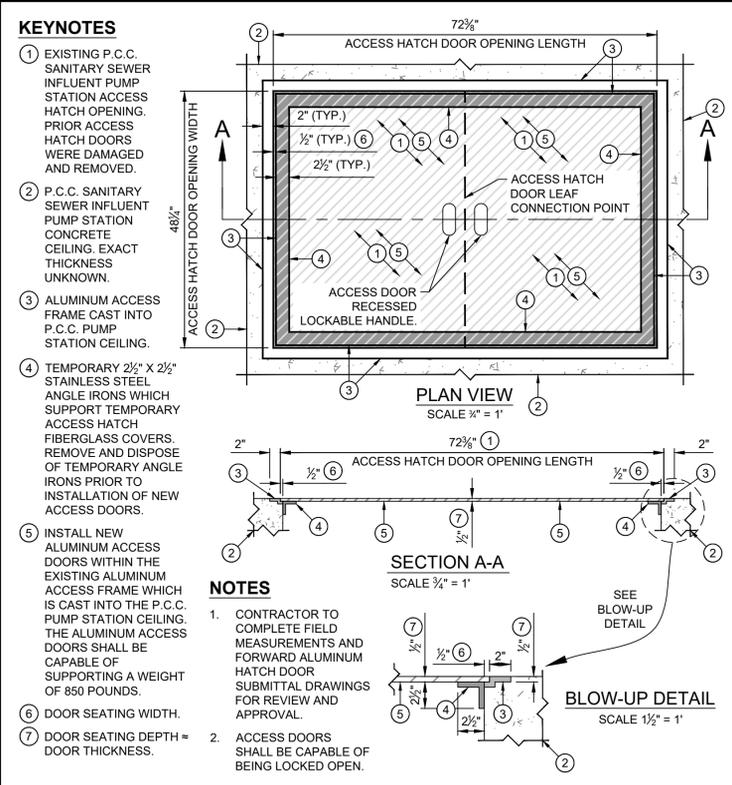
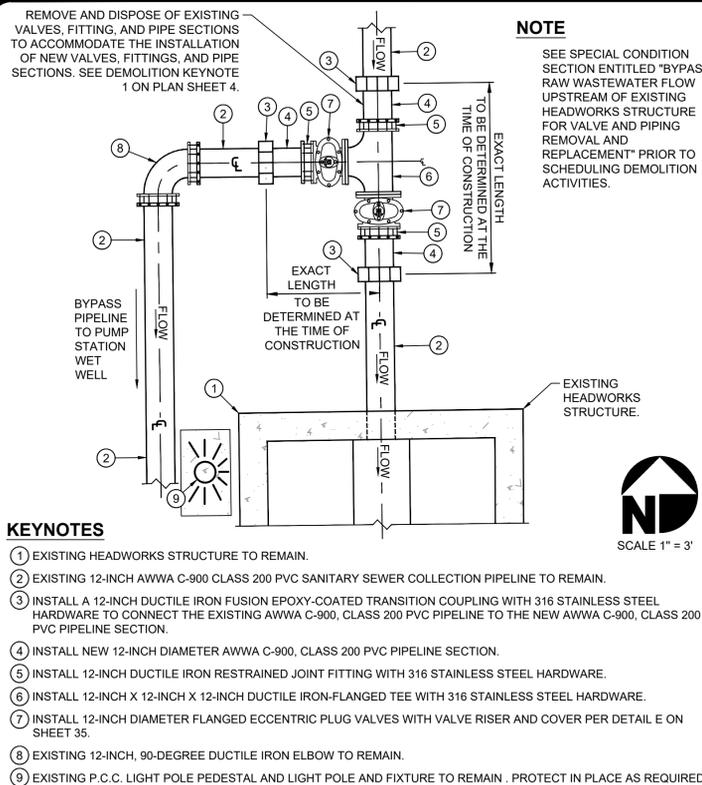
COUNTY OF IMPERIAL

NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS

CHEMICAL AND WATER TANK DETAILS AND SECTIONS

REFERENCE	THG #542.089
SHEET	11 OF 50

C:\Users\casarolo\OneDrive - HNTB Group\542.08904 - CAD & PDF DRAWINGS\510-18-2023 - Set of Plans\542.089 - SHEET 11 - Chemical and Water Tank Details and Sections.dwg 10/18/2024 11:04

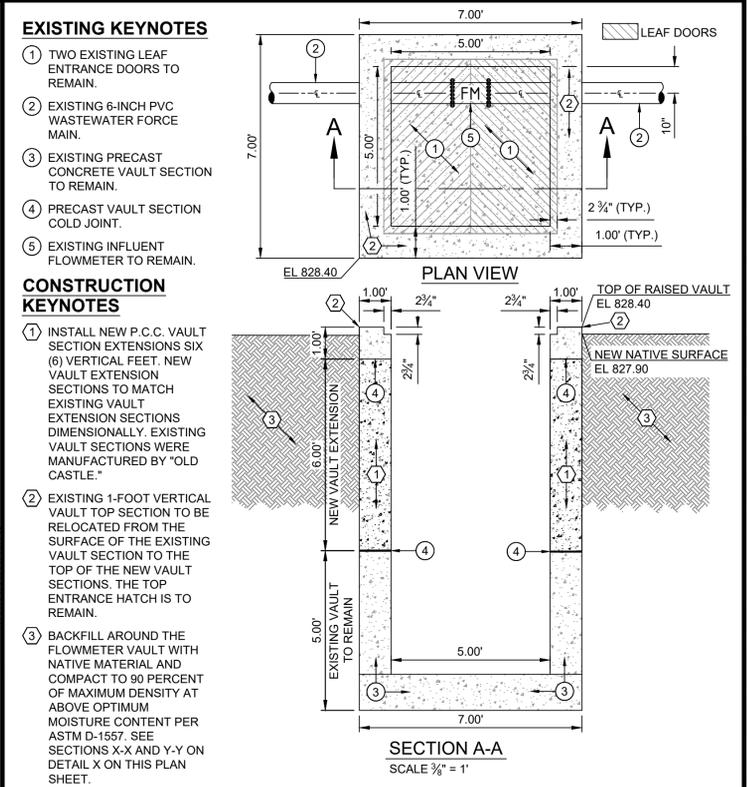
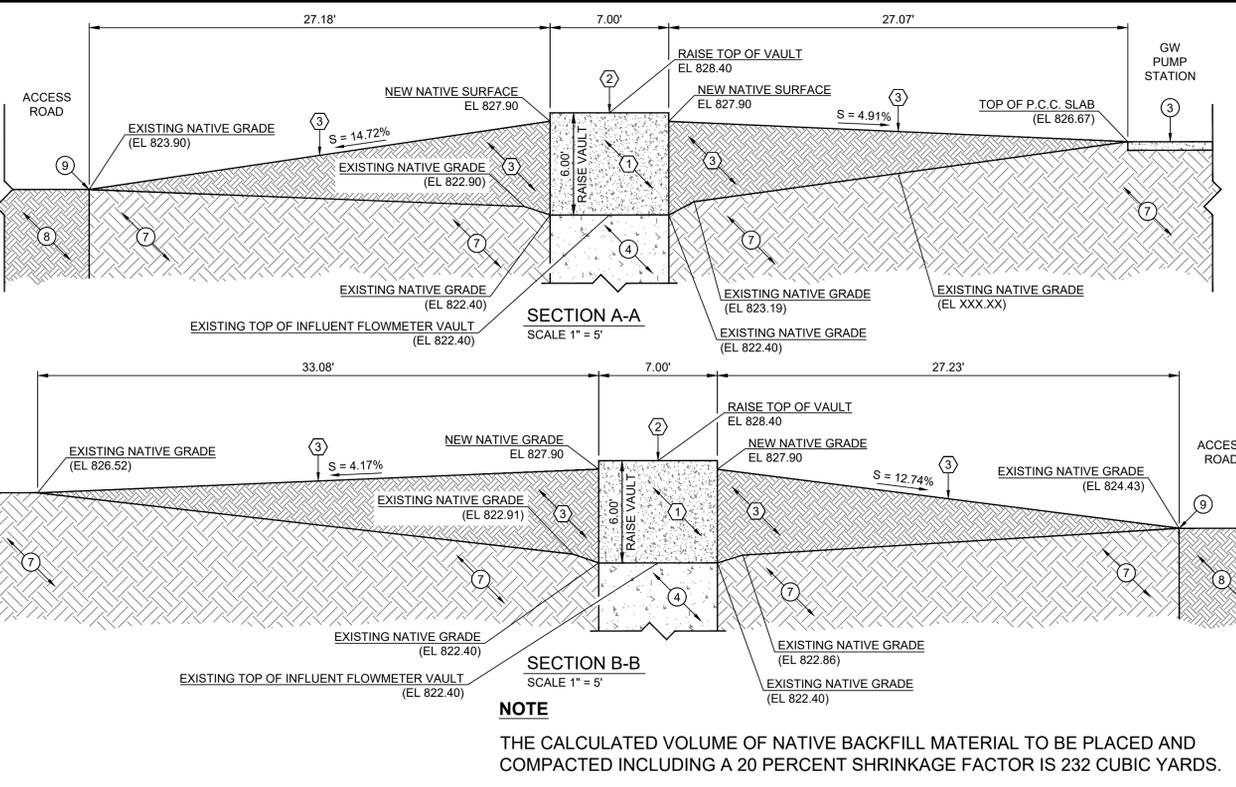
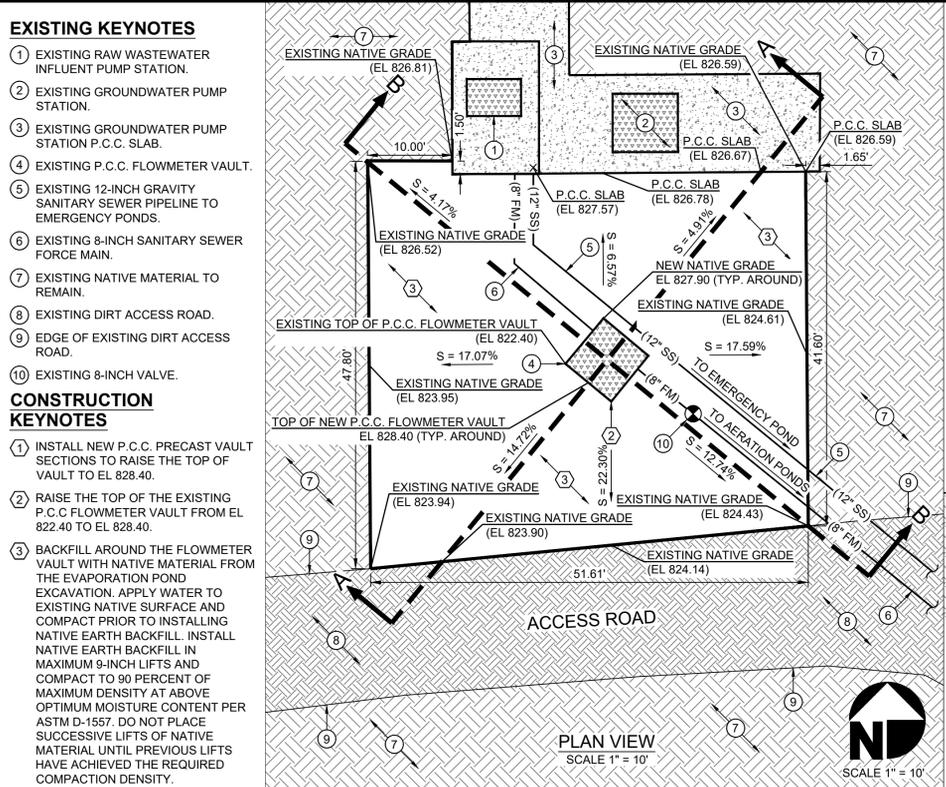


**NEW VALVE AND PIPELINE FITTING REPLACEMENT UPSTREAM OF P.C.C. HEADWORKS STRUCTURE DETAIL**  
SCALE 1" = 3'

**SANITARY SEWER INFLUENT PUMP STATION ACCESS HATCH DETAIL**  
PLAN AND SECTION SCALE 3/4" = 1', BLOW-UP SCALE 1 1/2" = 1'

**GROUND WATER PUMP STATION ACCESS HATCH DETAIL**  
NOT TO SCALE

**EXISTING P.C.C. SAMPLING VAULT OUTLET STRUCTURE NEW ALUMINUM GRATE DETAIL**  
PLAN AND SECTION SCALE 1/2" = 1', BLOW-UP SCALE 1 1/2" = 1'



**PRECAST CONCRETE INFLUENT FLOW METER VAULT EXTENSION DETAIL**  
PLAN SCALE 1" = 10', SECTIONS SCALE 1" = 5'

**PRECAST CONCRETE INFLUENT FLOWMETER VAULT EXTENSION DETAIL**  
SCALE 3/8" = 1'

**PRECAST CONCRETE INFLUENT FLOWMETER VAULT EXTENSION DETAIL**  
SCALE 3/8" = 1'

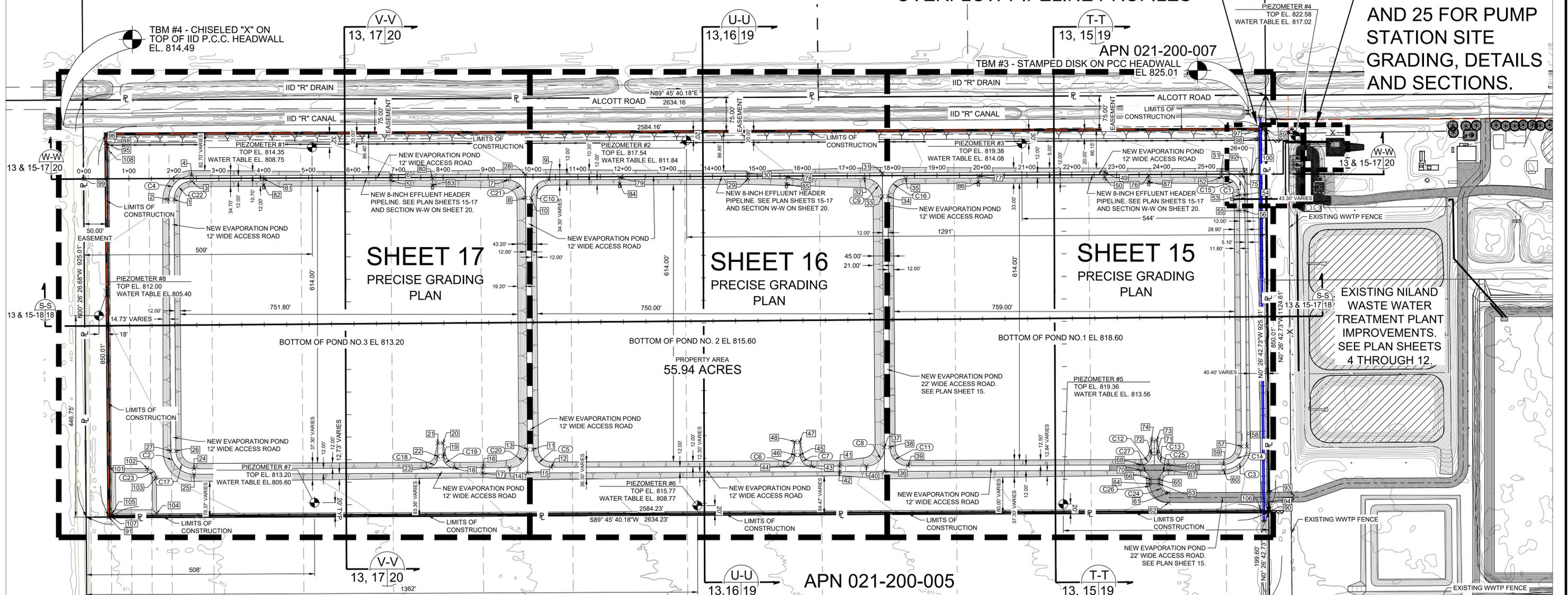
REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:  JAMES G. JACK HOLT 10/18/2023 DATE	31773 R.C.E. No. 12/31/24 REG. EXP.	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:  JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	62028 R.C.E. No. 09/30/25 REG. EXP.	COUNTY OF IMPERIAL EL CENTRO, CALIFORNIA	DATE: 10/18/2023 DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JGH	PROJECT TITLE: COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS HEADWORKS STRUCTURE VALVE REPLACEMENT & SANITARY SEWER INFLUENT PUMP STATION, GROUND WATER PUMP STATION AND SAMPLING VAULT ACCESS HATCH/COVER REPLACEMENT DETAILS & INFLUENT FLOWMETER VAULT IMPROVEMENTS	REFERENCE: THG #542.089 SHEET: 12 OF 50
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APN 021-200-006

SEE PLAN AND PROFILE SHEET 21 FOR PUMP STATION EFFLUENT PIPELINE S.S. FORCEMAIN AND EMERGENCY OVERFLOW PIPELINE PROFILES

APN 021-220-003

SEE SHEETS 24 AND 25 FOR PUMP STATION SITE GRADING, DETAILS AND SECTIONS.



SHEET 17  
PRECISE GRADING  
PLAN

SHEET 16  
PRECISE GRADING  
PLAN

SHEET 15  
PRECISE GRADING  
PLAN

PROPERTY AREA  
55.94 ACRES

EXISTING NILAND  
WASTE WATER  
TREATMENT PLANT  
IMPROVEMENTS.  
SEE PLAN SHEETS  
4 THROUGH 12.

Point #	Northing	Easting	Description
1	2026881.74	6780100.43	EC
2	2026881.64	6780088.43	EC
3	2026922.05	6780140.26	BC
4	2026934.05	6780140.21	BC
5	2026923.89	6780583.27	GB
6	2026935.89	6780583.22	GB
7	2026924.98	6780843.26	BC
8	2026884.96	6780883.43	EC
9	2026925.36	6780935.26	BC
10	2026885.05	6780895.43	EC
11	2026327.06	6780899.77	BC
12	2026287.38	6780939.93	EC
13	2026327.30	6780887.76	BC
14	2026286.99	6780847.93	EC
15	2026275.16	6780887.98	GB
16	2026286.74	6780787.93	GB
17	2026274.74	6780787.98	GB
18	2026286.46	6780724.99	BC
19	2026311.29	6780699.88	EC
20	2026341.37	6780699.65	BOT

Point #	Northing	Easting	Description
21	2026341.32	6780687.65	BOT
22	2026311.42	6780687.88	BC
23	2026286.22	6780662.99	EC
24	2026284.06	6780144.93	EC
25	2026272.06	6780144.98	EC
26	2026323.75	6780104.77	BC
27	2026323.66	6780092.77	BC
28	2026937.14	6780883.21	GB
29	2026927.21	6781378.26	GB
30	2026939.21	6781378.21	GB
31	2026940.46	6781678.21	BC
32	2026928.29	6781638.26	BC
33	2026886.60	6781678.43	EC
34	2026888.70	6781690.43	EC
35	2026928.68	6781730.26	BC
36	2026278.47	6781682.98	GB
37	2026332.12	6781682.75	BC
38	2026332.21	6781694.75	BC
39	2026290.69	6781734.93	EC
40	2026290.31	6781642.93	EC

Point #	Northing	Easting	Description
41	2026290.06	6781582.93	GB
42	2026278.06	6781582.98	GB
43	2026289.79	6781519.98	BC
44	2026284.06	6781457.98	BC
45	2026314.60	6781494.88	EC
46	2026314.73	6781482.88	EC
47	2026344.69	6781494.65	BOT
48	2026344.60	6781482.65	BOT
49	2026942.52	6782173.02	GB
50	2026930.52	6782173.07	GB
51	2026943.61	6782433.21	EC
52	2026931.61	6782433.26	EC
53	2026691.92	6782473.42	BC
54	2026892.01	6782485.42	GB
55	2026856.92	6782473.70	BC
56	2026857.01	6782485.70	GB
57	2026333.93	6782477.76	BC
58	2026334.02	6782489.76	EC
59	2026293.62	6782437.93	BC
60	2026281.62	6782437.98	BC

Point #	Northing	Easting	Description
61	2026231.20	6782315.48	BC
62	2026209.20	6782315.57	EC
63	2026251.04	6782295.40	EC
64	2026250.87	6782273.40	EC
65	2026260.95	6782295.32	BC
66	2026291.01	6782273.32	BC
67	2026281.11	6782315.26	EC
68	2026292.85	6782252.98	EC
69	2026293.11	6782314.98	BC
70	2026280.85	6782253.26	BC
71	2026317.91	6782289.88	EC
72	2026318.04	6782433.26	BC
73	2026348.00	6782289.85	BOT
74	2026347.91	6782277.65	BOT
75	2026937.82	6782479.02	STAND PIPE
76	2026935.56	6782271.49	TEE
77	2026933.97	6781892.00	TEE
78	2026334.02	6782489.76	TEE
79	2026930.64	6781093.00	TEE
80	2026928.91	6780676.10	TEE

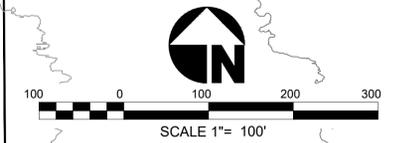
Point #	Northing	Easting	Description
81	2026298.03	6780300.20	ELBOW
82	2026913.71	6780300.26	DISCHARGE
83	2026913.08	6780676.16	DISCHARGE
84	2026917.02	6781093.06	DISCHARGE
85	2026915.79	6781464.56	DISCHARGE
86	2026920.35	6781892.05	DISCHARGE
87	2026920.99	6782271.55	DISCHARGE
88	2027027.25	6779948.15	LIMITS OF CONST.
89	2027038.02	6782532.46	LIMITS OF CONST.
90	2026188.12	6782538.91	LIMITS OF CONST.
91	2026177.27	6779954.69	LIMITS OF CONST.
92	2026943.82	6782485.02	TOP OF BERM COR.
93	2026232.13	6782538.72	ROAD/PL
94	2026210.13	6782538.72	ROAD/PL
95	2027007.25	6779948.23	LIMITS OF CONST.
96	2027023.25	6779948.18	TOP SLOPE
97	2027033.95	6782514.85	TOP SLOPE
98	2027017.95	6782514.99	TOE SLOPE
99	2026927.25	6779900.00	STA 0+00
100	2026937.89	6782499.98	STA 26+00

Point #	Northing	Easting	Description
101	2026284.19	6779960.87	TOP BASIN
102	2026284.80	6780040.86	TOP BASIN
103	2026284.96	6780061.02	TOP BASIN
104	2026184.61	6780061.64	TOP BASIN
105	2026184.19	6779961.64	TOP BASIN
106	2026191.47	6782521.40	CL TOP BERM
107	2026180.68	6779958.16	CL TOP BERM
108	2026994.28	6779951.90	CL TOP BERM

Curve #	Length	Radius	Delta	Tangent
C20	31.42	20.00	90.00	20.00
C1	81.49	52.00	89.79	51.81
C2	81.49	52.00	89.79	51.81
C3	81.87	52.00	90.21	52.19
C4	81.87	52.00	90.21	52.19
C5	62.69	40.00	89.79	39.86
C6	39.36	25.00	90.21	25.09
C7	39.18	25.00	89.79	24.91
C8	62.98	40.00	90.21	40.14
C9	62.69	40.00	89.79	39.86
C10	62.98	40.00	90.21	40.14
C11	62.69	40.00	89.79	39.86
C12	39.36	25.00	90.21	25.09
C13	39.18	25.00	89.79	24.91
C14	62.98	40.00	90.21	40.14
C15	62.69	40.00	89.79	39.86
C16	62.98	40.00	90.21	40.14
C17	62.69	40.00	89.79	39.86
C18	39.36	25.00	90.21	25.09
C19	39.18	25.00	89.79	24.91

Curve #	Length	Radius	Delta	Tangent
C20	62.98	40.00	90.21	40.14
C21	62.69	40.00	89.79	39.86
C22	62.98	40.00	90.21	40.14
C24	31.34	20.00	89.79	19.93
C25	31.49	20.00	90.21	20.07
C26	65.82	42.00	89.79	41.85
C27	31.34	20.00	89.79	19.93

APN 021-240-002



REVISION	DATE	COMMENTS

PREPARED UNDER THE DIRECT SUPERVISION OF:

**JAMES G. JACK**  
REGISTERED PROFESSIONAL ENGINEER  
No. 31773  
Exp. 12-31-24  
DATE: 10/18/2023

31773  
R.C.E. No.  
12/31/24  
REG. EXP.

COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
APPROVED FOR CONSTRUCTION BY:

**JOHN GAY, P.E.**  
DIRECTOR OF PUBLIC WORKS  
DATE: \_\_\_\_\_

62028  
R.C.E. No.  
09/30/25  
REG. EXP.

**COUNTY OF IMPERIAL**  
PUBLIC WORKS DEPARTMENT  
EL CENTRO, CALIFORNIA

DATE: 10/18/2023  
DRAWN: RS  
DESIGNED: RS  
SCALE: N/A  
CHECKED: JGH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**

EVAPORATION/INFILTRATION POND INDEX  
MAP AND HORIZONTAL CONTROL DATA

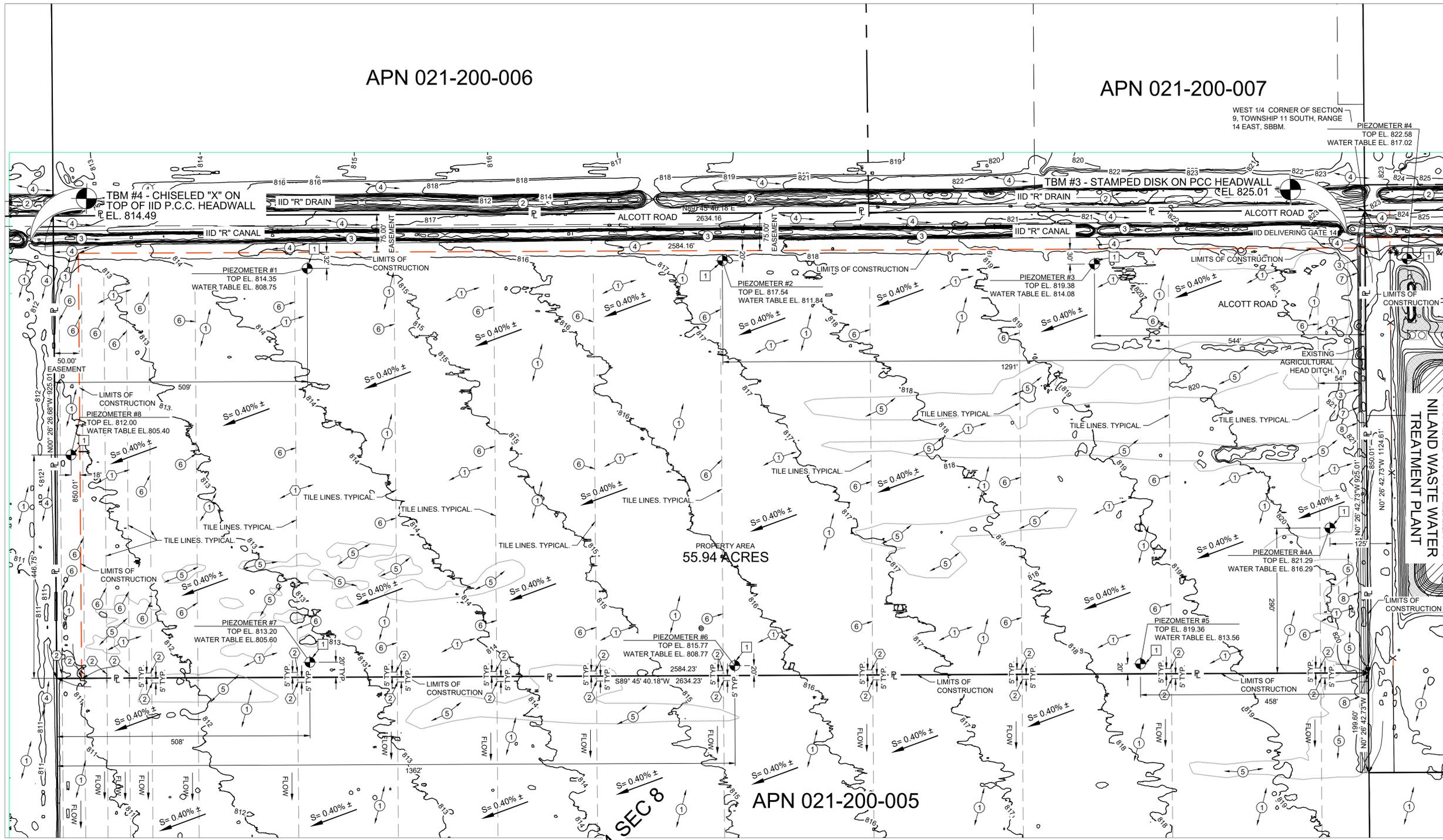
REFERENCE: THG #542.089

SHEET: 13 OF 50

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APN 021-200-006

APN 021-200-007

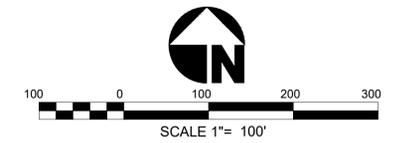


- EVAPORATION / INFILTRATION PONDS EXISTING KEYNOTES**
- EXISTING NATIVE MATERIAL.
  - EXISTING IID "R" DRAIN.
  - EXISTING IID "R" CANAL.
  - COUNTY OF IMPERIAL ALCOTT ROAD. ALCOTT ROAD IS A "DIRT" ROAD.
  - EXISTING DENSE BRUSH VEGETATION.
  - EXISTING DRAINAGE TILE LINE TO BE ABANDONED.
  - EXISTING REMNANTS OF CONCRETE-LINED IRRIGATION LATERAL.
  - EXISTING EARTH-LINED IRRIGATION LATERAL.

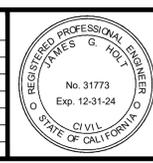
- EVAPORATION / INFILTRATION PONDS DEMOLITION KEYNOTES**
- CLEAR AND GRUB EXISTING THE NATIVE SURFACE WITHIN THE EVAPORATION PONDS LIMITS OF CONSTRUCTION, REMOVE AND DISPOSE OF ALL EXISTING VEGETATION OR DEBRIS INCLUDING GRASS, TREES, ROOT BALLS, WEEDS, BUSHES AND SIMILAR VEGETATION.
  - SAWCUT THE EXISTING TILE LINE AT LOCATION 5-FOOT NORTH AND A LOCATION 5-FOOT SOUTH OF PROPERTY LINE, REMOVE AND DISPOSE OF 10-FOOT SECTION OF EXISTING TILE LINE. THE REMAINING TILE LINES ARE TO BE PLUGGED WITH P.C.C. CONCRETE AT THE TERMINATION POINTS OF THE PIPELINES. SEE IID TILE DRAIN PIPELINE PLAN SHEET NUMBER 1354, PLAN SHEETS 1 AND 2 IN THE SPECIAL CONDITIONS SECTION OF THE SPECIFICATIONS.
  - REMOVE AND DISPOSE OF EXISTING P.C.C. CANAL LINING REMNANTS.

- EVAPORATION / INFILTRATION PONDS PIEZOMETER KEYNOTES**
- THE CONTRACTOR SHALL INSTALL MONUMENT WELL ENCLOSURES OVER THE EXISTING PIEZOMETERS PER DETAIL WW ON PLAN SHEET 43 PRIOR TO COMMENCING CLEARING AND GRUBBING OPERATIONS. THE MONUMENT ENCLOSURES SHALL BE INSTALLED TO THE FINISH NATIVE DESIGN GRADE. FOUR(4) FOOT LATH WITH FLAGGING SHALL BE PLACED AROUND THE PIEZOMETER MONUMENT ENCLOSURES THROUGHOUT THE CONSTRUCTION PERIOD. IT IS IMPORTANT THAT THE PIEZOMETERS BE PRESERVED IN GOOD CONDITION TO MONITOR THE WATER TABLE AFTER THE EVAPORATION PONDS ARE CONSTRUCTED AND PLACED IN OPERATION. IF THE PIEZOMETERS ARE DAMAGED OR DESTROYED DURING THE PROJECT CONSTRUCTION THEN THE CONTRACTOR SHALL BE REQUIRED TO ENGAGE A GEOTECHNICAL CONSULTANT, APPROVED BY THE NILAND COUNTY SANITATION DISTRICT (NCS), TO INSTALL REPLACEMENT PIEZOMETERS AT THE CONTRACTORS EXPENSE TO THE SATISFACTION OF THE NCS.

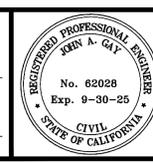
**NOTE:**  
THE EXACT HORIZONTAL AND VERTICAL LOCATION OF THE EXISTING UNDERGROUND DRAINAGE TILE LINES ILLUSTRATED ON THIS PLAN ARE APPROXIMATE. THE CONTRACTOR SHALL POT-HOLE THE EXISTING DRAINAGE TILE LINES PRIOR TO THE COMMENCEMENT OF SITE GRADING ACTIVITIES TO DETERMINE THE EXACT LOCATION OF THE TILE LINES. SEE IID TILE DRAIN PIPELINE PLAN SHEET NUMBER 1354, PLAN SHEETS 1 AND 2 IN THE SPECIAL CONDITIONS SECTION OF THE SPECIFICATIONS.



REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
  
 JAMES G. "JACK" HOLT  
 10/18/2023 DATE  
 31773 R.C.E. No.  
 12/31/24 REG. EXP.



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
 JOHN GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 DATE  
 62028 R.C.E. No.  
 09/30/25 REG. EXP.

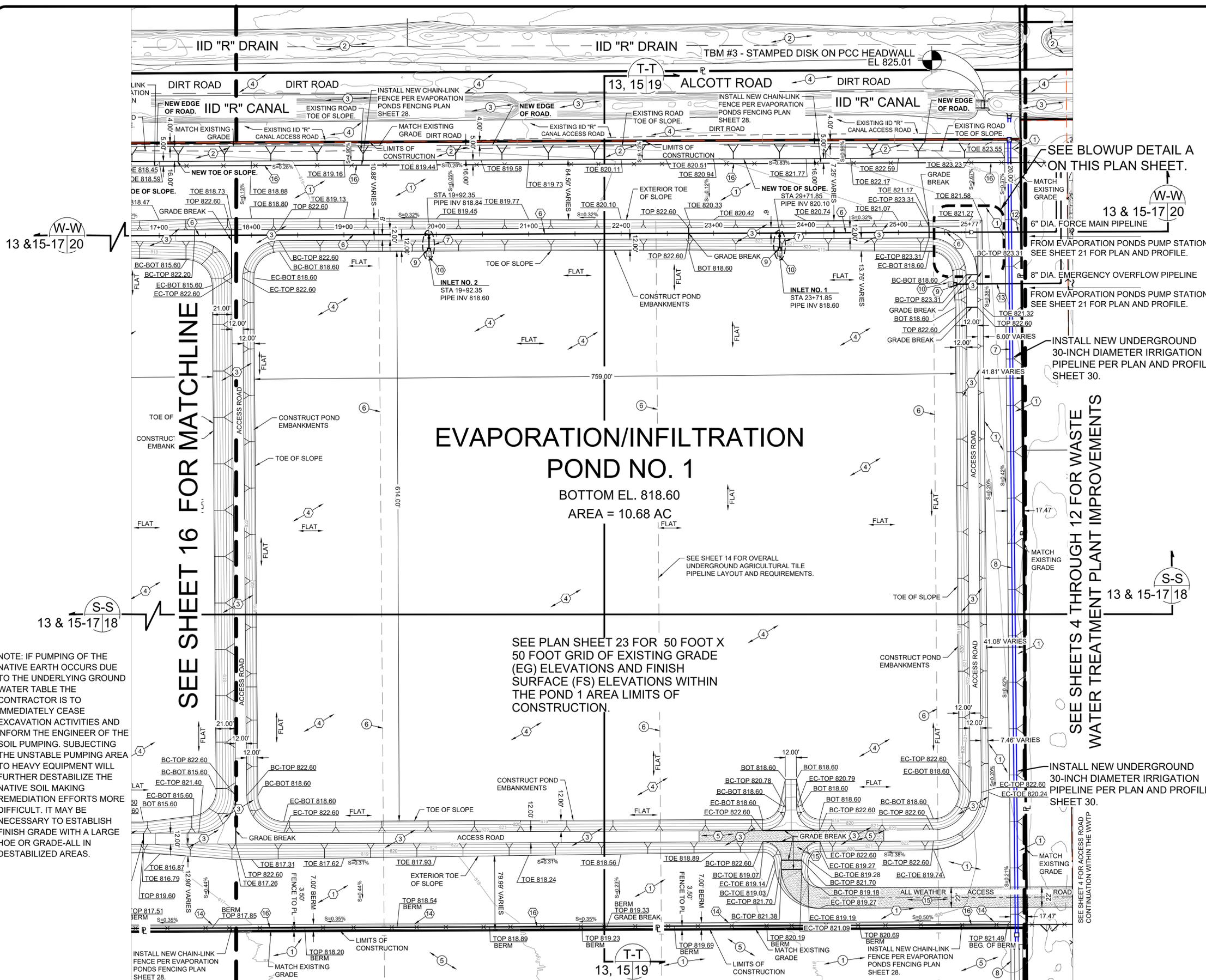
PUBLIC WORKS DEPARTMENT  
**COUNTY OF IMPERIAL**  
 EL CENTRO, CALIFORNIA

DATE: 10/18/2023  
 DRAWN: RS  
 DESIGNED: RS  
 SCALE: N/A  
 CHECKED: JCH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
**EVAPORATION/INFILTRATION PONDS  
 EXISTING SITE PLAN AND TOPOGRAPHY**

REFERENCE	THG #542.089
SHEET	14 OF 50

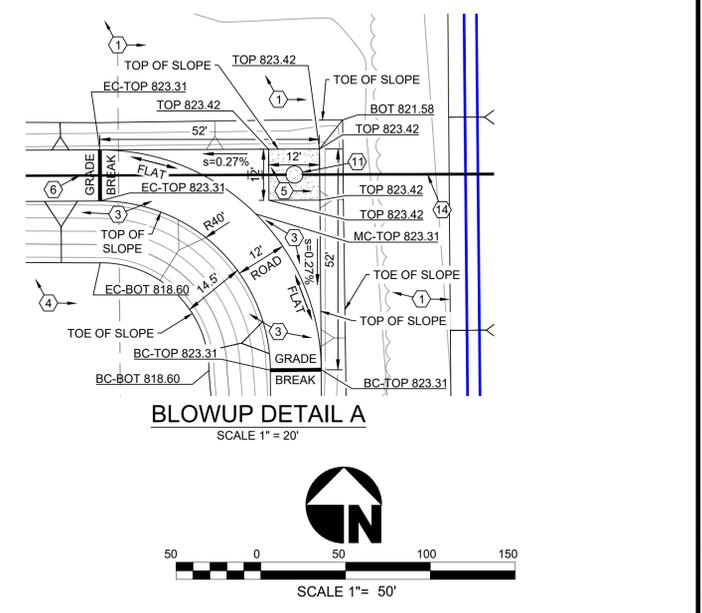
C:\Users\casaroto\OneDrive\Desktop\LEGION-WIN\The Holt Group\542.089 - 542.089004 - CAD & PDF DRAWINGS\10-18-2023 - Set of Plans\542.089 - SHEET 14 - Evap Ponds Existing Site.dwg 11/20/2023 09:50



- EVAPORATION / INFILTRATION PONDS EXISTING KEYNOTES**
- EXISTING NATIVE MATERIAL.
  - EXISTING IID "R" DRAIN.
  - EXISTING IID "R" CANAL.
  - EXISTING ALCOTT ROAD.
  - EXISTING DENSE BRUSH VEGETATION.
  - EXISTING AGRICULTURAL DRAINAGE TILE PIPELINE TO BE ABANDONED.
  - EXISTING AGRICULTURAL CONCRETE LINED IRRIGATION LATERAL CONCRETE REMNANTS.
  - EXISTING AGRICULTURAL EARTH-LINED IRRIGATION LATERAL.

- EVAPORATION/INFILTRATION POND CONSTRUCTION KEYNOTES**
- AFTER CLEARING AND GRUBBING IS COMPLETED PULVERIZE THE NATIVE MATERIAL FOR A DEPTH OF 1 FOOT TO LESS THAN 1 INCH MAXIMUM CLODS OUTSIDE OF THE EVAPORATION/INFILTRATION POND EXTERIOR TOE OF SLOPE. COMPACT THE NATIVE MATERIAL FINISH SURFACE TOP 1 FOOT TO 85 PERCENT OF MAXIMUM DENSITY AND GRADE THE NATIVE SURFACE TO DESIGN GRADE WITH A BLADE OR MOTOR PATROL TO WITHIN PLUS OR MINUS 0.05 FEET OF DESIGN FINISH GRADE.  
AT THE CONCLUSION OF THE PROJECT THE AREA SHALL BE WATERED AND BLADED SMOOTH.
  - RE-CONSTRUCT THE EXISTING SOUTH NATIVE EARTH SLOPE FROM THE SOUTH SIDE OF THE SOUTH "R" LATERAL ACCESS ROAD TO THE NEW TOE OF SLOPE PER THE ELEVATIONS, SLOPE PERCENTAGES AND HORIZONTAL DISTANCES ILLUSTRATED ON THE PLANS. THE NATIVE MATERIAL TO RE-CONSTRUCT THE SIDE SLOPES SHALL BE PULVERIZED AND DISCED TO 3/4 INCH MAXIMUM CLOD SIZE PRIOR TO BEING PLACED IN MAXIMUM 1 FOOT LIFTS AND COMPACTED TO 85 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. SUBSEQUENT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND APPROVED BY THE ENGINEER. THE NATIVE EARTH SIDESLOPE SHALL BE OVERBUILT HORIZONTALLY BY 6 INCHES AND SUBSEQUENTLY CUT TO THE ILLUSTRATED DESIGN LINE AND GRADE.
  - CONSTRUCT EVAPORATION/INFILTRATION POND EMBANKMENTS. CONSTRUCTION OF THE EVAPORATION/INFILTRATION POND EMBANKMENT SHALL BE COMPLETED IN THE FOLLOWING SEQUENTIAL ORDER:
    - PRIOR TO PLACING ANY POND EMBANKMENT FILLS OR COMPLETING ANY EXCAVATION WORK, THE SURFACE 3 FEET OF SOIL BENEATH THE EMBANKMENTS SHALL BE PRE-WETTED TO A MINIMUM OF 20 PERCENT OF MOISTURE CONTENT.
    - AFTER PRE-WETTING OF THE SOIL BENEATH THE EMBANKMENT IS ACCOMPLISHED AND UPON THE APPROVAL OF THE GEOTECHNICAL REPRESENTATIVE, THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS SHALL BE EXCAVATED AND REMOVED.
    - AFTER THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS IS REMOVED, THE TOP 8 INCHES OF EXPOSED NATIVE SURFACE SHALL BE UNIFORMLY DISCED AND WETTED TO A MINIMUM OF OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
    - AFTER THE TOP 8 INCHES OF EXPOSED NATIVE SOIL SURFACE IS MOISTURE CONDITIONED AND SATISFACTORILY COMPACTED CONSTRUCT THE NATIVE MATERIAL POND EMBANKMENTS TO THE DESIGN GRADE ELEVATION AS ILLUSTRATED ON THE GRADING PLANS. THE ENGINEERED FILL SHALL BE UNIFORMLY DISCED AND MOISTURE CONDITIONED TO OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED IN 6 INCH MAXIMUM LIFTS TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. SUBSEQUENT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE ATTAINED THE PLUS OPTIMUM MOISTURE PERCENTAGE AND COMPACTION REQUIREMENTS. EARTH CLODS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH PRIOR TO BEING PLACED AS FILL. EMBANKMENTS SHALL BE HORIZONTALLY OVERBUILT BY 6 INCHES AND SUBSEQUENTLY CUT TO THE PLAN LINE AND GRADE. THE TOP SURFACE GRADE OF THE ACCESS ROAD SHALL BE CONSTRUCTED TO WITHIN 0.05 FEET PLUS OR 0.05 FEET MINUS OF DESIGN GRADE.

- THE ABOVE POND EMBANKMENT EARTHWORK REQUIREMENTS APPLY TO ALL POND EMBANKMENTS.
- EXCAVATE NATIVE MATERIAL TO A ROUGH DESIGN GRADE (PLUS OR MINUS 0.20 FEET OF DESIGN GRADE) WITHIN THE EVAPORATION PONDS BOTTOM AREA. AFTER THE EVAPORATION POND INFILTRATION POND BOTTOM ROUGH DESIGN GRADE IS ESTABLISHED DISC THE POND BOTTOM AREA FOR A DEPTH OF 24 INCHES AND MOISTURE CONDITIONED TO 20 PERCENT OF MOISTURE CONTENT. EARTH CLODS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH. AFTER THE MOISTURE CONDITIONED ROUGH GRADED NATIVE MATERIAL HAS SUFFICIENTLY DRIED, AS DETERMINED BY THE GEOTECHNICAL REPRESENTATIVE, THE POND BOTTOM SHALL BE FINISHED GRADED WITH A BLADE OR MOTOR PATROL AND ROLLED TO A SMOOTH CONSISTENT GRADE TO WITHIN 0.05 FEET PLUS OR MINUS FROM DESIGN GRADE. AFTER THE POND BOTTOM ELEVATION HAS BEEN CHECKED AND APPROVED BY THE ENGINEER AND THE POND BOTTOM HAS SUFFICIENTLY DRIED, AS DETERMINED BY THE GEOTECHNICAL REPRESENTATIVE, THE POND BOTTOM SHALL BE SCARIFIED FOR A DEPTH OF 18 INCHES.
  - INSTALL 12 INCHES OF CLASS 2 BASE MATERIAL TO FINISH GRADE ELEVATION. COMPACT THE CLASS 2 BASE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
  - INSTALL 8 INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT HEADER PIPELINE PER CROSS SECTION W-W ON SHEET 20 AND TRENCH DETAIL CC ON SHEET 26.
  - INSTALL EVAPORATION/INFILTRATION POND INLET PIPING INCLUDING BUT NOT LIMITED TO DUCTILE IRON FITTINGS, VALVES, VALVE RISERS AND COVERS, FLANGED COUPLING ADAPTERS, HARDWARE AND 8 INCH DIAMETER AWWA C-900, DR 18 PVC PIPELINE SECTIONS PER DETAIL UU ON SHEET 42.
  - INSTALL EVAPORATION/INFILTRATION POND PCC OUTLET STRUCTURE PER DETAIL BB ON SHEET 26 AND DETAILS UU AND VV ON SHEET 42.
  - CONSTRUCT EVAPORATION/INFILTRATION POND CONCRETE BASIN PER DETAIL BB ON SHEET 26 AND DETAILS UU AND VV ON SHEET 42.
  - INSTALL 3 INCH COBLE EROSION DISSIPATION MATERIAL BASIN PER DETAIL BB ON SHEET 26 AND DETAILS UU AND VV ON SHEET 42.
  - INSTALL P.C.C. STAND PIPE PER DETAIL AA ON SHEET 26.
  - INSTALL 6 INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT OVERFLOW PIPELINE PER TRENCH DETAIL CC ON SHEET 26.
  - INSTALL 8 INCH DIAMETER AWWA C-900, DR 21 PVC EMERGENCY OVERFLOW PIPELINE PER PLAN AND PROFILE SHEET 21 AND TRENCH DETAIL CC ON SHEET 26.
  - CONSTRUCT NEW EARTH BERM FOR STORM WATER RUNOFF PROTECTION PER DETAIL II ON SHEET 27. THE CONSTRUCTION OF THE NEW EARTH BERM FOR STORM WATER RUNOFF PROTECTION WAS A REQUIREMENT OF THE IID.
  - INSTALL CLASS 2 BASE ALL WEATHER ACCESS ROAD PER SECTION B-B ON PLAN SHEET 45.
  - INSTALL NEW 6 FOOT CHAIN LINK FENCE PER PLAN SHEETS 28 AND 29. MAINTAIN A 5 FOOT HORIZONTAL DISTANCE FROM THE NEW NATIVE EARTH TOE OF SLOPE ALONG THE NORTH PROJECT BOUNDARY AND THE NEW 6 FOOT CHAIN LINK FENCE. MAINTAINING THE 5 FOOT HORIZONTAL DISTANCE WAS AN IID REQUIREMENT.
  - EXCAVATE RETENTION BASIN TO THE GRADES AND DIMENSIONS ILLUSTRATED. SIDESLOPES SHALL BE INITIALLY EXTENDED BY 6 INCHES AND SUBSEQUENTLY CUT TO THE PLAN LINE AND GRADE. EARTH CLODS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH PRIOR TO BEING PLACED AS FILL. EMBANKMENTS SHALL BE HORIZONTALLY OVERBUILT BY 6 INCHES AND SUBSEQUENTLY CUT TO THE PLAN LINE AND GRADE. THE TOP SURFACE GRADE OF THE ACCESS ROAD SHALL BE CONSTRUCTED TO WITHIN 0.05 FEET PLUS OR MINUS 0.05 FEET OF DESIGN GRADE.



NOTE: IF PUMPING OF THE NATIVE EARTH OCCURS DUE TO THE UNDERLYING GROUND WATER TABLE THE CONTRACTOR IS TO IMMEDIATELY CEASE EXCAVATION ACTIVITIES AND INFORM THE ENGINEER OF THE SOIL PUMPING. SUBJECTING THE UNSTABLE PUMPING AREA TO HEAVY EQUIPMENT WILL FURTHER DESTABILIZE THE NATIVE SOIL MAKING REMEDIATION EFFORTS MORE DIFFICULT. IT MAY BE NECESSARY TO ESTABLISH FINISH GRADE WITH A LARGE HOE OR GRADE-ALL IN DESTABILIZED AREAS.

SEE SHEET 16 FOR MATCHLINE

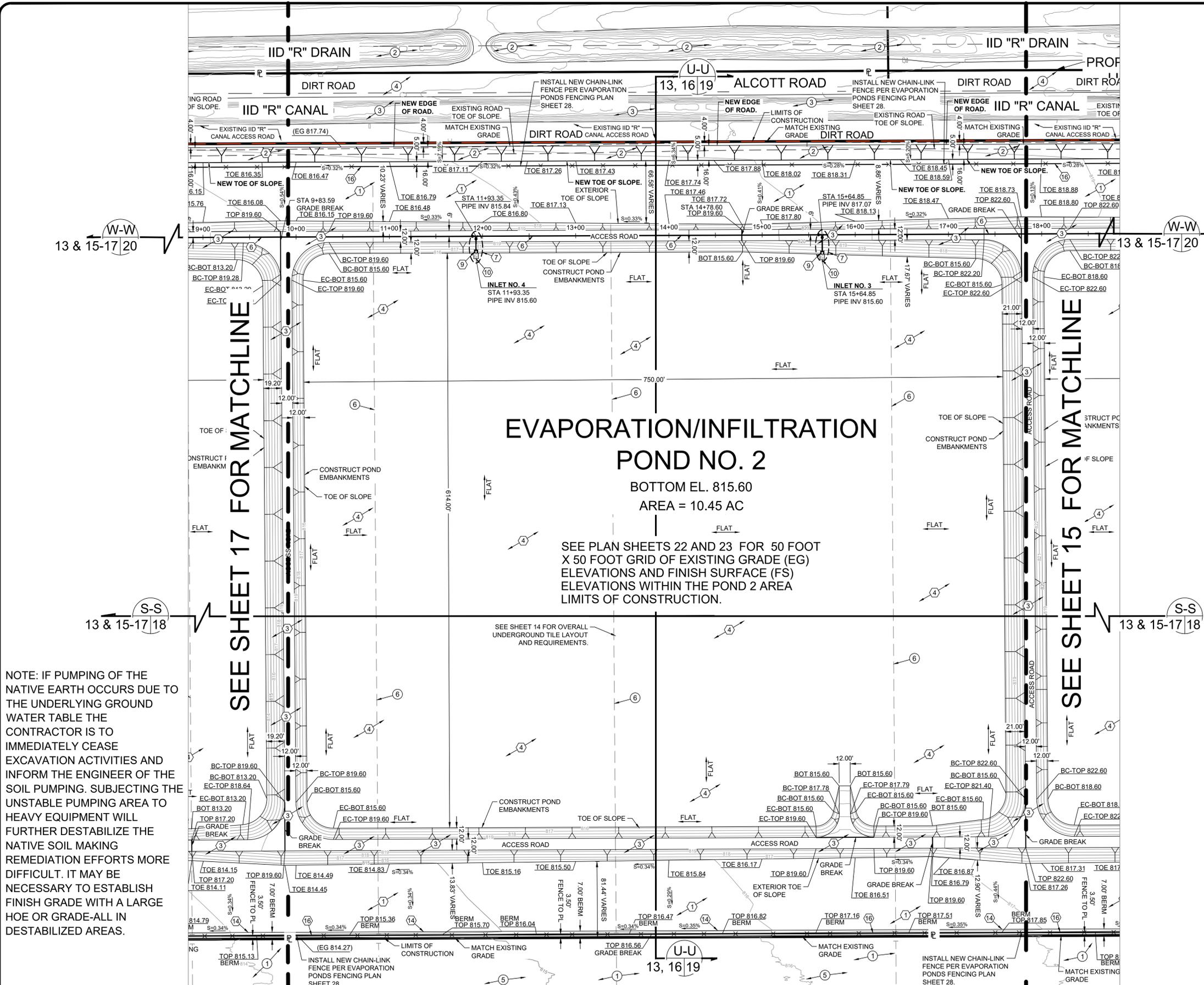
SEE SHEETS 4 THROUGH 12 FOR WASTE WATER TREATMENT PLANT IMPROVEMENTS

## EVAPORATION/INFILTRATION POND NO. 1

BOTTOM EL. 818.60  
AREA = 10.68 AC

SEE PLAN SHEET 23 FOR 50 FOOT X 50 FOOT GRID OF EXISTING GRADE (EG) ELEVATIONS AND FINISH SURFACE (FS) ELEVATIONS WITHIN THE POND 1 AREA LIMITS OF CONSTRUCTION.

REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT	DATE	PROJECT TITLE	REFERENCE	THG #542.089
			JAMES G. JACK HOLT No. 31773 Exp. 12-31-24 REGISTERED PROFESSIONAL ENGINEER CIVIL STATE OF CALIFORNIA	JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS	COUNTY OF IMPERIAL EL CENTRO, CALIFORNIA	10/18/2023	COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS EVAPORATION/INFILTRATION POND NO. 1 GRADING AND IMPROVEMENT PLAN		15 OF 50



- EVAPORATION / INFILTRATION PONDS EXISTING KEYNOTES**
- EXISTING NATIVE MATERIAL.
  - EXISTING IID "R" DRAIN.
  - EXISTING IID "R" CANAL.
  - EXISTING ALCOTT ROAD.
  - EXISTING DENSE BRUSH VEGETATION.
  - EXISTING AGRICULTURAL DRAINAGE TILE PIPELINE TO BE ABANDONED.
  - EXISTING AGRICULTURAL CONCRETE LINED IRRIGATION LATERAL CONCRETE REMNANTS.
  - EXISTING AGRICULTURAL EARTH-LINED IRRIGATION LATERAL.

- EVAPORATION/INFILTRATION POND CONSTRUCTION KEYNOTES**
- AFTER CLEARING AND GRUBBING IS COMPLETED PULVERIZE THE NATIVE MATERIAL FOR A DEPTH OF 1 FOOT TO LESS THAN 1 INCH MAXIMUM GLODS OUTSIDE OF THE EVAPORATION/INFILTRATION POND EXTERIOR TOE OF SLOPE. COMPACT THE NATIVE MATERIAL FINISH SURFACE TOP 1 FOOT TO 85 PERCENT OF MAXIMUM DENSITY AND GRADE THE NATIVE SURFACE TO DESIGN GRADE WITH A BLADE OR MOTOR PATROL TO WITHIN PLUS OR MINUS 0.05 FEET OF DESIGN FINISH GRADE.  
AT THE CONCLUSION OF THE PROJECT THE AREA SHALL BE WATERED AND BLADED SMOOTH.
  - RE-CONSTRUCT THE EXISTING SOUTH NATIVE EARTH SLOPE FROM THE SOUTH SIDE OF THE SOUTH "R" LATERAL ACCESS ROAD TO THE NEW TOE OF SLOPE PER THE ELEVATIONS, SLOPE PERCENTAGES AND HORIZONTAL DISTANCES ILLUSTRATED ON THE PLANS. THE NATIVE MATERIAL TO RE-CONSTRUCT THE SIDE SLOPES SHALL BE PULVERIZED AND DISCED TO 3/4 INCH MAXIMUM CLOD SIZE PRIOR TO BEING PLACED IN MAXIMUM 1 FOOT LIFTS AND COMPACTED TO 85 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. SUBSEQUENT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND APPROVED BY THE ENGINEER. THE NATIVE EARTH SIDESLOPE SHALL BE OVERBUILT HORIZONTALLY BY 6 INCHES AND SUBSEQUENTLY CUT TO THE ILLUSTRATED DESIGN LINE AND GRADE.
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    - AFTER PRE-WETTING OF THE SOIL BENEATH THE EMBANKMENT IS ACCOMPLISHED AND UPON THE APPROVAL OF THE GEOTECHNICAL REPRESENTATIVE, THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS SHALL BE EXCAVATED AND REMOVED.
    - AFTER THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS IS REMOVED, THE TOP 8 INCHES OF EXPOSED NATIVE SOIL SURFACE SHALL BE UNIFORMLY MOISTURE CONDITIONED BY DISCING AND WETTING TO A MINIMUM OF OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
    - AFTER THE TOP 8 INCHES OF EXPOSED NATIVE SOIL SURFACE IS MOISTURE CONDITIONED AND SATISFACTORILY COMPACTED CONSTRUCT THE NATIVE MATERIAL POND EMBANKMENTS TO THE DESIGN GRADE ELEVATION AS ILLUSTRATED ON THE GRADING PLANS. THE ENGINEERED FILL SHALL BE UNIFORMLY DISCED, AND MOISTURE CONDITIONED TO OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED IN 6 INCH MAXIMUM LIFTS TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. SUBSEQUENT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE ATTAINED THE PLUS OPTIMUM MOISTURE PERCENTAGE AND COMPACTION REQUIREMENTS. EARTH CLODS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH PRIOR TO BEING PLACED IN FILL. EMBANKMENTS SHALL BE HORIZONTALLY OVERBUILT BY 6 INCHES AND SUBSEQUENTLY CUT TO THE PLAN LINE AND GRADE. THE TOP SURFACE GRADE OF THE ACCESS ROAD SHALL BE CONSTRUCTED TO WITHIN 0.05 FEET PLUS OR 0.05 FEET MINUS OF DESIGN GRADE.
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  - EXCAVATE NATIVE MATERIAL TO A ROUGH DESIGN GRADE (PLUS OR MINUS 0.20 FEET OF DESIGN GRADE) WITHIN THE EVAPORATION PONDS BOTTOM AREA. AFTER THE EVAPORATION POND/INFILTRATION POND BOTTOM ROUGH DESIGN GRADE IS ESTABLISHED DISC THE POND BOTTOM AREA FOR A DEPTH OF 24 INCHES AND MOISTURE CONDITION TO 20 PERCENT OF MOISTURE CONTENT. EARTH CLODS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 1/2 INCH AFTER THE MOISTURE CONDITIONED ROUGH GRADED NATIVE MATERIAL HAS SUFFICIENTLY DRIED, AS DETERMINED BY THE GEOTECHNICAL REPRESENTATIVE, THE POND BOTTOM SHALL BE FINISHED GRADED WITH A BLADE OR MOTOR PATROL AND ROLLED TO A SMOOTH CONSISTENT GRADE TO WITHIN 0.05 FEET PLUS OR MINUS FROM DESIGN GRADE. AFTER THE POND BOTTOM ELEVATION HAS BEEN CHECKED AND APPROVED BY THE ENGINEER AND THE POND BOTTOM HAS SUFFICIENTLY DRIED, AS DETERMINED BY THE GEOTECHNICAL REPRESENTATIVE, THE POND BOTTOM SHALL BE SCARIFIED FOR A DEPTH OF 18 INCHES.
  - INSTALL 12 INCHES OF CLASS 2 BASE MATERIAL TO FINISH GRADE ELEVATION. COMPACT THE CLASS 2 BASE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
  - INSTALL 8 INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT HEADER PIPELINE PER CROSS SECTION W-W ON SHEET 20 AND TRENCH DETAIL CC ON SHEET 26.
  - INSTALL EVAPORATION/INFILTRATION POND INLET PIPING INCLUDING BUT NOT LIMITED TO DUCTILE IRON FITTINGS, VALVES, VALVE RISERS AND COVER, FLANGED COUPLING ADAPTERS, HARDWARE AND 8 INCH DIAMETER AWWA C-900, DR 18 PVC PIPELINE SECTIONS PER DETAIL UU ON SHEET 42.
  - INSTALL EVAPORATION/INFILTRATION POND INLET PIPING INCLUDING BUT NOT LIMITED TO DUCTILE IRON FITTINGS, HARDWARE AND 8 INCH DIAMETER AWWA C-900, DR 18 PVC PIPELINE SECTIONS PER DETAIL VV ON SHEET 42.
  - CONSTRUCT EVAPORATION/INFILTRATION POND PCC OUTLET STRUCTURE PER DETAIL BB ON SHEET 26 AND DETAILS UU AND VV ON SHEET 42.
  - INSTALL 3 INCH COBBLE EROSION DISSIPATION MATERIAL BASIN PER DETAIL BB ON SHEET 26 AND DETAILS UU AND VV ON SHEET 42.
  - INSTALL P.C.C. STAND PIPE PER DETAIL AA ON SHEET 26.
  - INSTALL 6 INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT FORCE MAIN PER TRENCH DETAIL CC ON SHEET 26.
  - INSTALL 8 INCH DIAMETER AWWA C-900, DR 21 PVC EMERGENCY OVERFLOW PIPELINE PER PLAN AND PROFILE SHEET 21 AND TRENCH DETAIL CC ON SHEET 26.
  - CONSTRUCT NEW EARTH BERM FOR STORM WATER RUNOFF PROTECTION PER DETAIL II ON SHEET 27. THE CONSTRUCTION OF THE NEW EARTH BERM FOR STORM WATER RUNOFF PROTECTION WAS A REQUIREMENT OF THE IID.
  - INSTALL CLASS 2 BASE ALL WEATHER ACCESS ROAD PER SECTION B-B ON PLAN SHEET 45.
  - INSTALL NEW 6 FOOT CHAIN LINK FENCE PER PLAN SHEETS 28 AND 29. MAINTAIN A 5 FOOT HORIZONTAL DISTANCE FROM THE NEW NATIVE EARTH TOE OF SLOPE ALONG THE NORTH PROJECT BOUNDARY AND THE NEW 6 FOOT CHAIN LINK FENCE. MAINTAINING THE 5 FOOT HORIZONTAL DISTANCE WAS AN IID REQUIREMENT.
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**EVAPORATION / INFILTRATION EARTHWORK ESTIMATED QUANTITIES AND NOTE:**

NATIVE EARTH CUT ESTIMATED QUANTITY: 46,789 CYD  
 NATIVE EARTH FILL ESTIMATED QUANTITY: 31,256 CYD

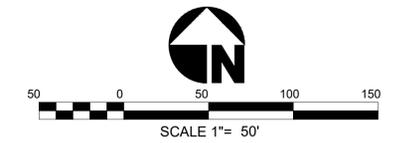
NOTE: A 33 PERCENT SHRINKAGE RATE WAS ASSUMED FOR NATIVE CUT MATERIAL USED AS COMPACTED FILL MATERIAL.

IF EXCESS CUT MATERIAL IS GENERATED DURING THE EXCAVATION PROCESS IT SHALL BE PLACED WITHIN THE AREA BETWEEN THE NORTH EVAPORATION/INFILTRATION POND EMBANKMENTS AND THE NORTH "LIMITS OF CONSTRUCTION" BOUNDARY LINE IN AN AREA DETERMINED BY THE ENGINEER. THE NATIVE MATERIAL SHALL BE PLACED IN 1 FOOT LIFTS ACROSS THE ENTIRE AREA TO BE USED FOR EXCESS CUT DISPOSAL AND COMPACTED TO 85 PERCENT OF MAXIMUM DENSITY PER ASTM D1557. A COMPACTION TEST SHALL BE OBTAINED FOR EACH 7,500 SQUARE FEET OF NATIVE MATERIAL PLACED. SUCCESSIVE 1 FOOT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE REQUIRED PERCENTAGE OF COMPACTION REQUIRED. THE NEW FENCING NEAR THE NORTH EVAPORATION/INFILTRATION POND "LIMITS OF CONSTRUCTION" SHALL NOT BE INSTALLED UNTIL THE SITE GRADING WORK HAS BEEN COMPLETED.

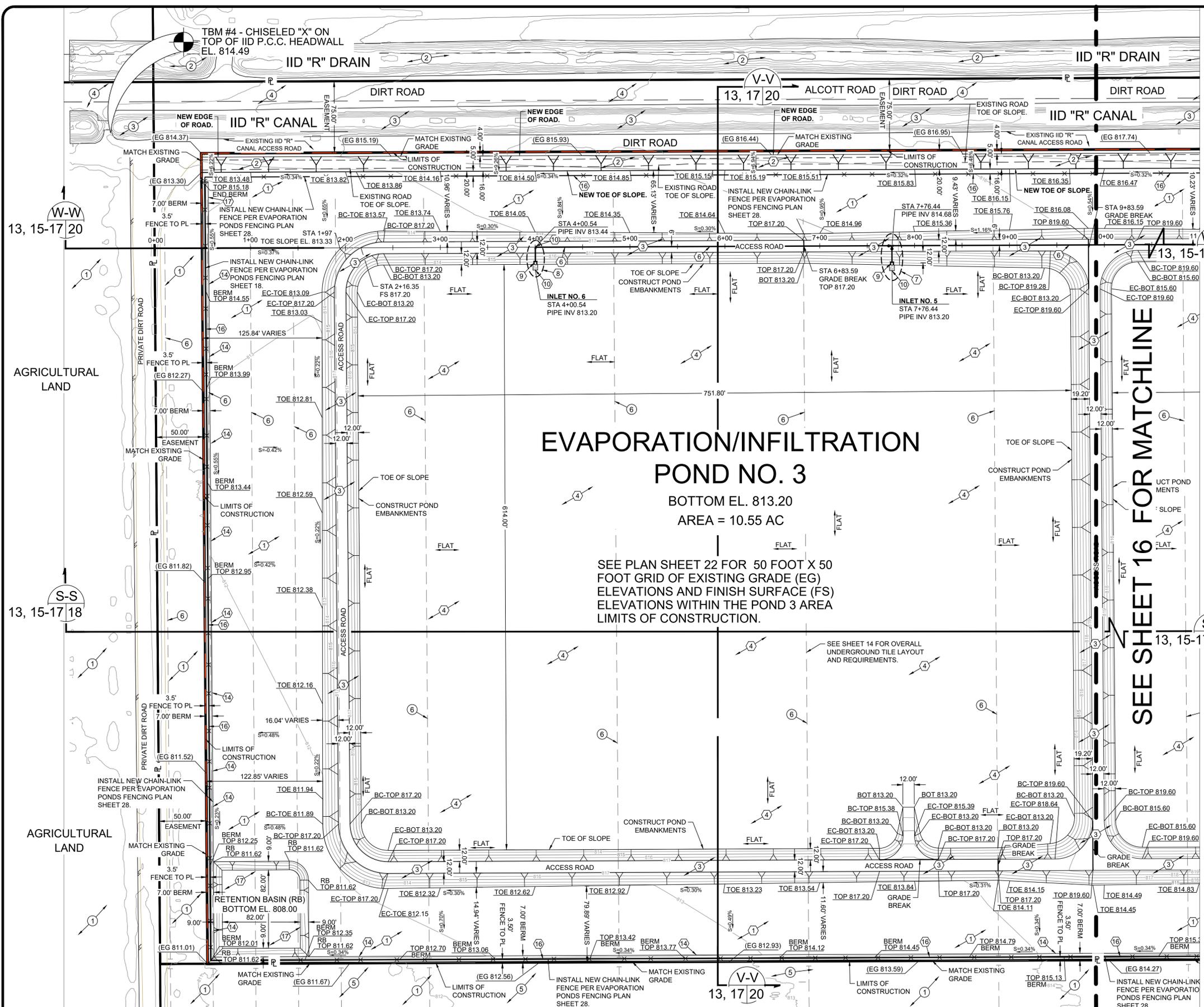
IF FILL MATERIAL IS REQUIRED IT SHALL BE OBTAINED FROM THE EXCAVATIONS REQUIRED AT THE EXISTING NILAND WASTEWATER TREATMENT PLANT.

NOTE: IF PUMPING OF THE NATIVE EARTH OCCURS DUE TO THE UNDERLYING GROUND WATER TABLE THE CONTRACTOR IS TO IMMEDIATELY CEASE EXCAVATION ACTIVITIES AND INFORM THE ENGINEER OF THE SOIL PUMPING. SUBJECTING THE UNSTABLE PUMPING AREA TO HEAVY EQUIPMENT WILL FURTHER DESTABILIZE THE NATIVE SOIL MAKING REMEDIATION EFFORTS MORE DIFFICULT. IT MAY BE NECESSARY TO ESTABLISH FINISH GRADE WITH A LARGE HOE OR GRADE-ALL IN DESTABILIZED AREAS.

REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:	DATE	PROJECT TITLE	REFERENCE	THG #542.089
			JAMES G. "JACK" HOLT	JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS	10/18/2023	COUNTY OF IMPERIAL - NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS		
			10/18/2023		62028	EVAPORATION/INFILTRATION POND NO. 2 GRADING AND IMPROVEMENT PLAN		
			12/31/24		09/30/25			
			REG. EXP.		REG. EXP.			SHEET 16 OF 50



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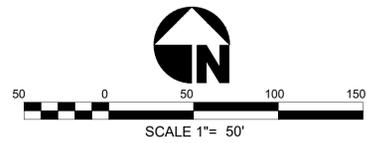
**EVAPORATION / INFILTRATION PONDS EXISTING KEYNOTES**

- 1 EXISTING NATIVE MATERIAL.
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- 3 EXISTING IID "R" CANAL.
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- 5 EXISTING DENSE BRUSH VEGETATION.
- 6 EXISTING AGRICULTURAL DRAINAGE TILE PIPELINE TO BE ABANDONED.
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- 8 EXISTING AGRICULTURAL EARTH-LINED IRRIGATION LATERAL.

**EVAPORATION/INFILTRATION POND CONSTRUCTION KEYNOTES**

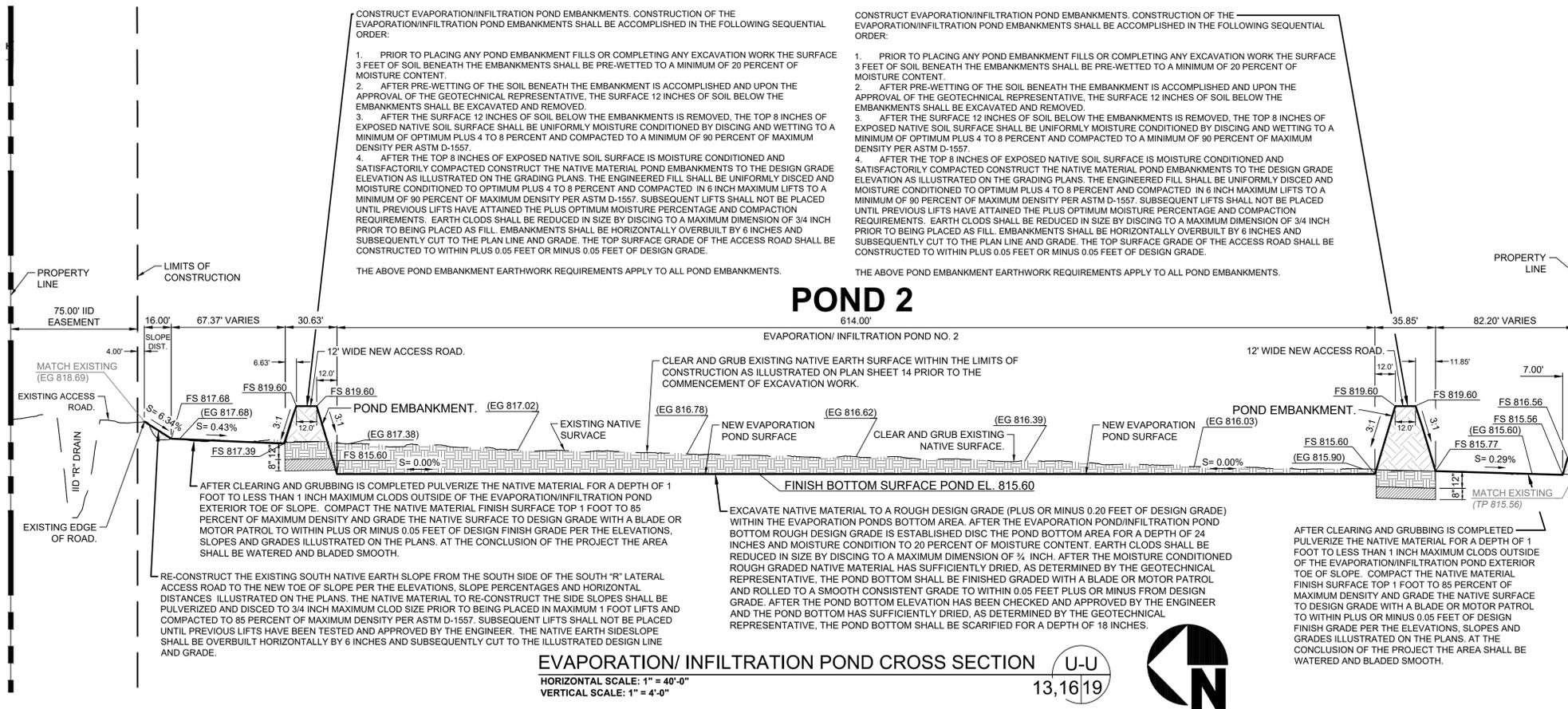
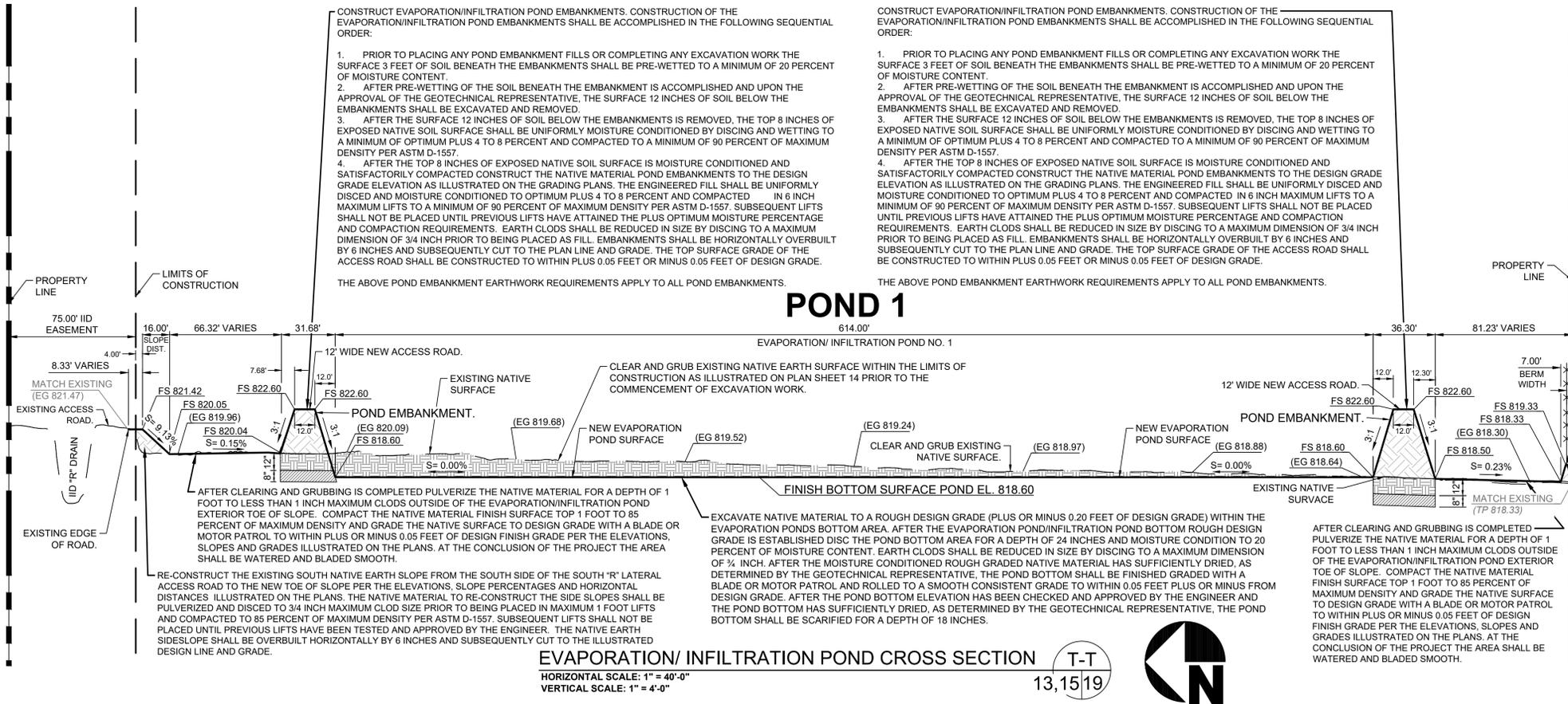
- 1 AFTER CLEARING AND GRUBBING IS COMPLETED PULVERIZE THE NATIVE MATERIAL FOR A DEPTH OF 1 FOOT TO LESS THAN 1 INCH MAXIMUM CLOUDS OUTSIDE OF THE EVAPORATION/INFILTRATION POND EXTERIOR TOE OF SLOPE. COMPACT THE NATIVE MATERIAL FINISH SURFACE TOP 1 FOOT TO 85 PERCENT OF MAXIMUM DENSITY AND GRADE THE NATIVE SURFACE TO DESIGN GRADE WITH A BLADE OR MOTOR PATROL TO WITHIN PLUS OR MINUS 0.05 FEET OF DESIGN FINISH GRADE.
- 2 AT THE CONCLUSION OF THE PROJECT THE AREA SHALL BE WATERED AND BLADED SMOOTH.
- 3 RE-CONSTRUCT THE EXISTING SOUTH NATIVE EARTH SLOPE FROM THE SOUTH SIDE OF THE SOUTH "R" LATERAL ACCESS ROAD TO THE NEW TOE OF SLOPE PER THE ELEVATIONS, SLOPE PERCENTAGES AND HORIZONTAL DISTANCES ILLUSTRATED ON THE PLAN. THE NATIVE MATERIAL TO RE-CONSTRUCT THE SLOPE SHALL BE PULVERIZED AND DISCED TO 3/4 INCH MAXIMUM CLOUD SIZE PRIOR TO BEING PLACED IN MAXIMUM 1 FOOT LIFTS AND COMPACTED TO 85 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. SUBSEQUENT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND APPROVED BY THE ENGINEER. THE EARTH SLOPE SHALL BE OVERBUILT HORIZONTALLY BY 6 INCHES AND SUBSEQUENTLY CUT TO THE ILLUSTRATED DESIGN LINE AND GRADE.
- 4 CONSTRUCT EVAPORATION/INFILTRATION POND EMBANKMENTS. CONSTRUCTION OF THE EVAPORATION/INFILTRATION POND EMBANKMENTS SHALL BE ACCOMPLISHED IN THE FOLLOWING SEQUENTIAL ORDER:
  - 3.1 PRIOR TO PLACING ANY POND EMBANKMENT FILLS OR COMPLETING ANY EXCAVATION WORK, THE SURFACE 3 FEET OF SOIL BENEATH THE EMBANKMENTS SHALL BE PRE-WETTED TO A MINIMUM OF 20 PERCENT OF MOISTURE CONTENT.
  - 3.2 AFTER PRE-WETTING OF THE SOIL BENEATH THE EMBANKMENT IS ACCOMPLISHED AND UPON THE APPROVAL OF THE GEOTECHNICAL REPRESENTATIVE, THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS SHALL BE EXCAVATED AND REMOVED.
  - 3.3 AFTER THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS IS REMOVED, THE TOP 8 INCHES OF EXPOSED NATIVE SOIL SURFACE SHALL BE UNIFORMLY MOISTURE CONDITIONED BY DISCING AND WETTING TO A MINIMUM OF OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
  - 3.4 AFTER THE TOP 8 INCHES OF EXPOSED NATIVE SOIL SURFACE IS MOISTURE CONDITIONED AND SATISFACTORILY COMPACTED CONSTRUCT THE NATIVE MATERIAL POND EMBANKMENTS TO THE DESIGN GRADE ELEVATION AS ILLUSTRATED ON THE GRADING PLANS. THE ENGINEERED FILL SHALL BE UNIFORMLY DISCED, AND MOISTURE CONDITIONED TO OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED IN 6 INCH MAXIMUM LIFTS TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. SUBSEQUENT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE ATTAINED THE PLUS OPTIMUM MOISTURE PERCENTAGE AND COMPACTION REQUIREMENTS. EARTH CLOUDS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH PRIOR TO BEING PLACED AS FILL. EMBANKMENTS SHALL BE HORIZONTALLY OVERBUILT BY 6 INCHES AND SUBSEQUENTLY CUT TO THE PLAN LINE AND GRADE. THE TOP SURFACE GRADE OF THE ACCESS ROAD SHALL BE CONSTRUCTED TO WITHIN 0.05 FEET PLUS OR 0.05 FEET MINUS OF DESIGN GRADE.
- 5 THE ABOVE POND EMBANKMENT EARTHWORK REQUIREMENTS APPLY TO ALL POND EMBANKMENTS.
- 6 EXCAVATE NATIVE MATERIAL TO A ROUGH DESIGN GRADE (PLUS OR MINUS 0.20 FEET OF DESIGN GRADE) WITHIN THE EVAPORATION PONDS BOTTOM AREA. AFTER THE EVAPORATION/INFILTRATION POND BOTTOM ROUGH DESIGN GRADE IS ESTABLISHED DISC THE POND BOTTOM AREA FOR A DEPTH OF 24 INCHES AND MOISTURE CONDITION TO 20 PERCENT OF MOISTURE CONTENT. EARTH CLOUDS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH. AFTER THE MOISTURE CONDITIONED ROUGH GRADED NATIVE MATERIAL HAS SUFFICIENTLY DRIED, AS DETERMINED BY THE GEOTECHNICAL REPRESENTATIVE, THE POND BOTTOM SHALL BE FINISHED GRADED WITH A BLADE OR MOTOR PATROL AND ROLLED TO A SMOOTH CONSISTENT GRADE TO WITHIN 0.05 FEET PLUS OR MINUS FROM DESIGN GRADE. AFTER THE POND BOTTOM ELEVATION HAS BEEN CHECKED AND APPROVED BY THE ENGINEER AND THE POND BOTTOM HAS SUFFICIENTLY DRIED, AS DETERMINED BY THE GEOTECHNICAL REPRESENTATIVE, THE POND BOTTOM SHALL BE SCARIFIED FOR A DEPTH OF 18 INCHES.
- 7 INSTALL 12 INCHES OF CLASS 2 BASE MATERIAL TO FINISH GRADE ELEVATION. COMPACT THE CLASS 2 BASE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 8 INSTALL 8 INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT HEADER PIPELINE PER CROSS SECTION W-W ON SHEET 20 AND TRENCH DETAIL CC ON SHEET 26.
- 9 INSTALL EVAPORATION/INFILTRATION POND INLET PIPING INCLUDING BUT NOT LIMITED TO DUCTILE IRON FITTINGS, VALVES, VALVE RISERS AND COVERS, FLANGED COUPLING ADAPTERS, HARDWARE AND 8 INCH DIAMETER AWWA C-900, DR 18 PVC PIPELINE SECTIONS PER DETAIL UU ON SHEET 42.
- 10 INSTALL EVAPORATION/INFILTRATION POND INLET PIPING INCLUDING BUT NOT LIMITED TO DUCTILE IRON FITTINGS, HARDWARE AND 8 INCH DIAMETER AWWA C-900, DR 18 PVC PIPELINE SECTIONS PER DETAIL VV ON SHEET 42.
- 11 CONSTRUCT EVAPORATION/INFILTRATION POND PCC OUTLET STRUCTURE PER DETAIL BB ON SHEET 26 AND DETAILS UU AND VV ON SHEET 42.
- 12 INSTALL 3 INCH COBLE EROSION DISSIPATION MATERIAL BASIN PER DETAIL BB ON SHEET 26 AND DETAILS UU AND VV ON SHEET 42.
- 13 INSTALL P.C.C. STAND PIPE PER DETAIL AA ON SHEET 26.
- 14 INSTALL 6 INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT FORCE MAIN PER TRENCH DETAIL CC ON SHEET 26.
- 15 INSTALL 8 INCH DIAMETER AWWA C-900, DR 21 PVC EMERGENCY OVERFLOW PIPELINE PER PLAN AND PROFILE SHEET 21 AND TRENCH DETAIL CC ON SHEET 26.
- 16 CONSTRUCT NEW EARTH BERM FOR STORM WATER RUNOFF PROTECTION PER DETAIL II ON SHEET 27. THE CONSTRUCTION OF THE NEW EARTH BERM FOR STORM WATER RUNOFF PROTECTION WAS A REQUIREMENT OF THE IID.
- 17 INSTALL CLASS 2 BASE ALL WEATHER ACCESS ROAD PER SECTION B-B ON PLAN SHEET 45.
- 18 INSTALL NEW 6 FOOT CHAIN LINK FENCE PER PLAN SHEETS 28 AND 29. MAINTAIN A 5 FOOT HORIZONTAL DISTANCE FROM THE NEW NATIVE EARTH TOE OF SLOPE ALONG THE NORTH PROJECT BOUNDARY AND THE NEW 6 FOOT CHAIN LINK FENCE, MAINTAINING THE 5 FOOT HORIZONTAL DISTANCE WAS AN IID REQUIREMENT.
- 19 EXCAVATE RETENTION BASIN TO THE GRADES AND DIMENSIONS ILLUSTRATED. SIDESLOPES SHALL BE INITIALLY EXTENDED BY 6 INCHES AND SUBSEQUENTLY CUT TO THE PLAN LINE AND GRADE. EARTH CLOUDS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH PRIOR TO GRADING THE RETENTION BASIN BOTTOM WITH A BLADE OR MOTOR PATROL. GRADE THE RETENTION BASIN BOTTOM TO WITHIN PLUS 0.05 FEET OR MINUS 0.05 FEET OF DESIGN GRADE.

NOTE: IF PUMPING OF THE NATIVE EARTH OCCURS DUE TO THE UNDERLYING GROUND WATER TABLE THE CONTRACTOR IS TO IMMEDIATELY CEASE EXCAVATION ACTIVITIES AND INFORM THE ENGINEER OF THE SOIL PUMPING. SUBJECTING THE UNSTABLE PUMPING AREA TO HEAVY EQUIPMENT WILL FURTHER DESTABILIZE THE NATIVE SOIL MAKING REMEDIATION EFFORTS MORE DIFFICULT. IT MAY BE NECESSARY TO ESTABLISH FINISH GRADE WITH A LARGE HOE OR GRADE-ALL IN DESTABILIZED AREAS.



REVISION	DATE	COMMENTS	DATE	REG. EXP.	DATE	REG. EXP.	DATE	REG. EXP.	DATE	REG. EXP.	PROJECT TITLE	REFERENCE	SHEET
			10/18/2023	12/31/24	09/30/25	09/30/25	09/30/25	09/30/25	09/30/25	09/30/25	COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS EVAPORATION/INFILTRATION POND NO. 3 GRADING AND IMPROVEMENT PLAN	THG #542.089	17 OF 50





REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
**JAMES G. "JACK" HOLT**  
 10/18/2023 DATE  
 31773 R.C.E. No.  
 12/31/24 REG. EXP.

COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
**JOHN GAY, P.E.**  
 DIRECTOR OF PUBLIC WORKS  
 DATE

**COUNTY OF IMPERIAL**  
 EL CENTRO, CALIFORNIA

DATE: 10/18/2023  
 DRAWN: RS  
 DESIGNED: RS  
 SCALE: N/A  
 CHECKED: JGH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
**EVAPORATION/ INFILTRATION  
 POND CROSS SECTIONS**

REFERENCE	THG #542.089
SHEET	19 OF 50

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CONSTRUCT EVAPORATION/INFILTRATION POND EMBANKMENTS. CONSTRUCTION OF THE EVAPORATION/INFILTRATION POND EMBANKMENTS SHALL BE ACCOMPLISHED IN THE FOLLOWING SEQUENTIAL ORDER:

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2. AFTER PRE-WETTING OF THE SOIL BENEATH THE EMBANKMENT IS ACCOMPLISHED AND UPON THE APPROVAL OF THE GEOTECHNICAL REPRESENTATIVE, THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS SHALL BE EXCAVATED AND REMOVED.
3. AFTER THE SURFACE 12 INCHES OF SOIL BELOW THE EMBANKMENTS IS REMOVED, THE TOP 8 INCHES OF EXPOSED NATIVE SOIL SURFACE SHALL BE UNIFORMLY MOISTURE CONDITIONED BY DISCING AND WETTING TO A MINIMUM OF OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
4. AFTER THE TOP 8 INCHES OF EXPOSED NATIVE SOIL SURFACE IS MOISTURE CONDITIONED AND SATISFACTORILY COMPACTED CONSTRUCT THE NATIVE MATERIAL POND EMBANKMENTS TO THE DESIGN GRADE ELEVATION AS ILLUSTRATED ON THE GRADING PLANS. THE ENGINEERED FILL SHALL BE UNIFORMLY DISCED AND MOISTURE CONDITIONED TO OPTIMUM PLUS 4 TO 8 PERCENT AND COMPACTED IN 6 INCH MAXIMUM LIFTS TO A MINIMUM OF 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. SUBSEQUENT LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE ATTAINED THE PLUS OPTIMUM MOISTURE PERCENTAGE AND COMPACTION REQUIREMENTS. EARTH CLOUDS SHALL BE REDUCED IN SIZE BY DISCING TO A MAXIMUM DIMENSION OF 3/4 INCH PRIOR TO BEING PLACED AS FILL. EMBANKMENTS SHALL BE HORIZONTALLY OVERBUILT BY 6 INCHES AND SUBSEQUENTLY CUT TO THE PLAN LINE AND GRADE. THE TOP SURFACE GRADE OF THE ACCESS ROAD SHALL BE CONSTRUCTED TO WITHIN PLUS 0.05 FEET OR MINUS 0.05 FEET OF DESIGN GRADE.

THE ABOVE POND EMBANKMENT EARTHWORK REQUIREMENTS APPLY TO ALL POND EMBANKMENTS.

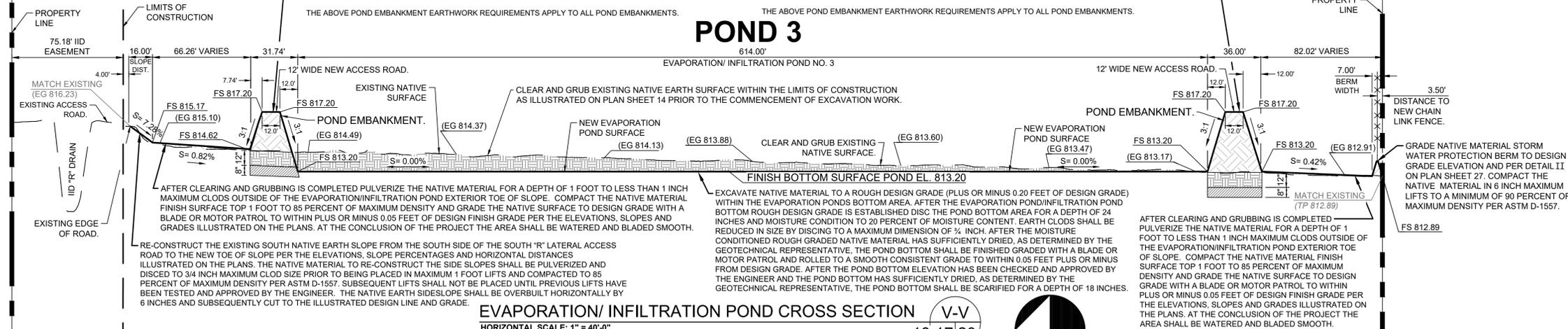
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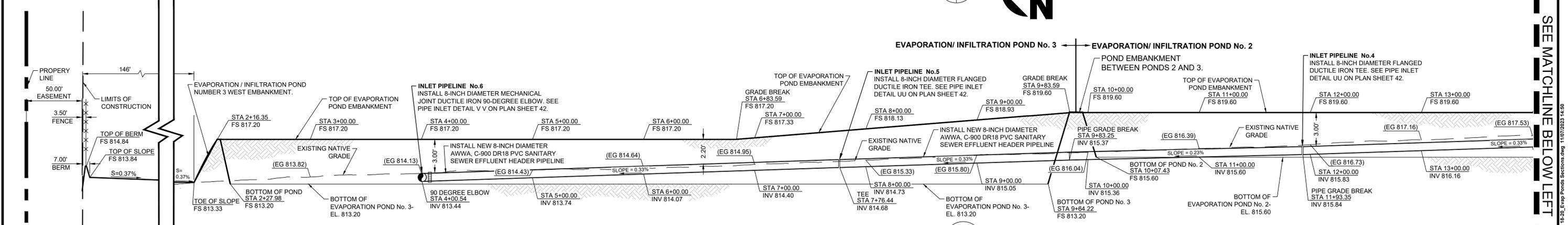
THE ABOVE POND EMBANKMENT EARTHWORK REQUIREMENTS APPLY TO ALL POND EMBANKMENTS.

### POND 3

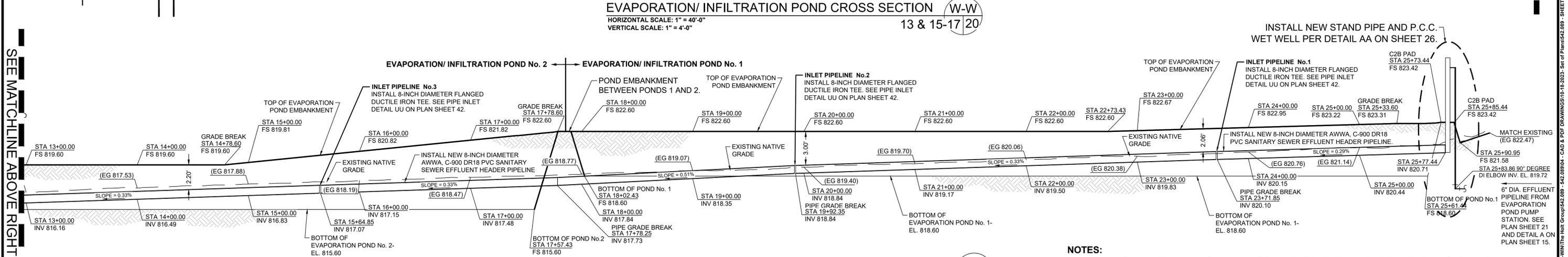
EVAPORATION/INFILTRATION POND NO. 3



EVAPORATION/INFILTRATION POND CROSS SECTION V-V  
HORIZONTAL SCALE: 1" = 40'-0"  
VERTICAL SCALE: 1" = 4'-0"



EVAPORATION/INFILTRATION POND CROSS SECTION W-W  
HORIZONTAL SCALE: 1" = 40'-0"  
VERTICAL SCALE: 1" = 4'-0"



EVAPORATION/INFILTRATION POND CROSS SECTION W-W  
HORIZONTAL SCALE: 1" = 40'-0"  
VERTICAL SCALE: 1" = 4'-0"



- NOTES:**
1. NEW 8-INCH DIAMETER AWWA, C900 DR18 PVC SANITARY SEWER EFFLUENT HEADER PIPELINE IS TO BE INSTALLED AFTER THE NATIVE EARTH POND EMBANKMENTS ARE CONSTRUCTED. THE 8 INCH DIAMETER AWWA C-900, DR18 PVC PIPELINE IS NOT TO BE SUBJECTED TO THE WEIGHT OF FRONT END LOADERS, SCRAPPERS OR SIMILAR HEAVY EQUIPMENT.

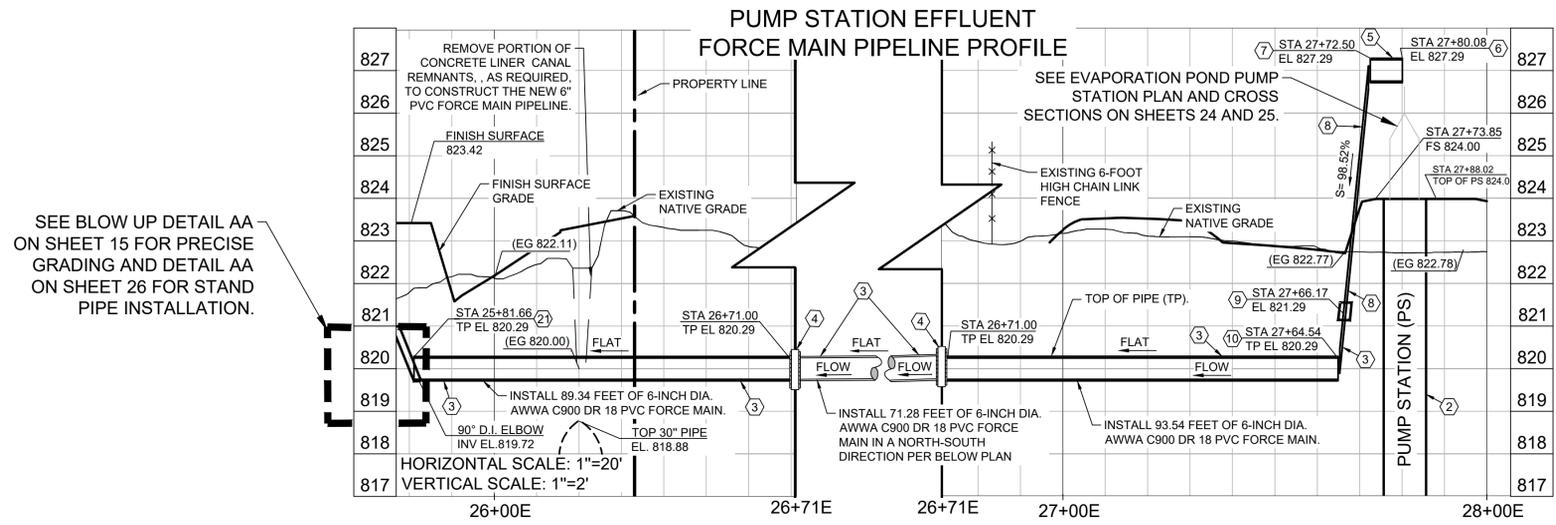
REVISION	DATE	COMMENTS

<p>REGISTERED PROFESSIONAL ENGINEER JAMES G. JACK HOLT No. 31773 Exp. 12-31-24 CIVIL STATE OF CALIFORNIA</p>	<p>PREPARED UNDER THE DIRECT SUPERVISION OF:</p> <p>JAMES G. JACK HOLT</p> <p>10/18/2023 DATE</p>	<p>31773 R.C.E. No.</p> <p>12/31/24 REG. EXP.</p>	<p>COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:</p> <p>JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS</p> <p>DATE</p>	<p>62028 R.C.E. No.</p> <p>09/30/25 REG. EXP.</p>	<p>COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT EL CENTRO, CALIFORNIA</p>	<p>DATE: 10/18/2023 DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JGH</p>	<p>PROJECT TITLE COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS</p>	<p>REFERENCE THG #542.089</p>	<p>SHEET 20 OF 50</p>
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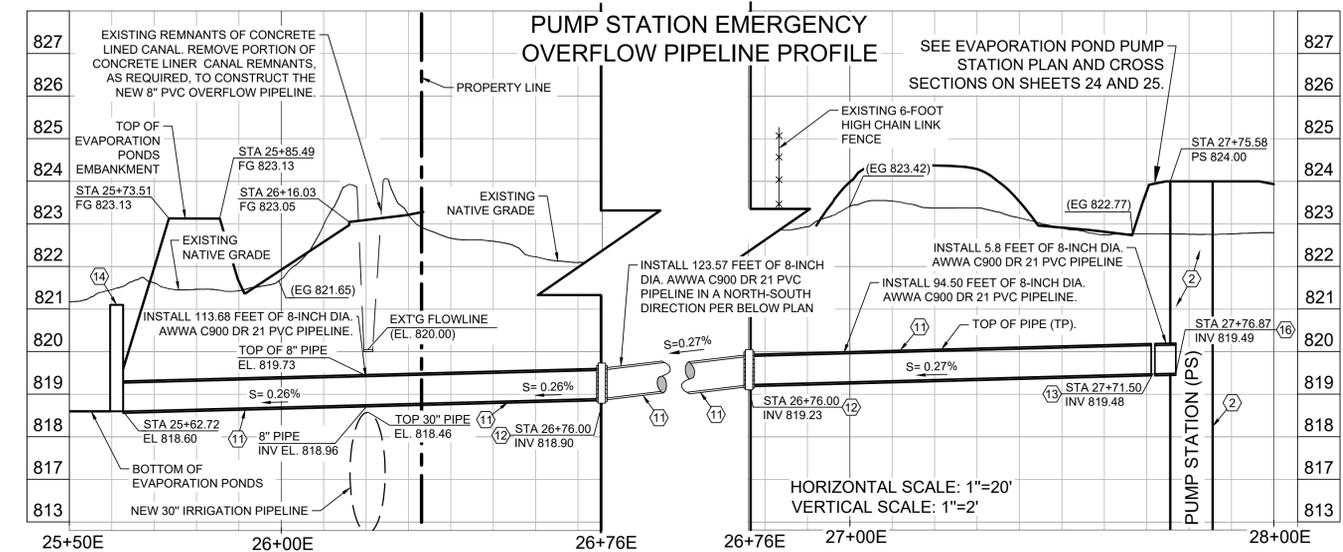
SEE MATCHLINE BELOW LEFT

SEE MATCHLINE ABOVE RIGHT

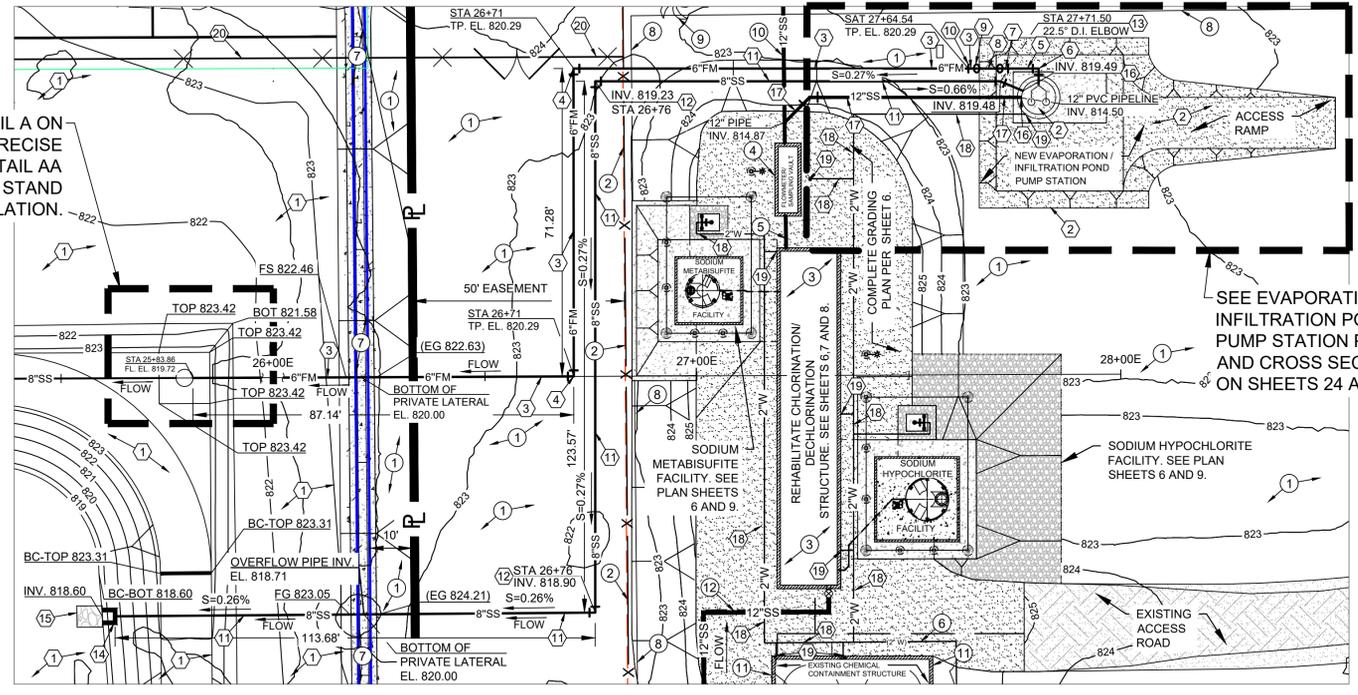
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SEE BLOW UP DETAIL AA ON SHEET 15 FOR PRECISE GRADING AND DETAIL AA ON SHEET 26 FOR STAND PIPE INSTALLATION.



SEE BLOW UP DETAIL A ON SHEET 15 FOR PRECISE GRADING AND DETAIL AA ON SHEET 26 FOR STAND PIPE INSTALLATION.

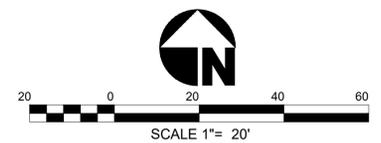


#### EXISTING KEYNOTES

- 1 EXISTING NATIVE MATERIAL.
- 2 EXISTING 6-FOOT CHAIN LINK FENCE TO REMAIN.
- 3 EXISTING P.C.C. CHLORINATION/DECHLORINATION STRUCTURE.
- 4 EXISTING P.C.C. FLOW METER/ SAMPLING VAULT.
- 5 EXISTING 12-INCH PVC SANITARY SEWER EFFLUENT PIPELINE TO REMAIN.
- 6 EXISTING 2-INCH PVC WATER PIPELINE TO REMAIN.
- 7 EXISTING IID CONCRETE LINED IRRIGATION CANAL REMNANTS.
- 8 EXISTING 6-INCH PERFORATED PIPELINE TO REMAIN.
- 9 EXISTING PALM TREES TO REMAIN.
- 10 EXISTING 12-INCH PVC SANITARY SEWER EFFLUENT PIPELINE TO BE ABANDONED IN PLACE AFTER EVAPORATION/ INFILTRATION PONDS ARE ACTIVATED.
- 11 EXISTING CHEMICAL CONTAINMENT STRUCTURE TO BE ABANDONED IN PLACE.
- 12 EXISTING 12-INCH PVC SANITARY SEWER PIPELINE FROM AERATION PONDS TO CHLORINATION/DECHLORINATION STRUCTURE TO REMAIN.

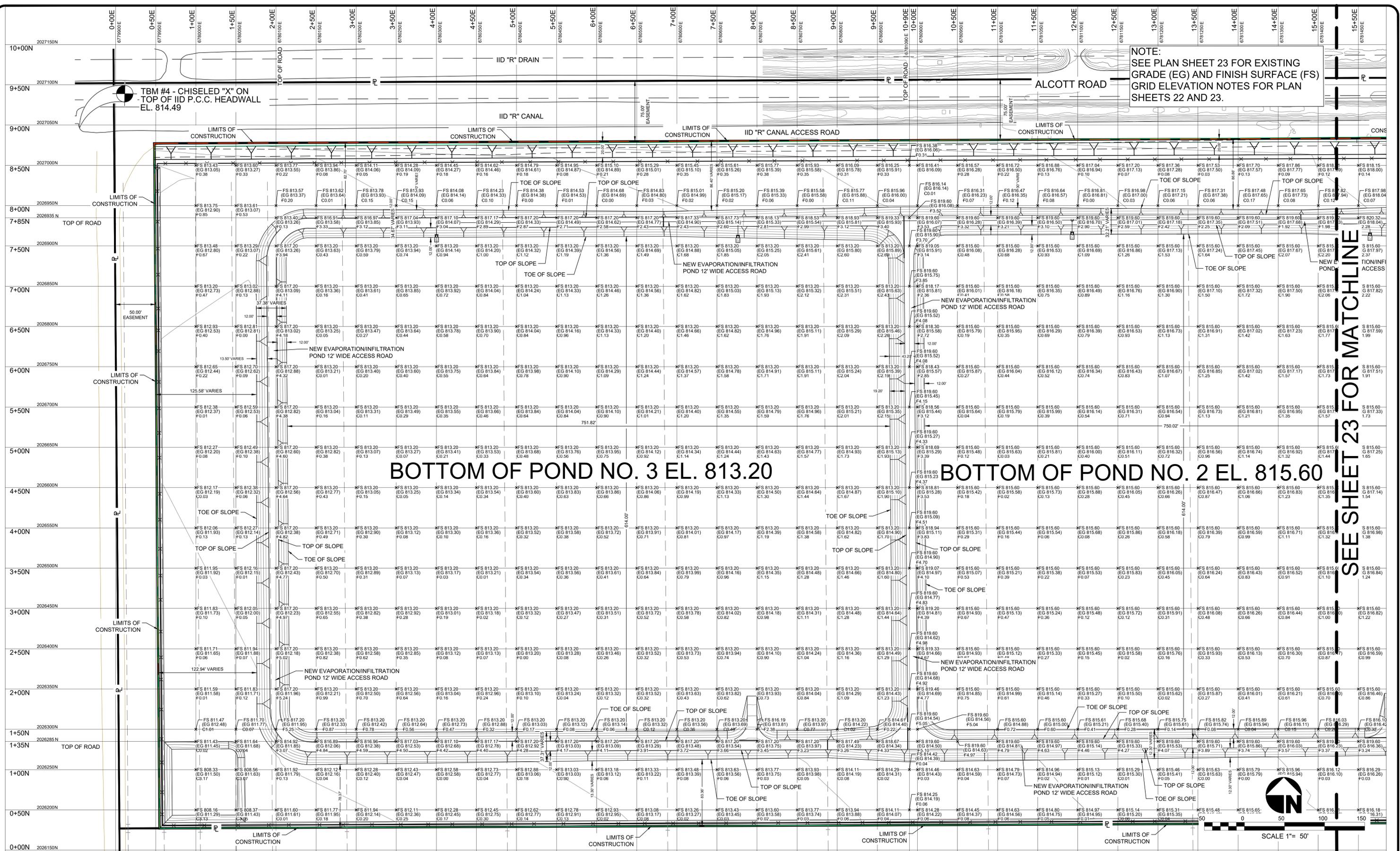
#### CONSTRUCTION KEYNOTES

- 1 GRADE EVAPORATION PONDS SITE PER GRADING PLAN PER PLAN SHEETS 15-17.
- 2 INSTALL EVAPORATION/INFILTRATION POND PUMP STATION PER PLAN SHEETS 24 AND 25.
- 3 INSTALL A 6-INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT FORCE MAIN PER TRENCH DETAIL CC ON SHEET 26.
- 4 INSTALL A 6-INCH MECHANICAL JOINT 90-DEGREE DUCTILE IRON ELBOW WITH RESTRAINED JOINT FITTINGS AND 316 STAINLESS STEEL HARDWARE.
- 5 INSTALL A 6-INCH DIAMETER, FLANGED DUCTILE IRON PIPE. SEE SECTION Y-Y ON PLAN SHEET 25.
- 6 INSTALL A 6-INCH FLANGED DUCTILE IRON 90 DEGREE ELBOW. SEE SECTION Y-Y ON PLAN SHEET 25.
- 7 INSTALL A 6-INCH FLANGED 45 DEGREE DUCTILE IRON ELBOW. SEE SECTION Y-Y ON PLAN SHEET 25.
- 8 INSTALL A 6-INCH DIAMETER, FLANGED X PLAIN END CLASS 53 DUCTILE IRON PIPE. SEE SECTION Y-Y ON PLAN SHEET 25.
- 9 INSTALL A 6-INCH DUCTILE IRON EPOXY COATED TRANSITION COUPLING WITH 316 STAINLESS STEEL HARDWARE. THE TRANSITION COUPLING SHALL BE A SMITH-BLAIR MODEL NO. 461-06540765-031 OR AN APPROVED EQUAL. SEE SECTION Y-Y ON PLAN SHEET 25.
- 10 INSTALL A 6-INCH MECHANICAL JOINT DUCTILE IRON 45 DEGREE ELBOW WITH RESTRAINED JOINT FITTINGS AND 316 STAINLESS STEEL HARDWARE. SEE SECTION Y-Y ON PLAN SHEET 25.
- 11 INSTALL AN 8-INCH DIAMETER AWWA DR 21 PVC PUMP STATION GRAVITY OVERFLOW PIPELINE PER TRENCH DETAIL CC ON SHEET 26.
- 12 INSTALL AN 8-INCH DIAMETER MECHANICAL JOINT 90-DEGREE DUCTILE IRON ELBOW WITH RESTRAINED JOINT FITTINGS AND STAINLESS STEEL HARDWARE.
- 13 INSTALL AN 8-INCH DIAMETER MECHANICAL JOINT 22.5-DEGREE DUCTILE IRON ELBOW WITH RESTRAINED JOINT FITTINGS AND STAINLESS STEEL HARDWARE.
- 14 INSTALL P.C.C. HEADWALL PER DETAIL BB ON SHEET 26.
- 15 INSTALL A 6-FOOT WIDE X 5-FOOT LONG X 1.5-FOOT DEEP 3" COBLE DISSIPATION MATERIAL BASIN. SEE DETAIL BB ON PLAN SHEET 26.
- 16 INSTALL THE PIPELINE THROUGH THE NEW P.C.C. WET WELL WALL PER PENETRATION DETAIL DD ON SHEET 26.
- 17 INSTALL 12-INCH DIAMETER SANITARY SEWER INFLUENT PIPELINE PER EVAPORATION POND PUMP STATION PLAN SHEET 24.
- 18 INSTALL NEW 2-INCH SCHEDULE 80 PVC WATER PIPELINES. SEE PLAN SHEETS 6 AND 24.
- 19 INSTALL NEW WATER FAUCET PER CONSTRUCTION KEYNOTE 2 ON PLAN SHEET 24.
- 20 INSTALL NEW 6-FOOT HIGH CHAIN LINK FENCE PER PLAN SHEETS 28 AND 29.
- 21 INSTALL 6-INCH DUCTILE IRON 90-DEGREE ELBOW AT TRANSITION TO VERTICAL PIPE SECTION PER STANDPIPE DETAIL AA ON PLAN SHEET 26.



REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT	DATE	PROJECT TITLE
			 JAMES G. JACK HOLT 10/18/2023 DATE	 JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	10/18/2023 DATE	COUNTY OF IMPERIAL WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS EFFLUENT PIPELINE AND PUMP STATION OVERFLOW PIPELINE PLAN AND PROFILE
				COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY: JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	62028 R.C.E. No. 09/30/25 REG. EXP.	COUNTY OF IMPERIAL SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS EFFLUENT PIPELINE AND PUMP STATION OVERFLOW PIPELINE PLAN AND PROFILE
				COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT EL CENTRO, CALIFORNIA		REFERENCE THG #542.089 SHEET 21 OF 50

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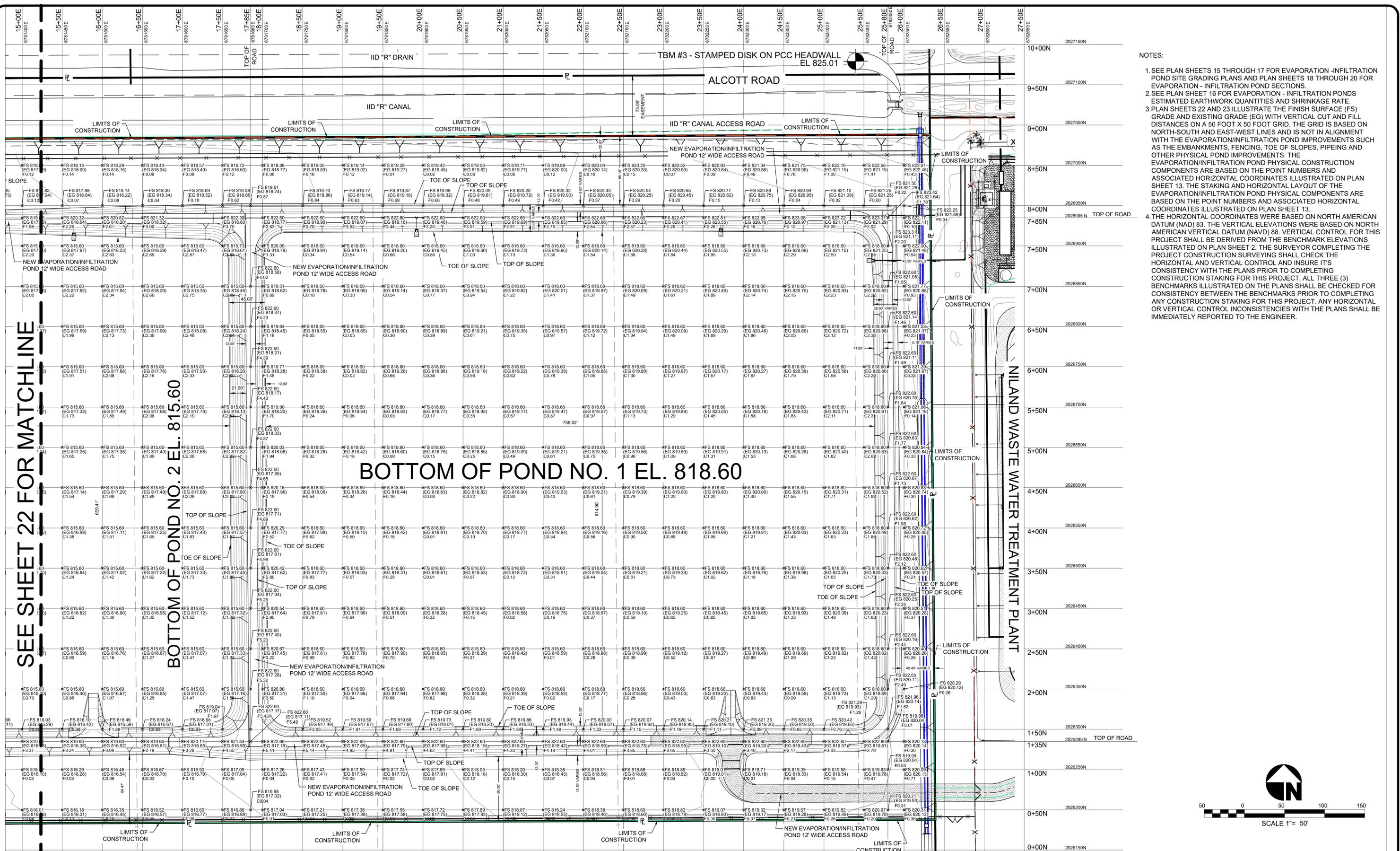


NOTE:  
SEE PLAN SHEET 23 FOR EXISTING  
GRADE (EG) AND FINISH SURFACE (FS)  
GRID ELEVATION NOTES FOR PLAN  
SHEETS 22 AND 23.

SEE SHEET 23 FOR MATCHLINE

REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:		DATE	PROJECT TITLE	REFERENCE	THG #542.089
			 JAMES G. JACK HOLT 10/18/2023 DATE		 JOHN GAY, P.E. 12/31/24 REG. EXP.		10/18/2023	COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS EVAPORATION/INFILTRATION POND SITE EARTHWORK - EXISTING GRADE (EG) AND FINISH SURFACE (FS) GRID ELEVATIONS		
					COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT EL CENTRO, CALIFORNIA		DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JGH			

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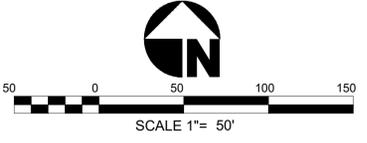


- NOTES:
- SEE PLAN SHEETS 15 THROUGH 17 FOR EVAPORATION - INFILTRATION POND SITE GRADING PLANS AND PLAN SHEETS 18 THROUGH 20 FOR EVAPORATION - INFILTRATION POND SECTIONS.
  - SEE PLAN SHEET 16 FOR EVAPORATION - INFILTRATION PONDS ESTIMATED EARTHWORK QUANTITIES AND SHRINKAGE RATE.
  - PLAN SHEETS 22 AND 23 ILLUSTRATE THE FINISH SURFACE (FS) GRADE AND EXISTING GRADE (EG) WITH VERTICAL CUT AND FILL DISTANCES ON A 50 FOOT X 50 FOOT GRID. THE GRID IS BASED ON NORTH-SOUTH AND EAST-WEST LINES AND IS NOT IN ALIGNMENT WITH THE EVAPORATION/INFILTRATION POND IMPROVEMENTS SUCH AS THE EMBANKMENTS, FENCING, TOE OF SLOPES, PIPEING AND OTHER PHYSICAL POND IMPROVEMENTS. THE EVAPORATION/INFILTRATION POND PHYSICAL CONSTRUCTION COMPONENTS ARE BASED ON THE POINT NUMBERS AND ASSOCIATED HORIZONTAL COORDINATES ILLUSTRATED ON PLAN SHEET 13. THE STAKING AND HORIZONTAL LAYOUT OF THE EVAPORATION/INFILTRATION POND PHYSICAL COMPONENTS ARE BASED ON THE POINT NUMBERS AND ASSOCIATED HORIZONTAL COORDINATES ILLUSTRATED ON PLAN SHEET 13.
  - THE HORIZONTAL COORDINATES WERE BASED ON NORTH AMERICAN DATUM (NAD) 83. THE VERTICAL ELEVATIONS WERE BASED ON NORTH AMERICAN VERTICAL DATUM (NAVD) 88. VERTICAL CONTROL FOR THIS PROJECT SHALL BE DERIVED FROM THE BENCHMARK ELEVATIONS ILLUSTRATED ON PLAN SHEET 2. THE SURVEYOR COMPLETING THE PROJECT CONSTRUCTION SURVEYING SHALL CHECK THE HORIZONTAL AND VERTICAL CONTROL AND INSURE ITS CONSISTENCY WITH THE PLANS PRIOR TO COMPLETING CONSTRUCTION STAKING FOR THIS PROJECT. ALL THREE (3) BENCHMARKS ILLUSTRATED ON THE PLANS SHALL BE CHECKED FOR CONSISTENCY BETWEEN THE BENCHMARKS PRIOR TO COMPLETING ANY CONSTRUCTION STAKING FOR THIS PROJECT. ANY HORIZONTAL OR VERTICAL CONTROL INCONSISTENCIES WITH THE PLANS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.

**BOTTOM OF POND NO. 1 EL. 818.60**

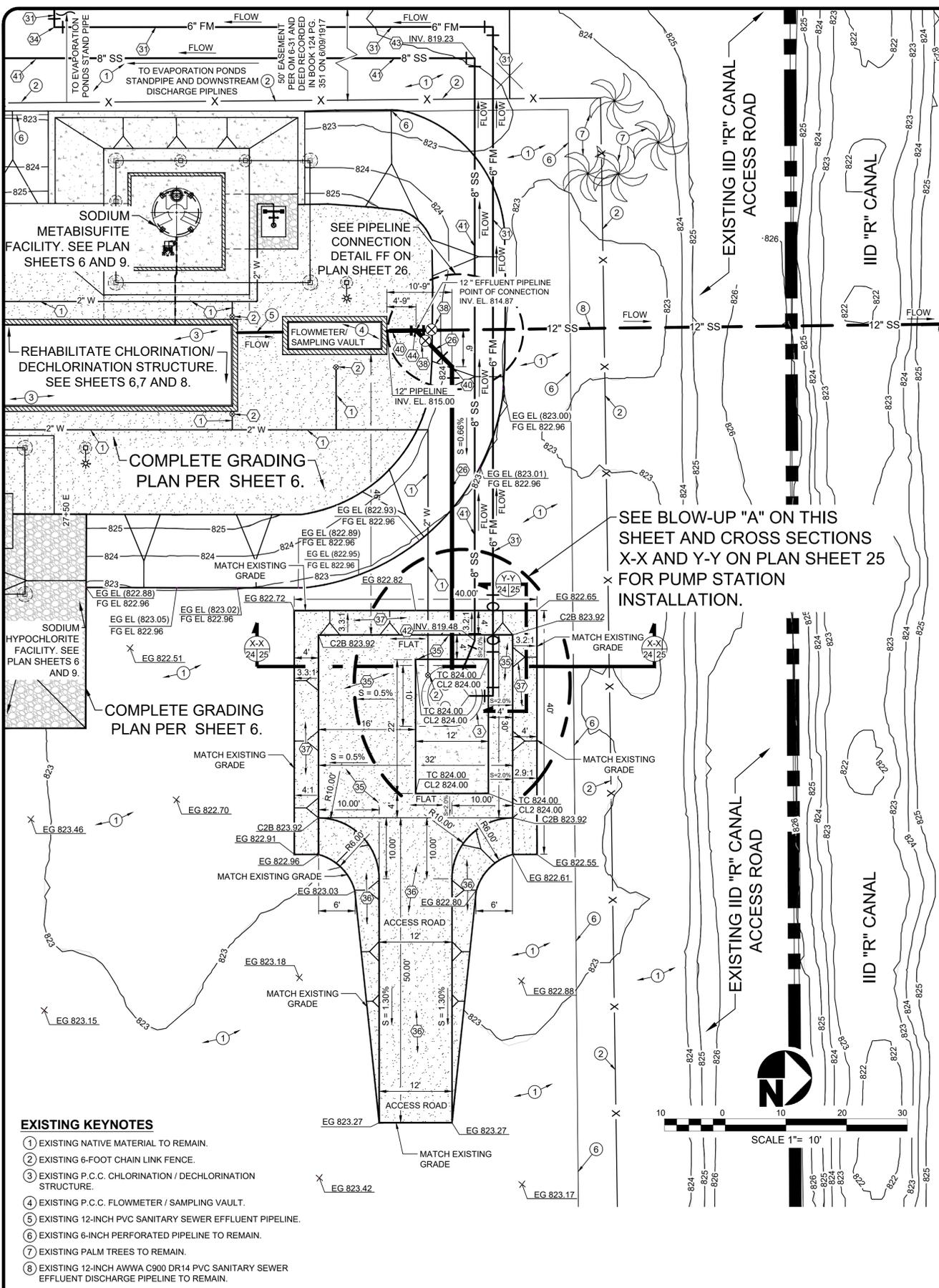
**BOTTOM OF POND NO. 2 EL. 815.60**

**SEE SHEET 22 FOR MATCHLINE**



<table border="1"> <thead> <tr> <th>REVISION</th> <th>DATE</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>		REVISION	DATE	COMMENTS										<p>PREPARED UNDER THE DIRECT SUPERVISION OF:</p> <p><i>JAMES G. JACK</i>  <b>JAMES G. JACK</b>      REGISTERED PROFESSIONAL ENGINEER      No. 11773      Exp. 12-31-24      CIVIL      STATE OF CALIFORNIA</p>		<p>COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT      APPROVED FOR CONSTRUCTION BY:</p> <p><i>JOHN GAY</i>  <b>JOHN GAY, P.E.</b>      DIRECTOR OF PUBLIC WORKS</p>		<p>DATE: 10/18/2023</p> <p>DRAWN: RS</p> <p>DESIGNED: RS</p> <p>SCALE: N/A</p> <p>CHECKED: JGH</p>		<p>PROJECT TITLE</p> <p><b>COUNTY OF IMPERIAL - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS</b></p> <p>EVAPORATION/INFILTRATION POND SITE EARTHWORK - EXISTING GRADE (EG) AND FINISH SURFACE (FS) GRID ELEVATIONS</p>		<p>REFERENCE: THG #542.089</p> <p>SHEET: 23 OF 50</p>	
REVISION	DATE	COMMENTS																					

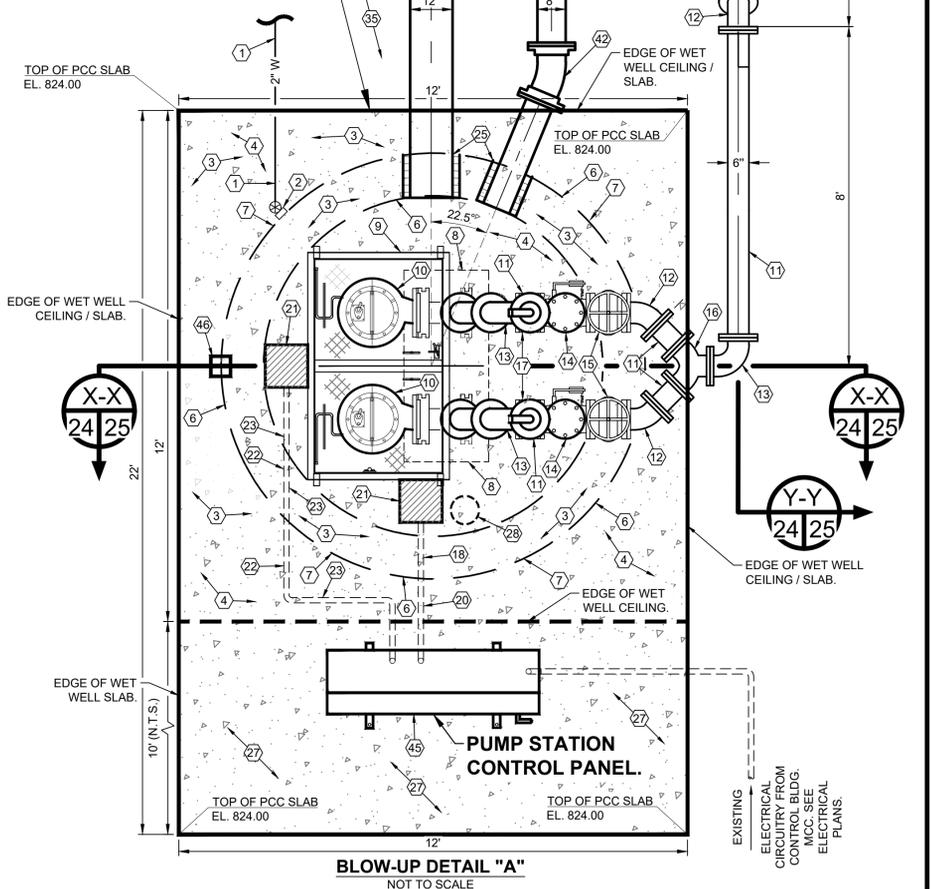
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**EVAPORATION / INFILTRATION PUMP STATION CONSTRUCTION KEYNOTES**

1. INSTALL 2-INCH DIAMETER SCHEDULE 80 PVC WATER PIPELINE BELOW GRADE PER DETAIL GG ON SHEET 27.
2. INSTALL A VERTICAL SECTION OF 1-INCH TYPE K COPPER HARD WATER PIPELINE. COMPLETE ALL NECESSARY CONNECTIONS BELOW GRADE BETWEEN THE 2-INCH SCHEDULE 80 PVC WATER PIPELINE AND 1-INCH TYPE K COPPER HARD PIPELINE. INSTALL A BRASS WATER FAUCET WITH A CIRCULAR OPERATOR HANDLE TO THE TOP OF THE TYPE K HARD COPPER PIPELINE. THE 1-INCH TYPE K HARD COPPER PIPELINE SHALL BE SUPPORTED BY A 5-FOOT LONG, 1/2-INCH X 1/2-INCH STAINLESS STEEL STRUT SYSTEM ANCHORED TO THE P.C.C. WALL. A TOTAL OF 3 FEET OF THE STRUT SYSTEM SHALL BE PLACED BELOW THE FINISH SLAB LEVEL OF THE PUMP STATION. A TOTAL OF 2 FEET OF THE STRUT SYSTEM SHALL BE PLACED ABOVE THE LEVEL OF THE P.C.C. WALL WITH 3/8-INCH DIAMETER EXPANSION BOLTS PLACED 6 INCHES ON CENTER. THE 1-INCH TYPE K COPPER PIPELINE SHALL BE CONNECTED TO THE STRUT SYSTEM WITH PIPE CLAMPS PLACED 6 INCHES ON CENTER. A PROTECTIVE CAP DEVICE MANUFACTURED BY THE STRUT SUPPLIER SHALL BE PLACED ON THE TOP OF THE STRUT MEMBER FOR SAFETY PURPOSES.
3. CONSTRUCT CONCRETE WASTEWATER PUMP STATION PER SECTION X-X ON SHEET 25.
4. CONSTRUCT REINFORCED CONCRETE SQUARE CEILING SECTION PER SECTION X-X ON SHEET 25.
5. CONNECT THE NEW 2-INCH DIAMETER PVC WATER PIPELINE TO THE EXISTING NON-POTABLE WATER PIPELINE.
6. INSTALL REINFORCED PRE-CAST CONCRETE CIRCULAR WALLS.
7. THE EXTERIOR SURFACE OF THE WET WELL WALLS SHALL BE COATED WITH AN ELASTOMERIC COAT-TAR FREE FILM APPLIED WATERPROOFING MEMBRANE. THE MEMBRANE SHALL BE APPLIED TO A DRY FILL THICKNESS OF 60 MILS. THE MEMBRANE COATING SHALL BE APPLIED PER THE MANUFACTURER'S RECOMMENDATIONS. THE MEMBRANE SHALL BE A TREMPROOF 201/202 MEMBRANE PRODUCT AS MANUFACTURED BY MAMECO INTERNATIONAL, INC. OR AN APPROVED EQUIVALENT OR EQUAL SUBSTANCE AND FUNCTION. A 3/4-INCH POLYURETHANE GREEN FOAM BACKER BOARD SHALL BE PLACED OVER THE EXTERIOR SURFACE OF THE WET WELL AFTER THE COATING SYSTEM IS APPLIED TO PROTECT THE COATING FROM BACKFILL OPERATIONS.
8. CONSTRUCT A 2'-0" WIDE X 4'-6" LONG X 10" HIGH P.C.C. PUMP PEDESTAL. PLACE TWO (2) ROWS OF 3/4-INCH DIAMETER, 6-INCH LONG, 316 STAINLESS STEEL EXPANSION BOLTS 6 INCHES ON CENTER TO SECURE THE P.C.C. PEDESTAL TO THE PRE-CAST CONCRETE FLOOR. PLACE A 3/4-INCH CHAMFER ALONG THE UPPER PERIMETER EDGE OF THE P.C.C. PEDESTAL.
9. INSTALL A 3'-0" X 5'-0" INSIDE OPENING DOUBLE LEAF ALUMINUM ACCESS DOOR WITH EXTENDED ALUMINUM CHANNEL FRAME. ALL HARDWARE AND ACCESSORIES SHALL BE COMPOSED OF STAINLESS STEEL. DOORS SHALL CLOSE FLUSH WITH THE FRAME AND REST ON A BUILT IN NEOPRENE GASKET. THE DOOR SHALL BE SUPPLIED WITH A STAINLESS STEEL PADLOCK LOOP. THE ACCESS HATCHES SHALL BE CAPABLE OF BEING PLACED IN A LOCK OPEN POSITION. THE CONTRACTOR SHALL SUPPLY A PADLOCK AND SIX (6) SETS OF KEYS TO THE OWNER. THE ALUMINUM ACCESS HATCH SHALL BE A BILCO TYPE J-AL OR J-D ALUMINUM DOUBLE LEAF ACCESS DOOR.
10. INSTALL TWO (2) 7.5-HORSEPOWER, 1750-RPM, 480-VOLT, 3-PHASE, 60-HERTZ GRUNDFOS SL1.40A40.75 EX 4.61R.C SUBMERSIBLE PUMPS OR AN APPROVED EQUAL. SUBMERSIBLE PUMPS SHALL BE SUPPLIED WITH STAINLESS STEEL SLIDE RAIL ASSEMBLY, STAINLESS STEEL LIFTING CABLES, BREAKAWAY 90-DEGREE DISCHARGE ELBOW AND ALL ACCESSORIES. THE PUMP SLIDE RAIL ASSEMBLY, STAINLESS STEEL LIFT CABLES, BREAKAWAY DISCHARGE ELBOW AND ALL ACCESSORIES SHALL BE SUPPLIED BY A SINGLE MANUFACTURER. EACH PUMP SHALL DELIVER 410 GALLONS PER MINUTE AT 33 FEET OF TOTAL DYNAMIC HEAD. SECURE THE 90-DEGREE DISCHARGE ELBOW TO THE CONCRETE PEDESTAL WITH 316 STAINLESS STEEL BOLTS OF AN APPROPRIATE DIAMETER SIZE AS DESIGNATED BY THE MANUFACTURER. THE DISCHARGE ELBOW SHALL BE LEVELED IN BOTH HORIZONTAL DIRECTIONS TO INSURE THAT THE SLIDE BARS AND VERTICAL DISCHARGE PIPELINE ARE MAINTAINED IN A PLUMB CONDITION AND COINCIDE AND FIT APPROPRIATELY WITH THE ALUMINUM ACCESS FRAME. THE STAINLESS STEEL LIFTING CABLES SHALL BE CAPABLE OF SUPPORTING TWO (2) TIMES THE WEIGHT OF THE PUMP DESIGNATED BY THE PUMP MANUFACTURER. THE STAINLESS STEEL SLIDE RAIL PIPES SHALL BE OF A DIAMETER SIZE REQUIRED BY THE MANUFACTURER. SUPPORT THE GUIDE RAILS WITH INTERMEDIATE SUPPORT BRACKETS AT A POSITION HALF WAY BETWEEN THE PUMP AND THE TOP OF THE WET WELL. ALL PUMP ASSEMBLY HARDWARE SHALL BE COMPOSED OF 316 STAINLESS STEEL.
11. INSTALL A 6-INCH DIAMETER, FLANGED CLASS 53 DUCTILE IRON PIPE SPOOL.
12. INSTALL A 6-INCH FLANGED DUCTILE IRON 45 DEGREE ELBOW.
13. INSTALL A 6-INCH FLANGED DUCTILE IRON 90 DEGREE ELBOW.
14. INSTALL A 6-INCH FLANGED DUCTILE IRON SPRING LOADED CHECK VALVE. THE CHECK VALVE SHALL BE A MUELLER MODEL NO. A-2602-6-02 OR AN APPROVED EQUAL.
15. INSTALL A 6-INCH FLANGED RESILIENT WEDGE GATE VALVE WITH HAND WHEEL OPERATOR. THE RESILIENT WEDGE GATE VALVE SHALL BE A MUELLER MODEL NO. A-2360-6 OR AN APPROVED EQUAL.
16. INSTALL A 6-INCH FLANGED DUCTILE IRON TRUE WYE.
17. INSTALL A 2-INCH FLANGED, STAINLESS STEEL, COMBINATION AIR RELEASE / VACUUM VALVE. THE COMBINATION AIR RELEASE VALVE SHALL BE AN A.R.I. MODEL NO. D-020.
18. CAST A 3-INCH DIAMETER SCHEDULE 40 PVC CONDUIT WITHIN THE WET WELL ROOF CONCRETE SLAB AND CONTROL PANEL SLAB BETWEEN THE PUMP STATION MCC AND ELECTRICAL JUNCTION BOX. INSTALL DUCT SEAL IN THE ANNULAR VOID OF THE INTERIOR CONDUIT SLEEVE TO "SEAL OFF" THE WET WELL GASES FROM ACCESSING THE MOTOR CONTROL CENTER.
19. INSTALL A 3-INCH SCHEDULE 40 PVC CONDUIT. INSTALL THE CONDUIT AND "SO" RUBBER CORD CABLES PER TRENCH DETAIL E ON SHEET 3.
20. INSTALL THE "SO" RUBBER CORD CABLE SUPPLIED WITH THE PUMPS TO THE JUNCTION BOX AT THE TOP OF THE WET WELL. THE "SO" RUBBER CORD CABLE SHALL CONTINUE TO BE EXTENDED FROM THE ELECTRICAL JUNCTION BOX TO THE PUMP MOTOR CONTROL CENTER WITH NO SPLICES OCCURRING ALONG THE LENGTH OF THE "SO" RUBBER CORD CABLE. SUPPORT THE "SO" RUBBER CORD CABLE WITH STAINLESS STEEL KELLUMS GRIP AT THE TOP OF THE PUMP STATION WET WELL CEILING.
21. CAST A NEMA 4 APPLETON SERIES WYR-121212 12-INCH X 12-INCH X 12-INCH CAST IRON ELECTRICAL JUNCTION BOX OR AN APPROVED EQUAL LEVEL WITH THE P.C.C. SLAB. PLACE NON-FERROUS WATER TIGHT GROMMETS AT THE INTERIOR BASE OF THE PULLBOX TO SECURE THE MERCURY FLOAT CABLES FOR THE CONTROL CIRCUITRY AND "SO" RUBBER CORD CABLES FOR THE POWER CIRCUITRY.
22. CAST A 2-INCH SCHEDULE 40 PVC CONDUIT WITHIN THE WET WELL ROOF CONCRETE SLAB AND CONTROL PANEL SLAB BETWEEN THE MOTOR CONTROL CENTER AND ELECTRICAL JUNCTION BOX. INSTALL FOUR (4) SEPARATE RUBBER CORD ELECTRICAL CABLES FROM THE MERCURY FLOAT SWITCHES TO THE MOTOR CONTROL CENTER. INSTALL DUCT SEAL IN THE ANNULAR VOID OF THE INTERIOR CONDUIT SLEEVE TO "SEAL OFF" THE WET WELL GASES FROM ACCESSING THE MOTOR CONTROL CENTER.
23. INSTALL FOUR (4) SJE-RHOMBUS MERCURY TYPE PVC FLOAT SWITCHES WITH 90 FEET OF SITO-VIA RUBBER CORD CABLE. THE POLYPROPYLENE SENSORS SHALL BE SUPPLIED WITH WEIGHTS. EXTEND THE POLYPROPYLENE LIQUID LEVEL SENSOR CONDUCTORS TO THE APPROPRIATE ELECTRICAL TERMINATION POINT. NO SPLICING OF THE CABLE SHALL BE ALLOWED FROM THE POLYPROPYLENE LIQUID LEVEL SENSOR TO THE POINT OF TERMINATION WITHIN THE MOTOR CONTROL CENTER.
24. BOLT A 12-GAUGE STAINLESS STEEL STRUT MEMBER TO THE ALUMINUM ACCESS COVER WITH STAINLESS STEEL BOLTS. SECURE A 2-INCH SCHEDULE 80 PVC SUPPORT MEMBER TO THE STRUT MEMBER WITH STAINLESS STEEL PIPE SUPPORT STRAPS. THE MERCURY FLOATS SHALL BE ATTACHED TO THE 2-INCH SCHEDULE 80 PVC SUPPORT MEMBER AND BE CONSTRUCTED FOR EASY REMOVAL FROM THE WET WELL FOR MAINTENANCE PURPOSES.
25. INSTALL THE 8-INCH DIAMETER AWWA - C-900, DR21 PVC OVERFLOW PIPELINE AND 12" DIAMETER AWWA-C900, DR18 PVC INFLUENT PIPELINES THROUGH THE PCC WET WELL WALL PER PENETRATION DETAIL DD ON SHEET 26.
26. INSTALL THE 12-INCH DIAMETER AWWA DR 18 PVC SANITARY SEWER EFFLUENT PIPELINE FROM THE POINT OF CONNECTION AT THE EXISTING 12-INCH DIAMETER EFFLUENT PIPELINE NORTH OF THE EXISTING SAMPLING/FLOW METER STRUCTURE. INSTALL THE SANITARY SEWER PIPELINE PER TRENCH DETAIL TT ON SHEET 42 OF THE IMPROVEMENT PLANS.
27. INSTALL A 12-INCH DEEP P.C.C. SLAB OVER 12 INCHES OF CLASS 2 BASE. COMPACT THE CLASS 2 BASE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
28. INSTALL AN 8-INCH DIAMETER AWWA C-900, CLASS 150 PVC VERTICAL VENT PIPELINE FLUSH WITH THE INTERIOR SURFACE OF THE WET WELL SLAB. PLACE A RING TIGHT PVC COVER OVER THE TOP OF THE PIPE. DRILL HORIZONTAL ROWS OF 1/2-INCH DIAMETER HOLES 6 INCHES ON CENTER AROUND THE CIRCUMFERENCE OF THE PIPELINE. THE VERTICAL DISTANCE BETWEEN THE HORIZONTAL ROWS SHALL MEASURE 6 INCHES.
29. INSTALL A 6-INCH DIAMETER, FLANGED X PLAIN END CLASS 53 DUCTILE IRON PIPE.
30. INSTALL A 6-INCH DUCTILE IRON EPOXY COATED
31. INSTALL A 6-INCH DIAMETER AWWA C-900, DR 18 DIAMETER AWWA-C900, DR18 PVC INFLUENT PIPELINES THROUGH THE PCC WET WELL WALL PER PENETRATION DETAIL DD ON SHEET 26.
32. INSTALL A 6-INCH MECHANICAL JOINT 45-DEGREE DUCTILE IRON ELBOW WITH 316 STAINLESS STEEL HARDWARE.
33. INSTALL A 6-INCH DUCTILE IRON RESTRAINED JOINT FITTING WITH 316 STAINLESS STEEL HARDWARE.
34. INSTALL A 6-INCH MECHANICAL JOINT 90-DEGREE DUCTILE IRON ELBOW WITH 316 STAINLESS STEEL HARDWARE.
35. INSTALL 12 INCHES OF CLASS 2 BASE FLUSH WITH THE TOP OF THE P.C.C. WET WELL SLAB. COMPACT THE CLASS 2 BASE MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
36. INSTALL 12 INCHES OF CLASS 2 BASE ALONG THE 12-FOOT WIDE PUMP STATION ACCESS ROAD AND SIDE SLOPES. COMPACT THE CLASS 2 BASE MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
37. INSTALL CLASS 2 BASE TO THE TOE OF SLOPE FOR A DISTANCE OF 4 FEET FROM THE EDGE OF THE CLASS 2 BASE PUMP STATION PAD TO EXISTING NATIVE GRADE. COMPACT THE CLASS 2 BASE SIDE SLOPE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
38. INSTALL 12 INCH ECCENTRIC PLUG VALVE WITH VALVE RISER AND COVER PER DETAIL E ON PLAN SHEET 35.
39. INSTALL 12-INCH MECHANICAL JOINT DUCTILE IRON 45 DEGREE ELBOW WITH RESTRAINED JOINT FITTINGS AND STAINLESS STEEL HARDWARE.
40. EXISTING 12" AWWA C-900, DR14 PVC PIPELINE TO REMAIN.
41. INSTALL AN 8-INCH DIAMETER AWWA DR 21 PVC PUMP STATION OVERFLOW PIPELINE PER TRENCH DETAIL CC ON SHEET 26. SEE SHEET 21 FOR PLAN AND PROFILE PIPELINE ILLUSTRATION.
42. INSTALL AN 8-INCH DIAMETER MECHANICAL JOINT X MECHANICAL JOINT 22.5-DEGREE DUCTILE IRON ELBOW WITH RESTRAINED JOINT FITTINGS AND STAINLESS STEEL HARDWARE.
43. INSTALL AN 8-INCH DIAMETER MECHANICAL JOINT 90-DEGREE DUCTILE IRON ELBOW WITH RESTRAINED JOINT FITTINGS AND STAINLESS STEEL HARDWARE.
44. INSTALL 12-INCH X 12-INCH X 12-INCH DUCTILE IRON WYE FITTING WITH RESTRAINED JOINT FITTINGS AND STAINLESS STEEL HARDWARE. SEE DETAIL FF ON PLAN SHEET 26.
45. INSTALL A NEMA 4 SUBMERSIBLE PUMP STATION MOTOR CONTROL CENTER WITH DUST TIGHT WEATHER STRIP. THE NEMA 4 ENCLOSURE SHALL BE CONSTRUCTED OF 12-GAUGE STEEL AND COATED WITH AN ANSI 61 WHITE COLOR
46. POLYESTER POWER COATING SYSTEM. THE DEADFRONT ENCLOSURE SHALL BE SUPPORTED BY 316 STAINLESS STEEL UNISTRUT MEMBERS SECURED TO THE P.C.C. PUMP STATION SLAB. THE NEMA 4 ENCLOSURE SHALL BE SUPPLIED WITH A 3-POINT LATCH WITH POWER GLIDE LOCKABLE HANDLE AND A HEAVY GAUGE CONTINUOUS HINGED DOOR. THE PUMP STATION MOTOR CONTROL CENTER SHALL BE PROVIDED WITH A MAIN BREAKER AND TWO 3-POINT BRANCH BREAKERS FOR EACH SUBMERSIBLE PUMP. EXTERIOR RESET BUTTONS SHALL BE PROVIDED FOR THE PUMP STARTERS. THE SUBMERSIBLE PUMPS SHALL ALTERNATE BETWEEN CYCLES. PROVIDE A 110-VOLT, 1-PHASE TRANSFORMER FOR THE CONTROL CIRCUITRY AND A 110-VOLT, 1-PHASE DUPLEX EXTERIOR RECEPTACLE WITH DIE-CAST COVER ON THE OUTSIDE OF THE ENCLOSURE. HOA SWITCHES SHALL BE PROVIDED FOR EACH PUMP. EACH PUMP SHALL BE PROVIDED WITH GREEN GLASS RUNNING LIGHTS, RED GLASS PUMP OFF LIGHTS AND AMBER GLASS THERMAL OVERLOAD AND LEAK DETECTION LIGHTS. PROVIDE A VISUAL / AUDIBLE ALARM WITH AN EXTERIOR RESET BUTTON. THE VISUAL ALARM SHALL BE A RED LIGHT IN A VANDAL-PROOF GLASS MOUNTED AT THE TOP OF THE ENCLOSURE. SENSATIONS TO PROVIDE ALARM CONDITIONS TO THE SENSAPHONE SENTINEL PRO AUTODIALLER WITHIN THE ELECTRICAL CONTROL PANEL AT THE EXISTING LABORATORY BUILDING SHALL BE INCLUDED. PROVIDE AN ELECTRICAL CONTROL DIAGRAM FOR THE PROPOSED PUMP CONTROL PANEL WITH SUBMITTAL DOCUMENTS. INSTALL A SS SHADE STRUCTURE OVER PUMP STATION CONTROL PANEL.
46. INSTALL TERN SPT10-E2 COMMANDER 1000 SERIES OR AN APPROVED EQUAL PORTABLE PUMP UNIT CRANE WITH REQUIRED HARDWARE AND ACCESSORIES.

**EVAPORATION / INFILTRATION POND PUMP STATION.**



**BLOW-UP DETAIL "A"**  
NOT TO SCALE

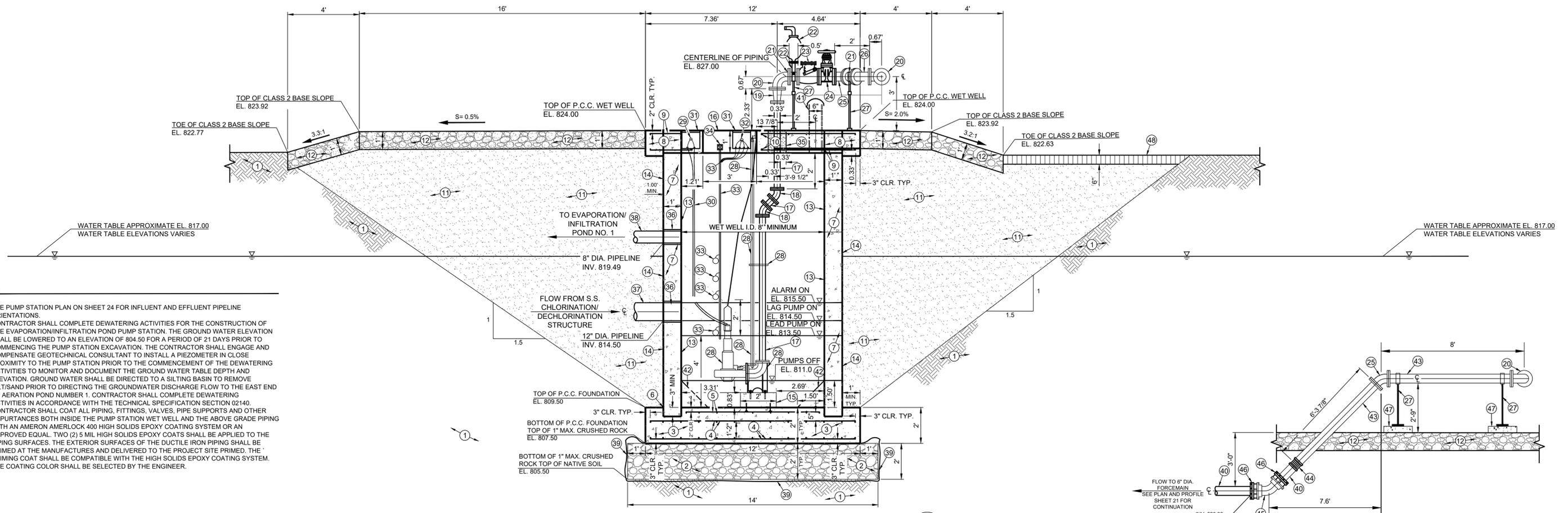
- EXISTING KEYNOTES**
1. EXISTING NATIVE MATERIAL TO REMAIN.
  2. EXISTING 6-FOOT CHAIN LINK FENCE.
  3. EXISTING P.C.C. CHLORINATION / DECHLORINATION STRUCTURE.
  4. EXISTING P.C.C. FLOWMETER / SAMPLING VAULT.
  5. EXISTING 12-INCH PVC SANITARY SEWER EFFLUENT PIPELINE.
  6. EXISTING 6-INCH PERFORATED PIPELINE TO REMAIN.
  7. EXISTING PALM TREES TO REMAIN.
  8. EXISTING 12-INCH AWWA C900 DR14 PVC SANITARY SEWER EFFLUENT DISCHARGE PIPELINE TO REMAIN.

REVISION	DATE	COMMENTS	DATE	REG. EXP.								

	<p>PREPARED UNDER THE DIRECT SUPERVISION OF:</p> <p><i>JAMES G. "JACK" HOLT</i></p> <p>10/18/2023</p>	<p>31773 R.C.E. No.</p> <p>12/31/24 REG. EXP.</p>	<p>COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:</p> <p><i>JOHN GAY, P.E.</i> DIRECTOR OF PUBLIC WORKS</p> <p>DATE</p>	<p>62028 R.C.E. No.</p> <p>09/30/25 REG. EXP.</p>	<p>PUBLIC WORKS DEPARTMENT <b>COUNTY OF IMPERIAL</b> EL CENTRO, CALIFORNIA</p>	<p>DATE: 10/18/2023</p> <p>DRAWN: RS</p> <p>DESIGNED: RS</p> <p>SCALE: N/A</p> <p>CHECKED: JGH</p>	<p>PROJECT TITLE</p> <p><b>COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS</b></p> <p><b>EVAPORATION / INFILTRATION POND PUMP STATION PLAN</b></p>	<p>REFERENCE</p> <p>THG #542.089</p>	<p>SHEET 24 OF 50</p>
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EVAPORATION / INFILTRATION PUMP STATION SECTION X-X  
SCALE: 3/8"=1'-0" 24/25

WASTEWATER PUMP STATION SECTION Y-Y  
SCALE: 3/8"=1'-0" 24/25

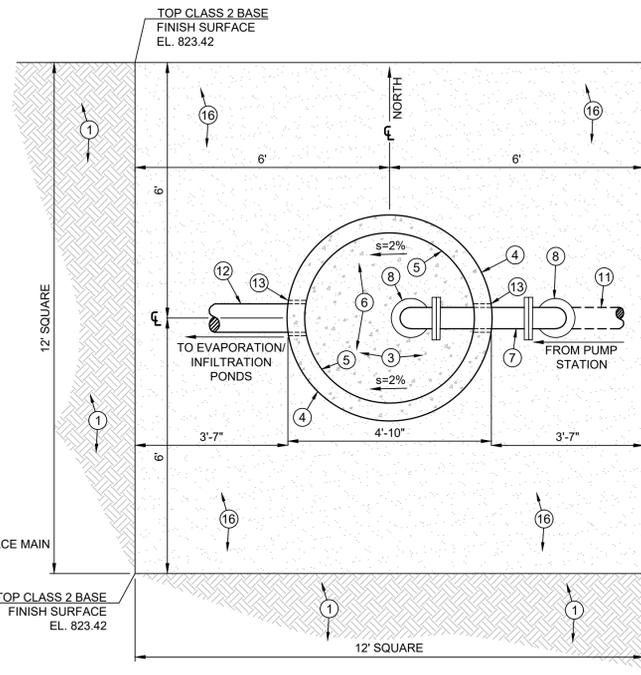
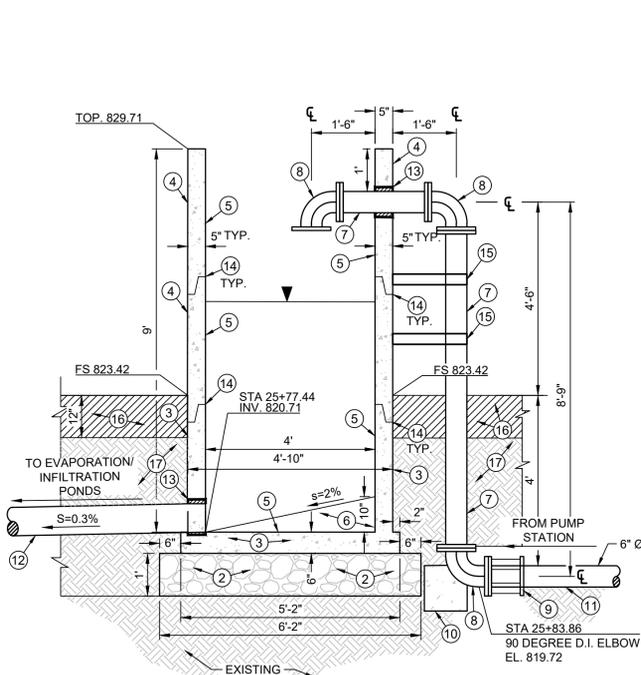
- NOTES:**
- SEE PUMP STATION PLAN ON SHEET 24 FOR INFLUENT AND EFFLUENT PIPELINE ORIENTATIONS.
  - CONTRACTOR SHALL COMPLETE DEWATERING ACTIVITIES FOR THE CONSTRUCTION OF THE EVAPORATION/INFILTRATION POND PUMP STATION. THE GROUND WATER ELEVATION SHALL BE LOWERED TO AN ELEVATION OF 804.50 FOR A PERIOD OF 21 DAYS PRIOR TO COMMENCING THE PUMP STATION EXCAVATION. THE CONTRACTOR SHALL ENGAGE AND COMPENSATE GEOTECHNICAL CONSULTANT TO INSTALL A PIEZOMETER IN CLOSE PROXIMITY TO THE PUMP STATION PRIOR TO THE COMMENCEMENT OF THE DEWATERING ACTIVITIES TO MONITOR AND DOCUMENT THE GROUND WATER TABLE DEPTH AND ELEVATION. GROUND WATER SHALL BE DIRECTED TO A SILTING BASIN TO REMOVE SILT/SAND PRIOR TO DIRECTING THE GROUNDWATER DISCHARGE FLOW TO THE EAST END OF AERATION POND NUMBER 1. CONTRACTOR SHALL COMPLETE DEWATERING ACTIVITIES IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION SECTION 02140.
  - CONTRACTOR SHALL COAT ALL PIPING, FITTINGS, VALVES, PIPE SUPPORTS AND OTHER APPURTANCES BOTH INSIDE THE PUMP STATION WET WELL AND THE ABOVE GRADE PIPING WITH AN AMERON AMERLOCK 400 HIGH SOLIDS EPOXY COATING SYSTEM OR AN APPROVED EQUAL. TWO (2) 5 MIL HIGH SOLIDS EPOXY COATS SHALL BE APPLIED TO THE PIPING SURFACES. THE EXTERIOR SURFACES OF THE DUCTILE IRON PIPING SHALL BE PRIMED AT THE MANUFACTURER'S AND DELIVERED TO THE PROJECT SITE PRIMED. THE PRIMING COAT SHALL BE COMPATIBLE WITH THE HIGH SOLIDS EPOXY COATING SYSTEM. THE COATING COLOR SHALL BE SELECTED BY THE ENGINEER.

**KEYNOTES**

- EXISTING NATIVE MATERIAL TO REMAIN.
- INSTALL 3/4 - INCH CRUSHED ROCK.
- CONSTRUCT REINFORCED CAST-IN-PLACE CONCRETE 12'-0" X 12'-0" FOUNDATION SLAB. CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN 5,000 PSI COMPRESSIVE STRENGTH AFTER 28 DAYS CURING.
- INSTALL NO. 6 REINFORCING STEEL BARS AT 12 INCHES ON CENTER EACH WAY.
- INSTALL NO. 5 REINFORCING STEEL BARS AT 12 INCHES ON CENTER EACH WAY.
- CAST PRECAST WET WELL SHAFT 3 INCHES INTO THE P.C.C. CAST IN PLACE PUMP STATION SUPPORT FOUNDATION.
- INSTALL REINFORCED PRE-CAST CONCRETE CIRCULAR WALLS.
- CONSTRUCT THE REINFORCED CONCRETE SQUARE CEILING SECTION. THE CEILING SHALL BE OF CAST-IN-PLACE CONSTRUCTION. THE CONTRACTOR SHALL PLACE THE ELECTRICAL CONDUIT, ELECTRICAL JUNCTION BOXES, ALUMINUM ACCESS HATCH AND OTHER PUMP STATION ITEMS AS ILLUSTRATED ON THE PLANS WITHIN THE ROOF SECTION FORMWORK PRIOR TO THE PLACEMENT OF CONCRETE.
- INSTALL NO. 5 REINFORCING STEEL BARS AT 12 INCHES ON CENTER EACH WAY.
- INSTALL TWO NO. 5 REINFORCING STEEL BARS, TOP AND BOTTOM AT EACH SIDE OF ACCESS HATCH OPENING. TYPICAL, ALL SIDES OF ACCESS HATCH.
- REMOVE AND DISPOSE OF THE EXISTING NATIVE BACKFILL MATERIAL PRIOR TO THE CONSTRUCTION OF THE PUMP STATION WET WELL. INSTALL GRANULAR SAND BACKFILL IN MAXIMUM 1 FOOT LIFTS. COMPACT GRANULAR SAND MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D1557. ADDITIONAL LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE ATTAINED THE SPECIFIED COMPACTION DENSITY. BACKFILL MATERIAL SHALL NOT BE PLACED UNTIL THE CONSTRUCTION OF THE WET WELL FOUNDATION AND WALLS ARE COMPLETE.
- INSTALL 12 INCHES OF CLASS 2 BASE. COMPACT THE CLASS 2 BASE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- BRUSH BLAST CONCRETE SURFACES PRIOR TO COATING APPLICATION. A RAVEN 405 EPOXY COATING SYSTEM, OR AN APPROVED EQUAL, IS TO BE APPLIED TO THE INTERIOR SURFACES OF THE PUMP STATION WET WELL. A PRIMER RECOMMENDED BY THE MANUFACTURER SHALL BE INSTALLED PRIOR TO THE INSTALLATION OF THE EPOXY COATING SYSTEM. THE MINIMUM THICKNESS OF THE EPOXY COATING SYSTEM SHALL BE 125 MILS. DURING THE EPOXY COATING SYSTEM INSTALLATION, A MIL GAUGE SHALL BE USED TO VERIFY THAT THE MINIMUM THICKNESS OF THE COATING MEETS AND/OR EXCEEDS THE MINIMUM SPECIFIED THICKNESS. AFTER THE COATING SYSTEM IS INSTALLED THE COATING SHALL BE SPARK TESTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, SPECIFICATION 2021 SECTION 502-6.2 AND REPAIRED PER SECTION 502-6.5.
- THE EXTERIOR SURFACE OF THE WET WELL WALLS SHALL BE COATED WITH AN ELASTOMERIC COAL-TAR FREE FLUID APPLIED WATERPROOFING MEMBRANE. THE MEMBRANE SHALL BE APPLIED TO A DRY FILM THICKNESS OF 60 MILS. THE MEMBRANE COATING SHALL BE APPLIED PER THE MANUFACTURER'S RECOMMENDATIONS. THE MEMBRANE SHALL BE A TREMPROOF 201/202 MEMBRANE PRODUCT AS MANUFACTURED BY MAMECO INTERNATIONAL, INC. OR AN APPROVED EQUIVALENT OR EQUAL SUBSTANCE AND FUNCTION. A 3/8-INCH POLYURETHANE GREEN FOAM BACKER BOARD SHALL BE PLACED OVER THE EXTERIOR SURFACE OF THE PCC WET WELL WALLS AFTER THE COATING SYSTEM IS APPLIED TO PROTECT THE COATING FROM BACKFILL OPERATIONS.
- CONSTRUCT A 2'-0" W X 4'-6" L X 10" HIGH P.C.C. PUMP PEDESTAL. PLACE TWO (2) ROWS OF 5/8-INCH DIAMETER, 6-INCH LONG, 316 STAINLESS STEEL EXPANSION BOLTS 6 INCHES ON CENTER TO SECURE THE P.C.C. PEDESTAL TO THE PRE-CAST CONCRETE FLOOR. PLACE A 3/4-INCH CHAMFER ALONG THE UPPER PERIMETER EDGE OF THE P.C.C. PEDESTAL.
- INSTALL A 3'-0" X 5'-0" INSIDE OPENING DOUBLE LEAF ALUMINUM ACCESS DOOR WITH EXTENDED ALUMINUM CHANNEL FRAME. ALL HARDWARE AND ACCESSORIES SHALL BE COMPOSED OF STAINLESS STEEL. DOORS SHALL CLOSE FLUSH WITH THE FRAME AND REST ON A BUILT IN NEOPRENE GASKET. THE DOOR SHALL BE SUPPLIED WITH A STAINLESS STEEL PADLOCK LOOP. THE ACCESS HATCHES SHALL BE CAPABLE OF BEING PLACED IN A LOCK OPEN POSITION. THE CONTRACTOR SHALL SUPPLY A PADLOCK AND SIX (6) SETS OF KEYS TO THE OWNER. THE ALUMINUM ACCESS HATCH SHALL BE A BILCO TYPE J-AL OR J-DAL ALUMINUM DOUBLE LEAF ACCESS DOOR.
- INSTALL A 4-INCH DIAMETER, FLANGED CLASS 53 DUCTILE IRON PIPE SECTION WITH 316 STAINLESS STEEL HARDWARE.
- INSTALL A 4-INCH FLANGED 45-DEGREE DUCTILE IRON ELBOW WITH 316 STAINLESS STEEL HARDWARE.
- INSTALL A 4-INCH X 6-INCH FLANGED DUCTILE IRON REDUCER WITH STAINLESS STEEL HARDWARE.
- INSTALL A 6-INCH FLANGED DUCTILE IRON 90 DEGREE ELBOW.
- INSTALL A 6-INCH DIAMETER, FLANGED CLASS 53 DUCTILE IRON PIPE SPOOL.
- INSTALL A 2-INCH FLANGED, STAINLESS STEEL, COMBINATION AIR RELEASE / VACUUM VALVE. CONNECT THE VALVE WITH A 6-INCH LONG, MALE THREADED BY FLANGED, 2-INCH DIAMETER PIPE SECTION. CONNECT THE 6-INCH PIPE TO A 2-INCH FEMALE THREADED HOLE BUNG. THE COMBINATION AIR RELEASE VALVE SHALL BE AN A.R.I. MODEL NO. D-020.
- INSTALL A 6-INCH FLANGED DUCTILE IRON SPRING LOADED CHECK VALVE. THE CHECK VALVE SHALL BE A MUELLER MODEL NO. A-2602-6-02 OR AN APPROVED EQUAL.
- INSTALL A 6-INCH FLANGED RESILIENT WEDGE GATE VALVE WITH HAND WHEEL OPERATOR. THE RESILIENT WEDGE GATE VALVE SHALL BE A MUELLER MODEL NO. A-2360-6 OR AN APPROVED EQUAL.
- INSTALL A 6-INCH FLANGED DUCTILE IRON 45 DEGREE ELBOW.
- INSTALL A 6-INCH FLANGED DUCTILE IRON TRUE WYE.
- INSTALL ADJUSTABLE STEEL PIPE SUPPORTS. WELD A 6-INCH X 6-INCH X 1/4-INCH STEEL PLATE TO THE BASE OF THE PIPE SUPPORT VERTICAL MEMBER. SECURE THE STEEL PLATE TO THE CONCRETE FLOOR OR PIPE SUPPORT PCC FOUNDATION SLAB WITH FOUR (4) 3/8-INCH DIAMETER, 6-INCH LONG EXPANSION BOLTS.
- INSTALL TWO (2) 7.5-HORSEPOWER, 1750 RPM, 480 VOLT, 3-PHASE, 60-HERTZ GRINDFOS SL 40.A40.75 EX.4.61R.C. SUBMERSIBLE PUMPS, OR AN APPROVED EQUAL. SUBMERSIBLE PUMPS SHALL BE SUPPLIED WITH STAINLESS STEEL SLIDE RAIL ASSEMBLY, STAINLESS STEEL LIFTING CABLES, BREAKAWAY 90-DEGREE DISCHARGE ELBOW AND ALL ACCESSORIES. THE PUMP SLIDE RAIL ASSEMBLY, STAINLESS STEEL LIFT CABLES, BREAKAWAY DISCHARGE ELBOW AND ALL ACCESSORIES SHALL BE SUPPLIED BY A SINGLE MANUFACTURER. EACH PUMP SHALL DELIVER 410 GALLONS PER MINUTE AT 33 FEET OF TOTAL DYNAMIC HEAD. SECURE THE 90-DEGREE DISCHARGE ELBOW TO THE CONCRETE PEDESTAL WITH 316 STAINLESS STEEL BOLTS OF AN APPROPRIATE DIAMETER SIZE AS DESIGNATED BY THE MANUFACTURER. THE DISCHARGE ELBOW SHALL BE LEVELED IN BOTH HORIZONTAL DIRECTIONS TO INSURE THAT THE SLIDE BARS AND VERTICAL DISCHARGE PIPELINE ARE MAINTAINED IN A PLUMB CONDITION AND COINCIDE AND FIT APPROPRIATELY WITH THE ALUMINUM ACCESS FRAME. THE STAINLESS STEEL LIFTING CABLES SHALL BE CAPABLE OF SUPPORTING TWO (2) TIMES THE WEIGHT OF THE PUMP DESIGNATED BY THE PUMP MANUFACTURER. THE STAINLESS STEEL SLIDE RAIL PIPES SHALL BE OF A DIAMETER SIZE REQUIRED BY THE MANUFACTURER. SUPPORT THE GUIDE RAILS WITH INTERMEDIATE SUPPORT BRACKETS AT A POSITION HALF WAY BETWEEN THE PUMP AND THE TOP OF THE WET WELL. ALL PUMP ASSEMBLY HARDWARE SHALL BE COMPOSED OF 316 STAINLESS STEEL.
- CAST A 3-INCH DIA. SCHEDULE 40 PVC CONDUIT WITHIN THE WET WELL ROOF CONCRETE SLAB BETWEEN THE ELECTRICAL PANEL AND ELECTRICAL JUNCTION BOX. INSTALL DUCT SEAL IN THE ANNULAR VOID OF THE INTERIOR CONDUIT SLEEVE TO "SEAL OFF" THE WET WELL GASES FROM ACCESSING THE MOTOR CONTROL CENTER.
- INSTALL THE "SO" RUBBER CORD CABLE SUPPLIED WITH THE PUMPS TO THE JUNCTION BOX AT THE TOP OF THE WET WELL. THE "SO" RUBBER CORD CABLE SHALL CONTINUE TO BE EXTENDED FROM THE ELECTRICAL JUNCTION BOX TO THE PUMP MOTOR CONTROL CENTER WITH NO SPLICES OCCURRING ALONG THE LENGTH OF THE "SO" RUBBER CORD CABLE. SUPPORT THE "SO" RUBBER CORD CABLE WITH STAINLESS STEEL KELLUMS GRIP AT THE TOP OF THE PUMP STATION WET WELL CEILING.
- CAST A NEMA 4 APPLETON SERIES WYR-121212 12" X 12" X 12" CAST IRON ELECTRICAL JUNCTION BOX OR AN APPROVED EQUAL LEVEL WITH THE P.C.C. SLAB. PLACE NON-FERROUS WATER TIGHT GROMMETS AT THE INTERIOR BASE OF THE PULBOX TO SECURE THE MERCURY FLOAT CABLES FOR THE CONTROL CIRCUITRY AND "SO" RUBBER CORD CABLES FOR THE POWER CIRCUITRY.
- INSTALL FOUR (4) SEPARATE RUBBER CORD ELECTRICAL CABLES IN A 2-INCH SCHEDULE 40 PVC CONDUIT FROM THE ELECTRICAL JUNCTION BOX TO THE MOTOR CONTROL CENTER.
- INSTALL FOUR (4) SJE-RHOMBUS MERCURY TYPE PVC FLOAT SWITCHES WITH 90 FEET OF SJTO-VIA RUBBER CORD CABLE. THE POLYPROPYLENE SENSORS SHALL BE SUPPLIED WITH WEIGHTS. EXTEND THE POLYPROPYLENE LIQUID LEVEL SENSOR CONDUCTORS TO THE APPROPRIATE ELECTRICAL TERMINATION POINT. NO SPLICES OF THE CABLE SHALL BE ALLOWED FROM THE POLYPROPYLENE LIQUID LEVEL SENSOR TO THE POINT OF TERMINATION WITHIN THE MOTOR CONTROL CENTER.
- BOLT A 12-GAUGE STAINLESS STEEL STRUT MEMBER TO THE ALUMINUM ACCESS COVER WITH STAINLESS STEEL BOLTS. SECURE A 2-INCH SCHEDULE 80 PVC PIPE SUPPORT MEMBER TO THE STRUT MEMBER WITH STAINLESS STEEL PIPE SUPPORT STRAPS. THE MERCURY FLOATS SHALL BE ATTACHED TO THE 2-INCH SCHEDULE 80 PVC SUPPORT PIPE MEMBER AND BE CONSTRUCTED FOR EASY REMOVAL FROM THE WET WELL FOR MAINTENANCE PURPOSES.
- PLACE THE VERTICAL 4-INCH PIPELINE THROUGH A 10" AWWA C-900 PVC PIPE SLEEVE PLACED THROUGH THE FULL DEPTH OF THE WET WELL CEILING. PLACE P.C.C. NON-SHRINK GROUT WITHIN THE VOID BETWEEN THE PIPE SLEEVE AND DUCTILE IRON PIPELINE LEVEL WITH THE BOTTOM AND TOP OF THE P.C.C. WET WELL ROOF SLAB.
- INSTALL THE 8-INCH DIAMETER AWWA C-900 DR21 PUMP STATION OVERFLOW PIPELINE AND 12" DIAMETER AWWA C-900, DR 18 PVC INFLUENT PIPELINE THROUGH THE PCC WET WELL WALL PER PENETRATION DETAIL DD ON PLAN SHEET 26.
- INSTALL THE 12-INCH DIAMETER AWWA C-900, DR 18 PVC SANITARY SEWER EFFLUENT PIPELINE FROM THE POINT OF CONNECTION AT THE EXISTING 12-INCH DIAMETER EFFLUENT PIPELINE NORTH OF THE EXISTING SAMPLING FLOW METER STRUCTURE. INSTALL THE SANITARY SEWER PIPELINE PER TRENCH DETAIL TT ON SHEET 42 OF THE IMPROVEMENT PLANS.
- INSTALL 8-INCH DIAMETER AWWA C-900 DR21 PVC EMERGENCY OVERFLOW PIPELINE PER PLAN AND PROFILE SHEET 21 AND TRENCH DETAIL CC ON SHEET 26.
- INSTALL MIRAFI 600X GEOTEXTILE FABRIC BENEATH THE ROCK. LAP THE FABRIC 48 INCHES.
- INSTALL A 6-INCH DIAMETER AWWA C-900, DR18 PVC PIPELINE.
- INSTALL A 6-INCH DIAMETER AWWA C-900, CLASS 150 PVC VERTICAL VENT PIPELINE FLUSH WITH THE INTERIOR SURFACE OF THE WET WELL SLAB. PLACE A RING TIGHT PVC COVER OVER THE TOP OF THE PIPE. DRILL CIRCUMFERENTIAL ROWS OF 1/2 INCH DIAMETER HOLES 6 INCHES ON CENTER AROUND THE CIRCUMFERENCE OF THE PIPELINE. THE VERTICAL DISTANCE BETWEEN THE HORIZONTAL ROWS SHALL MEASURE 6 INCHES.
- INSTALL A 18-INCH X 18-INCH, 45 DEGREE CEMENT GROUT FILLET ALONG THE INTERIOR BASE PERIMETER WALLS OF THE WET WELL.
- INSTALL A 6-INCH DIAMETER, CLASS 53 DUCTILE IRON PIPE. THE LENGTH OF PIPE TO BE VERIFIED AND FIELD MODIFIED BY CONTRACTOR AS REQUIRED.
- INSTALL A 6-INCH DUCTILE IRON EPOXY COATED TRANSITION COUPLING WITH 316 STAINLESS STEEL HARDWARE. THE TRANSITION COUPLING SHALL BE A SMITH-BLAIR MODEL NO. 461-06540765-031 OR AN APPROVED EQUAL.
- INSTALL A 6-INCH MECHANICAL JOINT, 45 DEGREE DUCTILE IRON ELBOW WITH 316 STAINLESS STEEL HARDWARE.
- INSTALL A 6-INCH DUCTILE IRON RESTRAINED JOINT FITTING WITH 316 STAINLESS STEEL HARDWARE.
- INSTALL 1.5' X 1.5' X 1" P.C.C. PIPE SUPPORT FOUNDATION SLAB OVER 1 FOOT OF CLASS 2 BASE COMPACTED TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D1557.
- AT THE CONCLUSION OF THE PUMP STATION CONSTRUCTION PLACE 6 INCHES OF NATIVE MATERIAL OVER SAND BACKFILL SURFACES ON ALL SIDES OF THE PUMP STATION TO THE FINISH SURFACE. COMPACT THE NATIVE MATERIAL TO 85 PERCENT MAXIMUM DENSITY PER ASTM D1557.

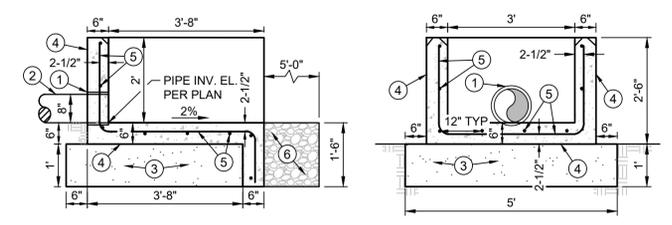
REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:	DATE	PROJECT TITLE
			JAMES G. JACK HOLT 10/18/2023 DATE	JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	10/18/2023 62028 R.C.E. No.	COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS EVAPORATION/ INFILTRATION POND PUMP STATION SECTION
					12/31/24 REG. EXP.	THG #542.089 SHEET 25 OF 50

C:\Users\casero\HOLT\LEGION\WINThe\Holt Group\542.089 - 542.08904 - CAD & PDF DRAWING\542.089 - 542.08904 - SHEET 25 - Evaporation Pond Pump Station Section.dwg 12/18/2023 10:27



**DETAIL AA KEYNOTES**

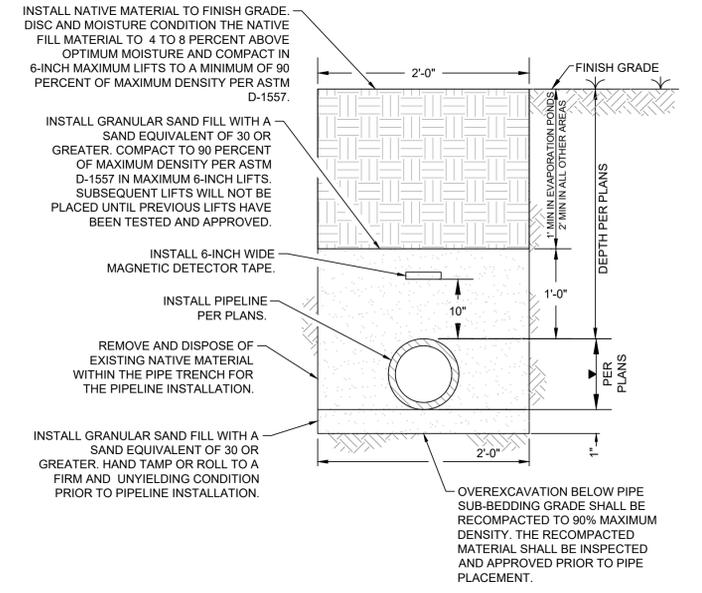
- 1 INSTALL NATIVE MATERIAL TO FINISH GRADE AS ILLUSTRATED ON SHEET 15 OF THE IMPROVEMENT PLANS.
- 2 INSTALL 3/4" MAXIMUM CRUSHED ROCK.
- 3 INSTALL REINFORCED 4-FOOT INSIDE DIAMETER PRE-CAST CONCRETE STAND PIPE BASE.
- 4 INSTALL REINFORCED 4-FOOT INSIDE DIAMETER PRE-CAST CONCRETE STAND PIPE SHAFT.
- 5 COAT ALL INTERIOR CONCRETE SURFACES OF THE WET WELL WITH A RAVEN 405 HIGH BUILD EPOXY COATING SYSTEM. THE COATING SHALL BE APPLIED PER MANUFACTURER'S RECOMMENDATIONS.
- 6 INSTALL CEMENT GROUT AT THE INTERIOR BOTTOM OF THE WET WELL. PLACE THE CEMENT GROUT AT A 2 PERCENT SLOPE IN THE DIRECTION OF THE NEW 8-INCH EFFLUENT HEADER PIPE. THE LOWER EDGE OF THE CEMENT GROUT SLOPE SHALL BE INSTALLED FLUSH WITH THE 8-INCH EFFLUENT HEADER PIPE INVERT.
- 7 INSTALL 6-INCH DIAMETER CLASS 53 DUCTILE IRON FLANGED SPOOL.
- 8 INSTALL 6-INCH DIAMETER DUCTILE IRON FLANGED 90-DEGREE ELBOW WITH STAINLESS STEEL HARDWARE.
- 9 INSTALL 6-INCH DIAMETER DUCTILE IRON FLANGED COUPLING ADAPTER WITH STAINLESS STEEL HARDWARE.
- 10 INSTALL P.C.C. THRUST BLOCK PER DETAIL EE ON SHEET 26.
- 11 INSTALL 6-INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT FORCE MAIN PER PLAN SHEET 21 AND TRENCH DETAIL CC ON SHEET 26.
- 12 INSTALL 8-INCH DIAMETER AWWA C-900, DR 18 PVC EFFLUENT HEADER PIPELINE PER TRENCH DETAIL CC ON PLAN SHEET 26. SEE GRADING PLAN SHEETS 15-17 AND SECTION E-E ON SHEET 20 FOR PIPELINE INVERT ELEVATIONS.
- 13 INSTALL THE PIPELINE THROUGH THE NEW P.C.C. WET WELL WALL PER PENETRATION DETAIL DD ON SHEET 26.
- 14 INSTALL A BUTYL BLACK MAJESTIC ROPE BETWEEN THE PRECAST SHAFT COLD JOINT SECTIONS. INSTALL A NON-SHRINK GROUT IN THE INTERSTITIAL VOIDS ON THE COLD JOINTS AT THE INTERIOR AND EXTERIOR WALLS.
- 15 INSTALL STAINLESS STEEL PIPE SUPPORT BRACKETS SECURED TO THE PRECAST CONCRETE STAND PIPE SHAFT WITH 316 STAINLESS STEEL HARDWARE.
- 16 INSTALL 12 INCHES OF CLASS 2 BASE MATERIAL. COMPACT THE CLASS 2 BASE MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 17 INSTALL NATIVE MATERIAL TO CONSTRUCT POND EMBANKMENTS PER SHEET 15.



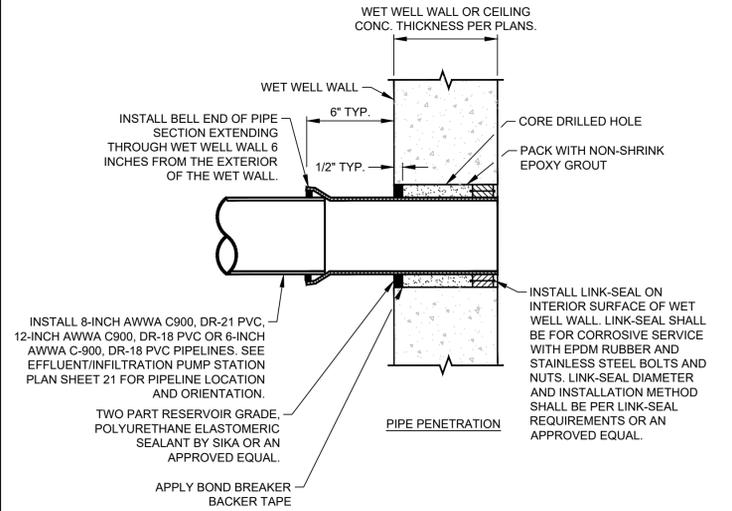
- 1 INSTALL THE COUPLING OF AN 8-INCH DIAMETER AWWA C-900, DR18 PVC PIPE FLUSH WITH THE INSIDE FACE OF THE CONCRETE HEADWALL STRUCTURE. THE COUPLING SHALL BE INSTALLED WITHIN THE FORMWORK PRIOR TO THE INSTALLATION OF THE CONCRETE. THE INVERT OF THE PIPE SHALL BE PLACED FLUSH WITH THE HEADWALL SLAB.
- 2 INSTALL 8-INCH DIAMETER AWWA C-900, DR18 PVC HEADER PIPELINE PER TRENCH DETAIL C ON SHEET 26 AND DETAILS UU AND VV ON PLAN SHEET 42. EXCEPT THE PIPE TRENCH MATERIAL FROM THE TOP OF POND TOP OF SLOPE TO THE PCC HEADWALL SHALL BE NATIVE EARTH AND BE COMPACTED TO 90 PERCENT OF MAXIMUM DENSITY PER ASTM D 1557.
- 3 INSTALL 12-INCHES OF CLASS 2 BASE MATERIAL BENEATH THE HEADWALL STRUCTURE. COMPACT THE CLASS 2 BASE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 4 CONSTRUCT THE REINFORCED P.C.C. SLAB AND WALLS OF THE HEADWALL STRUCTURE. THE TOPS OF ALL CONCRETE WALLS SHALL BE CHAMFERED ON BOTH SIDES AND ALL SURFACES SHALL BE GIVEN A SMOOTH TROWELED FINISH.
- 5 PLACE #4 REINFORCING BARS 12 INCHES ON CENTER BOTH WAYS.
- 6 INSTALL A 6-FOOT WIDE X 5-FOOT LONG X 1.5-FOOT DEEP, 3-INCH DIAMETER COBBLE ROCK DISSIPATION MATERIAL. INSTALL A NON-WOVEN GEOTEXTILE FABRIC ALONG THE SIDES AND BOTTOM OF THE 3-INCH COBBLES. THE NON-WOVEN GEOTEXTILE FABRIC SHALL BE MIRAFI 600X OR AN APPROVED EQUAL.

EVAPORATION/INFILTRATION POND PCC STAND PIPE DETAIL AA  
NOT TO SCALE 15 26

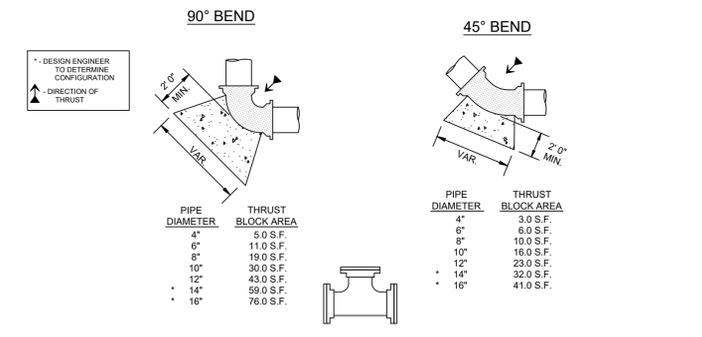
EVAPORATION/INFILTRATION POND P.C.C. OUTLET STRUCTURE DETAIL BB  
NOT TO SCALE 15-17 26



6-INCH EFFLUENT FORCE MAIN AND 8-INCH DISCHARGE HEADER PIPELINE TRENCH DETAIL CC  
NOT TO SCALE 4, 15-17, 25 26

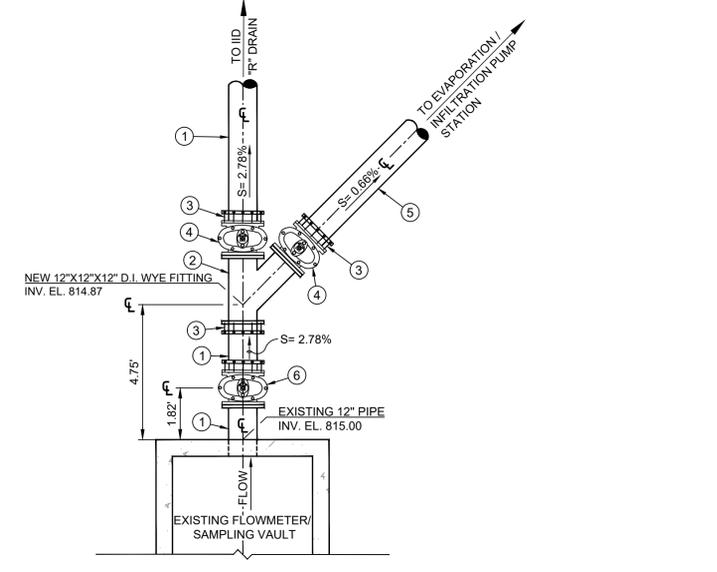


PUMP STATION WET WELL AND STAND PIPE PIPELINE PENETRATION DETAIL DD  
NOT TO SCALE 15 26



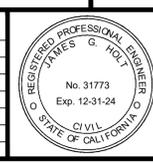
- GENERAL NOTES:**
1. BEARING AREAS MAY BE INCREASED AT THE OPTION OF THE COUNTY OF IMPERIAL IF SOIL BEARING PRESSURE IS LESS THAN 1,000 P.S.F.
  2. APPROVED COMPACTED BACKFILL MAY BE REQUIRED BY THE COUNTY OF IMPERIAL TO IMPROVE THRUST BLOCK BEARING AREA.
  3. ANY METAL COMPONENT WHICH IS NOT STAINLESS STEEL OR BRONZE SHALL BE WRAPPED WITH A 10 MIL. POLYETHYLENE PLASTIC SHEETING MATERIAL BEFORE CONCRETE PLACEMENT OR BURIAL.
  4. UNLESS OTHERWISE NOTED, THRUST BLOCK BEARING FORCES SHALL BE POURED AGAINST UNDISTURBED SOIL OR APPROVED COMPACTED BACKFILL.
  5. AFTER THE TRENCH HAS BEEN BACKFILLED TO THE TOP OF THE PIPE, AREAS TO BE OCCUPIED BY THRUST BLOCKS SHALL BE RE-EXCAVATED AND SHAPED. AFTER SHAPING, SIMPLE PLYWOOD OR BOX WOOD FORMS SHALL BE INSERTED ADJACENT TO THE VERTICAL NON-PRESSURE BEARING SIDES OF THE MOLD. COUNTY OF IMPERIAL INSPECTION OF THE MOLD FORM MUST BE OBTAINED PRIOR TO CASTING THE CONCRETE THRUST BLOCK.
  6. THE CONCRETE THRUST BLOCK IS TO BE CAST IN SUCH A MANNER AS TO CRADLE THE FITTING. CONCRETE ENCASUREMENT SHALL BE PERPENDICULAR TO THE LINE OF THRUST. CONCRETE SHALL NOT CONTACT THE PIPE.
  7. ALL FITTING HARDWARE SHALL REMAIN EXPOSED AFTER THE CONCRETE THRUST BLOCK PLACEMENT TO ALLOW FREE ACCESS FOR REMOVAL AND REPLACEMENT OF THE HARDWARE AS REQUIRED.
  8. CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS CURING.

P.C.C. THRUST BLOCK DETAIL EE  
NOT TO SCALE 15 26



EVAPORATION / INFILTRATION PUMP STATION INFLUENT PIPELINE VALVE AND FITTING DETAIL FF  
SCALE 1" = 3" 6,21,24 26

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
 JAMES G. "JACK" HOLT  
 10/18/2023 DATE  
 31773 R.C.E. No.  
 12/31/24 REG. EXP.



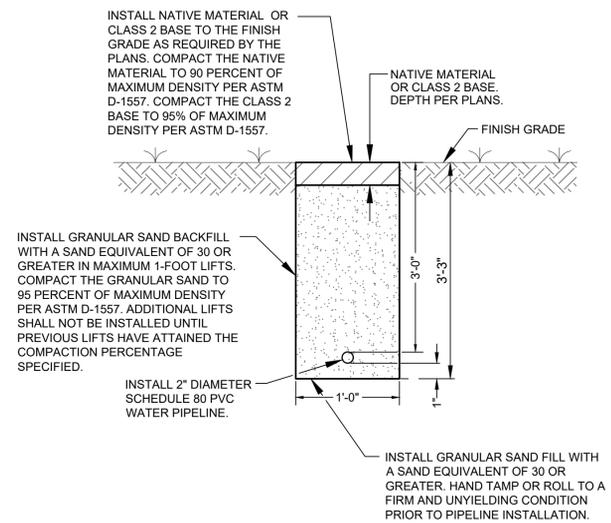
COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
 JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS  
 DATE  
 62028 R.C.E. No.  
 09/30/25 REG. EXP.

PUBLIC WORKS DEPARTMENT  
**COUNTY OF IMPERIAL**  
 EL CENTRO, CALIFORNIA

DATE 10/18/2023  
 DRAWN RS  
 DESIGNED RS  
 SCALE N/A  
 CHECKED JGH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
**EVAPORATION/INFILTRATION POND  
 DETAILS**

REFERENCE THG #542.089  
 SHEET 26 OF 50

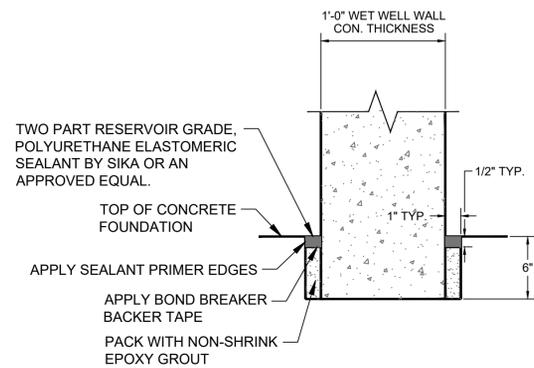


POTABLE WATER SERVICE PIPELINE DETAIL

NOT TO SCALE

GG

24 27

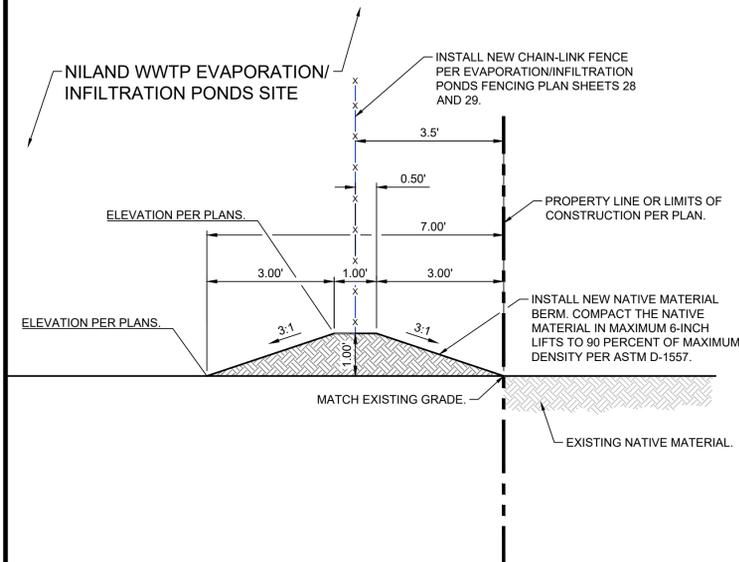


FOUNDATION BLOCKOUT DETAIL

NOT TO SCALE

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25 27



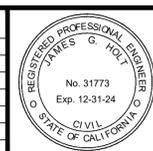
STORM WATER DRAINAGE BERM DETAIL

NOT TO SCALE

II

15-17 27

REVISION	DATE	COMMENTS

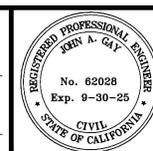


PREPARED UNDER THE DIRECT SUPERVISION OF:

JAMES G. "JACK" HOLT

31773 R.C.E. No.

12/31/24 REG. EXP.



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT

APPROVED FOR CONSTRUCTION BY:

JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS

62028 R.C.E. No.

09/30/25 REG. EXP.

PUBLIC WORKS DEPARTMENT

COUNTY OF IMPERIAL

EL CENTRO, CALIFORNIA

PROJECT TITLE	
COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS	
DATE	10/18/2023
DRAWN	RS
DESIGNED	RS
SCALE	N/A
CHECKED	JCH

REFERENCE	
THG #542.089	
SHEET	27 OF 50

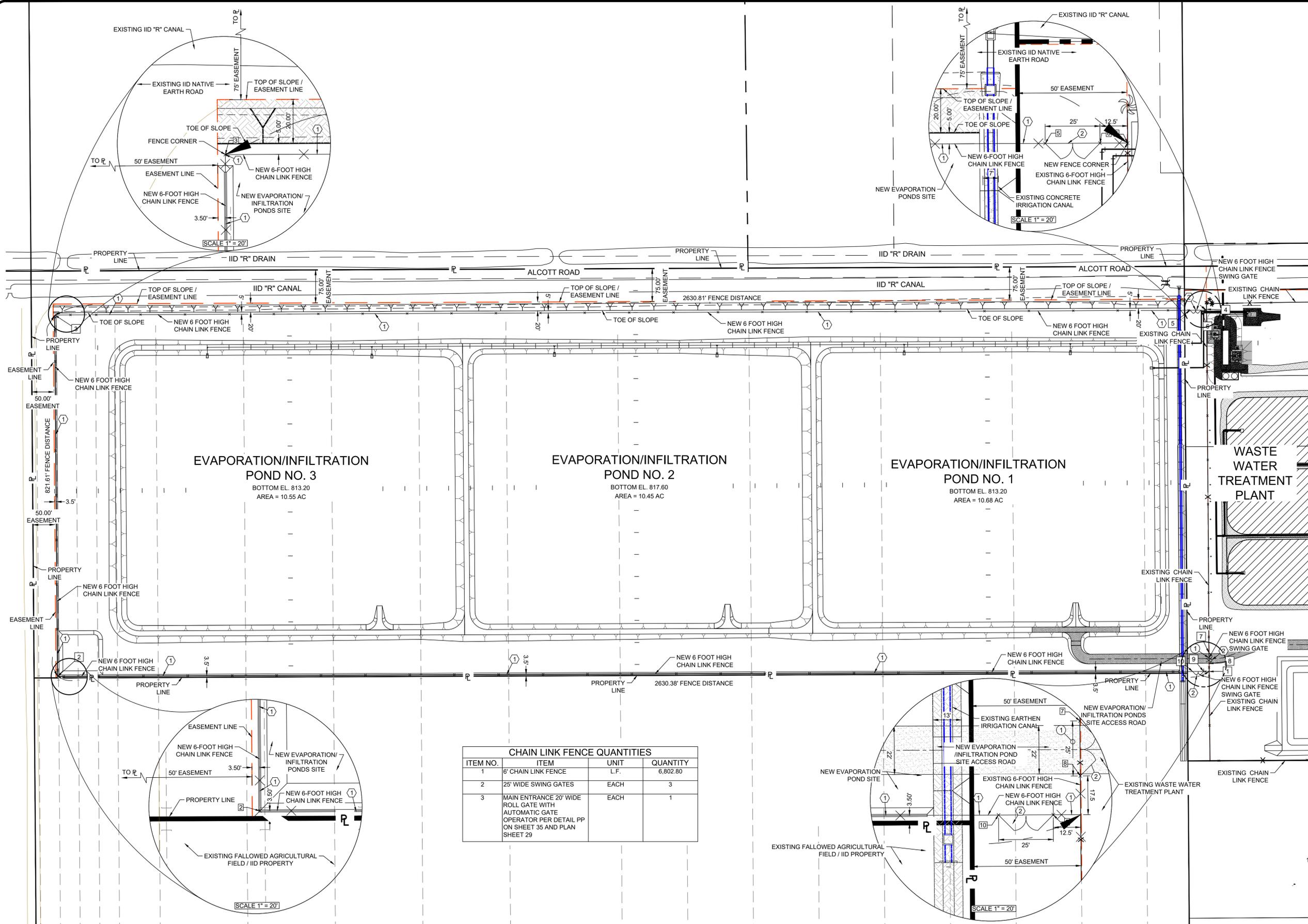
**DEMOLITION KEYNOTES**

- ① REMOVE AND DISPOSE OF EXISTING CHAIN LINK FENCE

**CONSTRUCTION KEYNOTES**

- ① INSTALL NEW CHAINLINK FENCE PER PLAN SHEET 29.
- ② INSTALL NEW 25-FOOT WIDE DOUBLE SWING GATE PER DETAIL B ON SHEET 29.

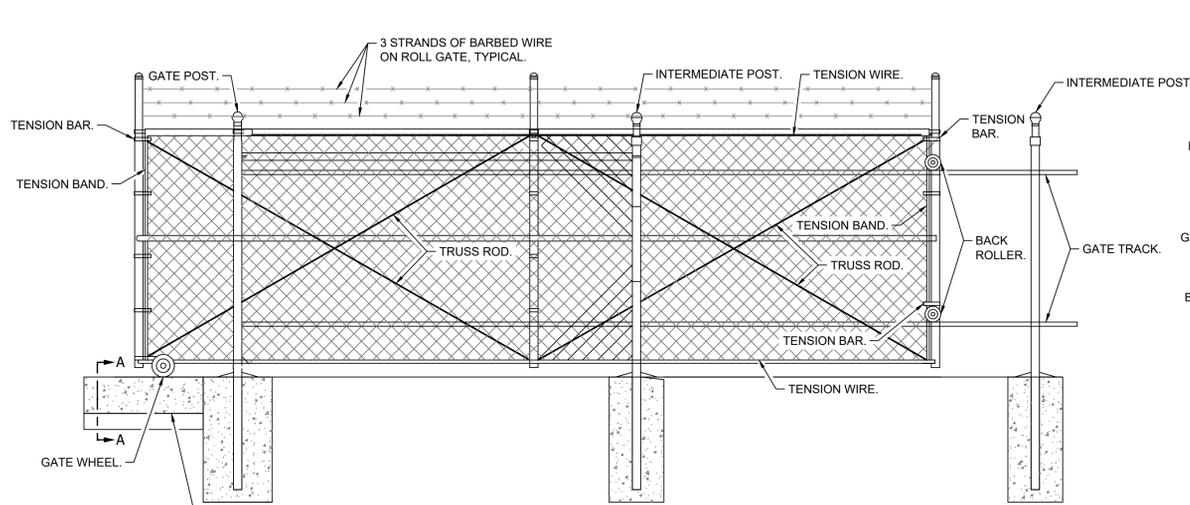
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Point #	Northing	Easting	Description
2	2026180.68	6779958.16	FNC COR
3	2027002.26	6779951.84	FNC COR
4	2027013.23	6782582.63	FNC COR
5	2027013.07	6782544.96	GATE POST
6	2027013.18	6782569.96	GATE POST
7	2026234.34	6782588.15	GATE POST
8	2026209.37	6782588.37	GATE POST
9	2026191.70	6782576.02	GATE POST
10	2026191.60	6782551.04	GATE POST



CHAIN LINK FENCE QUANTITIES			
ITEM NO.	ITEM	UNIT	QUANTITY
1	6" CHAIN LINK FENCE	L.F.	6,802.80
2	25' WIDE SWING GATES	EACH	3
3	MAIN ENTRANCE 20' WIDE ROLL GATE WITH AUTOMATIC GATE OPERATOR PER DETAIL PP ON SHEET 35 AND PLAN SHEET 29	EACH	1

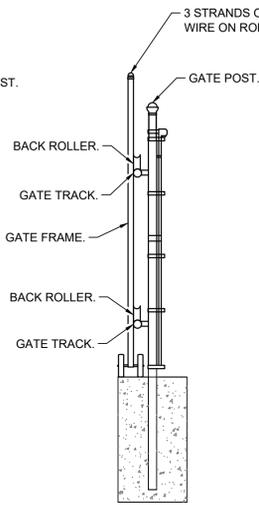
REVISION	DATE	COMMENTS		PREPARED UNDER THE DIRECT SUPERVISION OF: JAMES G. "JACK" HOLT 10/18/2023 DATE	31773 R.C.E. No. 12/31/24 REG. EXP.		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY: JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	62028 R.C.E. No. 09/30/25 REG. EXP.	PUBLIC WORKS DEPARTMENT <b>COUNTY OF IMPERIAL</b> EL CENTRO, CALIFORNIA	DATE: 10/18/2023 DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JGH	PROJECT TITLE COUNTY OF IMPERIAL NINLAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS <b>EVAPORATION/INFILTRATION                  POND FENCING PLAN</b>	REFERENCE THG #542.089 SHEET <b>28</b> OF <b>50</b>
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C:\Users\rsanchez\OneDrive\Desktop\18-2023 - Set of Plans\542.089 - SHEET 28 - Evap Ponds Fencing Plan.dwg 11/07/2023 10:24

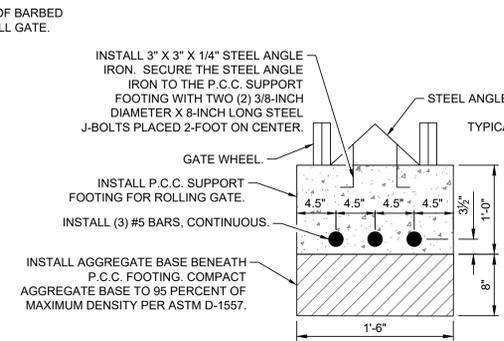


INSTALL 1-FOOT DEEP P.C.C. ROLL GATE FOOTING OVER EIGHT INCHES OF AGGREGATE BASE COMPACTED TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. THE CONTRACTOR SHALL PROVIDE AN INVERTED ANGLE IRON WITH ATTACHED "L" SHAPED ANCHORS EMBEDDED IN THE P.C.C. FOOTING FOR EACH ROLLING GATE SECTION OR AN APPROVED EQUAL. SEE SECTION A-A ON THIS PLAN SHEET.

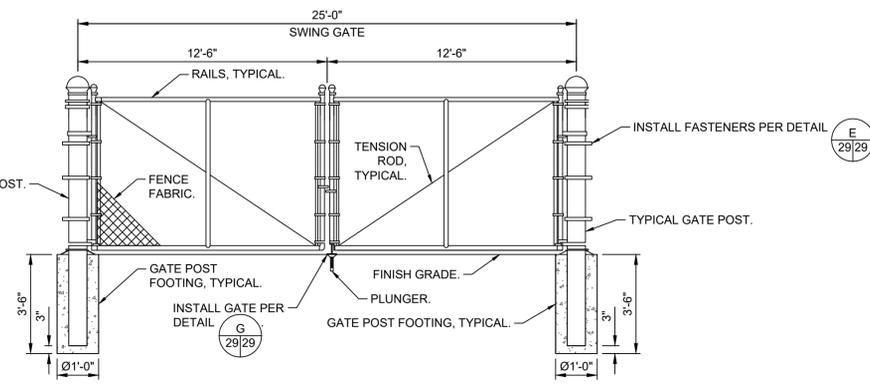
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NOT TO SCALE



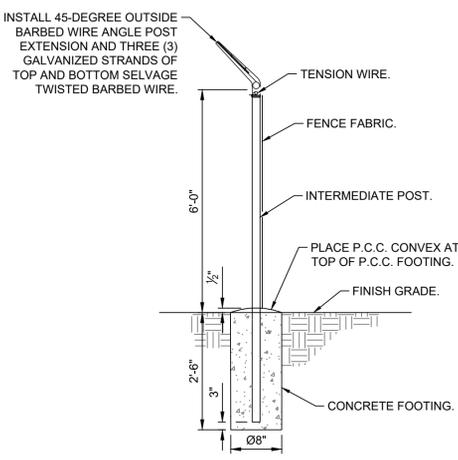
**SIDE VIEW**  
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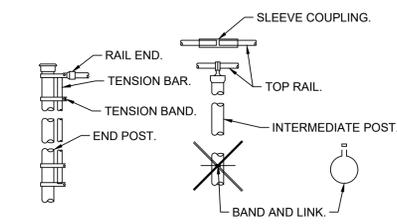
**SECTION A-A**  
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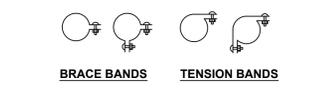
**DOUBLE SWING GATE DETAIL**  
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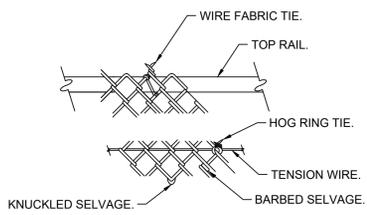
**INTERMEDIATE POST SECTION, TYPICAL**  
NOT TO SCALE



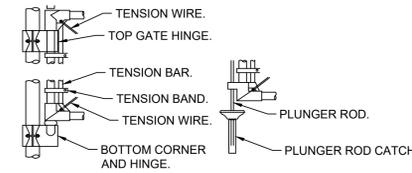
**ENLARGED POST DETAILS**  
NOT TO SCALE



**ENLARGED FASTENER DETAILS**  
NOT TO SCALE



**ENLARGED FABRIC DETAIL**  
NOT TO SCALE



**ENLARGED GATE DETAILS**  
NOT TO SCALE

**MATERIALS SCHEDULE FOR FENCING:**

DESCRIPTION	SIZE
I. FABRIC	2" MESH, #9 GAUGE
II. RAILS, POSTS, AND GATES	
A. END, CORNER, AND PULL POSTS	2 1/2" O.D. @ 2.72 LB/FT
B. INTERMEDIATE POSTS	2 1/2" O.D. @ 2.23 LB/FT
C. RAILS	1 1/2" @ 1.65 LB/FT
D. GATE POSTS	4" O.D. @ 7.85 LB/FT
E. GATE FRAMES	1 1/2" TUBULAR MATERIAL
III. TENSION BARS	1/2" X 3/4"
IV. TENSION WIRE	#9 GAUGE
V. FOOTINGS	
A. END, CORNER, AND PULL POSTS	12" O.D. X 42" DEEP
B. INTERMEDIATE POSTS	8" O.D. X 30" DEEP
C. GATE POSTS	12" O.D. X 42" DEEP
D. CONCRETE	FOOTINGS SHALL CONSIST OF 7 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE AND SHALL ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS OF CURING.

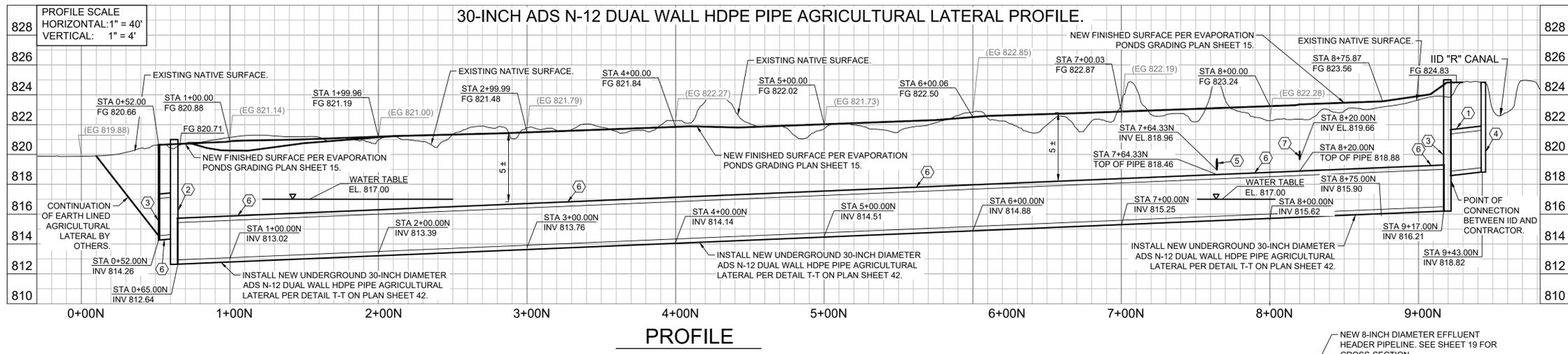
**FENCING NOTES:**

- GRADING OF THE GROUND ALONG THE FENCE TO ASSURE A UNIFORM GRADE ALONG THE LENGTH OF THE FENCE SHALL BE ACCOMPLISHED BY THE CONTRACTOR PRIOR TO POST PLACEMENT.
- THE CHAIN LINK FENCE FABRIC SHALL BE NO. 9 GAUGE STEEL WIRE, 2 INCH MESH, SIX (6) FEET HIGH AND SHALL BE GALVANIZED AFTER WEAVING. IT SHALL BE FASTENED TO THE LINE POSTS BY MEANS OF SUITABLE GALVANIZED CLIPS AT INTERVALS OF NOT MORE THAN TWO (2) FEET AND FASTENED TO THE END, CORNER AND GATE POSTS BY MEANS OF ADJUSTABLE CLAMPS AT INTERVALS NOT TO EXCEED 15 INCHES AND AT TENSION BARS.
- FABRIC SHALL CONFORM TO ASTM STANDARD A-392, EXCEPT THAT IT SHALL WITHSTAND SIX (6) DIPS OF ONE (1) MINUTE EACH BY THE PRECEE TEST (ASTM A-239).
- PIPE SHALL CONFORM TO ASTM STANDARD A-120.
- THE CHAIN LINK FABRIC SHALL BE ATTACHED TO THE TENSION WIRE AT INTERVALS OF NOT MORE THAN (2) FEET. TENSION WIRE SHALL CONFORM TO ASTM STANDARD A-112. THE CHAIN LINK GATES TO BE FURNISHED AND INSTALLED SHALL BE JOINED AT THE CORNERS BY ARC WELDING TO FORM A SOLID PANEL, AND SHALL BE SUITABLY BRACED TO PREVENT SAGGING. THE FABRIC SHALL BE THE SAME AS SPECIFIED FOR THE FENCE AND IT SHALL BE FASTENED TO THE FRAME BY MEANS OF ADJUSTABLE CLAMPS AND TENSION RODS. THE GATES SHALL BE EQUIPPED WITH SUITABLE HINGES AND COMBINATION CATCHES AND LOCKING OF APPROVED DESIGN.
- EXCEPT WHERE OTHERWISE SPECIFIED, ALL PARTS OF THE FENCE, GATES AND PIPE CLAMPS ARE TO BE GALVANIZED THROUGHOUT WITH HOT DIP GALVANIZING IN CONFORMANCE WITH "STANDARD SPECIFICATIONS OF ZINC (HOT GALVANIZED) COATINGS ON STRUCTURAL STEEL SHAPES, PLATES, BARS AND THEIR PRODUCTS" (ASTM A-123), AND WITHSTANDING SIX (6) ONE MINUTE IMMERSIONS BY THE PRECEE TEST (ASTM A-239-44).
- GATES MAY BE GALVANIZED AFTER FABRICATION OR FABRICATED FROM GALVANIZED PARTS, IN WHICH CASE THE WELDS SHALL BE PROTECTED BY AN APPROVED METHOD THAT WILL MEET THE REQUIREMENTS OF THE PRECEE TEST REFERENCED ABOVE. POSTS SHALL BE SET PLUMB AND SHALL BE CENTERED IN THE CONCRETE ENCASEMENT.
- THE TOP SURFACES OF THE CONCRETE ENCASEMENT SHALL BE SLOPED OUTWARD TO SHED WATER AND SHALL HAVE A NEAT APPEARANCE. ANY GALVANIZED COATING DAMAGED DURING CONSTRUCTION OF THE FENCING SHALL BE CORRECTED BY THE CONTRACTOR AT HIS OWN EXPENSE.
- AFTER THE FENCE IS INSTALLED, THE CONTRACTOR SHALL COLLECT ALL DEBRIS RESULTING FROM THE FENCE INSTALLATION AND REMOVE IT FROM THE PROJECT SITE.
- THE GROUND ON EACH SIDE OF THE FENCE SHALL BE LEVELLED EVEN WITH THE EXISTING GRADE FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE FENCE UNLESS PROHIBITED BY OTHER PHYSICAL ITEMS.
- A SUITABLE LOCK MECHANISM FOR THE SWING GATES SHALL BE PROVIDED. THE LOCK MECHANISM SHALL BE PROVIDED WITH A GATE LOCK AND SIX KEYS FOR THE LOCK. LOCK MECHANISM SHALL BE APPROVED DURING SUBMITTAL PROCESS.

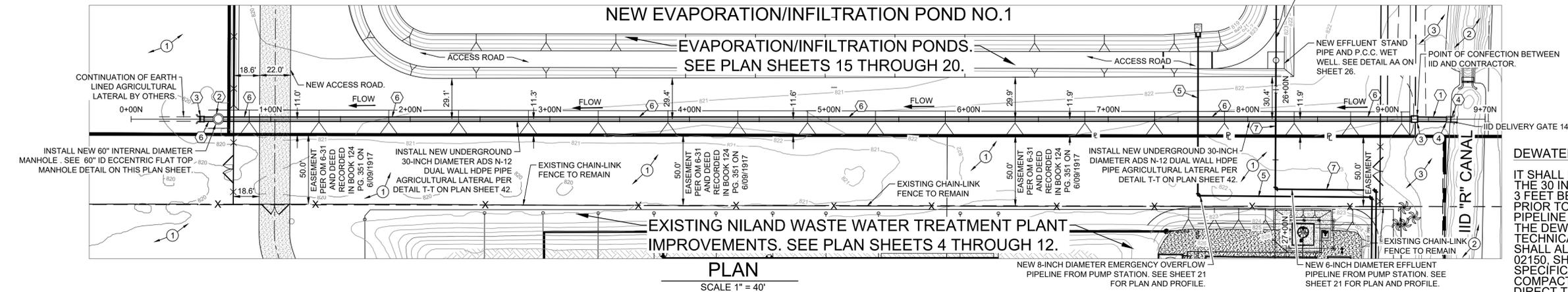
**ROLL GATE REQUIREMENTS:**

- SEE CONSTRUCTION KEYNOTE 20 ON PLAN SHEET 4 AND DETAIL PP ON PLAN SHEET 35 REGARDING ROLL GATE REQUIREMENTS.

<table border="1"> <thead> <tr> <th>REVISION</th> <th>DATE</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISION	DATE	COMMENTS														<p>PREPARED UNDER THE DIRECT SUPERVISION OF:</p> <p><i>James G. Holt</i> JAMES G. HOLT 10/18/2023 DATE</p>	<p>31773 R.C.E. No.</p> <p>12/31/24 REG. EXP.</p>		<p>COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:</p> <p>JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS</p> <p>DATE</p>	<p>62028 R.C.E. No.</p> <p>09/30/25 REG. EXP.</p>	<p>PUBLIC WORKS DEPARTMENT <b>COUNTY OF IMPERIAL</b> EL CENTRO, CALIFORNIA</p>	<p>DATE: 10/18/2023</p> <p>DRAWN: RS</p> <p>DESIGNED: RS</p> <p>SCALE: N/A</p> <p>CHECKED: JGH</p>	<p>PROJECT TITLE</p> <p><b>COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS</b></p> <p><b>EVAPORATION / INFILTRATION POND FENCING DETAILS</b></p>	<p>REFERENCE</p> <p>THG #542.089</p>	<p>SHEET</p> <p>29 OF 50</p>
REVISION	DATE	COMMENTS																								

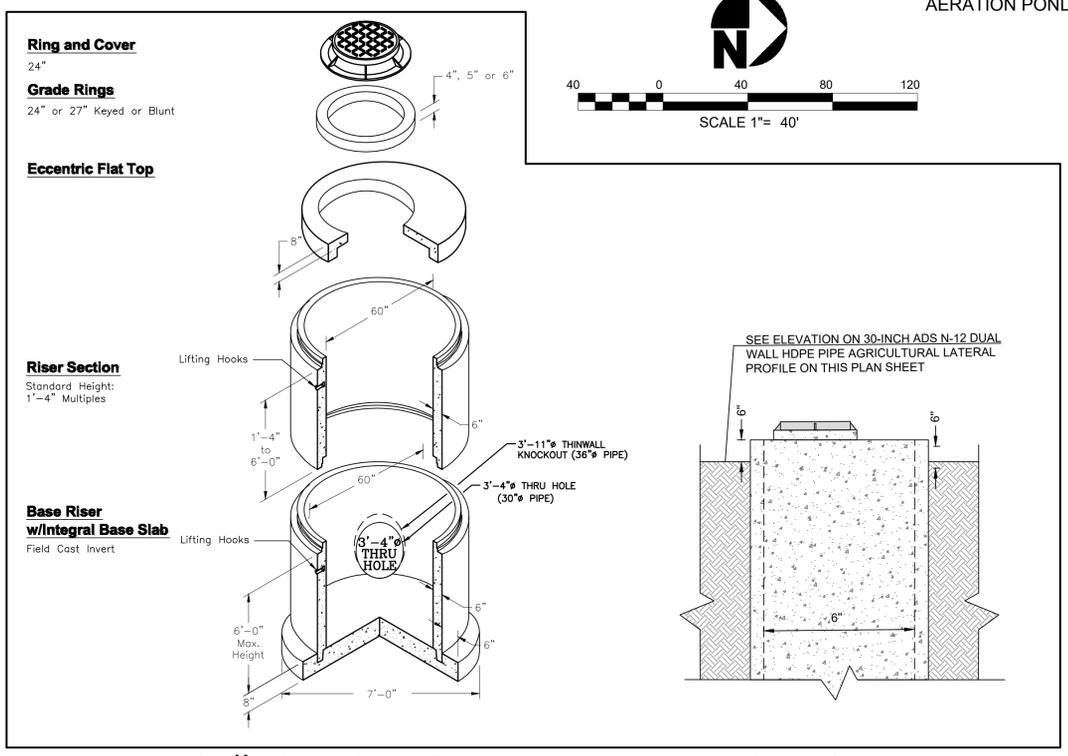
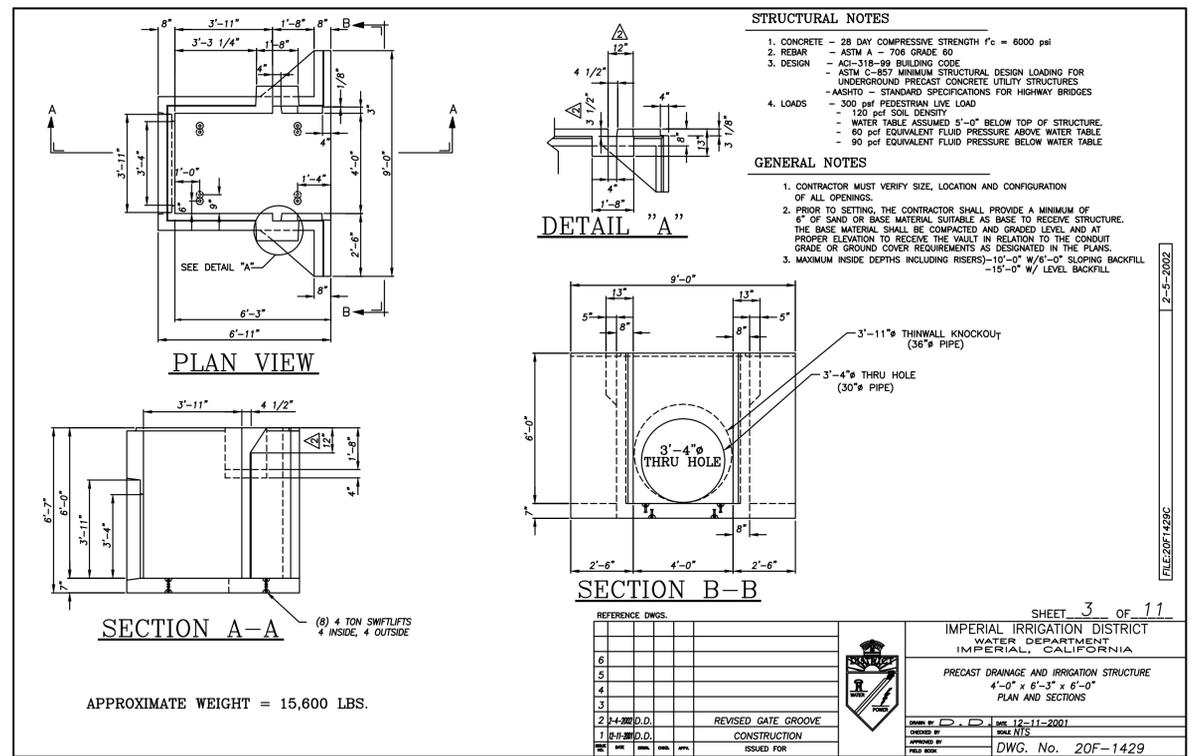


- EXISTING KEYNOTES**
- EXISTING NATIVE MATERIAL TO REMAIN.
  - EXISTING IID IRRIGATION CANAL TO REMAIN.
  - EXISTING DIRT ROAD TO REMAIN.
  - EXISTING IID DELIVERY GATE 14 TO BE REPLACED WITH NEW DELIVERY GATE.
  - EXISTING IID "R" CANAL CHECK STRUCTURE TO REMAIN.
  - EXISTING DETERIORATED CONCRETE-LINED IRRIGATION LATERAL.
  - EXISTING EARTH-LINED IRRIGATION LATERAL.
- CONSTRUCTION KEYNOTES**
- IID TO INSTALL NEW UNDERGROUND 30-INCH DIAMETER PIPELINE FROM THE NEW HEAD GATE TO THE STRUCTURE PER IID DRAWINGS.
  - INSTALL NEW 60" INTERNAL DIAMETER MANHOLE. SEE 60" ID ECCENTRIC FLAT TOP MANHOLE DETAIL ON THIS PLAN SHEET.
  - INSTALL NEW PRECAST DRAINAGE AND IRRIGATION STRUCTURE PER IID DRAWING No. 20F-1429 AS ILLUSTRATED ON THIS PLAN SHEET.
  - IID TO INSTALL NEW IID DELIVERY GATE NUMBER 14 PER IID DRAWINGS.
  - NEW 8-INCH DIAMETER EMERGENCY OVERFLOW PIPELINE FROM PUMP STATION. SEE SHEET 21 FOR PLAN AND PROFILE.
  - INSTALL NEW UNDERGROUND 30-INCH DIAMETER ADS-N-12 DUAL WALL HDPE PIPE AGRICULTURAL LATERAL PER DETAIL T-T ON PLAN SHEET 42.
  - NEW 6-INCH DIAMETER EFFLUENT FORCEMAIN FROM PUMP STATION. SEE SHEET 21 FOR PLAN AND PROFILE.



**DEWATERING NOTE**

IT SHALL BE NECESSARY FOR THE CONTRACTOR TO DEWATER THE 30 INCH DIAMETER IRRIGATION LATERAL PIPELINE TRENCH 3 FEET BELOW THE BOTTOM OF THE PIPE TRENCH 21 DAYS PRIOR TO COMPLETING THE PIPELINE TRENCH EXCAVATION AND PIPELINE INSTALLATION. THE CONTRACTOR SHALL COMPLETE THE DEWATERING IN CONFORMANCE WITH DEWATERING TECHNICAL SPECIFICATION SECTION 02140. THE CONTRACTOR SHALL ALSO COMPLY WITH TECHNICAL SPECIFICATION SECTION 02150, SHEETING, SHORING AND BRACING AND TECHNICAL SPECIFICATION 02221, TRENCHING, BACKFILLING AND COMPACTION. THE CONTRACTOR SHALL BE ALLOWED TO DIRECT THE GROUND WATER DISCHARGE TO THE WEST SIDE OF AERATION POND NUMBER 1.



PRECAST DRAINAGE AND IRRIGATION STRUCTURE DETAIL- IID DWG No. 20F-1429 SCALE = NTS

60" ID ECCENTRIC FLAT TOP MANHOLE DETAIL SCALE = NTS

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			JAMES G. JACK HOLT 10/18/2023	JOHN GAY, P.E. DATE	10/18/2023	COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS UNDER GROUND 30-INCH DIAMETER AGRICULTURAL LATERAL PLAN AND PROFILE
			31773 R.C.E. No.	62028 R.C.E. No.		REFERENCE
			12/31/24 REG. EXP.	09/30/25 REG. EXP.		THG #542.089
						SHEET 30 OF 50

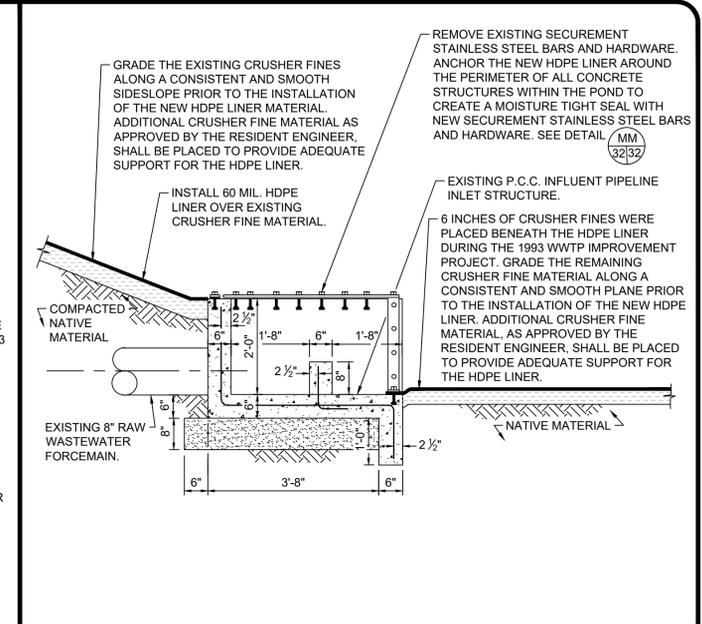
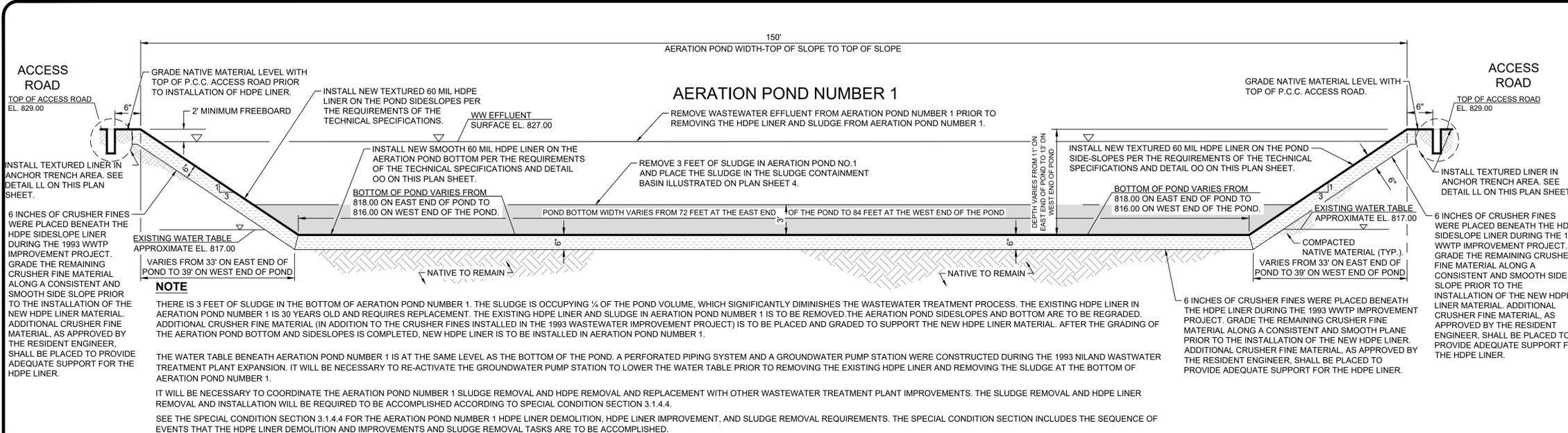
- EXISTING KEYNOTES**
- EXISTING NATIVE MATERIAL.
  - EXISTING NATIVE MATERIAL BORROW AREA AND EMERGENCY WASTE WATER STORAGE POND.
  - EXISTING BUILDING.
  - EXISTING P.C.C. RIBBON GUTTER.
  - EXISTING P.C.C. SIDEWALK.
  - EXISTING ABANDONED EMERGENCY WASTE WATER STORAGE POND.
  - EXISTING RAW WATER STORAGE POND.
  - EXISTING CHAIN LINK FENCE.
  - EXISTING CHAIN LINK FENCE SWING GATE.
  - EXISTING CHAIN LINK FENCE ROLL GATE.
  - EXISTING HD IRRIGATION CANAL TO REMAIN.
  - EXISTING HD EARTHEN DRAIN.
  - EXISTING 60 MIL HDPE LINED AERATION POND.
  - EXISTING DIRT ACCESS ROAD.
  - EXISTING DIRT PILE.
  - EXISTING TREE.
  - EXISTING PALM TREE.
  - EXISTING BRUSH VEGETATION.
  - EXISTING GRAVITY SANITARY SEWER PIPELINE.
  - EXISTING SANITARY SEWER FORCE MAIN.
  - EXISTING SANITARY SEWER MANHOLE.
  - EXISTING SANITARY SEWER FORCE MAIN FLOW METER VAULT.
  - EXISTING SANITARY SEWER FORCE MAIN VALVE.
  - EXISTING GRAVITY SANITARY SEWER VALVE.
  - EXISTING EMERGENCY WASTE WATER DISCHARGE PIPELINE.
  - EXISTING GROUND WATER PUMP DISCHARGE PIPELINE.
  - EXISTING 2" SCHEDULE 80 PVC RAW WATER PIPELINE.
  - EXISTING HOSE BIB.
  - EXISTING P.C.C. HEADWORKS STRUCTURE.
  - EXISTING WASTE WATER INFLUENT PUMP STATION.
  - EXISTING GROUND WATER PUMP STATION.
  - EXISTING CHLORINATION/DECHLORINATION STRUCTURE.
  - EXISTING EFFLUENT FLOW METER/SAMPLING VAULT.
  - EXISTING CHEMICAL STORAGE TANK TO BE ABANDONED.
  - EXISTING CHEMICAL CONTAINMENT STRUCTURE TO BE ABANDONED.
  - EXISTING AERATION POND CATWALK STRUCTURE.
  - EXISTING WWTP MAIN ACCESS WOODEN BRIDGE.
  - SURVEY MONUMENT NOTED AS "1 1/2 INCH IRON PIPE TAGGED L55937" PER RECORD OF SURVEY ON FILE IN RECORDERS OFFICE AT THE IMPERIAL COUNTY RECORDERS OFFICE. CONTRACTOR SHALL TAKE EXTREME CAUTION NOT TO DISRUPT OR DESTROY THE EXISTING MONUMENTS DURING THE PROJECT CONSTRUCTION PERIOD. SEE THE MONUMENT PRESERVATION NOTE ON THIS PLAN SHEET.
  - SURVEY MONUMENT NOTED AS "1 1/2 INCH IRON PIPE TAGGED L55937" NOTED TO BE THE WEST 1/4 CORNER OF SECTION 9, TOWNSHIP 35 SOUTH RANGE 14 EAST SAN BERNARDINO MERIDIAN PER RECORD OF SURVEY ON FILE IN BOOK 10 PAGE 24 AT THE IMPERIAL COUNTY RECORDERS OFFICE.
  - EXISTING SANITARY SEWER GRAVITY VALVES.
  - EXISTING GRAVITY SANITARY SEWER PIPELINE.
  - EXISTING GENERATOR SET.
  - EXISTING MOORING POST.
  - EXISTING 7.5 H.P. AERATOR.
  - EXISTING P.C.C. INLET STRUCTURE.
  - EXISTING AERATOR ELECTRICAL FIELD CONTROL STATION AND AERATOR MOORING POST.
  - UNDERGROUND ELECTRICAL CONDUIT AND CONDUCTORS.

- CONSTRUCTION KEYNOTES**
- REPAIR EXISTING HDPE LINER FAILURE AREAS PER DIMENSIONS SPECIFIED IN THIS PLAN SHEET.

- NOTES**
- THE EXISTING 60 MIL HDPE LINER IN AERATION POND NUMBERS 2 AND 3 IS TO BE REPAIRED AS ILLUSTRATED ON THIS PLAN SHEET. THE EXISTING AERATION POND LINER IN AERATION POND NUMBER 1 IS TO BE REPLACED AFTER THE SLUDGE IS REMOVED FROM THE BOTTOM OF AERATION POND NUMBER 1. SEE PLAN SHEET NUMBERS 32, 33 AND 34 AND THE SPECIAL CONDITION SECTION 3.1.4.4 FOR THE REMOVAL OF THE SLUDGE IN AERATION POND NUMBER 1 AND THE REMOVAL AND REPLACEMENT OF THE 60 MIL HDPE LINER IN AERATION POND NUMBER 1.
  - THE EXISTING SANITARY SEWER FORCE MAIN, GRAVITY SANITARY SEWER PIPELINE AND UNDERGROUND ELECTRICAL LINE LOCATIONS ILLUSTRATED ON THIS PLAN SHEET ARE APPROXIMATE. IT WILL BE NECESSARY FOR THE CONTRACTOR TO POTHOLE THE SANITARY SEWER PIPELINES AND ELECTRICAL LINES TO DETERMINE THE LOCATION OF THE UTILITIES DURING THE CONSTRUCTION PERIOD.

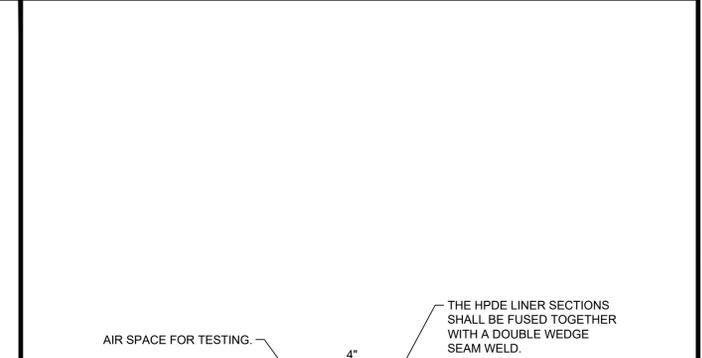
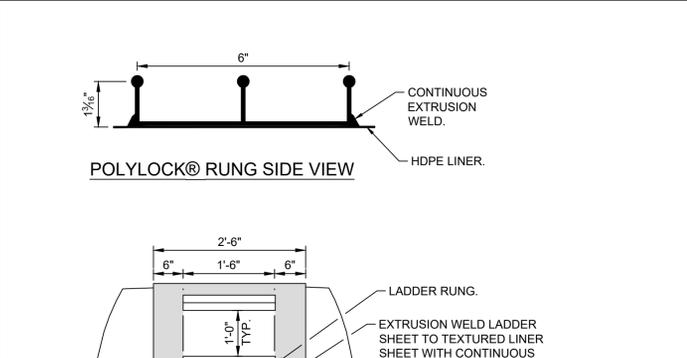
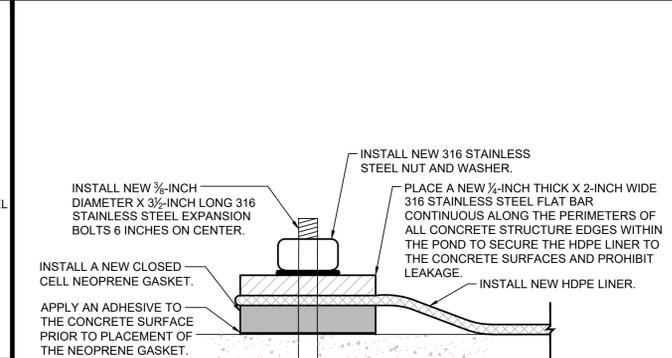
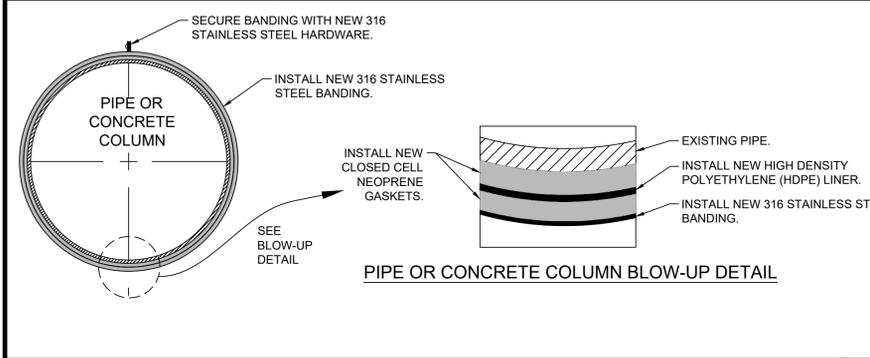


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**AERATION POND NUMBER 1 SECTION Z-Z**  
 NTS 33/32

**HDPE SECUREMENT TO CONCRETE INFLUENT PIPELINE INLET STRUCTURE DETAIL JJ**  
 NTS 32/32

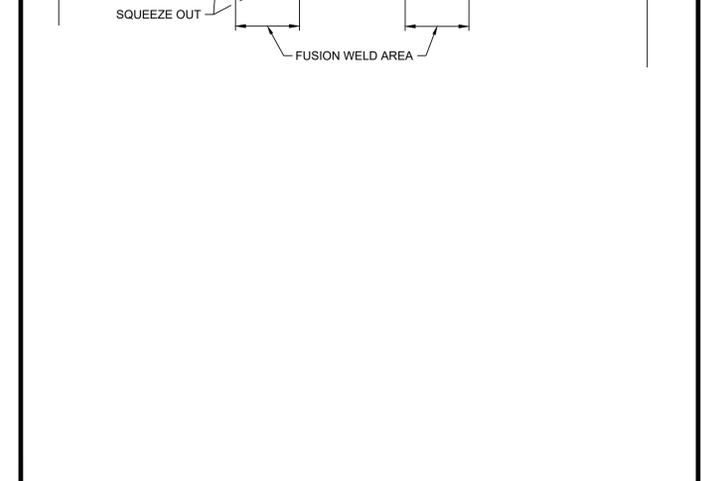
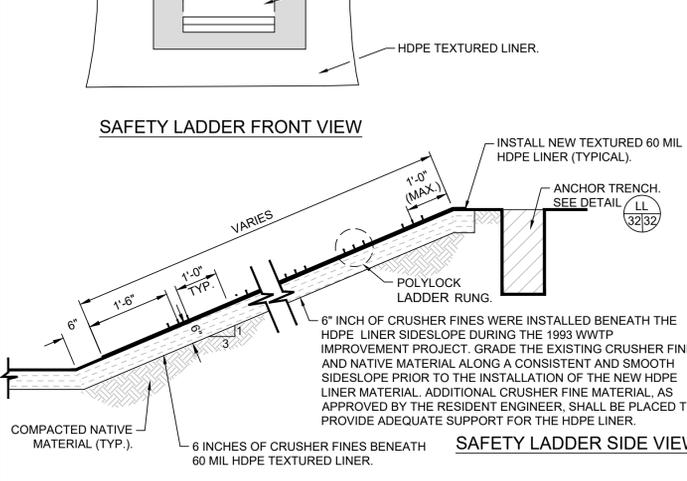
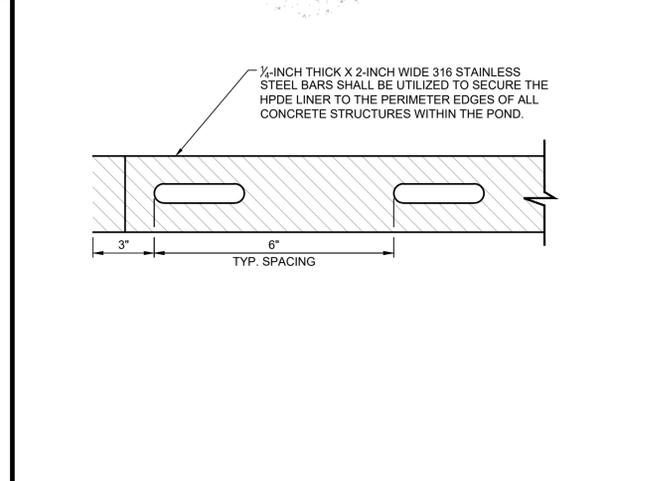
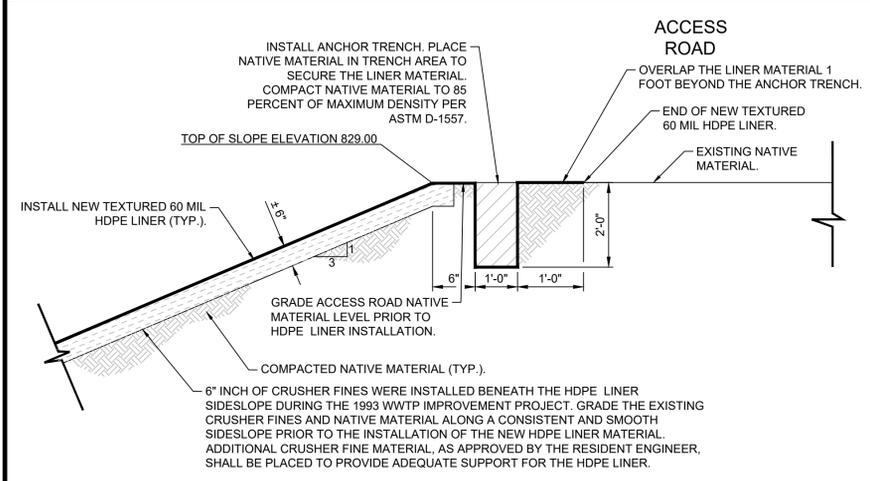


**HDPE LINER CLAMP DETAIL KK**  
 NTS 32/32

**SECUREMENT OF HDPE LINER TO PERIMETER EDGES OF ALL CONCRETE STRUCTURES DETAIL MM**  
 NTS 32/32

**SAFETY LADDER DETAIL NN**  
 NTS 32/32

**HDPE DOUBLE WEDGE SEAM FUSION WELD DETAIL OO**  
 NTS 32/32



**HDPE ANCHOR TRENCH DETAIL LL**  
 NTS 32/32

**SECUREMENT OF HDPE LINER TO PERIMETER EDGES OF ALL CONCRETE STRUCTURES DETAIL MM**  
 NTS 32/32

**SAFETY LADDER DETAIL NN**  
 NTS 32/32

**HDPE DOUBLE WEDGE SEAM FUSION WELD DETAIL OO**  
 NTS 32/32

REVISION	DATE	COMMENTS

PREPARED UNDER THE DIRECT SUPERVISION OF:

**JAMES G. JACK HOLT**  
 No. 31773  
 R.C.E. No.  
 10/18/2023  
 DATE

COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:

**JOHN GAY, P.E.**  
 DIRECTOR OF PUBLIC WORKS  
 DATE

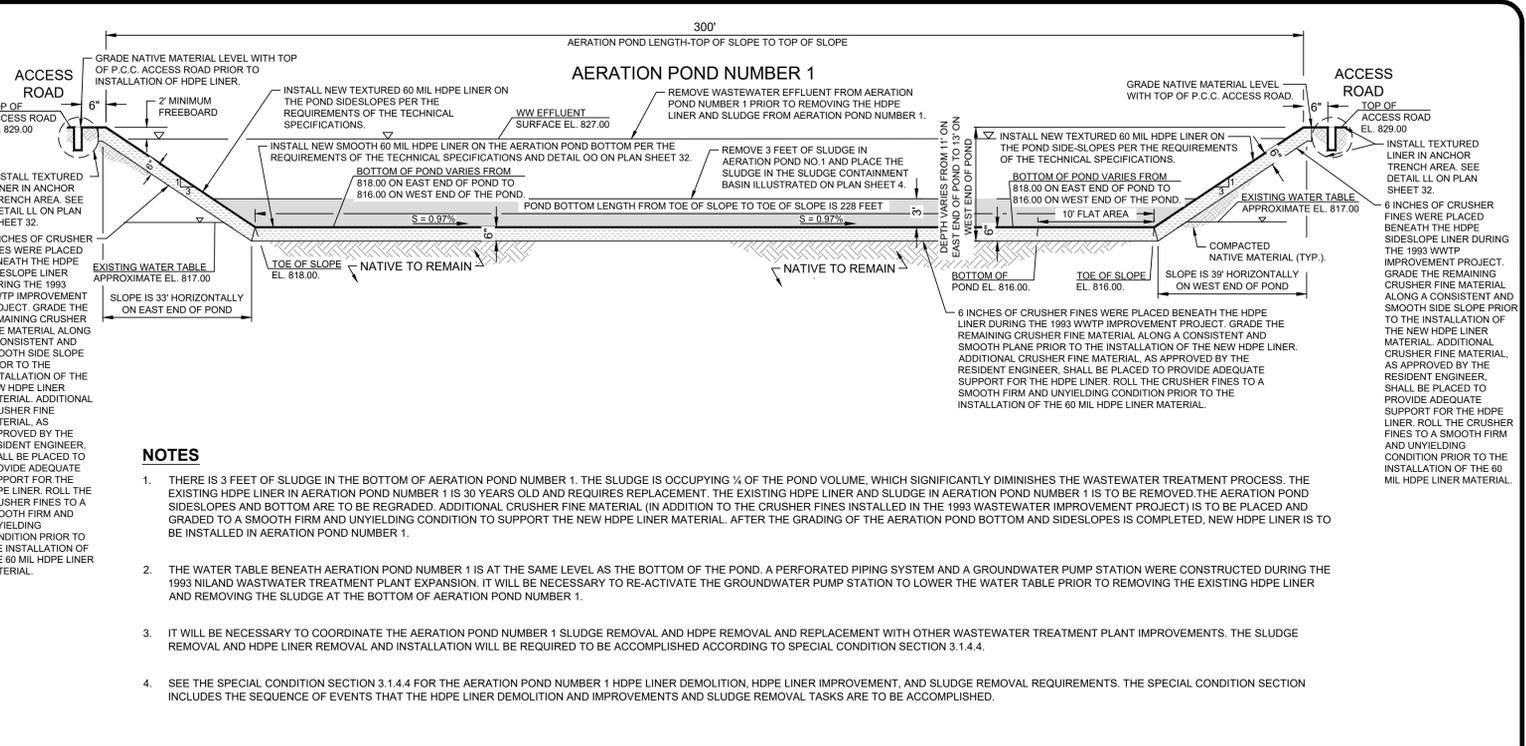
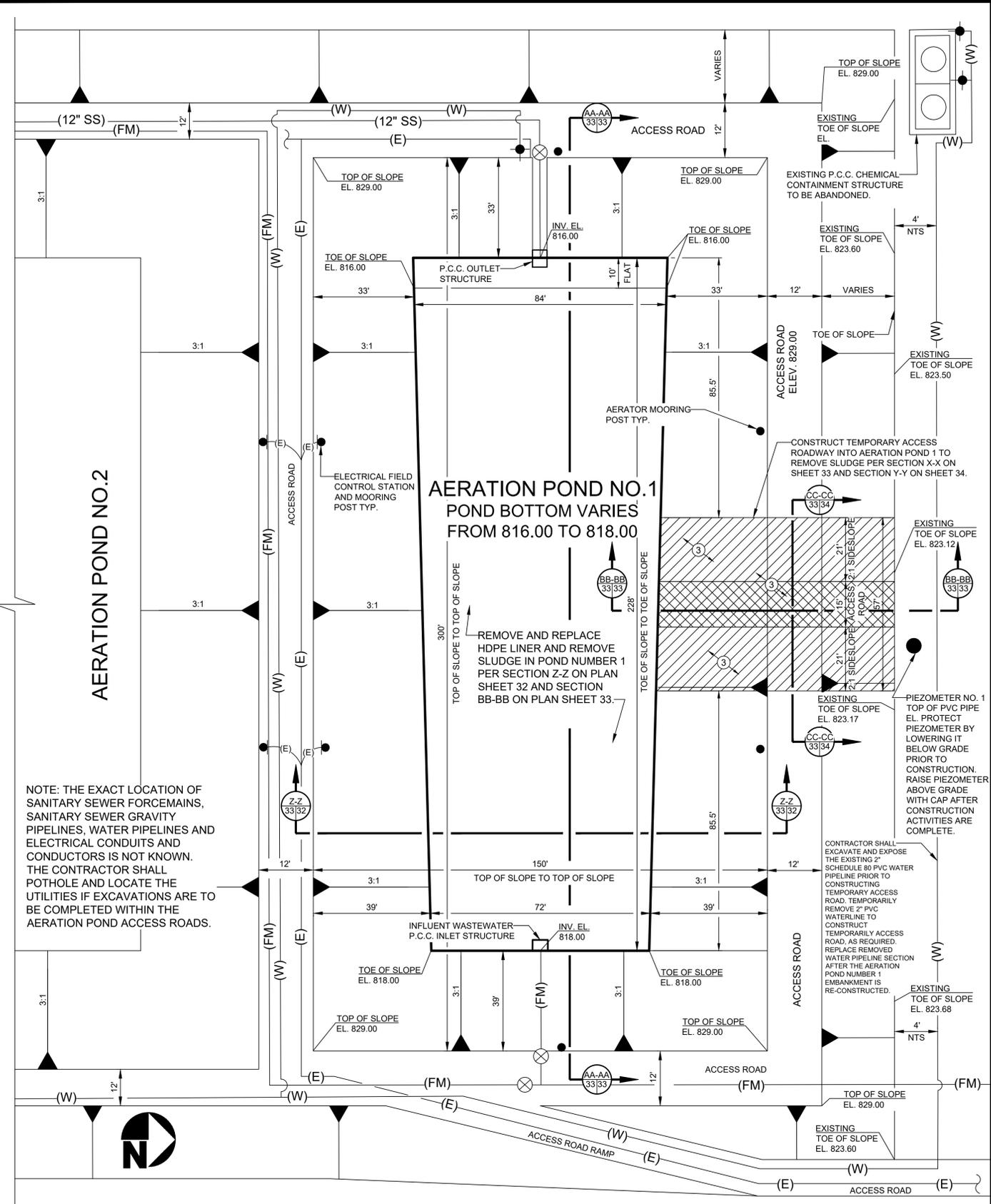
COUNTY OF IMPERIAL  
 EL CENTRO, CALIFORNIA

DATE: 10/18/2023  
 DRAWN: RS  
 DESIGNED: RS  
 SCALE: N/A  
 CHECKED: JGH

PROJECT TITLE:  
**COUNTY OF IMPERIAL  
 NINLAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**

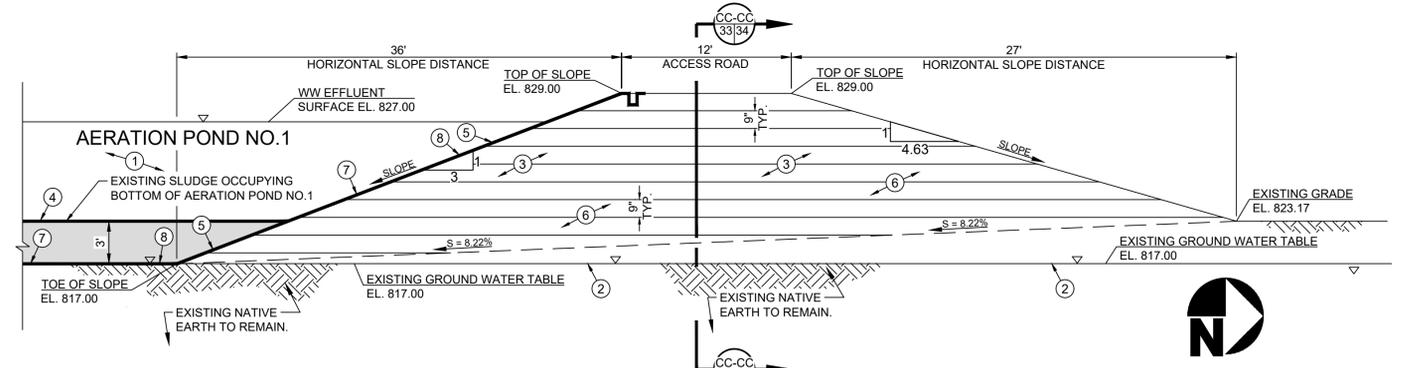
REFERENCE: THG #542.089  
 SHEET: 32 OF 50

C:\Users\castro\HOLT\LEGION\WIN\The Holt Group\542.089 - 542.08904 - CAD & PDF DRAWINGS\10-18-2023 - Set of Plans\542.089 - SHEET 32 - HDPE Liner Details and Sections.dwg 01/05/2024 11:13



- NOTES**
1. THERE IS 3 FEET OF SLUDGE IN THE BOTTOM OF AERATION POND NUMBER 1. THE SLUDGE IS OCCUPYING 1/4 OF THE POND VOLUME, WHICH SIGNIFICANTLY DIMINISHES THE WASTEWATER TREATMENT PROCESS. THE EXISTING HDPE LINER IN AERATION POND NUMBER 1 IS 30 YEARS OLD AND REQUIRES REPLACEMENT. THE EXISTING HDPE LINER AND SLUDGE IN AERATION POND NUMBER 1 IS TO BE REMOVED. THE AERATION POND SIDESLOPES AND BOTTOM ARE TO BE REGRADED. ADDITIONAL CRUSHER FINE MATERIAL (IN ADDITION TO THE CRUSHER FINES INSTALLED IN THE 1993 WASTEWATER IMPROVEMENT PROJECT) IS TO BE PLACED AND GRADED TO A SMOOTH FIRM AND UNYIELDING CONDITION TO SUPPORT THE NEW HDPE LINER MATERIAL. AFTER THE GRADING OF THE AERATION POND BOTTOM AND SIDESLOPES IS COMPLETED, NEW HDPE LINER IS TO BE INSTALLED IN AERATION POND NUMBER 1.
  2. THE WATER TABLE BENEATH AERATION POND NUMBER 1 IS AT THE SAME LEVEL AS THE BOTTOM OF THE POND. A PERFORATED PIPING SYSTEM AND A GROUNDWATER PUMP STATION WERE CONSTRUCTED DURING THE 1993 NILDAN WASTEWATER TREATMENT PLANT EXPANSION. IT WILL BE NECESSARY TO RE-ACTIVATE THE GROUNDWATER PUMP STATION TO LOWER THE WATER TABLE PRIOR TO REMOVING THE EXISTING HDPE LINER AND REMOVING THE SLUDGE AT THE BOTTOM OF AERATION POND NUMBER 1.
  3. IT WILL BE NECESSARY TO COORDINATE THE AERATION POND NUMBER 1 SLUDGE REMOVAL AND HDPE REMOVAL AND REPLACEMENT WITH OTHER WASTEWATER TREATMENT PLANT IMPROVEMENTS. THE SLUDGE REMOVAL AND HDPE LINER REMOVAL AND INSTALLATION WILL BE REQUIRED TO BE ACCOMPLISHED ACCORDING TO SPECIAL CONDITION SECTION 3.1.4.4.
  4. SEE THE SPECIAL CONDITION SECTION 3.1.4.4 FOR THE AERATION POND NUMBER 1 HDPE LINER DEMOLITION, HDPE LINER IMPROVEMENT, AND SLUDGE REMOVAL REQUIREMENTS. THE SPECIAL CONDITION SECTION INCLUDES THE SEQUENCE OF EVENTS THAT THE HDPE LINER DEMOLITION AND IMPROVEMENTS AND SLUDGE REMOVAL TASKS ARE TO BE ACCOMPLISHED.

**AERATION POND NUMBER 1 SECTION AA-AA**  
NTS



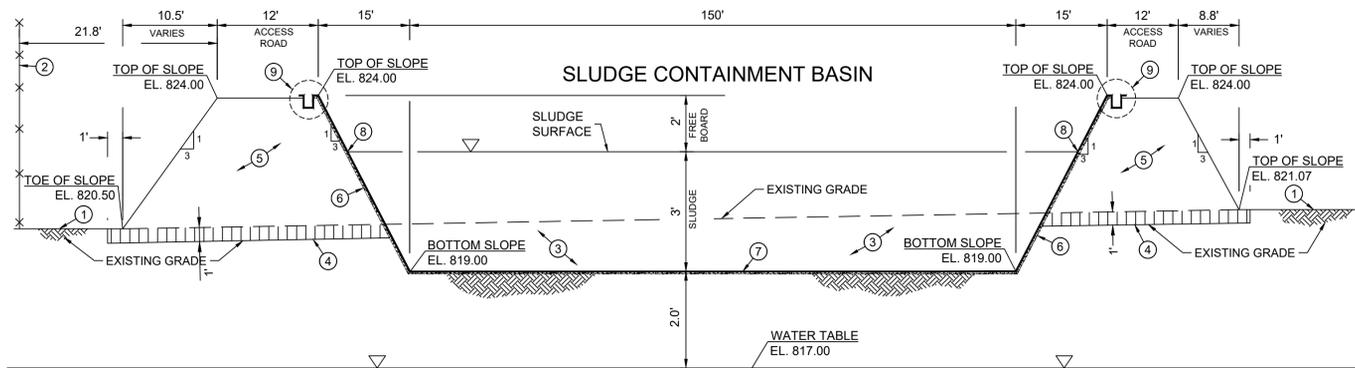
- KEYNOTES**
- 1 REMOVE THE WASTEWATER EFFLUENT CONTENTS FROM AERATION POND NUMBER 1 PRIOR TO REMOVING THE EXISTING HDPE LINER AND SLUDGE PER SECTION Z-Z ON PLAN SHEET 32, SECTION AA-AA ON PLAN SHEET 33 AND THE SPECIAL CONDITIONS.
  - 2 LOWER THE EXISTING GROUND WATER TABLE PRIOR TO REMOVING THE EXISTING HDPE LINER AND SLUDGE PER THE SPECIAL CONDITIONS.
  - 3 REMOVE A 57 FOOT WIDE SECTION OF THE EXISTING AERATION POND NUMBER 1 EMBANKMENT AFTER AERATION POND NUMBER 1 EFFLUENT CONTENTS ARE REMOVED AND AFTER THE GROUND WATER TABLE IS LOWERED. SEE THE SPECIAL CONDITIONS AND SECTION CC-CC ON PLAN SHEET 34. STORE THE NATIVE MATERIAL IN THE AREA NORTH OF AERATION POND NUMBER 1.
  - 4 REMOVE 3 FEET OF SLUDGE FROM THE BOTTOM OF AERATION POND NUMBER 1. PLACE THE SLUDGE IN THE SLUDGE CONTAINMENT BASIN ILLUSTRATED ON PLAN SHEET 4 AND SECTIONS AND DETAILS ON PLAN SHEET 34. CONSTRUCT SLUDGE CONTAINMENT BASIN PRIOR TO COMMENCING THE SLUDGE REMOVAL PROCESS FROM AERATION POND NUMBER 1. SEE THE SPECIAL CONDITIONS.
  - 5 REMOVE AND DISPOSE OF EXISTING 60 MIL HDPE LINER MATERIAL AFTER THE SLUDGE IS REMOVED FROM AERATION POND NUMBER 1.
  - 6 RECONSTRUCT AERATION POND NUMBER 1 EMBANKMENT AFTER REMOVAL OF SLUDGE FROM THE BOTTOM OF AERATION POND NUMBER 1. INSTALL THE STORED NATIVE MATERIAL PER KEYNOTE 3 IN 9 INCH LIFTS. COMPACT THE NATIVE MATERIAL TO 90 PERCENT MAXIMUM DENSITY PER ASTM D 1557. ADDITIONAL LIFTS SHALL NOT BE INSTALLED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE REQUIRED COMPACTION DENSITY.
  - 7 GRADE THE AERATION POND NUMBER 1 SIDESLOPES AND BOTTOM AFTER THE REMOVAL AND DISPOSAL OF THE EXISTING HDPE LINER AND RECONSTRUCTION OF THE AERATION POND NUMBER 1 EMBANKMENT. INSTALL ADDITIONAL CRUSHER FINES ON THE AERATION POND BOTTOM AND SIDESLOPES AND ROLL THE CRUSHER FINES TO PROVIDE A SMOOTH FIRM AND UNYIELDING CRUSHER FINE SURFACE AND PROVIDE ADEQUATE SUPPORT FOR THE NEW HDPE LINER MATERIAL.
  - 8 INSTALL THE NEW 60 MIL HDPE LINER ALONG THE BOTTOM AND SIDESLOPES OF AERATION POND NUMBER 1 PER SECTION Z-Z ON PLAN SHEET 32, SECTION AA-AA ON PLAN SHEET 33, THE TECHNICAL SPECIFICATIONS AND THE SPECIAL CONDITIONS.

**REMOVE AND REPLACE SECTION OF AERATION POND NUMBER 1 EMBANKMENT TO ACCESS AERATION POND NUMBER 1 TO REMOVE AND REPLACE EXISTING HDPE LINER AND REMOVE SLUDGE - SECTION BB-BB**  
SCALE: 1" = 6'

**AERATION POND NUMBER 1 - HDPE LINER REMOVAL AND REPLACEMENT AND SLUDGE REMOVAL PLAN**  
SCALE: 1" = 20'

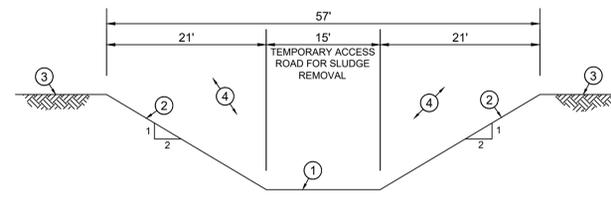
REVISION	DATE	COMMENTS	DATE	COMMENTS	DATE	COMMENTS	DATE	COMMENTS

	PREPARED UNDER THE DIRECT SUPERVISION OF:  JAMES G. JACK HOLT 10/18/2023 DATE	31773 R.C.E. No. 12/31/24 REG. EXP.	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:  JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	62028 R.C.E. No. 09/30/25 REG. EXP.		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT <b>COUNTY OF IMPERIAL</b> EL CENTRO, CALIFORNIA	DATE: 10/18/2023 DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JGH	PROJECT TITLE <b>COUNTY OF IMPERIAL          NILDAN COUNTY SANITATION DISTRICT - WASTEWATER          TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS</b> <b>AERATION POND NUMBER 1 HDPE LINER REMOVAL          AND REPLACEMENT AND SLUDGE REMOVAL</b>	REFERENCE THG #542.089 SHEET <b>33</b> OF <b>50</b>
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**KEYNOTES**

- ① EXISTING NATIVE GRADE TO REMAIN.
- ② EXISTING 6 FOOT HIGH CHAIN LINK FENCE TO REMAIN. SECTIONS OF THE FENCE SHALL BE ALLOWED TO BE TEMPORARILY REMOVED DURING THE CONSTRUCTION OF THE SLUDGE CONTAINMENT BASIN. IF SECTIONS OF THE FENCE ARE REMOVED THE CONTRACTOR IS RESPONSIBLE TO STORE THE REMOVED FENCING MATERIAL IN A SECURE LOCATION. AFTER THE CONSTRUCTION OF THE SLUDGE CONTAINMENT BASIN IS COMPLETED ANY TEMPORARILY REMOVED FENCE SECTIONS SHALL BE REPLACED. NEW VERTICAL POSTS WITH NEW PCC FOOTINGS SHALL BE CONSTRUCTED PER THE FENCING DETAIL ON SHEET 29. OTHER DAMAGED FENCE COMPONENTS SHALL BE REPLACED WITH NEW COMPONENTS PER FENCING DETAIL SHEET 29 REQUIREMENTS. THE FENCE SHALL BE REPLACED TO THE SATISFACTION OF THE RESIDENT ENGINEER.
- ③ EXCAVATE NATIVE EARTH IN THE SLUDGE CONTAINMENT BASIN WITH 3:1 SIDESLOPES TO THE SLUDGE CONTAINMENT BASIN BOTTOM. EXCAVATED NATIVE MATERIAL SHALL BE USED TO CONSTRUCT THE ABOVE GRADE BASIN EMBANKMENTS. THE DEPTH FROM THE SLUDGE CONTAINMENT BASIN DESIGN BOTTOM TO THE EXISTING WATER TABLE IS APPROXIMATELY 2.0 FEET. PUMPING OF THE NATIVE EARTH ABOVE THE WATER TABLE CAN EASILY OCCUR IF SUBJECTED TO EQUIPMENT WITH LARGE POINT LOADS. THE CONTRACTOR SHALL COMPLETE THE NATIVE EARTH EXCAVATION WITH LIGHT EQUIPMENT. EQUIPMENT WHICH CREATES HEAVY POINT LOADS, SUCH AS FRONT END LOADERS, SHALL NOT BE ALLOWED TO COMPLETE THE EXCAVATION WORK. IF PUMPING OCCURS DURING THE EXCAVATION OF THE SLUDGE CONTAINMENT BASIN, THE RESIDENT ENGINEER SHALL BE IMMEDIATELY INFORMED OF THE PUMPING CONDITION. IF PUMPING OCCURS EXCAVATION WORK SHALL IMMEDIATELY CEASE. IF PUMPING OCCURS THE REMAINING EXCAVATION WORK TO THE DESIGN BOTTOM OF THE SLUDGE CONTAINMENT BASIN SHALL BE COMPLETED WITH A HOE TYPE EXCAVATOR OR A GRADALL.
- ④ SCARIFY AND COMPACT EXISTING NATIVE MATERIAL FOR A DEPTH OF 1 FOOT BENEATH THE SLUDGE CONTAINMENT BASIN EMBANKMENTS. SCARIFY AND COMPACT THE EXISTING NATIVE MATERIAL FOR A HORIZONTAL DISTANCE OF 1 FOOT BEYOND THE EMBANKMENT EXTERIOR TOE OF SLOPE. THE NATIVE EARTH SHALL BE COMPACTED TO 90 PERCENT OF MAXIMUM DENSITY AT OPTIMUM WATER CONTENT PER ASTM D 1557. CONSTRUCTION OF THE EMBANKMENTS SHALL NOT COMMENCE UNTIL THE SCARIFIED AND COMPACTED NATIVE MATERIAL HAS BEEN TESTED AND ATTAINED THE SPECIFIED COMPACTION DENSITY.
- ⑤ INSTALL NATIVE MATERIAL FOR THE CONSTRUCTION OF THE EMBANKMENTS IN MAXIMUM 9 INCH LIFTS AT 90 PERCENT OF MAXIMUM DENSITY AT OPTIMUM WATER CONTENT PER ASTM D-1557. ADDITIONAL LIFTS SHALL NOT BE INSTALLED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE SPECIFIED COMPACTION DENSITY. IF THE NATIVE EARTH EXCAVATED FROM THE SLUDGE CONTAINMENT BASIN IS NOT SUFFICIENT TO CONSTRUCT THE EMBANKMENTS THEN EXCESS EARTH FROM THE EVAPORATION BASIN EARTHWORK OR NATIVE EARTH OBTAINED FROM THE EXISTING EMERGENCY WASTEWATER POND SHALL BE USED TO COMPLETE THE CONSTRUCTION OF THE EMBANKMENTS. IF NATIVE EARTH IS OBTAINED FROM THE EMERGENCY WASTEWATER POND IT SHALL BE REMOVED IN 8 INCH LIFTS AT A UNIFORM ELEVATION ACROSS THE ENTIRE POND BOTTOM.
- ⑥ INSTALL 6 INCHES OF CRUSHER FINES AT THE BOTTOM AND SIDESLOPES OF THE SLUDGE CONTAINMENT BASIN. ROLL THE CRUSHER FINES TO A SMOOTH, FIRM AND UNYIELDING CONDITION PRIOR TO THE INSTALLATION OF THE 60 MIL HDPE LINER MATERIAL.
- ⑦ INSTALL NEW SMOOTH 60 MIL HDPE LINER ON THE AERATION POND BOTTOM PER THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
- ⑧ INSTALL NEW TEXTURED 60 MIL HDPE LINER ON THE POND SIDESLOPES PER THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
- ⑨ INSTALL HDPE ANCHOR TRENCH PER DETAIL LL ON PLAN SHEET 32.



**KEYNOTES**

- ① REMOVE A PORTION OF THE EXISTING NATIVE EARTH AERATION POND NUMBER 1 EMBANKMENT AS ILLUSTRATED ON THE AERATION POND NUMBER 1 PLAN AND SECTION BB-BB ON PLAN SHEET 33. A 15 FOOT WIDE TEMPORARY ACCESS ROAD IS TO BE CONSTRUCTED.
- ② THE AERATION POND NUMBER 1 TEMPORARY ACCESS ROAD IS TO BE PROVIDED WITH 2:1 SIDESLOPES AS ILLUSTRATED ON THE AERATION POND NUMBER 1 PLAN ON PLAN SHEET 33.
- ③ TOP OF EXISTING AERATION POND NUMBER 1 EMBANKMENT TO REMAIN.
- ④ RECONSTRUCT THE AERATION POND NUMBER 1 EMBANKMENT AFTER THE REMOVAL OF SLUDGE FROM THE BOTTOM OF AERATION POND NUMBER 1. SEE SECTION BB-BB ON PLAN SHEET 33.

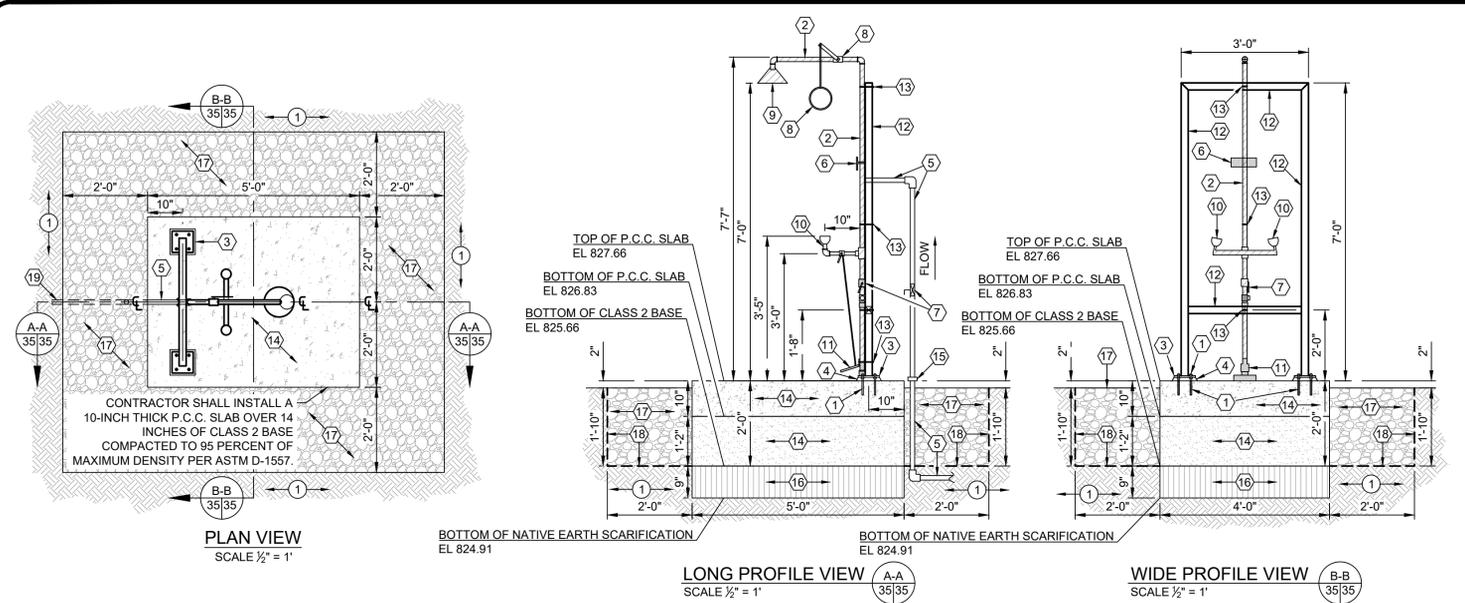
SLUDGE CONTAINMENT BASIN - SECTION A-A  
NTS

A-A  
4/34

REMOVE AND REPLACE SECTION OF AERATION POND NUMBER 1 EMBANKMENT TO REMOVE AND REPLACE EXISTING HDPE LINER AND REMOVE SLUDGE - SECTION NTS

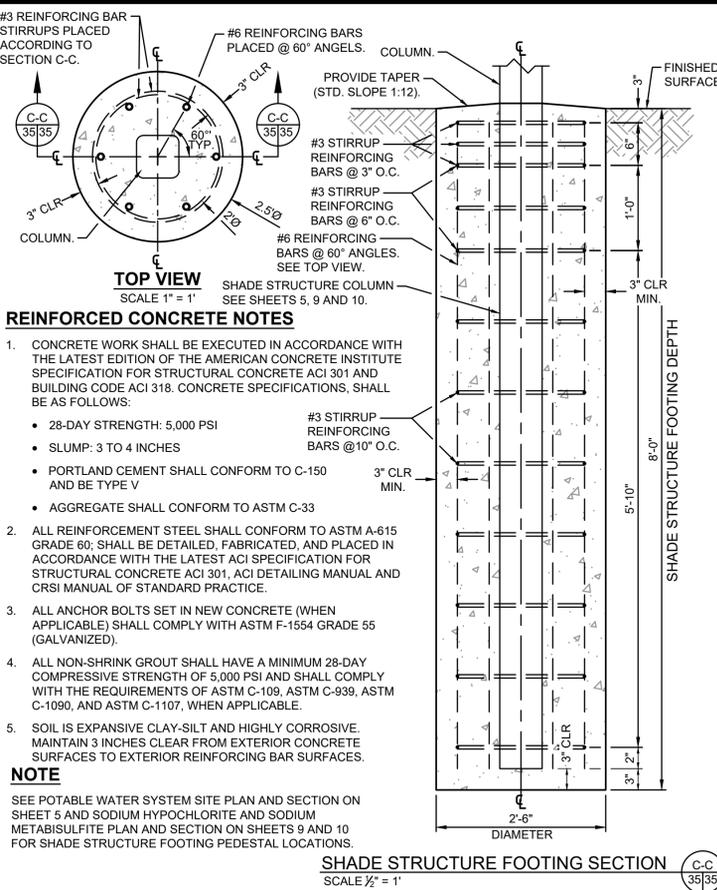
CC-CC  
33/34

REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:		PROJECT TITLE		REFERENCE	THG #542.089
			 JAMES G. JACK HOLT 10/18/2023 DATE		 JOHN A. GAY 09/30/25 REG. EXP.		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT EL CENTRO, CALIFORNIA		COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS SLUDGE CONTAINMENT BASIN AND AERATION POND NO.1 DETAILS AND SECTIONS	SHEET 34 OF 50

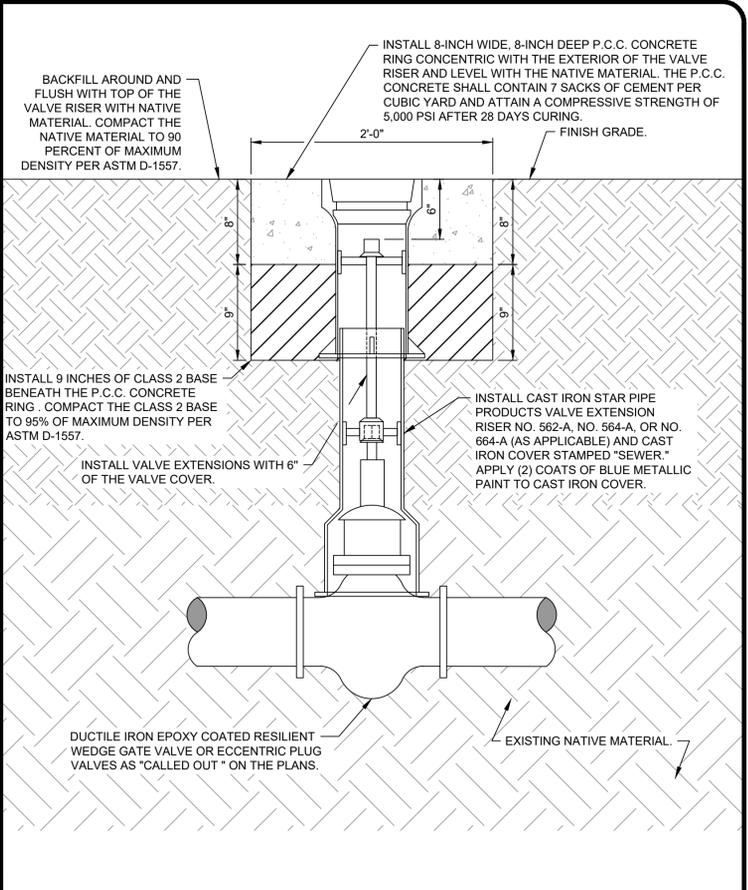


- EXISTING KEYNOTES**
- EXISTING NATIVE EARTH TO REMAIN TO REMAIN.
- CONSTRUCTION KEYNOTES**
- INSTALL 1/2-INCH ADHESIVE ANCHOR BOLTS WITH STAINLESS STEEL STUDS, WASHER AND NUT, EMBEDDED 4 INCHES, TYP.
  - INSTALL 1/2-INCH GALVANIZED PIPE AND FITTINGS.
  - INSTALL 8-INCH X 8-INCH X 1/2-INCH GALVANIZED STEEL BASE PLATE WITH 1/4-INCH HOLES NEAR THE CORNERS FOR 1/2-INCH BOLTS. TYP. PLACE BOLTS ABOVE AND BELOW THE BASE PLATE TO ALLOW THE LEVELING OF THE BASE PLATE.
  - INSTALL 1-INCH MINIMUM, NON-SHRINK GROUT BELOW BASE PLATE AFTER LEVELING OF BASE PLATE IS ACCOMPLISHED, TYP.
  - INSTALL 1/2-INCH WATER SUPPLY PIPELINE AND FITTINGS, AS NEEDED TO
- PROVIDE WATER TO THE EMERGENCY SHOWER AND EYEWASH STATION. SEE CONSTRUCTION KEYNOTE 14 ON SHEET 9. INSTALL GALVANIZED STEEL PIPELINE ABOVE GRADE. INSTALL SCHEDULE 80 PVC PIPELINE BELOW GRADE.
  - INSTALL CLAMP FOR SUPPORT OF SAFETY SIGN. SAFETY SIGN TO BE FURNISHED BY THE EYEWASH STATION SUPPLIER.
  - INSTALL 1/2-INCH STAINLESS STEEL, BALL VALVE.
  - INSTALL STAINLESS STEEL, PULL ROD WITH ROUND HANDLE.
  - INSTALL 10-INCH DIAMETER BLUE ABS PLASTIC SHOWER HEAD.
  - INSTALL STAINLESS STEEL EYE / FACE WASH UNIT.
  - INSTALL FOOT PEDAL CONTROL.
  - INSTALL 2-INCH X 2-INCH STEEL SQUARE TUBING, GALVANIZED, TYP.
  - INSTALL 3/8-INCH U-BOLTS WITH WASHERS AND NUTS.
  - THE CONTRACTOR SHALL INSTALL A 10-INCH THICK P.C.C. SLAB OVER 14 INCHES OF CLASS 2 BASE COMPACTED TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
  - 1/2-INCH COUPLING CONNECTION FOR GALVANIZED TO PVC PIPING.
  - SCARIFY AND COMPACT NATIVE MATERIAL TO 90 PERCENT OF MAXIMUM DENSITY AT 4 TO 8 PERCENT OVER OPTIMUM WATER CONTENT PER ASTM D-1557.
  - INSTALL 1'-10" DEEP X 2'-0" WIDE, 3/4-INCH CRUSHED ROCK SUMP AROUND THE PERIMETER OF THE P.C.C. SLAB.
  - PLACE MIRAFI 600X NON-WOVEN GEOTEXTILE FABRIC ENVELOPE AROUND THE EDGES AND BOTTOMS OF THE 3/4-INCH CRUSHED ROCK SUMP TO MITIGATE NATIVE MATERIAL FROM MIGRATING INTO THE CRUSHED ROCK SUMP.
  - CONTINUE INSTALLATION OF 1/2-INCH WATER SUPPLY LINE TO CONNECTION POINT WITH EXISTING WATER PIPELINE IN THE VICINITY OF THE CHLORINATION / DECHLORINATION BASIN. SEE PLAN SHEET 4.

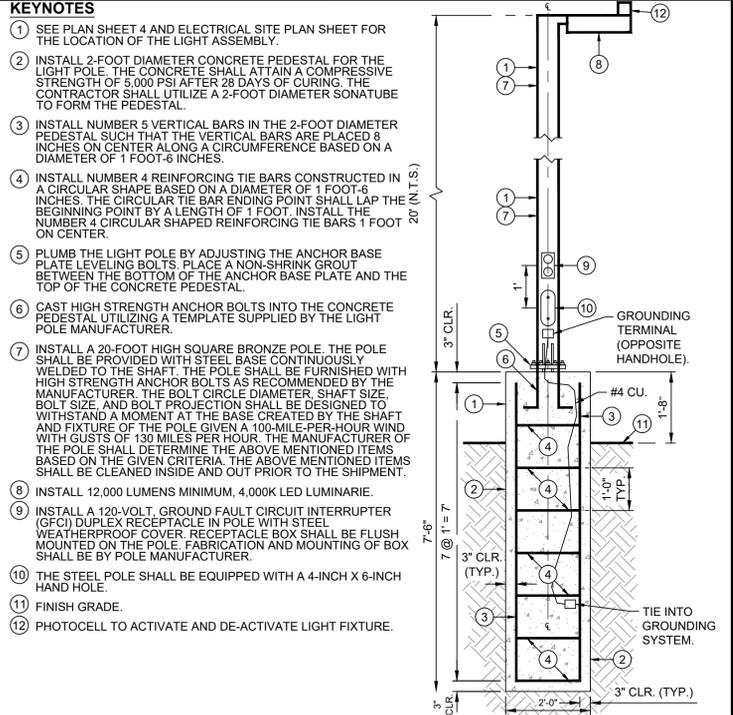
**EMERGENCY SHOWER AND EYEWASH STATION DETAIL** N  
SCALE 1/2" = 1'  
6, 9 35



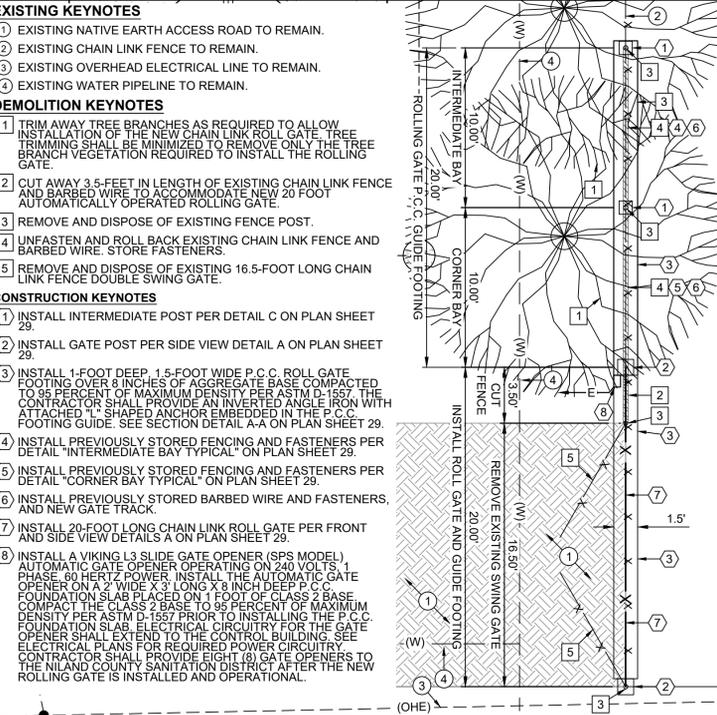
**SHADE STRUCTURE FOOTING PEDESTAL DETAIL** I  
SCALE 1" = 1'  
5 35



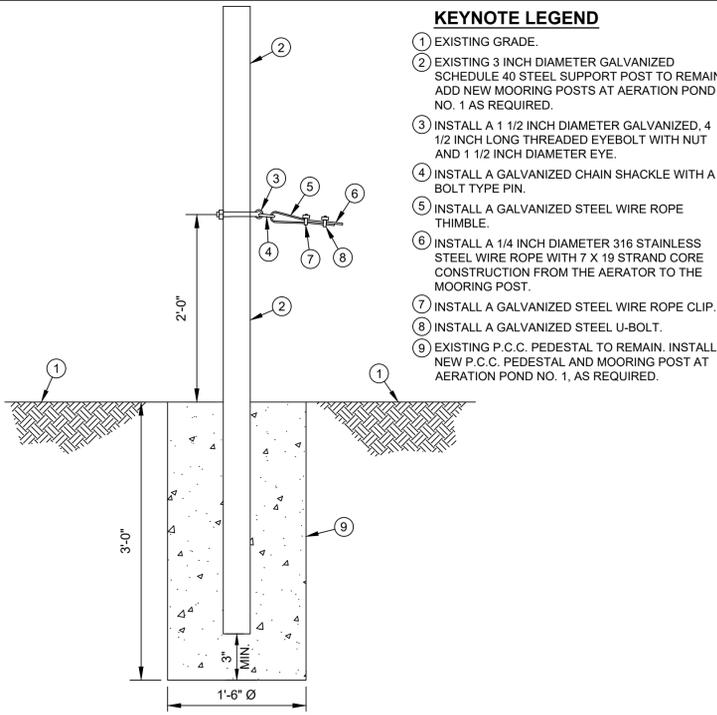
**SANITARY SEWER FORCE MAIN AND GRAVITY SANITARY SEWER PIPELINE VALVE RISER AND COVER** E  
SCALE 1/2" = 1'  
4 35



**LIGHT ASSEMBLY AND PEDESTAL DETAIL** O  
SCALE 1/2" = 1'  
6, 9 35

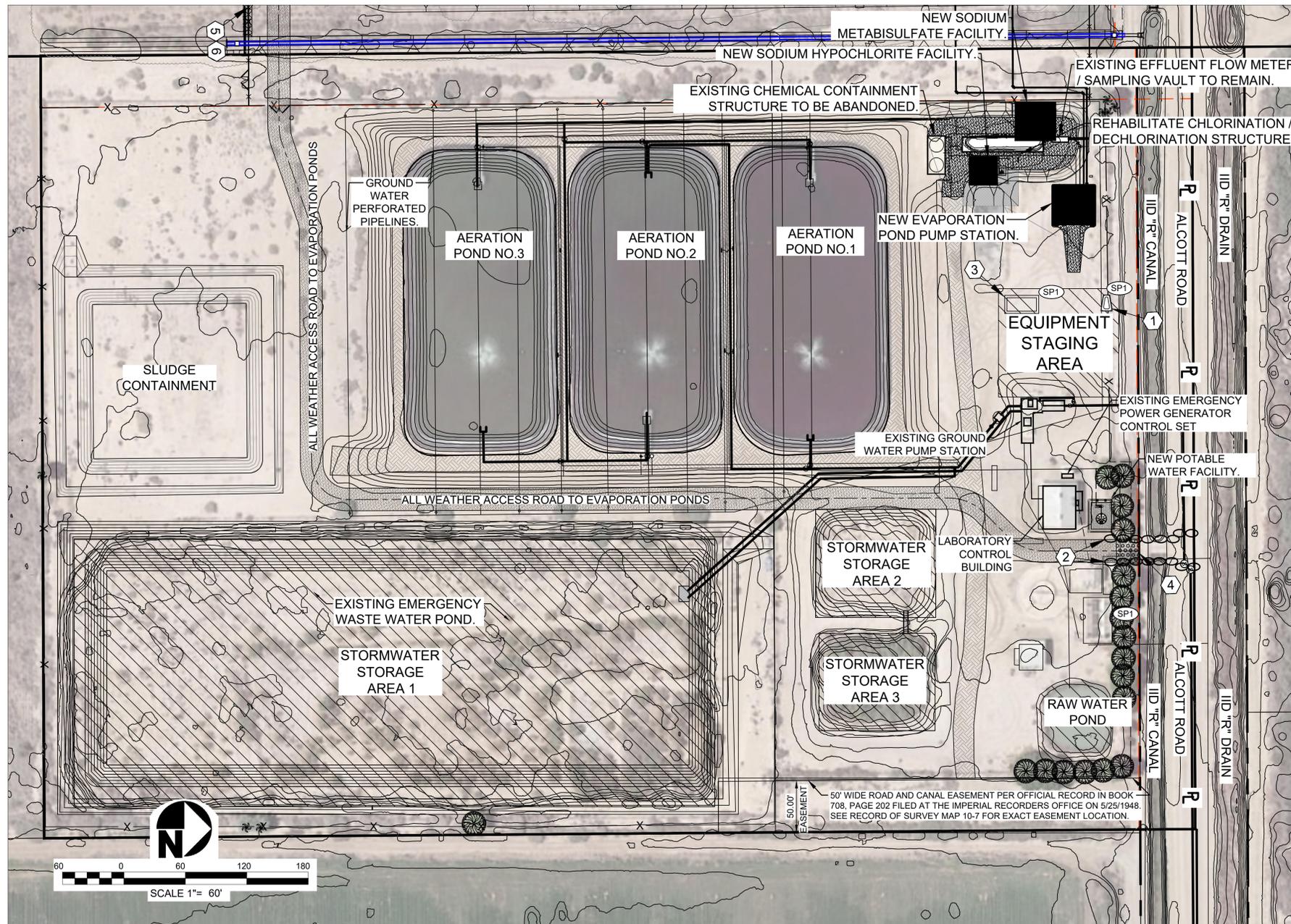


**CHAIN LINK FENCE ROLL GATE BLOW-UP DETAIL** PP  
SCALE 3/16" = 1'  
4 35



**AERATOR PIPE MOORING ASSEMBLY DETAIL** RR  
NTS  
4, 50 35

REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF: JAMES G. JACK HOLT 10/18/2023 DATE	31773 R.C.E. No. 12/31/24 REG. EXP.	COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY: JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS DATE	62028 R.C.E. No. 09/30/25 REG. EXP.	PUBLIC WORKS DEPARTMENT COUNTY OF IMPERIAL EL CENTRO, CALIFORNIA	DATE: 10/18/2023 DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JGH	PROJECT TITLE: COUNTY OF IMPERIAL NILDAD COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS WASTEWATER TREATMENT PLANT MISCELLANEOUS DETAILS	REFERENCE: THG #542.089 SHEET: 35 OF 50
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TEMPORARY CONSTRUCTION SITE BMPs				
BMP #	ITEM	UNIT	ESTIMATED QUANTITY	NOTES
-	CONSTRUCTION SITE AND WPCP MANAGEMENT BY QSP	LS	1	SITE MANAGEMENT INCLUDES BUT IS NOT LIMITED TO: NS-1, NS-8 THRU NS-10 AND WM-1 THRU WM-10. REFER TO CALTRANS CONSTRUCTION SITE BMP FACT SHEETS AT WWW.DOT.CA.GOV/HQ/CONSTRUC/STORMWATER/FACTSHEETS.HTM
SC-10	TEMPORARY DRAINAGE INLET PROTECTION	EA	1	DRAINAGE INLETS SHALL BE PROTECTED WITH GRAVEL BAGS. THE GRAVEL BAGS SHALL NOT EXTEND MORE THAN 2' INTO THE TRAVELED WAY.
WM-8	TEMPORARY PORTABLE CONCRETE WASHOUT	EA	1	TEMPORARY PORTABLE CONCRETE WASHOUT SHALL BE PROVIDED THROUGHOUT THE DURATION OF CONCRETE WORK BEING PERFORMED.
WM-9	RESTROOM FACILITIES	EA	2	THE RESTROOM FACILITIES SHALL BE SECURED FROM OVERTURNING IN HIGH WIND CONDITIONS
SE-5	FIBER ROLLS	LF	3,840	EROSION CONTROL, PLACED ON TOE AND FACE OF SLOPES TO INTERCEPT RUNOFF. REDUCE IFS FLOW VELOCITY, RELEASE THE RUNOFF AS SHEET FLOW AND PROVIDE REMOVAL OF SEDIMENT FROM THE RUNOFF.
WE-1	WIND EROSION CONTROL	LS	1	MAINTAIN DUST CONTROL THROUGHOUT THE ENTIRE SITE FOR THE DURATION OF THE PROJECT. WATER TRUCKS, OR EQUIVALENT BMP, SHALL BE USED FOR DUST SUPPRESSION. CONTRACTOR SHALL OBSERVE COUNTY OF IMPERIAL AIR POLLUTION CONTROL DISTRICT REQUIREMENTS THROUGHOUT THE CONSTRUCTION PROJECT.
NS-2	DEWATERING OPERATIONS	LS	1	AN EXISTING PERFORATED PIPELINE SYSTEM IS LOCATED BENEATH A PORTION OF THE EXISTING WASTEWATER TREATMENT PLANT. THE PERFORATED PIPELINES TRANSMIT GROUND WATER TO AN EXISTING GROUND WATER PUMP STATION. THE GROUND WATER PUMP STATION WILL DIRECT THE GROUND WATER TO THE WASTEWATER TREATMENT PLANT POND NUMBER 2 FOR PROCESSING.

**BMP KEYNOTES**

- CONTRACTOR SHALL LOCATE THE PORTABLE RESTROOM FACILITIES IN THE STAGING AREA. INSTALL TWO (2) PORTABLE RESTROOM FACILITIES. SEE DETAIL E5 FOR TYPICAL STAGING AREA ON SHEET 38.
- INSTALL TWO (2) LAYER GRAVEL-FILLED BAGS. SEE DETAIL E3 ON SHEET 38.
- INSTALL CONCRETE WASHOUT AREA. SEE DETAIL E4 ON SHEET 38.
- INSTALL CONSTRUCTION ENTRANCE PER DETAIL E1 AND E5 ON SHEET 38.
- INSTALL FIBER ROLLS PER DETAIL E2 ON SHEET 38. INSTALL FIBER ROLLS ON INTERIOR OF DIRT BERM TOE OF SLOPE. SEE BMP KEYNOTE 6.
- INSTALL DIRT BERM PER DETAIL I ON SHEET 27.

**LEGEND**

- PORTABLE TOILET
- GRAVEL BAGS
- CONCRETE WASHOUT AREA
- CONSTRUCTION ENTRANCE
- FIBER ROLLS
- SAMPLE POINT
- DIRT BERM

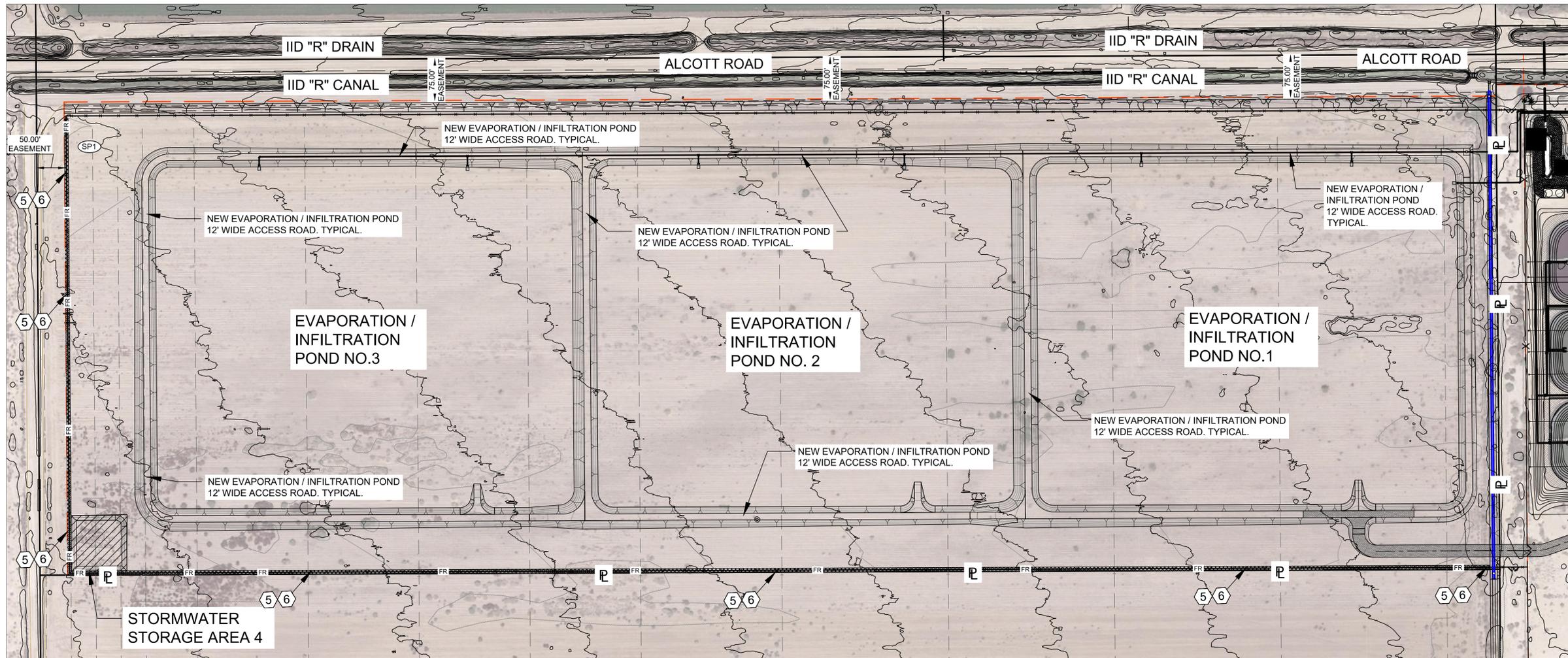
**GENERAL EROSION CONTROL NOTES:**

- EROSION CONTROL PLAN INCLUDES ALL POSSIBLE BMPs FOR THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL APPLY APPROPRIATE BMPs FOR EACH PHASE OF CONSTRUCTION.
- STREET SWEEPING (DURING MASS GRADING ACTIVITIES, STREETS WILL BE SWEEP AS NECESSARY TO PREVENT DIRT AND DUST FROM LEAVING THE CONSTRUCTION AREA).
- CONTRACTOR SHALL PROVIDE ADEQUATE DUST SUPPRESSION TO MEET ALL COUNTY OF IMPERIAL AIR POLLUTION CONTROL DISTRICT REQUIREMENTS.
- ALL BEST MANAGEMENT PRACTICES SHALL MEET THE REQUIREMENTS OF THE LATEST VERSION OF CALTRANS CONSTRUCTION SITE BMP FACT SHEETS.
- SITE DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES.
- NO SITE CLEARING OR GRADING SHALL BEGIN UNTIL ALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED.
- GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.

**NOTE:**  
THE ENTIRE PROJECT AREA IS THE DRAINAGE AREA, EXCLUDING THE AERATION PONDS, THE EVAPORATION PONDS, SLUDGE CONTAINMENT BASIN, AND RAW WATER POND.

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISION</th> <th>DATE</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISION	DATE	COMMENTS														<p>PREPARED UNDER THE DIRECT SUPERVISION OF:</p> <p> JAMES G. "JACK" HOLT</p> <p>10/18/2023 DATE</p>	<p>31773 R.C.E. No.</p> <p>12/31/24 REG. EXP.</p> 	<p>COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:</p> <p>JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS</p> <p>DATE</p>	<p>62028 R.C.E. No.</p> <p>09/30/25 REG. EXP.</p>  <p>PUBLIC WORKS DEPARTMENT <b>COUNTY OF IMPERIAL</b> EL CENTRO, CALIFORNIA</p>	<p>DATE: 10/18/2023</p> <p>DRAWN: RS</p> <p>DESIGNED: RS</p> <p>SCALE: N/A</p> <p>CHECKED: JGH</p>	<p>PROJECT TITLE</p> <p><b>COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS</b></p> <p>EXISTING WASTEWATER TREATMENT PLANT EROSION CONTROL PLAN</p>	<p>REFERENCE</p> <p>THG #542.089</p> <p>SHEET 36 OF 50</p>
REVISION	DATE	COMMENTS																					

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**BMP KEYNOTES**

- ① CONTRACTOR SHALL LOCATE THE PORTABLE RESTROOM FACILITIES IN THE STAGING AREA. INSTALL TWO (2) PORTABLE RESTROOM FACILITIES. SEE DETAIL E5 FOR TYPICAL STAGING AREA ON SHEET 38.
- ② INSTALL TWO (2) LAYER GRAVEL-FILLED BAGS. SEE DETAIL E3 ON SHEET 38.
- ③ INSTALL CONCRETE WASHOUT AREA. SEE DETAIL E4 ON SHEET 38.
- ④ INSTALL CONSTRUCTION ENTRANCE PER DETAIL E1 AND E5 ON SHEET 38.
- ⑤ INSTALL FIBER ROLLS PER DETAIL E2 ON SHEET 38. INSTALL FIBER ROLLS ON INTERIOR OF DIRT BERM TOE OF SLOPE. SEE BMP KEYNOTE 6.
- ⑥ INSTALL DIRT BERM PER DETAIL I ON SHEET 27.

**LEGEND**

- PORTABLE TOILET
- GRAVEL BAGS
- CONCRETE WASHOUT AREA
- CONSTRUCTION ENTRANCE
- FIBER ROLLS
- SAMPLE POINT
- DIRT BERM

**GENERAL EROSION CONTROL NOTES:**

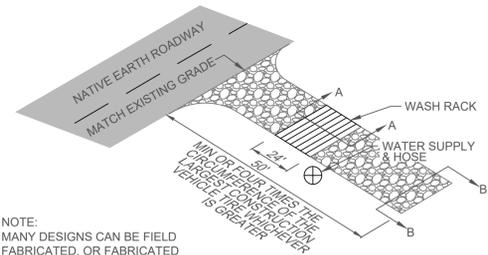
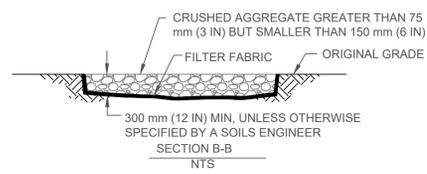
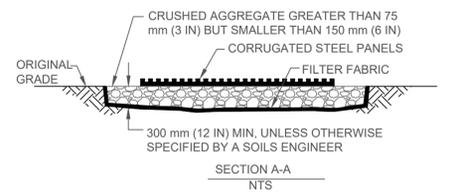
1. EROSION CONTROL PLAN INCLUDES ALL POSSIBLE BMPs FOR THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL APPLY APPROPRIATE BMPs FOR EACH PHASE OF CONSTRUCTION.
2. STREET SWEEPING (DURING MASS GRADING ACTIVITIES, STREETS WILL BE SWEEP AS NECESSARY TO PREVENT DIRT AND DUST FROM LEAVING THE CONSTRUCTION AREA).
3. CONTRACTOR SHALL PROVIDE ADEQUATE DUST SUPPRESSION TO MEET ALL COUNTY OF IMPERIAL AIR POLLUTION CONTROL DISTRICT REQUIREMENTS.
4. ALL BEST MANAGEMENT PRACTICES SHALL MEET THE REQUIREMENTS OF THE LATEST VERSION OF CALTRANS CONSTRUCTION SITE BMP FACT SHEETS.
5. SITE DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES.
6. NO SITE CLEARING OR GRADING SHALL BEGIN UNTIL ALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED.
7. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.

**NOTE:**

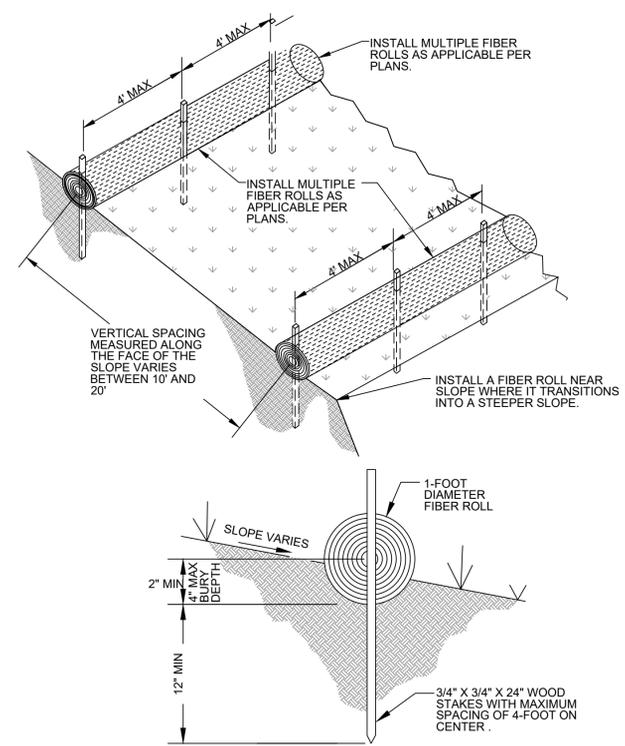
THE ENTIRE PROJECT AREA IS THE DRAINAGE AREA, EXCLUDING THE AERATION PONDS, THE EVAPORATION / INFILTRATION PONDS, SLUDGE CONTAINMENT BASIN, AND RAW WATER POND.

REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:		DATE	PROJECT TITLE	REFERENCE	
				JAMES G. "JACK" HOLT No. 31773 Exp. 12-31-24	31773 R.C.E. No.		JOHN A. GAY No. 62028 Exp. 9-30-25	10/18/2023	COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS	THG #542.089
				10/18/2023 DATE	12/31/24 REG. EXP.		JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS	09/30/25 REG. EXP.		SHEET 37 OF 50
							PUBLIC WORKS DEPARTMENT COUNTY OF IMPERIAL EL CENTRO, CALIFORNIA			

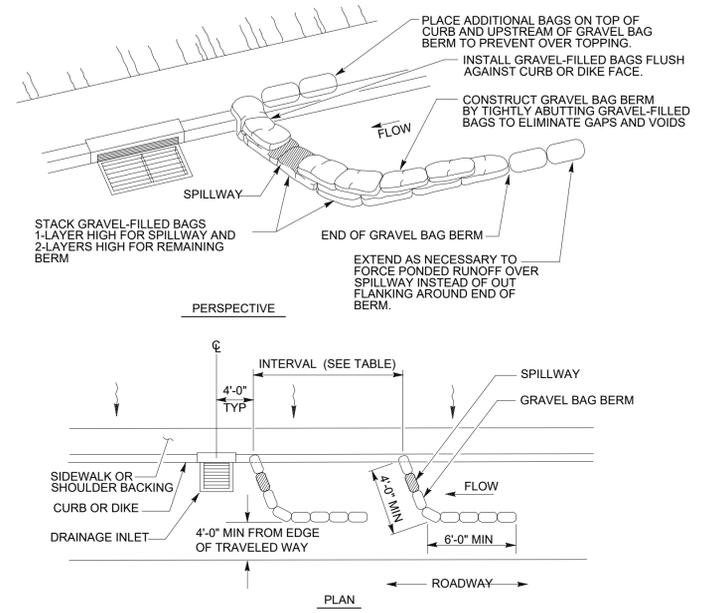
C:\Users\jcastro\OneDrive\The Holt Group\542.089 - 542.089004 - CAD & PDF DRAWINGS\10-18-2023 - Set of Plans\542.089 - SHEET 36-37 - Erosion Control Plan.dwg 11/07/2023 16:04



**CONSTRUCTION ENTRANCE - DETAIL E1**  
NOT TO SCALE



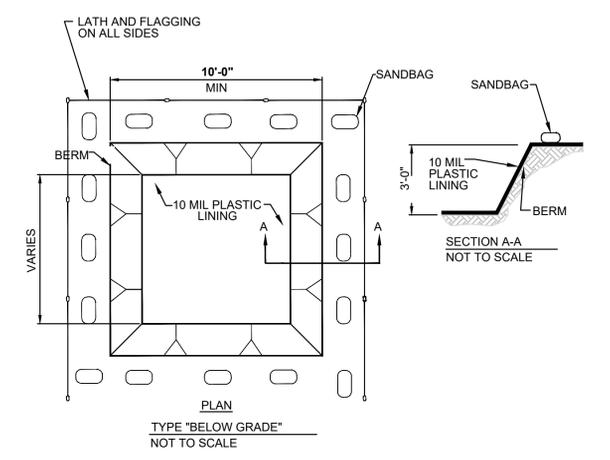
**TYPICAL FIBER ROLL INSTALLATION - DETAIL E2**  
NOT TO SCALE



SLOPE OF ROADWAY (PERCENT)	1 to 3.9	4 to 5.9	6 to 7.9	8 to 10	10+
INTERVAL BETWEEN BERM	100'	75'	50'	25'	12'

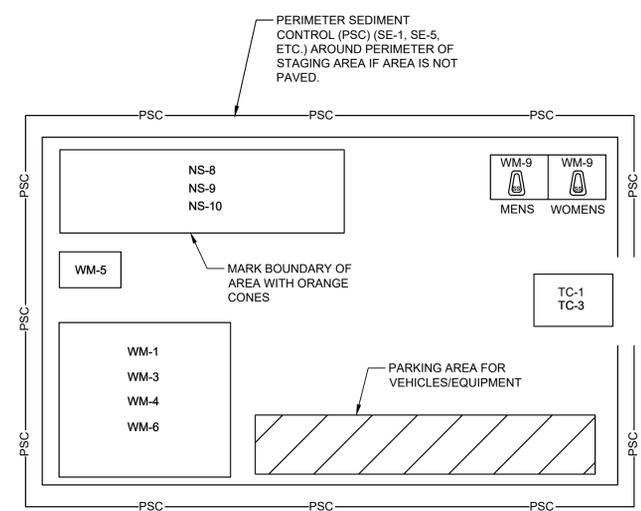
For slope of less than 1%, install barriers only if erosion/sediment is prevalent

**GRAVEL BAG DETAIL - DETAIL E3**  
NOT TO SCALE



NOTE: CONTRACTOR SHALL USE A TEMPORARY WASHOUT AREA AT AREAS WHERE A PERMANENT CONCRETE WASHOUT IS NOT ALLOWED.

**CONCRETE WASHOUT AREA - DETAIL E4**  
NOT TO SCALE



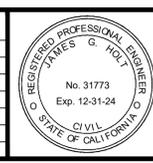
**TYPICAL STAGING AREA LAYOUT**

NOTES:  
1. CONTRACTOR SHALL ADJUST THE LAYOUT OF STAGING AREA BASED ON PROJECT SITE CONDITIONS AS NECESSARY.  
2. CONTRACTOR SHALL IMPLEMENT PERIMETER SEDIMENT CONTROL FOR STAGING AREA BASED ON PROJECT SITE CONDITIONS UPON THE APPROVAL OF THE RESIDENT ENGINEER.

- LEGEND**
- SE-1 SILT FENCE
  - SE-5 FIBER ROLLS
  - NS-8 VEHICLE AND EQUIPMENT CLEANING
  - NS-9 VEHICLE AND EQUIPMENT FUELING
  - NS-10 VEHICLE AND EQUIPMENT MAINTENANCE
  - WM-1 MATERIAL DELIVERY AND STORAGE
  - WM-3 STOCKPILE MANAGEMENT
  - WM-4 SPILL PREVENTION AND CONTROL
  - WM-5 SOLID WASTE MANAGEMENT
  - WM-6 HAZARDOUS WASTE MANAGEMENT
  - WM-9 SANITARY/SEPTIC WASTE MANAGEMENT
  - TC-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT
  - TC-3 TEMPORARY ENTRANCE/OUTLET TIRE WASH
  - WE-1 WIND EROSION CONTROL (TO BE IMPLEMENTED FOR UNPAVED/INACTIVE AREAS STOCKPILE MANAGEMENT)

**TYPICAL STAGING AREA - DETAIL E5**  
NOT TO SCALE

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
JAMES G. JACK HOLT  
10/18/2023  
DATE

31773  
R.C.E. No.  
12/31/24  
REG. EXP.



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
APPROVED FOR CONSTRUCTION BY:  
JOHN GAY, P.E.  
DIRECTOR OF PUBLIC WORKS  
DATE

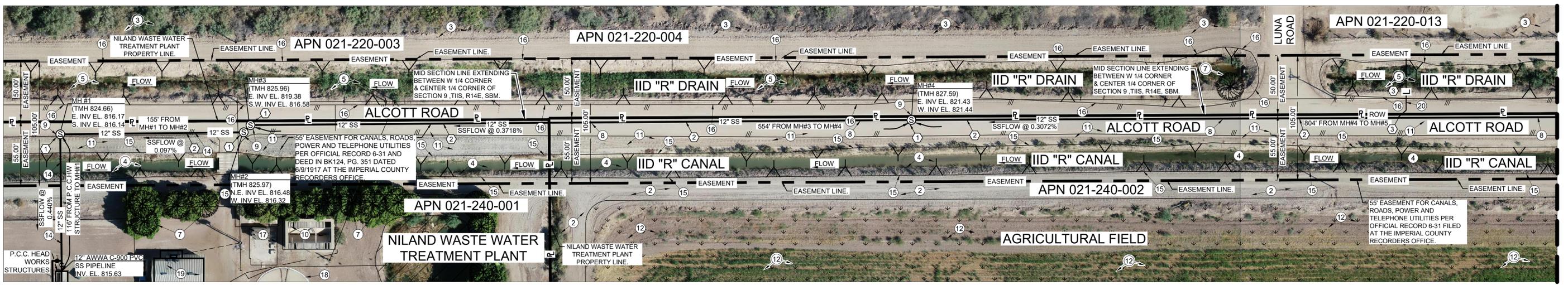
62028  
R.C.E. No.  
09/30/25  
REG. EXP.

PUBLIC WORKS DEPARTMENT  
**COUNTY OF IMPERIAL**  
EL CENTRO, CALIFORNIA

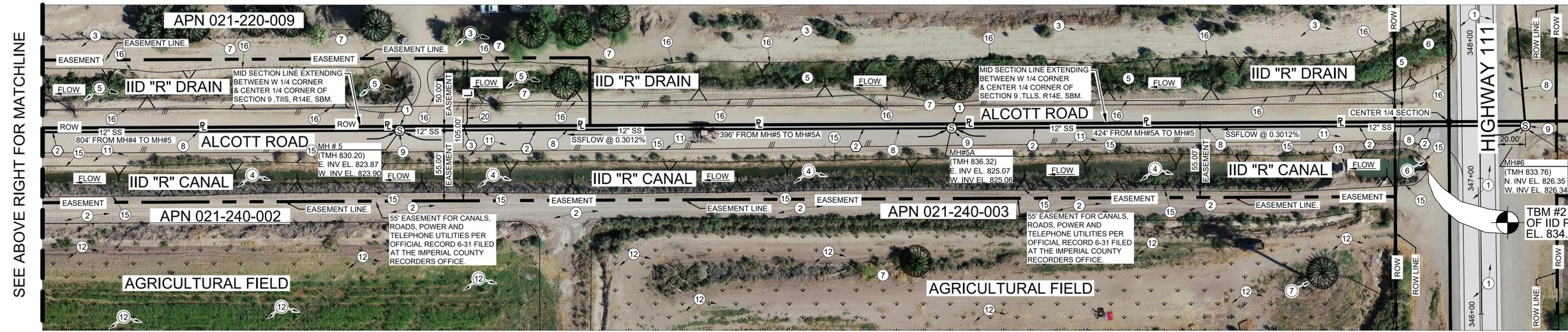
DATE: 10/18/2023  
DRAWN: RS  
DESIGNED: RS  
SCALE: N/A  
CHECKED: JCH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
**EROSION CONTROL PLAN DETAILS**

REFERENCE: THG #542.089  
SHEET 38 OF 50



SEE BELOW LEFT FOR MATCHLINE



SEE ABOVE RIGHT FOR MATCHLINE

MANHOLE TO BE REHABILITATED PER CONSTRUCTION KEYNOTE 1 ON PLAN SHEET 3 OF THE SEPARATE SET OF SANITARY SEWER PIPELINE IMPROVEMENTS IN STATE HIGHWAY 111 - CALTRANS RIGHT OF WAY.  
TBM #2 - BRASS DISK ON TOP OF IID P.C.C. HEADWALL EL. 834.90

**EXISTING KEYNOTES**

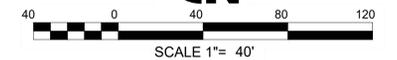
- ① EXISTING A.C. PAVEMENT.
- ② EXISTING NATIVE EARTH ACCESS ROAD.
- ③ EXISTING NATIVE AREA.
- ④ EXISTING IID EARTH LINED "R" CANAL.
- ⑤ EXISTING IID EARTH LINED "R" DRAIN.
- ⑥ EXISTING IID P.C.C. HEADWALL STRUCTURE.
- ⑦ EXISTING TREE.
- ⑧ EXISTING 12 INCH DIAMETER VCP SANITARY SEWER PIPELINE.
- ⑨ EXISTING SANITARY SEWER MANHOLE.
- ⑩ EXISTING ABANDONED P.C.C. IMHOFF TANK.
- ⑪ EXISTING NATIVE EARTH ALCOTT ROAD.
- ⑫ EXISTING AGRICULTURAL FIELD.
- ⑬ EXISTING IID P.C.C. WEIR STRUCTURE.
- ⑭ EXISTING 12 INCH DIAMETER PVC SANITARY SEWER PIPELINE TO REMAIN.
- ⑮ EARTH LINED CANAL TOP OF SLOPE.
- ⑯ EARTH LINED DRAIN TOP OF SLOPE.
- ⑰ EXISTING BUILDING P.C.C. SLAB.
- ⑱ EXISTING P.C.C. TANK SLAB.
- ⑲ EXISTING LABORATORY BUILDING.
- ⑳ EXISTING 4" SANITARY LATERAL. EXACT LOCATION UNKNOWN.

**CONSTRUCTION KEYNOTES**

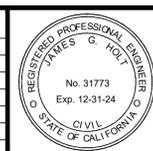
- ① REHABILITATE EXISTING MANHOLE PER DETAIL QQ ON PLAN SHEET 40.
- ② INSTALL CURED-IN-PLACE PIPE (CIPP) MATERIAL WITHIN THE EXISTING 12-INCH DIAMETER VITRIFIED CLAY PIPE (VCP) ALONG ALCOTT ROAD IN CONFORMANCE WITH THE TECHNICAL SPECIFICATIONS.
- ③ CUT OPENING IN C.I.P.P. LINER TO CONNECT TO THE EXISTING SANITARY SEWER LATERAL.

**MANHOLE REHABILITATION AND CURE-IN-PLACE PIPE (C.I.P.P.) QUANTITIES**

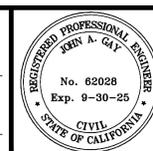
ITEM	QUANTITY
MANHOLE REHABILITATION (EACH)	6 EACH
12" VCP PIPELINE - (C.I.P.P.)	2,459 LINEAL FEET



REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
  
 JAMES G. "JACK" HOLT  
 10/18/2023 DATE  
 31773 R.C.E. No.  
 12/31/24 REG. EXP.



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
 JOHN GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 DATE  
 62028 R.C.E. No.  
 09/30/25 REG. EXP.

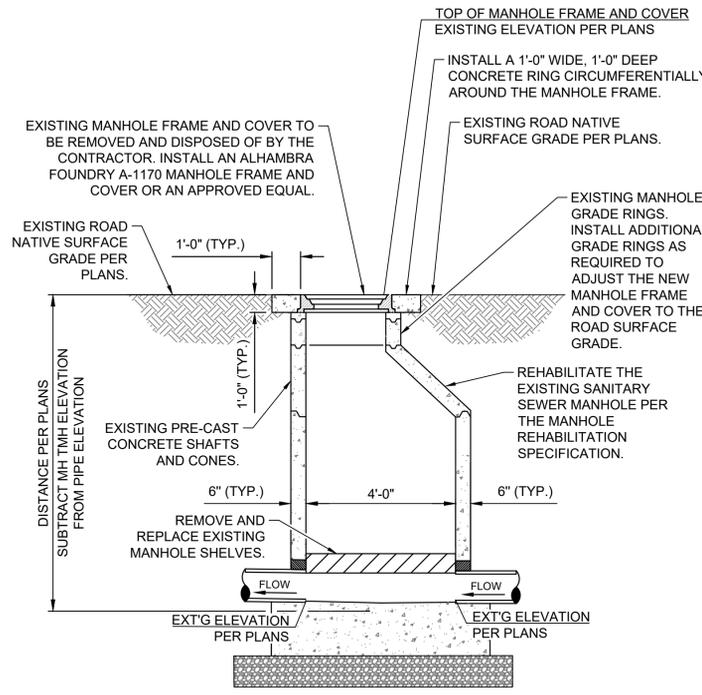
PUBLIC WORKS DEPARTMENT  
**COUNTY OF IMPERIAL**  
 EL CENTRO, CALIFORNIA

DATE: 10/18/2023  
 DRAWN: RS  
 DESIGNED: RS  
 SCALE: N/A  
 CHECKED: JCH

PROJECT TITLE  
**COUNTY OF IMPERIAL**  
**NILAND COUNTY SANITATION DISTRICT - WASTEWATER**  
**TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
 SANITARY SEWER PIPELINE PLAN ALONG ALCOTT ROAD FROM THE WWTP TO HIGHWAY 111

REFERENCE  
 THG #542.089  
 SHEET 39 OF 50

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**EXISTING MANHOLE SECTION VIEW**  
NTS

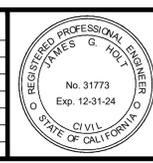
**EXISTING MANHOLE REHABILITATION SPECIFICATION**

THE INTERIOR OF THE EXISTING MANHOLE SHAFT SIDEWALLS, CONE AND GRADE RINGS SHALL BE HYDRO-BLASTED AND THE WALL SURFACES REPAIRED PRIOR TO THE INSTALLATION OF A HIGH STRENGTH MORTAR TO RE-BUILD THE MANHOLE SIDEWALLS. ADDITIONAL PCC GRADE RINGS SHALL BE ADDED AT THE MANHOLE ENTRANCE OPENING TO ELEVATE THE MANHOLE RING AND COVER TO THE EXISTING NATIVE GRADE, AS REQUIRED. A NEW MANHOLE FRAME AND COVER WITH A CONCRETE RING SHALL BE INSTALLED AT THE TOP OF THE REHABILITATED MANHOLE. PCC FLOOR SHELVES SHALL BE REPLACED AT THE BOTTOM OF THE MANHOLE. FOLLOWING IS THE LIST OF MANHOLE REHABILITATION ITEMS TO BE COMPLETED:

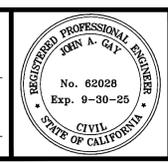
1. PRIOR TO COMMENCING WORK THE CONTRACTOR SHALL ENSURE THAT THE EXISTING WASTEWATER FLOW THROUGH THE MANHOLE WILL NOT BE IMPEDED. THE CONTRACTOR SHALL FURNISH AND INSTALL DEBRIS CONTAINMENT DEVICES TO CATCH ALL MANHOLE DEBRIS DURING THE MANHOLE REHABILITATION PROCESS WHILE MAINTAINING WASTEWATER FLOW THROUGH THE MANHOLE. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DEBRIS COLLECTED FROM THE MANHOLE REHABILITATION EFFORT. THE CONTRACTOR SHALL ALSO PROVIDE PROPER EQUIPMENT TO COMPLY WITH CONFINED WORK SPACE WORK AREA AND HAZARDOUS ENVIRONMENT CONDITIONS. THE CONTRACTOR'S PERSONNEL SHALL BE TRAINED TO WORK IN CONFINED WORK SPACE AND ENVIRONMENTALLY HAZARDOUS AREAS.
2. THE CONTRACTOR SHALL ERECT BARRICADES AROUND THE MANHOLE TO INSURE PEDESTRIANS OR VEHICULAR TRAFFIC DOES NOT ENTER THE MANHOLE REHABILITATION AREA.
3. THE EXISTING INTERIOR CONCRETE MANHOLE SHAFT, CONE AND GRADE RING SURFACES SHALL BE HYDRO-BLASTED AT A MINIMUM 5,000 PSI PRESSURE OR AN APPROVED METHOD RECOMMENDED BY THE LINING SYSTEM MANUFACTURER AND APPROVED BY THE ENGINEER. A PNEUMATIC CHISEL MAY BE USED TO REMOVE DETERIORATED CONCRETE FROM ISOLATED AREAS WITHIN THE MANHOLE INTERIOR.
4. AFTER THE INTERIOR MANHOLE WALL SURFACES ARE CLEANED LOCALIZED REPAIRS SHALL BE PERFORMED USING RAPID SETTING MORTARS COMPATIBLE WITH THE LINING SYSTEM. REPAIR MORTARS SHALL BE USED TO FILL SURFACE IRREGULARITIES, VOIDS AND DETERIORATED SURFACES AND TO REPAIR THE UNDERLYING MANHOLE STRUCTURE TO A UNIFORM SURFACE. MANUFACTURER'S SPECIFICATIONS SHALL BE FOLLOWED WHEN PERFORMING REPAIRS, MATERIAL HANDLING, MIXING INSTALLATION AND CURING.
5. A HIGH STRENGTH MORTAR SHALL BE APPLIED TO THE INTERIOR SURFACES OF THE MANHOLE AFTER THE ABOVE ITEMS HAVE BEEN SATISFACTORILY COMPLETED. THE HIGH STRENGTH MORTAR SHALL BE APPLIED IN CONTINUOUS LIFTS OF 1/2 INCH MINIMUM THICKNESS. THE HIGH STRENGTH MORTAR SHALL BE APPLIED ACCORDING TO THE MANUFACTURERS RECOMMENDATION AND CREATE A SMOOTH AND STRUCTURALLY SOUND INTERIOR SURFACE. THE HIGH STRENGTH MORTAR SHALL BE CURED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS.
6. A RAVEN 405 EPOXY COATING SYSTEM, OR AN APPROVED EQUAL, IS TO BE APPLIED TO THE INTERIOR SURFACE OF THE MANHOLE AFTER ITEM 5 ABOVE HAS BEEN SATISFACTORILY COMPLETED. A PRIMER RECOMMENDED BY THE MANUFACTURER SHALL BE INSTALLED PRIOR TO THE INSTALLATION OF THE EPOXY COATING SYSTEM. THE MINIMUM THICKNESS OF THE EPOXY COATING SYSTEM SHALL BE 125 MILS. DURING THE EPOXY COATING SYSTEM INSTALLATION, A MIL GAUGE SHALL BE USED TO VERIFY THAT THE MINIMUM THICKNESS OF THE LINING MEETS AND/OR EXCEEDS THE MINIMUM SPECIFIED THICKNESS.
7. AFTER THE LINING SYSTEM IS INSTALLED THE LINING SHALL BE SPARK TESTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION SPECIFICATION 2021 SECTION 502-6.2 AND REPAIRED PER SECTION 502-6.5.
8. THE CONCRETE BASE INCLUDING CHANNELS AND SHELVES SHALL BE REPLACED AT THE BOTTOM OF THE MANHOLE. THE CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS CURING.
9. INSTALL A NEW CONCRETE MANHOLE COVER AND CONCRETE RING AROUND THE MANHOLE COVER AS ILLUSTRATED ON THE EXISTING MANHOLE SECTION VIEW. THE CONCRETE RING SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS CURING.
10. COMPLETE MANHOLE REHABILITATION WORK AS NOTED IN ITEMS 1 THROUGH 9 ABOVE AND IN CONFORMANCE WITH THE PUBLIC WORKS SPECIFICATION SECTION 502-6.5, 2021 EDITION.

**EXISTING MANHOLE REHABILITATION DETAIL** QQ  
NTS 39/40

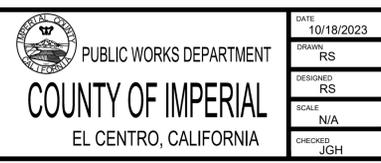
REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
  
 JAMES G. "JACK" HOLT  
 No. 31773 R.C.E. No.  
 10/18/2023 DATE 12/31/24 REG. EXP.



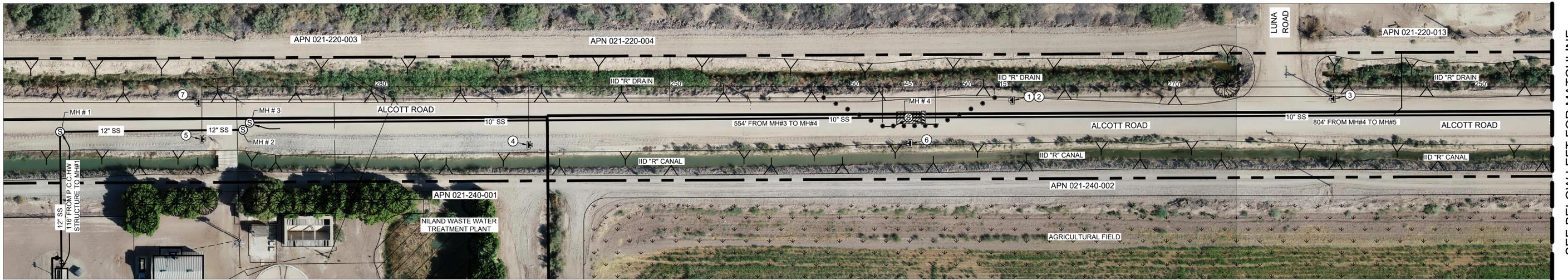
COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
  
 JOHN GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 DATE 62028 R.C.E. No. 09/30/25 REG. EXP.



DATE	10/18/2023
DRAWN	RS
DESIGNED	RS
SCALE	N/A
CHECKED	JGH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
**SANITARY SEWER COLLECTION  
 SYSTEM DETAILS**

REFERENCE	THG #542.089
SHEET	40 OF 50



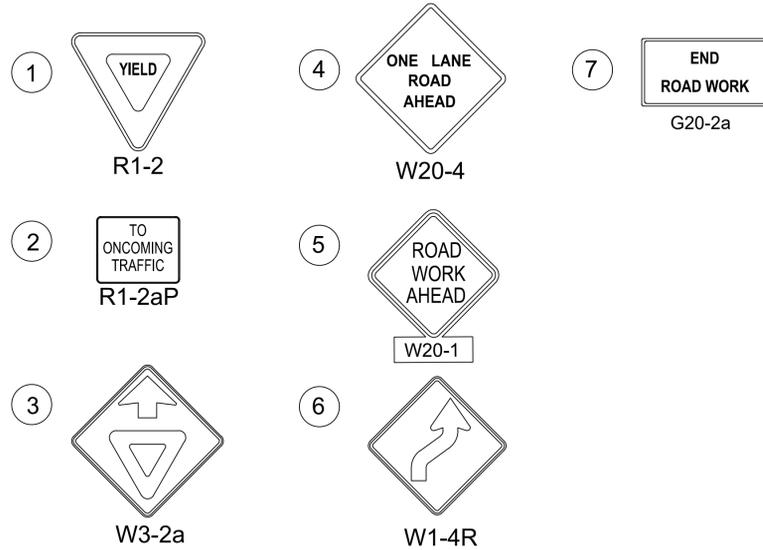
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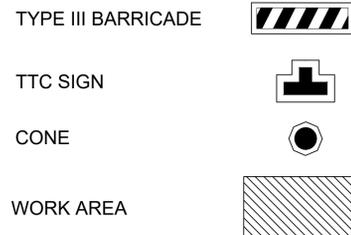
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TBM #2 - BRASS DISK ON TOP OF IID P.C.C. HEADWALL EL. 834.90

**KEYNOTES**



**LEGEND**

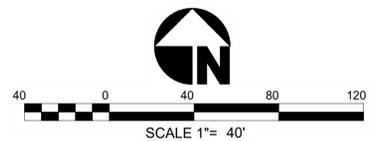


**NOTE:**

TRAFFIC CONTROL ILLUSTRATED ON THIS PLAN IS BASED ON MODIFIED TA-11 FROM CALIFORNIA MUTCD (LANE CLOSURE ON A TWO-LANE ROAD WITH LOW TRAFFIC VOLUMES.)

THIS TEMPORARY TRAFFIC CONTROL CONFIGURATION IS ILLUSTRATED FOR THE REHABILITATION OF MANHOLE NUMBER 4 AND CURED-IN-PLACE PIPE (CIPP) REHABILITATION WORK TO BE COMPLETED FROM MANHOLE NUMBER 4. THIS SIMILAR TRAFFIC CONTROL CONFIGURATION SHALL BE USED FOR THE IMPROVEMENTS TO THE OTHER SANITARY SEWER MANHOLES AND CIPP PIPELINE IMPROVEMENT WORK ALONG ALCOTT ROAD.

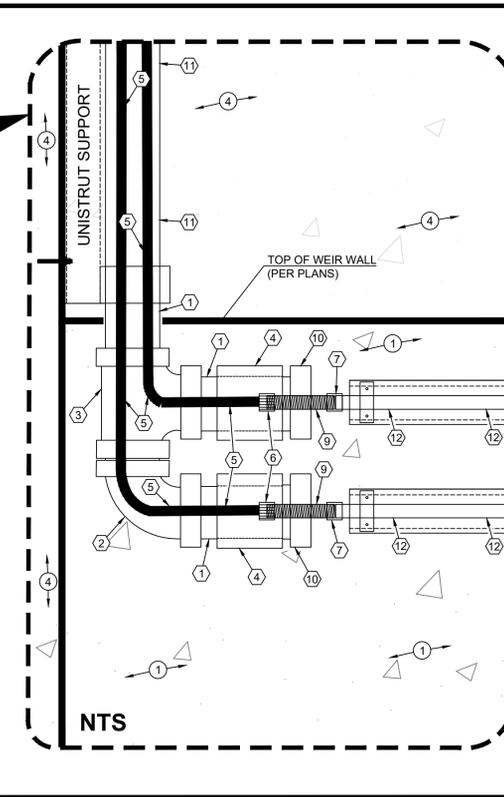
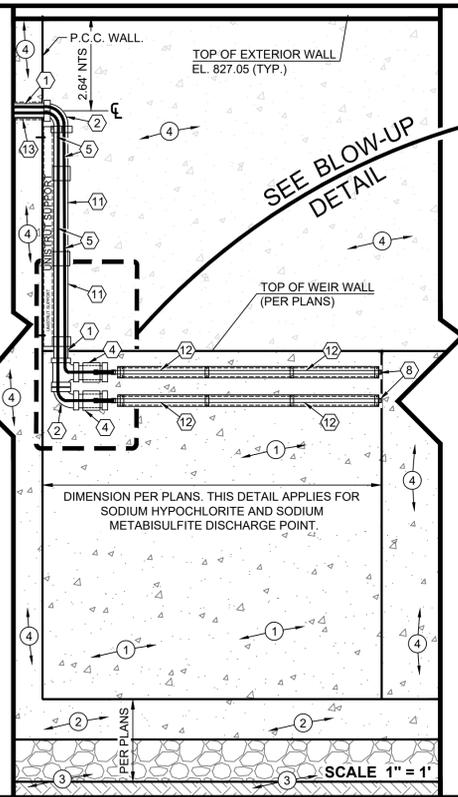
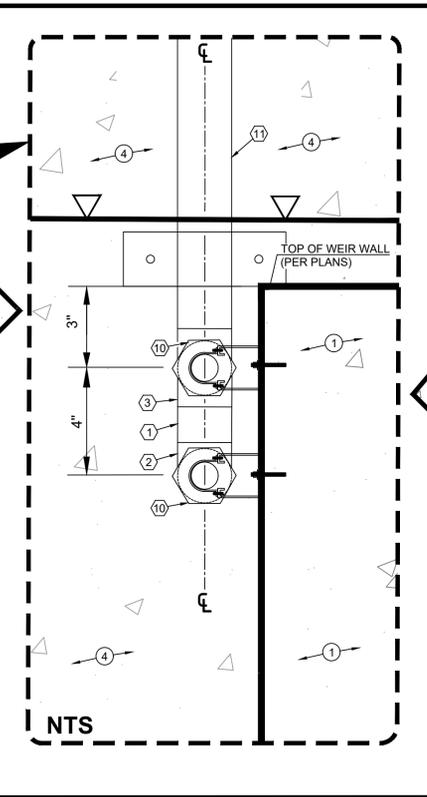
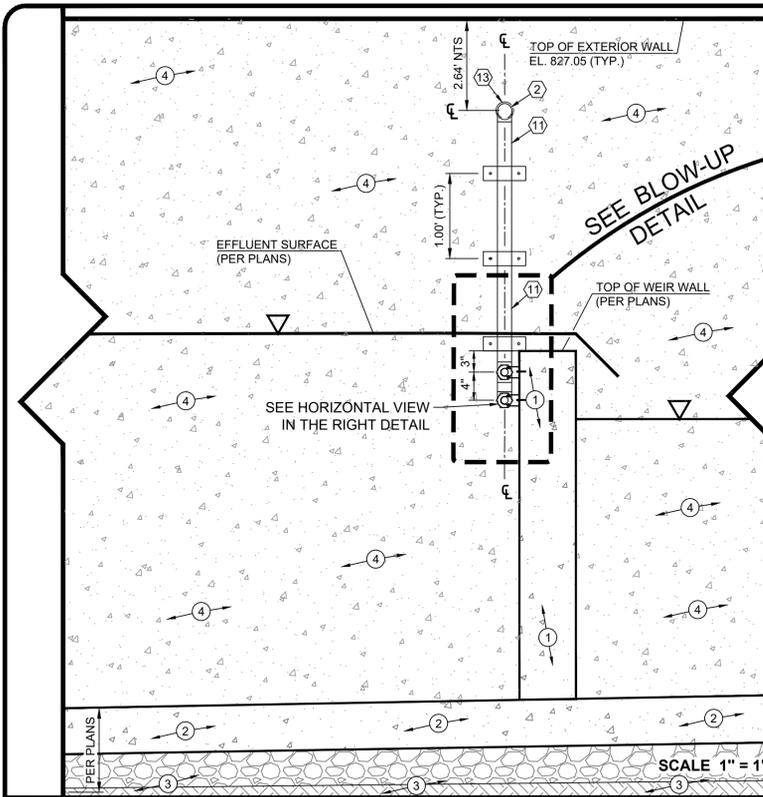
SIGNAL LIGHTS TO BE TEMPORARILY SET TO FLASH RED DURING CONSTRUCTION TIME FRAME. COORDINATE WITH COUNTY PUBLIC WORKS FIELD OPERATIONS REPRESENTATIVES A MINIMUM OF TWO DAYS (48 HOURS) PRIOR TO THE START OF WORK.



REVISION	DATE	COMMENTS	PREPARED UNDER THE DIRECT SUPERVISION OF:		COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT APPROVED FOR CONSTRUCTION BY:		DATE	PROJECT TITLE
			 JAMES G. "JACK" HOLT 10/18/2023 DATE		 JOHN A. GAY 09/30/25 REG. EXP.		10/18/2023	COUNTY OF IMPERIAL COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS TRAFFIC CONTROL PLAN
			31773 R.C.E. No. 12/31/24 REG. EXP.		62028 R.C.E. No. 09/30/25 REG. EXP.		DRAWN: RS DESIGNED: RS SCALE: N/A CHECKED: JCH	
								REFERENCE: THG #542.089 SHEET: 41 OF 50

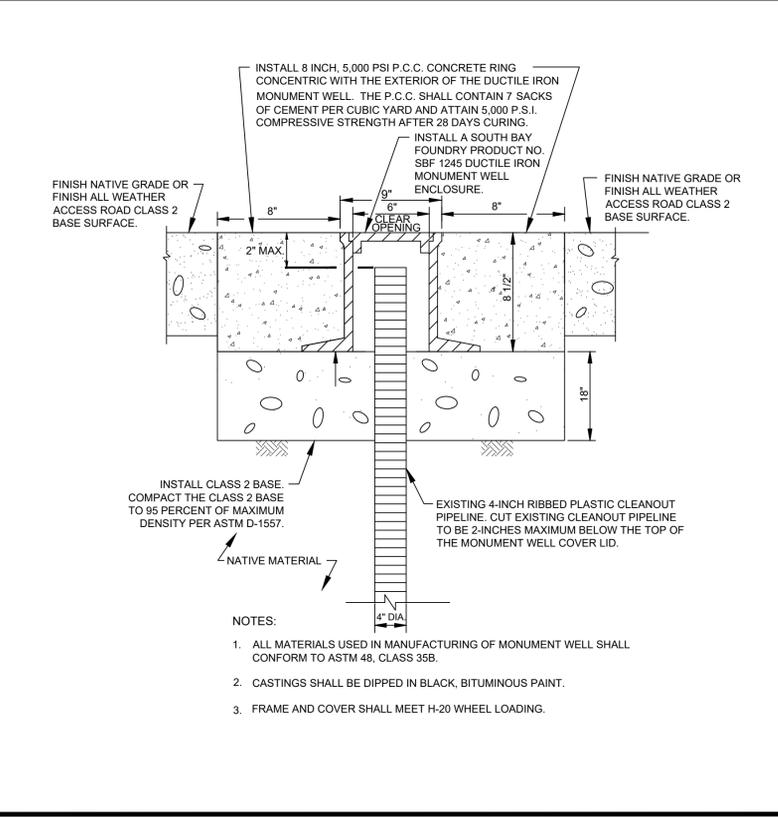
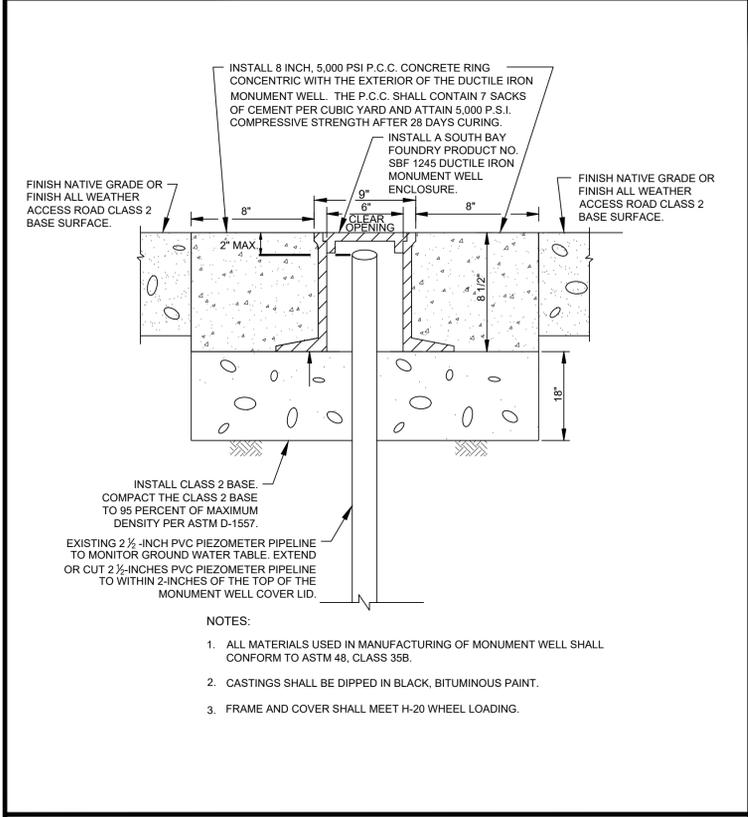
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- EXISTING KEYNOTES**
- EXISTING CHLORINATION / DECHLORINATION P.C.C. WEIR WALL.
  - EXISTING CHLORINATION / DECHLORINATION P.C.C. SLAB.
  - EXISTING CHLORINATION / DECHLORINATION SUB GRADE MATERIAL.
  - EXISTING CHLORINATION / DECHLORINATION P.C.C. WALL.
- CONSTRUCTION KEYNOTES**
- INSTALL 2-INCH SCHEDULE 80 PVC PIPELINE.
  - INSTALL 2-INCH SCHEDULE 80 PVC PIPELINE 90 DEGREE ELBOW.
  - INSTALL 2-INCH SCHEDULE 80 PVC TEE FITTING.
  - INSTALL 2-INCH SCHEDULE 80 PVC COUPLING FITTING.
  - INSTALL 1/2-INCH SOFT TUBE CLEAR PLASTIC TUBING.
  - INSTALL RYAN-HERCO SOFT TUBE TRANSITION FITTING OR AN APPROVED EQUAL TO CONNECT THE CLEAR PVC TUBING WITH THE SCHEDULE 80 PVC PIPE.
  - INSTALL 1/2" PVC SCHEDULE 80 FEMALE NPT THREADED ADAPTER TO PVC PIPELINE FITTING.
  - INSTALL 1/2" SCHEDULE 80 PVC CAP SOCKET.
  - INSTALL 1/2" X 2-1/2" PVC SCHEDULE 80 PVC THREADED NIPPLE AT THE CENTER OF THE REDUCING BUSHING 2 INCH X 1/2 INCH SCHEDULE 80 MALE SPIGOT X FEMALE NPT FITTING. THE PVC SCHEDULE 80 NIPPLE MUST BE THREADED FOR COMPLETE LENGTH OF 2-1/2 INCHES WITH 1/2 INCH - 14 IN. NPT STEEL HEX PIPE DIE.
  - INSTALL A REDUCING BUSHING 2 INCH X 1/2 INCH SCHEDULE 80 MALE SPIGOT X FEMALE NPT FITTING.
  - INSTALL 2 INCH SCHEDULE 80 PVC PIPELINE OVER THE TOP OF THE WALL. SUPPORT THE CHEMICAL PIPE TO THE CONCRETE WALL SURFACE WITH 1-5/8 304 STAINLESS STEEL UNISTRUT AND UNISTRUT CLAMPS PLACED 1-FEET ON CENTER. ANCHOR THE UNISTRUT TO THE CONCRETE WALL WITH (2) 3/16 STAINLESS STEEL EXPANSION BOLTS. COAT THE EXTERIOR PIPE EXPOSED TO SUNLIGHT WITH EXTERIOR LATEX PAINT.
  - INSTALL A 1/2 INCH PVC DIFFUSER PIPELINE. PLACE 3/16 INCH DIAMETER HOLES COMMENCING 6 INCHES FROM EACH INTERIOR WALL EDGE FACING STRAIGHT UP 6 INCHES ON CENTER. SUPPORT THE CHEMICAL PIPE TO THE CONCRETE WALL SURFACE WITH 1-5/8 316 STAINLESS STEEL UNISTRUT AND UNISTRUT CLAMPS PLACED 1-FEET ON CENTER. ANCHOR THE UNISTRUT TO THE CONCRETE WALL WITH (2) 3/16 STAINLESS STEEL EXPANSION BOLTS. ALIGN THE PVC 1/2 INCH PIPE VERTICALLY WITH THE 2 INCH INSTALLED PIPE.
  - DRILL NEW 2 1/4-INCH DIAMETER HOLE IN THE EXISTING P.C.C. WALL. GROUT THE ANNULAR AREA BETWEEN THE EXTERIOR OF THE 2" SCHEDULE 80 PVC PIPE AND THE 2 1/4-INCH DRILLED HOLE WITH A NON-SHRINK GROUT.

DELIVERY PIPELINE SYSTEM OF SODIUM HYPOCHLORITE AND SODIUM METABISULFITE Q  
7,9,10 43



**PIEZOMETERS INFORMATION**

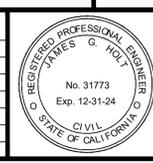
PIEZOMETER NUMBER	TOP OF 2 1/2" PIEZOMETER PVC SLOTTED PIPE	WATER MEASUREMENT TOP OF PIEZOMETER PIPE TO WATER TABLE	WATER TABLE ELEVATION
P1	823.81	6.92'	816.89
P2	826.96		
P3	822.57	5.25'	817.32
P4	823.40	7.08'	816.32
P5	821.66	4.67'	816.99
P6	821.16	3.92'	817.24
P7	821.00	4.08'	816.92
P8	821.15	4.08'	817.07
P9	822.54	5.42'	817.12
P10	823.08	5.92'	817.16

TYPICAL MONUMENT WELL ENCLOSURE FOR EXISTING 2 1/2-INCH PVC PIEZOMETERS - DETAIL WW  
4 43

TYPICAL MONUMENT WELL ENCLOSURE FOR EXISTING PERFORATED PIPELINE CLEANOUTS - DETAIL XX  
4 43

TABLE A  
4 43

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:

*JAMES G. HOLT*  
JAMES G. "JACK" HOLT  
10/18/2023 DATE

31773 R.C.E. No.  
12/31/24 REG. EXP.



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
APPROVED FOR CONSTRUCTION BY:

*JOHN GAY*  
JOHN GAY, P.E.  
DIRECTOR OF PUBLIC WORKS  
DATE

62028 R.C.E. No.  
09/30/25 REG. EXP.

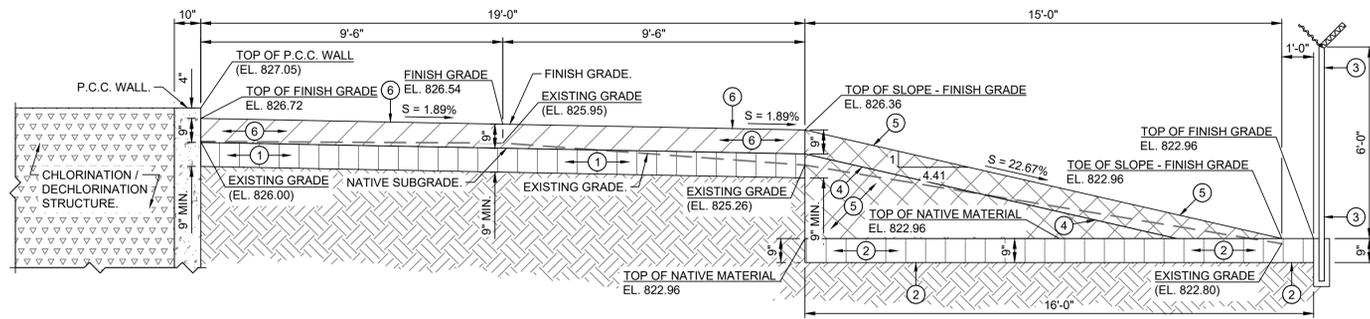
PUBLIC WORKS DEPARTMENT  
**COUNTY OF IMPERIAL**  
EL CENTRO, CALIFORNIA

DATE: 10/18/2023  
DRAWN: RS  
DESIGNED: RS  
SCALE: N/A  
CHECKED: JCH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**

MISCELLANEOUS DETAIL SHEET

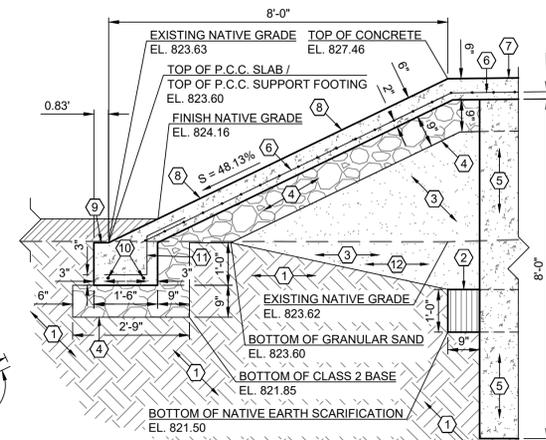
REFERENCE	THG #542.089
SHEET	43 OF 50



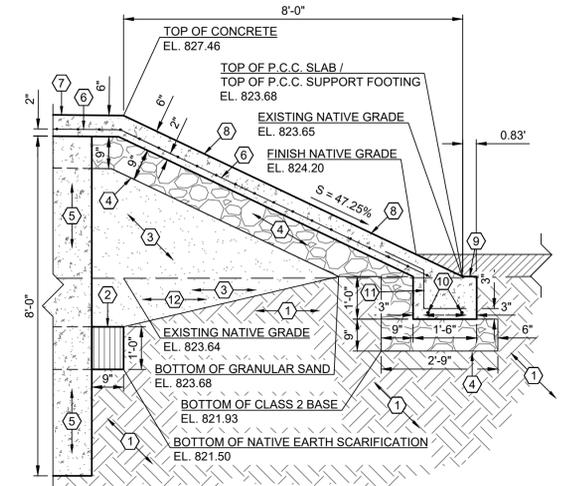
CHLORINATION / DECHLORINATION BASIN WEST-SIDE, SOUTH-FACING GRADING SECTION

SCALE 3/8" = 1'

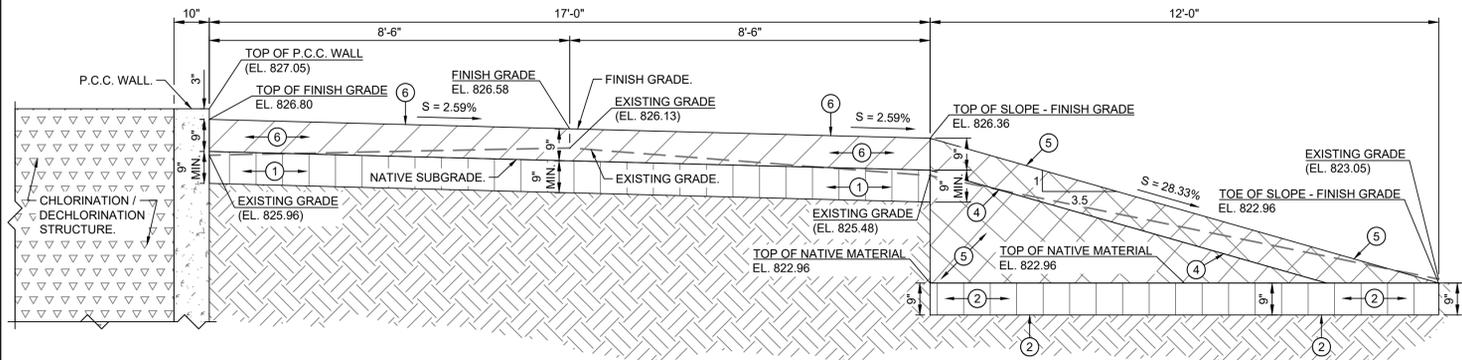
H-H  
6 44



REINFORCING BAR DOWEL DETAIL



REINFORCING BAR DOWEL DETAIL



CHLORINATION / DECHLORINATION BASIN EAST-SIDE, NORTH-FACING GRADING SECTION

SCALE 1/2" = 1'

I-I  
6 44

NEW SODIUM METABISULFITE STRUCTURE SOUTH SIDESLOPE SECTION

SCALE 1/2" = 1'

M-M  
6,9 44

NEW SODIUM METABISULFITE STRUCTURE NORTH SIDESLOPE SECTION

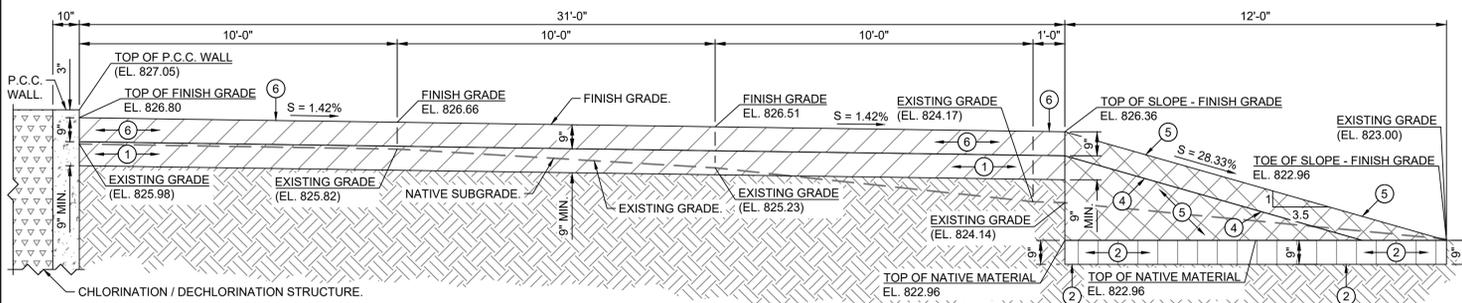
SCALE 1/2" = 1'

N-N  
6,9 44

KEYNOTES (SECTIONS M-M AND N-N)

- 1 EXISTING NATIVE SOIL TO REMAIN.
- 2 SCARIFY AND MOISTURE CONDITION EXISTING NATIVE MATERIAL FOR A DEPTH OF 1 FOOT. COMPACT SCARIFIED AND MOISTURE CONDITIONED NATIVE SOIL AT 4 TO 8 PERCENT OVER OPTIMUM WATER CONTENT TO 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 3 INSTALL GRANULAR SAND MATERIAL IN MAXIMUM 9-INCH LIFTS. COMPACT GRANULAR SAND MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY AT OPTIMUM WATER CONTENT PER ASTM D-1557. SUCCESSIVE LIFTS SHALL NOT BE PLACED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE REQUIRED COMPACTION DENSITY.
- 4 INSTALL CLASS 2 BASE. COMPACT THE CLASS 2 BASE MATERIAL TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 5 INSTALL SHADE STRUCTURE FOOTING PER DETAIL I ON PLAN SHEET 36. P.C.C. CONCRETE SHALL CONTAIN 7 SACKS OF CEMENT PER CUBIC YARD AND ATTAIN A COMPRESSIVE STRENGTH OF 5,000 PSI AFTER 28 DAYS OF CURING.

- 6 INSTALL 6-INCH X 6-INCH, 6-GAUGE WELDED WIRE FABRIC.
- 7 INSTALL 6-INCH P.C.C. SLAB.
- 8 INSTALL 6-INCH P.C.C. SIDESLOPE.
- 9 INSTALL P.C.C. SIDESLOPE SUPPORT FOOTING. FOOTING TO BE INSTALLED AT A 35% SLOPE PER SECTION M-M AND 36% SLOPE PER SECTION N-N.
- 10 INSTALL TWO (2) CONTINUOUS NUMBER 5 HORIZONTAL REINFORCING BARS.
- 11 INSTALL NUMBER 4 REINFORCING BAR DOWEL 1.5 FEET ON CENTER PER RESPECTIVE DETAILS IN LOWER LEFT CORNER OF SECTION DETAILS M-M AND N-N ON THIS DETAIL SHEET. NO. 5 HORIZONTAL REINFORCING BARS AND 6-INCH X 6-INCH, 6-GAUGE WELDED WIRE FABRIC TO BE TIED TO THE NUMBER 4 REINFORCING DOWEL.
- 12 REMOVE AND DISPOSE OF EXISTING NATIVE MATERIAL TO THE BOTTOM OF THE GRANULAR SAND MATERIAL OR P.C.C. FOOTING PRIOR TO CONSTRUCTING CHEMICAL STRUCTURES.



CHLORINATION / DECHLORINATION BASIN NORTH-SIDE, WEST-FACING GRADING SECTION

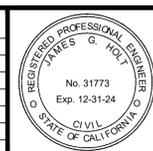
SCALE 3/8" = 1'

J-J  
6 44

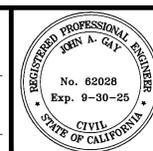
KEYNOTES (SECTIONS H-H, I-I, AND J-J)

- 1 SCARIFY AND COMPACT THE EXISTING NATIVE MATERIAL FOR A MINIMUM OF 9 INCHES. ADD ADDITIONAL NATIVE MATERIAL AS REQUIRED TO ESTABLISH THE NATIVE SUBGRADE 9 INCHES BELOW THE FINISH GRADE BETWEEN THE CHLORINATION / DECHLORINATION BASIN AND THE TOP OF SLOPE. COMPACT THE SCARIFIED NATIVE MATERIAL TO 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 2 GRADE. SCARIFY AND COMPACT THE NATIVE MATERIAL FOR A DEPTH OF 9 INCHES TO AN ELEVATION OF 822.96 ALONG THE EXISTING 6-FOOT CHAIN LINK FENCE FOR A DISTANCE OF 16 FEET AS ILLUSTRATED ON THE SECTION H-H AND A DISTANCE OF 12 FEET FOR SECTIONS I-I AND J-J. COMPACT THE SCARIFIED NATIVE MATERIAL TO 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.
- 3 CONTRACTOR SHALL BE ALLOWED TO REMOVE AND REINSTALL THE EXISTING CHAIN LINK FENCE FABRIC, AS NECESSARY, TO COMPLETE GRADING ACTIVITIES. CONTRACTOR SHALL REPLACE THE CHAIN LINK FENCE FABRIC AFTER GRADING ACTIVITIES ARE COMPLETED. CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE ANY DAMAGED FENCE COMPONENTS AFTER GRADING ACTIVITIES ARE COMPLETED. INSTALL FENCE FABRIC AND REPLACE ANY REQUIRED FENCING COMPONENTS IN ACCORDANCE WITH FENCE PLAN SHEET 29.
- 4 EXISTING NATIVE EARTH SIDE SLOPE VARIES. SEE CONTOURS ON PLAN SHEET 6 FOR EXISTING GRADES.
- 5 REMOVE EXISTING NATIVE EARTH SIDE SLOPE FROM THE TOP OF SLOPE TO THE TOE OF SLOPE FOR A 15 FOOT HORIZONTAL DISTANCE TO AN ELEVATION OF 822.96 FOR SECTION H-H AND A 12 FOOT HORIZONTAL DISTANCE TO AN ELEVATION OF 822.96 FOR SECTIONS I-I AND J-J. RE-INSTALL THE NATIVE MATERIAL IN 9-INCH LIFTS. COMPACT THE 9-INCH LIFTS TO 90 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557. THE FINISH SIDE SLOPE GRADE SHALL BE CONSTRUCTED AT A SLOPE OF 4.41:1 FOR SECTION H-H AND 3.5:1 FOR SECTIONS I-I AND J-J.
- 6 INSTALL 9 INCHES OF CLASS 2 BASE UPON SCARIFIED, COMPACTED, AND GRADED NATIVE SUBGRADE. COMPACT CLASS 2 BASE TO 95 PERCENT OF MAXIMUM DENSITY PER ASTM D-1557.

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
  
 JAMES G. "JACK" HOLT  
 31773 R.C.E. No.  
 10/18/2023 DATE  
 12/31/24 REG. EXP.



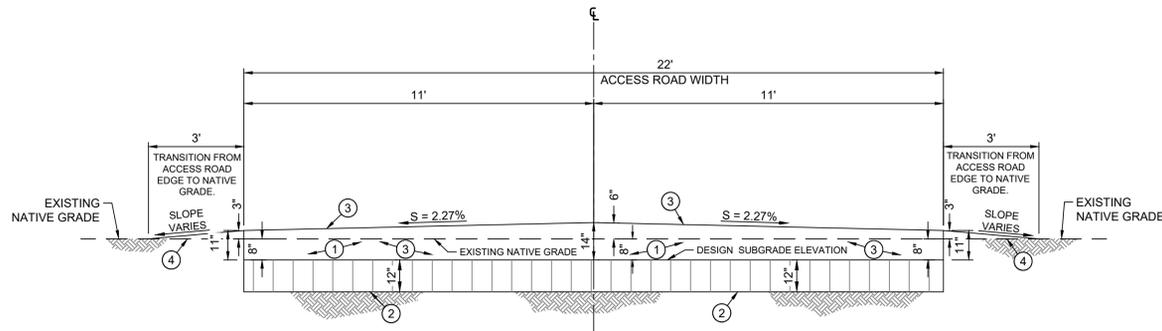
COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
  
 JOHN GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 62028 R.C.E. No.  
 09/30/25 REG. EXP.

PUBLIC WORKS DEPARTMENT  
 COUNTY OF IMPERIAL  
 EL CENTRO, CALIFORNIA

DATE 10/18/2023  
 DRAWN RS  
 DESIGNED RS  
 SCALE N/A  
 CHECKED JGH

PROJECT TITLE  
 COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS  
 MISCELLANEOUS DETAIL SHEET

REFERENCE	THG #542.089
SHEET	44 OF 50



**KEYNOTES**

- REMOVE EXISTING NATIVE MATERIAL TO DESIGN SUBGRADE ELEVATION. NATIVE EARTH SHALL BE USED AS FILL FOR OTHER PROJECT IMPROVEMENTS OR REMOVED AND DISPOSED OF FROM THE PROJECT SITE.
- SCARIFY AND COMPACT NATIVE MATERIAL TO DESIGN SUBBASE GRADE FOR A DEPTH OF 12 INCHES AT 90 PERCENT OF MAXIMUM DENSITY AT OPTIMUM WATER CONTENT PER ASTM D-1557.
- INSTALL CLASS 2 BASE ACCORDING TO THE CENTERLINE DESIGN GRADE ESTABLISHED BY THE FINISH GRADE ELEVATIONS AT B.C.'S, E.C.'S AND END POINTS AS ILLUSTRATED ON PLAN SHEET 4 AND THIS SECTION. THE CLASS 2 BASE DEPTH SHALL BE 14 INCHES AT THE ACCESS ROAD CENTERLINE AND 11 INCHES AT THE ACCESS ROAD EDGES.
- GRADE NATIVE MATERIAL FROM THE ACCESS ROAD CLASS 2 BASE EDGES TO THE NATIVE GRADE IN A 3 FOOT HORIZONTAL DISTANCE.

**NOTE:**

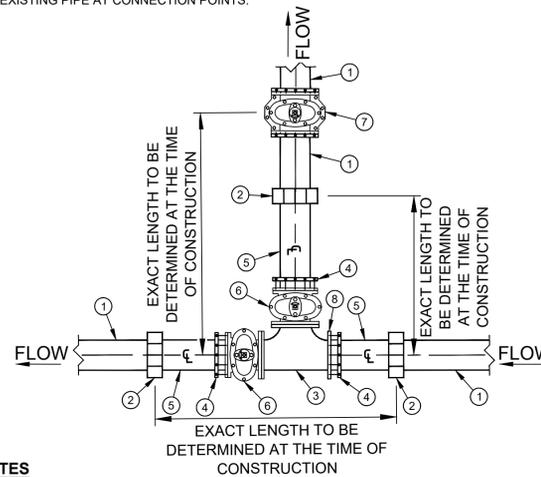
THE SURVEYOR COMPLETING THE CONSTRUCTION STAKING SHALL PROVIDE ROADWAY DESIGN GRADE AND SUBGRADE ELEVATIONS ALONG THE ACCESS ROADWAY CENTERLINE AND ROAD EDGES AT 50 FOOT INTERVALS ALONG THE LINEAR ROAD SEGMENTS AND 15 FOOT INTERVALS ALONG THE CURVE CENTERLINES. THE DESIGN GRADE AND SUBBASE ELEVATIONS SHALL BE PROVIDED TO THE ENGINEER AS A SUBMITTAL DOCUMENT FOR REVIEW AND APPROVAL. EXCAVATION WORK FOR THE CONSTRUCTION OF THE ALL WEATHER ACCESS ROAD SHALL NOT COMMENCE UNTIL THE ENGINEER HAS APPROVED THE DESIGN GRADE SUBMITTAL DOCUMENT.

**ALL WEATHER ACCESS ROAD SECTION**  
SCALE 3/8" = 1'-0"

**B-B**  
4 45

**NOTE:**

PIPELINE CONNECTION INSTALLATION NATIVE MATERIAL BACKFILL SHALL BE INSTALLED IN MAXIMUM 9 INCH LIFTS AT 90 PERCENT OF MAXIMUM DENSITY AT OPTIMUM WATER CONTENT PER ASTM D-1557. ADDITIONAL LIFTS SHALL NOT BE INSTALLED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE SPECIFIED COMPACTION DENSITY. CONTRACTOR TO REMOVE AND DISPOSE OF PRIOR EXISTING PIPING, VALVES AND FITTINGS. CONTRACTOR TO SAWCUT EXISTING PIPE AT CONNECTION POINTS.



**KEYNOTES**

- EXISTING 6-INCH AWWA C-900 DR18 PVC SANITARY SEWER FORCE MAIN.
- INSTALL AN 6-INCH DUCTILE IRON EPOXY-COATED TRANSITION COUPLING WITH 316 STAINLESS STEEL HARDWARE TO CONNECT THE EXISTING AWWA C-900, DR18 PVC PIPELINE TO THE NEW AWWA C-900, DR18 PVC PIPELINE SECTION.
- INSTALL 6-INCH X 6-INCH X 6-INCH DUCTILE IRON-FLANGED TEE WITH 316 STAINLESS STEEL HARDWARE.
- INSTALL 6-INCH DUCTILE IRON RESTRAINED JOINT FITTING WITH 316 STAINLESS STEEL HARDWARE.
- INSTALL NEW 6-INCH DIAMETER AWWA C-900, DR18 PVC PIPELINE.
- INSTALL 6-INCH DIAMETER FLANGED ECCENTRIC PLUG VALVE WITH VALVE RISER AND COVER PER DETAIL E ON SHEET 35.
- INSTALL 6-INCH INSERT VALVE INCLUDING ALL HARDWARE REQUIRED FOR THE INSTALLATION. ALL HARDWARE SHALL BE 316 STAINLESS STEEL. SEE SPECIAL CONDITIONS FOR SEQUENCE OF INSTALLATION. INSTALL VALVE RISER, VALVE EXTENSION AND VALVE COVER.
- INSTALL 6-INCH DUCTILE IRON FLANGED COUPLING ADAPTER.

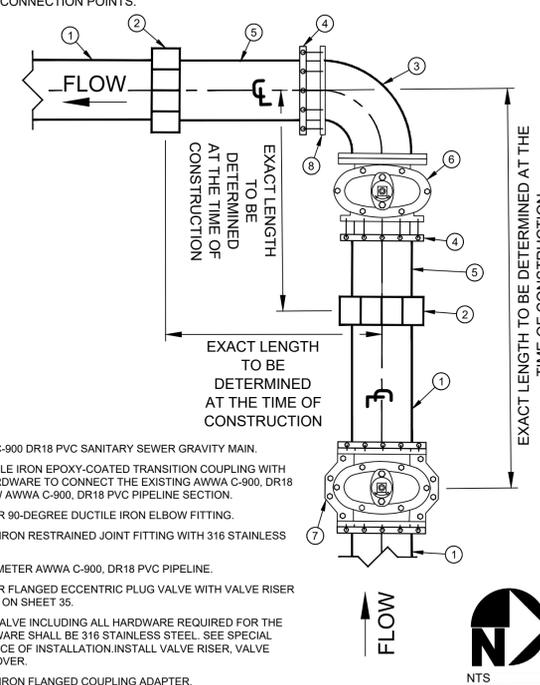


**PIPELINE CONNECTION DETAIL**  
NOT TO SCALE

**ZZ**  
4 45

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**KEYNOTES**

- EXISTING 12-INCH AWWA C-900 DR18 PVC SANITARY SEWER GRAVITY MAIN.
- INSTALL AN 12-INCH DUCTILE IRON EPOXY-COATED TRANSITION COUPLING WITH 316 STAINLESS STEEL HARDWARE TO CONNECT THE EXISTING AWWA C-900, DR18 PVC PIPELINE TO THE NEW AWWA C-900, DR18 PVC PIPELINE SECTION.
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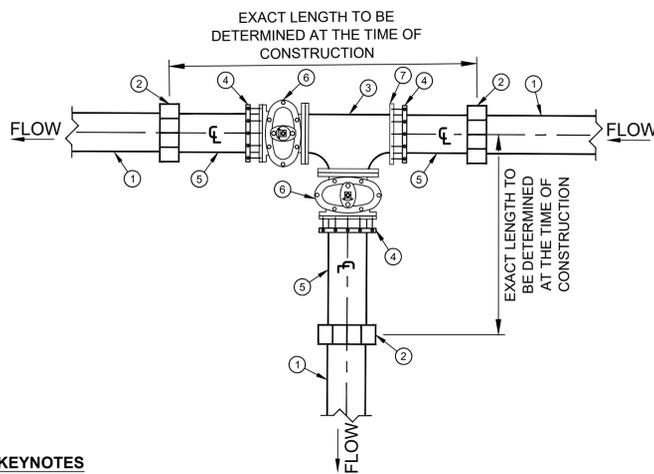


**PIPELINE CONNECTION DETAIL**  
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**AAA**  
4 45

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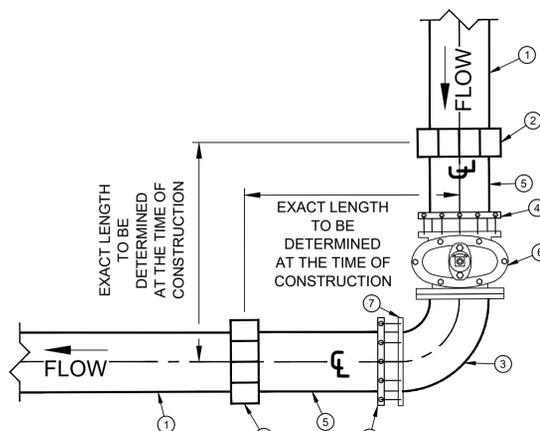


**PIPELINE CONNECTION DETAIL**  
NOT TO SCALE

**BBB**  
4 45

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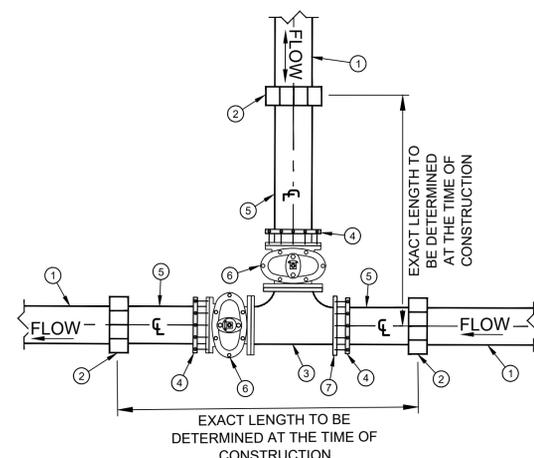


**PIPELINE CONNECTION DETAIL**  
NOT TO SCALE

**CCC**  
4 45

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- INSTALL 12-INCH DUCTILE IRON FLANGED COUPLING ADAPTER.

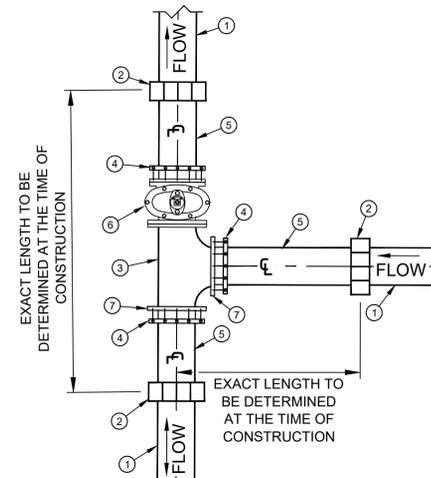


**PIPELINE CONNECTION DETAIL**  
NOT TO SCALE

**DDD**  
4 45

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**KEYNOTES**

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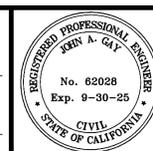
**PIPELINE CONNECTION DETAIL**  
NOT TO SCALE

**EEE**  
4 45

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
  
 JAMES G. JACK HOLT  
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 31773 R.C.E. No.  
 12/31/24 REG. EXP.



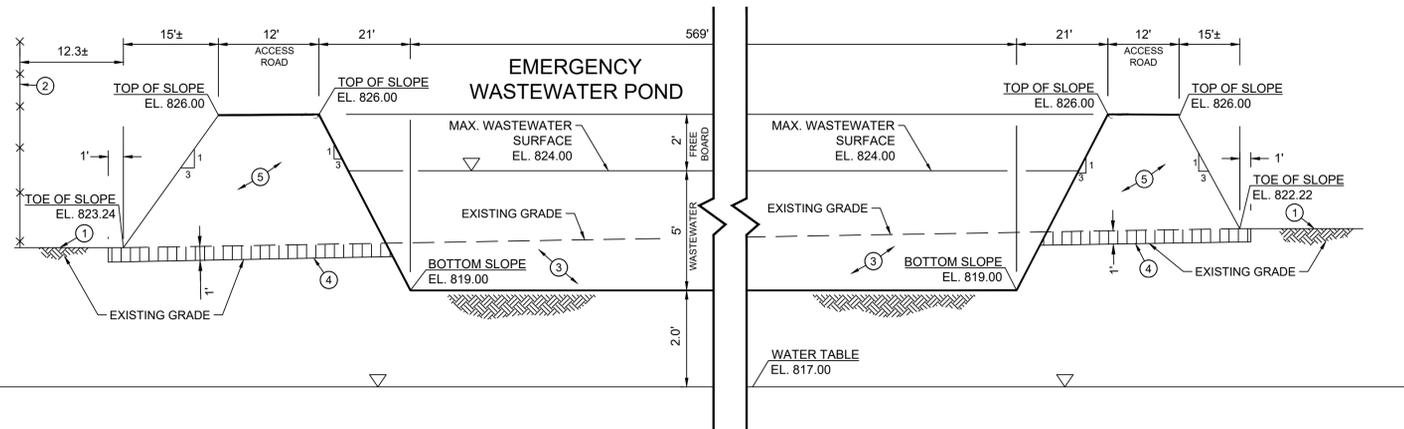
COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
  
 JOHN A. GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 DATE  
 62028 R.C.E. No.  
 09/30/25 REG. EXP.

PUBLIC WORKS DEPARTMENT  
**COUNTY OF IMPERIAL**  
 EL CENTRO, CALIFORNIA

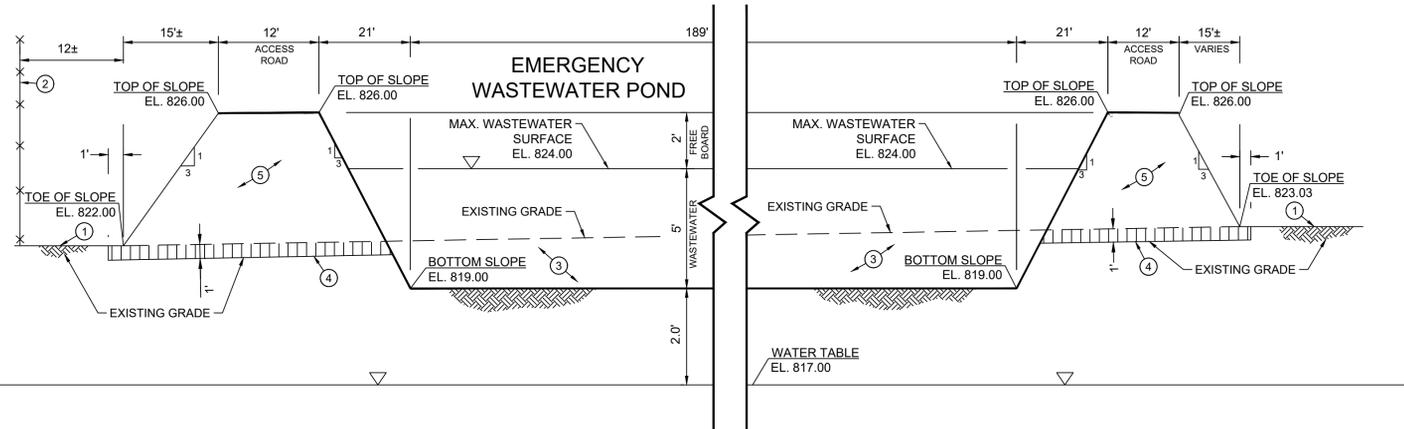
DATE: 10/18/2023  
 DRAWN: RS  
 DESIGNED: RS  
 SCALE: N/A  
 CHECKED: JGH

PROJECT TITLE  
**COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
 MISCELLANEOUS DETAIL SHEET

REFERENCE  
 THG #542.089  
 SHEET 45 OF 50

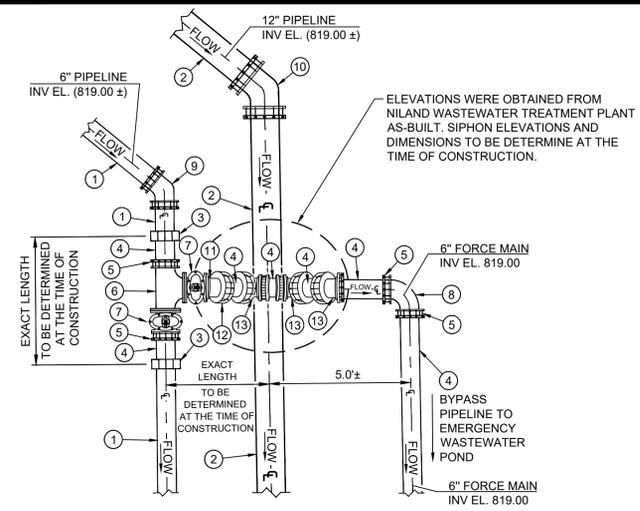


**EMERGENCY WASTEWATER POND - SECTION C-C**  
NTS  
4 46



**EMERGENCY WASTEWATER POND - SECTION D-D**  
NTS  
4 46

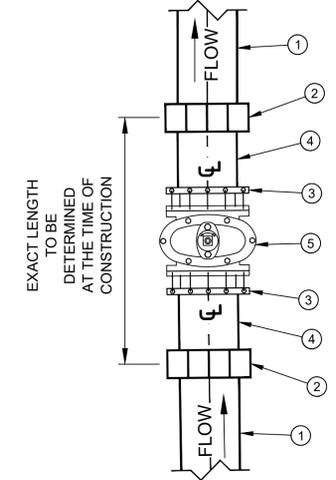
- KEYNOTES**
- EXISTING NATIVE GRADE TO REMAIN.
  - EXISTING 6 FOOT HIGH CHAIN LINK FENCE TO REMAIN. SECTIONS OF THE FENCE SHALL BE ALLOWED TO BE TEMPORARILY REMOVED DURING THE CONSTRUCTION OF THE EMERGENCY WASTEWATER POND. IF SECTIONS OF THE FENCE ARE REMOVED THE CONTRACTOR IS RESPONSIBLE TO STORE THE REMOVED FENCING MATERIAL IN A SECURE LOCATION. AFTER THE CONSTRUCTION OF THE EMERGENCY POND IS COMPLETED ANY TEMPORARILY REMOVED FENCE SECTIONS SHALL BE REPLACED. NEW VERTICAL POSTS WITH NEW PCC FOOTINGS SHALL BE CONSTRUCTED PER THE FENCING DETAIL ON SHEET 29. OTHER DAMAGED FENCE COMPONENTS SHALL BE REPLACED WITH NEW COMPONENTS PER FENCING DETAIL SHEET 29 REQUIREMENTS. THE FENCE SHALL BE REPLACED TO THE SATISFACTION OF THE RESIDENT ENGINEER.
  - EXCAVATE NATIVE EARTH IN THE EMERGENCY POND WITH 3:1 SIDESLOPES TO THE EMERGENCY POND BOTTOM. EXCAVATED NATIVE MATERIAL SHALL BE USED TO CONSTRUCT THE ABOVE GRADE BASIN EMBANKMENTS. THE DEPTH FROM THE EMERGENCY POND DESIGN BOTTOM TO THE EXISTING WATER TABLE IS APPROXIMATELY 2.0 FEET. PUMPING OF THE NATIVE EARTH ABOVE THE WATER TABLE CAN EASILY OCCUR IF SUBJECTED TO EQUIPMENT WITH LARGE POINT LOADS. THE CONTRACTOR SHALL COMPLETE THE NATIVE EARTH EXCAVATION WITH LIGHT EQUIPMENT. EQUIPMENT WHICH CREATES HEAVY POINT LOADS, SUCH AS FRONT END LOADERS, SHALL NOT BE ALLOWED TO COMPLETE THE EXCAVATION WORK. IF PUMPING OCCURS DURING THE EXCAVATION OF THE EMERGENCY POND, THE RESIDENT ENGINEER SHALL BE IMMEDIATELY INFORMED OF THE PUMPING CONDITION. IF PUMPING OCCURS EXCAVATION WORK SHALL IMMEDIATELY CEASE. IF PUMPING OCCURS THE REMAINING EXCAVATION WORK TO THE DESIGN BOTTOM OF THE EMERGENCY POND BASIN SHALL BE COMPLETED WITH A HOE TYPE EXCAVATOR OR A GRADALL.
  - SCARIFY AND COMPACT EXISTING NATIVE MATERIAL FOR A DEPTH OF 1 FOOT BENEATH THE SLUDGE CONTAINMENT BASIN EMBANKMENTS. SCARIFY AND COMPACT THE EXISTING NATIVE MATERIAL FOR A HORIZONTAL DISTANCE OF 1 FOOT BEYOND THE EMBANKMENT EXTERIOR TOE OF SLOPE. THE NATIVE EARTH SHALL BE COMPACTED TO 90 PERCENT OF MAXIMUM DENSITY AT 4 TO 8% ABOVE OPTIMUM WATER CONTENT PER ASTM D 1557. CONSTRUCTION OF THE EMBANKMENTS SHALL NOT COMMENCE UNTIL THE SCARIFIED AND COMPACTED NATIVE MATERIAL HAS BEEN TESTED AND ATTAINED THE SPECIFIED COMPACTION DENSITY.
  - INSTALL NATIVE MATERIAL FOR THE CONSTRUCTION OF THE EMBANKMENTS IN MAXIMUM 9 INCH LIFTS AT 90 PERCENT OF MAXIMUM DENSITY AT 4 TO 8% ABOVE OPTIMUM WATER CONTENT PER ASTM D-1557. ADDITIONAL LIFTS SHALL NOT BE INSTALLED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE SPECIFIED COMPACTION DENSITY. IF THE NATIVE EARTH EXCAVATED FROM THE EMERGENCY WASTEWATER POND IS NOT SUFFICIENT TO CONSTRUCT THE EMBANKMENTS THEN EXCESS EARTH FROM THE EVAPORATION BASIN EARTHWORK OR NATIVE EARTH OBTAINED FROM THE EXISTING EMERGENCY WASTEWATER POND SHALL BE USED TO COMPLETE THE CONSTRUCTION OF THE EMBANKMENTS.



- KEYNOTES**
- EXISTING 6-INCH AWWA C-900 DR18 PVC SANITARY SEWER FORCE MAIN.
  - EXISTING 12-INCH AWWA C-900 DR18 PVC GRAVITY PIPELINE TO EMERGENCY WASTE WATER POND.
  - INSTALL AN 6-INCH DUCTILE IRON EPOXY-COATED TRANSITION COUPLING WITH 316 STAINLESS STEEL HARDWARE TO CONNECT THE EXISTING AWWA C-900, DR18 PVC PIPELINE TO THE NEW AWWA C-900, DR18 PVC PIPELINE SECTION.
  - INSTALL NEW 6-INCH DIAMETER AWWA C-900, DR18 PVC PIPELINE.
  - INSTALL 6-INCH DUCTILE IRON RESTRAINED JOINT FITTING WITH 316 STAINLESS STEEL HARDWARE.
  - INSTALL 6-INCH X 6-INCH X 6-INCH DUCTILE IRON-FLANGED TEE WITH 316 STAINLESS STEEL HARDWARE.
  - INSTALL 6-INCH DIAMETER FLANGED ECCENTRIC PLUG VALVE WITH VALVE RISER AND COVER PER DETAIL E ON SHEET 35.
  - INSTALL 6-INCH DIAMETER 90-DEGREE DUCTILE IRON ELBOW FITTING.
  - EXISTING 6-INCH 45-DEGREE DUCTILE IRON FITTING.
  - EXISTING 12-INCH 45-DEGREE DUCTILE IRON FITTING.
  - INSTALL NEW 6-INCH 45 DEGREE FLANGED DUCTILE IRON ELBOW FITTING.
  - INSTALL NEW 6-INCH FLANGED COUPLING ADAPTER FITTING.
  - INSTALL NEW 6-INCH 45 DEGREE M.J. DUCTILE IRON ELBOW.

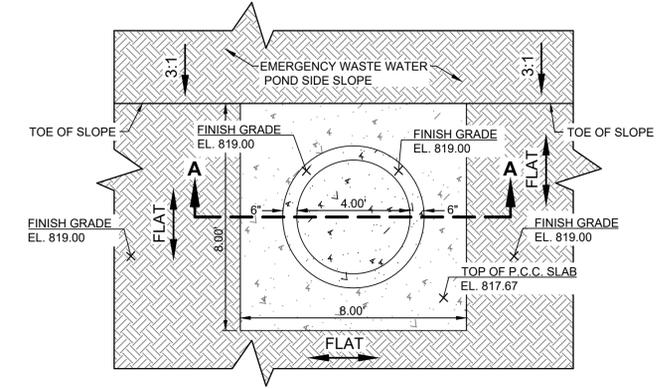
**FORCE MAIN BYPASS CONNECTION DETAIL**  
SCALE 1" = 3"  
SS 4 46

**NOTE:**  
PIPELINE CONNECTION INSTALLATION NATIVE MATERIAL BACKFILL SHALL BE INSTALLED IN MAXIMUM 9 INCH LIFTS AT 90 PERCENT OF MAXIMUM DENSITY AT OPTIMUM WATER CONTENT PER ASTM D-1557. ADDITIONAL LIFTS SHALL NOT BE INSTALLED UNTIL PREVIOUS LIFTS HAVE BEEN TESTED AND ATTAINED THE SPECIFIED COMPACTION DENSITY. CONTRACTOR TO REMOVE AND DISPOSE OF PRIOR EXISTING PIPING, VALVES AND FITTINGS. CONTRACTOR TO SAWCUT EXISTING PIPE AT CONNECTION POINTS.

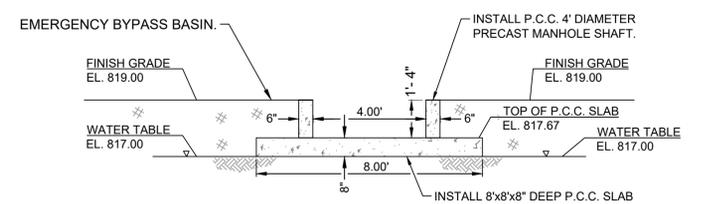


- KEYNOTES**
- EXISTING 12-INCH AWWA C-900 DR18 PVC SANITARY SEWER GRAVITY MAIN.
  - INSTALL AN 12-INCH DUCTILE IRON EPOXY-COATED TRANSITION COUPLING WITH 316 STAINLESS STEEL HARDWARE TO CONNECT THE EXISTING AWWA C-900, DR18 PVC PIPELINE TO THE NEW AWWA C-900, DR18 PVC PIPELINE SECTION.
  - INSTALL 12-INCH DUCTILE IRON RESTRAINED JOINT FITTING WITH 316 STAINLESS STEEL HARDWARE.
  - INSTALL NEW 12-INCH DIAMETER AWWA C-900, DR18 PVC PIPELINE.
  - INSTALL 12-INCH DIAMETER FLANGED ECCENTRIC PLUG VALVE WITH VALVE RISER AND COVER PER DETAIL E ON SHEET 35.

**PIPELINE CONNECTION DETAIL**  
NOT TO SCALE  
FFF 4 46



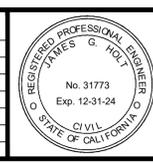
**WW EMERGENCY FLOW BYPASS PUMP SUMP**



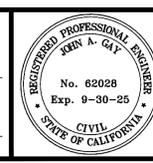
**SECTION A**  
SCALE 1" = 3"  
YY 4 46

**P.C.C. PUMP SUMP DETAIL**  
SCALE 1" = 3"  
YY 4 46

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
  
 JAMES G. JACK HOLT  
 31773 R.C.E. No.  
 10/18/2023 DATE  
 12/31/24 REG. EXP.

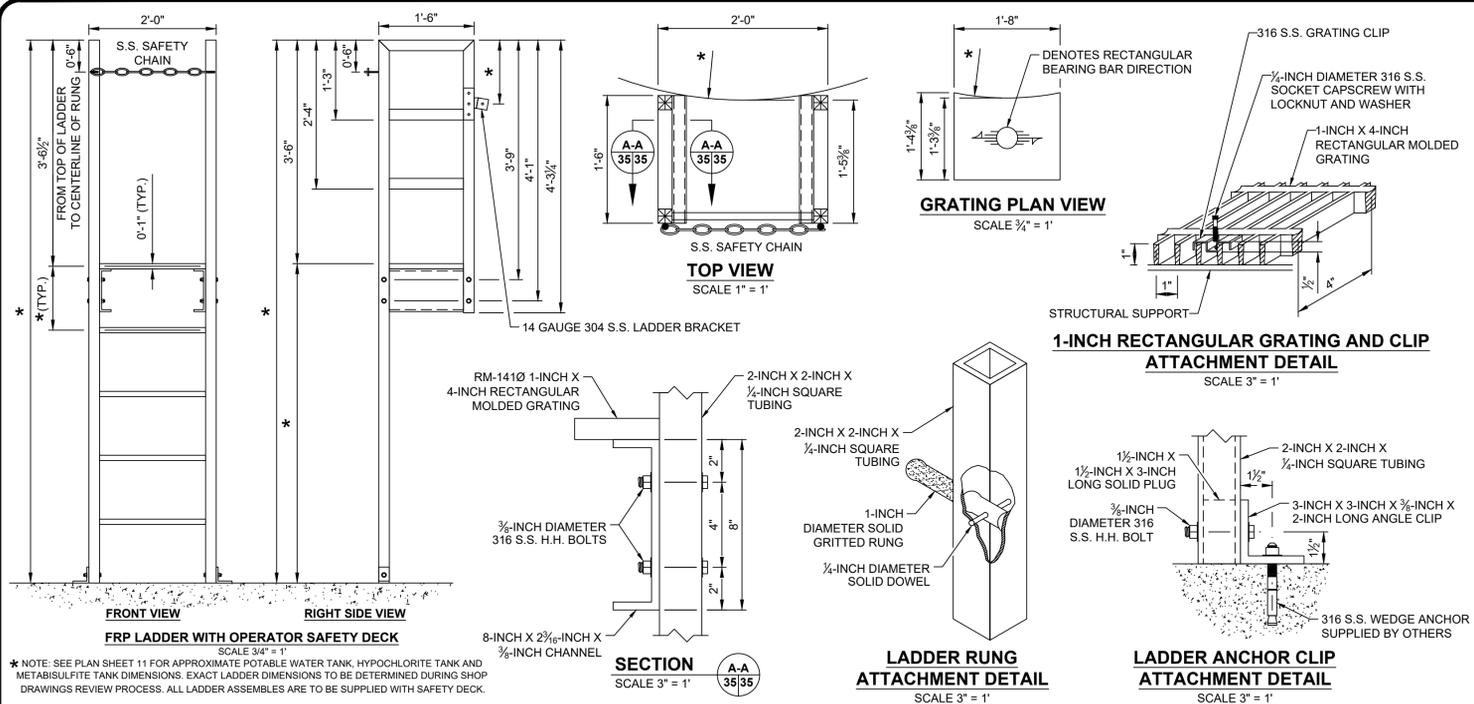


COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
  
 JOHN A. GAY  
 62028 R.C.E. No.  
 09/30/25 REG. EXP.

COUNTY OF IMPERIAL  
 EL CENTRO, CALIFORNIA  
 PUBLIC WORKS DEPARTMENT

DATE: 10/18/2023  
 DRAWN: RS  
 DESIGNED: RS  
 SCALE: N/A  
 CHECKED: JGH  
 PROJECT TITLE:  
 COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS  
 MISCELLANEOUS DETAIL SHEET

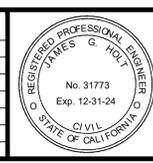
REFERENCE	THG #542.089
SHEET	46 OF 50



FIBERGLASS REINFORCED PLASTIC (FRP)  
 LADDER WITH OPERATOR SAFETY DECK DETAIL  
 SCALE VARIES

Z  
 11 47

REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:

*JAMES G. "JACK" HOLT*  
 JAMES G. "JACK" HOLT  
 No. 31773 R.C.E. No.  
 Exp. 12-31-24  
 10/18/2023 DATE  
 12/31/24 REG. EXP.



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:

*JOHN GAY*  
 JOHN GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 DATE

62028 R.C.E. No.  
 09/30/25 REG. EXP.



PROJECT TITLE	
DATE	10/18/2023
DRAWN	RS
DESIGNED	RS
SCALE	N/A
CHECKED	JCH
COUNTY OF IMPERIAL NILAND COUNTY SANITATION DISTRICT - WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS MISCELLANEOUS DETAIL SHEET	

REFERENCE	THG #542.089
SHEET	47 OF 50

**EXISTING KEY NOTES:**

- 1 EXISTING NATIVE MATERIAL.
- 2 EXISTING NATIVE MATERIAL BORROW AREA AND EMERGENCY WASTE WATER STORAGE POND.
- 3 EXISTING BUILDING.
- 4 EXISTING P.C.C. RIBBON GUTTER.
- 5 EXISTING P.C.C. SIDEWALK.
- 6 EXISTING ABANDONED EMERGENCY WASTE WATER STORAGE POND CONVERTED TO STORM WATER STORAGE POND.
- 7 EXISTING RAW WATER STORAGE POND.
- 8 EXISTING CHAIN LINK FENCE.
- 9 EXISTING CHAIN LINK FENCE SWING GATE.
- 10 EXISTING CHAIN LINK FENCE ROLL GATE.
- 11 EXISTING IID IRRIGATION CANAL TO REMAIN
- 12 EXISTING IID EARTHEN DRAIN.
- 13 EXISTING HDPE LINED AERATION POND.
- 14 EXISTING DIRT ACCESS ROAD.
- 15 EXISTING MOORING POST. TYPICAL.
- 16 EXISTING TREE.
- 17 EXISTING PALM TREE.
- 18 EXISTING BRUSH VEGETATION.
- 19 EXISTING GRAVITY SANITARY SEWER PIPELINE.
- 20 EXISTING SANITARY SEWER FORCE MAIN.
- 21 EXISTING SANITARY SEWER MANHOLE.
- 22 EXISTING SANITARY SEWER FORCE MAIN INFLUENT FLOW METER VAULT.
- 23 EXISTING SANITARY SEWER FORCE MAIN VALVE.
- 24 EXISTING GRAVITY SANITARY SEWER VALVE.
- 25 EXISTING EMERGENCY WASTE WATER DISCHARGE PIPELINE.
- 26 EXISTING GROUND WATER PUMP DISCHARGE PIPELINE.
- 27 EXISTING RAW WATER PIPELINE.
- 28 EXISTING HOSE BIB.
- 29 EXISTING P.C.C. HEADWORKS STRUCTURE.
- 30 EXISTING WASTE WATER INFLUENT PUMP STATION.
- 31 EXISTING GROUND WATER PUMP STATION.
- 32 EXISTING CHLORINATION/DECHLORINATION STRUCTURE.
- 33 EXISTING EFFLUENT FLOW METER / SAMPLING VAULT.
- 34 EXISTING CHEMICAL STORAGE TANK.
- 35 EXISTING OUT OF SERVICE CHEMICAL STORAGE TANK.
- 36 EXISTING AERATION POND CATWALK STRUCTURE.
- 37 EXISTING AERATOR. TYPICAL.
- 38 SURVEY MONUMENTS NOTED AS "1 1/2 INCH IRON PIPE TAGGED L55397" PER RECORD OF SURVEY ON FILE IN BOOK 10, PAGE 7 AT THE IMPERIAL COUNTY RECORDERS OFFICE. CONTRACTOR SHALL TAKE EXTREME CAUTION NOT TO DISTURB OR DESTROY THE EXISTING MONUMENTS DURING THE PROJECT CONSTRUCTION PERIOD.
- 39 SURVEY MONUMENT NOTED AS "1 1/2 INCH IRON PIPE TAGGED L55397" NOTED TO BE THE WEST 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER RECORD OF SURVEY ON FILE IN BOOK 10, PAGE 7 AT THE IMPERIAL COUNTY RECORDERS OFFICE.
- 40 EXISTING SANITARY SEWER GRAVITY PIPELINE VALVES.
- 41 EXISTING GRAVITY SANITARY SEWER PIPELINE.
- 42 EXISTING EMERGENCY POWER GENERATOR SET.
- 43 EXISTING (2) HEAVY DUTY LIGHT FIXTURES MOUNTED ON A STEEL POLE ASSEMBLY AT THE TOP OF THE CHLOR./DECHLOR. STRUCTURE WALL & CONNECTED TO AN EXISTING 110V RECEPTACLE.

**ELECTRICAL KEY NOTES:**

- 1 IMPERIAL IRRIGATION DISTRICT POWER POLE NUMBER 68947.
- 2 EXISTING 480V, 3ø, 4W UNDERGROUND SERVICE EXTENDING FROM IID POWER POLE NUMBER 68947 TO THE EXISTING SERVICE ENTRANCE SECTION (SES).
- 3 EXISTING SERVICE ENTRANCE SECTION (SES), 300A, 480V, 3ø, 4W IN A NEMA 3R/12 DISTRIBUTION SWITCHBOARD. SEE ELECTRICAL ONE-LINE DIAGRAM.
- 4 EXISTING NEMA 1 MOTOR CONTROL CENTER (MCC) LOCATED INSIDE THE LABORATORY BUILDING. SEE ELECTRICAL ONE-LINE DIAGRAM.
- 5 NEW POTABLE WATER DUPLEX VARIABLE SPEED CENTRIFUGAL PUMPING SYSTEM CONTROL PANEL. SEE CIVIL PLAN SHEET 5. THE PUMPING SYSTEM WILL INCLUDE TWO (2) 2HP 480V, 3ø, CENTRIFUGAL PUMPS.
- 6 INSTALL DUPLEX MOTOR CONTROL CENTER FOR A DUPLEX EVAPORATION POND SUBMERSIBLE PUMP STATION. SEE CIVIL PLAN SHEETS 24 & 25. EACH OF THE TWO (2) SUBMERSIBLE PUMPS SHALL BE RATED 480V, 3ø, 60HZ, 7.5HP.
- 7 NEW 1" PVC UG CONDUIT (FEEDER) & 1" PVC UG CONDUIT (CONTROL/SIGNAL). INSTALL ELECTRICAL CIRCUITRY FROM THE EXISTING MOTOR CONTROL CENTER INSIDE THE LABORATORY/CONTROL BUILDING TO THE NEW POTABLE WATER FACILITY VARIABLE SPEED CENTRIFUGAL PUMPING SYSTEM CP. SEE ELECTRICAL ONE-LINE DIAGRAM.
- 8 NEW 2" PVC UG CONDUIT (FEEDER) & 1" PVC UG CONDUIT (CONTROL/SIGNAL). INSTALL ELECTRICAL CIRCUITRY FROM THE EXISTING MOTOR CONTROL CENTER INSIDE THE LABORATORY/CONTROL BUILDING TO THE EVAPORATION POND SUBMERSIBLE PUMP STATION. SEE ELECTRICAL ONE-LINE DIAGRAM.
- 9 INSTALL NEW 110V, 1ø, 60HZ, GF1 FOURPLEX RECEPTACLE IN AN EXTERIOR CAST ALUMINUM BOX WITH A WP-UI COVER SUPPORTED BY A UNI-STRUT SYSTEM. EACH DUPLEX RECEPTACLE & BRANCH CIRCUIT TO BE RECONNECTED TO THE EXISTING EQUIPMENT DEDICATED BRANCH CIRCUIT BREAKER IT IS REPLACING. SEE PLAN SHEETS 6, 9, & 10.
- 10 NEW (4) #10 CU THWN-2, (1) #10 CU GROUND, IN 1" PVC UG CONDUIT FROM THE LABORATORY/CONTROL BUILDING MCC LOAD CENTER TO THE NEW FOURPLEX EXTERIOR RECEPTACLES AT THE NEW SODIUM METABISULFATE FACILITY. SEE PLAN SHEETS 6, 9, AND 10. (MCC-A-24,36)
- 11 NEW (4) #10 CU THWN-2, (1) #10 CU GROUND, IN 1" PVC UG CONDUIT FROM THE LABORATORY/CONTROL BUILDING MCC LOAD CENTER TO THE NEW FOURPLEX EXTERIOR RECEPTACLES AT THE NEW SODIUM HYPOCHLORITE FACILITY. SEE PLAN SHEETS 6, 9, AND 10. (MCC-A-28,30)
- 12 REMOVE THE EXISTING FLASH MIXER FIELD CONTROL STATION FROM THE EXISTING CHLORINATION/DECHLORINATION STRUCTURE SOUTH WALL PRIOR TO THE DEMOLITION AND RECONSTRUCTION OF PORTION OF THE CHLORINATION/DECHLORINATION STRUCTURE. SEE CIVIL PLAN SHEET 7 FOR ADDITIONAL ELECTRICAL DEMOLITION. DISCONNECT THE ELECTRICAL CIRCUITRY PRIOR TO REMOVING THE EXISTING FLASH MIXER FIELD CONTROL STATION. SEE THE FLASH MIXER FIELD CONTROL STATION DETAIL 1/50. AFTER THE RECONSTRUCTION OF THE CHLORINATION/DECHLORINATION STRUCTURE IS COMPLETE, INSTALL A NEW FLASH MIXER FIELD CONTROL STATION. THE EXISTING ALUMINUM BACK PLATE OF THE REMOVED FLASH MIXER FIELD CONTROL STATION CAN BE REUSED. ALL OTHER FLASH MIXER FIELD CONTROL STATION ITEMS ARE TO BE CONSTRUCTED WITH NEW MATERIAL INCLUDING BUT NOT LIMITED TO THE 3 INCH GALVANIZED SUPPORT POST AND POC SUPPORT PEDESTAL. GUTTER, STOP/START STATION AND DISCONNECT SWITCH. RECONNECT THE ELECTRICAL CIRCUITRY TO THE NEW FLASH MIXER FIELD CONTROL STATION. ALSO SEE CIVIL DETAIL 1/48.
- 13 EXISTING 7.5 HP 480V, 3ø AERATOR TO BE REPLACED (SEE CIVIL). THERE ARE TWO (2) AERATORS IN EACH AERATION POND & A TOTAL OF SIX (6) AERATORS IN THE AERATION POND SYSTEM. INSTALL NEW 50 RUBBER CORD CABLE TO BE SUPPLIED WITH NEW AERATOR UNITS AND ELECTRICAL SUPPORT ITEMS PER DETAIL 2/50 & CONSTRUCTION KEYNOTES 19, 21, 22, & 23 ON PLAN SHEET 4.
- 14 EXISTING AERATION ELECTRICAL LOCAL FIELD CONTROL STATION TO BE REPLACED, COMPLETE IMPROVEMENTS AT AERATOR FIELD CONTROL STATION PER DETAIL 2/50.
- 15 EXISTING BRANCH CIRCUIT WIRING & ELECTRICAL CIRCUITRY FOR THE EXISTING SODIUM HYPOCHLORITE & SODIUM METABISULFATE PUMPS TO BE DISCONNECTED FROM THE MCC & PANEL IN THE LABORATORY BUILDING AFTER THE NEW SODIUM METABISULFATE & SODIUM HYPOCHLORITE FACILITIES ARE CONSTRUCTED AND OPERATIONAL.

**ELECTRICAL KEY NOTES (CONT.):**

- 16 EXISTING 480V, 3ø EXTERIOR ARC TYPE RECEPTACLE & STOP/START STATION FOR TEMPORARY PUMP AT THE TERMINATION POINT OF THE BRIDGE TO REMAIN. A 120V, 1ø EXTERIOR RECEPTACLE IS ALSO LOCATED AT THE TERMINATION POINT OF THE BRIDGE.
- 17 INSTALL NEW CHAIN LINK FENCE MOTORIZED GATE OPENER PER DETAIL PP ON PLAN SHEET 35. INSTALL ADDITIONAL UG CONDUITS TO GATE SENSORS & KEYPADS IF REQUIRED BY INSTALLER. INSTALL (2) #12 CU THWN-2, (1) #12 CU GROUND, IN 1" PVC UG CONDUIT FROM THE LABORATORY/CONTROL BUILDING MCC LOAD CENTER TO THE NEW EQUIPMENT. (MCC-A-20,22)
- 18 INSTALL NEW LIGHT POLE & LUMINAIRES PER DETAIL O ON PLAN SHEET 35. SEE PLAN SHEET 6 FOR PRECISE LIGHT POLE LOCATION. INSTALL (2) #8 CU THWN-2, (1) #10 CU GROUND, IN 1" PVC UG CONDUIT FROM THE LABORATORY/CONTROL BUILDING MCC LOAD CENTER TO THE NEW EQUIPMENT. (MCC-A-3)
- 19 PROVIDE A MOTOR RATED DISCONNECT SWITCH IN A WP ENCLOSURE ON THE LINE SIDE OF THE RECEPTACLES.
- 20 INSTALL ADDITIONAL 1" PVC UG CONDUIT WITH CONTROL/SIGNAL WIRING FOR 2 ALARM CIRCUITS & CONTROL CIRCUIT. ONE ALARM CIRCUIT IS REQUIRED TO BE INSTALLED FROM EACH OF THE 2 SODIUM HYPOCHLORITE PUMPS & EACH OF THE 2 SODIUM METABISULFATE PUMPS TO THE EXISTING SENSAPHONE AUTODIALLER LOCATED IN THE CONTROL BUILDING MCC. 1 CONTROL CIRCUIT IS REQUIRED TO BE INSTALLED FROM THE RATE OF FLOW CONTROLLER LOCATED IN THE CONTROL BUILDING MCC.
- 21 PROVIDE RECEPTACLE OR MOTOR RATED DISCONNECT SWITCH FOR POTABLE WATER PUMPING SYSTEM ENCLOSURE AC UNIT. INSTALL (2) #12 CU THWN-2, (1) #12 CU GROUND, IN 1" PVC UG CONDUIT FROM THE LABORATORY/CONTROL BUILDING MCC LOAD CENTER TO THE NEW EQUIPMENT. (MCC-A-32)

**NOTES:**

1. ALL ELECTRICAL WORK SHOWN IS NEW UNLESS OTHERWISE NOTED.
2. SEE PANEL SCHEDULES FOR BRANCH CIRCUIT WIRE SIZING UNLESS INDICATED OTHERWISE.
3. EXISTING ELECTRICAL NOT INDICATED TO BE REMOVED OR REPLACED SHALL BE PROTECTED DURING CONSTRUCTION & LEFT IN PLACE. CLEAN/REPAIR/RESTORE THIS EXISTING ELECTRICAL TO SERVICEABLE CONDITION PRIOR TO COMPLETION OF WORK.
4. THE ELECTRICAL CONTRACTOR SHALL COORDINATE, BID, AND PROVIDE ALL INCIDENTAL ELECTRICAL DEMOLITION WORK, TEMPORARY ELECTRICAL REMOVAL & REINSTALLATION WORK, & RESTORATION OF EXISTING ELECTRICAL WORK TO EXISTING CONDITION OR BETTER AT ANY MECHANICAL DEMOLITION OR RENOVATIONS IDENTIFIED ON THE CIVIL PLANS. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE CIVIL PLANS & COORDINATING WORK RESPONSIBILITY WITH THE GENERAL CONTRACTOR & INCLUDING ALL SUCH WORK IN THE CONTRACT BID.

EXISTING EMERGENCY WASTEWATER POND.

LOT 25 OF ALEXANDER TRACT ACCORDING TO MAP NO. 360 ON FILE IN BOOK 6, PAGE 31 OF OFFICIAL MAPS AT THE IMPERIAL COUNTY RECORDERS OFFICE

LOT 25 OF ALEXANDER TRACT ACCORDING TO MAP NO. 360 ON FILE IN BOOK 6, PAGE 31 OF OFFICIAL MAPS AT THE IMPERIAL COUNTY RECORDERS OFFICE



REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
 JAMES R. ADLER  
 No. E 16119  
 Exp. 12/31/23  
 10/18/2023  
 DATE



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
 JOHN GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 DATE

PUBLIC WORKS DEPARTMENT  
**COUNTY OF IMPERIAL**  
 EL CENTRO, CALIFORNIA

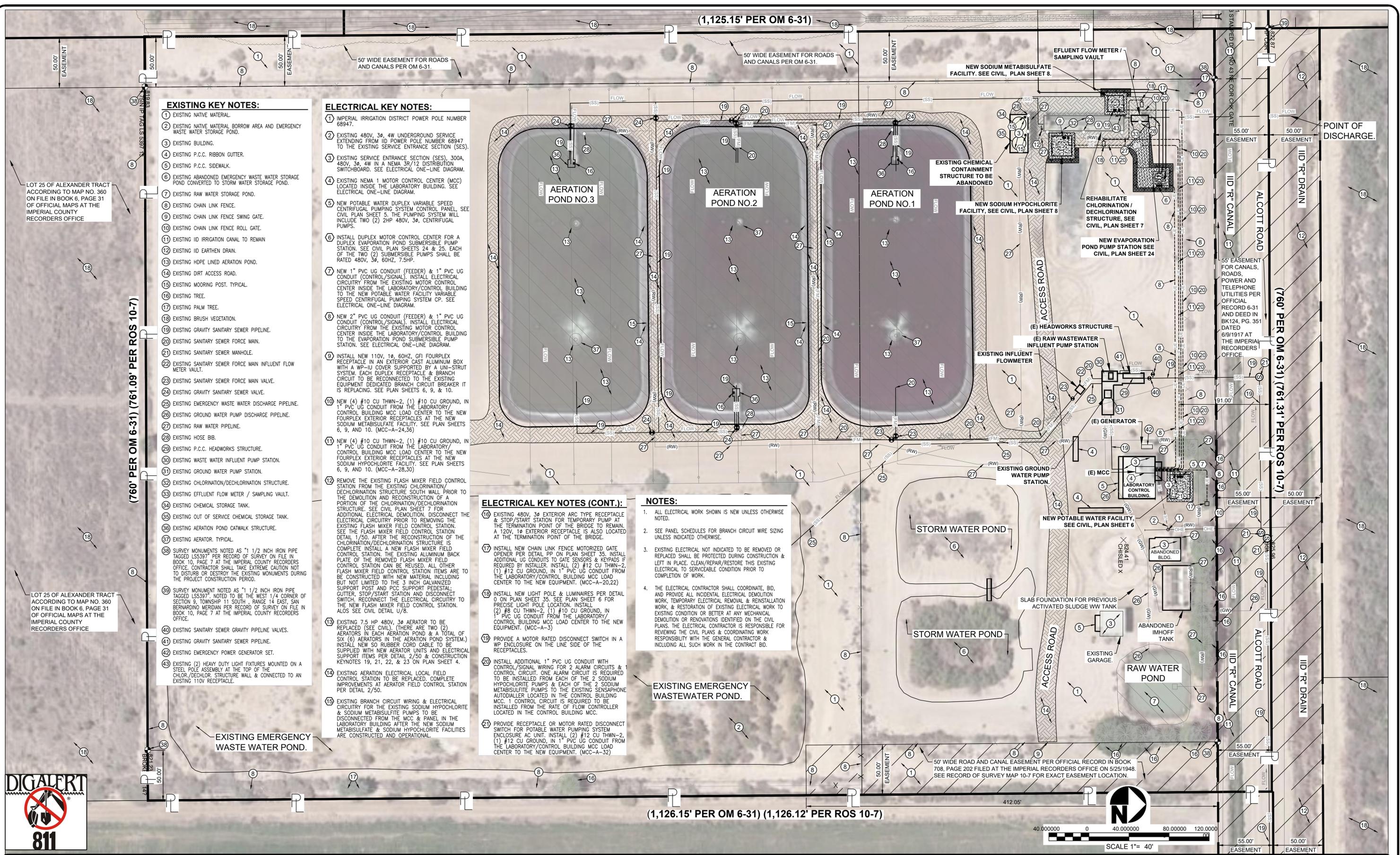
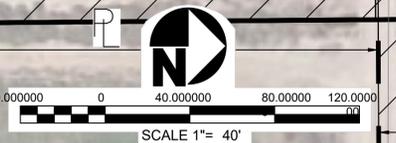
DATE: 10/18/2023  
 DRAWN: STAFF  
 DESIGNED: J.R.A.  
 SCALE: 1" = 40'  
 CHECKED: J.R.A.

PROJECT TITLE  
**COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS**  
**ELECTRICAL SITE PLAN**

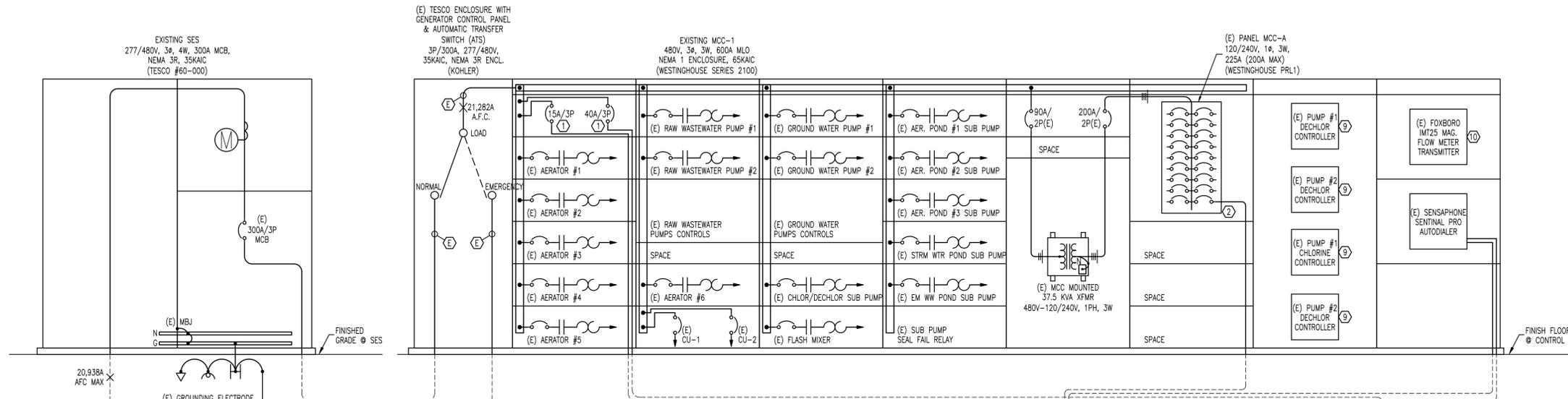
REFERENCE: THG #542.089  
 XX  
 SHEET 48 OF 50

(760' PER OM 6-31) (761.09' PER ROS 10-7)

(1,126.15' PER OM 6-31) (1,126.12' PER ROS 10-7)



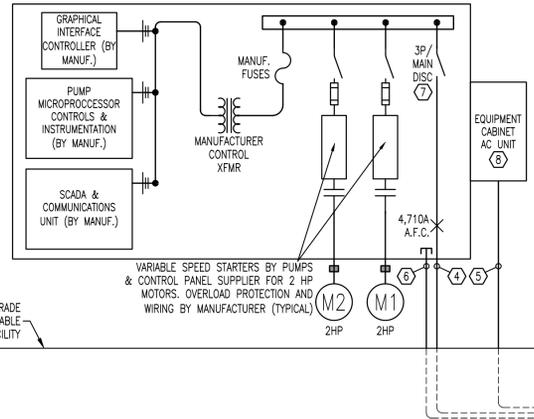
I:\SERVER\100-Archives-JOL\Archives-2023\23034-Niland\NWP\Improvement\23034-Electrical\23034-XREF\Electrical\XREF\642-089 - Imperial Title Block - Electrical.dwg\$\* \$(BETVAR, 7)



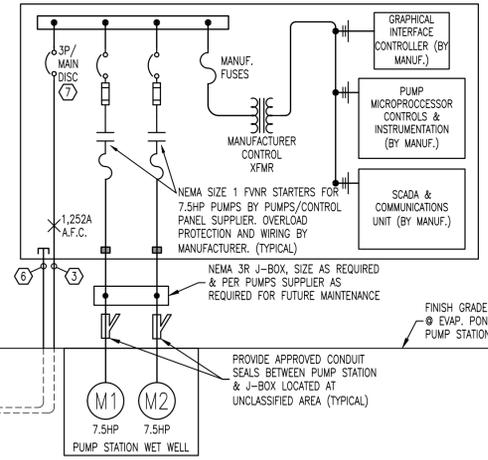
LOAD SUMMARY (EXISTING 300A SES) AMPS @ 277/480V/3PH

EQUIPMENT	QTY	HP	KVA	SUB LOAD	TOTAL LOAD
EXISTING 300A SES & MCC					
(E) AC CONDENSING UNITS	2	1/3	-		1,662 VA
(E) GROUND WATER SUB. PUMPS	2	4	-		8,314 VA
(E) FLASH MIXER	1	5	-		6,319 VA
(E) AERATION POND AERATORS	6	7.5	-		54,870 VA
(E) AERATION POND SUB. PUMPS	3	10	-		34,917 VA
(E) RAW WASTEWATER PUMPS	2	10	-		23,278 VA
(E) CHLOR/DECHLOR SUB. PUMP	1	10	-		11,639 VA
(E) STORM WATER RET. BASIN PUMP	1	10	-		11,639 VA
(E) WASTE WATER STORAGE PUMP	1	10	-		11,639 VA
NEW EVAPORATION POND PUMP STATION	2	7.5	-		18,290 VA
NEW PACKAGE POTABLE WATER TREATMENT FAC	2	2	-		5,654 VA
(E) 37.5KVA XFMR & PANEL MCC-A					
NEW LIGHTING & RECEPTACLES	-	-	-	560 VA	
NEW EQUIPMENT AC UNIT	-	-	-	1,620 VA	
NEW MOTORIZED GATE OPERATOR	1	1/2	-	360 VA	
(E) LOAD (SEE PANEL SCHEDULE)	-	-	-	21,382 VA	
SUBTOTAL					23,922 VA
25% LARGEST MOTOR	0.25	10	-		2,910 VA
TOTAL					215,053 VA 258.7 A

NEW PACKAGED POTABLE WATER TREATMENT FACILITY MANUF. FURNISHED CONTROL PANEL 'MPC' VARIABLE SPEED DUPLEX PUMP CONTROLLER, 480V, 3PH, 3W, 100KVA, NEMA 3R INDUSTRIAL ENCLOSURE, UL LISTED (SEE SUPPLIER SHOP DRAWINGS). SYSTEM CONTROLLER SHALL BE BY THE SYSTEM SUPPLIER AND SHALL INCLUDE INTELLIGENT CONTROLLER, NORMAL/EMERGENCY OPERATING SWITCHES, OVERLOAD PROTECTION & ACCESSORIES, DATA LOGGING, SYSTEM ALARMS & ALARM FAULT LIGHT, RUN STATUS, PUMP ALTERNATION, SURGE PROTECTION, AND PROVISIONS FOR CONNECTION TO AUTODIALER, SCADA, OR RTU PER IMPERIAL COUNTY SPECIFICATIONS (SEE CIVIL, GRUNDFOS HYDRO MPC CME OR AS SPECIFIED).



NEW EVAPORATION POND PUMP STATION MCC 'EPSP' DUPLEX PUMP CONTROLLER, 480V, 3PH, 3W, 42KVA, NEMA 4 INDUSTRIAL ENCLOSURE, UL LISTED (SEE SUPPLIER SHOP DRAWINGS). SYSTEM CONTROLLER SHALL BE BY THE SYSTEM SUPPLIER AND SHALL INCLUDE INTELLIGENT CONTROLLER, PUMP SELECTOR/OPERATING SWITCHES, OVERLOAD PROTECTION & ACCESSORIES, DATA LOGGING, SYSTEM ALARMS & ALARM FAULT LIGHT, RUN STATUS, PUMP ALTERNATION, SURGE PROTECTION, AND PROVISIONS FOR CONNECTION TO AUTODIALER, SCADA, OR RTU PER IMPERIAL COUNTY SPECIFICATIONS (SEE CIVIL PLAN SHEET 24).



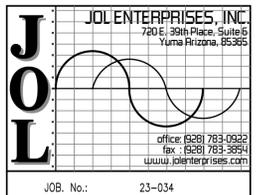
**ELECTRICAL ONE-LINE DIAGRAM**  
(NO SCALE)

**KEY NOTES:**

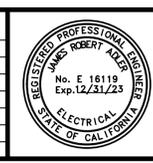
- ① VERIFY THE EXISTING MCC FOR ANY OTHER READILY AVAILABLE SPACE FOR THE NEW FEEDER BREAKERS PRIOR TO WORK. IF NO OTHER SPACE IS AVAILABLE, RELOCATE THE EXISTING AERATOR PUMP SEAL FAIL RELAYS TO A MORE APPROPRIATE LOCATION FOR CONTROL COMPONENTS AT THE RIGHT END OF THE MCC. PROVIDE & INSTALL NEW FEEDER BREAKERS COMPATIBLE TO THE EXISTING EQUIPMENT & RATINGS AT THE EXISTING AVAILABLE BUSSED SPACE. VERIFY CONTROL PANELS CAPACITY & REQUIREMENTS WITH SUPPLIER PRIOR TO WORK. ORDER BRANCH CIRCUIT BREAKERS & SIZE BRANCH CIRCUITS TO COORDINATE TO THE PANEL. CONNECT NEW FEEDERS. LABEL PER SPECIFICATIONS.
- ② INSTALL NEW BRANCH BREAKERS AT EXISTING PANEL & CONNECT NEW BRANCH CIRCUITS AS SHOWN. SEE PANEL SCHEDULE.
- ③ (3) #8 CU THWN-2, (1) #10 CU GRD, 2" CONDUIT.
- ④ (3) #10 CU THWN-2, (1) #10 CU GRD, 1" CONDUIT.
- ⑤ (2) #12 CU THWN-2, (1) #12 CU GRD, 1" CONDUIT.
- ⑥ 1" CONDUIT WITH CONTROL/SIGNAL CABLING AS REQUIRED BY CONTROL PANEL SUPPLIER FOR CONTROL & MONITORING AT THE CONTROL BUILDING.
- ⑦ MOTOR STARTER, CONTROLS, DISCONNECT SWITCH, SHORT-CIRCUIT/GROUND-FAULT PROTECTION, OVERLOAD PROTECTION, WIRE, CONDUIT, & ACCESSORIES AT PACKAGED EQUIPMENT PER EQUIPMENT MANUFACTURER & ASSEMBLER. SEE EQUIPMENT SHOP DRAWINGS.
- ⑧ PROVIDE & INSTALL NEW EQUIPMENT ENCLOSURE HVAC UNIT. SEE CIVIL. HVAC UNIT TO BE AS RECOMMENDED BY SUPPLIER AND MINIMUM 400BTU/HR, 115V, 13.5FLA MAX., NEMA 4X ENCLOSURE (HOTMAN CR2904160688, PENTAIR APW MCLEAN CR29-0416-0068H, OR EQUAL). CIRCUIT TO MCC-A-32.
- ⑨ VERIFY & REPAIR OR REPLACE EXISTING CHLORINATION & DECHLORINATION PUMP CONTROLLERS. EXTEND CONTROL CIRCUITRY TO CHEMICAL PUMPS FOR RATE OF EFFLUENT FLOW OPERATION.
- ⑩ VERIFY, TEST, & CALIBRATE EXISTING FLOW METER 4-20MA OUTPUT AT THE EXISTING FLOW METER CONTROLLER. REPAIR OR REPLACE EXISTING EQUIPMENT IF NEEDED.
- ⑪ EXISTING FEEDER WIRE & CONDUIT TO REMAIN.

**NOTES (ONE-LINE DIAGRAM):**

- 1. PROVIDE RATED EQUIPMENT & DEVICES BY MANUFACTURER CAPABLE OF SAFELY INTERRUPTING THE AVAILABLE FAULT CURRENT.
- 2. PROVIDE WARNING LABELS & MARKING BY MANUFACTURER AT ALL SWITCHBOARDS, PANELBOARDS, & INDUSTRIAL CONTROL PANELS/MCC'S LIKELY TO CREATE ARC FLASH CONDITIONS AS REQUIRED BY NEC ART. 110.16.
- 3. LABEL & MARK MAIN SERVICE DISCONNECT(S) PER NEC. MAXIMUM OF 6 DISCONNECTS PERMITTED PER NEC.
- 4. OUTDOOR EQUIPMENT SHALL BE DESIGNED & MANUFACTURED FOR OPERATION IN AN OUTDOOR ENVIRONMENT WITH A MAXIMUM AMBIENT OF 50°C. (122°F.). PROVIDE ADDITIONAL VENTILATION AND AMBIENT COMPENSATED CB'S, OVERLOAD RELAYS, WIRING, CT'S, & ACCESSORIES AS REQUIRED BY MANUFACTURER.
- 5. VERIFY EXISTING MCC CONFIGURATION & ARRANGEMENT, AVAILABLE SPACES, & AVAILABLE PARTS SUPPLY PRIOR TO BID. INCLUDE ALL NEW PARTS & INSTALLATION IN THE BID. INCLUDE COMPLETE REPLACEMENT MCC IF THE CONTRACTOR & SUPPLIER ARE UNABLE TO PROCURE THE NECESSARY PARTS TO MODIFY THE EXISTING WESTINGHOUSE EQUIPMENT AS REQUIRED BY THESE PLANS.



REVISION	DATE	COMMENTS



PREPARED UNDER THE DIRECT SUPERVISION OF:  
**J.R.S.**  
 JAMES R. ADLER  
 10/18/2023  
 DATE



COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT  
 APPROVED FOR CONSTRUCTION BY:  
 JOHN GAY, P.E.  
 DIRECTOR OF PUBLIC WORKS  
 DATE



DATE: 10/18/2023  
 DRAWN: STAFF  
 DESIGNED: J.R.A.  
 SCALE: NO SCALE  
 CHECKED: J.R.A.

PROJECT TITLE  
 COUNTY OF IMPERIAL  
 NILAND COUNTY SANITATION DISTRICT - WASTEWATER  
 TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS  
**ELECTRICAL ONE-LINE DIAGRAM**

REFERENCE	THG #542.089
XX	SHEET 49 OF 50



**SHEET INDEX**

1. TITLE SHEET
2. HIGHWAY 111 - SANITARY SEWER PIPELINE AND MANHOLE IMPROVEMENT PLAN - STA 346+10 TO STA 375+62.
3. HIGHWAY 111 AND ALCOTT ROAD SANITARY SEWER PIPELINE PLAN AND PROFILE - STA 346+10 TO STA 349+35.
4. HIGHWAY 111 AND NOFFSINGER ROAD SANITARY SEWER PLAN AND PROFILE - STA 372+18 TO STA 375+20.
5. SANITARY SEWER SECTIONS AND DETAILS
6. TRAFFIC CONTROL PLAN
7. TRAFFIC CONTROL PLAN
8. EROSION CONTROL PLAN AND DETAILS

REVISOR  
DATE  
DATE

DATE

CALCULATED/  
DESIGNED BY

CHECKED BY

PROJECT ENGINEER

THE HOLT GROUP, INC.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
PROJECT PLANS FOR CONSTRUCTION ON  
STATE ROUTE  
IN IMPERIAL COUNTY ON SR 111  
COUNTY OF IMPERIAL - NILAND WASTE WATER TREATMENT  
PLANT AND COLLECTION SYSTEM IMPROVEMENTS

PERMIT NUMBER 11- XXX  
CO IMP RTE 111 PM R39.589 - R40.089  
AS-BUILT PLANS FOR ROADWAY GEOMETRIC  
AND ABOVE GROUND FEATURES

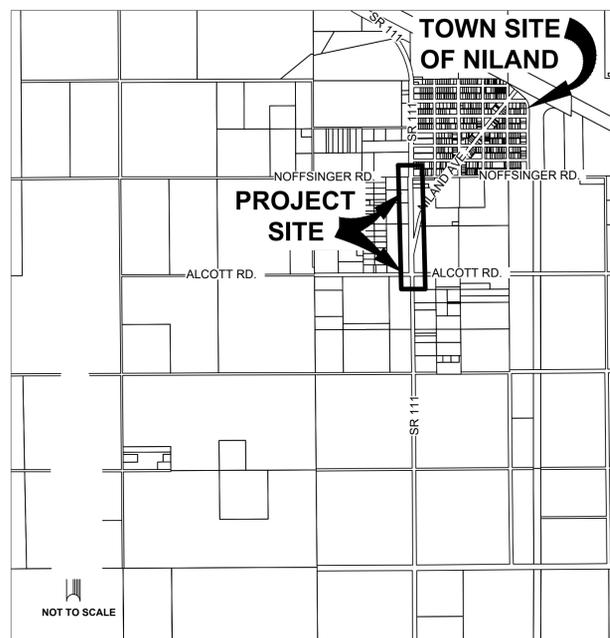
STATE REPRESENTATIVE DATE

DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	IMPERIAL	111	PM R39.589 & R40.089	1	8



LOCATION MAP

VICINITY MAP



NOT TO SCALE

**ABBREVIATIONS**

AGG.	AGGREGATE
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
B.C.	BEGINNING OF CURVE RADIUS
BLDG.	BUILDING
CBO	CHIEF BUILDING OFFICIAL
CO	CLEANOUT
CL	CENTERLINE
C2B	CLASS 2 BASE
DIA.	DIAMETER
DCO	DOUBLE CLEANOUT
D/W	DRIVEWAY
Δ	DELTA
E.P.	EDGE OF PAVEMENT
E	EAST / ELECTRICAL
EL.	ELEVATION
E.C.	END OF CURVE RADIUS
F.F.	FINISH FLOOR ELEVATION
FP	FIRE PROTECTION
FL	FLOWLINE
F.S.	FINISH SURFACE
IRR	IRRIGATION
L	LENGTH
MAX.	MAXIMUM
MIN.	MINIMUM
MISC.	MISCELLANEOUS
N	NORTH
NS	NATIVE SURFACE
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OHE	OVERHEAD ELECTRICAL LINE
P.E.	PAD ELEVATION
%	PERCENT
P.C.C.	PORTLAND CEMENT CONCRETE
POC	POINT OF CONNECTION
P.P.	POWER POLE
P.V.C.	POLY VINYL CHLORIDE
R	RADIUS/ RIGHT
R.C.P.	REINFORCED CONCRETE PIPE
RE	RESIDENT ENGINEER
R/W	RIGHT-OF-WAY
S	SOUTH / SLOPE
SS	SANITARY SEWER / STAINLESS STEEL
SSFM	SANITARY SEWER FORCE MAIN
TBM	TEMPORARY BENCHMARK
T.C.	TOP OF CURB OR TOP OF CONCRETE
T.P.	TOP OF PAVEMENT
W	WEST / WATER

**CONSTRUCTION SYMBOLS**

ITEM NO.	DESCRIPTION	SYMBOL
1	EXISTING A.C. PAVEMENT	[Symbol]
2	PIPE TRENCH IN PAVEMENT AREAS	[Symbol]
3	TRENCH IN NATIVE AREAS	[Symbol]
4	P.C.C. STRUCTURES	[Symbol]
5	SIGNS / POSTS	[Symbol]
6	POWER POLE	[Symbol]
7	GUY WIRE	[Symbol]
8	STREET LIGHT	[Symbol]
9	FOUND MONUMENT	[Symbol]
10	TELEPHONE (AT&T) ENCLOSURE	[Symbol]
11	WATER VALVE	[Symbol]
12	WATER METER	[Symbol]
13	FIRE HYDRANT	[Symbol]
14	EXISTING TREE	[Symbol]
15	EXISTING PALM TREE	[Symbol]
16	RIGHT OF WAY	[Symbol]
17	LIMITS OF CONSTRUCTION	[Symbol]
18	SANITARY MANHOLE	[Symbol]
19	WATER PIPELINE	[Symbol]
20	GAS PIPELINE	[Symbol]
21	SANITARY SEWER PIPELINE	[Symbol]
22	CENTER LINE	[Symbol]
23	STORM DRAIN MANHOLE	[Symbol]
24	MASONRY WALL	[Symbol]
25	EXISTING FENCE	[Symbol]
26	SANITARY SEWER CLEANOUT	[Symbol]
27	AERIAL TARGET	[Symbol]
28	BENCHMARK	[Symbol]
29	COLD PLANE/A.C. PAVEMENT MILLING AREA	[Symbol]
30	EDGE OF PAVEMENT	[Symbol]

**ADDENDUM #2**

JAMES G. "JACK" HOLT  
PROJECT ENGINEER  
REGISTERED CIVIL ENGINEER, 31773  
10/18/2023  
DATE  
No. 31773  
Exp. 12-31-24  
CIVIL  
STATE OF CALIFORNIA

PLANS APPROVAL DATE

APPROVED FOR THE COUNTY OF IMPERIAL

BY: JOHN GAY, P.E. DIRECTOR OF PUBLIC WORKS  
62028 RCE NO.  
10/18/2023 DATE

TITLE SHEET  
NTS

PROJECT: COUNTY OF IMPERIAL - NILAND WASTE WATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS.  
IMPERIAL COUNTY PUBLIC WORKS  
155 S 11TH ST  
EL CENTRO, CA 92243  
THE HOLT GROUP, INC.  
1601 NORTH IMPERIAL AVENUE  
EL CENTRO, CA 92243  
CONTRACT NO.



Underground Service Alert  
Call: TOLL FREE 811

TWO WORKING DAYS BEFORE DIGGING

**BENCH MARK**

BRASS DISK LOCATED AT THE SOUTH WEST INTERSECTION OF ALCOTT ROAD AND STATE ROUTE 111. BRASS DISK LOCATED ALONG THE MOST SOUTHERN AND EASTERLY CORNER OF THE P.C.C. HEADWALL OF THE IMPERIAL IRRIGATION R LATERAL CANAL. EL. 834.90

THC PROJECT NO. 542.089  
DATE PLOTTED=> 01-16-2024  
TIME PLOTTED=> 01:58 PM  
LAST REVISION  
10-18-2023

THE HOLT GROUP, INC. PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 DATE  
 REVISOR  
 DATE REVISOR

PERMIT NUMBER 11- XXX  
 CO IMP RTE 111 PM R39.589 - R40.089  
 AS-BUILT PLANS FOR ROADWAY GEOMETRIC  
 AND ABOVE GROUND FEATURES

STATE REPRESENTATIVE DATE

DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	IMPERIAL	111	PM R39.589 - R40.089	2	8

JAMES G. "JACK" HOLT  
 PROJECT ENGINEER  
 REGISTERED CIVIL ENGINEER, 31773

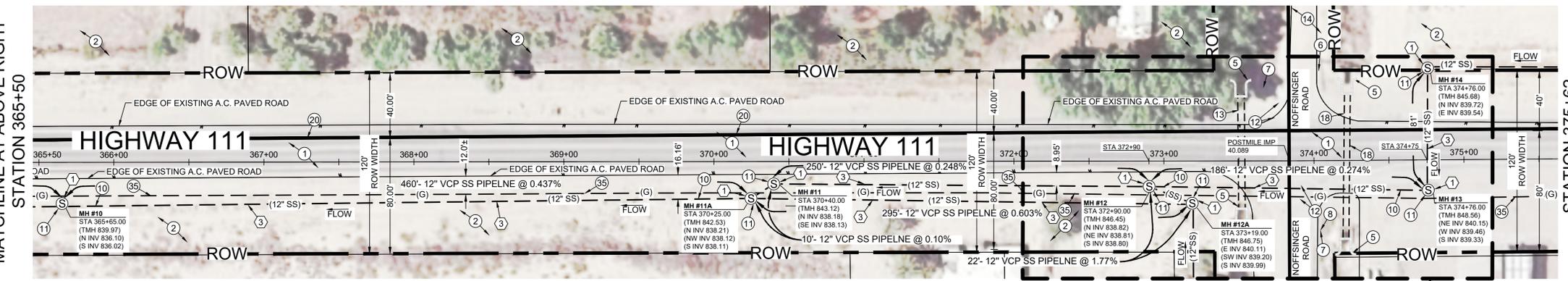
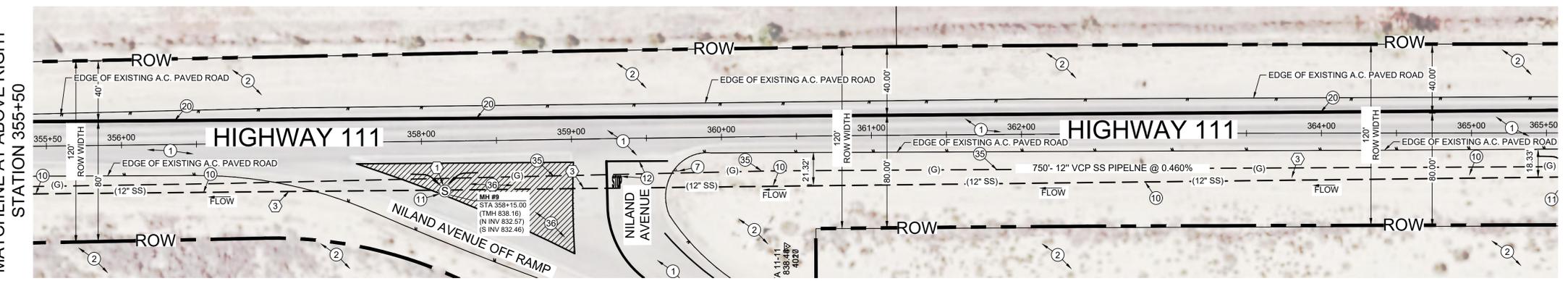
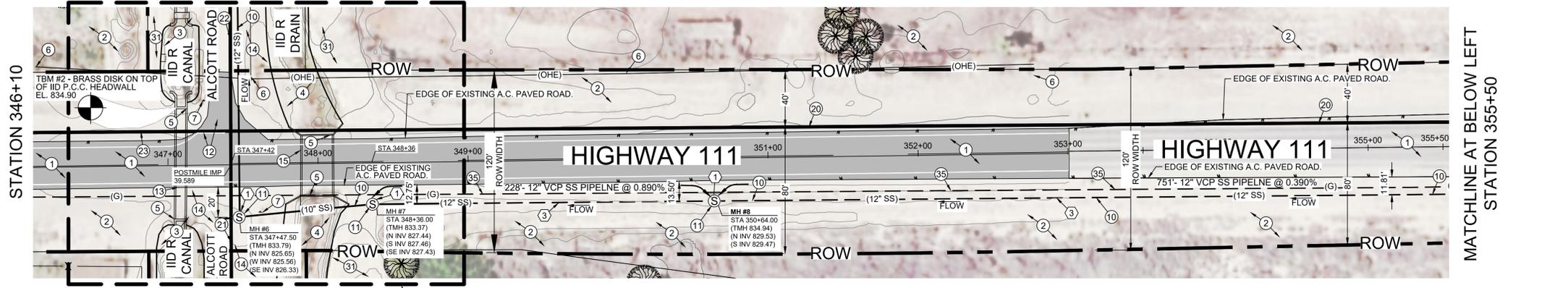
10/18/2023  
 DATE

PLANS APPROVAL DATE  
 IMPERIAL COUNTY PUBLIC WORKS  
 115 S 11TH STREET  
 EL CENTRO, CA 92243

THE HOLT GROUP, INC.  
 1601 NORTH IMPERIAL AVENUE  
 EL CENTRO, CA 92243

- EXISTING KEYNOTES**
- EXISTING A.C. PAVEMENT.
  - EXISTING NATIVE MATERIAL.
  - EXISTING EARTH LINED IID R CANAL.
  - EXISTING EARTH LINED IID R DRAIN.
  - EXISTING P.C.C. IID HEADWALL STRUCTURE.
  - EXISTING IID POWER POLE.
  - EXISTING STOP SIGN.
  - EXISTING STREET NAME SIGN.
  - EXISTING AT&T ENCLOSURE.
  - EXISTING SANITARY SEWER PIPELINE.
  - EXISTING SANITARY SEWER MANHOLE.
  - EXISTING STOP LEGEND AND STOP BAR.
  - EXISTING UNDERGROUND CANAL PIPELINE TO REMAIN.
  - EXISTING DIRT ROADWAY.
  - EXISTING IID R DRAIN PCC BOX DRAIN CULVERT
  - EXISTING CENTERLINE STRIPING.
  - EXISTING EDGE LINE STRIPING.
  - EXISTING UNDERGROUND DRAIN PIPELINE TO REMAIN.
  - SEARCH, NOT FOUND, CENTER 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE COUNTY OF IMPERIAL RECORDERS OFFICE ON 2/26/1992.
  - 1/4 SECTION LINE BETWEEN THE CENTER 1/4 CORNER AND NORTH 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE IMPERIAL COUNTY RECORDERS OFFICE ON 2/26/1992.
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  - TOP OF CANAL SLOPE.
  - TOP OF DRAIN SLOPE.
  - DRAIN CHANNEL.
  - SIPHON BEGINS AT CONNECTION OF 10" VCP SANITARY SEWER GRAVITY PIPELINE TO 8" PVC SANITARY SEWER SIPHON PIPELINE.
  - SIPHON ENDS AT CONNECTION OF 8" PVC SANITARY SEWER SIPHON PIPELINE TO 10" VCP SANITARY SEWER GRAVITY PIPELINE.
  - EDGE OF DIRT ROAD.
  - EXISTING A.C. PAVEMENT STOPS.
  - I.I.D. DIRT CANAL OR DRAIN ACCESS ROAD.
  - EXISTING EARTH LINED I.I.D. "S" CANAL.
  - EXISTING EARTH LINED I.I.D. "S" DRAIN.
  - S 1/4 CORNER, SECTION 10, T.11S., R.14E., SBB&M PER PM 51/41, PM 8/8, ROS 11/46, ROS 10/17 AND ROS 20/24.
  - EXISTING GAS PIPELINE. HORIZONTAL LOCATION, DEPTH AND DIAMETER SIZE UNKNOWN.
  - NO TRAFFIC AREA.

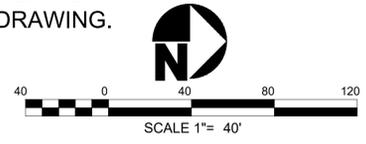
- CONSTRUCTION KEYNOTES**
- THE CONTRACTOR SHALL REHABILITATE THE EXISTING MANHOLE IN CONFORMANCE WITH DETAIL B ON PLAN SHEET 5.
  - CONSTRUCT NEW 10 INCH DIAMETER SDR 26 PVC PIPELINE SECTION BETWEEN THE PIPELINE SIPHON AND MANHOLE NUMBER 6. INSTALL FERNCO ECCENTRIC 8" X 10" COUPLING WITH 316 SS BANDS AND OTHER JUNCTION FITTINGS AS REQUIRED.
  - INSTALL CURED-IN-PLACE PIPE (C.I.P.P.) MATERIAL WITHIN THE EXISTING 12-INCH DIAMETER SDR 35 PVC PIPE WITHIN THE HIGHWAY 111 RIGHT-OF-WAY.



**MANHOLE REHABILITATION AND CURE-IN-PLACE PIPE (C.I.P.P.) QUANTITIES**

ITEM	QUANTITY
MANHOLE REHABILITATION (EACH)	11 EACH
12" VCP PIPELINE - (C.I.P.P.)	3,025 LINEAR FEET

SEE PAGE 4 FOR  
 SANITARY SEWER PLAN  
 AND PROFILE DRAWING.



**HIGHWAY 111 - SANITARY SEWER  
 PIPELINE AND MANHOLE IMPROVEMENT  
 PLAN- STA 346+10 TO STA 375+62**

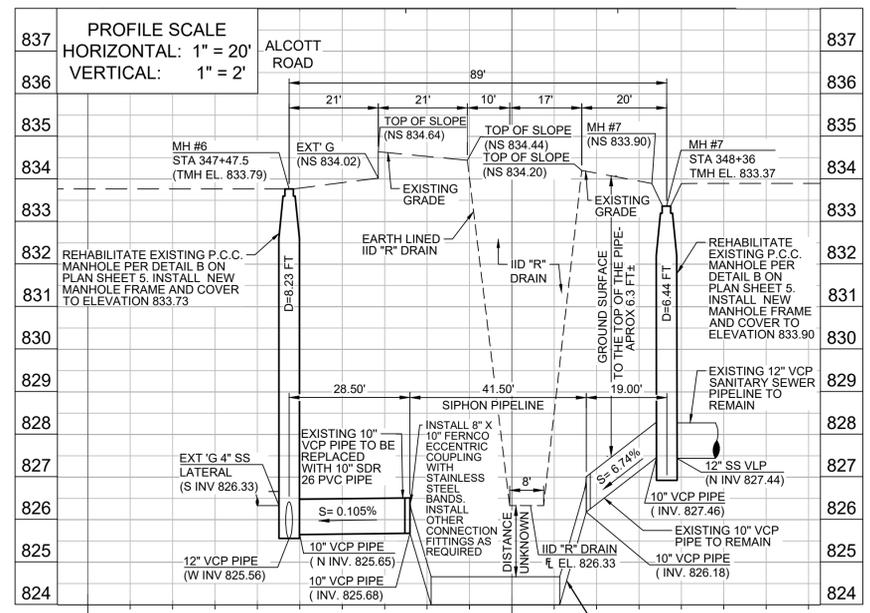
DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	IMPERIAL	111	PM R39.589 - R40.089	3	8

10/18/2023  
 DATE

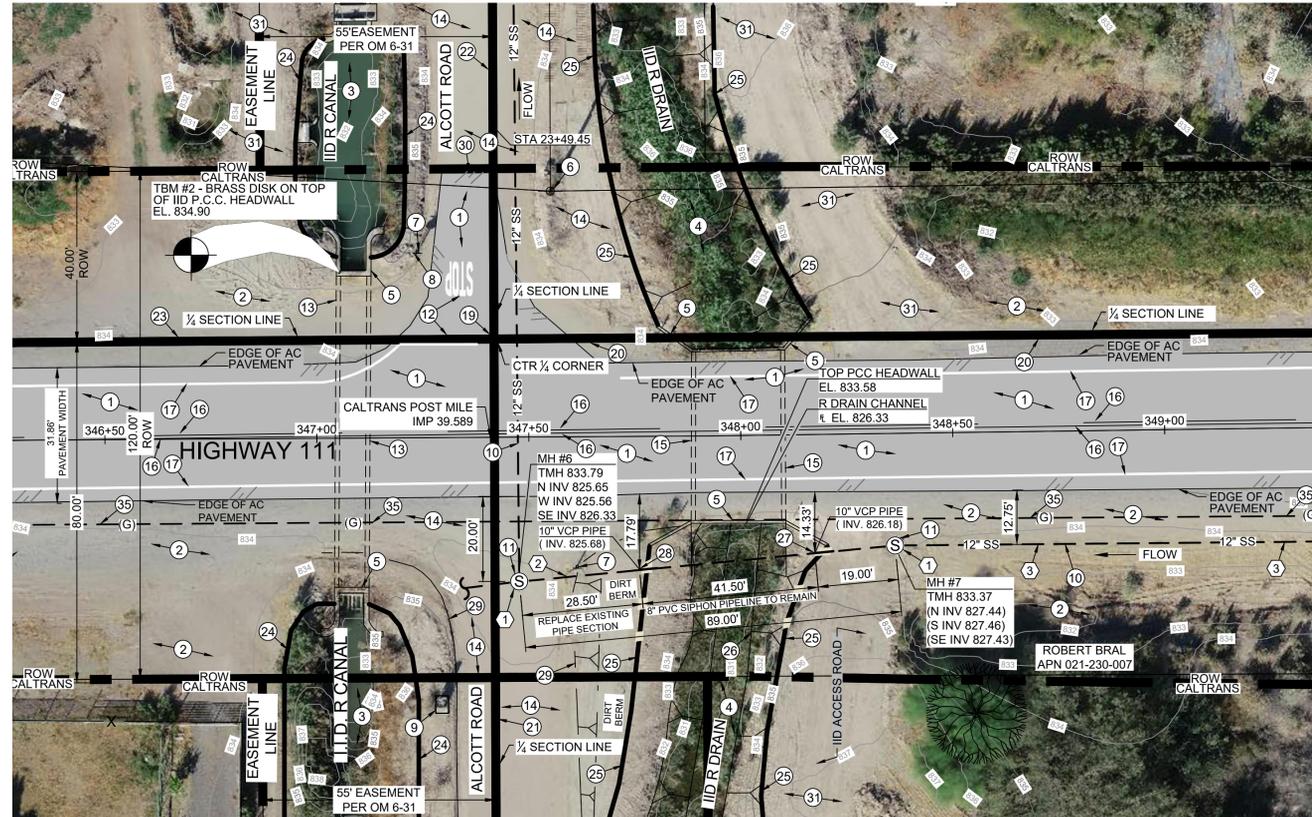
JAMES G. "JACK" HOLT  
 PROJECT ENGINEER  
 REGISTERED CIVIL ENGINEER, 31773

PLANS APPROVAL DATE  
 IMPERIAL COUNTY PUBLIC WORKS  
 115 S 11TH STREET  
 EL CENTRO, CA 92243

THE HOLT GROUP, INC.  
 1601 NORTH IMPERIAL AVENUE  
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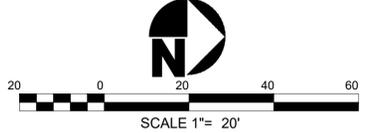


THE 8 INCH PVC SANITARY SEWER SIPHON PIPELINE EXTENDING BENEATH THE IMPERIAL IRRIGATION DISTRICT "R" DRAIN WAS AIR TESTED BETWEEN THE BEGINNING AND END POINTS OF THE 8 INCH SIPHON PIPELINE ON APRIL 6TH, 2022. THE AIR TEST WAS WITNESSED BY THE CONSULTING DESIGN ENGINEER ENGAGED BY THE COUNTY OF IMPERIAL TO COMPLETE THE NILAND COUNTY STATION DISTRICT WASTEWATER TREATMENT PLANT AND COLLECTION SYSTEM IMPROVEMENTS AND THE ENGINEER HAS STAMPED AND SIGNED THE IMPROVEMENT PLAN DRAWINGS; JAMES G. HOLT, P.E. - CALIFORNIA CIVIL ENGINEERING LICENSE NUMBER 31,773. THE 8 INCH PVC SANITARY SEWER SIPHON PIPELINE WAS AIR TESTED AT 5 PSI. THE 8 INCH PVC SIPHON PIPELINE HELD 5 PSI PRESSURE FOR 5 MINUTES AND SUCCESSFULLY PASSED THE AIR TEST. THE SIPHON PIPELINE IS LEAK PROOF AND THERE IS NO WATER INFILTRATING INTO THE SIPHON PIPELINE AND NO WASTEWATER EXFILTRATING FROM THE SIPHON PIPELINE. THE EXISTING 8 INCH PVC SANITARY SEWER SIPHON PIPELINE SHALL THEREFORE BE MAINTAINED IN SERVICE IN ITS EXISTING CONDITION.



STATION 346+10

STATION 349+35 - SEE PAGE 2  
 FOR CONTINUATION



### EXISTING KEYNOTES

- EXISTING A.C. PAVEMENT.
- EXISTING NATIVE MATERIAL.
- EXISTING EARTH LINED IID R CANAL.
- EXISTING EARTH LINED IID R DRAIN.
- EXISTING P.C.C. IID HEADWALL STRUCTURE.
- EXISTING IID POWER POLE.
- EXISTING STOP SIGN.
- EXISTING STREET NAME SIGN.
- EXISTING AT&T ENCLOSURE.
- EXISTING SANITARY SEWER PIPELINE.
- EXISTING SANITARY SEWER MANHOLE.
- EXISTING STOP LEGEND AND STOP BAR.
- EXISTING UNDERGROUND CANAL PIPELINE TO REMAIN.
- EXISTING DIRT ROADWAY.
- EXISTING IID R DRAIN PCC BOX DRAIN CULVERT
- EXISTING CENTERLINE STRIPING.
- EXISTING EDGE LINE STRIPING.
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- 1/4 SECTION LINE BETWEEN THE CENTER 1/4 CORNER AND SOUTH 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE IMPERIAL COUNTY RECORDERS OFFICE ON 2/26/1992.
- TOP OF CANAL SLOPE.
- TOP OF DRAIN SLOPE.
- DRAIN CHANNEL.
- SIPHON BEGINS AT CONNECTION OF 10" VCP SANITARY SEWER GRAVITY PIPELINE TO 8" PVC SANITARY SEWER SIPHON PIPELINE.
- SIPHON ENDS AT CONNECTION OF 8" PVC SANITARY SEWER SIPHON PIPELINE TO 10" VCP SANITARY SEWER GRAVITY PIPELINE.
- EDGE OF DIRT ROAD.
- EXISTING A.C. PAVEMENT STOPS.
- I.I.D. DIRT CANAL OR DRAIN ACCESS ROAD.
- EXISTING EARTH LINED I.I.D. "S" CANAL.
- EXISTING EARTH LINED I.I.D. "S" DRAIN.
- S 1/4 CORNER SECTION 10, T. 11S, R. 14E., SBB&M PER PM 51/41, PM 8/8, ROS 11/46, ROS 10/17 AND ROS 20/24.
- EXISTING GAS PIPELINE. HORIZONTAL LOCATION, DEPTH AND DIAMETER SIZE UNKNOWN.
- NO TRAFFIC AREA.

- ### CONSTRUCTION KEYNOTES
- THE CONTRACTOR SHALL REHABILITATE THE EXISTING MANHOLE IN CONFORMANCE WITH DETAIL B ON PLAN SHEET 5.
  - CONSTRUCT NEW 10 INCH DIAMETER SDR 26 PVC PIPELINE SECTION BETWEEN THE PIPELINE SIPHON AND MANHOLE NUMBER 6. INSTALL FERRO ECCCENTRIC 8" X 10" COUPLING WITH 316 SS BANDS AND OTHER JUNCTION FITTINGS AS REQUIRED.
  - INSTALL CURED-IN-PLACE PIPE (C.I.P.P.) MATERIAL WITHIN THE EXISTING 12-INCH DIAMETER SDR 35 PVC PIPE WITHIN THE HIGHWAY 111 RIGHT-OF-WAY.

REVISOR BY DATE

DATE

CALCULATED/DESIGNED BY CHECKED BY

PROJECT ENGINEER

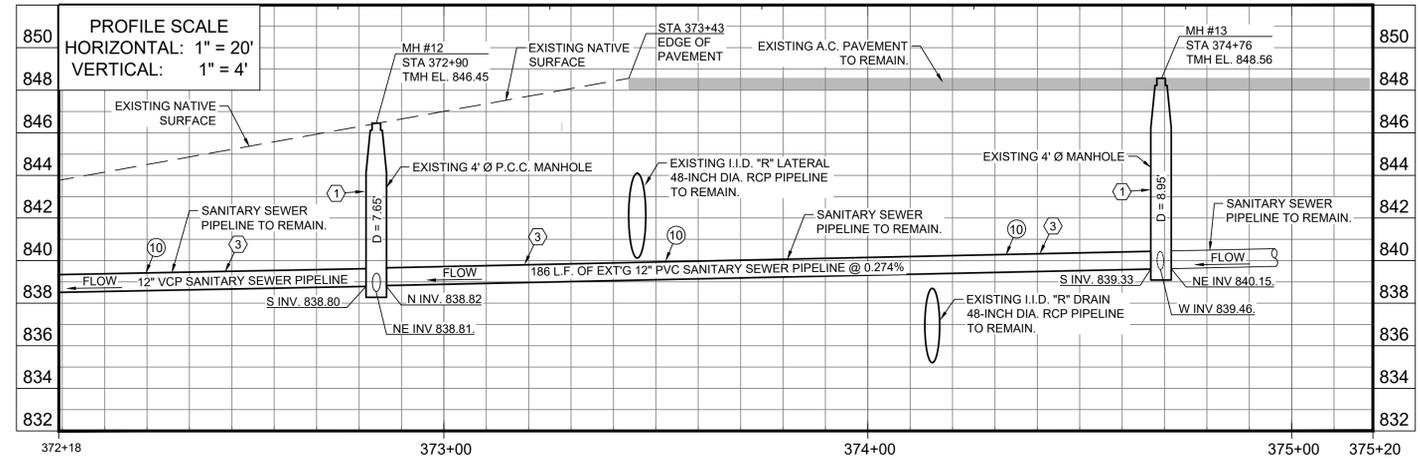
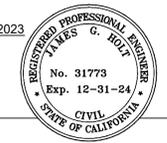
THE HOLT GROUP, INC.

THE HOLT GROUP, INC. PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 DATE  
 REVISIONS  
 DATE REVISION  
 DATE REVISION

PERMIT NUMBER 11- XXX  
 CO IMP RTE 111 PM R39.589 - R40.089  
 AS-BUILT PLANS FOR ROADWAY GEOMETRIC AND ABOVE GROUND FEATURES

DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	IMPERIAL	111	PM R39.589 - R40.089	4	8

STATE REPRESENTATIVE \_\_\_\_\_ DATE \_\_\_\_\_  
 10/18/2023  
 DATE  
 JAMES G. "JACK" HOLT  
 PROJECT ENGINEER  
 REGISTERED CIVIL ENGINEER, 31773  
 IMPERIAL COUNTY PUBLIC WORKS  
 115 S 11TH STREET  
 EL CENTRO, CA 92243  
 THE HOLT GROUP, INC.  
 1601 NORTH IMPERIAL AVENUE  
 EL CENTRO, CA 92243

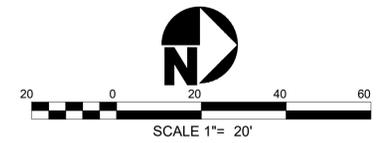
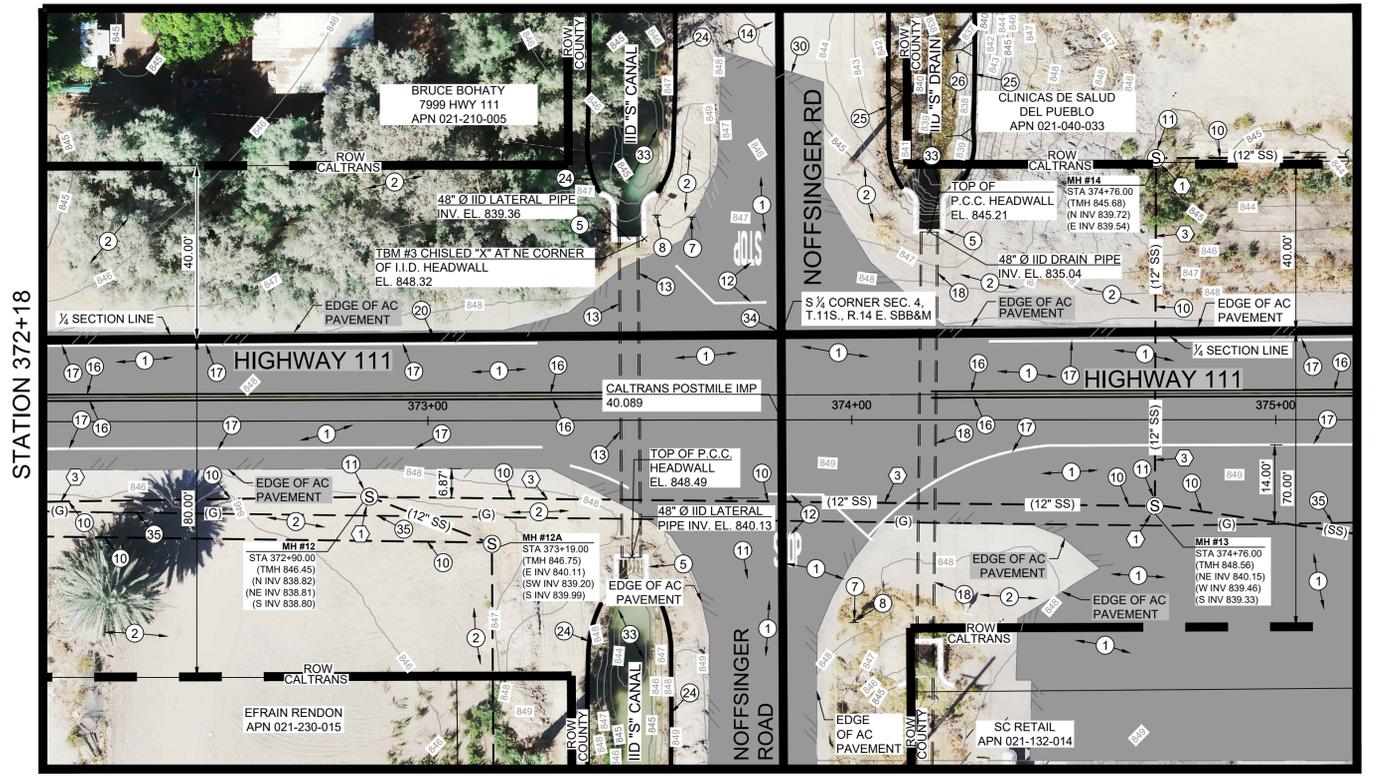


**EXISTING KEYNOTES**

- 1 EXISTING A.C. PAVEMENT.
- 2 EXISTING NATIVE MATERIAL.
- 3 EXISTING EARTH LINED IID R CANAL.
- 4 EXISTING EARTH LINED IID R DRAIN.
- 5 EXISTING P.C.C. IID HEADWALL STRUCTURE.
- 6 EXISTING IID POWER POLE.
- 7 EXISTING STOP SIGN.
- 8 EXISTING STREET NAME SIGN.
- 9 EXISTING AT&T ENCLOSURE.
- 10 EXISTING SANITARY SEWER PIPELINE.
- 11 EXISTING SANITARY SEWER MANHOLE.
- 12 EXISTING STOP LEGEND AND STOP BAR.
- 13 EXISTING UNDERGROUND CANAL PIPELINE TO REMAIN.
- 14 EXISTING DIRT ROADWAY.
- 15 EXISTING IID R DRAIN PCC BOX DRAIN CULVERT
- 16 EXISTING CENTERLINE STRIPING.
- 17 EXISTING EDGE LINE STRIPING.
- 18 EXISTING UNDERGROUND DRAIN PIPELINE TO REMAIN.
- 19 SEARCH, NOT FOUND, CENTER 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE COUNTY OF IMPERIAL RECORDERS OFFICE ON 2/26/1992.
- 20 1/2 SECTION LINE BETWEEN THE CENTER 1/4 CORNER AND NORTH 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE IMPERIAL COUNTY RECORDERS OFFICE ON 2/26/1992.
- 21 1/2 SECTION LINE BETWEEN THE CENTER 1/4 CORNER AND EAST 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE IMPERIAL COUNTY RECORDERS OFFICE ON 2/26/1992.
- 22 1/2 SECTION LINE BETWEEN THE CENTER 1/4 CORNER AND WEST 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE IMPERIAL COUNTY RECORDERS OFFICE ON 2/26/1992.
- 23 1/2 SECTION LINE BETWEEN THE CENTER 1/4 CORNER AND SOUTH 1/4 CORNER OF SECTION 9, TOWNSHIP 11 SOUTH, RANGE 14 EAST, SAN BERNARDINO MERIDIAN PER ROS 10-7 FILED AT THE IMPERIAL COUNTY RECORDERS OFFICE ON 2/26/1992.
- 24 TOP OF CANAL SLOPE.
- 25 TOP OF DRAIN SLOPE.
- 26 DRAIN CHANNEL.
- 27 SIPHON BEGINS AT CONNECTION OF 10" VCP SANITARY SEWER GRAVITY PIPELINE TO 8" PVC SANITARY SEWER SIPHON PIPELINE.
- 28 SIPHON ENDS AT CONNECTION OF 8" PVC SANITARY SEWER SIPHON PIPELINE TO 10" VCP SANITARY SEWER GRAVITY PIPELINE.
- 29 EDGE OF DIRT ROAD.
- 30 EXISTING A.C. PAVEMENT STOPS.
- 31 I.I.D. DIRT CANAL OR DRAIN ACCESS ROAD.
- 32 EXISTING EARTH LINED I.I.D. "S" CANAL.
- 33 EXISTING EARTH LINED I.I.D. "S" DRAIN.
- 34 S 1/4 CORNER, SECTION 10, T.11S., R.14E., SBB&M PER PM 51/41, PM 8/8, ROS 11/46, ROS 10/17 AND ROS 20/24.
- 35 EXISTING GAS PIPELINE. HORIZONTAL LOCATION, DEPTH AND DIAMETER SIZE UNKNOWN.
- 36 NO TRAFFIC AREA.

**CONSTRUCTION KEYNOTES**

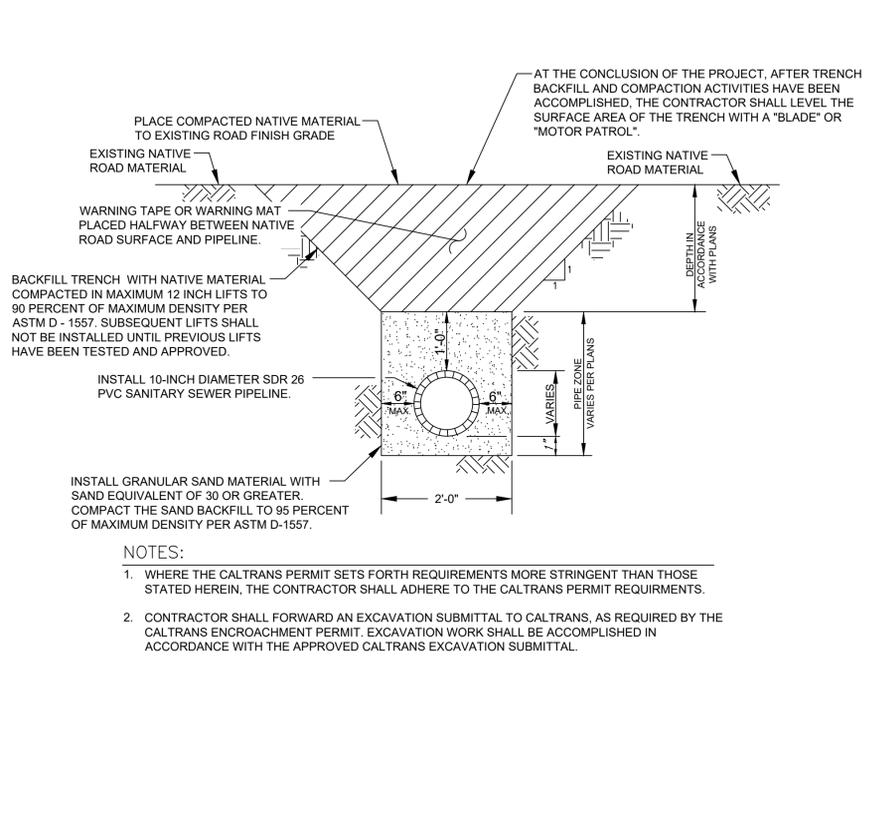
- 1 THE CONTRACTOR SHALL REHABILITATE THE EXISTING MANHOLE IN CONFORMANCE WITH DETAIL B ON PLAN SHEET 5.
- 2 CONSTRUCT NEW 10 INCH DIAMETER SDR 26 PVC PIPELINE SECTION BETWEEN THE PIPELINE SIPHON AND MANHOLE NUMBER 6. INSTALL FERRO ECCCENTRIC 8" X 10" COUPLING WITH 316 SS BANDS AND OTHER JUNCTION FITTINGS AS REQUIRED.
- 3 INSTALL CURED-IN-PLACE PIPE (C.I.P.P.) MATERIAL WITHIN THE EXISTING 12-INCH DIAMETER SDR 35 PVC PIPE WITHIN THE HIGHWAY 111 RIGHT-OF-WAY.



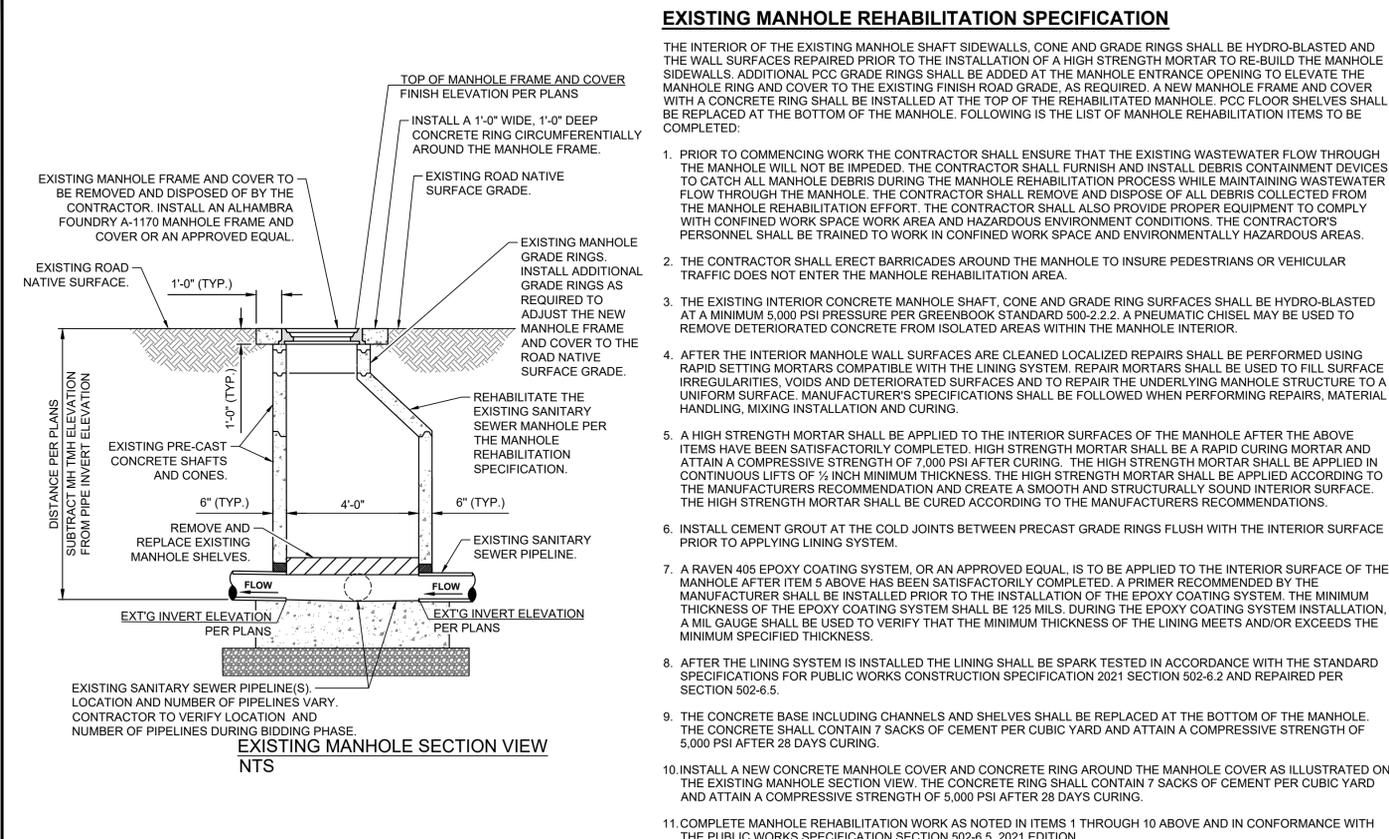
**HIGHWAY 111 AND NOFFSINGER ROAD  
 SANITARY SEWER PIPELINE AND MANHOLE  
 IMPROVEMENT PLAN- STA 372+18 TO STA 375+20**

THC PROJECT NO. 542.089  
 DATE PLOTTED=> 11-06-2023  
 TIME PLOTTED=> 05:21 PM  
 LAST REVISION  
 10-18-2023

THE HOLT GROUP, INC. PROJECT ENGINEER  
 CALCULATED/DESIGNED BY CHECKED BY  
 DATE DATE REVISIONS  
 REVISED BY DATE REVISIONS



SANITARY SEWER MAIN TRENCH IN UNPAVED AREA **A**  
 NTS 3 5

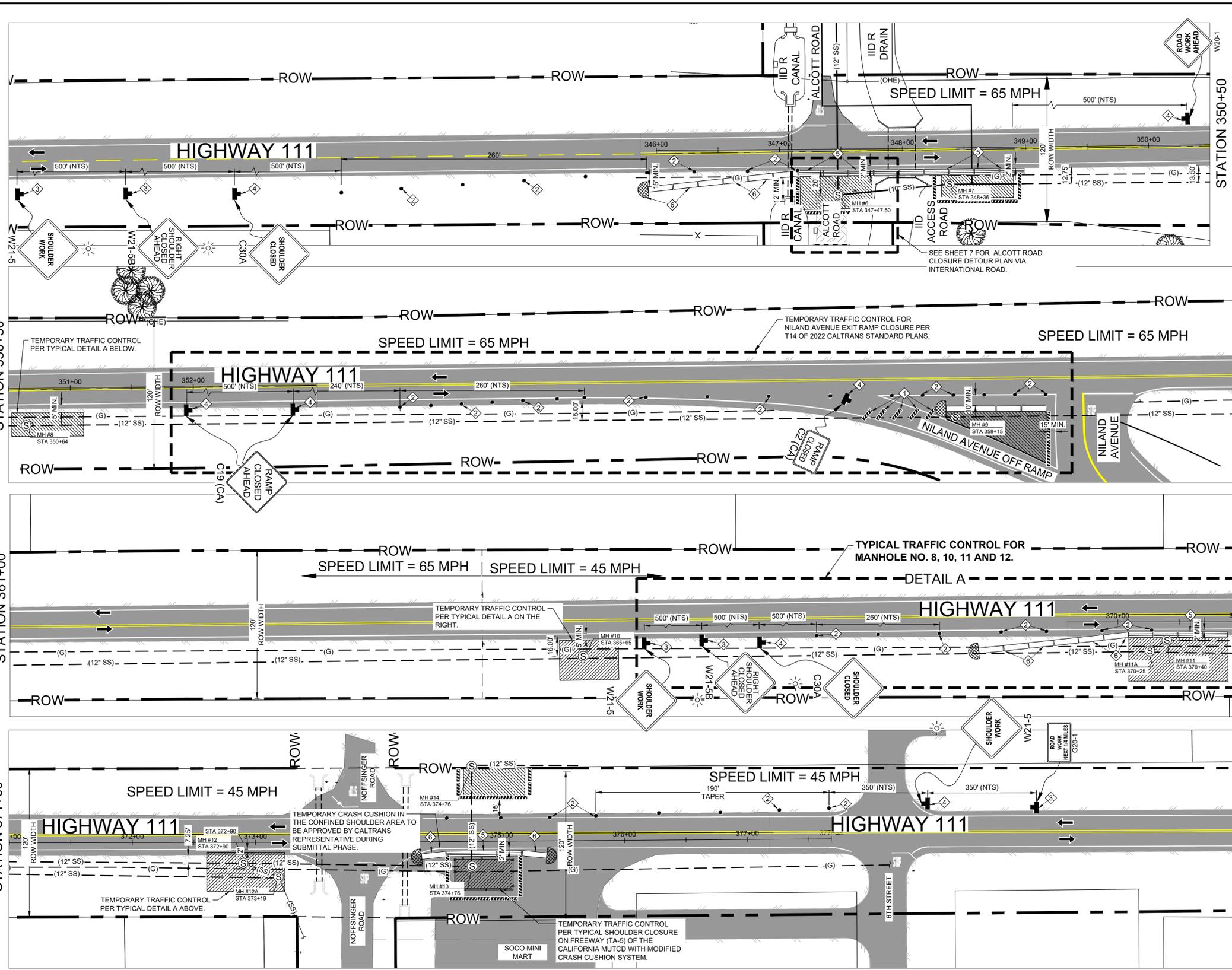


EXISTING MANHOLE REHABILITATION DETAIL **B**  
 NTS 2-4 5

PERMIT NUMBER 11- XXX		CO IMP RTE 111 PM R39.589 - R40.089		AS-BUILT PLANS FOR ROADWAY GEOMETRIC AND ABOVE GROUND FEATURES	
STATE REPRESENTATIVE		DATE			
DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	IMPERIAL	111	PM R39.589 - R40.089	5	8
JAMES G. "JACK" HOLT PROJECT ENGINEER REGISTERED CIVIL ENGINEER, 31773			10/18/2023 DATE		
PLANS APPROVAL DATE IMPERIAL COUNTY PUBLIC WORKS 115 S 11TH STREET EL CENTRO, CA 92243					
THE HOLT GROUP, INC. 1601 NORTH IMPERIAL AVENUE EL CENTRO, CA 92243					



THE HOLT GROUP, INC. PROJECT ENGINEER CHECKED BY DATE REVISIONS



PERMIT NUMBER 11- XXX  
 CO IMP RTE 111 PM R39.589 - R40.089  
 AS-BUILT PLANS FOR ROADWAY GEOMETRIC AND ABOVE GROUND FEATURES

STATE REPRESENTATIVE DATE

DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	IMPERIAL	111	PM R39.589 - R40.089	6	8

JAMES G. "JACK" HOLT  
 PROJECT ENGINEER  
 REGISTERED CIVIL ENGINEER, 31773

10/18/2023  
 DATE

PLANS APPROVAL DATE  
 IMPERIAL COUNTY PUBLIC WORKS  
 115 S 11TH STREET  
 EL CENTRO, CA 92243

THE HOLT GROUP, INC.  
 1601 NORTH IMPERIAL AVENUE  
 EL CENTRO, CA 92243

- TRAFFIC CONTROL KEYNOTES**
- INSTALL TYPE III BARRICADE.
  - INSTALL REFLECTIVE TRAFFIC CONES/DELINEATORS AT SPACING INDICATED ON TABLES PER T3 OF 2022 CALTRANS STANDARD PLANS ALONG THE TAPER. TYPICAL.
  - INSTALL WARNING/REGULATORY SIGN WITH WARNING LIGHT AS ILLUSTRATED ON THE PLAN.
  - INSTALL WARNING/REGULATORY SIGN AS ILLUSTRATED ON THE PLAN.
  - INSTALL K-RAIL AS ILLUSTRATED ON THE PLAN.
  - INSTALL TEMPORARY CRASH CUSHIONS PER T2 OF 2022 CALTRANS STANDARD PLANS AND TA-5 OF CALIFORNIA MUTCD.

**TRAFFIC CONTROL LEGEND**

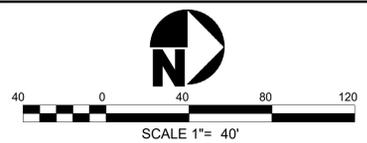
ITEM NO.	ITEM DESCRIPTION	ITEM
1.	CHANNELIZING DEVICE	
2.	DIRECTION OF TRAFFIC	
3.	TYPE III BARRICADE	
4.	WARNING/REGULATORY SIGN	
5.	WARNING LIGHT	
6.	WORK AREA	
7.	K-RAIL	
8.	CRASH CUSHION BARRICADE	
9.	CRASH CUSHION	

**TEMPORARY TRAFFIC CONTROL SET-UP**

MH #	STA.	DISTANCE BETWEEN EDGE OF TRAVELED WAY AND K-RAIL OUTER EDGE (FT)	REHABILITATE OR TO REMAIN	2022 CALTRANS STANDARD PLAN	2014 CALIFORNIA MUTCD
6	347+47.50	2' MIN.	REHABILITATE	T2	TA-5
7	348+36	2' MIN.	REHABILITATE	T2	TA-5
8	350+64	2' MIN.	REHABILITATE	T2	TA-5
9	358+15	10' MIN.	REHABILITATE	T2 AND T14	TA-5
10	365+65	2' MIN.	REHABILITATE	T2	TA-5
11	370+40	2' MIN.	REHABILITATE	T2	TA-5
11A	370+25	2' MIN.	REHABILITATE	T2	TA-5
12	372+90	2' MIN.	REHABILITATE	T2	TA-5
12A	373+19	2' MIN.	REHABILITATE	T2	TA-5
13	374+76	2' MIN.	REHABILITATE	T2	TA-5
14	374+76	15' MIN.	REHABILITATE	N/A	TA-3

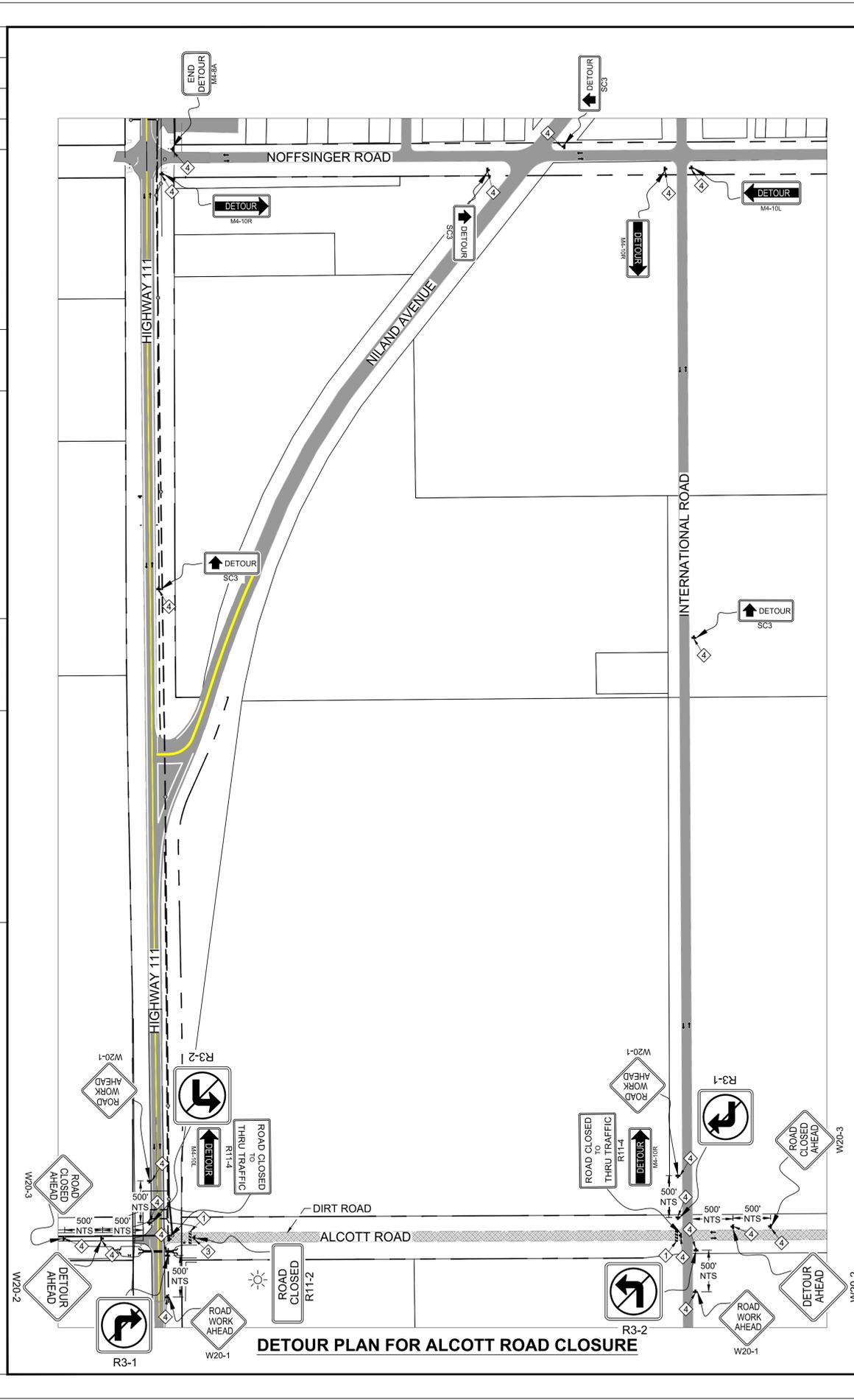
**NOTES:**

- THE CONTRACTOR SHALL MAINTAIN THE INGRESS AND EGRESS OF THE RESIDENTIAL AND BUSINESS ACCESS AT ALL TIMES DURING THE CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL PROVIDE TEMPORARY ACCESS RAMP(S) OR TRAVEL WAYS, IF NECESSARY.
- REFER TO GENERAL NOTES ON PLAN SHEET 7.



**TRAFFIC CONTROL PLAN**

THE HOLT GROUP, INC. PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 DATE  
 REVISOR  
 DATE REVISOR



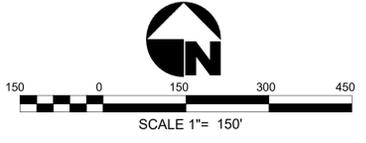
**DETOUR PLAN FOR ALCOTT ROAD CLOSURE**

**TRAFFIC CONTROL KEYNOTES**

- 1. INSTALL TYPE III BARRICADE.
- 2. INSTALL REFLECTIVE TRAFFIC CONES/DELINEATORS AT SPACING INDICATED ON TABLES PER T9 OF 2022 CALTRANS STANDARD PLANS ALONG THE TAPER. TYPICAL.
- 3. INSTALL WARNING/REGULATORY SIGN WITH WARNING LIGHT AS ILLUSTRATED ON THE PLAN.
- 4. INSTALL WARNING/REGULATORY SIGN AS ILLUSTRATED ON THE PLAN.
- 5. INSTALL K-RAIL AS ILLUSTRATED ON THE PLAN.
- 6. INSTALL TEMPORARY CRASH CUSHIONS PER T2 OF 2022 CALTRANS STANDARD PLANS AND TA-5 OF CALIFORNIA MUTCD.

ITEM NO.	ITEM DESCRIPTION	ITEM
1.	CHANNELIZING DEVICE	
2.	DIRECTION OF TRAFFIC	
3.	TYPE III BARRICADE	
4.	WARNING/REGULATORY SIGN	
5.	WARNING LIGHT	
6.	WORK AREA	
7.	K-RAIL	
8.	CRASH CUSHION BARRICADE	
9.	CRASH CUSHION	

**NOTE: THE CONTRACTOR SHALL MAINTAIN THE INGRESS AND EGRESS OF THE RESIDENTIAL AND BUSINESS ACCESS AT ALL TIMES DURING THE CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL PROVIDE TEMPORARY ACCESS RAMP(S) OR TRAVEL WAYS, IF NECESSARY.**



PERMIT NUMBER 11- XXX  
 CO IMP RTE 111 PM R39.589 - R40.089  
 AS-BUILT PLANS FOR ROADWAY GEOMETRIC AND ABOVE GROUND FEATURES

STATE REPRESENTATIVE		DATE
DIST 11	COUNTY IMPERIAL	ROUTE 111
MILE POST TOTAL PROJECT	PM R39.589 - R40.089	SHEET NO. 7
		TOTAL SHEETS 8

JAMES G. "JACK" HOLT  
 PROJECT ENGINEER  
 REGISTERED CIVIL ENGINEER, 31773  
 DATE 10/18/2023

PLANS APPROVAL DATE  
 IMPERIAL COUNTY PUBLIC WORKS  
 115 S 11TH STREET  
 EL CENTRO, CA 92243

THE HOLT GROUP, INC.  
 1601 NORTH IMPERIAL AVENUE  
 EL CENTRO, CA 92243

**GENERAL TRAFFIC CONTROL NOTES:**

1. ALL TRAFFIC CONTROL DEVICES FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF CALTRANS STANDARD PLANS AND/OR MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND MUTCD CALIFORNIA SUPPLEMENT.
2. TRAFFIC CONTROL SHOWN HEREIN IS THE MINIMUM REQUIRED. ADDITIONAL TRAFFIC CONTROL MAY BE REQUIRED TO FACILITATE PUBLIC SAFETY AND TRAFFIC FLOW IF DEEMED NECESSARY BY THE CALTRANS REPRESENTATIVE, COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT REPRESENTATIVE, OR THE COUNTY ENGINEER. THESE CHANGES MAY BE DONE IN THE FIELD.
3. TRAFFIC CONTROL DEVICES SHOWN ON PLANS ARE LOCATED APPROXIMATELY AND SHALL BE ADJUSTED AS REQUIRED TO MEET FIELD CONDITIONS. ALL SUCH CHANGES MADE DUE TO FIELD CONDITIONS SHALL BE IN ACCORDANCE WITH THE LATEST VERSION OF CALTRANS STANDARD PLANS, MUTCD, AND MUTCD CALIFORNIA SUPPLEMENT.
4. THROUGHOUT EACH WORK PERIOD, CONTRACTOR SHALL INSPECT TRAFFIC CONTROL (SIGNS, BARRICADES AND DELINEATORS) AND MAINTAIN SAME IN ACCORDANCE WITH TRAFFIC CONTROL PLANS.
5. CONTRACTOR SHALL MAINTAIN A MINIMUM 12-FOOT TRAFFIC LANE WIDTH AT ALL TIMES. THERE SHALL BE A MINIMUM 2-FOOT BETWEEN THE EDGE OF CUT AND THE NEAREST TRAFFIC LANE.
6. ACCESS TO PRIVATE PROPERTY SHALL BE MAINTAINED AT ALL TIMES.
7. ALL SIGNS SHALL BE HIGH INTENSITY REFLECTIVE. ALL TRAFFIC CONTROL DEVICES SHALL BE REFLECTIVE. FLASHING LIGHTS ARE OPTIONAL. TRAFFIC BEACONS (12") SHALL BE PLACED ON ALL DETOUR AHEAD (W21-4) AND ROAD CLOSED AHEAD (C19) SIGNS.
8. THE INTENSITY AND DISTRIBUTION OF LIGHT FROM EACH ILLUMINATED SIGNAL LENS SHOULD CONFORM TO THE CURRENT STANDARDS FOR VEHICLE TRAFFIC CONTROL SIGNAL HEADS AND TRAFFIC SIGNAL LAMPS (SEE SECTION 14.11 OF LATEST VERSION OF CALMUTCD). IF A SIGNAL INDICATION IS OPERATED IN THE FLASHING MODE FOR NIGHTTIME OPERATION AND THE SIGNAL INDICATION IS SO BRIGHT AS TO CAUSE EXCESSIVE GLARE, SOME FORM OF AUTOMATIC DIMMING SHOULD BE USED TO REDUCE THE BRILLIANCE OF THE SIGNAL INDICATION.
9. REFER TO THE LATEST REVISION OF CALIFORNIA MUTCD REGARDING THE NOTES FOR EACH TYPICAL APPLICATION CALLED OUT ON THIS PLAN.
10. CONTRACTOR SHALL INSPECT TRAFFIC CONTROL AT THE BEGINNING AND AT THE END OF EACH WORKING DAY TO ENSURE COMPLIANCE WITH THESE PLANS AND PROJECT SPECIFICATIONS.
11. ALL TEMPORARY TRAFFIC CONTROL DEVICES NOT APPLICABLE FOR NIGHT TIME TEMPORARY TRAFFIC CONTROL SHALL BE REMOVED AND STORED AT A SAFE LOCATION. NO SUCH DEVICE SHALL BE LEFT IN PLACE WITHOUT PRIOR APPROVAL BY THE CALTRANS REPRESENTATIVE AND/OR COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT REPRESENTATIVE AND/OR THE COUNTY ENGINEER.
12. ARROWS AND STRIPING IN CONSTRUCTION ZONE SHALL BE COVERED WITH TEMPORARY STRIPING BLACKOUT TAPE. THE TAPE SHALL BE REMOVED AT THE END OF THE WORK.
13. THE CALTRANS REPRESENTATIVE, COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT REPRESENTATIVE AND/OR THE PROJECT RESIDENT ENGINEER SHALL DETERMINE IF THE PLAN STAYS IN PLACE OVERNIGHT OR NOT. IF A PORTION OF THE CONSTRUCTION AREA MUST REMAIN OPEN AT THE END OF EACH WORK DAY, EACH EXPOSED SECTION MUST BE COMPLETELY FILLED WITH CLASS 2 BASE MATERIAL, AND SURROUNDED WITH BARRICADES AND TAPE OR AS APPROVED BY THE CALTRANS REPRESENTATIVE, COUNTY OF IMPERIAL PUBLIC WORKS DEPARTMENT REPRESENTATIVE OR THE COUNTY ENGINEER.
14. CONTRACTOR SHALL APPLY TEMPORARY TRAFFIC CONTROL IN ACCORDANCE WITH THE LATEST VERSION OF MUTCD, MUTCD CALIFORNIA SUPPLEMENT, AND CALTRANS STANDARD PLANS FOR THE INSTALLATION OF TEMPORARY STRIPING.
15. ALL ADJACENT BUSINESSES, RESIDENCES, SCHOOL AND CHURCHES SHALL BE DULY NOTIFIED BY THE CONTRACTOR, IN WRITING, OF THEIR PROPOSED OPERATIONS. NOTICE SHALL BE DELIVERED AT LEAST TWO (2) WORKING WEEKS PRIOR TO START OF CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPRODUCTION OF NOTIFICATION LETTERS. THE NOTIFICATION LETTERS SHALL BE WRITTEN IN ENGLISH AND SPANISH LANGUAGES. RE-NOTIFICATION WILL BE REQUIRED IF THE CONTRACTOR'S SCHEDULE IS ALTERED OR OTHER DELAYS OCCUR WHICH AFFECT THE PROJECT SCHEDULE.
16. CONTRACTOR SHALL COVER EXISTING TRAFFIC SIGNS, TRAFFIC SIGNALS, OR PEDESTRIAN SIGNAL INDICATIONS SHOULD SAID CONTROLS CONFLICT WITH TEMPORARY TRAFFIC CONTROL PLAN OR AS DIRECTED BY THE CALTRANS OR COUNTY OF IMPERIAL REPRESENTATIVE.
17. CONTRACTOR SHALL REPLACE/REPAIR ANY AND ALL STRIPING, PAVEMENT MARKINGS, RAISED PAVEMENT MARKERS, AND CURB PAINT DISRUPTED OR REMOVED DURING THE CONSTRUCTION TO THE SATISFACTION OF THE CALTRANS REPRESENTATIVE AND/OR COUNTY ENGINEER. ALL CONFLICTING LINES, ARROWS, MARKINGS, OR CURB PAINT SHALL BE REMOVED BY WET SANDBLASTING OR OTHER APPROVED METHOD PRIOR TO INSTALLATION OF NEW/TEMPORARY STRIPING. ALL CONFLICTING RAISED PAVEMENT MARKERS SHALL BE REMOVED. PAVEMENT THAT IS DAMAGED DUE TO THE REMOVAL OF MARKINGS SHALL BE REPAIRED TO THE SATISFACTION OF THE CALTRANS REPRESENTATIVE AND/OR COUNTY ENGINEER.
18. WHENEVER THE WORK CAUSES OBLITERATION OF PAVEMENT DELINEATION, TEMPORARY OR PERMANENT PAVEMENT DELINEATION SHALL BE IN PLACE PRIOR TO OPENING THE TRAVELED WAY TO PUBLIC TRAFFIC. LANE LINES AND CENTERLINE PAVEMENT DELINEATION SHALL BE PROVIDED AT ALL TIMES FOR TRAVELED WAYS OPEN TO THE PUBLIC TRAFFIC.
19. ALL ADVANCED WARNING SIGNS SHALL BE EQUIPPED WITH FLAGS FLASHING YELLOW BEACONS, TYPE-B ON ALL W20-1 SIGNS AND ON ALL TYPE-III AND TYPE-II BARRICADES GUARDING THE WORK AREA OVERNIGHT.

**TRAFFIC CONTROL PLAN**

THG PROJECT NO. 542.089  
 DATE PLOTTED=> 11-03-2023  
 TIME PLOTTED=> 04:02 PM  
 LAST REVISION 10-18-2023

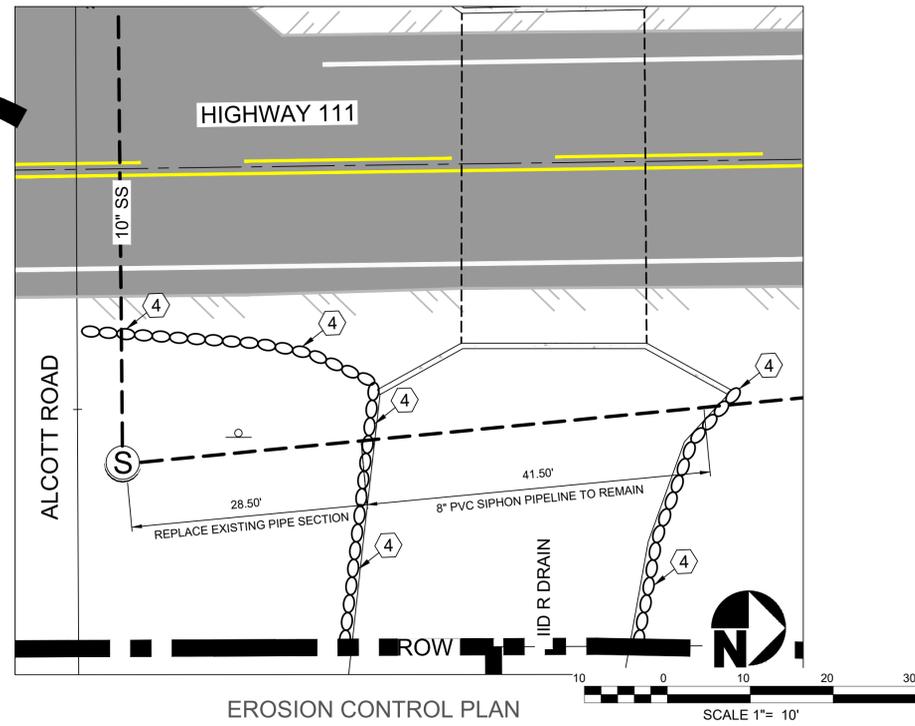
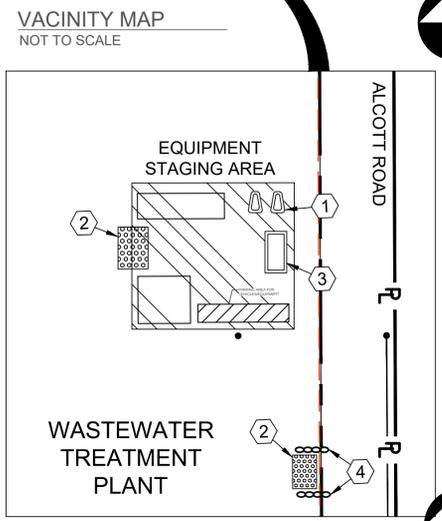
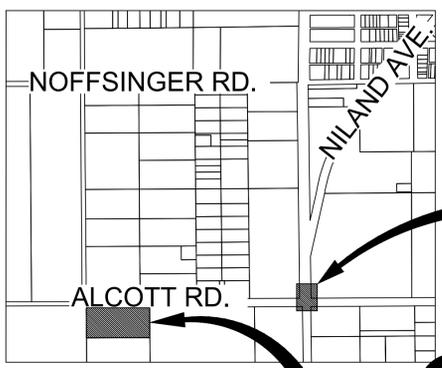
STATE REPRESENTATIVE		DATE			
DIST	COUNTY	ROUTE	MILE POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	IMPERIAL	111	PM R39.589 - R40.089	8	8

JAMES G. "JACK" HOLT  
 PROJECT ENGINEER  
 REGISTERED CIVIL ENGINEER, 31773

10/18/2023  
 DATE

PLANS APPROVAL DATE  
 IMPERIAL COUNTY PUBLIC WORKS  
 115 S 11TH STREET  
 EL CENTRO, CA 92243

THE HOLT GROUP, INC.  
 1601 NORTH IMPERIAL AVENUE  
 EL CENTRO, CA 92243



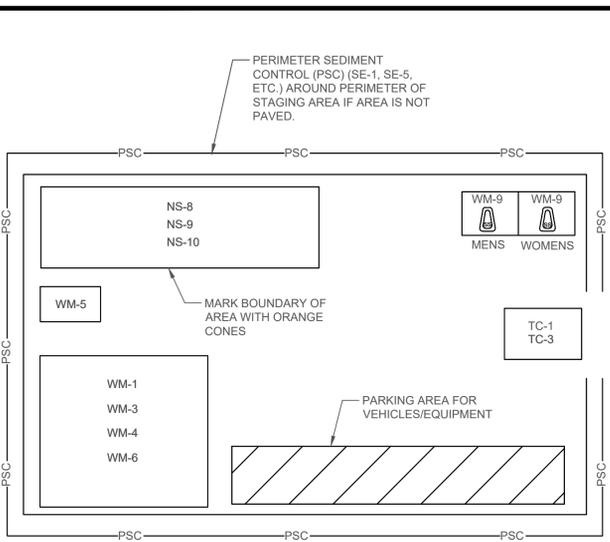
- LEGEND**
- PORTABLE TOILET
  - GRAVEL BAGS
  - CONCRETE WASHOUT AREA
  - CONSTRUCTION ENTRANCE

- BMP KEYNOTES**
- 1 CONTRACTOR SHALL LOCATE THE PORTABLE RESTROOM FACILITIES IN THE STAGING AREA. INSTALL TWO (2) PORTABLE RESTROOM FACILITIES. SEE DETAIL E1 FOR TYPICAL STAGING AREA ON SHEET 8.
  - 2 INSTALL CONSTRUCTION ENTRANCE PER DETAIL E1 AND E2 ON SHEET 8. RELOCATE THE CONSTRUCTION ENTRANCE AS NEEDED TO MINIMIZE DIRT AND DUST FROM LEAVING THE CONSTRUCTION AREA.
  - 3 INSTALL CONCRETE WASHOUT AREA. SEE DETAIL E1 AND E3 ON SHEET 8.
  - 4 INSTALL TWO (2) LAYER GRAVEL-FILLED BAGS. SEE DETAIL E4 ON SHEET 8.

**GENERAL EROSION CONTROL NOTES:**

1. EROSION CONTROL PLAN INCLUDES ALL POSSIBLE BMPs FOR THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL APPLY APPROPRIATE BMPs FOR EACH PHASE OF CONSTRUCTION.
2. STREET SWEEPING (STREETS WILL BE SWEEPED DAILY AND AS NECESSARY TO PREVENT DIRTY AND DUST FROM LEAVING THE CONSTRUCTION AREA).
3. CONTRACTOR SHALL PROVIDE ADEQUATE DUST SUPPRESSION TO MEET ALL COUNTY OF IMPERIAL AIR POLLUTION CONTROL DISTRICT REQUIREMENTS.
4. ALL BEST MANAGEMENT PRACTICES SHALL MEET THE REQUIREMENTS OF THE LATEST VERSION OF CALTRANS CONSTRUCTION SITE BMP FACT SHEETS.
5. SITE DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY GOVERNING AUTHORITIES.
6. NO SITE CLEARING OR GRADING SHALL BEGIN UNTIL ALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED.
7. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
8. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.

STAGING AREA WITHIN THE WWTP  
 NOT TO SCALE

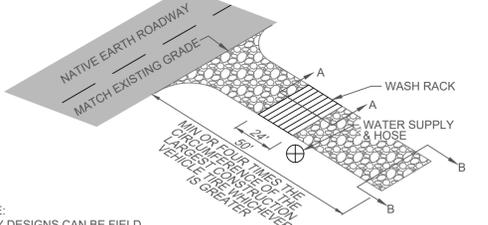
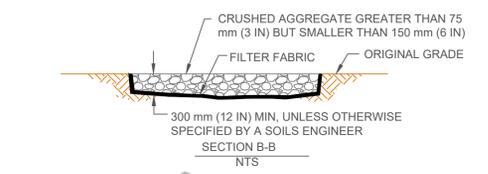
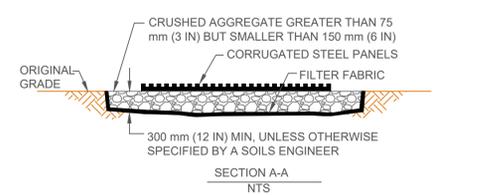


- LEGEND**
- SE-1 SILT FENCE
  - SE-5 FIBER ROLLS
  - NS-8 VEHICLE AND EQUIPMENT CLEANING
  - NS-9 VEHICLE AND EQUIPMENT FUELING
  - NS-10 VEHICLE AND EQUIPMENT MAINTENANCE
  - WM-1 MATERIAL DELIVERY AND STORAGE
  - WM-3 STOCKPILE MANAGEMENT
  - WM-4 SPILL PREVENTION AND CONTROL
  - WM-5 SOLID WASTE MANAGEMENT
  - WM-6 HAZARDOUS WASTE MANAGEMENT
  - WM-9 SANITARY/SEPTIC WASTE MANAGEMENT
  - TC-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT
  - TC-3 TEMPORARY ENTRANCE/OUTLET TIRE WASH
  - WE-1 WIND EROSION CONTROL (TO BE IMPLEMENTED FOR UNPAVED NATIVE AREAS STOCKPILE MANAGEMENT)

**TYPICAL STAGING AREA LAYOUT**

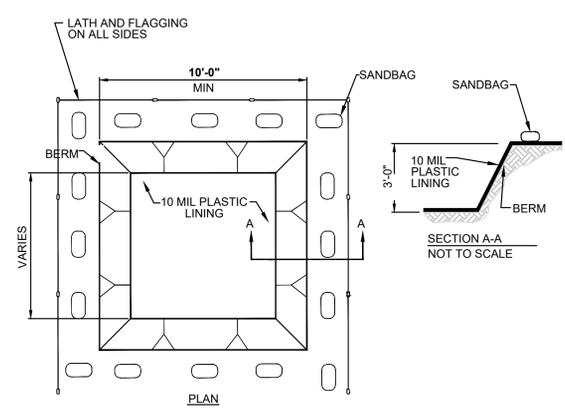
NOTES:

1. CONTRACTOR SHALL ADJUST THE LAYOUT OF STAGING AREA BASED ON PROJECT SITE CONDITIONS AS NECESSARY.
2. CONTRACTOR SHALL IMPLEMENT PERIMETER SEDIMENT CONTROL FOR STAGING AREA BASED ON PROJECT SITE CONDITIONS UPON THE APPROVAL OF THE RESIDENT ENGINEER.



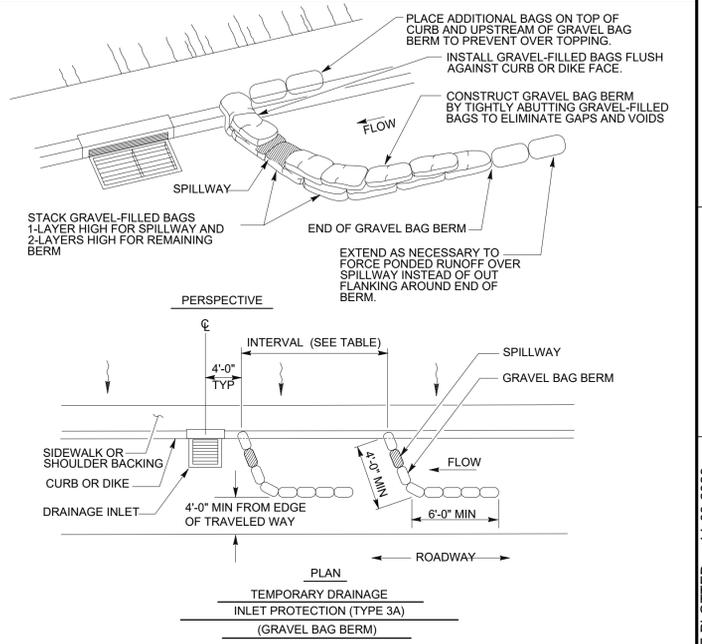
NOTE: MANY DESIGNS CAN BE FIELD FABRICATED, OR FABRICATED UNITS MAY BE USED AS LONG AS DESIGN IS ADEQUATE FOR FULL LENGTH CONSTRUCTION TRUCK VEHICLES.

CONSTRUCTION ENTRANCE - DETAIL E2  
 NOT TO SCALE



NOTE: CONTRACTOR SHALL USE A TEMPORARY WASHOUT AREA AT AREAS WHERE A PERMANENT CONCRETE WASHOUT IS NOT ALLOWED.

CONCRETE WASHOUT AREA - DETAIL E3  
 NOT TO SCALE



**GRAVEL BAG BERM (TYPE 3A) SPACING TABLE**

SLOPE OF ROADWAY (PERCENT)	1 to 3.9	4 to 5.9	6 to 7.9	8 to 10	10+
INTERVAL BETWEEN BERM	100'	75'	50'	25'	12'

For slope of less than 1%, install barriers only if erosion/sediment is prevalent

GRAVEL BAG DETAIL - DETAIL E4  
 NOT TO SCALE

**EROSION CONTROL PLAN AND DETAILS**

REVISOR  
 DATE

DESIGNED BY  
 CHECKED BY

PROJECT ENGINEER

THE HOLT GROUP, INC.