

ATTACHMENT A

**KNIGHTS LANDING DRAINAGE INFRASTRUCTURE IMPROVEMENTS PROJECT
SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS**



PROJECT MANUAL

Volume II: SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS



County of Yolo General Services Department
Knights Landing Flood Management Project
Drainage Infrastructure Improvement Project
Knights Landing, CA 95694

April 30, 2024



THIS PAGE INTENTIONALLY LEFT BLANK



Engineer's Certification

These Specifications for the Knights Landing Flood Management Project, Contract No. #, have been prepared by the following professional engineering companies, with the design responsibility for each as indicated:

Civil Design of the Knights Landing Drainage Improvement Plans, Volume 3



THIS PAGE INTENTIONALLY LEFT BLANK



TABLE OF CONTENTS

VOLUME 1: BIDDING AND CONTRACTING REQUIREMENTS

DIVISION 00 – BIDDING AND CONTRACTING REQUIREMENTS

00 01 10	Table of Contents
00 01 15	List of Bid Documents
00 12 00	Notice to Bidders
00 20 00	Instructions to Bidders
00 41 00	Bid Form with Bid Schedule
00 42 00	Bidder's Bond
00 43 00	Subcontractor List
00 44 00	Bidder Information Sheet
00 45 00	List of Successful Projects
00 45 10	Non-Collusion Declaration
00 45 26	Joint Apprenticeship Committee Certification
00 45 27	Statement re No Apprenticeship Violation
00 45 28	Acknowledgment re: Health Care Expenditure Requirement
00 45 46	Certification Against Lobbying-reserved
00 51 00	Notice of Award
00 52 00	Construction Agreement (Contract)
00 55 00	Notice to Proceed
00 61 00	Performance Bond
00 62 00	Payment Bond
00 62 10	Indemnification
00 62 20	Iran Contacting Act
00 70 00	General Conditions



VOLUME 2: SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS

SPECIAL PROVISIONS

- SP-1 Location of Work
- SP-2 Scope of Work
- SP-3 Site Conditions
- SP-4 Allowable Time, Schedule Constraints and Time of Completion
- SP-5 Liquidated Damages
- SP-6 Allowable Work Hours
- SP-7 Lands and Right-Of-Way
- SP-8 Land Available for Use of Temporary Facilities
- SP-9 Access by The Agency, and Other Jurisdictional Public Agencies
- SP-10 Construction Access
- SP-11 Water Source for Construction Operations
- SP-12 Import/Borrow Material
- SP-13 Protection of Existing Improvements
- SP-14 Cleaning Up
- SP-15 Record Drawings
- SP-16 Permits and Approvals
- SP-17 Fire Control
- SP-18 Environmental Awareness Training Program
- SP-19 Stop Work Authority
- SP-20 Implement Fugitive Dust Control Plan
- SP-21 Traffic Management Plan
- SP-22 Archaeological, Paleontology, and Cultural Resources
- SP-23 Raptor and Migratory Birds
- SP-24 Storm Water Pollution Prevention Plan
- SP-25 Speed Limit
- SP-26 Contract Geotechnical Reference Documents
- SP-27 Prepare and Implement a Spill Prevention Control, and Counter-Measure Plan
- SP-28 Mitigation Monitoring and Reporting Program Compliance
- SP-29 Water Quality Work for Discharge into A Waters of The U.S. Or State
- SP-30 Working Around Existing and Temporary Utility Poles
- SP-31 Utility Provider Response Plan
- SP-32 Seasonal Wetland
- SP-33 Surveys
- SP-34 Haul and Waste Excess Earthwork Material



TECHNICAL SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 11 00	SUMMARY OF WORK
SECTION 01 11 00.01	MOBILIZATION AND DEMOBILIZATION
SECTION 01 22 00.00 10	MEASUREMENT AND PAYMENT
SECTION 01 33 00.00 41	SUBMITTAL PROCEDURES
SECTION 01 35 26	GENERAL SIGNAGE AND SAFETY
REQUIREMENTS	
SECTION 01 42 00	SOURCES FOR REFERENCE PUBLICATIONS
SECTION 01 45 01.10	QUALITY CONTROL SYSTEM (QCS)
SECTION 01 45 04.00 41	CONTRACTOR QUALITY CONTROL
SECTION 01 50 02.00 41	TEMPORARY CONSTRUCTION FACILITIES
SECTION 01 74 19	CONSTRUCTION AND DEMOLITION WASTE
	MANAGEMENT
SECTION 01 78 00	CLOSEOUT SUBMITTALS

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 41 00	DEMOLITION AND DECONSTRUCTION
------------------	-------------------------------

DIVISION 03 – CONCRETE

SECTION 03 40 00.00 10	PLANT-PRECAST CONCRETE PRODUCTS FOR
	BELOW GRADE CONSTRUCTION

DIVISION 31 – EARTHWORK

SECTION 31 00 00	EARTHWORK
SECTION 31 11 00	CLEARING AND GRUBBING

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 10 00	BITUMINOUS CONCRETE PAVEMENT
SECTION 32 11 23	AGGREGATE BASE COURSE
SECTION 32 17 24.00 10	PAVEMENT MARKINGS
SECTION 32 92 19	EROSION CONTROL SEEDING

DIVISION 33 – UTILITIES

SECTION 33 40 00	STORM DRAIN UTILITIES
------------------	-----------------------



REFERENCES

California Environmental Quality Act Mitigation Monitoring and Reporting Program

Geotechnical Data Report

VOLUME 3: KNIGHTS LANDING DRAINAGE IMPROVEMENT PLANS

SPECIAL PROVISIONS

SPECIAL PROVISIONS

- SP-1 LOCATION OF WORK**
- SP-2 SCOPE OF WORK**
- SP-3 SITE CONDITIONS**
- SP-4 ALLOWABLE TIME, SCHEDULE CONSTRAINTS AND TIME OF COMPLETION**
- SP-5 LIQUIDATED DAMAGES**
- SP-6 ALLOWABLE WORK HOURS**
- SP-7 LANDS AND RIGHT-OF-WAY**
- SP-8 LAND AVAILABLE FOR USE FOR TEMPORARY FACILITIES**
- SP-9 ACCESS BY THE AGENCY, AND OTHER JURISDICTIONAL PUBLIC AGENCIES**
- SP-10 CONSTRUCTION ACCESS**
- SP-11 WATER SOURCE FOR CONSTRUCTION OPERATIONS**
- SP-12 IMPORT/BORROW MATERIAL**
- SP-13 PROTECTION OF EXISTING IMPROVEMENTS**
- SP-14 CLEANING UP**
- SP-15 RECORD DRAWINGS**
- SP-16 PERMITS AND APPROVALS**
- SP-17 FIRE CONTROL**
- SP-18 ENVIRONMENTAL AWARENESS TRAINING PROGRAM**
- SP-19 STOP WORK AUTHORITY**
- SP-20 IMPLEMENT FUGITIVE DUST CONTROL PLAN**
- SP-21 TRAFFIC MANAGEMENT PLAN**
- SP-22 ARCHAEOLOGICAL, PALEONTOLOGICAL, AND CULTURAL RESOURCES**
- SP-23 RAPTORS AND MIGRATORY BIRDS**
- SP-24 STORM WATER POLLUTION PREVENTION PLAN**
- SP-25 SPEED LIMIT**
- SP-26 CONTRACT GEOTECHNICAL REFERENCE DOCUMENTS**
- SP-27 PREPARE AND IMPLEMENT A SPILL PREVENTION, CONTROL, AND COUNTER-MEASURE PLAN**
- SP-28 MITIGATION MONITORING AND REPORTING PROGRAM COMPLIANCE**
- SP-29 WATER QUALITY WORK FOR DISCHARGE INTO A WATERS OF THE U.S. OR STATE**
- SP-30 WORKING AROUND EXISTING AND TEMPORARY UTILITY POLES**
- SP-31 UTILITY PROVIDER RESPONSE PLAN**
- SP-32 SEASONAL WETLAND**
- SP-33 SURVEYS**
- SP-34 HAUL AND WASTE EXCESS EARTHWORK MATERIAL**

SPECIAL PROVISIONS

SP-1 LOCATION OF WORK

The Knights Landing Flood Management Project is located in the Town of Knights Landing within the County of Yolo in California, along the northern side of 2nd Street and eastern side of Railroad Street.

SP-2 SCOPE OF WORK

The work includes approximately 2,088 linear feet (0.4 miles) of drainage improvements as outlined below:

- Drainage ditch excavation and grading construction
- Storm drain pipe installation
- Demolition of existing drainage structures
- Roadway sawcut removal and reinstall

SP-3 SITE CONDITIONS

The Contractor shall satisfy himself or herself concerning the nature and location of the work; the general and local conditions, particularly those affecting transportation, disposal, handling and storage facilities; availability of labor, water, power, communications, roads, climatic conditions and seasons; physical conditions at the job sites and Project areas as a whole; job-site topography and ground conditions; permits, equipment, and facilities needed preliminary to, and during, work prosecution; and all other matters which can in any way affect the work, including cost thereof. Failure of the Contractor to become acquainted with all available information regarding any applicable conditions will not relieve the Contractor from the responsibility for properly estimating either the difficulties or the costs of successfully performing the work.

SP-4 ALLOWABLE TIME, SCHEDULE CONSTRAINTS AND TIME OF COMPLETION

As required in Section 3.01 of the General Conditions, the Contractor is required to provide a progress schedule indicating how the work will be performed during the time allowed. The Contractor may schedule the work in any reasonable fashion so that all work is completed by the times specified herein. There are several constraints, as outlined in separate provisions that will apply to the work and must be incorporated into the Contractor's schedule. As set forth in Section 3.07 of the General Conditions, the Date of Completion for the Contract shall be as provided in the following table.

TIME OF COMPLETION		
KNIGHTS LANDING FLOOD MANAGEMENT PROJECT		
Description of work		Date of Completion
1.	Complete storm drain construction, ditch construction, roadway sawcut removal and reinstall, existing structure demolition and all grading	October 1, 2024
2.	Complete erosion control seeding of all areas	October 1, 2024
3.	Complete demobilization and site cleanup of all areas	October 1, 2024
4.	Complete and provide all as-built/record drawings and contract close-out reports	October 31, 2024

Refer to SP-5 for Liquidated damages.

SP-5 LIQUIDATED DAMAGES

As set forth in Section 3.12 of the General Conditions, the liquidated damages for this Contract shall be as provided in the following table:

LIQUIDATED DAMAGES			
KNIGHTS LANDING FLOOD MANAGEMENT PROJECT			
Description of work		Date of Completion	Liquidated Damages
1.	Complete storm drain construction, ditch construction, roadway sawcut removal and reinstall, existing structure demolition and all grading	October 1, 2024	\$4,000/Day plus all fines, penalties, and damages levied against the Agency by federal and state regulatory agencies as a result of the delay.
2.	Complete erosion control seeding of all areas	October 1, 2024	\$4,000/Day
3.	Complete demobilization and site cleanup of all areas	October 1, 2024	\$4,000/Day
4.	Complete and provide all as-built/record drawings and contract close-out reports	October 31, 2024	\$4,000/Day

Refer to SP-4 for additional information regarding construction completion dates and restrictions.

The liquidated damages shall be additive should multiple activities subject to liquidated damages be incomplete concurrently.

SP-6 ALLOWABLE WORK HOURS

The Contractor shall limit construction activities to between the hours of 7:30 a.m. and 5 p.m., Monday through Friday. No other construction work will be allowed outside the above listed hours. Such extended work hours must be reflected in the Contractor’s initial approved schedule for the Project. The Agency shall be compensated for its costs for additional inspection if the need to work additional hours is caused by the Contractor’s failure to prosecute the work properly after the initial schedule is accepted, or is needed to recover schedule.

SP-7 LANDS AND RIGHT-OF-WAY

The right-of-way for the construction of work, as shown on the Plans, will be provided by the Agency. The Contractor is responsible for obtaining land rights and easements for areas to be used for the Contractor’s own convenience outside the right-of-way shown and construction limits shown on the Plans.

SP-8 LAND AVAILABLE FOR USE FOR TEMPORARY FACILITIES

In addition to existing easements, see Specification Section 01 50 02.00 41, TEMPORARY CONSTRUCTION FACILITIES, for requirements pertaining to properties that can be used for temporary construction facilities.

SP-9 ACCESS BY THE AGENCY, AND OTHER JURISDICTIONAL PUBLIC AGENCIES

The Contractor shall conduct the work so that personnel and equipment are not prevented access to, from and passage along the project limits at all times for normal and emergency purposes. Yolo County shall

have jurisdictional authority over the work as defined in the respective sections on permits and agreements. The Contractor shall allow these agencies, and other jurisdictional public agencies, unrestricted access to the Project site.

SP-10 CONSTRUCTION ACCESS

All haul and access routes shall be existing public roads, maintenance roads, and temporary haul roads created along the project limits as directed for such use by the Agency. Stockpiling of construction materials, including portable equipment, vehicles, and supplies, shall be restricted to designated construction limits. Movement of heavy equipment to and from the Project site shall be restricted to a Contractor plan approved by the Agency prior to movement of the heavy equipment. The Contractor's construction access points shall be limited to public roadways unless otherwise noted or as directed in the field by the Agency. Paved areas at access points shall be swept each day, or more frequently, as required by the Contractor to control dust and clean up material tracked or spilled on said paved areas or roadways. The Contractor shall conform to all governing codes, laws, and ordinances.

SP-11 WATER SOURCE FOR CONSTRUCTION OPERATIONS

Refer to Specification Section 01 50 02.00 41, TEMPORARY CONSTRUCTION FACILITIES and the General Conditions, for the requirements pertaining to the use of possible water sources by the Contractor. The Contractor shall be responsible for providing and maintaining water service to the site during construction at the Contractor's sole cost and expense. The Contractor shall not connect to fire hydrants for construction water without the prior consent of the fire department with jurisdiction.

SP-12 IMPORT/BORROW MATERIAL

Import/Borrow for the Knights Landing Flood Management Project shall be from source(s) provided by the Contractor. The material shall meet the requirements of the specifications. Agreements made to borrow material from a permitted or commercial source shall be the responsibility of the Contractor. All costs associated with providing borrow for the Project including, but not limited to, royalties, fees, loading, grading, BMPs, dust control, sweeping, traffic control and hauling, shall be included in the applicable bid items.

SP-13 PROTECTION OF EXISTING IMPROVEMENTS

Except as specified herein or as shown on the Plans, existing structures, facilities, utilities, or other improvements in the area adjacent to the work area shall not be disturbed, damaged, or undermined by the Contractor, except where in the opinion of the Agency it is essential to relocate such improvements. If relocation of any facility is required, the Contractor shall relocate the improvements to be at least equal in condition and utility to the original. The Contractor shall take all necessary precautions to prevent any damage to existing facilities. Should damage or injury occur as a result of the Contractor's operations, the Contractor shall repair or replace such damaged facilities to the Agency's satisfaction at the Contractor's expense.

The Contractor shall repair any damage to public streets resulting from the Contractor's operations at the Contractor's expense.

SP-14 CLEANING UP

The Contractor shall comply with Sections 21.02 and 21.03 of the General Conditions and the pertinent sections of the Technical Specifications. The Contractor shall dispose of all trash items in closed containers, which should be removed at least once per day. Vegetative wastes shall be chipped or delivered to waste energy facilities, mulched, composted, or used for firewood.

SP-15 RECORD DRAWINGS

The Contractor shall maintain a neat and accurate marked set of working record drawings in accordance with Technical Specification Section 01 78 00, CLOSEOUT SUBMITTALS, and General Conditions

Sections 4.05 and 24.03 and the applicable requirements of the General Conditions. The record drawings shall be subject to the inspection of the Agency at all times and shall be kept current weekly with all work instructions, change orders, and construction adjustments shown thereon and initiated by the Agency. The Agency reserves the right to withhold progress payments, or portions thereof, if record drawings are not maintained as stated above.

SP-16 PERMITS AND APPROVALS

The Agency has obtained various permits, agreements, and rights for performance of the work. These permits may be described more fully in other Special Provisions and are provided in the reference section of these Specifications. The Contractor may be required to obtain duplicate permits or be a signatory on the Agency obtained permits. The Contractor shall be responsible for complying with all conditions of the permits and agreements. Any delays to the Project resulting from the Contractor's failure to follow permit requirements will not be the responsibility of the Agency and the Contractor will not be granted any extension of time for such delays.

The Contractor is responsible for obtaining all environmental permits or use permits required for easements to land being used for the Contractor's own convenience. Any delays to the Project resulting from the lack of these additional permits or the Contractor's failure to follow permit requirements will not be the responsibility of the Agency and the Contractor will not be granted any extension of time or additional compensation for such delays.

Permits from Yolo County will be required for the construction of the Work and for hauling on public roadways. The contractor shall be responsible for obtaining all such permits and for all associated fees consistent with Section 20.02 of the General Conditions.

SP-17 FIRE CONTROL

The Contractor shall comply with protocols in Section 15.04 of the General Conditions. Onsite burning of removed vegetation shall be prohibited.

SP-18 ENVIRONMENTAL AWARENESS TRAINING PROGRAM

Before on-site construction activities begin, including mobilization and staging, the Agency Biologist and Archaeologist will conduct mandatory awareness training for all construction personnel to brief them on the need to avoid effects on sensitive biological resources (e.g., wetlands, special-status species, special-status wildlife habitat), cultural resources (e.g., bone, shell, artifacts, human remains, bottles, ceramics, bricks), and paleontological resources (e.g. fossils). Construction personnel will be informed of relevant laws and regulations that protect these resources and sensitive resources that could occur onsite, the role of biological and cultural monitors, applicable avoidance measures to protect the resources, penalties for not complying with such measures, and the terms and conditions of the relevant permits and authorizations. The Contractor shall provide a translator during training sessions that include Spanish language speakers and other languages as needed or necessary. The Contractor shall provide 2-week advance notice to the Agency prior to commencement of on-site project activities (including mobilization) to allow the Agency to schedule the initial trainings. Environmental awareness training shall be conducted for new personnel as they are brought on the job during the construction period. The Agency will provide a narrated video PowerPoint presentation to be viewed by new personnel before they begin work on the project. The Contractor is responsible for providing the necessary equipment for viewing the training, ensuring all new personnel complete the training, and documenting training completion.

SP-19 STOP WORK AUTHORITY

The Agency Biologist shall have the authority to immediately stop any activity that is not in compliance with the permits, and/or order any reasonable measure to avoid the unauthorized take of an individual of any Federally- or State-listed species or unauthorized impact on sensitive habitat.

SP-20 IMPLEMENT FUGITIVE DUST CONTROL PLAN

The Contractor shall comply with the conditions of Section 15.05 of the General Conditions. The Contractor shall prepare and submit a dust control plan to the Agency for the work and shall receive approval of the plan before groundbreaking.

Dust control measures to be included in the fugitive dust control plan are listed below.

- Water active unpaved areas at all construction sites at least twice daily in dry conditions or more frequently as required, with the frequency of watering based on the type of operation, soil, and wind exposure. Construction sites shall be watered as directed by the Department of Public Works or Yolo Solano Air Quality Management District (YSAQMD) and as necessary to prevent fugitive dust violations.
- Cease all grading activities when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.
- Limit onsite vehicles to a speed that prevents visible dust emissions to extend beyond unpaved roads.
- Cover all trucks hauling dirt, sand, or loose materials.
- On-site dirt piles or other stockpiled particulate matter should be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce windblown dust emissions.
- Cover or hydroseed unpaved areas that will remain inactive for extended periods.
- Apply soil stabilizers to active and inactive areas where appropriate.
- Install wheel washers where project vehicles and/or equipment exit onto paved streets from unpaved roads. Alternatively, install a gravel bed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.
- Sweep paved streets frequently (water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.
- Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person will respond and take corrective action within 48 hours. Include the phone number of the YSAQMD.

During the performance of the work, the Contractor shall assume all responsibility for dust control and shall furnish all labor, equipment, and means required, and shall carry out proper and efficient measures wherever and as often as necessary to prevent the construction operations from producing dust in amounts harmful to persons, damaging to property, or causing a nuisance to persons living nearby or occupying buildings in the vicinity of the work, or as directed by the Agency. Dust control will be strictly enforced with particular emphasis on work areas adjacent to residential and agricultural properties. The curtailment of the construction activities as a result of inadequate dust control measures will not be considered an unavoidable delay. The Contractor shall suspend all grading operations when fugitive dust levels exceed levels specified by YSAQMD or OSHA Permissible Exposure Limits (PEL's) for airborne particles not otherwise specified (NOS) (5 milligrams per cubic meter), whichever is most stringent.

SP-21 TRAFFIC MANAGEMENT PLAN

Before starting construction, the Agency and its construction contractor(s) will determine the number of truck trips required for construction activities. The Agency and/or its construction contractor(s) will prepare and implement a plan to manage expected construction-related traffic to the extent feasible, and to avoid

and minimize potential traffic hazards on local roadways during construction. Items (a) through (g) of this mitigation measure, as listed below, will be integrated as terms of the construction contracts.

- The traffic management plan will outline the phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways.
- The plan will attempt to schedule haul truck trips outside of peak commute periods, minimizing project construction effects on traffic congestion where feasible.
- The construction contractor(s) will develop a traffic safety and management plan for the local roadways that would be affected by construction traffic. Before the start of construction-related activities involving high volumes of traffic, the plan will be submitted for review by the agency of local jurisdiction that has responsibility for roadway safety at and between project sites. The plan will call for the following elements:
 - posting warnings about the potential presence of slow-moving vehicles;
 - using traffic control personnel when appropriate; and
 - placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's California Manual on Uniform Traffic Control Devices (2014) and in accordance with city/county requirements.

The contractor(s) will train construction personnel in appropriate safety measures as described in the plan and will implement the plan. The plan will include the prescribed locations for staging equipment and parking trucks and vehicles. Provisions will be made for overnight parking of haul trucks to avoid causing traffic or circulation congestion.

- During all construction activities, the contractor(s) will limit and expeditiously remove, as necessary, the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours if substantial volumes of soil have been carried by project construction onto adjacent paved public roadways.
- If needed to comply with Caltrans requirements, the transportation management plan will be prepared and submitted to Caltrans to cover any points of access from the state highway system for haul trucks and other construction equipment.
- Before the start of the first construction season, the Agency and/or its construction contractor(s) will enter into maintenance agreements with Yolo County (and any other affected jurisdictions) to address maintenance and repair of affected roadways resulting from increased truck traffic. The agreements will ensure that the affected roadways are repaired to a level that is equivalent to their pre-project condition as determined by the affected jurisdiction.
- Before project construction begins, the Agency and/or its construction contractor(s) will provide notification of project construction to all appropriate emergency service providers in Yolo County, and will coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.

SP-22 ARCHAEOLOGICAL, PALEONTOLOGICAL, AND CULTURAL RESOURCES

The Contractor shall comply with the Cultural Resources Inadvertent Discovery Plan provided in the references section of the General Conditions. In the event of the inadvertent discovery of archaeological, paleontological, or cultural resources the contractor shall cease work within 100-ft of the vicinity of the find and shall immediately notify the Agency for further direction. The Contractor shall allow access to the Agency and its representatives and shall cooperate with all pertinent mitigation procedures.

SP-23 RAPTORS AND MIGRATORY BIRDS

The Contractor shall comply with the conditions of the Construction Contractor Protocols for Avoiding and Minimizing Impacts to Raptors, Special Status, and Other Nesting Birds. The Contractor shall provide 2-week advance notice to the Agency prior to commencement of on-site project activities (including mobilization) to allow the Agency to schedule a pre-construction nesting bird survey by a qualified biologist. If active nests are found in the survey area, the monitoring biologist will establish buffers around the nest sites to avoid disturbance or destruction of the nest site until the monitoring biologist determined the nests are no longer active. No vegetation with active raptor or migratory bird nests may be removed.

If a bird is found dead or injured on the project site, the Contractor shall immediately notify the Agency Biologist.

SP-24 STORM WATER POLLUTION PREVENTION PLAN

Coverage under the National Pollutant Discharge Elimination System (NPDES) and State Water Resources Control Board (SWRCB) General Permit to Discharge Water Associated with Construction Activity shall be obtained by the Contractor and is applicable to this Project. The NOI to comply with the Terms of the General Permit to Discharge Storm Water Associated with Construction Activity shall be filed by the Contractor for the Project. In addition, a SWPPP shall be prepared by the Contractor. A copy of the NOI and SWPPP will be provided to the Agency. The Contractor shall implement the SWPPP prior to the start of soil-disturbing activity and be responsible for all monitoring and implementation of measures to prevent erosion for the duration of the Project. The Contractor shall furnish a qualified SWPPP practitioner and make them responsible for the day-to-day implementation of the SWPPP. The Contractor shall also be responsible for keeping the SWPPP updated by a qualified SWPPP Developer.

SP-25 SPEED LIMIT

The speed limit in all Project work areas shall be 10 miles per hour, except on county roads, City roads and on highways. The Contractor may request Agency approval to increase speed limits on haul roads above the project speed limit. If higher haul road speeds are proposed, the Contractor shall be required to develop and implement a plan that includes measures to address dust control, protect wildlife and provide for public and project safety. This plan shall contain suitable avoidance measures for wildlife which may include but are not limited to installing exclusionary fencing (silt fencing) within areas that are adjacent to habitat features. Critical habitat includes aquatic areas and adjacent uplands areas 200 feet on each side of aquatic habitat limits. Exclusionary fencing shall extend a minimum of 500 feet beyond the limits of habitat as flagged in the field by Agency. The Contractor’s plan shall be subject to review of the resource agencies, and the Contractor shall add a minimum of 60 days to normal submittal schedule for review and approval of the plan.

SP-26 CONTRACT GEOTECHNICAL REFERENCE DOCUMENTS

The following Contract geotechnical reference documents are included in the reference sections of the specifications:

Document Name	Date
Geotechnical Letter, Knights Landing Flood Management Project	August 1, 2022

SP-27 PREPARE AND IMPLEMENT A SPILL PREVENTION, CONTROL, AND COUNTER-MEASURE PLAN

A Spill Prevention, Control, and Counter-measure Plan (SPCCP) is intended to prevent any discharge of oil into drainage pathways. The Contractor would develop and implement an SPCCP to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during construction and operation activities. The SPCCP would be completed before any construction activities begin. Implementation of this measure would comply with State and Federal water quality regulations. The SPCCP

would describe spill sources and spill pathways in addition to the actions that would be taken in the event of a spill (e.g., an oil spill from engine refueling would be immediately cleaned up with oil absorbents). The SPCCP would outline descriptions of containments facilities and practices such as doubled-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures and spill response kits. It would also describe how and when employees are trained in proper handling procedure and spill prevention and response procedures. The SPCCP shall be prepared by the contractor and submitted to the Agency for review

The Federal reportable spill quantity for petroleum products, as defined in 40 CFR 110, is any oil spill that results in one or more of the following.

- Violates applicable water quality standards.
- Causes a film or sheen on or discoloration of the water surface or adjoining shoreline.
- Causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.

If a spill is reportable, the Contractor shall notify Agency immediately. A written description of reportable releases must be submitted to the Agency and must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred and a description of the steps taken to prevent and control future releases.

SP-28 MITIGATION MONITORING AND REPORTING PROGRAM COMPLIANCE

Prepare and implement a worker health and safety plan before the start of construction activities that identifies, at a minimum, the potential types of contaminants that could be encountered during construction activity; all appropriate worker, public health, and environmental protection equipment and procedures to be used during project activities should hazardous materials be encountered on site; and emergency response procedures.

If, during site preparation and construction activities, evidence of hazardous materials contamination is observed or suspected (e.g., stained or odorous soil or groundwater), construction activities will cease immediately in the vicinity of the find and the Yolo County Division of Environmental Health will be notified. Measures to remediate contamination and protect worker health and the environment will be implemented in accordance with applicable Federal, State, regional, and local regulations before construction activities may resume at the site where contamination is encountered.

If any unanticipated aboveground or underground storage tanks or septic systems are encountered during construction activities, construction in the immediate vicinity of the tank or septic system will be halted and the Yolo County Division of Environmental Health will be notified. All storage tanks and septic systems will be removed and properly disposed of in accordance with applicable Federal, State, regional, and local regulations.

If any oil, natural gas, and geothermal wells are discovered during project construction, immediately notify the Division of Oil, Gas, and Geothermal Resources to determine the appropriate course of action.

Retain a licensed contractor to investigate all structures to be demolished for the presence of asbestos-containing materials and materials coated with lead-based paint. If these materials are determined to be present, ensure such materials are properly removed and disposed of by a licensed abatement contractor in accordance with EPA and Cal/OSHA standards and ARB Asbestos Rule 902.

SP-29 WATER QUALITY WORK FOR DISCHARGE INTO A WATERS OF THE U.S. OR STATE

The discharge of water from construction activities into canals, ditches, marsh areas or wetlands within the construction area will require separate permitting. Any effluent from temporary dewatering or un-watering

activities is regulated. The Contractor shall obtain all necessary permits prior to discharging into waters of the U.S. or State.

SP-30 WORKING AROUND EXISTING AND TEMPORARY UTILITY POLES

During construction, the Contractor shall work around and protect in place any existing or temporary utility poles. As necessary, the Contractor shall grade or work around utility poles and proceed with the surrounding construction with no delay. Contractor will not be paid any additional costs and will not be allowed any time of completion extensions resulting from this effort.

SP-31 UTILITY PROVIDER RESPONSE PLAN

The Contractor shall prepare and submit a Utility Response Plan. The Plan shall detail how utility locations are verified, provide protocol for coordination with Utility Providers, detail process on conducting required worker training for all on-site employees with respect to accidental utility damage, and provide utility provider emergency contact information. The Contractor is responsible for coordinating any temporary utility service needs during construction.

SP-32 SEASONAL WETLAND

Environmental Sensitive Area (ESA) fencing shall be established by the Contractor prior to ground disturbance in coordination with the Agency Biologist. No project-related activity will be allowed within the ESA area shown in the Plans.

SP-33 SURVEYS

The Contractor shall provide all survey data to the Engineer and the Agency's surveyor, no later than 24 hours after its collection, in the format stated below. In addition, cross sectional drawings shall be submitted to the Engineer no later than five (5) working days after the data collection. Cross sections shall be referenced to the project alignment and all data points shall be labeled. The survey shall include a cross section showing the original ground. The subsequent surveys shall plot the additional information on the cross-section drawing. The drawings shall identify the source data file and date when the survey was performed. The failure of the Contractor to submit the survey data within the time specified will jeopardize the Agency's evaluation of the work progress for determining measurement and payment.

The following surveys for control of the construction and for measurement and payment shall be performed by the Contractor:

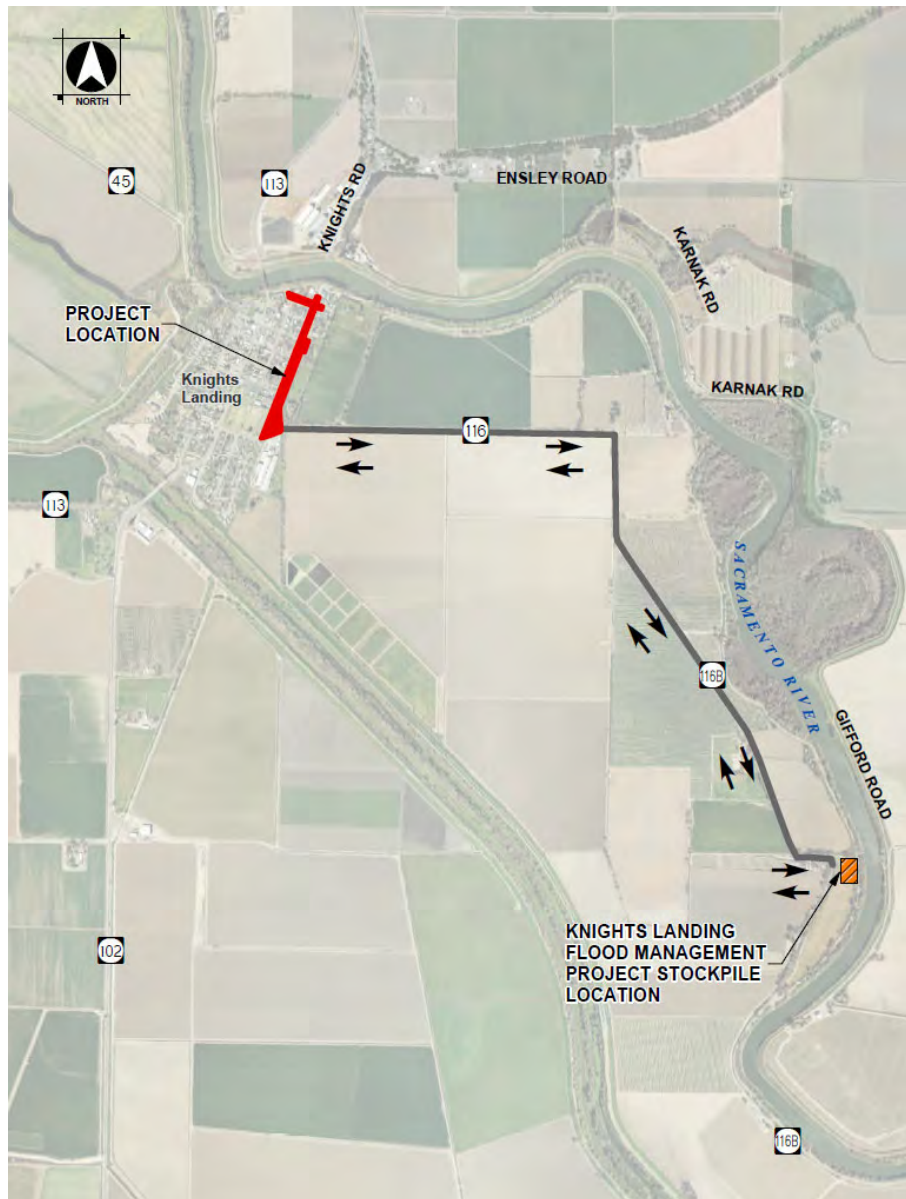
1. An elevation profile shall be surveyed along the drain pipe and ditch centerline prior to roadway surface removal or excavation. This survey will be the basis for reconstruction unless other improvements are required by the Contract.
2. Cross sections shall be performed at one hundred (100) foot maximum intervals before excavation and roadway surface removal, and after excavation and roadway replacement.
3. The cross sections shall be tied into the baseline, and a reproducible plot of the section (one [1] inch = five [5] feet vertical scale, one [1] inch = twenty [20] feet horizontal scale) shall be furnished to the Engineer. Cross sectional drawings shall include elevation and offset information at all breaks in grade. In lieu of reproducible plots, the Contractor may provide electronic data files of the surveys, in both CAD and Portable Document Format (pdf).
4. Elevation profiles shall be surveyed along the centerline that will be used as haul routes before hauling begins and after hauling is complete.

The cross sections for all construction shall be at the same location (station) for all surveys. In addition to average end area calculations, Digital Terrain Models shall be submitted for all surveys used to generate construction quantities. Survey cross sections shall be performed with conventional survey methods using total station survey equipment and by performing closed level loop surveys to established benchmarks.

In addition to the above surveys, the profile and cross sections to 10 feet beyond the limits of work shall be surveyed at one hundred (100) feet maximum intervals. These surveys will be utilized to confirm that the project was constructed or reconstructed to the grade tolerances, as specified in the Technical Specifications.

SP-34 HAUL AND WASTE EXCESS EARTHWORK MATERIAL

Earthwork material encountered during roadside ditch excavation, earthwork excavation, and/or trench excavation (approximately 1,200 CY) that cannot be reused on the project site shall be hauled and wasted at the existing Knights Landing Flood Management Project stockpile located near the following address 11010 County Road 116B, Woodland, Ca. 95776 (approximately 2.5 miles from project location). Alternatively, the contractor can haul and waste excess earthwork material at a contractor preferred offsite location.



END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 11 00

SUMMARY OF WORK

01/08

PART 1 GENERAL

- 1.1 WORK INCLUDED
- 1.2 TYPE OF CONTRACT
- 1.3 PROJECT DESCRIPTION
 - 1.3.1 Project Description
 - 1.3.2 Location
- 1.4 EXISTING FACILITIES
- 1.5 CONTRACTOR'S USE OF THE PREMISES
- 1.6 WORK TO BE PERFORMED BY THE CONTRACTOR
- 1.7 SCHEDULE CONSTRAINTS

PART 2 PRODUCTS

PART 3 EXECUTION

-- End of Section Table of Contents --

SECTION 01 11 00

SUMMARY OF WORK
01/08

PART 1 GENERAL

1.1 WORK INCLUDED

This Specification section describes the Project location and access, existing facilities, the Contractor's use of the premises, Project occupancy, and the Work to be performed by the Contractor. The description of the Work that is provided herein is intended to be a general overview and does not include all the Work actually required under the Contract.

1.2 TYPE OF CONTRACT

This Contract consists of LS and unit price Bid Schedule Items.

1.3 PROJECT DESCRIPTION

1.3.1 Project Description

The Knights Landing Flood Management Project will construct a new storm drain pipe system and reconstruct the existing roadside ditches along 2nd Street and Railroad Street. The project will include removal of an existing concrete arch culvert, with excavation and grading. A description and location of proposed improvements follow.

The Work includes the following:

- a. Excavation of the roadside ditches along 2nd Street and Railroad Street, and earthwork grading, as shown on the plans.
- b. Installation of underground storm drain and drainage structures within Railroad Street roadway, with roadway sawcut removal and replacement.
- c. Existing driveway replacement, as noted on the plans.
- d. Demolition and disposal of an existing concrete arch culvert structure, as noted on the plans.

1.3.2 Location

The Knights Landing Flood Management Project is located in Yolo County, on 2nd Street and Railroad Street.

1.4 EXISTING FACILITIES

Existing facilities are shown on the Plans to the extent known.

1.5 CONTRACTOR'S USE OF THE PREMISES

In addition to requirements presented elsewhere in the Contract documents, the Contractor shall adhere to the following requirements:

- a. The Contractor shall not create or permit the continued existence of any nuisance in or about the Work site.
- b. The Contractor shall protect from its operations and not disturb existing properties and facilities, and access thereto, that are not in the Work area or are in the Work area unless otherwise shown on the Plans. The Contractor shall protect and minimize the disturbance of existing properties and facilities, and access thereto, within the Work area.
- c. Materials and equipment shall be stored and protected, as recommended by the manufacturer and required by applicable codes and standards, to guarantee preservation of quality, appearance, and suitability for the Project. They shall be stored to facilitate inspection by the Agency. Materials shall not be stored on embankment slopes.
- d. The Agency will provide the lands, easements, and rights-of-way, or other rights-to-enter as shown on the Plans. Nothing herein contained and nothing marked on the Plans, shall be interpreted as giving the Contractor exclusive occupancy of the lands, easements, or rights-of-way provided by the Agency.
- e. The Work areas and the areas for the Contractor's use are shown on the Plans.
- f. The Contractor shall be responsible for restoring, at its own expense, all disturbed Work areas to a condition similar to those existing prior to construction, except where other surfacing or treatment is required by the Contract documents.

1.6 WORK TO BE PERFORMED BY THE CONTRACTOR

Construction of the Project consists, in general, of the following activities:

- a. Performing mobilization, demobilization, and Contract administration.
- b. Performing construction activities as shown or indicated on the Contract documents.
- c. Performing erosion and sediment control and storm water pollution prevention, and complying with all environmental controls and requirements related to the Contractor's operations as specified in Project licenses and permits obtained by the Agency, and as specified elsewhere in the Specifications.
- d. Performing construction surveying and construction quality control.
- e. Providing all required submittals, equipment, personnel, and materials to construct the Project as required by the Plans and Specifications, and to complete the Project in accordance with the Contract Time.
- f. Providing all required temporary facilities, utilities, and offices required to complete the Work.

- g. Providing water for construction from available sources, including pumping, piping, hauling, and storage that may be required, and paying all fees and costs associated with developing the water supply, including, but not limited to, the cost of pumping if wells are used.

1.7 SCHEDULE CONSTRAINTS

The Contractor shall reference the applicable Contract documents for schedule constraints.

The Contractor shall reference applicable Contract documents for information on Contract completion dates and liquidated damages.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 11 00.01

MOBILIZATION AND DEMOBILIZATION

06/06

PART 1 GENERAL

- 1.1 SCOPE
 - 1.1.1 Temporary Offices
- 1.2 CONTRACTOR RESPONSIBILITY
- 1.3 STAGING AREAS
 - 1.3.1 Alternative Staging Areas
- 1.4 SPECIAL REQUIREMENTS
 - 1.4.1 Flooding
 - 1.4.2 Site Grading
- 1.5 SUBMITTALS

PART 2 PRODUCTS

- 2.1 MATERIAL STORAGE
 - 2.1.1 Subcontractors' Storage
- 2.2 DRINKING WATER
- 2.3 WATER FOR CONSTRUCTION PURPOSES
- 2.4 TEMPORARY TOILETS
- 2.5 ELECTRICAL LIGHT AND POWER
- 2.6 SITE CLEANUP AND DISPOSAL OF RUBBISH
- 2.7 BARRICADES, RAILING AND PROTECTION
- 2.8 STORM WATER POLLUTION PREVENTION PLAN

PART 3 EXECUTION

- 3.1 REQUIREMENTS
 - 3.1.1 Codes
- 3.2 STORM WATER POLLUTION PREVENTION PLAN AND BEST MANAGEMENT PRACTICES
- 3.3 PROJECT ACCESS

-- End of Section Table of Contents --

SECTION 01 11 00.01

MOBILIZATION AND DEMOBILIZATION
06/06

PART 1 GENERAL

1.1 SCOPE

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 the establishment of all facilities necessary for work on the project, and for all other work and operations which must be performed, or costs incurred prior to beginning work on the various Contract items on the project site. Demobilization shall consist of work and operations necessary to disband all mobilized items.

1.1.1 Temporary Offices

See Section 01 50 02.00 41 TEMPORARY CONSTRUCTION FACILITIES for requirements for temporary offices for the Contractor and the Agency.

1.2 CONTRACTOR RESPONSIBILITY

The Contractor shall be responsible for furnishing all labor, equipment, supplies, and materials necessary to perform all operations required for Project completion and for establishing, maintaining, and providing security for the Project site for the duration of the Project.

1.3 STAGING AREAS

Contractor shall coordinate with the Agency for locations of staging areas and project administration offices, if any. By making the sites available to the Contractor, the Agency, the property owner, and any other person or agency connected with the properties shall in no way be responsible or liable for any activity of the Contractor, Subcontractors, or any individual or organization connected with the work of the Contractor.

1.3.1 Alternative Staging Areas

If alternative sites are determined to be necessary, they must be near the project and the Contractor must make all arrangements including but not limited to clearance of non-sensitive archeological and environmental sites for their use at the Contractor's expense and must be reviewed by the Agency prior to use.

1.4 SPECIAL REQUIREMENTS

Contractor shall comply with all other applicable provisions of the GENERAL CONDITIONS and SPECIAL PROVISIONS including but not limited to restoration of landscape to original conditions. Unless specifically designated for removal, no existing trees in staging areas shall be removed. If construction of ramps, berms or other features is necessary, the Contractor shall be responsible for the import and disposal of such material and the restoration of the site to its original condition.

1.4.1 Flooding

The Contractor is to monitor flooding conditions and in the event of potential flooding of the site or at the direction of the Agency, the Contractor shall remove all vehicles and other mobile equipment, fuels and soluble materials within twenty-four (24) hours of notification.

1.4.2 Site Grading

If site grading is performed at staging areas, the site shall be restored to a natural vegetated condition at completion of work in accordance with one of the following:

- a. Restored to original grade.
- b. Restored in accordance with guidance from the Agency.

1.5 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-09 Contractor's Field Reports

Mobilization/Demobilization Work Plan;

Before starting the work, the Contractor shall submit to the Agency a plan identifying his requirements for space for temporary structures, location and approximate size of mobile and stationary equipment, and storage of materials. The Contractor shall submit to the Agency a proposed plan and layout for all temporary offices, sanitary facilities, storage buildings, storage yards, temporary water service and distribution, and temporary power service and distribution.

Should the Contractor require space in addition to that available on-site, the Contractor shall make arrangements for storage of materials and equipment in locations off the construction site at the Contractor's own expense.

Stormwater Pollution Prevention Plan;

Refer to Special Provisions for Stormwater Pollution Prevention Plan requirements.

PART 2 PRODUCTS

2.1 MATERIAL STORAGE

Provide buildings or shelters at site as required for material storage for protection against the elements, theft or other damage. The buildings shall be of sufficient size and so arranged or partitioned to provide security for their contents and provide ready access for inspection and inventory. Buildings shall be located only where described in Section 01 50 02.00 41 TEMPORARY CONSTRUCTION FACILITIES or where reviewed by the Agency.

2.1.1 Subcontractors' Storage

Subcontractors may provide temporary buildings or shelters for storage and protection of their materials. Buildings shall be located only where described in Section 01 50 02.00 41 TEMPORARY CONSTRUCTION FACILITIES or where reviewed by the Agency.

2.2 DRINKING WATER

Provide drinking water for all personnel connected with the work. Transport water in such a manner as to keep it clean and fresh. Serve from single service containers with paper cups or sanitary drinking fountains.

2.3 WATER FOR CONSTRUCTION PURPOSES

Reference Section 01 50 02.00 41 TEMPORARY CONSTRUCTION FACILITIES.

2.4 TEMPORARY TOILETS

Provide adequate chemical toilet facilities for all individuals connected with the work, in number as required by Federal and State Safety and Occupational Standards and at locations convenient for use. Keep in sanitary condition. Remove at completion of construction and disinfect premises. Toilets shall be regularly maintained, cleaned and drained.

2.5 ELECTRICAL LIGHT AND POWER

Provide temporary light and power service as required for the work and to inhibit vandalism. Provide safety switches and wiring into buildings and all required extension cords, lighting outlets, power outlets (grounded type), lamps and other equipment and accessories necessary for adequate temporary lighting and power for construction purposes. Remove temporary lighting and power and their connections at completion of the work.

2.6 SITE CLEANUP AND DISPOSAL OF RUBBISH

Maintain the construction site and building areas in a neat, orderly condition throughout the duration of this Contract. Remove from the site all rubbish, debris, and materials not to be incorporated into the work and all other accumulations that may result from work under this Contract on a weekly basis.

2.7 BARRICADES, RAILING AND PROTECTION

Provide barricades, railing (Type K) temporary fencing, handrails, shoring and other devices required by law and as necessary to protect new construction and materials and to protect all persons on the Job site.

2.8 STORM WATER POLLUTION PREVENTION PLAN

Contractor shall implement the SWPPP in accordance with the Special Provisions.

PART 3 EXECUTION

3.1 REQUIREMENTS

The Contractor shall furnish, install, service and maintain for the duration of the project the personnel, material and equipment as described

in paragraph 1.2 of this section.

3.1.1 Codes

All facilities installed under this section shall meet the requirements of the applicable codes and regulations.

3.2 STORM WATER POLLUTION PREVENTION PLAN AND BEST MANAGEMENT PRACTICES

Contractor shall implement Standard Best Management Practices (BMPs), Implement the Storm Water Pollution Prevention Plan (SWPPP), and Comply with National Pollutant Discharge Elimination System (NPDES) Permit Conditions

3.3 PROJECT ACCESS

Reference Section 01 50 02.00 41 TEMPORARY CONSTRUCTION FACILITIES.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 22 00.00 10

MEASUREMENT AND PAYMENT

04/06

PART 1 GENERAL

- 1.1 SUBMITTALS
- 1.2 LUMP SUM PAYMENT ITEMS
- 1.3 UNIT PRICE PAYMENT ITEMS
- 1.4 PAYMENT ITEMS
 - 1.4.1 Mobilization and Demobilization
 - 1.4.1.1 Measurement
 - 1.4.1.2 Payment
 - 1.4.2 Traffic Control
 - 1.4.2.1 Measurement
 - 1.4.2.2 Payment
 - 1.4.3 SWPPP
 - 1.4.3.1 Measurement
 - 1.4.3.2 Payment
 - 1.4.4 Clear and Grubbing
 - 1.4.4.1 Measurement
 - 1.4.4.2 Payment
 - 1.4.5 Remove and Dispose Existing Concrete Culvert
 - 1.4.5.1 Measurement
 - 1.4.5.2 Payment
 - 1.4.6 Earthwork Excavation
 - 1.4.6.1 Measurement
 - 1.4.6.2 Payment
 - 1.4.7 Roadside Ditch - 2nd Street
 - 1.4.7.1 Measurement
 - 1.4.7.2 Payment
 - 1.4.8 Roadside Ditch - Railroad Street
 - 1.4.8.1 Measurement
 - 1.4.8.2 Payment
 - 1.4.9 Sawcut, Remove and Dispose Pavement
 - 1.4.9.1 Measurement
 - 1.4.9.2 Payment
 - 1.4.10 12 Inch Corrugated Metal Pipe
 - 1.4.10.1 Measurement
 - 1.4.10.2 Payment
 - 1.4.11 12 Inch Reinforced Concrete Pipe
 - 1.4.11.1 Measurement
 - 1.4.11.2 Payment
 - 1.4.12 18 Inch Reinforced Concrete Pipe
 - 1.4.12.1 Measurement
 - 1.4.12.2 Payment
 - 1.4.13 12 Inch Corrugated Metal Pipe Flared End Section
 - 1.4.13.1 Measurement
 - 1.4.13.2 Payment
 - 1.4.14 18 Inch Corrugated Metal Pipe Flared End Section
 - 1.4.14.1 Measurement

- 1.4.15 Storm Drain Manhole
 - 1.4.15.1 Measurement
 - 1.4.15.2 Payment
- 1.4.16 Storm Drain Inlet
 - 1.4.16.1 Measurement
 - 1.4.16.2 Payment
- 1.4.17 Waterline Utility Crossing Station 16+69
 - 1.4.17.1 Measurement
 - 1.4.17.2 Payment
- 1.4.18 Waterline Utility Crossing Station 19+25
 - 1.4.18.1 Measurement
 - 1.4.18.2 Payment
- 1.4.19 Waterline Utility Crossing Station 19+61
 - 1.4.19.1 Measurement
 - 1.4.19.2 Payment
- 1.4.20 Driveway Replacement
 - 1.4.20.1 Measurement
 - 1.4.20.2 Payment
- 1.4.21 Asphalt Concrete
 - 1.4.21.1 Measurement
 - 1.4.21.2 Payment
- 1.4.22 Rip Rap
 - 1.4.22.1 Measurement
 - 1.4.22.2 Payment
- 1.4.23 Erosion Control
 - 1.4.23.1 Measurement
 - 1.4.23.2 Payment
- 1.4.24 Remove and Relocate Existing Residential Landscape Features
 - 1.4.24.1 Measurement
 - 1.4.24.2 Payment

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

1.4.38 General Signage and Safety

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section Table of Contents --

SECTION 01 22 00.00 10

MEASUREMENT AND PAYMENT
04/06

PART 1 GENERAL

1.1 SUBMITTALS

Submittals shall be submitted in accordance with the appropriate technical provisions of the Project Specifications.

1.2 LUMP SUM PAYMENT ITEMS

Payment items for work which will be completed on a lump sum basis are listed as bid items in the bid schedule. All costs for work necessary to complete the Project, which are not specifically mentioned to be included in a particular lump sum or unit price payment item, shall be included in the listed lump sum item most closely associated with the Work involved. The lump sum price and payment made for each item listed shall constitute full compensation for furnishing all facilities, plants, labor, materials, tests, and equipment, and performing all associated Contractor quality control, environmental protection, and tests, providing all reports, meeting all safety requirements, and for performing all work required for which separate payment is not otherwise provided.

Contractor shall provide a schedule of values for all lump sum items prior to start of construction. The schedule of values shall be a detailed list of items of work including quantities and unit prices. The schedule of values shall be part of the submittal for the lump sum payment items. Lump sum payment items shall not be accepted without the schedule of values. The schedule of values shall be used for progress payments and determining the completeness of the submittal.

1.3 UNIT PRICE PAYMENT ITEMS

Payment items for the Work that shall be performed on a unit price basis are listed in the bid schedule. The unit price and payment made for the work of each item listed shall constitute full compensation for furnishing all facilities, plants, labor, materials, tools, equipment, incidentals, performing all associated Contractor quality control, environmental protection and tests, providing all reports, meeting safety requirements, tests and reports, and for performing all Work required for each of the unit price items.

1.4 PAYMENT ITEMS

1.4.1 Mobilization and Demobilization

1.4.1.1 Measurement

Unit of measure: Lump Sum

1.4.1.2 Payment

Payment for mobilization, demobilization, staging areas, temporary construction facilities, and for all other work covered by the Project Specifications and all costs associated therewith shall be included in the lump-sum bid item for "MOBILIZATION AND DEMOBILIZATION"; which payment shall constitute full compensation for all the Work involved in mobilization and demobilization as shown or specified in the Contract documents and directed by the Agency.

1.4.2 Traffic Control

1.4.2.1 Measurement

Unit of measure: Lump Sum

1.4.2.2 Payment

Payment for providing traffic control, traffic control plan, obtaining local agency permits for traffic control, traffic control signage, related labor, equipment, and materials, and all costs associated therewith shall be included in the lump-sum bid item for "TRAFFIC CONTROL"; which payment shall constitute full compensation for all the Work involved in traffic control as shown or specified in the Contract documents, and directed by the Agency.

1.4.3 SWPPP

1.4.3.1 Measurement

Unit of measure: Lump Sum

1.4.3.2 Payment

Payment will be made for SWPPP design and implementation as specified in the Contract documents, and as directed by the Owner's Representative at the Contract bid price for "SWPPP"; which payment shall constitute full compensation for furnishing all supplies, labor, equipment, materials, and for performing all operations necessary for designing and implementing the SWPPP for the project site which includes, but is not limited to, installing and maintaining best management practices and temporary and final erosion control, for the duration of the project.

1.4.4 Clear and Grubbing

1.4.4.1 Measurement

Unit of measure: Lump Sum

1.4.4.2 Payment

Payment will be made for Clearing and grubbing of the project site, and the disposal of the materials from this operation and for all other related Work shall be paid at the contract bid price for "CLEARING AND GRUBBING"; which payment shall constitute full compensation for furnishing all labor, materials, equipment and incidentals, and doing all work necessary to complete the clearing and grubbing at the project site including removal of rocks, debris, concrete rubble, existing AC and AB surfacing, haul and

disposal of existing trees and bushes, demolition of structures not specified elsewhere, fencing and all other deleterious items and as noted on or specified in the Contract documents and as directed by the Owner's Representative, including disposal or salvage of materials, and restoring all ground surfaces.

1.4.5 Remove and Dispose Existing Concrete Culvert

1.4.5.1 Measurement

Unit of measure: Lump Sum

1.4.5.2 Payment

Payment for demolishing and wasting existing culvert and headwall structures and all costs associated therewith shall be included in the lump-sum bid item for "REMOVE AND DISPOSE EXISTING CONCRETE CULVERT"; which price shall constitute full compensation for providing all labor, equipment, materials and work involved in demolishing and wasting, at an off-site location, the existing structures, reinforcement, concrete pads, associated appurtenances, and all other items as shown or specified in the Contract documents and as directed by the Agency.

1.4.6 Earthwork Excavation

1.4.6.1 Measurement

Unit of measure: Cubic Yard

Earthwork excavation as shown on the plans will be measured for payment by the cubic yard and quantities will be determined by the average end area method. The basis for measurement will be the actual cross sections after clearing and grubbing. Cross sections shall be performed at significant breaks in grade except that the maximum distance between cross sections shall not exceed the distance specified in the Special Provisions. Excavation in excess of the design grades as indicated on the plans, including allowable tolerance, will not be accepted.

1.4.6.2 Payment

Payment for earthwork excavation located at the existing concrete culvert shall be paid at the Contract unit bid price for "EARTHWORK EXCAVATION". This price shall constitute full compensation for all equipment, labor, materials, hauling excavated materials to and from stockpile locations or other point of use, hauling to offsite waste sites and all incidentals necessary to complete the Work as shown or specified in the Contract documents, or as directed by the Agency.

1.4.7 Roadside Ditch - 2nd Street

1.4.7.1 Measurement

Unit of measure: Linear Foot

1.4.7.2 Payment

Payment will be made for costs associated with operations necessary for installation of the roadside ditch located on 2nd Street. The work shall include furnishing all labor, materials, tools, equipment, hauling excavated materials to and from stockpile locations or other points of use, hauling to offsite waste sites, and incidentals and doing all work necessary to complete the roadside ditch as specified. All costs associated therewith shall be included in the unit bid item for "ROADSIDE DITCH - 2ND STREET"; which payment shall constitute full compensation for all Work involved in installation of the roadside ditch as shown or specified in the Contract documents.

1.4.8 Roadside Ditch - Railroad Street

1.4.8.1 Measurement

Unit of measure: Linear Foot

1.4.8.2 Payment

Payment will be made for costs associated with operations necessary for installation of the roadside ditch located on Railroad Street. The work shall include furnishing all labor, materials, tools, equipment, hauling excavated materials to and from stockpile locations or other points of use, hauling to offsite waste sites, and incidentals and doing all work necessary to complete the roadside ditch as specified. All costs associated therewith shall be included in the unit bid item for "ROADSIDE DITCH - RAILROAD STREET"; which payment shall constitute full compensation for all Work involved in installation of the roadside ditch as shown or specified in the Contract documents.

1.4.9 Sawcut, Remove and Dispose Pavement

1.4.9.1 Measurement

Unit of measure: Linear Foot

1.4.9.2 Payment

Payment will be made for removing and disposing existing asphalt concrete and aggregate base material as shown or specified in the contract documents, and as directed by the Agency shall be paid at the Contract unit bid price for "SAWCUT, REMOVE AND DISPOSE PAVEMENT"; which shall include full compensation for all equipment, labor, pavement saw cutting, transportation, materials, hauling excavated material including excavated trench material to and from temporary on-site stockpile locations, hauling to offsite waste sites, dewatering, and incidentals necessary to complete the Work as shown or specified in the Contract documents, or as directed by the Agency. No separate payment will be made for stockpiling or loading material from the stockpile.

1.4.10 12 Inch Corrugated Metal Pipe

1.4.10.1 Measurement

Unit of measure: Linear Foot

1.4.10.2 Payment

Payment will be made for costs associated with operations necessary for installation of the 12 Inch corrugated metal pipe. The work shall include furnishing the pipe, installing pipe, excavation, backfill, related labor, equipment, testing and materials. All costs associated therewith shall be included in the unit bid item for "12 INCH CORRUGATED METAL PIPE"; which payment shall constitute full compensation for all Work involved in installation of pipeline as shown or specified in the Contract documents.

1.4.11 12 Inch Reinforced Concrete Pipe

1.4.11.1 Measurement

Unit of measure: Linear Foot

1.4.11.2 Payment

Payment will be made for costs associated with operations necessary for installation of the 12 Inch reinforced pipe. The work shall include furnishing the pipe, installing pipe, excavation, backfill, related labor, equipment, testing and materials. All costs associated therewith shall be included in the unit bid item for "12 INCH REINFORCED CONCRETE PIPE"; which payment shall constitute full compensation for all Work involved in installation of pipeline as shown or specified in the Contract documents.

1.4.12 18 Inch Reinforced Concrete Pipe

1.4.12.1 Measurement

Unit of measure: Linear Foot

1.4.12.2 Payment

Payment will be made for costs associated with operations necessary for installation of the 18 Inch reinforced concrete pipe. The work shall include furnishing the pipe, installing pipe, excavation, backfill, related labor, equipment, testing and materials. All costs associated therewith shall be included in the unit bid item for "18 INCH REINFORCED CONCRETE PIPE" which payment shall constitute full compensation for all Work involved in installation of pipeline as shown or specified in the Contract documents.

1.4.13 12 Inch Corrugated Metal Pipe Flared End Section

1.4.13.1 Measurement

Unit of measure: Each

1.4.13.2 Payment

Payment will be made for costs associated with operations necessary for installation of the corrugated metal pipe flared end section. The work shall include furnishing and installing the flared end section, excavation, backfill, related labor, equipment, and materials. All costs associated therewith shall be included in the unit bid item for "12 INCH CORRUGATED METAL PIPE FLARED END SECTION"; which payment shall constitute full

compensation for all Work involved in installation of the flared end section as shown or specified in the Contract documents.

1.4.14 18 Inch Reinforced Concrete Pipe Flared End Section

1.4.14.1 Measurement

Unit of measure: Each

1.4.14.2 Payment

Payment will be made for costs associated with operations necessary for installation of the reinforced concrete pipe flared end section. The work shall include furnishing and installing the flared end section, excavation, backfill, riprap installation, related labor, equipment, and materials. All costs associated therewith shall be included in the unit bid item for "18 INCH REINFORCED CONCRETE PIPE FLARED END SECTION"; which payment shall constitute full compensation for all Work involved in installation of the flared end section as shown or specified in the Contract documents.

1.4.15 Storm Drain Manhole

1.4.15.1 Measurement

Unit of measure: Each

1.4.15.2 Payment

Payment will be made for costs associated with operations necessary for installation of the Storm Drain Manhole. The work shall include furnishing and installing the Storm Drain Manhole, excavation, backfill, related labor, equipment, and materials. All costs associated therewith shall be included in the bid item for "STORM DRAIN MANHOLE"; which payment shall constitute full compensation for all Work involved in installation of the concrete manhole shown or specified in the Contract documents.

1.4.16 Storm Drain Inlet

1.4.16.1 Measurement

Unit of measure: Each

1.4.16.2 Payment

Payment will be made for costs associated with operations necessary for installation of the Storm Drain Inlet. The work shall include furnishing and installing the Storm Drain Inlet, excavation, backfill, related labor, equipment, and materials. All costs associated therewith shall be included in the bid item for "STORM DRAIN INLET"; which payment shall constitute full compensation for all Work involved in installation of the concrete manhole shown or specified in the Contract documents.

1.4.17 Waterline Utility Crossing Station 16+69

1.4.17.1 Measurement

Unit of measure: Each

1.4.17.2 Payment

Payment will be made for costs associated with operations necessary for installation of the waterline utility crossing at Station 16+69. The work shall include furnishing and installing the utility crossing, excavation, backfill, related labor, equipment, disinfection, testing and materials. All costs associated therewith shall be included in the bid item for "WATERLINE UTILITY CROSSING STATION 16+69"; which payment shall constitute full compensation for all Work involved in installation of the waterline utility crossing shown or specified in the Contract documents.

1.4.18 Waterline Utility Crossing Station 19+25

1.4.18.1 Measurement

Unit of measure: Each

1.4.18.2 Payment

Payment will be made for costs associated with operations necessary for installation of the waterline utility crossing at Station 19+61. The work shall include furnishing and installing the utility crossing, excavation, backfill, related labor, equipment, disinfection, testing and materials. All costs associated therewith shall be included in the bid item for "WATERLINE UTILITY CROSSING STATION 19+25"; which payment shall constitute full compensation for all Work involved in installation of the waterline utility crossing shown or specified in the Contract documents.

1.4.19 Waterline Utility Crossing Station 19+61

1.4.19.1 Measurement

Unit of measure: Each

1.4.19.2 Payment

Payment will be made for costs associated with operations necessary for installation of the waterline utility crossing at Station 19+61. The work shall include furnishing and installing the utility crossing, excavation, backfill, related labor, equipment, disinfection, testing and materials. All costs associated therewith shall be included in the bid item for "WATERLINE UTILITY CROSSING STATION 19+61"; which payment shall constitute full compensation for all Work involved in installation of the waterline utility crossing shown or specified in the Contract documents.

1.4.20 Driveway Replacement

1.4.20.1 Measurement

Unit of measure: Each

1.4.20.2 Payment

Driveway Replacement shall be paid at the contract unit bid price for "DRIVEWAY REPLACEMENT". Payment will constitute full compensation for replacing in kind the existing driveways as indicated in these

specifications and on the plans including furnishing all labor, material, equipment, stockpiling, transportation to and from stockpile locations, compacting, and all incidentals necessary to complete the work required as shown on the plans and by these Specifications.

1.4.21 Asphalt Concrete

1.4.21.1 Measurement

Unit of measure: Square Foot

The quantity of asphalt concrete paving completed and accepted as determined by the Agency or Agency's representative will be based upon the surveyed area measured after paving of asphalt concrete.

1.4.21.2 Payment

Quantities of asphalt concrete paving as measured above, shall be paid at the Contract unit bid price for "ASPHALT CONCRETE". Payment shall constitute full compensation for the construction and completion of the bituminous concrete pavement and speed bump replacement, including material, paint pavement striping and furnishing all labor and incidentals necessary to complete the work required as shown or specified in the Contract documents, or as directed by the Agency.

1.4.22 Rip Rap

1.4.22.1 Measurement

Unit of measure: Ton

Rip Rap placed will be measured for payment by the ton, to the nearest 1.0 ton. Measurement will be based on weight tickets from certified scales for rip rap placed as shown on the plans or as directed by the Agency.

1.4.22.2 Payment

Payment will constitute full compensation for furnishing all labor, materials, tools, equipment, and incidentals and doing all work necessary to complete the work, including subgrade preparation, processing work, rock placement, backfill of voids, excavation, hauling, fill and all incidentals necessary to complete the work as indicated in the specifications and as shown on the plans or as directed by the Agency.

1.4.23 Erosion Control Seeding

1.4.23.1 Measurement

Unit of measure: Acre

Erosion control seeding at all disturbed areas as shown or specified in the Contract documents, and as directed by the Agency, shall be measured by the Acre using horizontal area surveys.

1.4.23.2 Payment

Erosion control seeding at all disturbed areas as shown or specified in the Contract documents and as directed by the Agency, shall be paid at the contract unit bid price for "EROSION CONTROL SEEDING"; which shall include installation, water, supplies, labor, equipment and material, and performing all operations to establish erosion control seeding. Erosion control measures, which are required to be repeated due to the Contractor's negligence, carelessness, neglect, failure to install or maintain permanent erosion control seeding properly, shall be performed by the Contractor at no expense to the Agency.

1.4.24 Remove and Relocate Existing Residential Landscape Features

1.4.24.1 Measurement

Unit of measure: LS

1.4.24.2 Payment

Payment for remove and replace existing residential landscape features and all costs associated therewith shall be included in the lump-sum bid item for "REMOVE AND RELOCATE EXISTING RESIDENTIAL LANDSCAPE FEATURES"; which price shall constitute full compensation for providing all labor, equipment, materials and work involved in removing and relocating existing landscape bushes, irrigation system, header boards, associated appurtenances, and all other items as shown or specified in the Contract documents and as directed by the Agency.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 33 00.00 41

SUBMITTAL PROCEDURES

03/04

PART 1 GENERAL

- 1.1 SUBMITTALS
 - 1.1.1 Submittal
 - 1.1.2 Submittal Descriptions (SD)
- 1.2 USE OF SUBMITTAL REGISTER
 - 1.2.1 Submittal Register
 - 1.2.2 Contractor Use of Submittal Register
 - 1.2.3 Agency Use of Submittal Register
 - 1.2.4 Contractor Action Code and Action Code
 - 1.2.5 Copies Delivered to the Agency
- 1.3 PROCEDURES FOR SUBMITTALS
 - 1.3.1 Procedures
 - 1.3.2 Reviewing and Certifying
 - 1.3.3 Constraints
 - 1.3.4 Scheduling
 - 1.3.5 Variations
 - 1.3.5.1 Considering Variations
 - 1.3.5.2 Proposing Variations
 - 1.3.5.3 Warranting that Variations are Compatible
 - 1.3.5.4 Review Schedule is Modified
 - 1.3.6 Contractor's Responsibilities
 - 1.3.7 Agency's Responsibilities
 - 1.3.8 Actions Possible
- 1.4 FORMAT OF SUBMITTALS
 - 1.4.1 Transmittal Form
 - 1.4.2 Identifying Submittals
 - 1.4.3 Format for All Shop Drawings
 - 1.4.4 Format of All Product Data and Manufacturer's Instruction
 - 1.4.5 Format of Samples
 - 1.4.6 Format of Design Data and Certificates
 - 1.4.7 Format of Test Reports and Manufacturer's Field Reports
 - 1.4.8 Format of Preconstruction Submittals and Closeout Submittals
- 1.5 QUANTITY OF SUBMITTALS
 - 1.5.1 Number of Copies of SD-02 Shop Drawings
 - 1.5.2 Number of Copies of Product Data and Manufacturer's Instructions
 - 1.5.3 Number of Samples
 - 1.5.4 Number of Copies of Design Data and Certificates
 - 1.5.5 Number of Copies of Test Reports and Manufacturer's Field Reports
 - 1.5.6 Number of Copies of Operation and Maintenance Data
 - 1.5.7 Number of Copies of Preconstruction Submittals and Closeout Submittals
- 1.6 FORWARDING SUBMITTALS
 - 1.6.1 Submittals Required from the Contractor
 - 1.6.1.1 O&M Data

- 1.7 REVIEWED SUBMITTALS
- 1.8 WITHHOLDING OF PAYMENT
- 1.9 GENERAL
- 1.10 SUBMITTAL REGISTER
- 1.11 SCHEDULING
- 1.12 CONTROL OF SUBMITTALS
- 1.13 AGENCY REVIEWED SUBMITTALS
- 1.14 STAMPS

PART 2 PRODUCTS

PART 3 EXECUTION

-- End of Section Table of Contents --

SECTION 01 33 00.00 41

SUBMITTAL PROCEDURES
03/04

PART 1 GENERAL

1.1 SUBMITTALS

The Agency will further discuss detailed submittal procedures with the Contractor at the Preconstruction Conference.

1.1.1 Submittal

Shop drawings, product data, samples, operation and maintenance data, and administrative submittals presented by the Contractor for review.

1.1.2 Submittal Descriptions (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Work plans outlining methods of performing various portions of the work.

SD-02 Shop Drawings

Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the Work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the Project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary Work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, and systems or equipment for some portion of the Work.

Samples of warranty language when the Contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for

the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

Design submittals, design substantiation submittals and extensions of design submittals.

SD-06 Test Reports

Reports signed by an authorized official of a testing laboratory that a material, product, or system identical to the material, product, or system to be provided has been tested in accordance with specified requirements. (Testing must have been within three years of date of Contract award.)

Reports that include findings of a test required to be performed by the Contractor on an actual portion of the Work or prototype prepared for the Project before shipment to the job site.

Reports that include findings of a test made at the job site or on samples taken from the job site, on portions of Work during or after installation.

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedures.

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (MSDS)concerning impedances,

hazards and safety precautions.

SD-09 Contractor's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and must state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

SD-10 Operation and Maintenance Data

Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

This data is intended to be incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.2 USE OF SUBMITTAL REGISTER

The Contractor shall prepare and maintain a submittal register. The Contractor shall not change data which is output in columns (a), (g), (h), and (i) once reviewed.

1.2.1 Submittal Register

The Contractor shall verify that all submittals required for the Project are listed and notify the Agency of missing submittals. The Contractor shall complete the following on the register:

Column (a) Activity Number: Activity number from the approved Project schedule.

Column (g) Contractor Submittal Date: Scheduled date for Agency to receive submittals.

Column (h) Review By Date: Latest date that Contractor needs review

of the submittal by.

Column (i) Contractor Material: Latest date that Contractor needs material delivered for use/installation.

1.2.2 Contractor Use of Submittal Register

The Contractor shall update the following fields.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code and Column (k): Date of Action: used to record Contractor's review when forwarding submittals to QC.

1.2.3 Agency Use of Submittal Register

The Agency shall update the following fields.

Column (l) List date of submittal receipt.

Column (m) through (p) List date related to review actions.

Column (q) List date returned to Contractor.

1.2.4 Contractor Action Code and Action Code

Agency action codes shall be as follows (others may be prescribed by Transmittal Form):

NR - Not Reviewed

NN - No Exceptions Taken as Noted. May Proceed Based upon Satisfactory Performance

NE - No Exception Taken. May Proceed Based upon Satisfactory Performance

RR - Revise and Resubmit

1.2.5 Copies Delivered to the Agency

The Contractor shall update the submittal register and include one copy of the updated submittal register with each progress payment request submitted to the Agency.

1.3 PROCEDURES FOR SUBMITTALS

1.3.1 Procedures

The Agency will further discuss detailed submittal procedures with the Contractor at the Preconstruction Conference.

1.3.2 Reviewing and Certifying

The Contractor shall be responsible for reviewing and certifying that all required submittals are in compliance with Contract requirements. All submittals will be reviewed by the Agency. Agency review may include review by County of Yolo, DWR and other regulating agencies.

1.3.3 Constraints

- a. Submittals listed or specified in this Contract shall conform to provisions of the Contract documents.
- b. Submittals shall be complete for each definable feature of Work; submittals for components of definable features interrelated as a system shall be submitted at the same time.
- c. When acceptability of a submittal is dependent upon conditions, items, or materials included in separate subsequent submittals, submittals will be returned by the Agency without review.
- d. Review of separate materials, products, or components does not imply concurrence to proceed with construction.

1.3.4 Scheduling

- a. The Contractor shall coordinate scheduling, sequencing, preparing, and processing of submittals with performance of Work so that the Work will not be delayed by submittal processing. The Contractor shall allow time for potential requirement to resubmit.
- b. Except as specified otherwise, the Contractor shall allow 15 working days for Agency review, beginning with receipt by the Agency. The period of review for each resubmittal is the same as for initial submittal.

1.3.5 Variations

Variations from Contract requirements require Agency review and will be considered where advantageous to the Agency. Agency acceptance and approval of a submittal containing variations for Contract requirements that are not specifically noted as such by the Contractor shall not constitute a waiver of to the Contract requirements. The Agency reserves the right to rescind inadvertent approval of submittals containing unnoted variations from Contract requirements. All costs associated with such rescission shall be borne by the Contractor.

1.3.5.1 Considering Variations

Discussion with the Agency prior to submission will help ensure that functional and quality requirements are met and will minimize rejections and resubmittals. When contemplating a variation from Contract requirements that results in lower cost, consider submission of the variation as a Value Engineering Change Proposal.

1.3.5.2 Proposing Variations

When proposing a variation from Contract requirements, deliver a written request to the Agency, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Agency. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for a variation from Contract requirements, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

1.3.5.3 Warranting that Variations are Compatible

When delivering a variation from Contract requirements for review, the Contractor warrants that it has reviewed the Contract to establish that the variation, if incorporated, will be compatible with other elements of the Work.

1.3.5.4 Review Schedule is Modified

In addition to the normal submittal review period, a period of ten (10) additional Working Days will be allowed for consideration by the Agency of submittals with variations from Contract requirements.

1.3.6 Contractor's Responsibilities

- a. Determine and verify field measurements, materials, field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the Work and Contract documents.
- b. Transmit submittals in a timely fashion to prevent delays in the Work, delays to the Agency, or delays to other contractors that might be working on other projects.
- c. Correct and resubmit submittals that are rejected or returned without Agency review as specified in Section 1.3.8a.
- d. Furnish additional copies of submittals when requested by the Agency, to a limit of ten (10) copies per submittal.
- e. Complete work that must be accomplished as basis of a submittal in time to allow the submittal to occur as scheduled.
- f. Ensure no work has begun until submittals for that work have been returned by the Agency marked as "No Exception Taken. May Proceed Based on Satisfactory Performance," or "No Exceptions Taken as Noted. May Proceed Based on Satisfactory Performance.", except to the extent that a portion of work must be accomplished as the basis of the submittal.

1.3.7 Agency's Responsibilities

The Agency will:

- a. Note date on which submittal was received from the Contractor.
- b. Review submittals within scheduling period specified and only for compliance with the Contract documents.
- c. Identify returned submittals with one of the actions defined in the paragraph entitled, "Actions Possible", with markings appropriate for the action indicated.

1.3.8 Actions Possible

Submittals will be returned with one of the following notations:

- a. Submittals marked "Not Reviewed" will indicate the submittal has been previously reviewed, is not required, or is not complete. A

submittal marked "Not Reviewed" will be returned with an explanation of the reason it was not reviewed. The Contractor shall resubmit submittals with appropriate action, coordination, or change.

- b. Submittals marked "No Exceptions Taken. May Proceed Based on Satisfactory Performance." authorize the Contractor to proceed with the work covered.
- c. Submittals marked "No Exceptions Taken as Noted. May Proceed Based on Satisfactory Performance." authorize the Contractor to proceed with work as noted provided the Contractor takes no exception to the notations.
- d. Submittals marked "Revise and Resubmit" indicate submittal is incomplete or does not comply with the Contract documents and shall be resubmitted with appropriate changes. No work shall proceed for this item until resubmittal is reviewed by the Agency.

1.4 FORMAT OF SUBMITTALS

1.4.1 Transmittal Form

The Contractor shall transmit each submittal, except sample installations and sample panels, to the Agency. Transmit submittals with an accompanying transmittal form prescribed by Agency. The transmittal form shall identify the Contractor, indicate the date of the submittal, and include information prescribed by the transmittal form and required in the Paragraph 1.4.2, "Identifying Submittals." Process the transmittal forms to record actions regarding sample panels and sample installations.

1.4.2 Identifying Submittals

Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on the transmittal form. Mark each copy of each submittal identically, with the following:

- a. Project title and location.
- b. Construction Contract number.
- c. Section number of the Specification section by which submittal is required.
- d. Submittal description (SD) number of each component of submittal.
- e. Bid item number(s) related to submittal.
- f. When a resubmission, add alphabetic suffix on submittal description, for example, SD-10A, to indicate resubmission.
- g. Name, address, and telephone number of Subcontractor, supplier, manufacturer, and any other second tier subcontractor associated with the submittal.
- h. Product identification and location in the Project.

1.4.3 Format for All Shop Drawings

- a. Shop drawings shall not be less than 8-1/2 by 11 inches nor more than 30 by 42 inches.
- b. Present 8-1/2 by 11 inch shop drawings as part of the bound volume for submittals required by this section. Present larger drawings in sets.
- c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in the paragraph entitled, "Identifying Submittals."
- d. Dimension the drawings, except diagrams and schematic drawings. Prepare drawings to scale when demonstrating interface with other trades. Shop drawing dimensions shall be the same unit of measure as indicated on the Plans. Identify materials and products for work shown.
- e. Shop drawings shall include the nameplate data, size, and capacity. Also include applicable federal, military, industry, and technical society publication references.

1.4.4 Format of All Product Data and Manufacturer's Instruction

- a. Present product data submittals for each portion of the Work as a complete, bound volume. Include a table of contents, listing page and catalog item numbers for the product data.
- b. Indicate, by prominent notation, each product that is being submitted. Indicate the Specification section number and paragraph number to which it pertains.
- c. Supplement product data with material prepared specifically for the Project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for the Project.
- d. Product data shall include the manufacturer's name, trade name, place of manufacture, and catalog model or number, if applicable. Submittals shall also include applicable federal, industry, and technical society publication references. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified for the initial submittal.
- e. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI) or ASTM, submit proof of compliance such as test results or a certificate from an independent testing organization, competent to perform testing, showing that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.4.5 Format of Samples

- a. Furnish samples in sizes indicated below, unless otherwise specified or unless the manufacturer has prepackaged samples of

approximately same size as specified:

1. Sample of Equipment or Device: Full size.
 2. Sample of Materials Less Than 2 by 3 inches: Built up to 8-1/2 by 11 inches.
 3. Sample of Materials Exceeding 8-1/2 by 11 inches: Cut down to 8-1/2 by 11 inches and adequate to indicate color, texture, and material variations.
 4. Sample of Linear Devices or Materials: 10-inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.
 5. Sample of Non-Solid Materials: Pint. Examples of non-solid materials are sand and paint.
 6. Color Selection Samples: 2 by 4 inches.
 7. Sample Panel: 4 by 4 feet.
 8. Sample Installation: 100 square feet.
- b. Samples Showing Range of Variation: Where variations are unavoidable due to the nature of the materials, submit sets of samples of not less than three (3) units showing extremes and middle of range.
- c. Reusable Samples: Incorporate returned samples into the Work only if so specified or indicated. Incorporated samples shall be in undamaged condition at time of use.
- d. Recording of Sample Installation: Note and preserve the notation of the area constituting sample installation, but remove the notation at final clean up of the Project.
- e. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style for comparison.

1.4.6 Format of Design Data and Certificates

- a. Provide design data and calculations and certificates on 8-1/2 by 11 inch or 11 by 17 inch paper, as appropriate. Provide a bound volume for submittals containing numerous pages.

1.4.7 Format of Test Reports and Manufacturer's Field Reports

- a. Provide reports on 8-1/2 by 11 inch paper in a complete bound volume.
- b. Indicate by prominent notation, each report in the submittal. Indicate the Specification number and paragraph number to which it pertains.

1.4.8 Format of Preconstruction Submittals and Closeout Submittals

When submittals include a document that is to be used in the Project or to

become part of the Project record, other than as a submittal, do not apply the Contractor's approval stamp to the document, but to a separate sheet accompanying document. The accompanying sheet shall identify and reference the submittal document it accompanies.

1.5 QUANTITY OF SUBMITTALS

1.5.1 Number of Copies of SD-02 Shop Drawings

Submit six (6) hard copies and one (1) PDF copy of submittals of shop drawings requiring review by the Agency.

1.5.2 Number of Copies of Product Data and Manufacturer's Instructions

Submit in compliance with the quantity requirements specified for shop drawings.

1.5.3 Number of Samples

- a. Submit two (2) samples, or two (2) sets of samples showing the range of variation, of each required item. One (1) approved sample or set of samples will be retained by the Agency and one (1) will be returned to the Contractor.
- b. Submit one (1) sample panel. Include components listed in the technical section or as directed.
- c. Submit one (1) sample installation, where directed.
- d. Submit one (1) sample of non-solid materials.

1.5.4 Number of Copies of Design Data and Certificates

Submit in compliance with the quantity requirements specified for shop drawings.

1.5.5 Number of Copies of Test Reports and Manufacturer's Field Reports

Submit in compliance with the quantity and quality requirements specified for shop drawings.

1.5.6 Number of Copies of Operation and Maintenance Data

Submit five (5) copies of O&M data to the Agency for review.

1.5.7 Number of Copies of Preconstruction Submittals and Closeout Submittals

Unless otherwise specified, submit administrative submittals in compliance with quantity requirements specified for shop drawings.

1.6 FORWARDING SUBMITTALS

1.6.1 Submittals Required from the Contractor

As soon as practicable after Award of Contract, and before procurement of fabrication, forward to the Agency submittals required in the technical sections of this Specification, including shop drawings, product data, and samples.

The Agency will review the Contractor's submittals to verify the submittals comply with the Contract Documents.

1.6.1.1 O&M Data

The Agency will review O&M data to verify the submittals comply with the Contract requirements; submit data specified for a given item when the item is delivered to the job site.

In the event the Contractor fails to deliver O&M data within the time limits specified, the Agency may withhold from progress payments.

1.7 REVIEWED SUBMITTALS

The Agency's review of submittals shall not be construed as a complete check, but will indicate only that the design, general method of construction, materials, detailing, and other information appear to meet the requirements of the Contract documents. Agency review will not relieve the Contractor of the responsibility for any error that may exist, as the Contractor is responsible for the satisfactory construction of the Work. After submittals have been reviewed by the Agency, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.8 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the Work will not be made if required reviews have not been obtained. No payment for materials incorporated in the Work will be made if all required Agency reviews have not been obtained. No payment will be made for any materials incorporated into the work covered by submittals found to contain errors or variations from the Contract requirements.

1.9 GENERAL

The Contractor shall make submittals as required by the Specifications. The Agency may request submittals in addition to those specified when deemed necessary to adequately describe the Work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the Contract Plans. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with Contract requirements. Proposed variations from the Contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts, or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Agency review shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the Work shall be picked up and disposed of in accordance with the manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.10 SUBMITTAL REGISTER

At the end of this Specification section is a Submittal Register showing items of equipment and materials for which submittals are required by the

Specifications; this list may not be all inclusive and additional submittals may be required. The Contractor shall maintain a Submittal Register for the Project. The Agency will provide the initial Submittal Register. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Agency will be included in its export file to the Contractor. The Contractor shall track all submittals.

1.11 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent Plans shall be so scheduled. A minimum of 15 working days exclusive of mailing time, shall be allowed and shown on the register for review. No delay damages or time extensions will be allowed for time lost in late submittals.

1.12 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor's scheduled submittal date shown on the reviewed "Submittal Register."

1.13 AGENCY REVIEWED SUBMITTALS

Upon completion of review of submittals requiring Agency review, the submittals will be marked with "No Exceptions Taken. May Proceed Based on Satisfactory Performance" or "No Exceptions Taken as Noted. May Proceed Based on Satisfactory Performance." Four (4) copies of the submittal will be retained by the Agency and two (2) copies of the submittal will be returned to the Contractor.

1.14 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets Contract requirements shall be similar to the following:

CONTRACTOR (Firm Name)
_____ Reviewed
_____ Reviewed with corrections as noted on submittal data and/or attached sheet(s).
SIGNATURE: _____
TITLE: _____
DATE: _____

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Knights Landing Drainage Improvements

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH
		01 11 00.01	SD-09 Manufacturer's Field Reports														
			Mobilization/Demobilization Work Plan														
			Stormwater Pollution Prevention Plan														
		01 33 00.00 41	SD-01 Preconstruction Submittals														
			Work plans outlining methods of performing various portions of the work.														
			SD-02 Shop Drawings														
			Drawings, diagrams, and schedules														
			Diagrams and instructions from a manufacturer														
			Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary Work will be coordinated.														
			SD-03 Product Data														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION Knights Landing Drainage Improvements						CONTRACTOR											
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 33 00.00 41	Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, and systems or equipment Samples of warranty language SD-06 Test Reports Reports signed by an authorized official of a testing laboratory Reports that include findings of a test required to be performed by the Contractor Reports that include findings of a test made at the job site Investigation reports Daily logs and checklists Final acceptance test and operational test procedures														
		01 35 26	SD-01 Preconstruction Submittals Safety Plan Worker's Compensation Claim Summary														
		01 45 04.00 41	SD-01 Preconstruction Submittals CQC Plan														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Knights Landing Drainage Improvements

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 50 02.00 41	SD-01 Preconstruction Submittals														
			Traffic Control Plan	1.4.3													
			Site Plan														
			Pre-Construction Survey of Roads														
		01 74 19	SD-01 Preconstruction Submittals														
			Waste Management Plan														
		01 78 00	SD-02 Shop Drawings														
			Record Drawings	1.2.1													
			SD-03 Product Data														
			As-Built Record of Equipment and Materials														
			SD-09 Manufacturer's Field Reports														
			Final CQC Summary														
		02 41 00	SD-01 Preconstruction Submittals														
			Work Plan														
			Demolition Plan														
			Receipts														
		03 40 00.00 10	SD-01 Preconstruction Submittals														
			Quality Control Procedures	1.4.2.2													
			SD-02 Shop Drawings														
			Standard Precast Units	1.2.1													
			Custom-Made Precast Units	1.2.2													
			SD-03 Product Data														
			Standard Precast Units	1.2.1													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION Knights Landing Drainage Improvements						CONTRACTOR											
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR A/E REVIEWER CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		03 40 00.00 10	Proprietary Precast Units	1.2.3													
			Embedded Items	3.1.3													
			Accessories	2.1.11													
			SD-05 Design Data														
			Design Calculations	1.2.2													
			Concrete Mix Proportions	1.2.5.1													
			SD-06 Test Reports														
			Test Reports	1.4.2.2													
			SD-07 Certificates														
			Quality Control Procedures	1.4.2.2													
		31 00 00	SD-01 Preconstruction Submittals														
			Excavation														
			Survey Data														
			Equipment Data														
			Material Distribution and Stockpile Plan														
			Sheeting and Shoring Plan														
			Geotechnical Engineer														
			Plan of Operations														
			SD-03 Product Data														
			Fill and Backfill Materials														
			SD-09 Manufacturer's Field Reports														
			Quality Control Testing														
			Test Data Summaries														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Knights Landing Drainage Improvements

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR A/E REVIEWER CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		MAILED TO CONTR/ DATE RCD FRM APPR AUTH
		31 00 00	Construction Verification Survey Report														
		31 11 00	SD-01 Preconstruction Submittals Work Plan														
		32 10 00	SD-04 Samples														
			Uncompacted mix														
			Pavement cores														
			SD-06 Test Reports														
			Trial batch														
			Mix design	1.3.4													
			Asphalt concrete														
			Density	3.4.1													
			Thickness	3.4.1													
			Straightedge test	3.4.1													
			SD-07 Certificates														
			Asphalt mix delivery record														
			Asphalt concrete and material sources														
			Asphalt concrete														
		32 11 23	SD-03 Product Data														
			Plant, Equipment, and Tools	1.7													
			Waybills and Delivery Tickets														
			SD-06 Test Reports														
			Source of Material Compliance	1.5.4													
			Test Data														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Knights Landing Drainage Improvements

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR A/E REVIEWER CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		MAILED TO CONTR/ DATE RCD FRM APPR AUTH	
																		(g)
		32 11 23	Laboratory Moisture-Density Relationship	1.5.3.2														
			Moisture-Density Determinations															
			Field Density Tests	1.5.2.2														
		32 17 24.00 10	SD-03 Product Data															
			Equipment	1.2														
			Composition Requirements															
			Qualifications	1.4.1														
			SD-06 Test Reports															
			Sampling and Testing	2.3														
			SD-07 Certificates															
			Volatile Organic Compound (VOC)															
		32 92 19	SD-04 Samples															
			SEED MATERIALS															
			SD-07 Certificates															
			Invoices															
		33 40 00	SD-03 Product Data															
			Placing Pipe	3.3														
			SD-04 Samples															
			Pipe for Culverts and Storm Drains	2.1														
			SD-07 Certificates															
			Resin Certification															
			Pipeline Testing	3.7														

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 35 26

GENERAL SIGNAGE AND SAFETY REQUIREMENTS

08/09

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 PROJECT SIGNS
 - 1.2.1 General
 - 1.2.2 Number of Signs
 - 1.2.3 Construction
 - 1.2.4 Painting
 - 1.2.5 Placement of Signs
- 1.3 BULLETIN BOARD
 - 1.3.1 General
 - 1.3.2 Maintenance and Disposal
- 1.4 GENERAL SAFETY REQUIREMENTS
 - 1.4.1 General
 - 1.4.2 Contractor's Superintendent
 - 1.4.3 Job Hazard Analysis
 - 1.4.4 Violations
 - 1.4.5 Fire Prevention
 - 1.4.6 Record-keeping/Reporting Requirements
 - 1.4.7 Accident Reporting
- 1.5 SECURITY
- 1.6 SUBMITTALS

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

-- End of Section Table of Contents --

SECTION 01 35 26

GENERAL SIGNAGE AND SAFETY REQUIREMENTS
08/09

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926 Safety and Health Regulations for
Construction

1.2 PROJECT SIGNS

1.2.1 General

The Contractor shall construct and erect Project, safety, and hard hat signs at locations designated by the Agency. The signs shall conform to the figure at the end of this section, see Attachment 1. The signs shall be erected within 15 Work Days after date of commencement of Work under this Contract.

1.2.2 Number of Signs

The Contractor shall furnish the following signs:

Project Sign	1
Hard Hat Sign	1
Safety Sign	1

1.2.3 Construction

Signs shall be constructed as detailed on attached figure.

1.2.4 Painting

All exposed surfaces and edges of plywood shall be given one coat of linseed oil and be wiped prior to applying primer. All exposed surfaces of signs and supports shall be given one coat of primer and two finish coats of white paint. All lettering shall be sized as indicated. Width of letter stroke shall be 1/6 of the letter height.

1.2.5 Placement of Signs

Sign placement shall be coordinated with the Agency and signs installed prior to the beginning of Project construction activities.

1.3 BULLETIN BOARD

1.3.1 General

A bulletin board shall be provided in a location approved by the Agency. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and other items as directed by the Agency.

1.3.2 Maintenance and Disposal

The Contractor shall maintain the bulletin board in good condition throughout the life of the Project. The bulletin board shall remain the property of the Contractor and upon completion of the Project shall be removed from the site.

1.4 GENERAL SAFETY REQUIREMENTS

1.4.1 General

The Project general safety requirements are included in 29 CFR 1926.

1.4.2 Contractor's Superintendent

The Contractor's superintendent shall take an active role in enforcing the Project general safety requirements by participation in safety conferences, Activity Hazard Analysis, toolbox meetings, walk-through inspections, correction of violations, etc., including that of the subcontractor's work.

1.4.3 Job Hazard Analysis

Based on the construction schedule, the Contractor shall submit an Activity Hazard Analysis of each major phase of Work prior to entering that phase of activity as outlined in Section 01 45 04.00 41. The analysis shall include major or high-risk hazards, as well as commonly recurring deficiencies that might possibly be encountered for that operation. The analysis shall identify the Contractor's Superintendent, who shall take active participation in the Activity Hazard Analysis. Prior to start of construction activities a meeting shall be held with the Contractor, Agency, and affected Subcontractors to review the Activity Hazard Analysis. In addition, job site meetings shall be held to indoctrinate supervisory personnel and workers on details of this analysis.

1.4.4 Violations

If recurring violations and/or gross violations indicate that the safety performance is unsatisfactory, corrective action shall be taken as directed by the Agency, and at the discretion of the Agency additional retention will be withheld from the progress payment until corrective action has been completed.

1.4.5 Fire Prevention

Cutting or welding will be permitted only in areas that are, or have been made, fire safe.

1.4.6 Record-keeping/Reporting Requirements

On all Contract operations, the Contractor shall be responsible for

recording and reporting all accident exposure and experience incident to the Work to the appropriate governing agency. As a minimum, these records shall include exposure work-hours and a log of occupational injuries and illnesses using OSHA Form 300 or state equivalent.

1.4.7 Accident Reporting

As part of the requirements for reporting accidents in accordance with EM 385-1-1, the Contractor shall submit at the 50% point and 100% of Project completion, a written summary of worker's compensation claims filed by workers on the Project. The report covering the Contractor claims shall be certified as "correct and true" by the Contractor's compensation insurance carrier. The same certification shall be required for Subcontractor reports.

1.5 SECURITY

The location of Work may be particularly subject to vandalism. Materials left on-site are done so at the Contractors' risk, and if lost, at the Contractor's expense. The Contractor is responsible for security for all the Work. Particularly, the Contractor shall construct and maintain the signs, including but not limited to, those necessary for public safety and traffic control, as specified in these specifications. The Contractor shall replace those signs damaged or destroyed due to vandalism at no additional expense to the Agency.

1.6 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Safety Plan

Worker's Compensation Claim Summary

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

-- End of Section --

ATTACHMENT 1

5" HIGH LETTERS

2" HIGH LETTERS

3" HIGH LETTERS

2" HIGH LETTERS

COUNTY OF YOLO

KNIGHTS LANDING FLOOD MANAGEMENT PROJECT

Please pardon our construction activities while we complete the new

DRAINAGE INFRASTRUCTURE IMPROVEMENT PROJECT

Funding for this project has been provided in full or in part from the California Disaster Preparedness and Flood Prevention Bond Act of 2006 and through an agreement with the State Department of Water Resources

STATE DWR MULTI-COLOR LOGO
18"X18" MINIMUM SIZE

Project Sign (6-ft width x 4-ft height)

Each line shall have minimum 8" HIGH

CAUTION!
HARD HATS MUST BE WORN IN CONSTRUCTION AREAS AT ALL TIMES

Hard Hat Sign

Each line shall have minimum 8" HIGH

CAUTION!
CONSTRUCTION SAFETY ZONE

Safety Sign

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

08/10

PART 1 GENERAL

1.1 REFERENCES

1.2 ORDERING INFORMATION

PART 2 PRODUCTS

PART 3 EXECUTION

-- End of Section Table of Contents --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS
08/10

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization, (e.g. ASTM B564 Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the standards producing organization should be ordered from the source by title rather than by number.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331
Ph: 248-848-3700
Fax: 248-848-3701
E-mail: bkstore@concrete.org
Internet: <http://www.concrete.org>

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aaashto.org
Internet: <http://www.aashto.org>

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)
1303 W. Walnut Hill Lane, Suite 305
Irving, TX 75038-3008
Ph: 972-506-7216
Fax: 972-506-7682
E-mail: info@concrete-pipe.org
Internet: <http://www.concrete-pipe.org>

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)
1800 East Oakton Street
Des Plaines, IL 60018-2187
Ph: 847-699-2929

Fax: 847-768-3434
E-mail: customerservice@asse.org
Internet: <http://www.asse.org>

AMERICAN WELDING SOCIETY (AWS)
550 N.W. LeJeune Road
Miami, FL 33126
Ph: 800-443-9353 - 305-443-9353
Fax: 305-443-7559
E-mail: info@aws.org or customerservice@awspubs.com
Internet: <http://www.aws.org>

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9585
Fax: 610-832-9555
E-mail: service@astm.org
Internet: <http://www.astm.org>

CSA STANDARDS (CSA)
8501 East Pleasant Valley Road
Cleveland, OH 44131-5575
Ph: 216-524-4990 or 877-235-9791
Fax: 216-520-8979
E-mail: cathy.rake@csa-america.org
Internet: <http://www.csa-america.org>

NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA)
10333 N. Meridian Street, Suite 272
Indianapolis, Indiana 46290
Ph: 317-571-9500 or 800 366 7731
Fax: 317-571-0041
E-mail: npca@precast.org
Internet: www.precast.org

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)
Publication Distribution Unit
1900 Royal Oaks Dr.
Sacramento, CA 95815-3800
Ph: 916-263-0822 or 916-263-0865
Fax: 916-263-0469
E-mail: publications@dot.ca.gov
Internet: www.caltrans-opac.ca.gov/publicathtm

U.S. ARMY CORPS OF ENGINEERS (USACE)
Order CRD-C DOCUMENTS from:
U.S. Army Engineer Waterways Experiment Station
ATTN: Technical Report Distribution Section, Services
Branch, TIC
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
E-mail: MTC-INFO@erdc.usace.army.mil
Internet:
<http://gsl.erdc.usace.army.mil/SL/MTC/handbook/handbook.htm>
Order Other Documents from:
USACE Publications Depot
Attn: CEHEC-IM-PD
2803 52nd Avenue

Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
E-mail: pubs-army@usace.army.mil
Internet: <http://www.usace.army.mil/publications>
or <http://www.hnd.usace.army.mil/techinfo/engpubs.htm>

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272
Fax: 301-837-0483
E-mail: contactcenter@gpo.gov
Internet: <http://www.archives.gov>
Order documents from:
Superintendent of Documents
U.S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800
Fax: 202-512-2104
E-mail: contactcenter@gpo.gov
Internet: <http://www.gpoaccess.gov>

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 45 01.10

QUALITY CONTROL SYSTEM (QCS)

PART 1 GENERAL

1.1 GENERAL

1.1.1 Correspondence and Electronic Communications

1.2 QCS SOFTWARE

1.3 ADMINISTRATION

1.3.1 Contractor Information

1.3.1.1 Subcontractor Information

1.3.1.2 Correspondence

1.3.1.3 Equipment

1.3.2 Quality Control (QC)

1.3.2.1 Daily Contractor Quality Control (CQC) Reports.

1.3.2.2 Deficiency Tracking

1.3.2.3 Accident/Safety Tracking

1.3.2.4 QC Requirements

1.3.3 Submittal Management

1.3.4 Schedule

1.4 MONTHLY COORDINATION

1.5 NOTIFICATION OF NONCOMPLIANCE

PART 2 PRODUCTS

PART 3 EXECUTION

-- End of Section Table of Contents --

SECTION 01 45 01.10

QUALITY CONTROL SYSTEM (QCS)

PART 1 GENERAL

1.1 GENERAL

The Agency will use a project tracking software to assist in its monitoring and administration of this Contract. The Contractor shall use a project tracking software to record, maintain, and submit various information throughout the Contract period. Refer to 1.2 "QCS SOFTWARE".

1.1.1 Correspondence and Electronic Communications

For ease and speed of communications, both Agency and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official Contract record shall also be provided in paper format, with signatures and dates where necessary. Formally submitted and received paper documents will govern, in the event of discrepancy with the electronic version.

1.2 QCS SOFTWARE

The Contractor shall use a proprietary or aftermarket quality control system (QCS) software to track the Project.

The Contractor shall submit to the Agency for review a description of the proposed software before delivery. Contractor shall furnish QCS software and all original software manuals to the Agency within 30 calendar days of contract review. The furnished QCS software shall become the property of the Agency and will not be returned to the Contractor. The Agency will compensate the Contractor in conformance with the General Provisions for replacement of software that is damaged, lost or stolen after delivery to the Agency.

1.3 ADMINISTRATION

1.3.1 Contractor Information

The QCS software shall contain the Contractor's name, address, telephone numbers, management staff, and other required items.

1.3.1.1 Subcontractor Information

The QCS software shall contain the name, trade, address, phone numbers, and other required information for all Subcontractors.

1.3.1.2 Correspondence

Contractor correspondence to the Agency shall be identified by use of unique, consecutive serial numbers. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Correspondence initiated by the Contractor's home (main) office shall be prefixed with

"H". Correspondence shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Agency's correspondence to the Contractor will be prefixed with "C".

1.3.1.3 Equipment

The Contractor's QCS software shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.3.2 Quality Control (QC)

The Contractor shall on a daily basis, track daily reports, identify and track deficiencies, document progress of the Work, and support other Contractor QC requirements. The Contractor shall maintain this data on a daily basis. The Contractor shall provide the Agency a Contractor Quality Control (CQC) Plan within the time required in Section 01 45 04.00 41, CONTRACTOR QUALITY CONTROL.

1.3.2.1 Daily Contractor Quality Control (CQC) Reports.

The QCS software shall include the means to produce Daily CQC Reports. The Contractor may use other formats to record basic QC data. Daily CQC Reports shall be submitted as required by Section 01 45 04.00 41, CONTRACTOR QUALITY CONTROL. Reports shall be submitted to the Agency within 24 hours after the date covered by the report. The Contractor shall also provide the Agency a signed, printed copy of the Daily CQC reports.

1.3.2.2 Deficiency Tracking

The Contractor shall use the QCS software to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS software. The Agency's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.3.2.3 Accident/Safety Tracking

The Agency will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Agency's safety comments will be issued to the Contractor.

1.3.2.4 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing.

1.3.3 Submittal Management

The Contractor will provide submittals on an Agency Approved form. The Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Agency will be included. Refer to section 01 33 00.00 41 SUBMITTAL PROCEDURES for required submittals.

1.3.4 Schedule

The Contractor shall develop a construction schedule, in accordance with the General Provisions.

1.4 MONTHLY COORDINATION

The Contractor shall update the QCS software each Work Day. The Contractor shall submit to the Agency all QC data with progress payment requests.

1.5 NOTIFICATION OF NONCOMPLIANCE

The Agency will notify the Contractor in writing of any detected noncompliance with the requirements of the Contract documents. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 45 04.00 41

CONTRACTOR QUALITY CONTROL

03/04

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 PAYMENT
- 1.3 SUBMITTALS

PART 2 PRODUCTS

PART 3 EXECUTION

- 3.1 GENERAL REQUIREMENTS
- 3.2 QUALITY CONTROL PLAN
 - 3.2.1 Content of the CQC Plan
 - 3.2.2 Acceptance of Plan
 - 3.2.3 Notification of Changes
- 3.3 COORDINATION MEETING
- 3.4 QUALITY CONTROL ORGANIZATION
 - 3.4.1 Personnel Requirements
 - 3.4.2 CQC System Manager
 - 3.4.3 Organizational Changes
- 3.5 CONTROL
 - 3.5.1 Preparatory Phase
 - 3.5.2 Initial Phase
 - 3.5.3 Follow-up Phase
 - 3.5.4 Additional Preparatory and Initial Phases
- 3.6 TESTS
 - 3.6.1 Testing Procedure
 - 3.6.2 Testing Laboratories
 - 3.6.2.1 Capability Check
 - 3.6.3 Contractor's Laboratory
 - 3.6.4 Furnishing or Transportation of Samples for Testing
- 3.7 COMPLETION INSPECTION
 - 3.7.1 Punch-Out Inspection
 - 3.7.2 Pre-Final Inspection
 - 3.7.3 Final Acceptance Inspection
- 3.8 DOCUMENTATION
- 3.9 NOTIFICATION OF NONCOMPLIANCE

-- End of Section Table of Contents --

SECTION 01 45 04.00 41

CONTRACTOR QUALITY CONTROL
03/04

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C1077	(2011c) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM D3740	(2012a) Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E29	(2008) Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control Program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

1.3 SUBMITTALS

Submittals shall be made as specified in Section 01 33 00.00 41 SUBMITTAL PROCEDURES. The Contractor Quality Control (CQC) organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

SD-01 Preconstruction Submittals

CQC Plan

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and

maintain an effective quality control system in compliance with the Contract documents. The QCS shall consist of plans, procedures, and organization necessary to produce an end product that complies with the Contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent shall be held responsible for the quality of work on the job and is subject to removal by the Agency for non-compliance with the quality requirements specified in the Contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Agency, and shall be responsible for all construction and construction-related activities at the site.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Agency, not later than 15 Work Days after receipt of Notice To Proceed, the CQC Plan proposed to implement the requirements of the Contract documents. The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Agency will consider an interim plan for the first 30 Work Days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents subcontractors, designers or record, consultants, and architect/engineers (AE):

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement using a three phase control system for all aspects of the Work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm that describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work that is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Agency.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of Subcontractors, offsite

fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES.

- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, Specification paragraph requiring test, feature of Work to be tested, test frequency, and person responsible for each test. Laboratory facilities shall be approved by the Agency.
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of Work. A definable feature of Work is a task that is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be Work by the same trade in a different environment. Although each section of the Specifications may generally be considered as a definable feature of Work, there is frequently more than one definable feature under a particular section. This list shall be reviewed by the Agency during the coordination meeting.
- j. Tracking procedures for data to include construction documentation report, i.e., frequency and distribution of soil testing (soil properties, compaction).

3.2.2 Acceptance of Plan

Acceptance of the CQC plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Agency reserves the right to require the Contractor to make changes in the CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified. The Agency may accept interim CQC plan for particular portions of the Work.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Agency in writing of any proposed change. Proposed changes are subject to acceptance by the Agency.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Agency of the CQC Plan, the Contractor shall meet with the Agency and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 14 Calendar Days prior to the Coordination Meeting. During the meeting, the system details shall be developed, including the forms for recording the CQC operations,

control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of Contractor's Management and control with the Agency's quality assurance. Minutes of the Coordination Meeting shall be prepared by the Agency and signed by both the Contractor and the Agency. The minutes shall become a part of the Contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The personnel requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The safety and health manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the Technical Provisions as requiring specialized skills to assure the required Work is being performed properly shall also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the Work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff shall be subject to acceptance by the Agency. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all correspondence, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Agency.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within its organization at the site of the Work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 10 years construction experience on construction similar to the Work undertaken in this Contract. This CQC System Manager shall be on the site at all times during construction and shall be employed by the Contractor. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Agency for review.

3.5 CONTROL

CQC is the means by which the Contractor ensures that the construction of

the Project, complies with the requirements of the Contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of Work as follows:

3.5.1 Preparatory Phase

This phase shall be conducted prior to beginning work on each definable feature of Work, after all required plans/documents/materials are reviewed/accepted, and after copies of all Contract documents are at the Work site. This phase shall include:

- a. A review of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the Work to be accomplished shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the construction trailer and available for use by Agency personnel until final acceptance of the work.
- b. A review of the Plans.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and reviewed.
- d. A review of provisions that have been made to provide required control inspection and testing.
- e. An examination of the Work area to assure that all required preliminary Work has been completed and is in compliance with the Contract.
- f. An examination of required materials, equipment, and sample Work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate Activity Hazard Analysis to assure safety requirements are met.
- h. A discussion of procedures for controlling quality of the work including repetitive deficiencies. Document allowable construction tolerances and workmanship standards for that feature of Work.
- i. A check to ensure that the portion of the plan for the Work to be performed has been accepted by the Agency.
- j. A discussion of the initial control phase.
- k. The Agency shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the Daily CQC Report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet Contract Specifications.

3.5.2 Initial Phase

This phase shall be conducted at the beginning of a definable feature of Work. The following shall be accomplished:

- a. A Check Work to ensure that it is in full compliance with Contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full Contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences resulting from a review of the Contract documents.
- e. Check safety to include compliance with the safety plan and Activity Hazard Analysis. Review the Activity Hazard Analysis with each worker.
- f. The Agency shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the Daily CQC Report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time specified quality standards are not being met.

3.5.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with Contract requirements, until completion of the particular feature of Work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of Work that may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.5.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of Work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if Work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.6 TESTS

3.6.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product that conforms to contract requirements. Upon request, the Contractor shall furnish to the Agency duplicate samples of test specimens for possible testing by the

Agency. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of an Agency-approved testing laboratory or establish an approved testing laboratory at the Project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with Contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Record results of all tests taken, both passing and failing tests, shall be recorded on the Daily CQC Report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Agency, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Agency. Final reports shall comply with the minimum requirements of ASTM D3740, ASTM C1077, and ASTM E29, which includes certification by a California Registered Civil Engineer. Distribution of the final copies of each test result shall be made to the Agency within 24 hours after collecting the laboratory test samples or initiating the field test, except when the required test duration exceeds 24 hours. When the test duration exceeds 24 hours, distribution of the final test results shall be made within 24 hours after completion of the test by the Contractor prior to submittal. Test forms submitted to the Agency shall be accurately completed. Incomplete or inaccurate forms will be immediately returned to the Contractor for correction. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.6.2 Testing Laboratories

3.6.2.1 Capability Check

The Agency reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the Contract Specifications and to check the laboratory technician's testing procedures and techniques.

3.6.3 Contractor's Laboratory

The Agency reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Agency.

3.6.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Agency shall be delivered to the Agency.

3.7 COMPLETION INSPECTION

3.7.1 Punch-Out Inspection

Near the end of the Work, the CQC Manager shall conduct an inspection of the Work. A punch list of items that do not conform to the approved Contract Plans and Specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Agency that the facility is ready for the Agency Pre-Final inspection.

3.7.2 Pre-Final Inspection

The Agency will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. An Agency Pre-Final Punch List may be developed as a result of this inspection. The CQC System Manager shall ensure that all items on this list have been corrected before notifying the Agency, so that a Final inspection with the Agency can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire Work or any particular increment of the Work if the Project is divided into increments by separate completion dates.

3.7.3 Final Acceptance Inspection

The CQC inspection personnel, plus the superintendent or other primary management person, and the Agency shall be in attendance at the final acceptance inspection. The final acceptance inspection will be formally scheduled by the Agency based upon results of the Pre-Final inspection. Notice shall be given to the Agency at least 14 Calendar Days prior to the date of final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all Contract Work acceptably complete for this inspection shall be cause for the Agency to bill the Contractor for the Agency's additional inspection cost.

3.8 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the Work of Subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/Subcontractor and their area of responsibility.

- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom.
- d. Test and/or control activities performed with results and references to Specifications/Plans requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to Specifications/Plans requirements.
- f. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.
- g. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in Plans and/or Specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the Work and workmanship comply with the contract. The original plus one copy and electronic files of these records in report form shall be furnished to the Agency daily within 48 hours after the date covered by the report, except that reports need not be submitted for days on which no Work is performed. As a minimum, one report shall be prepared and submitted for every 7 Calendar Days of no work and on the last day of a no work period. All Calendar Days shall be accounted for throughout the life of the Contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.9 NOTIFICATION OF NONCOMPLIANCE

The Agency will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the Work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Agency may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 50 02.00 41

TEMPORARY CONSTRUCTION FACILITIES

03/04

PART 1 GENERAL

- 1.1 GENERAL REQUIREMENTS
 - 1.1.1 Site Plan
 - 1.1.2 Employee Parking
 - 1.1.3 Site Grading
 - 1.1.4 Drinking Water
- 1.2 AVAILABILITY AND USE OF UTILITY SERVICES
 - 1.2.1 Water
 - 1.2.2 Sanitation
 - 1.2.3 Telephone
 - 1.2.4 Electrical and Power
- 1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN
 - 1.3.1 Bulletin Board
 - 1.3.2 Project and Safety Signs
- 1.4 PROTECTION AND MAINTENANCE OF TRAFFIC
 - 1.4.1 Haul Roads
 - 1.4.2 Barricades
 - 1.4.3 Traffic Control
- 1.5 CONTRACTOR'S TEMPORARY FACILITIES
 - 1.5.1 Administrative Field Office
 - 1.5.2 Security Provisions
- 1.6 TEMPORARY PROJECT SAFETY FENCING
- 1.7 RESTORATION OF AREAS USED BY CONTRACTOR
- 1.8 SUBMITTALS

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section Table of Contents --

SECTION 01 50 02.00 41

TEMPORARY CONSTRUCTION FACILITIES

03/04

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Site Plan

Before starting the Work, the Contractor shall submit a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used (if necessary), avenues of ingress/egress to the fenced area and details of the fence installation. Any areas that may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is needed.

If supplemental sites are determined to be necessary, they must be near the project and the Contractor must make all arrangements including but not limited to clearance of non-sensitive archeological and environmental sites for their use at the Contractor's expense and must be reviewed by the Agency prior to use.

1.1.2 Employee Parking

Contractor employees shall park vehicles, excluding construction equipment, in staging areas. This area shall be within walking distance of the construction site. Contractor employee parking shall not interfere with existing and established roadways, private property and/or agricultural land in the Project area.

1.1.3 Site Grading

If site grading is performed at the staging area, the site shall be restored to a natural vegetated condition at completion of Work.

1.1.4 Drinking Water

Provide drinking water for all personnel connected with the work. Transport water in such a manner as to keep it clean and fresh. Serve from single service containers with paper cups or sanitary drinking fountains.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Water

Temporary connections to existing fire hydrants and/or water mains may be utilized at the Contractor's option but shall be coordinated, by the Contractor, with the local approving agency and shall be disconnected at Project completion.

1.2.2 Sanitation

The Contractor shall provide and maintain within the construction trailer plumbed sanitary facilities approved by the Agency. Should lack of utilities in the proposed temporary construction area preclude the use of a

plumbed trailer, minimum field-type sanitary facilities shall be provided with approval by the Agency. Agency toilet facilities will not be available to Contractor's personnel.

1.2.3 Telephone

The Contractor shall, at its own expense, make arrangements and procure telephone facilities.

1.2.4 Electrical and Power

Provide temporary light and power service as required for the work and to inhibit vandalism. Provide safety switches and wiring into buildings and all required extension cords, lighting outlets, power outlets (grounded type), lamps and other equipment and accessories necessary for adequate temporary lighting and power for construction purposes. Remove temporary lighting and power and their connections at completion of the work.

1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.3.1 Bulletin Board

Immediately upon beginning of Work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the Contract, Wage Rate Information poster, and other information reviewed by the Agency. The bulletin board shall be located at the Project site in a conspicuous place easily accessible to all employees. Legible copies of the aforementioned data shall be displayed until Work is completed. Upon completion of Work the bulletin board shall be removed by and remain the property of the Contractor. Bulletin boards shall be installed at each site.

1.3.2 Project and Safety Signs

The requirements for the signs, their content, and location shall be as described in Section 01 35 26 GENERAL SIGNAGE AND SAFETY REQUIREMENTS. The signs shall be erected within 15 calendar days after receipt of the Notice to Proceed at each site. The data required by the safety sign shall be corrected daily, with light colored metallic or non-metallic numerals. Upon completion of the Project, the signs shall be removed from the site.

1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Agency. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the Work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations. The Contractor shall

perform a photo or video survey of all roads anticipated to be impacted by the Work.

1.4.1 Haul Roads

The Contractor shall, at its own expense, construct access and on-site haul roads necessary for proper prosecution of the Work under this Contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and haul roads shall be subject to review by the Agency. Lighting shall be adequate to assure full and clear visibility for full width of haul road and Work areas during any night work operations. Upon completion of the Work, haul roads designated by the Agency shall be removed and haul road areas shall be returned to pre-construction condition.

1.4.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to the Work area and to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night. Barricades shall remain the property of the Contractor and removed upon completion of the Work.

1.4.3 Traffic Control

The Contractor shall submit a Traffic Control Plan for Agency review. The Traffic Control Plan shall describe methods used to safely control traffic in and around the Work areas. Plan shall detail signage, traffic control personnel, anticipated traffic flow patterns, hours of operation and safety measures.

1.5 CONTRACTOR'S TEMPORARY FACILITIES

1.5.1 Administrative Field Office

If necessary, Contractor shall provide and maintain, at its own expense, administrative field office facilities for its staff.

1.5.2 Security Provisions

Outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment. Security lighting shall be removed upon completion of the Project.

1.6 TEMPORARY PROJECT SAFETY FENCING

If needed, not later than 5 days after the date established for commencement of work and prior to the start of ground disturbing activities, the Contractor shall furnish and erect temporary protective fencing at the work site along the construction limit. The fencing shall be

maintained by the Contractor during the life of the contract. Upon completion and acceptance of the work, the fencing shall become the property of the Contractor and shall be removed from the work site.

1.7 RESTORATION OF AREAS USED BY CONTRACTOR

Upon completion of the Project and after removal of contractor facilities, materials, and equipment from within the fenced area, the fence shall be removed. All areas used by the Contractor, including staging, temporary construction easement areas, and haul roads, for the storage of equipment or material, or other use, shall be restored to pre-construction or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary. Erosion control seeding shall be completed in accordance with Section 32 92 19, EROSION CONTROL SEEDING.

1.8 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Traffic Control Plan

Site Plan

Before starting the work, the Contractor shall submit to the Agency a site plan identifying his requirements for space for temporary structures, location and approximate size of mobile and stationary equipment, and storage of materials. The Contractor shall submit to the Agency a proposed plan and layout for all temporary offices, sanitary facilities, storage buildings, storage yards, temporary water service and distribution, and temporary power service and distribution.

Should the Contractor require space in addition to that available on-site, the Contractor shall make arrangements for storage of materials and equipment in locations off the construction site at the Contractor's own expense.

Pre-Construction Survey of Roads

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

01/07

PART 1 GENERAL

- 1.1 AGENCY POLICY
- 1.2 MANAGEMENT
- 1.3 PLAN
- 1.4 RECORDS
- 1.5 COLLECTION
 - 1.5.1 Source Separated Method
 - 1.5.2 Co-Mingled Method
 - 1.5.3 Other Methods
- 1.6 DISPOSAL
 - 1.6.1 Reuse
 - 1.6.2 Recycle
 - 1.6.3 Waste
- 1.7 SUBMITTALS

PART 2 PRODUCTS

PART 3 EXECUTION

-- End of Section Table of Contents --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01/07

PART 1 GENERAL

1.1 AGENCY POLICY

Agency policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

1.2 MANAGEMENT

The Contractor shall take a pro-active, responsible role in the management of construction and demolition waste and require all Subcontractors, vendors, and suppliers to participate. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the Work. In the management of waste, consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal Project completion mandates. The Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage or recycling shall accrue to the Contractor. Firms and facilities used for recycling, reuse, and disposal shall be appropriately permitted for the intended use to the extent required by federal, state, and local regulations.

1.3 PLAN

A waste management plan shall be submitted within 15 calendar days after Contract award and prior to initiating any site preparation Work. The plan shall include the following:

- a. Names of individuals on the Contractor's staff responsible for waste prevention and management.
- b. Actions that will be taken to reduce solid waste generation.
- c. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.
- d. Characterization, including estimated types and quantities, of the waste to be generated.
- e. Name of landfill and/or incinerator to be used and the estimated

costs for use, assuming that there would be no salvage or recycling on the Project.

f. List of specific waste materials that will be salvaged for resale, salvaged and reused, or recycled. Recycling facilities that will be used shall be identified.

g. Identification of materials that cannot be recycled/reused with an explanation or justification.

1.4 RECORDS

The Contractor shall maintain records documenting the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. The records shall be made available to the Engineer during construction, and a copy of the records shall be delivered to the Engineer upon completion of the construction.

1.5 COLLECTION

The Contractor shall provide the necessary containers, bins, and storage areas to facilitate effective waste management and shall be clearly and appropriately identified. Recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials and separated by one of the following methods:

1.5.1 Source Separated Method

The Contractor shall separate waste products and materials that are recyclable from trash and sort into appropriately marked separate containers and then transport to the respective recycling facility for further processing.

1.5.2 Co-Mingled Method

The Contractor shall place waste products and recyclable materials into a single container and then transport to a recycling facility where the recyclable materials are sorted and processed.

1.5.3 Other Methods

Other methods proposed by the Contractor may be used when reviewed by the Engineer.

1.6 DISPOSAL

Except as otherwise specified in other sections of the Specifications, disposal shall be in accordance with the following:

1.6.1 Reuse

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Sale or donation of waste suitable for reuse shall be considered. Salvaged materials, other than those specified in other sections to be salvaged and reinstalled, shall not be used in the Project.

1.6.2 Recycle

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling whenever economically feasible.

1.6.3 Waste

The Contractor shall dispose materials with no practical use or economic benefit at a landfill or incinerator.

1.7 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used. -- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 78 00

CLOSEOUT SUBMITTALS

05/09

PART 1 GENERAL

1.1 SUBMITTALS

1.2 PROJECT RECORD DOCUMENTS

1.2.1 Record Drawings

1.2.1.1 Agency Furnished Materials

1.2.1.2 Working Record and Final Record Drawings

1.2.1.3 Drawing Preparation

1.2.1.4 Payment

1.2.2 Record of Equipment and Materials

1.2.3 Final Approved Shop Drawings

1.2.4 Construction Contract Specifications

1.2.5 Real Property Equipment

1.2.5.1 Schedule

1.2.6 Test Results

1.2.7 Photo Documentation

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section Table of Contents --

SECTION 01 78 00

CLOSEOUT SUBMITTALS
05/09

PART 1 GENERAL

1.1 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41
SUBMITTAL PROCEDURES:

SD-02 Record Drawings

Record Drawings

The final Record Drawings for this Project shall consist of two
sets of the approved Record Drawings prepared by the Contractor.

SD-03 Product Data

As-Built Record of Equipment and Materials

Two copies of the record listing the as-built materials and
equipment incorporated into the construction of the Project.

SD-09 Reports

Final CQC Summary;

Final CQC records and quality control data

1.2 PROJECT RECORD DOCUMENTS

1.2.1 Record Drawings

This paragraph covers Record Drawings completed as a requirement of the
Contract. The terms "drawings," "contract drawings," "drawing files,"
"working record drawings" and "final record drawings" refer to Plans which
are revised to be used for final Record Drawings.

1.2.1.1 Agency Furnished Materials

One set of electronic CADD files in the specified software and format
revised to reflect all bid amendments will be provided by the Agency at the
preconstruction conference for projects requiring CADD file Record Drawings.

1.2.1.2 Working Record and Final Record Drawings

The Contractor shall revise two (2) sets of paper drawings by red-line
process to show the record conditions during the prosecution of the
Project. These working record marked drawings shall be kept current on a
weekly basis and at least one set shall be made available on the jobsite at
all times. Changes from the Plans which are made in the Work or additional
information that might be uncovered in the course of construction shall be
accurately and neatly recorded as they occur by means of details and

notes. Final Record Drawings shall be prepared after the completion of each definable feature of Work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the Project). The working record marked prints and final Record Drawings will be jointly reviewed for accuracy and completeness by the Agency and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final Record Drawings as specified herein, the Agency will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the record drawings. This monthly deduction will continue until an agreement can be reached between the Agency and the Contractor regarding the accuracy and completeness of updated drawings. The working and final record drawings shall show, but shall not be limited to, the following information:

- a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the Record Drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall be recorded.
- b. Correct grade, elevations, cross section, and alignment of roads, earthwork, structures and utilities if any changes were made from the Plans.
- c. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
- d. The topography, invert elevations and grades of drainage installed or affected as part of the Project construction.
- e. Changes or modifications that result from the final inspection.
- f. Where Plans or Specifications present options, show only the option selected for construction on the final record prints.
- g. If borrow material for this Project is from sources on Agency property, or if Agency property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.
- h. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.
- i. Modifications (the Contractor shall include within change order price the cost to change working and final record drawings to reflect modifications) and compliance with the following procedures.
 - (1) Follow directions in the modification for posting descriptive changes.
 - (2) Place a modification circle at the location of each deletion.
 - (3) For new details or sections that are added to a drawing,

place a Modification Circle by the detail or section title.

(4) For minor changes, place a Modification Circle by the area changed on the drawing (each location).

(5) For major changes to a drawing, place a Modification Circle by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, place a Modification Circle either by the schedule heading or by the change in the schedule.

(7) The Modification Circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

1.2.1.3 Drawing Preparation

The Record Drawings as may be necessary to correctly show the features of the Project as it has been constructed by bringing the Contract set into agreement with reviewed working record prints, and adding such additional drawings as may be necessary. These working record marked prints must be neat, legible and accurate. These drawings are part of the permanent records of this Project and must be returned to the Agency. Any drawings damaged or lost by the Contractor must be satisfactorily replaced by the Contractor at no expense to the Agency.

a. Colors shall be the "base" of red, green, and blue. Color code for changes as follows:

(1) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

(2) Additions (Green) - Added items, lettering in notes and leaders.

(3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

b. Within ten (10) calendar days after Agency review of all of the working Record Drawings for a phase of Work, the Contractor shall prepare the final record drawings for that phase of Work and submit two sets of prints of these drawings for Agency review. The Agency will promptly return one set of prints annotated with any necessary corrections. Within 7 calendar days the Contractor shall revise the drawings accordingly at no additional cost and submit one set of final prints for the completed phase of Work to the Agency. Within ten (10) calendar days of substantial completion of all phases of Work, the Contractor shall submit the final Record Drawing package for the entire project. The drawings shall be complete in all details and identical in form and function to the contract drawing files supplied by the Agency. Any transactions or adjustments necessary to accomplish this are the responsibility of the Contractor. Failure to submit final record drawing files and marked prints as specified shall be cause for withholding any payment due the Contractor under this Contract. Approval and acceptance of final Record Drawings shall be accomplished before final payment is made to the Contractor.

1.2.1.4 Payment

No separate payment will be made for Record Drawings required under this Contract, and all costs accrued in connection with such drawings are considered a subsidiary obligation of the Contractor.

1.2.2 Record of Equipment and Materials

The Contractor shall furnish one copy of preliminary record of equipment and materials used on the Project at least 15 calendar days prior to final inspection. This preliminary submittal will be reviewed and returned 7 calendar days after final inspection. Two sets of final record of equipment and materials shall be submitted within 10 calendar days after final inspection. The designations shall be keyed to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA

Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used
-------------	--------------------------	---	-------------------------	---------------

1.2.3 Final Approved Shop Drawings

Furnish final approved Project shop drawings within 30 calendar days after transfer of the completed facility to the Agency.

1.2.4 Construction Contract Specifications

The Contractor shall furnish final Record Specifications, including modifications thereto, within 30 calendar days after transfer of the completed facility.

1.2.5 Real Property Equipment

The Contractor shall furnish a list of installed equipment furnished under this Contract. This list shall include all information usually listed on manufacturer's name plate. In the "EQUIPMENT-IN-PLACE LIST" include, as applicable, the following for each piece of equipment installed: description of item, location, model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. A draft list shall be furnished at time of transfer. The final list shall be furnished within 30 calendar days after transfer of the completed facility.

1.2.5.1 Schedule

The Contractor shall submit a final schedule showing the proposed schedule versus the final schedule for all work.

1.2.6 Test Results

The Contractor shall submit copies of all QC and QC laboratory test reports with Engineer's stamp and signature.

1.2.7 Photo Documentation

The Contractor shall submit all pre-construction and post-construction

photo documentation in electronic format.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - EXISTING CONDITIONS

SECTION 02 41 00

DEMOLITION AND DECONSTRUCTION

10/06

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 GENERAL REQUIREMENTS
- 1.3 SUBMITTALS
- 1.4 REGULATORY AND SAFETY REQUIREMENTS
- 1.5 DUST AND DEBRIS CONTROL
- 1.6 PROTECTION
 - 1.6.1 Traffic Control Signs
 - 1.6.2 Existing Work
 - 1.6.3 Trees
 - 1.6.4 Facilities
 - 1.6.5 Protection of Personnel
- 1.7 BURNING
- 1.8 RELOCATIONS
- 1.9 REQUIRED DATA
- 1.10 USE OF EXPLOSIVES

PART 2 PRODUCTS - NOT APPLICABLE

PART 3 EXECUTION

- 3.1 EXISTING FACILITIES TO BE REMOVED
 - 3.1.1 Utilities and Related Equipment
 - 3.1.2 Paving and Slabs
 - 3.1.3 Concrete
 - 3.1.4 Patching
- 3.2 DISPOSITION OF MATERIAL
 - 3.2.1 Title to Materials
 - 3.2.2 Reuse of Materials and Equipment
 - 3.2.3 Salvaged Materials and Equipment
 - 3.2.4 Debris

-- End of Section Table of Contents --

SECTION 02 41 00

DEMOLITION AND DECONSTRUCTION
10/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

AMERICAN SOCIETY OF SAFETY ENGINEERS (ANSI/ASSE)

ANSI/ASSE A10.6 (2006) Safety Requirements for Demolition Operations

1.2 GENERAL REQUIREMENTS

The Contractor shall not begin demolition until authorization is received from the Agency. Remove rubbish and debris from the Project site and do not allow accumulations. Rubbish and debris shall be removed from the Project site daily, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in approved stockpile areas. In the interest of occupational safety and health, the Work shall be performed in accordance with ASSE/SAFE A10.6. In the interest of conservation, salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of as specified in Section 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. Contractor shall comply with all other applicable provisions of the GENERAL PROVISIONS and SPECIAL PROVISIONS including but not limited to contaminated or hazardous material or environments and sanitary regulations.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Plan

The procedures proposed for the accomplishment of the Work. The procedures shall provide for safe conduct of the Work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property that is to remain undisturbed, coordination with other Work in progress, and timely disconnection of utility services. Lateral

bracing and shoring work plan shall include shoring plans and calculations reviewed and stamped by a Civil or Structural Engineer registered in the State of California. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.

Demolition Plan

Submit proposed salvage, demolition and removal procedures to Agency for review before construction activities are started.

SD-18 Records Closeout Submittals

Receipts

1.4 REGULATORY AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the Contract safety requirements shall conform with ANSI/ASSE A10.6. Obtain necessary permits required for the demolition of structures and utility termination from the appropriate agencies.

1.5 DUST AND DEBRIS CONTROL

Prevent the spread of dust and debris to adjacent properties and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris.

1.6 PROTECTION

1.6.1 Traffic Control Signs

Where pedestrian and driver safety is endangered in the area of removal Work, use traffic barricades. Notify the Agency prior to beginning such Work.

1.6.2 Existing Work

Before beginning any demolition Work, the Contractor shall survey the site, take photos, and examine the Plans and Specifications to determine the extent of the Work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Agency or adjacent landowners; any damaged items shall be repaired or replaced as reviewed by the Agency at no cost to the Agency. The Contractor shall coordinate the Work of this section with all other Work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural and geotechnical elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this Contract. Do not overload structural elements or pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. All sheeting, shoring, bracing, and supports shall be designed and stamped by a Civil or Structural Engineer registered in the State of California.

1.6.3 Trees

In addition to other protective measures required by the General Provisions, trees within the Project site that might be damaged by the Contractor's activities, and that are to remain in place, shall be protected by temporary protective fencing or temporary security fencing. Any tree not designated for demolition that is removed under this Contract shall be replaced in kind.

1.6.4 Facilities

The Contractor shall protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.

The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition Work.

1.6.5 Protection of Personnel

During the demolition Work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.7 BURNING

The use of burning at the Project site for the disposal of refuse and debris will not be permitted.

1.8 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Damaged items that are to be relocated shall be repaired or replaced with new undamaged items.

1.9 REQUIRED DATA

The Demolition Plan shall include; procedures for careful removal and disposition of materials specified to be salvaged, coordination with other Work in progress, a disconnection schedule of utility services, a detailed description of methods and equipment to be used for each operation, and the sequence of operations.

1.10 USE OF EXPLOSIVES

Use of explosives will not be permitted.

PART 2 PRODUCTS - NOT APPLICABLE

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Utilities and Related Equipment

Remove existing utilities associated with structures to be removed as indicated on the Plans and terminate in a manner conforming to the nationally recognized code covering the specific utility and reviewed by the Agency. The extent of utility removal shall be as noted on the Plans. When utility lines are encountered that are not indicated on the Plans, the Agency shall be notified for direction prior to performing further work in the area containing utilities.

Protect in place all power poles and overhead and underground utility lines, unless otherwise indicated on the Plans. The Contractor shall obtain Agency approval prior to demolition of existing utilities. The Contractor will be held responsible for any damage or interruption of service to underground or overhead utilities to remain.

3.1.2 Paving and Slabs

Remove concrete and asphaltic concrete paving and slabs including aggregate base as indicated on the Plans to existing adjacent grade. Provide neat sawcuts at limits of pavement removal as indicated or at limits of proposed right-of-way.

3.1.3 Concrete

Sawcut concrete along straight lines to a depth of not less than 2 inches. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished Work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete.

3.1.4 Patching

Where removals leave holes and damaged surfaces exposed in the finished Work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces. Where new Work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new Work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish.

3.2 DISPOSITION OF MATERIAL

3.2.1 Title to Materials

Except where specified in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from the Project. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon review by the Agency of the Contractor's demolition and removal procedures, and authorization by the Agency to begin demolition. The Agency will not be responsible for the condition or loss of, or damage

to, such property after Contract award. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.

3.2.2 Reuse of Materials and Equipment

Remove and store materials and equipment indicated by the Agency to be reused or relocated to prevent damage, and reinstall as the Work progresses.

3.2.3 Salvaged Materials and Equipment

Remove materials and equipment that are indicated by the Agency to be removed by the Contractor and that are to remain the property of the Agency, and deliver to a storage site as directed by the Agency.

The Contractor shall inventory and salvage items and material to the maximum extent practicable.

Material salvaged by the Contractor shall be stored as approved by the Agency and shall be removed from the project site before completion of the Contract. Material salvaged by the Contractor shall not be sold on the site.

Salvaged items to remain the property of the Agency shall be removed in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage shall be repaired or replaced to match existing items. Containers shall be properly identified as to contents.

3.2.4 Debris

Debris and rubbish shall be removed from excavations. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 03 - CONCRETE

SECTION 03 40 00.00 10

PLANT-PRECAST CONCRETE PRODUCTS FOR BELOW GRADE CONSTRUCTION

08/06

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SYSTEM DESCRIPTION
 - 1.2.1 Standard Precast Units
 - 1.2.2 Custom-Made Precast Units
 - 1.2.3 Proprietary Precast Units
 - 1.2.4 Joints and Sealants
 - 1.2.5 Concrete Mix Design
 - 1.2.5.1 Concrete Mix Proportions
 - 1.2.5.2 Concrete Strength
 - 1.2.5.3 Water-to-Cement Ratio
 - 1.2.5.4 Air Content
 - 1.2.5.5 Corrosion Control for Sanitary Sewer Systems
- 1.3 SUBMITTALS
- 1.4 QUALITY ASSURANCE
 - 1.4.1 NPCA and ACPA Plant Certification
 - 1.4.2 Qualifications, Quality Control and Inspection
 - 1.4.2.1 Qualifications
 - 1.4.2.2 Quality Control Procedures
- 1.5 DELIVERY, STORAGE, AND HANDLING
 - 1.5.1 Delivery
 - 1.5.2 Storage
 - 1.5.3 Handling

PART 2 PRODUCTS

- 2.1 MATERIALS
 - 2.1.1 Cement
 - 2.1.2 Silica Fume
 - 2.1.3 Fly Ash and Pozzolans
 - 2.1.4 Ground Granulated Blast-Furnace Slag
 - 2.1.5 Water
 - 2.1.6 Aggregates
 - 2.1.6.1 Selection
 - 2.1.6.2 Aggregates for Lightweight Concrete
 - 2.1.7 Admixtures
 - 2.1.7.1 Air-Entraining
 - 2.1.7.2 Accelerating, Retarding, Water Reducing Moderate to High
 - 2.1.7.3 Pigments
 - 2.1.8 Reinforcement
 - 2.1.8.1 Reinforcing Bars
 - 2.1.8.2 Reinforcing Wire
 - 2.1.8.3 Welded Wire Fabric
 - 2.1.8.4 Epoxy Coated Reinforcement
 - 2.1.8.5 Galvanized Reinforcement

- 2.1.9 Synthetic Fiber Reinforcement
- 2.1.10 Inserts and Embedded Metal
- 2.1.11 Accessories
- 2.1.12 Pipe Entry Connectors
- 2.1.13 Grout

PART 3 EXECUTION

- 3.1 FABRICATION AND PLACEMENT
 - 3.1.1 Forms
 - 3.1.2 Reinforcement
 - 3.1.3 Embedded Items
 - 3.1.4 Synthetic Fiber Reinforced Concrete
- 3.2 CONCRETE
 - 3.2.1 Concrete Mixing
 - 3.2.2 Concrete Placing
 - 3.2.2.1 Cold Weather Concreting
 - 3.2.2.2 Hot Weather Concreting
 - 3.2.3 Concrete Curing
 - 3.2.3.1 Curing by Moisture Retention
 - 3.2.3.2 Curing with Heat and Moisture
 - 3.2.4 Surface Finish
 - 3.2.4.1 Formed Non-Architectural Surfaces
 - 3.2.4.2 Unformed Surfaces
 - 3.2.4.3 Special Finishes
 - 3.2.5 Stripping Products from Forms
 - 3.2.6 Patching and Repair
 - 3.2.6.1 Repairing Minor Defects
 - 3.2.6.2 Repairing Honeycombed Areas
 - 3.2.6.3 Repairing Major Defects
 - 3.2.7 Shipping Products
- 3.3 INSTALLATION
 - 3.3.1 Site Access
 - 3.3.2 General Requirements
 - 3.3.3 Water Tightness
- 3.4 FIELD QUALITY CONTROL
 - 3.4.1 Site Tests
 - 3.4.2 Vacuum Testing
 - 3.4.3 Water Testing

-- End of Section Table of Contents --

SECTION 03 40 00.00 10

PLANT-PRECAST CONCRETE PRODUCTS FOR BELOW GRADE CONSTRUCTION
08/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

- | | |
|-----------|---|
| ACI 211.1 | (1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete |
| ACI 211.2 | (1998; R 2004) Standard Practice for Selecting Proportions for Structural Lightweight Concrete |
| ACI 305R | (2010) Guide to Hot Weather Concreting |
| ACI 306.1 | (1990; R 2002) Standard Specification for Cold Weather Concreting |
| ACI 318 | (2011; Errata 1 2011; Errata 2 2012; Errata 3-4 2013) Building Code Requirements for Structural Concrete and Commentary |

AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)

- | | |
|-------------|---|
| ACPA 01-102 | (2000) Concrete Pipe Handbook |
| ACPA 01-110 | (1984) Design Manual for Sulfide and Corrosion Prediction and Control |
| ACPA QPC | (2005; Ver 3.0) QCast Plant Certification Manual |

AMERICAN WELDING SOCIETY (AWS)

- | | |
|----------------|---|
| AWS D1.1/D1.1M | (2010; Errata 2011) Structural Welding Code - Steel |
| AWS D1.4/D1.4M | (2011) Structural Welding Code - Reinforcing Steel |

ASTM INTERNATIONAL (ASTM)

- | | |
|-----------------|---|
| ASTM A153/A153M | (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
|-----------------|---|

ASTM A185/A185M	(2007) Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A36/A36M	(2012) Standard Specification for Carbon Structural Steel
ASTM A496/A496M	(2007) Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
ASTM A497/A497M	(2007) Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete
ASTM A615/A615M	(2012) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A706/A706M	(2009b) Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A767/A767M	(2009) Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
ASTM A775/A775M	(2007b) Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A82/A82M	(2007) Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A884/A884M	(2012) Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM C1064/C1064M	(2011) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1107/C1107M	(2013) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1116/C1116M	(2010a) Standard Specification for Fiber-Reinforced Concrete
ASTM C1240	(2012) Standard Specification for Silica Fume Used in Cementitious Mixtures
ASTM C1244	(2011) Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
ASTM C138/C138M	(2013) Standard Test Method for Density ("Unit Weight"), Yield, and Air Content (Gravimetric) of Concrete
ASTM C143/C143M	(2012) Standard Test Method for Slump of

Hydraulic-Cement Concrete

ASTM C1478	(2008; R 2013) Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals
ASTM C150/C150M	(2012) Standard Specification for Portland Cement
ASTM C171	(2007) Standard Specification for Sheet Materials for Curing Concrete
ASTM C173/C173M	(2012) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C192/C192M	(2013) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231/C231M	(2010) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	(2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C31/C31M	(2012) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2013) Standard Specification for Concrete Aggregates
ASTM C330	(2009) Standard Specification for Lightweight Aggregates for Structural Concrete
ASTM C39/C39M	(2012) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C443	(2011) Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C494/C494M	(2013) Standard Specification for Chemical Admixtures for Concrete
ASTM C595/C595M	(2013) Standard Specification for Blended Hydraulic Cements
ASTM C618	(2012a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

ASTM C877	(2008) External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
ASTM C891	(2011) Installation of Underground Precast Concrete Utility Structures
ASTM C920	(2011) Standard Specification for Elastomeric Joint Sealants
ASTM C923	(2008; R 2013) Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM C989/C989M	(2012a) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C990	(2009) Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants

CSA STANDARDS (CSA)

CSA A23.4	(2009; Update 2010) Precast Concrete - Materials and Construction
-----------	---

NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA)

NPCA QC Manual	(2012) Quality Control Manual for Precast and Prestressed Concrete Plants
----------------	---

1.2 SYSTEM DESCRIPTION

Furnish precast concrete units designed and fabricated by an experienced and acceptable precast concrete manufacturer who has been, for at least 3 years, regularly and continuously engaged in the manufacture of precast concrete work similar to that indicated on the drawings. Coordinate precast work with the work of other trades.

1.2.1 Standard Precast Units

Design standard precast concrete units to withstand indicated design load conditions in accordance with applicable industry design standards ACI 318, ASTM, ACPA 01-102, Chapter 7-Design for Sulfide Control. Design shall also consider stresses induced during handling, shipping and installation as to avoid product cracking or other handling damage. Indicate design loads for precast concrete units on the shop drawings. Submit drawings for standard precast concrete units furnished by the precast concrete producer for reviewal by the Engineer. These drawings shall demonstrate that the applicable industry design standards have been met. Include installation and construction information on shop drawings. Include details of steel reinforcement size and placement as well as supporting design calculations, if appropriate. Produce precast concrete units in accordance with the approved drawings. Submit cut sheets, for standard precast concrete units, showing conformance to project drawings and requirements, and to applicable industry design standards listed in this specification.

1.2.2 Custom-Made Precast Units

Submit design calculations for custom-made precast units, prepared and sealed by a registered professional engineer, for reviewal prior to fabrication. Include in the calculations the analysis of units for lifting stresses and the sizing of lifting devices. Submit drawings furnished by the precast concrete producer for reviewal by the Engineer. Show on these drawings complete design, installation, and construction information in such detail as to enable the Engineer to determine the adequacy of the proposed units for the intended purpose. Include details of steel reinforcement size and placement as well as supporting design calculations, if appropriate. Produce precast concrete units in accordance with the approved drawings.

1.2.3 Proprietary Precast Units

Products manufactured under franchise arrangements shall conform to all the requirements specified by the franchiser. Items not included in the franchise specification, but included in this specification, shall conform to the requirements in this specification. Submit standard plans or informative literature, for proprietary precast concrete units. Make available supporting calculations and design details upon request. Provide sufficient information as to demonstrate that such products will perform the intended task.

1.2.4 Joints and Sealants

Provide joints and sealants between adjacent units of the type and configuration indicated on shop drawings meeting specified design and performance requirements.

1.2.5 Concrete Mix Design

1.2.5.1 Concrete Mix Proportions

Base selection of proportions for concrete on the methodology presented in ACI 211.1 for normal weight concrete and ACI 211.2 for lightweight concrete. Develop the concrete proportions using the same type and brand of cement, the same type and brand of pozzolan, the same type and gradation of aggregates, and the same type and brand of admixture that will be used in the manufacture of precast concrete units for the project. Do not use calcium chloride in precast concrete containing reinforcing steel or other embedded metal items. At a minimum of thirty days prior to precast concrete unit manufacturing, the precast concrete producer will submit a mix design and proportions for each strength and type of concrete that will be used. Furnish a complete list of materials, including quantity, type, brand and applicable data sheets for all mix design constituents as well as applicable reference specifications. The use of self-consolidating concrete is permitted, provided that mix design proportions and constituents meet the requirements of this specification.

1.2.5.2 Concrete Strength

Provide precast concrete units with a 28-day compressive strength ($f'c$) of 5,000 psi.

1.2.5.3 Water-to-Cement Ratio

Furnish concrete, that will be exposed to freezing and thawing, containing

entrained air and with water-cement ratios of 0.45 or less. Furnish concrete which will not be exposed to freezing, but which is required to be watertight, with a water-cement ratio of 0.48 or less if the concrete is exposed to fresh water, or 0.45 or less if exposed to brackish water or sea water. Furnish reinforced concrete exposed to deicer salts, brackish water or seawater with a water-cement ratio of 0.40 or less for corrosion protection.

1.2.5.4 Air Content

The air content of concrete that will be exposed to freezing conditions shall be within the limits given below.

NOMINAL MAXIMUM AGGREGATE SIZE	AIR CONTENT %	
	SEVERE EXPOSURE	MODERATE EXPOSURE
10 mm (3/8 inch)	6.0 to 9.0	4.5 to 7.5
13 mm (1/2 inch)	5.5 to 8.5	4.0 to 7.0
19 mm (3/4 inch)	4.5 to 7.5	3.5 to 6.5
25 mm (1.0 inch)	4.5 to 7.5	3.0 to 6.0
38 mm (1.5 inch)	4.5 to 7.0	3.0 to 6.0

Note: For specified compressive strengths greater than 5000 psi, air content may be reduced 1 percent

1.2.5.5 Corrosion Control for Sanitary Sewer Systems

Follow design recommendations outlined in Chapter 7 of ACPA 01-102 or the ACPA 01-110 when hydrogen sulfide is indicated as a potential problem.

1.3 SUBMITTALS

All submittals are the responsibility of the precast concrete producer. Agency reviewal is required for submittals with a "EN" designation; submittals not having a "EN" designation are for information only. When used, a designation following the "EN" designation identifies the office that will review the submittal for the Agency. Submit the following in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Quality Control Procedures

SD-02 Shop Drawings

Standard Precast Units; EN
Custom-Made Precast Units; EN

SD-03 Product Data

Standard Precast Units
Proprietary Precast Units
Embedded Items
Accessories

SD-05 Design Data

Design Calculations; EN
Concrete Mix Proportions; EN

SD-06 Test Reports

Test Reports; EN

SD-07 Certificates

Quality Control Procedures

1.4 QUALITY ASSURANCE

Demonstrate adherence to the standards set forth in NPCA QC Manual and/or ACPA QPC. Meet requirements written in the subparagraphs below.

1.4.1 NPCA and ACPA Plant Certification

The precast concrete producer shall be certified by the National Precast Concrete Association's and/or the American Concrete Pipe Association's Plant Certification Program prior to and during production of the products for this project.

1.4.2 Qualifications, Quality Control and Inspection

1.4.2.1 Qualifications

Select a precast concrete producer that has been in the business of producing precast concrete units similar to those specified for a minimum of 3 years. The precast concrete producer shall maintain a permanent quality control department or retain an independent testing agency on a continuing basis.

1.4.2.2 Quality Control Procedures

Submit quality control procedures established by the precast manufacturer in accordance with NPCA QC Manual and/or ACPA QPC. Show that the following QC tests are performed as required and in accordance with the ASTM standards indicated.

- a. Slump: Perform a slump test for each 150 cu yd of concrete produced, or once a day, whichever comes first. Perform slump tests in accordance with ASTM C143/C143M.
- b. Temperature: Measure the temperature of fresh concrete when slump or air content tests are made and when compressive test specimens are made in accordance with ASTM C1064/C1064M.
- c. Compressive Strength: Make at least four compressive strength specimens for each 150 cubic yards of concrete of each mix in accordance with the following Standards: ASTM C31/C31M, ASTM C192/C192M, ASTM C39/C39M.
- d. Air Content: Perform tests for air content on air-entrained, wet-cast concrete for each 150 cu yd of concrete, but not less often than once each day when air-entrained concrete is used. Determine the air content in accordance with either ASTM C231/C231M or ASTM C173/C173M for normal weight aggregates and ASTM C173/C173M for lightweight aggregates.
- e. Unit Weight: Perform tests for unit weight a minimum of once per

week to verify the yield of batch mixes. Perform unit weight tests for each 100 cu yd of lightweight concrete in accordance with ASTM C138/C138M.

Submit test reports as Follows:

a. Copies of material certifications and/or laboratory test reports, including mill tests and all other test data, for portland cement, blended cement, pozzolans, ground granulated blast furnace slag, silica fume, aggregate, admixtures, and curing compound proposed for use on this project.

b. Copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Such tests may include compressive strength, flexural strength, plastic or hardened air content, freeze thaw durability, abrasion and absorption. Clearly detail in the specifications special tests for precast concrete or cast-in items.

c. Sufficient documentation, when the use of self-consolidating concrete (SCC) is proposed, showing a minimum of 30-days production track records demonstrating that SCC is appropriate for casting of the product.

d. Copies of in-plant QA/QC inspection reports, upon the request of the Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

Deliver precast units to the site in accordance with the delivery schedule to avoid excessive build-up of units in storage at the site. Upon delivery to the jobsite, all precast concrete units will be inspected by the Engineer for quality and final acceptance.

1.5.2 Storage

Store units off the ground or in a manner that will minimize potential damage.

1.5.3 Handling

Handle, transport, and store products in a manner to minimize damage. Lifting devices or holes shall be consistent with industry standards. Perform lifting with methods or devices intended for this purpose as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MATERIALS

Except as otherwise specified in the following paragraphs, conform material to Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE and Section 03 20 00.00 10 CONCRETE REINFORCING.

2.1.1 Cement

Furnish cement conforming to ASTM C150/C150M, Type I, II, III or V.
Furnish blended cements that conform to ASTM C595/C595M.

2.1.2 Silica Fume

Provide silica fume conforming to ASTM C1240. Provide available alkalis conforming to the optimal limit given in Table 2 of ASTM C1240. Silica fume may be furnished as a dry, densified material or as a slurry. When necessary, coordinate the services of a technical representative experienced in mixing, proportioning, placement procedures, and curing of concrete containing silica fume.

2.1.3 Fly Ash and Pozzolans

Fly ash is required as a supplementary cementitious material (SCM) conforming to ASTM C618, Class C or F with 4 percent maximum loss on ignition and 35 percent maximum cement replacement by weight.

2.1.4 Ground Granulated Blast-Furnace Slag

Ground granulated blast furnace slag is used as a supplementary cementitious material conforming to ASTM C989/C989M, Grade 120 with between 25 to 50 percent maximum cement replacement by weight.

2.1.5 Water

Furnish water potable or free of deleterious substances in amounts harmful to concrete or embedded metals.

2.1.6 Aggregates

2.1.6.1 Selection

Furnish aggregates conforming to ASTM C33/C33M. Provide aggregates not containing any substance, which may be deleteriously reactive with the alkalis in the cement.

2.1.6.2 Aggregates for Lightweight Concrete

ASTM C330

2.1.7 Admixtures

2.1.7.1 Air-Entraining

ASTM C260/C260M

2.1.7.2 Accelerating, Retarding, Water Reducing Moderate to High

ASTM C494/C494M

2.1.7.3 Pigments

Non-fading and lime-resistant

2.1.8 Reinforcement

2.1.8.1 Reinforcing Bars

- a. Deformed Billet-steel: ASTM A615/A615M
- b. Deformed Low-alloy steel: ASTM A706/A706M

2.1.8.2 Reinforcing Wire

- a. Plain Wire: ASTM A82/A82M
- b. Deformed Wire: ASTM A496/A496M

2.1.8.3 Welded Wire Fabric

- a. Plain Wire: ASTM A185/A185M
- b. Deformed Wire: ASTM A497/A497M

2.1.8.4 Epoxy Coated Reinforcement

- a. Reinforcing Bars: ASTM A775/A775M
- b. Wires and Fabric: ASTM A884/A884M

2.1.8.5 Galvanized Reinforcement

Provide galvanized reinforcement conforming to ASTM A767/A767M.

2.1.9 Synthetic Fiber Reinforcement

Synthetic fiber shall be polypropylene with a denier less than 100 and a nominal fiber length of 2 inch.

2.1.10 Inserts and Embedded Metal

All items embedded in concrete shall be of the type required for the intended task, and meet the following standards.

- a. Structural Steel Plates, Angles, etc.: ASTM A36/A36M
- b. Hot-dipped Galvanized: ASTM A153/A153M
- c. Proprietary Items: In accordance with manufacturers published literature

2.1.11 Accessories

Submit proper installation instructions and relevant product data for items including, but not limited to, sealants, gaskets, connectors, steps, cable racks and other items installed before or after delivery.

- a. Rubber Gaskets for Circular Concrete Sewer Pipe and Culvert Pipe: ASTM C443.
- b. External Sealing Bands for Noncircular Sewer, Storm Drain and Culvert Pipe: ASTM C877.
- c. Preformed Flexible Joint Sealants for Concrete Pipe, Manholes, and Manufactured Box Sections: ASTM C990.
- d. Elastomeric Joint Sealants: ASTM C920

2.1.12 Pipe Entry Connectors

Pipe entry connectors shall conform to ASTM C923 or ASTM C1478.

2.1.13 Grout

Nonshrink Grout shall conform to ASTM C1107/C1107M. Cementitious grout shall be a mixture of portland cement, sand, and water. Proportion one part cement to approximately 2.5 parts sand, with the amount of water based on placement method.

PART 3 EXECUTION

3.1 FABRICATION AND PLACEMENT

Perform fabrication in accordance with NPCA QC Manual and/or ACPA QPC unless specified otherwise.

3.1.1 Forms

Use forms, for manufacturing precast concrete products, of the type and design consistent with industry standards and practices. They should be capable of consistently providing uniform products and dimensions. Construct forms so that the forces and vibrations to which the forms will be subjected can cause no product damage. Clean forms of concrete build-up after each use. Apply form release agents according to the manufacturers recommendations and do not allow to build up on the form casting surfaces.

3.1.2 Reinforcement

Follow applicable ASTM Standard or ACI 318 for placement and splicing. Fabricate cages of reinforcement either by tying the bars, wires or welded wire fabric into rigid assemblies or by welding, where permissible, in accordance with AWS D1.4/D1.4M. Position reinforcing as specified by the design and so that the concrete cover conforms to requirements. The tolerance on concrete cover shall be one-third of that specified but not more than 1/2 inch. Provide concrete cover not less than 1/2 inch. Take positive means to assure that the reinforcement does not move significantly during the casting operations.

3.1.3 Embedded Items

Position embedded items at locations specified in the design documents. Perform welding in accordance with AWS D1.1/D1.1M when necessary. Hold rigidly in place inserts, plates, weldments, lifting devices and other items to be imbedded in precast concrete products so that they do not move significantly during casting operations. Submit product data sheets and proper installation instruction for anchors, lifting inserts and other devices. Clearly indicate the products dimensions and safe working load.

3.1.4 Synthetic Fiber Reinforced Concrete

Add fiber reinforcement to the concrete mix in accordance with the applicable sections of ASTM C1116/C1116M and the recommendations of the manufacturer, and in an amount of 0.1 percent by volume.

3.2 CONCRETE

3.2.1 Concrete Mixing

Mixing operations shall produce batch-to-batch uniformity of strength, consistency, and appearance.

3.2.2 Concrete Placing

Deposit concrete into forms as near to its final location as practical. Keep the free fall of the concrete to a minimum. Consolidate concrete in such a manner that segregation of the concrete is minimized and honeycombed areas are kept to a minimum. Use vibrators to consolidate concrete with frequencies and amplitudes sufficient to produce well consolidated concrete.

3.2.2.1 Cold Weather Concreting

Perform cold weather concreting in accordance with ACI 306.1.

- a. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather.
- b. Free from frost all concrete materials and all reinforcement, forms, fillers, and ground with which concrete is to come in contact.
- c. Do not use frozen materials or materials containing ice.
- d. In cold weather the temperature of concrete at the time of placing shall not be below 45 degrees F. Discard concrete that freezes before its compressive strength reaches 500 psi.

3.2.2.2 Hot Weather Concreting

Recommendations for hot weather concreting are given in detail in ACI 305R. During hot weather, give proper attention to constituents, production methods, handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation that could impair required strength or serviceability of the member or structure. The temperature of concrete at the time of placing shall not exceed 90 degrees F.

3.2.3 Concrete Curing

Commence curing immediately following the initial set and completion of surface finishing.

3.2.3.1 Curing by Moisture Retention

Prevent moisture evaporation from exposed surfaces until adequate strength for stripping is reached by one of the following methods:

- a. Cover with polyethylene sheets a minimum of 6 mils thick in accordance with ASTM C171.
- b. Cover with burlap or other absorptive material and keep continually moist.
- c. Use of a membrane-curing compound applied at a rate not to exceed 200 square ft/gallon, or in accordance with manufacturers' recommendations according to ASTM C309.

3.2.3.2 Curing with Heat and Moisture

Do not subject concrete to steam or hot air until after the concrete has attained its initial set. Apply steam, if used, within a suitable enclosure, which permits free circulation of the steam in accordance with CSA A23.4. If hot air is used for curing, take precautions to prevent moisture loss from the concrete. The temperature of the concrete shall not be permitted to exceed 150 degrees F. These requirements do not apply to products cured with steam under pressure in an autoclave.

3.2.4 Surface Finish

Finish unformed surfaces of wet-cast precast concrete products as specified. If no finishing procedure is specified, finish such surfaces using a strike-off to level the concrete with the top of the form.

3.2.4.1 Formed Non-Architectural Surfaces

Cast surfaces against approved forms following industry practices in cleaning forms, designing concrete mixes, placing and curing concrete. Normal color variations, form joint marks, small surface holes caused by air bubbles, and minor chips and spalls will be accepted but no major imperfections, honeycombs or other major defects will be permitted.

3.2.4.2 Unformed Surfaces

Finish unformed surfaces with a vibrating screed, or by hand with a float. Normal color variations, minor indentations, minor chips and spalls will be accepted but no major imperfections, honeycombs, or other major defects shall be permitted.

3.2.4.3 Special Finishes

Troweled, broom or other finishes shall be according to the requirements of project documents and performed in accordance with industry standards or supplier specifications. Submit finishes for review when required by the project documents. The sample finishes shall be reviewed prior to the start of production.

3.2.5 Stripping Products from Forms

Do not remove products from the forms until the concrete reaches the compressive strength for stripping required by the design. If no such requirement exists, products may be removed from the forms after the final set of concrete provided that stripping damage is minimal.

3.2.6 Patching and Repair

No repair is required to formed surfaces that are relatively free of air voids and honeycombed areas, unless the surfaces are required by the design to be finished.

3.2.6.1 Repairing Minor Defects

Defects that will not impair the functional use or expected life of a precast concrete product may be repaired by any method that does not impair the product.

3.2.6.2 Repairing Honeycombed Areas

When honeycombed areas are to be repaired, remove all loose material and cut back the areas into essentially horizontal or vertical planes to a depth at which coarse aggregate particles break under chipping rather than being dislodged. Use proprietary repair materials in accordance with the manufacturer's instructions. If a proprietary repair material is not used, saturate the area with water. Immediately prior to repair, the area should be damp, but free of excess water. Apply a cement-sand grout or an approved bonding agent to the chipped surfaces, followed immediately by consolidating an appropriate repair material into the cavity.

3.2.6.3 Repairing Major Defects

Evaluate, by qualified personnel, defects in precast concrete products which impair the functional use or the expected life of products to determine if repairs are feasible and, if so, to establish the repair procedure.

3.2.7 Shipping Products

Do not ship products until they are at least 5 days old, unless it can be shown that the concrete strength has reached at least 75 percent of the specified 28-day strength, or that damage will not result, impairing the performance of the product.

3.3 INSTALLATION

3.3.1 Site Access

It is the Contractor's responsibility to provide adequate access to the site to facilitate hauling, storage and proper handling of the precast concrete products.

3.3.2 General Requirements

- a. Install precast concrete products to the lines and grades shown in the contract documents or otherwise specified.
- b. Lift products by suitable lifting devices at points provided by the precast concrete producer.
- c. Install products in accordance with the precast concrete producer's instructions. In the absence of such instructions, install underground utility structures in accordance with ASTM C891. Install pipe and manhole sections in accordance with the procedures outlined by the American Concrete Pipe Association.
- d. Field modifications to the product will relieve the precast producer of liability even if such modifications result in the failure of the product.

3.3.3 Water Tightness

Where water tightness is a necessary performance characteristic of the precast concrete product's end use, watertight joints, connectors and inserts should be used to ensure the integrity of the entire system.

3.4 FIELD QUALITY CONTROL

3.4.1 Site Tests

When water tightness testing is required for an underground product, use one of the following methods:

3.4.2 Vacuum Testing

Prior to backfill vacuum test system according to ASTM C1244.

3.4.3 Water Testing

Perform water testing according to the contract documents and precast concrete producer's recommendations.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 31 - EARTHWORK

SECTION 31 00 00

EARTHWORK

08/08

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 DEFINITIONS
 - 1.2.1 Suitable Materials
 - 1.2.2 Unsuitable Materials
 - 1.2.3 Unsuitable Debris
 - 1.2.4 Fill Materials
 - 1.2.5 Structural Backfill
 - 1.2.6 Relative Compaction
- 1.3 QUALIFICATIONS
- 1.4 SUBMITTALS
- 1.5 GENERAL CONDITIONS
 - 1.5.1 Lines and Grades
 - 1.5.2 Conduct of the Work
 - 1.5.3 Fill Materials
 - 1.5.4 Haul Roads
 - 1.5.5 Slides and Foundation Failures
 - 1.5.6 Drainage Requirements
 - 1.5.7 Utilities
 - 1.5.8 Protection of Existing Man-Made Facilities and Natural Features

PART 2 PRODUCTS

- 2.1 MATERIALS
 - 2.1.1 Fill Materials

PART 3 EXECUTION

- 3.1 TOLERANCES
- 3.2 PREPARATION OF FOUNDATION AND ABUTMENTS
 - 3.2.1 Shoring and Sheeting
- 3.3 EXCAVATION
 - 3.3.1 General Excavation
 - 3.3.1.1 Ditches and Channels
 - 3.3.2 Over-Excavation
 - 3.3.2.1 Within Limits of Excavation
 - 3.3.2.2 Slopes and Surcharges
 - 3.3.3 Utilities
- 3.4 PLACEMENT AND SPREADING
 - 3.4.1 General
 - 3.4.1.1 Gradation and Distribution
 - 3.4.1.2 Equipment Traffic
 - 3.4.2 Placement of Fill and Structural Backfill
 - 3.4.3 Fill Lift Thickness
 - 3.4.4 Erosion Control Seeding

- 3.5 MOISTURE CONTROL
 - 3.5.1 General
 - 3.5.1.1 Drying Wet Material
- 3.6 COMPACTION
 - 3.6.1 Equipment
 - 3.6.1.1 Sheepsfoot Rollers
 - 3.6.1.2 Smooth-faced Steel Rollers
 - 3.6.1.3 Hand Operated Compactors
 - 3.6.1.4 Crawler-Type Tractors
 - 3.6.1.5 Sprinkling Equipment
 - 3.6.1.6 Miscellaneous Equipment
 - 3.6.2 Compaction of Fill
- 3.7 STOCKPILES
- 3.8 FIELD QUALITY CONTROL
 - 3.8.1 General
 - 3.8.2 Fill Testing
 - 3.8.3 Reporting

-- End of Section Table of Contents --

SECTION 31 00 00

EARTHWORK
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D 698	(2007e1) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D2216	(2010) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D3740	(2012a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D422	(1963; R 2007) Particle-Size Analysis of Soils
ASTM D4318	(2010) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4643	(2008) Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
ASTM D6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008; Errata 1-2010; Changes 1-3 2010; Changes 4-6 2011; Change 7 2012) Safety and Health Requirements Manual
------------	--

ER 1110-1-261

(1999) Quality Assurance of Laboratory
Testing Procedures

1.2 DEFINITIONS

1.2.1 Suitable Materials

Suitable materials shall consist of materials classified in accordance with ASTM D2487 as CL, CL-ML, MH, ML, SC, SM, GP, GW, GP-GM, GW-GM, GP-GC, GW-GC, SP, SW, SP-SM, SW-SM, SP-SC, SW-SC, and CH meeting the additional requirements of paragraph 2.2, types of fill materials. Suitable materials are free from unsuitable debris and organic material as defined herein.

1.2.2 Unsuitable Materials

Unsuitable materials include all other materials that are not defined as suitable materials in paragraph 1.2.1 herein. Materials are not classified as unsuitable based solely on moisture content. See paragraph 3.5 Moisture Control. Unsuitable materials shall be disposed of in accordance with Section 02 41 00 DEMOLITION AND DECONSTRUCTION.

1.2.3 Unsuitable Debris

Material containing organic content or roots greater than 1/2-inch in diameter and 6 inches in length, debris, rubble, trash or other deleterious items shall be classified as unsuitable debris.

1.2.4 Fill Materials

The terms "fill" as used in these specifications are defined as the earth fill portions within the limits of the project.

1.2.5 Structural Backfill

Earthen fill to be placed within 4-feet of completed or partially completed structures including ASTM C33 drainage layer material.

1.2.6 Relative Compaction

Relative Compaction refers to the in-place dry unit weight of soil expressed as a percentage of the maximum dry unit weight of the same soil, as determined by the ASTM D698 (latest edition) laboratory compaction test procedure.

1.3 QUALIFICATIONS

The earthwork contractor shall have experience in projects of similar size and scope completed in the last five (5) years. The project experience must have been performed by the entity proposing to perform the work as defined below. An individual's experience from former companies shall qualify as contractor experience provided that the individual is the Contractor's designated Project Manager or Site Superintendent.

Refer to the proposal forms for additional information.

1.4 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41

SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation;

Submit a written excavation plan a minimum of twenty (20) days prior to the beginning of any excavation. Review of the detailed plan shall be obtained from the Agency prior to starting the work. If necessary, the plan shall be modified as required to meet field conditions, and the modifications shall be reviewed prior to use. As a minimum, the plan shall contain the following:

- a. Proposed methods for preventing interference with, or damage to, existing underground or overhead utility lines, trees designated to remain, and other man-made facilities or natural features designated to remain within or adjacent to the construction right-of-way.
- b. The proposed methods for controlling surface and ground water in the required excavations.
- c. Stockpiling and blending plan for fill material showing locations, stockpile heights, slopes, limits, and drainage around the stockpile areas.
- d. A complete listing of equipment used for excavation and transport of the excavated material.
- e. The Contractor's proposed sequence of work for excavating with plan and cross sectional views showing starting and final work locations and clearing and grubbing limits.
- f. The Contractor's proposed road pattern and plan for implementing dust control measures.

Survey Data;

Copies of survey data in the form of cross sections prior to construction shall be submitted. The Contractor shall submit written certification that the data is accurate and surveying was performed by a surveyor authorized to practice land surveying in the State of California. Submit all data within 24 hours of performing field surveys in accordance with the Special Provisions.

Equipment Data;

Equipment data used for hauling, excavation, fill placement, compaction, and sprinkling equipment shall be submitted and include weights, size, and contact pressures.

Material Distribution and Stockpile Plan;

Earth material distribution and stockpile plan that describes where material will be obtained, placed, stockpiled and blended for usage or for temporary disposal. This information shall be provided within ten (10) days after the notice to proceed.

Sheeting and Shoring Plan;

Submit drawings and calculations, certified by a registered civil engineer authorized to practice in the State of California, describing the methods for shoring and sheeting of excavations if required. Drawings shall include material sizes and types, arrangement of members, and the sequence and method of installation and removal. Calculations shall include data and references used.

Geotechnical Engineer;

The Contractor shall provide a Professional Geotechnical Engineer licensed in the State of California to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical Engineer shall be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical Engineer shall update the excavation, sheeting, and dewatering plans as construction progresses to reflect changing conditions and shall submit an updated plan as necessary. A written report shall be submitted, at least monthly, informing the Agency and Construction Manager of the status of the plan and an accounting of the Contractor's adherence to the plan addressing any present or potential problems. The Geotechnical Engineer shall be available to meet with the Agency and Construction Manager at any time throughout the contract duration.

Plan of Operations;

Twenty (20) days prior to commencement of haul road construction, excavation or placing fill and backfill, whichever is earlier, the Contractor shall submit for review a Plan of Operations for accomplishing all fill, excavation and backfill construction and for the location and construction of haul roads. The plan shall be reviewed by the Agency prior to the start of Work. This plan shall include, but not be limited to, the Contractor's proposed sequence of construction for fill and backfill items, fill plan and methods and types of equipment to be utilized for all excavation, fill and backfill operations, including transporting, placing, and compaction. This plan shall also include the names and addresses of the commercial testing labs which will perform the soil testing and inspection and describe how all required soils testing will be performed and reported.

SD-03 Product Data

Fill and Backfill Materials;

At least 15 days prior to delivery of any Contractor-furnished material to the site of the work, the Contractor shall submit soil classification test results, moisture-density curves, gradation curves, and laboratory results of the required tests of the proposed material for review by the Agency.

SD-09 Contractor's Field Reports

Quality Control Testing;

The Contractor shall submit all quality control test results. Testing laboratories shall meet the requirement of ASTM D3740 and ER 1110-1-261. Supervision of tests and report preparation shall be by a professional civil or geotechnical engineer licensed in the State of California. All reports shall bear said professional engineer's signature and stamp. Distribution of the copies to the Agency shall be within 24 hours after sampling or initiating the test, except for test requirements that exceed 24 hours. For tests exceeding 24 hours, distribution shall be with 24 hours after completion of the test. Also refer to 01 45 01.10 QUALITY CONTROL SYSTEM (QCS).

All test reports shall be provided electronically and hard copy.

Test Data Summaries;

Summaries comparing test results with specified requirements shall be provided in electronic format and hard copy, demonstrate contract compliance, and be submitted with all requests for progress payments.

Construction Verification Survey Report;

The Contractor shall complete post-construction verification surveys and submit a "Construction Verification Survey Report" which will include the description of equipment used, a description of methodology used, copies of the field notes, and the final data submitted. This report shall contain the certificate below, and be stamped and signed by the Professional Land Surveyor (or Civil Engineer, if legally allowed to practice surveying in the State of California) responsible for the survey work performed.

1.5 GENERAL CONDITIONS

1.5.1 Lines and Grades

The fills, excavations and backfills shall be constructed to the lines, grades, and cross sections indicated on the Plans, unless otherwise directed by the Agency. The Agency reserves the right to increase or decrease the widths and fill slopes or to make such other changes in the fill, excavation or backfill sections as may be deemed necessary. Changes in quantities resulting from such revisions will not constitute justification for change in contract unit prices, except as provided for in the General Provisions.

1.5.2 Conduct of the Work

The Contractor shall maintain and protect the fill and backfill in a satisfactory condition at all times until final completion and acceptance of all work under the Contract. If the hauling equipment causes horizontal shear planes or slicken slides, rutting, quaking, heaving, cracking, or excessive deformation of the fill or backfill, the Contractor shall limit the type, load, or travel speed of the hauling equipment on the fill or backfill. The Contractor may be required to remove, at his own expense, any fill material placed outside of prescribed slope lines. Any approved

fill or backfill material which is lost in transit or rendered unsuitable after being placed in the fill or backfill and before final acceptance of the work shall be replaced by the Contractor in a satisfactory manner and no additional payment will be made. The Contractor shall excavate and remove from the fill or backfill any material which is unsatisfactory and shall also dispose of such material and refill the excavated area as directed, all at no cost to the Agency.

1.5.3 Fill Materials

Materials for fill construction shall be suitable materials obtained from the designated borrow areas or project excavations. The Contractor shall blend and reuse soil from project excavations to the maximum extent possible. Materials shall be blended at the borrow site or approved stockpile area. Materials shall be tested for suitability prior to placement. Fill materials shall have no visible concentrations of organics, roots greater than 1/2 inch in diameter and 6 inches in length, limbs, or wood fragments. Materials containing debris, rubble, other deleterious items, perishable material, and trash shall not be used in the fill. Material not meeting the specified requirements shall be hauled off site and disposed of in a legal manner.

1.5.4 Haul Roads

Haul roads and ramps shall be located and constructed within the construction limits shown on the Plans. Prior to the commencement of construction, the Contractor shall submit for review a site plan detailing the location of all haul roads and ramps within the construction limits. Haul roads and ramps shall be constructed to maintain the intended traffic, be free draining, and be maintained in good condition throughout the contract period. Haul roads and ramps which cross any creek or drainage channel shall be constructed and maintained by the Contractor so as to not flood either upstream areas by restricting stream flows or flood downstream areas by the release of any stored water in the event that the crossing fails for any cause. Haul roads and ramps constructed during the contract duration shall be removed after work is completed and the impacted area restored to its preconstruction conditions. All haul roads within the right-of-way that will remain as public thoroughfares after construction shall be cleaned daily and maintained in the preconstruction condition. All costs associated with these haul roads and ramps shall be considered as a subsidiary obligation of the Contractor.

1.5.5 Slides and Foundation Failures

The Contractor shall repair any sliding that occurs in any part of the fill and backfills prescribed in this section prior to final acceptance of the work. When the slide is caused through the fault of the Contractor, the repair shall be made at no cost to the Agency. The Contractor shall submit a plan detailing how the repair will be completed. The plan shall be reviewed by the Agency prior to the start of repair work. When the slide is not the fault of the Contractor, an extension of the unit prices for excavation and fill shall be made to cover the cost of the repairs.

1.5.6 Drainage Requirements

The Contractor shall not block or restrict the flow in a natural drain, existing culvert, ditch or channel at any time without obtaining prior written approval. This approval shall not relieve the Contractor from responsibility for any damage caused by his operation. The Contractor

shall monitor the channel flow and provide sufficient free discharge areas so that conditions are not worsened upstream or downstream by possible floods during construction. Surface water shall be directed away from excavations and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes, and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained. If private property is to be used for drainage, the Contractor shall submit written evidence that the right has been obtained from the property owner for drainage on his property.

1.5.7 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Utility lines damaged during construction shall be immediately reported to the Agency.

1.5.8 Protection of Existing Man-Made Facilities and Natural Features

Construction shall be conducted in such a manner as to avoid damage to trees left standing and trees outside the excavation areas, existing buildings, man-made facilities and natural features, with due regard to the safety of employees and others.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Fill Materials

Project fills shall be constructed of suitable earth materials as defined in 1.2 DEFINITIONS and obtained from project excavations. Materials shall be screened and blended as needed to obtain a blended material suitable for construction meeting the fill requirements outlined in these Specifications. Materials shall be screened, blended and tested for suitability at the borrow site or at stockpile areas prior to placement. Soil classification tests shall be completed for all blended material in accordance with ASTM D2487.

Soils classified as organic clay or organic silt (OH or OL) are unsuitable and shall not be blended for use in the fill areas. These materials shall be hauled off-site. Unsuitable debris as defined in paragraph 1.2 DEFINITIONS shall be disposed of off-site.

Fill may be obtained from project excavations shall be suitable for use as general site fill. Fill shall consist of suitable material with a maximum particle size less than 3 inches.

PART 3 EXECUTION

3.1 TOLERANCES

All fills, excavations and backfills shall be constructed to the grades, lines, and cross-sections shown on the Plans and as determined by Contractor's (Agency-reviewed) pre-construction surveys. The side slopes shall have a tolerance of 0 to plus 0.4 feet for final dressing (measured

perpendicular to the slope). These tolerances will be allowed provided that any excess material is distributed so that the slopes drain and that there are no abrupt humps or depressions in any surfaces.

A tolerance of 0.2 feet above or below the prescribed grade will be allowed for finished surfaces provided that the surface drains in the direction as indicated on the Plans with no abrupt humps or depressions.

3.2 PREPARATION OF FOUNDATION AND ABUTMENTS

3.2.1 Shoring and Sheeting

In addition to EM 385-1-1 and other requirements set forth in this contract, the Contractor shall include provisions in the shoring and sheeting plan that will accomplish the following:

- a. Prevent undermining of fills, roads, or structures.
- b. Prevent slippage or movement in banks or slopes adjacent to the excavation.

3.3 EXCAVATION

Excavation shall consist of the excavation and grading following removal of the existing arch culvert structure, excavation for roadside drainage ditches, removal of objectionable and unsuitable materials, and excavation for storm drain pipe installation.

3.3.1 General Excavation

Excavation shall be to the lines and grades shown on the Plans.

Materials obtained from project excavations that do not meet the requirements for fill shall become the property of the Contractor and shall be disposed of off-site in a legal manner.

Excavated material shall be used as fill and so long as it meets or can be blended to meet the requirements indicated in Paragraph 2.1, Materials, of these Specifications. Contractor shall maximize use of excavated material that meets or can be blended to meet the requirements for fill.

3.3.1.1 Ditches and Channels

Finish excavation of ditches and channels by cutting accurately to the cross sections, grades, and elevations shown on the Plans. Do not excavate ditches below grades shown. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.3.2 Over-Excavation

3.3.2.1 Within Limits of Excavation

Over-excavation within the limits of excavation shall be backfilled to

grade with the same material type that is to be placed immediately above the excavation, respectively, keyed into adjacent ground, placed in uncompacted lifts not exceeding six inches and compacted in accordance with this Specification. Keying of fill shall be in accordance with the details shown on the Plans.

3.3.2.2 Slopes and Surcharges

Temporary excavation slopes shall not be steeper than the specified finished slope or the specified construction slope, as shown on the plans. This may be accomplished by benching the temporary slope so that the average slope is not steeper than the specified amount.

No temporary, permanent, or construction slope shall be surcharged with excavated or stockpiled material or with heavy construction equipment which would have the same effect as the surcharge material. The toe of stockpiled material shall be maintained a minimum distance back from the top of the finished excavation equal to the depth of the excavation. The maximum height of such stockpile without causing instability of the excavation slope shall be determined by the Contractor. Any slide or other adverse conditions caused by failure of the Contractor to maintain these conditions shall be considered the responsibility of the Contractor and remedial measures shall be at the Contractor's expense.

3.3.3 Utilities

Excavations for utility removal shall be as specified on the Plans and in these Specifications.

Excavate to the dimensions indicated or to safe limits if dimensions are not provided. Grade bottom of trenches to provide uniform support for each section of pipe or structure after bedding material placement, as shown on the Plans. Subgrade shall be compacted in accordance with these Specifications per the material type and location. Pipes shall be uniformly supported for the entire length. Rock, where encountered, shall be excavated to a depth of at least 6 inches below the bottom of the pipe or structure.

Pipe bed shall be uniform and cleared of any loose material prior to placement of pipe.

3.4 PLACEMENT AND SPREADING

3.4.1 General

No fill shall be placed until such areas have been inspected by the Agency.

3.4.1.1 Gradation and Distribution

The gradation and distribution of materials shall be such that the fill will be free from layers of material differing substantially in texture or gradation from surrounding material of the same class. If layers of materials differing substantially in texture or gradation from surrounding material occur in the spread material, the layer shall be removed, blended, and tested for suitability prior to replacement. Screening and blending of materials shall occur in approved stockpile areas. During the placement and spreading process, the Contractor shall maintain at all times a force of workers adequate to remove oversized particles, oversized roots, debris, rubble, trash, deleterious items, concentrations of organic material,

oversized stones, and all oversized rock fragments from all fill materials. The maximum allowed particle size for the appropriate fill material type shall be as indicated in Section 2.1.1 FILL MATERIALS.

3.4.1.2 Equipment Traffic

Equipment traffic on any fill zone shall be routed to minimize rutting of placed fill and to distribute the compactive effort as much as practicable. Ruts formed in the surface of any layer of spread material shall be filled before that material is compacted. If the compacted surface of any layer of material is too smooth, as determined by the Engineer, to bond properly with the succeeding layer, the surface shall be loosened by scarifying and compacted before material for the succeeding layer is placed.

3.4.2 Placement of Fill and Structural Backfill

No fill or structural backfill shall be placed on or against concrete less than 7 days after placement or 70 percent of the design strength, without prior review by the Agency. Crawler-type tractors, vibratory equipment and other similar compaction equipment shall not be used within 4 feet of any completed or partially completed structure. Compaction within 4 feet of completed or partially completed structures shall be accomplished by the use of mechanical hand tampers, vibrating plates, or other approved methods and equipment. The Contractor shall ensure that compaction operations do not damage any existing utilities. Any damage caused by the Contractor's operation shall be repaired at the Contractor's expense.

3.4.3 Fill Lift Thickness

Fill materials shall be placed and spread in layers not more than six (6) inches in uncompacted thickness, except within four (4) feet of structures, where the uncompacted layer thickness shall be reduced to four (4) inches unless otherwise indicated on the plans.

3.4.4 Erosion Control Seeding

Slopes shall be track-walked and seeded in accordance with the requirements of 32 92 19 EROSION CONTROL SEEDING.

3.5 MOISTURE CONTROL

3.5.1 General

The moisture content prior to compaction shall be as specified below.

Material Type	Soil Type	Minimum Moisture Content Percentage Points Above Optimum (ASTM D698)
Fill Utility Trench Backfill Roadways Structural Backfill Subgrade to Receive Fill	CL	-1% < 0 < +3%
	SC or GC	-1% < 0 < +3%

Fill that is below the specified minimum moisture content shall be moisture conditioned prior to compaction. The contractor shall add water to the fill material and by harrowing, or other approved methods, work the moisture into the material until a uniform distribution of moisture is obtained. Water applied on a layer of fill shall be accurately controlled in amount so that free water will not appear on the surface during or subsequent to compaction. Should too much water be added to the fill, compaction shall be delayed until the moisture content of the materials is reduced to an amount that allows the specified relative compaction to be met.

3.5.1.1 Drying Wet Material

Fill that is too wet to allow the specified relative compaction to be met shall be dried prior to compaction. Drying shall be assisted by discing or harrowing, if necessary, until the moisture content is reduced to an amount that allows the specified relative compaction to be met.

3.6 COMPACTION

3.6.1 Equipment

Compaction equipment shall conform to the following requirements and shall be used as prescribed in subsequent paragraphs.

3.6.1.1 Sheepsfoot Rollers

Sheepsfoot rollers shall be capable of achieving the specified compaction and shall consist of self-propelled steel-wheeled compactors such as a Caterpillar 815, Caterpillar 825, or equivalent. Alternative compaction equipment must be approved by the Agency.

3.6.1.2 Smooth-faced Steel Rollers

Smooth-faced steel rollers for compacting aggregate base shall be capable of achieving the specified compaction. Alternative compaction equipment must be approved by the Agency.

3.6.1.3 Hand Operated Compactors

Compaction of material in areas where it is impracticable to use a roller shall be performed by the use of approved hand operated power compactors.

- a. Power Tampers: Power tampers shall be hand operated equipment capable of compacting material in confined areas. The compactors shall be either an internal combustion or pneumatic activated tamper.

Tampers shall have sufficient weight and striking power to produce the specified compaction. The character and efficiency of this equipment shall be subject to the review by the Agency.

b. Vibratory Plate Compactor: Vibratory compactors operated by hand in confined areas shall utilize the oscillating cam principle and shall deliver an impact of not less than 2000 lbf at a rate of approximately 2000 impulses per minute. The character and efficiency of this equipment shall be subject to the review by the Agency.

3.6.1.4 Crawler-Type Tractors

Crawler-type tractors used for spreading or track walking shall weigh not less than 20,000 pounds, shall exert a unit tread pressure of not less than 6 psi, and shall be operated at a speed not to exceed 3.5 miles per hour.

3.6.1.5 Sprinkling Equipment

Sprinkling equipment shall consist of tank trucks, pressure distributors or other equipment designed to apply water uniformly and in controlled quantities to variable width of surface.

3.6.1.6 Miscellaneous Equipment

Scarifiers, disks, spring-tooth or spike-tooth harrows, spreaders, and other equipment shall be suitable for use in fill construction. Equipment used for processing fill material shall be capable of penetrating the full loose lift thickness of the specific material type.

3.6.2 Compaction of Fill

After a layer of material has been dumped and spread, it shall be harrowed to break up the fill materials to eliminate all clods and to obtain uniform moisture distribution. Harrowing shall be performed with a heavy disk plow, or other approved harrow, to the full depth of the layer. If one pass of the harrow does not accomplish the breaking up of the materials, additional passes of the harrow shall be required, but in no case will more than three passes of the harrow on any one layer be required for this purpose.

Fill shall be uniformly compacted to comply with the following minimum relative compaction (maximum dry density in accordance with ASTM D 698, latest edition) and in accordance with the Plans:

<u>MATERIAL TYPE</u>	<u>MINIMUM RELATIVE COMPACTION</u>
General Fill	95 percent
Utility Trench and Trench Backfill	95 percent

A minimum of four passes with approved compaction equipment shall be performed over each fill layer.

In areas which are not accessible by roller, the fill shall be compacted with an approved hand operated compactor to a density equal to that

obtained in other areas which are accessible to rollers. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 3 feet.

3.7 STOCKPILES

Stockpiles shall be stored dry and not compacted through earthmoving operations more than is necessary for dust control and traction during placement. The only water application shall be to control dust and allow for traction of equipment.

Weeds growing on stockpiled material shall be controlled with a non-residual herbicide such as Glyphosate. Herbicides and methods of application shall be reviewed by the Agency prior to weed control.

3.8 FIELD QUALITY CONTROL

3.8.1 General

As a part of the Contractor Quality Control (CQC) system required by Section 01 45 01.10 QUALITY CONTROL SYSTEM (QCS), the Contractor shall establish and maintain field quality control for foundation preparation, excavation, fill and backfill operations to assure compliance with contract requirements and maintain detailed records of field quality control for all operations. Approximately 20 percent of tested locations will be selected for quality assurance by the Agency.

The Agency will retain a geotechnical engineering firm to provide testing and inspection of work in connection with excavating, filling, compacting, and grading. The testing program specified below shall be considered the minimum acceptable frequency of testing performed by the Agency.

3.8.2 Fill Testing

The Contractor shall perform sufficient testing to ensure that the fill is being constructed as specified. The testing program specified below shall be considered the minimum acceptable frequency of testing. This does not relieve the Contractor from the responsibility of performing additional testing if required to ensure compliance with these Specifications.

a. Fill Material Testing

(1) Moisture Density Relationships. The moisture-density relations for soils shall be determined in accordance with ASTM D 698 latest edition, with a minimum of four points of compaction test. The moisture-density curves will be compiled to form a family of curves that will be utilized to estimate optimum properties (maximum dry density and optimum moisture content) to be used with field density tests.

TEST METHOD

FREQUENCY

Moisture Density Relationship (ASTM D698)	Minimum of five (5) test or representative samples of each type of fill material used.
Soil Gradation (ASTM D422), Atterberg Limit (ASTM D4318), and Soil Classification (ASTM D2487)	One test for each moisture density and relative density relationship.

(2) Water (Moisture) Content Tests. Determination of water content shall be performed in accordance with ASTM D2216. ASTM D4643 may be used when rapid moisture content results are needed. One water content test may be performed for each in-place density test at the location of the in-place density test. Backfill and fills not meeting the required specifications for water content shall be retested after corrective measures have been applied.

(3) In-place Density Testing. The minimum frequency of in-place density testing is shown in the table below. The horizontal locations of tests shall be randomly staggered in the fill. Backfill and fills not meeting the required specifications for in-place density shall be retested after corrective measures have been applied.

TEST METHOD

FREQUENCY

Nuclear Method (ASTM D6938)

One (1) In-Place Density Test for every 600 cubic yards of completed fill unless otherwise specified.

Additionally, at least one (1) test for each lift of fill placed and material type.

Soil Gradation and Atterberg Limit Tests

One (1) test for every 1,200 cubic yards of compacted fill.

Minimum of one (1) test per shift and material type.

If soil appears to contain organics based on color or smell, the Agency may require the Contractor to test the material in accordance with ASTM D2487 to classify organic clay or organic silt (OH or OL).

3.8.3 Reporting

On a daily basis, the Contractor shall furnish the inspection records and all material testing results, the quantity of fill placed, as well as the records of corrective action taken, in accordance with Section 01 45 04.00 41 CONTRACTOR QUALITY CONTROL.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 31 - EARTHWORK

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

- 1.1 SUBMITTALS
- 1.2 DEFINITIONS
 - 1.2.1 Unsuitable Debris
- 1.3 SURVEYS
- 1.4 GENERAL
 - 1.4.1 Description of Work
- 1.5 ORDER OF WORK

PART 2 PRODUCTS

PART 3 EXECUTION

- 3.1 CLEARING
 - 3.1.1 General
 - 3.1.2 Roadwork, Structures and Ditches
 - 3.1.2.1 Vegetation
 - 3.1.2.2 Tree Removal
 - 3.1.2.3 Miscellaneous Structures and Debris
 - 3.1.3 Debris Removal
- 3.2 GRUBBING
 - 3.2.1 General
 - 3.2.2 Roadwork, Structures, and Ditches
 - 3.2.3 Filling of Holes
- 3.3 DISPOSAL REQUIREMENTS
 - 3.3.1 Cleared and Grubbed Material
- 3.4 FIELD QUALITY CONTROL
 - 3.4.1 Clearing and Grubbing

-- End of Section Table of Contents --

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41
SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Plan

Work Plan within 15 calendar days after notice to proceed. No work at the site, with the exception of site inspections and surveys, shall be performed until the Work Plan is reviewed. The Contractor shall allow 10 calendar days in the schedule for the Agency's review. No adjustment for time or money will be made if resubmittal of the Work Plan are required due to deficiencies in the plan. At a minimum, the Work Plan shall include:

- a. Schedule of activities.
- b. Method of clearing and grubbing, and equipment to be used.
- c. Method of removing asphalt and concrete removal and equipment to be used.
- d. Disposal or recycle site for asphalt and concrete roadway material to be removed.

1.2 DEFINITIONS

1.2.1 Unsuitable Debris

Materials containing roots greater than 1/2 inch in diameter and 6 inches in length, debris, rubble, trash or other deleterious items shall be classified as unsuitable debris.

1.3 SURVEYS

Surveys shall be performed immediately prior to clearing and grubbing to determine the acreage cleared and grubbed. The Contractor shall provide plan layout sheets on 100 foot intervals minimum and at break points for all cleared and grubbed areas.

1.4 GENERAL

1.4.1 Description of Work

The work covered by this section consists of furnishing all labor,

equipment, and materials necessary to perform the clearing and grubbing, asphalt and concrete roadway removal, the removal or disposal of all cleared and grubbed materials, the removal and disposal of all asphalt and concrete, and the filling of all grubbing holes, as specified herein, as shown on the Plans, or as otherwise directed by the Agency.

1.5 ORDER OF WORK

- a. Work shall be carried out within the project construction limit identified in the Plans. Clearing and grubbing within temporary construction access areas is not required unless it is necessary to allow for access.
- b. All clearing and grubbing work shall be completed at least 300 feet in advance of construction. In locations where work on drainage structures is performed prior to construction, all clearing and grubbing shall be completed in advance for at least 100 feet in both directions from the structure, measured along the center line.
- c. The Contractor shall comply with the requirements of the Special Provisions.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CLEARING

3.1.1 General

The clearing operations shall consist of the complete removal of all obstructions above the ground surface. Trees, stumps, down timber, snags, brush, vegetation, old piling, rock, stone, concrete rubble, abandoned structures, and similar debris shall be cleared within the limits of construction as shown on the Plans, excluding restricted habitat areas.

3.1.2 Roadwork, Structures and Ditches

All trees, stumps, down timber, snags, brush, vegetation, old piling, rock, stone, concrete rubble, abandoned structures, and similar debris shall be cleared within the limits of construction shown on the Plans, excluding restricted habitat areas. Refer to the plans for limits of tree removal.

3.1.2.1 Vegetation

Vegetation to be removed shall consist of all heavy growth of brush and woody vegetation.

3.1.2.2 Tree Removal

Tree removal shall consist of removing the canopy, tree trunk and roots per the details shown on the Plans.

3.1.2.3 Miscellaneous Structures and Debris

The Contractor shall also remove abandoned foundations, debris, concrete rubble, and other materials in degrade areas or in areas which will be

covered with embankment, and as shown on the Plans.

3.1.3 Debris Removal

Remove and dispose of any debris within the construction limit shown on the Plans, or as designated for removal on the Plans or as directed by the Agency.

3.2 GRUBBING

3.2.1 General

Grubbing shall consist of the removal of all stumps, roots, buried logs, old piling, old paving, and other objectionable material as defined in these Specifications and to the limits of construction shown on the Plans, excluding restricted habitat areas.

3.2.2 Roadwork, Structures, and Ditches

The entire area within the limits of construction as shown on the Plans (except in restricted habitat areas), ponding areas, ditches, structures, traverses, channels, ramps, and the areas within the limits of all structures shall be thoroughly grubbed. All tap roots, lateral roots, or other projections, encountered during excavation shall be removed.

3.2.3 Filling of Holes

All holes caused by grubbing operations shall be excavated with 3 to 1 (horizontal to vertical) side slopes. The excavations shall then be backfilled with the soil type to be placed above the material removed in conformance with Section 31 00 00 EARTHWORK. The backfill shall be keyed into adjacent ground and placed in layers to the level of adjacent stripping operations.

3.3 DISPOSAL REQUIREMENTS

3.3.1 Cleared and Grubbed Material

Except as hereinafter specified, all logs, limbs, slash, and other debris which are the products of the clearing and grubbing operations shall be disposed of offsite at an approved waste facility.

3.4 FIELD QUALITY CONTROL

3.4.1 Clearing and Grubbing

The Contractor shall establish and maintain quality control for clearing and grubbing operations to assure compliance with contract requirements, and maintain records of the quality control for all construction operations including but not limited to the items indicated below. These records, as well as the records of corrective actions taken, shall be furnished to the Agency in accordance with Section 01 45 01.10 QUALITY CONTROL SYSTEM (QCS).

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 10 00

BITUMINOUS CONCRETE PAVEMENT

08/08

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 QUALITY ASSURANCE
 - 1.3.1 Regulatory Requirements
 - 1.3.2 Modification of References
 - 1.3.3 Mix Delivery Record Data
 - 1.3.4 Mix Design
- 1.4 PAVEMENT DELINEATION

PART 2 PRODUCTS

- 2.1 ASPHALT CONCRETE
- 2.2 COMPOSITION OF MIXTURE REQUIREMENTS
 - 2.2.1 Mixture Properties
 - 2.2.2 Quantity of Bituminous Material

PART 3 EXECUTION

- 3.1 PREPARATION
 - 3.1.1 Excavation and Filling
- 3.2 INSTALLATION
 - 3.2.1 New Pavement
 - 3.2.2 Remove and Replace Paving
 - 3.2.3 Saw Cutting
- 3.3 VEHICLE PAVING REPAIR
 - 3.3.1 Repairing damaged paving after completion of construction
(except in areas where remove and replace paving is required)
- 3.4 FIELD QUALITY CONTROL
 - 3.4.1 Testing

-- End of Section Table of Contents --

SECTION 32 10 00

BITUMINOUS CONCRETE PAVEMENT
08/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

CALTRANS

State of California Department of
Transportation (CALTRANS) Standard
Specifications

1.2 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41
SUBMITTAL PROCEDURES:

SD-04 Samples

Uncompacted mix

Pavement Pavement cores

SD-06 Test Reports

Trial batch reports

Mix design

Asphalt concrete

Density

Thickness

Straightedge test

Submit reports for testing specified under paragraph entitled
"Field Quality Control."

SD-07 Certificates

Asphalt mix delivery record

Asphalt concrete and material sources and material sources

Obtain approval of the Agency for materials and material sources 2
days prior to the use of such material in the work.

Asphalt concrete

Submit certificates, signed by the producer, that paving materials and incidental construction items conform to specification requirements.

1.3 QUALITY ASSURANCE

1.3.1 Regulatory Requirements

Provide work and materials in accordance with applicable requirements of Caltrans Standard Specifications, except that paragraphs in the Standard Specifications entitled "Measurement and Payment" shall not apply.

1.3.2 Modification of References

Where term "Engineer" is used in the Caltrans Standard Specifications it shall be construed to mean Agency.

1.3.3 Mix Delivery Record Data

Record and submit the following information to each load of mix delivered to the job site. Submit within one day after delivery on Agency-furnished forms:

- a. Truck No:
- b. Time In:
- c. Time Out:
- d. Tonnage and Discharge Temperature:
- e. Mix Type:
- f. Location:
- g. Stations Placed:

1.3.4 Mix Design

Submit results of laboratory tests performed on each mix design. Testing shall have been accomplished not more than one year prior to date of material placement.

1.4 PAVEMENT DELINEATION

The existing pavement delineation and pavement markings shall be replaced with paint traffic stripe and two (2) coat pavement markings in accordance with the California Department of Transportation Standard Specifications and Standard Plans, dated May 2006. The new pavement delineation and pavement markings shall match the existing delineation. Temporary pavement delineation shall be in accordance with the California Department of Transportation Standard Specifications for temporary pavement delineation, permanent pavement delineation and pavement markings shall be considered to be included in the payment for asphalt concrete and no additional payment will be allowed.

PART 2 PRODUCTS

2.1 ASPHALT CONCRETE

Provide asphalt concrete, Type A in accordance with the Caltrans Standard Specifications. Bituminous concrete to be PG64-10, in accordance with CALTRANS Section 92. Maximum aggregate size shall be 1/2-inch.

2.2 COMPOSITION OF MIXTURE REQUIREMENTS

2.2.1 Mixture Properties

Gradation of mineral aggregate shall be as specified in these Specifications. Percentage of bituminous material provided in the bituminous mixtures shall be within the limits specified.

2.2.2 Quantity of Bituminous Material

Mix asphalt cement with aggregates of corresponding mixes in the following proportions:

ASPHALT CEMENT PERCENT BY WEIGHT OF TOTAL MIX

Binder Course

Wearing Course

4 to 8

5 to 9

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Excavation and Filling

Excavation and filling to establish elevation of subgrade is specified in Section 31 00 00 EARTHWORK.

3.2 INSTALLATION

Provide construction in accordance with the applicable requirements of the Caltrans Standard Specifications, except where indicated or specified otherwise.

3.2.1 New Pavement

Construct to the lines, grades and sections as shown on the Plans and in accordance with the project Specifications and the referenced State Specifications. Place and compact subgrade per Section 31 00 00 EARTHWORK prior to placing aggregate surfacing. Install aggregate surfacing in accordance with Section 32 11 23 AGGREGATE BASE COURSE. Install a surface course of asphalt concrete in accordance with Section 39 of State Specifications. Tolerance of finished grade shall be 0.1 ft above required elevations.

3.2.2 Remove and Replace Paving

Remove existing asphalt concrete and base materials to the lines shown and to depth required for placement of new pavement section. Compact subgrade

and place new aggregate surfacing and paving materials as specified for new pavement.

3.2.3 Saw Cutting

Saw cutting shall be required at locations as specified on the Plans. Saw cutting shall extend as deep as necessary to remove all existing asphalt concrete at the required locations. Asphalt concrete removed shall be disposed of in a manner consistent with these specifications.

3.3 VEHICLE PAVING REPAIR

Required for all areas damaged by construction.

3.3.1 Repairing damaged paving after completion of construction (except in areas where remove and replace paving is required)

Sawcut and remove paving to 1-foot outside of the damaged area to full depth of paving section, and in neat straight lines. Replace removed paving in accordance with Paragraph 3.2.1 New Pavement.

3.4 FIELD QUALITY CONTROL

3.4.1 Testing

The following testing shall be performed by the Contractor and be the basis of acceptance for asphalt concrete pavement.

- a. Density: Determine in-place density of asphalt concrete pavement by using cores and nuclear gauge obtained in accordance with CALTRANS Section 39 California Test Method 375 .
- b. Thickness: Determine thickness of the binder and wearing course from cores taken for density test.
- c. Straightedge Test: Test compacted surface of binder course and wearing course with a straightedge in accordance with Caltrans Standard Specifications. Pavement showing irregularities greater than that specified shall be corrected as directed by Agency. Pavement patches showing irregularities greater than 1/4 inch when compared to the adjacent, adjacent pavement shall be corrected as directed by Agency.
- d. Temperature Test: A minimum temperature of 240 degrees at delivery

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 11 23

AGGREGATE BASE COURSE

PART 1 GENERAL

- 1.1 SCOPE
- 1.2 REFERENCES
- 1.3 DEFINITIONS
 - 1.3.1 Aggregate Base Course
 - 1.3.2 Cement Treated Aggregate Base
 - 1.3.3 Degree of Compaction
- 1.4 SUBMITTALS
- 1.5 SAMPLING AND TESTING
 - 1.5.1 Sampling
 - 1.5.2 Tests
 - 1.5.2.1 Sieve Analysis
 - 1.5.2.2 Field Density Tests
 - 1.5.2.3 Wear Test
 - 1.5.3 Testing Frequency
 - 1.5.3.1 Initial Tests
 - 1.5.3.2 In Place Tests
 - 1.5.4 Approval of Material
- 1.6 WEATHER LIMITATIONS
- 1.7 PLANT, EQUIPMENT, AND TOOLS

PART 2 PRODUCTS

- 2.1 AGGREGATES
 - 2.1.1 Coarse Aggregate
 - 2.1.1.1 Aggregate Base Course
 - 2.1.2 Fine Aggregate
 - 2.1.2.1 Aggregate Base Course
 - 2.1.3 Gradation Requirements

PART 3 EXECUTION

- 3.1 GENERAL REQUIREMENTS
- 3.2 OPERATION OF AGGREGATE SOURCES
- 3.3 STOCKPILING MATERIAL
- 3.4 PREPARATION OF UNDERLYING COURSE
- 3.5 INSTALLATION
 - 3.5.1 Mixing the Materials
 - 3.5.2 Placing
 - 3.5.3 Grade Control
 - 3.5.4 Compaction
 - 3.5.5 Thickness
 - 3.5.6 Cement Treated Base Course
 - 3.5.7 Finishing
 - 3.5.8 Smoothness
- 3.6 TRAFFIC
- 3.7 MAINTENANCE

3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

-- End of Section Table of Contents --

SECTION 32 11 23

AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 SCOPE

The work specified herein consists of the construction of an aggregate base course. The work shall be performed in accordance with this specification and shall conform to the lines, grades, notes and typical sections shown in the plans. Sources of all materials shall be selected well in advance of the time that materials will be required in the work.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C117	(2004) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	(2012) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	(2012) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C131	(2006) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D1557	(2012) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³) (2700 kN-m/m ³)
ASTM D2487	(2011) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D75/D75M	(2010) Standard Practice for Sampling

Aggregates

ASTM E11 (2010a) Wire Cloth and Sieves for Testing
Purposes

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CDT)

CDT Std Specs (2006) Standard Specifications

1.3 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.3.1 Aggregate Base Course

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.3.2 Cement Treated Aggregate Base

Cement treated aggregate base shall be as described in Section 27, "Cement Treated Bases" of CDT Std Specs.

1.3.3 Degree of Compaction

Degree of compaction required is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557 abbreviated as percent of laboratory maximum dry density.

1.4 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools

List of proposed equipment to be used in performance of construction work, including descriptive data.

Waybills and Delivery Tickets

Copies of waybills and delivery tickets during the progress of the work.

SD-06 Test Reports

Source of Material Compliance Test Data

Gradation, Atterberg limits tests, and moisture-density relationship from the material source.

Laboratory Moisture-Density Relationship

Laboratory moisture-density relationship tests taken from material placed in the field for QC testing purposes.

Moisture-Density Determinations

Field Density Tests

Certified copies of test results for review not less than 15 days before material is required for the work.
Calibration curves and related test results prior to using the device or equipment being calibrated.
Copies of field test results within 24 hours after the tests are performed.

1.5 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by a testing laboratory approved in accordance with Section 01 45 04.00 41 CONTRACTOR QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. For all testing required by this section, appoint a registered professional civil engineer to certify inspections and test results. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials and conditions being certified by the tests. The materials shall be tested to establish compliance with the specified requirements; testing shall be performed at the specified frequency. The Agency may specify the time and location of the tests. Copies of test results shall be furnished to the Agency within 24 hours of completion of the tests. Certified copies of test results shall be submitted not less than 15 days after completion of initial test requests.

1.5.1 Sampling

Samples for laboratory testing shall be taken in conformance with ASTM D75/D75M. When deemed necessary, the sampling will be observed by the Agency. Contractor shall collect enough samples so that the Agency can perform assurance testing if it chooses to.

1.5.2 Tests

The following tests shall be performed in conformance with the applicable standards listed.

1.5.2.1 Sieve Analysis

Sieve analysis shall be made in conformance with ASTM C117 and ASTM C136. Sieves shall conform to ASTM E11.

1.5.2.2 Field Density Tests

Determine the in-place density in accordance with ASTM D6938.

1.5.2.3 Wear Test

Wear tests shall be made on ABC coarse material in conformance with ASTM C131.

1.5.3 Testing Frequency

1.5.3.1 Initial Tests

One of each of the following tests shall be performed on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

- a. Sieve Analysis.
- b. Moisture-density relationship.
- c. Wear.

1.5.3.2 In Place Tests

Each of the following tests shall be performed on samples taken from the placed and compacted ABC. Samples shall be taken and tested at the rates indicated.

- a. Density tests shall be performed on every lift of material placed and at a frequency of one tests for every 500 square yards, or portion thereof, of completed area.
- b. Sieve Analysis shall be performed on every lift of material placed and at a frequency of one sieve analysis for every 500 square yards, or portion thereof, of material placed.
- c. The total thickness of the base course shall be measured at intervals in such a manner as to ensure one measurement for each 500 square yards of base course, or portion thereof, of completed area. Measurements shall be made in 3 inch diameter test holes penetrating the base course. At least one test per completed area shall be performed.
- d. One laboratory moisture-density relationship per every 4 field density tests shall be performed of completed area.

1.5.4 Approval of Material

The source of the material shall be selected 30 days prior to the time the material will be required in the work. Tentative approval of material will be based on initial test results. Final approval of the materials will be based on sieve analysis, liquid limit, and plasticity index tests performed on samples taken from the completed and fully compacted course(s). The source of material compliance test data shall also be submitted.

1.6 WEATHER LIMITATIONS

Construction shall be done when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

1.7 PLANT, EQUIPMENT, AND TOOLS

All plant, equipment, and tools used in the performance of the work shall be subject to review before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 2 PRODUCTS

2.1 AGGREGATES

The aggregate base course (ABC) shall consist of clean, sound, durable particles of crushed stone, crushed gravel, angular sand, or other approved material. ABC shall be free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve shall be known as coarse aggregate; that portion passing the No. 4 sieve shall be known as fine aggregate.

2.1.1 Coarse Aggregate

Only one source of coarse aggregate shall be used on the project. Coarse aggregates shall be angular particles of uniform density. When the coarse aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements and shall be stockpiled separately.

a. Crushed Gravel: Crushed gravel shall be manufactured by crushing gravels, and shall meet all the requirements specified below.

b. Crushed Stone: Crushed stone shall consist of freshly mined quarry rock, and shall meet all the requirements specified below.

2.1.1.1 Aggregate Base Course

ABC coarse aggregate shall not show more than 50 percent loss when subjected to the Los Angeles abrasion test in accordance with ASTM C131. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, the crushed aggregates shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest mid sectional area of the piece. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces. Crushed gravel shall be manufactured from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve listed in TABLE 1.

2.1.2 Fine Aggregate

Fine aggregates shall be angular particles of uniform density. When the fine aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements.

2.1.2.1 Aggregate Base Course

ABC fine aggregate shall consist of screenings, angular sand, or other finely divided mineral matter processed or naturally combined with the

coarse aggregate.

2.1.3 Gradation Requirements

The specified gradation requirements shall apply to the completed base course. The aggregates shall be continuously well graded within the limits specified in TABLE 1. Sieves shall conform to ASTM E11.

TABLE I. GRADATION OF AGGREGATES

Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	Operating Range	Contract Compliance
1 inch	100	100
3/4 inch	90-100	87-100
No. 4	35-60	30-65
No. 30	10-30	5-35
No. 200	2-9	0-12

NOTE 1: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, they shall be tested in accordance with ASTM C127 and ASTM C128 to determine their specific gravities. If the specific gravities vary by more than 10 percent, the percentages passing the various sieves shall be corrected as directed by the Agency.

NOTE 2: The Contract compliance range consists of the material gradation tested after placement and including any deviation resulting from crushed particle occurring as the result of compaction.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC is constructed in more than one layer, the previously constructed layer shall be cleaned of loose and foreign matter. Adequate drainage shall be provided during the entire period of construction to prevent water from collecting or standing on the working area. Line and grade stakes shall be provided as necessary for control.

3.2 OPERATION OF AGGREGATE SOURCES

The aggregate sources shall be operated to produce the quantity and quality of materials meeting these specifications requirements in the specified time limit. Aggregate shall be from commercial sources.

3.3 STOCKPILING MATERIAL

Aggregates shall be stockpiled on the cleared and leveled areas designated by the Agency to prevent segregation. Materials obtained from different sources shall be stockpiled separately. Stockpiling of cement treated aggregate shall not be allowed.

3.4 PREPARATION OF UNDERLYING COURSE

Prior to constructing the base course, the underlying course or subgrade

shall be cleaned of all foreign substances. At the time of construction of the base course(s), the underlying course shall contain no frozen material. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances. The underlying course shall conform to Section 31 00 00 EARTHWORK. Ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses containing sands or gravels, as defined in ASTM D2487, the surface shall be stabilized prior to placement of the base course(s). Stabilization shall be accomplished by mixing ABC into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the base course is placed.

3.5 INSTALLATION

3.5.1 Mixing the Materials

The coarse and fine aggregates shall be mixed in a stationary plant at source. The Contractor shall make adjustments in placement methods or in equipment as directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory base course meeting all requirements of this specification.

3.5.2 Placing

The mixed material shall be placed on the prepared subgrade in layers of uniform thickness with an approved spreader. When a compacted layer 6 inches or less in thickness is required, the material shall be placed in a single layer. When a compacted layer in excess of 6 inches is required, the material shall be placed in layers of equal thickness. No layer shall be thicker than 6 inches or thinner than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to insure an acceptable base course.

3.5.3 Grade Control

The finished and completed base course shall conform to the lines, grades, and cross sections shown. Underlying material(s) shall be excavated and prepared at sufficient depth for the required base course thickness so that the finished base course and the subsequent surface course will meet the designated grades.

3.5.4 Compaction

Each layer of the base course shall be compacted with a minimum of 4 passes with approved compaction equipment. Water content shall be maintained during the compaction procedure to within plus or minus 2 percent of the optimum water content determined from laboratory tests as specified in

paragraph SAMPLING AND TESTING. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Compaction shall continue until each layer has a degree of compaction that is at least 95 percent of laboratory maximum density through the full depth of the layer in accordance with ASTM D1557. The Contractor shall make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory base course. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification.

3.5.5 Thickness

Compacted thickness of the base course shall be as indicated. No individual layer shall be thicker than 6 inches nor be thinner than 3 inches in compacted thickness. The total compacted thickness of the base course(s) shall be within 1/2 inch of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements plus 1/2 inches. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 1/4 inch of the thickness indicated. The total thickness of the base course shall be measured at intervals in such a manner as to ensure one measurement for each 160 square yards of base course. Measurements shall be made in 3 inch diameter test holes penetrating the base course.

3.5.6 Cement Treated Base Course

The placement and spreading of cement shall be in accordance with Section 27-1.06 of CALTRANS resulting in a maximum compacted thickness of 6 inches and minimum compacted thickness of 3 inches. Compaction of the cement treated base course shall be in accordance with Section 27-1.07 of CALTRANS except the finish surface shall meet the requirements of paragraph "Finishing" and "Smoothness" of this specification. Curing shall be in accordance with Section 27-1.10 of CALTRANS.

3.5.7 Finishing

The surface of the top layer of base course shall be finished after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. Thin layers of material shall not be added to the top layer of base course to meet grade. If the elevation of the top layer of base course is 1/2 inch or more below grade, then the top layer shall be scarified to a depth of at least 3 inches and new material shall be blended in and compacted to bring to grade. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable base course. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, the unsatisfactory portion shall be scarified, reworked and recompacted or it shall be replaced as directed.

3.5.8 Smoothness

The surface of the top layer shall show no deviations in excess of 3/8 inch when tested with a 12 foot straightedge. Measurements shall be taken in successive positions parallel to the centerline of the area to be paved. Measurements shall also be taken perpendicular to the centerline at 20 foot intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.6 TRAFFIC

Completed portions of the base course may be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Heavy equipment shall not be permitted except when necessary to construction, and then the area shall be protected against marring or damage to the completed work.

3.7 MAINTENANCE

The base course shall be maintained in a satisfactory condition until the full pavement section is completed and accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any base course that is not paved over prior to the onset of winter, shall be retested to verify that it still complies with the requirements of this specification. Any area of base course that is damaged shall be reworked or replaced as necessary to comply with this specification.

3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

Any unsuitable materials that must be removed shall be disposed of as directed. No additional payments will be made for materials that must be replaced.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 17 24.00 10

PAVEMENT MARKINGS

04/08

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SYSTEM DESCRIPTION
 - 1.2.1 Paint Application Equipment
 - 1.2.2 Reflective Media Dispenser
 - 1.2.3 Surface Preparation Equipment
 - 1.2.3.1 Sandblasting Equipment
 - 1.2.3.2 Waterblast Equipment
 - 1.2.4 Shotblasting Equipment
 - 1.2.5 Chemical Equipment
- 1.3 SUBMITTALS
- 1.4 QUALITY ASSURANCE
 - 1.4.1 Qualifications
 - 1.4.2 Traffic Controls
 - 1.4.3 Maintenance of Traffic
 - 1.4.3.1 Roads, Streets, and Parking Areas
- 1.5 DELIVERY, STORAGE, AND HANDLING
- 1.6 ENVIRONMENTAL REQUIREMENTS

PART 2 PRODUCTS

- 2.1 RAISED REFLECTIVE MARKERS
- 2.2 REFLECTIVE MEDIA
- 2.3 SAMPLING AND TESTING

PART 3 EXECUTION

- 3.1 SURFACE PREPARATION
 - 3.1.1 Pretreatment for Early Painting
 - 3.1.2 Cleaning Existing Pavement Markings
- 3.2 APPLICATION
 - 3.2.1 Raised Reflective Markers
 - 3.2.2 Reflective Media
- 3.3 MARKING REMOVAL
 - 3.3.1 Equipment Operation
 - 3.3.2 Cleanup and Waste Disposal

-- End of Section Table of Contents --

SECTION 32 17 24.00 10

PAVEMENT MARKINGS
04/08

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO M 247 (2011) Standard Specification for Glass
Beads Used in Pavement Markings

CALIFORNIA DEPARTMENT OF TRANSPORTATION

COUNTY OF YOLO

Yolo County Section 4-32 (2018) Yolo County Improvement Standards,
Section 4-32 Pavement Striping and Markings

1.2 SYSTEM DESCRIPTION

All machines, tools and equipment used in the performance of the work shall be maintained in satisfactory operating condition. Equipment operating on roads and runways shall display low speed traffic markings and traffic warning lights.

1.2.1 Paint Application Equipment

1.2.2 Reflective Media Dispenser

The dispenser for applying the reflective media shall be attached to the paint dispenser and shall operate automatically and simultaneously with the applicator through the same control mechanism. The dispenser shall be capable of adjustment and designed to provide uniform flow of reflective media over the full length and width of the stripe at the rate of coverage specified in paragraph 3.2 APPLICATION, at all operating speeds of the applicator to which it is attached.

1.2.3 Surface Preparation Equipment

1.2.3.1 Sandblasting Equipment

Sandblasting equipment shall include an air compressor, hoses, and nozzles of proper size and capacity as required for cleaning surfaces to be painted. The compressor shall be capable of furnishing not less than 150 cfm of air at a pressure of not less than 90 psi at each nozzle used, and shall be equipped with traps that will maintain the compressed air free of oil and water.

1.2.3.2 Waterblast Equipment

The water pressure shall be specified at 2600 psi at 140 degrees F in order to adequately clean the surfaces to be marked.

1.2.4 Shotblasting Equipment

Shotblasting equipment shall be capable of producing an adjustable depth of removal of marking and pavement. Each unit shall be self-cleaning and self-contained, shall be able to confine dust and debris from the operation, and shall be capable of recycling the abrasive for reuse.

1.2.5 Chemical Equipment

Chemical equipment shall be capable of application and removal of chemicals from the pavement surface, and shall leave only non-toxic biodegradable residue.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment

Lists of proposed equipment, including descriptive data, and notifications of proposed Contractor actions as specified in this section. List of removal equipment shall include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation.

Composition Requirements

Manufacturer's current printed product description and Material Safety Data Sheets (MSDS) for each type paint/color proposed for use.

Qualifications

Documentation on personnel qualifications, as specified.

SD-06 Test Reports

Sampling and Testing

Certified copies of the test reports, prior to the use of the materials at the jobsite. Testing shall be performed in an approved independent laboratory.

SD-07 Certificates

Volatile Organic Compound (VOC)

Certificate stating that the proposed pavement marking paint meets the VOC regulations of the local Air Pollution Control District having jurisdiction over the geographical area in which

the project is located.

1.4 QUALITY ASSURANCE

1.4.1 Qualifications

Submit documentation certifying that pertinent personnel are qualified for equipment operation and handling of chemicals.

1.4.2 Traffic Controls

Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly painted lines or freshly placed raised markers to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Painting equipment shall be marked with large warning signs indicating slow-moving painting equipment in operation.

1.4.3 Maintenance of Traffic

1.4.3.1 Roads, Streets, and Parking Areas

When traffic must be rerouted or controlled to accomplish the work, the necessary warning signs, flagpersons, and related equipment for the safe passage of vehicles shall be provided.

1.5 DELIVERY, STORAGE, AND HANDLING

All materials shall be delivered and stored in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's name, and directions, all of which shall be plainly legible at time of use.

1.6 ENVIRONMENTAL REQUIREMENTS

Pavement surface shall be free of snow, ice, or slush. Surface temperature shall be at least 50 degrees F and rising at the beginning of operations, except those involving shot or sand blasting. Operation shall cease during thunderstorms. Operation shall cease during rainfall, except for waterblasting and removal of previously applied chemicals. Waterblasting shall cease where surface water accumulation alters the effectiveness of material removal.

PART 2 PRODUCTS

2.1 RAISED REFLECTIVE MARKERS

Either metallic or nonmetallic markers of the button or prismatic reflector type may be used. Markers shall be of permanent colors, as specified for pavement marking, and shall retain the color and brightness under the action of traffic. Button markers shall have a diameter of not less than 4 inches, and shall be spaced not more than 40 feet apart on solid longitudinal lines. Broken centerline marker spacings shall be in segments indicated with gaps indicated between segments. Markers shall have rounded surfaces presenting a smooth contour to traffic and shall not project more than 3/4 inch above level of pavement. Pavement markers and adhesive epoxy shall conform to ASTM D4280.

2.2 REFLECTIVE MEDIA

Reflective media for roads and streets shall conform to AASHTO M 247, Type I or Yolo County Section 4-32.

2.3 SAMPLING AND TESTING

Materials proposed for use shall be stored on the project site in sealed and labeled containers, or segregated at source of supply, sufficiently in advance of needs to allow 60 days for testing. Upon notification by the Contractor that the material is at the site or source of supply, a sample shall be taken by random selection from sealed containers in the presence of the Agency. Samples shall be clearly identified by designated name, specification number, batch number, manufacturer's formulation number, project contract number, intended use, and quantity involved. Testing shall be performed in an approved independent laboratory. If materials are approved based on reports furnished by the Contractor, samples will be retained by the Agency for possible future testing should the material appear defective during or after application.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Thoroughly clean surfaces to be marked before application of the pavement marking material. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion as directed. Areas of old pavement affected with oil or grease shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil-soaked areas shall be sealed with cut shellac to prevent bleeding through the new paint. Pavement surfaces shall be allowed to dry, when water is used for cleaning, prior to striping or marking. Surfaces shall be re-cleaned, when work has been stopped due to rain.

3.1.1 Pretreatment for Early Painting

Where early painting is required on rigid pavements, apply a pretreatment with an aqueous solution, containing 3 percent phosphoric acid and 2 percent zinc chloride, to prepared pavement areas prior to painting.

3.1.2 Cleaning Existing Pavement Markings

In general, markings shall not be placed over existing pavement marking patterns. Remove existing pavement markings, which are in good condition but interfere or conflict with the newly applied marking patterns. Deteriorated or obscured markings that are not misleading or confusing or interfere with the adhesion of the new marking material do not require removal. New preformed and thermoplastic pavement markings shall not be applied over existing preformed or thermoplastic markings. Whenever grinding, scraping, sandblasting or other operations are performed the work must be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. When these operations are completed the pavement surface shall be blown off with compressed air to remove residue and debris resulting from the cleaning

work.

3.2 APPLICATION

All pavement markings and patterns shall be placed as shown on the plans.

3.2.1 Raised Reflective Markers

Prefabricated markers shall be aligned carefully at the required spacing and permanently fixed in place by means of epoxy resin adhesives. To insure good bond, pavement in areas where markers will be set shall be thoroughly cleaned by sandblasting and use of compressed air prior to applying adhesive.

3.2.2 Reflective Media

Application of reflective media shall immediately follow application of pigmented binder. Drop-on application of glass spheres shall be accomplished to insure that reflective media is evenly distributed at the specified rate of coverage. Should there be malfunction of either paint applicator or reflective media dispenser, operations shall be discontinued immediately until deficiency is corrected.

3.3 MARKING REMOVAL

Pavement marking, shall be removed in the areas shown on the drawings. Removal of marking shall be as complete as possible without damage to the surface. Aggregate shall not be exposed by the removal process. After the markings are removed, the cleaned pavement surfaces shall exhibit adequate texture for remarking as specified in paragraph 3.1 SURFACE PREPARATION. Demonstrate removal of pavement marking in an area designated by the Agency. The demonstration area will become the standard for the remainder of the work.

3.3.1 Equipment Operation

Equipment shall be controlled and operated to remove markings from the pavement surface, prevent dilution or removal of binder from underlying pavement, and prevent emission of blue smoke from asphalt or tar surfaces.

3.3.2 Cleanup and Waste Disposal

The worksite shall be kept clean of debris and waste from the removal operations. Cleanup shall immediately follow removal operations in areas subject to air traffic. Debris shall be disposed of at approved sites.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 92 19

EROSION CONTROL SEEDING

PART 1 GENERAL

- 1.1 SCOPE
- 1.2 QUALITY ASSURANCE
- 1.3 SUBMITTALS

PART 2 PRODUCTS

- 2.1 MATERIALS
 - 2.1.1 Seed
 - 2.1.1.1 Seed Species and Planting Rates
 - 2.1.2 Fertilizer
 - 2.1.3 Fiber Mulch
 - 2.1.4 Straw Mulch
 - 2.1.5 Water
 - 2.1.6 Stabilizing Emulsion (Tackifier)

PART 3 EXECUTION

- 3.1 PREPARATION
 - 3.1.1 General
 - 3.1.2 Debris Removal
 - 3.1.3 Surface Preparation
- 3.2 METHOD OF SEEDING
 - 3.2.1 Hydroseeding
- 3.3 ESTABLISHMENT
 - 3.3.1 Period
 - 3.3.2 Protection
- 3.4 REPAIR
 - 3.4.1 General
 - 3.4.2 Reseeding
 - 3.4.3 Replacement of Straw Mulch, Fiber, and Tackifier
- 3.5 FIELD QUALITY CONTROL

-- End of Section Table of Contents --

SECTION 32 92 19

EROSION CONTROL SEEDING

PART 1 GENERAL

1.1 SCOPE

Perform erosion control seeding on all disturbed areas, and restored access and haul roads and staging areas as specified herein, as shown on the Plans, or as otherwise directed by the Agency.

1.2 QUALITY ASSURANCE

There shall be no substitutions of seed species or variety as shown in seed mix tables unless authorized by the Agency.

Seed materials, including the seed mix, fertilizer, and mulch, shall be delivered by the Contractor to the job site with durable, waterproof labels indicating the correct species, variety, percent live seed (PLS) and other certifications, and the supplier's name, in conformance to these Specifications. The Agency will observe the seed mix, fertilizer, and mulch material as it is being delivered to the site for conformity to these Specifications. Such reviews shall not impair the right of additional observations during further progress of the work.

The Contractor shall be responsible for storing and maintaining the seed mix, fertilizer, and mulch as delivered throughout the Construction Period.

1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41 SUBMITTAL PROCEDURES

SD-04 Samples

SEED MATERIALS

The Agency may at any time request, test, and analyze seed materials including the seed mix, fertilizer, or mulch to ensure their conformance to these Specifications. The Contractor shall furnish, at no additional cost, the requested materials for the Agency's use. Seed materials not meeting the Agency's approval shall immediately be removed from the project site at the Contractor's expense. The Contractor shall incur any additional expenses required because of materials not meeting the requirements of these Specifications. The following shall be submitted by the Contractor according to submittal procedures included in the Contract. The Contractor shall furnish, at no additional cost, the requested materials for the Agency's review.

1. Seed mix verification by way of certified mix labels from supplier in sealed seed mix bags. In addition, the Contractor shall submit a 5 pound bag of the seed mix for review before any seeding operations.
2. Before delivery of the straw and fertilizer material to the

project site, the Contractor shall provide the material order and the name, address and telephone number of the material supplier. In addition, the Contractor shall submit mulch and fertilizer material samples in 5 pound bags, each, for review before any seeding operations.

SD-07 Certificates

Invoices

Duplicate copies of invoices for all materials. Invoices for fertilizer shall show the grade furnished.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Seed

2.1.1.1 Seed Species and Planting Rates

The following native grass seeds shall be applied at the following Pure rates.

Botanical Name	<u>Common Name</u>	Qty
Achillea millefolium	Yarrow	5 lbs/acre
Bromus carinatus	California brome	5 lbs/acre
Eschscholzia californica	California poppy	5 lbs/acre
Horduem brachyantherum	California barely	10 lbs/acre
Elymus (Leymus) triticoides	Creeping wildrye	20 lbs/acre
Stipa (Nassella) cernua	Nodding Needlegrass	10 lbs/acre
Stipa (Nassella) pulchra	Purple needlegrass	10 lbs/acre
Trifolium wildenovii	Tomcat clover	10 lbs/acre
Vulpia microstachys	Three week fescue	10 lbs/acre

2.1.2 Fertilizer

Fertilizer shall be liquid, of the concentrations indicated below:

<u>Item</u>	<u>Ratio</u>
Nitrogen (nitrate)	8
Phosphorus (Ammonium Polyphosphate)	24
Potassium (Potassium Sulfate)	3
Zinc (Zinc Sulfate)	0.25
Sulfur (Ammonium Thiosulfate)	2.5

Fertilizer shall be delivered in containers labeled in accordance with applicable State regulations and bearing the warranty of the producer for the grade furnished.

2.1.3 Fiber Mulch

Fiber mulch shall be dyed wood cellulose fiber specially prepared for hydroseeding.

2.1.4 Straw Mulch

Straw mulch shall be derived from rice, seedless wheat or native grass hay. The Contractor shall furnish evidence that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw obtained from outside the county in which it is to be used is delivered to the site of the work. Straw that has been used for stable bedding shall not be used. Straw shall be free of mold. Straw shall be cured and dry with no water added after baling.

2.1.5 Water

Water shall be furnished by the Contractor, in conformance with these Specifications, and shall be free of chemicals detrimental to the seed mixture.

2.1.6 Stabilizing Emulsion (Tackifier)

Stabilizing emulsion shall be in a dry powder form, may be re-emulsifiable and shall be a processed organic derivative of *Plantago insularis* used as a soil binder.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

The Contractor shall be responsible for coordinating all site preparation and seeding operations with seasonal water levels.

3.1.2 Debris Removal

Prior to ground surface preparation operations, Contractor shall remove and dispose of all wire, rubbish, stones, and other material that might hinder proper grading and subsequent maintenance.

3.1.3 Surface Preparation

Slopes shall be prepared consistent with 31 00 00 EARTHWORK, section 3.4.5 "Topsoil" prior to application of seeding. When conditions are such, by reason of excessive moisture or other factors, that satisfactory results are not likely to be obtained, the work shall be stopped and shall be resumed only when directed by the Agency.

3.2 METHOD OF SEEDING

3.2.1 Hydroseeding

The seed and fertilizer shall be mixed with cellulose fiber and water to form a slurry. Mix the slurry in tanks having continuous agitation so that a homogeneous mixture is discharged hydraulically through hoses on the area to be seeded.

a. Apply seed, fertilizer, and mulch in suspension at the following rates:

Seed - At rates specified in the Seed Mix Tables

Fertilizer - 150 pounds per acre

Fiber Mulch - 500 pounds per acre

b. Following the application of seed mix, straw mulch shall be pneumatically applied to the area seeded, at a rate of 3,000 pounds per acre.

c. Following the application of straw mulch, a stabilizing emulsion and fiber mulch mixture shall be hydraulically applied to the area strawed, at the following rates:

Stabilizing emulsion - 100 pounds per acre

Fiber Mulch - 1,000 pounds per acre

3.3 ESTABLISHMENT

3.3.1 Period

The Contractor shall be responsible for the proper care of the seeded areas until May 1 of the year following the seeding, or until the desired stand of vegetation is established. The desired stand of vegetation is defined as a minimum of 85 percent coverage of the area seeded. The need for repairing and reseeding (as described herein) within the establishment period shall be as determined by the Agency.

3.3.2 Protection

Protect areas susceptible to vehicular or heavy foot traffic by erecting suitable barricades immediately after seeding is completed and/or by placing warning signs of a type reviewed by the Agency.

3.4 REPAIR

3.4.1 General

When any portion of the ground surface becomes rilled, gullied or otherwise

damaged following seeding within the period of Contractor's responsibility, repair the affected portion to re-establish the condition and grade of the soil prior to planting and then reseed as specified for initial planting, all at no cost to the Agency.

3.4.2 Reseeding

When it becomes evident that the seeding has been unsuccessful, the Agency will require that these areas be reseeded with the same seed and quantity as specified for the initial seeding. Complete reseeded within fifteen (15) days following notification. Prepare the area to be reseeded as directed by the Agency. Reseeding due to damaged or deficient seed material or improper application will be completed at no additional cost to the Agency.

3.4.3 Replacement of Straw Mulch, Fiber, and Tackifier

Slopes of 3:1 or steeper where erosion has occurred, or where straw mulch has blown or washed away within the period of Contractor's responsibility shall have straw, fiber, and tackifier reapplied at the rate and method described in Sections 3.3.1 at no additional cost to the Agency.

3.5 FIELD QUALITY CONTROL

During the course of work or upon completion of the Project, a check of the quantities of materials will be made against the areas treated, and if the minimum rates of application have not been met, the Agency will require the distribution of additional quantities of those materials to make up the minimum applications specified.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 33 - UTILITIES

SECTION 33 40 00

STORM DRAIN UTILITIES

02/10

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY, STORAGE, AND HANDLING
 - 1.3.1 Delivery and Storage
 - 1.3.2 Handling

PART 2 PRODUCTS

- 2.1 PIPE FOR CULVERTS AND STORM DRAINS
 - 2.1.1 Reinforced Concrete Pipe
 - 2.1.2 Corrugated Metal Pipe
- 2.2 DRAINAGE STRUCTURES
 - 2.2.1 Flared End Sections
 - 2.2.2 Precast Reinforced Concrete Box
- 2.3 MISCELLANEOUS MATERIALS
 - 2.3.1 Concrete
 - 2.3.2 Mortar
 - 2.3.3 Precast Concrete Segmental Blocks
 - 2.3.4 Brick
 - 2.3.5 Precast Reinforced Concrete Manholes
 - 2.3.6 Prefabricated Corrugated Metal Manholes
 - 2.3.7 Frame and Cover for Gratings
 - 2.3.8 Joints
 - 2.3.8.1 Flexible Watertight Joints
 - 2.3.8.2 External Sealing Bands
 - 2.3.8.3 Flexible Watertight, Gasketed Joints
- 2.4 RESILIENT CONNECTORS
- 2.5 HYDROSTATIC TEST ON WATERTIGHT JOINTS
 - 2.5.1 Concrete Pipe

PART 3 EXECUTION

- 3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES
 - 3.1.1 Trenching
 - 3.1.2 Removal of Rock
 - 3.1.3 Removal of Unstable Material
- 3.2 BEDDING
 - 3.2.1 Concrete Pipe Requirements
- 3.3 PLACING PIPE
 - 3.3.1 Reinforced Concrete Pipe
- 3.4 JOINTING
 - 3.4.1 Concrete Pipe
 - 3.4.1.1 Flexible Watertight Joints
 - 3.4.1.2 External Sealing Band Joint for Noncircular Pipe

- 3.5 DRAINAGE STRUCTURES
 - 3.5.1 Manholes and Inlets
 - 3.5.2 Walls and Headwalls
- 3.6 BACKFILLING
 - 3.6.1 Backfilling Pipe in Trenches
 - 3.6.2 Backfilling Pipe in Fill Sections
 - 3.6.3 Movement of Construction Machinery
 - 3.6.4 Compaction
 - 3.6.4.1 General Requirements
 - 3.6.4.2 Minimum Density
 - 3.6.5 Determination of Density
- 3.7 PIPELINE TESTING
 - 3.7.1 Leakage Tests
 - 3.7.2 Deflection Testing
 - 3.7.3 Post-Installation Inspection

-- End of Section Table of Contents --

SECTION 33 40 00
STORM DRAIN UTILITIES
02/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO M 198 (2010) Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

ASTM INTERNATIONAL (ASTM)

ASTM A48/A48M (2003; R 2012) Standard Specification for Gray Iron Castings

ASTM C32 (2013) Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)

ASTM C443 (2011) Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

ASTM C76 (2013a) Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

ASTM A929/A929M (2001; R 2013) Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe

ASTM B26/B26M (2012) Standard Specification for Aluminum-Alloy Sand Castings

ASTM C1103 (2003; R 2009) Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines

ASTM C139 (2011) Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes

ASTM C1433 (2013) Standard Specification for Precast Reinforced Concrete Box Sections for

Culverts, Storm Drains, and Sewers

ASTM C32	(2013) Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C443	(2011) Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C478	(2013) Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C55	(2011) Concrete Brick
ASTM C62	(2013) Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C76	(2013a) Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C877	(2008) External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
ASTM C923	(2008; R 2013) Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM C231/C231M	(2010) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM D6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

1.2 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00.00 41
SUBMITTAL PROCEDURES:

SD-03 Product Data

Placing Pipe

SD-04 Samples

Pipe for Culverts and Storm Drains

SD-07 Certificates

Resin Certification
Pipeline Testing
Hydrostatic Test on Watertight Joints
Determination of Density
Frame and Cover for Gratings

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. Keep a copy of the manufacturer's instructions available at the construction site at all times and follow these instructions unless directed otherwise by the Engineer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Reinforced Concrete Pipe

Manufactured in accordance with and conforming to ASTM C76, and shall be minimum Class III. Fittings shall conform to the same specification as that used for the pipe and shall be designed as specified for the pipe. Cement used in the manufacture of the pipe and fittings shall be Type V conforming to ASTM C150/C150M.

a. Joints and Jointing Materials

Joints shall be in accordance with the pipe manufacturer's recommendations and meet the requirements of ASTM C443.

2.1.2 Corrugated Metal Pipe

Corrugated Metal Pipe shall be 16 gauge minimum corrugated steel and meet requirements of ASTM A929/A929M, able to be constructed with splice collars and flared end sections.

2.2 DRAINAGE STRUCTURES

2.2.1 Flared End Sections

Sections shall be of a standard design fabricated from zinc coated steel sheets meeting requirements of ASTM A929/A929M or shall be of standard design reinforced concrete pipe meeting requirements of AASHTO M 198, ASTM C76, and ASTM C443 as shown on the plans.

2.2.2 Precast Reinforced Concrete Box

Manufactured in accordance with and conforming to ASTM C1433.

2.3 MISCELLANEOUS MATERIALS

2.3.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 5,000 psi concrete under Section 03 30 00.00 10 CAST-IN-PLACE CONCRETE . The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C231/C231M. The concrete covering over steel reinforcing shall not be less than 1 inch thick for covers and not less than 1-1/2 inches thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Expansion-joint filler material shall conform to ASTM D1751, or ASTM D1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D1752.

2.3.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar but in no case shall exceed 0.5 gallons of water per sack of cement. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.3.3 Precast Concrete Segmental Blocks

Precast concrete segmental block shall conform to ASTM C139, not more than 8 inches thick, not less than 8 inches long, and of such shape that joints can be sealed effectively and bonded with cement mortar.

2.3.4 Brick

Brick shall conform to ASTM C62, Grade SW; ASTM C55, Grade S-I or S-II; or ASTM C32, Grade MS. Mortar for jointing and plastering shall consist of one part portland cement and two parts fine sand. Lime may be added to the mortar in a quantity not more than 25 percent of the volume of cement. The joints shall be filled completely and shall be smooth and free from surplus mortar on the inside of the structure. Brick structures shall be plastered with 1/2 inch of mortar over the entire outside surface of the walls. For

square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course. For round structures, brick shall be laid radially with every sixth course a stretcher course.

2.3.5 Precast Reinforced Concrete Manholes

Conform to ASTM C478. Joints between precast concrete risers and tops shall be made with flexible watertight, rubber-type gaskets meeting the requirements of paragraph JOINTS.

2.3.6 Prefabricated Corrugated Metal Manholes

Manholes shall be of the type and design recommended by the manufacturer. Manholes shall be complete with frames and cover, or frames and gratings.

2.3.7 Frame and Cover for Gratings

Submit certification on the ability of frame and cover or gratings to carry the imposed live load. Frame and cover for gratings shall be cast gray iron, ASTM A48/A48M, Class 35B; cast ductile iron, ASTM A536, Grade 65-45-12; or cast aluminum, ASTM B26/B26M, Alloy 356.OT6. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans. The word "Storm Sewer" shall be stamped or cast into covers so that it is plainly visible.

2.3.8 Joints

2.3.8.1 Flexible Watertight Joints

- a. Materials: Flexible watertight joints shall be made with plastic or rubber-type gaskets for concrete pipe and with factory-fabricated resilient materials for clay pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C443. Factory-fabricated resilient joint materials shall conform to ASTM C425. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber-type gasket are permitted if the nominal diameter of the pipe being gasketed exceeds 54 inches.
- b. Test Requirements: Watertight joints shall be tested and shall meet test requirements of paragraph HYDROSTATIC TEST ON WATERTIGHT JOINTS. Rubber gaskets shall comply with the oil resistant gasket requirements of ASTM C443. Certified copies of test results shall be delivered to the Engineer before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished, if specifically approved.

2.3.8.2 External Sealing Bands

Requirements for external sealing bands shall conform to ASTM C877.

2.3.8.3 Flexible Watertight, Gasketed Joints

- a. Gaskets: When infiltration or exfiltration is a concern for pipe lines, the couplings may be required to have gaskets. The closed-cell expanded rubber gaskets shall be a continuous band approximately 7 inches wide and approximately 3/8 inch thick, meeting the requirements of ASTM D1056, Type 2 B3, and shall have a quality retention rating of not less than 70 percent when tested for weather resistance by ozone

chamber exposure, Method B of ASTM D1171. Rubber O-ring gaskets shall be 13/16 inch in diameter for pipe diameters of 36 inches or smaller and 7/8 inch in diameter for larger pipe having 1/2 inch deep end corrugation. Rubber O-ring gaskets shall be 1-3/8 inches in diameter for pipe having 1 inch deep end corrugations. O-rings shall meet the requirements of AASHTO M 198 or ASTM C443. Flexible plastic gaskets shall conform to requirements of AASHTO M 198, Type B.

- b. Connecting Bands: Connecting bands shall be of the type, size and sheet thickness of band, and the size of angles, bolts, rods and lugs as indicated or where not indicated as specified in the applicable standards or specifications for the pipe. Exterior rivet heads in the longitudinal seam under the connecting band shall be countersunk or the rivets shall be omitted and the seam welded. Watertight joints shall be tested and shall meet the test requirements of paragraph HYDROSTATIC TEST ON WATERTIGHT JOINTS.

2.4 RESILIENT CONNECTORS

Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C923.

2.5 HYDROSTATIC TEST ON WATERTIGHT JOINTS

2.5.1 Concrete Pipe

A hydrostatic test shall be made on the watertight joint types as proposed. Only one sample joint of each type needs testing; however, if the sample joint fails because of faulty design or workmanship, an additional sample joint may be tested. During the test period, gaskets or other jointing material shall be protected from extreme temperatures which might adversely affect the performance of such materials. Performance requirements for joints in reinforced and nonreinforced concrete pipe shall conform to AASHTO M 198 or ASTM C443.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 31 00 00 EARTHWORK and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 18 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheet piling and bracing, where required, shall be placed within the trench width as specified, without any overexcavation. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures will be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Agency.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined in Section 31 00 00 EARTHWORK.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Engineer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor while performing shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Agency.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

3.2.1 Concrete Pipe Requirements

When no bedding class is specified or detailed on the drawings, concrete pipe shall be bedded in granular material minimum 4 inch in depth in trenches with soil foundation. Depth of granular bedding in trenches with rock foundation shall be 1/2 inch in depth per foot of depth of fill, minimum depth of bedding shall be 8 inch up to maximum depth of 24 inches. The middle third of the granular bedding shall be loosely placed. Bell holes and depressions for joints shall be removed and formed so entire barrel of pipe is uniformly supported. The bell hole and depressions for the joints shall be not more than the length, depth, and width required for properly making the particular type of joint.

3.3 PLACING PIPE

Submit printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Lifting lugs in vertically elongated metal pipe shall be placed in the same vertical plane as the major axis of the pipe. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary.

3.3.1 Reinforced Concrete Pipe

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.4 JOINTING

3.4.1 Concrete Pipe

3.4.1.1 Flexible Watertight Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements and in accordance with ASTM C443. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

3.4.1.2 External Sealing Band Joint for Noncircular Pipe

Surfaces to receive sealing bands shall be dry and clean. Bands shall be installed in accordance with manufacturer's recommendations.

3.5 DRAINAGE STRUCTURES

3.5.1 Manholes and Inlets

Construction shall be of reinforced concrete, plain concrete, brick, precast reinforced concrete, precast concrete segmental blocks, prefabricated corrugated metal, or bituminous coated corrugated metal; complete with frames and covers or gratings; and with fixed galvanized steel ladders where indicated. Pipe studs and junction chambers of prefabricated corrugated metal manholes shall be fully bituminous-coated and paved when the connecting branch lines are so treated. Pipe connections to concrete manholes and inlets shall be made with flexible, watertight connectors.

3.5.2 Walls and Headwalls

Construction shall be as indicated.

3.6 BACKFILLING

3.6.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of

pipe for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation equal to the midpoint (spring line) of RCP or has reached an elevation of at least 12 inches above the top of the pipe for flexible pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 6 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Engineer, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.6.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified below. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 12 inches. Use select granular material for this entire region of backfill for flexible pipe installations.

3.6.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.6.4 Compaction

3.6.4.1 General Requirements

Cohesionless materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, clays, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, cohesionless soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

3.6.4.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

- a. Under paved roads, streets, parking areas, and similar-use pavements including adjacent shoulder areas, the density shall be not less than

90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material, up to the elevation where requirements for pavement subgrade materials and compaction shall control.

- b. Under unpaved or turfed traffic areas, density shall not be less than 90 percent of maximum density for cohesive material and 95 percent of maximum density for cohesionless material.
- c. Under nontraffic areas, density shall be not less than that of the surrounding material.

3.6.5 Determination of Density

Testing is the responsibility of the Contractor and performed at no additional cost to the Agency. Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to reviewal. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D698 except that mechanical tampers may be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D2167 or ASTM D6938. When ASTM D6938 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in paragraph Calibration of the referenced publications. ASTM D6938 results in a wet unit weight of soil and ASTM D6938 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D6938. Test results shall be furnished the Engineer. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

3.7 PIPELINE TESTING

3.7.1 Leakage Tests

Lines shall be tested for leakage by low pressure air or water testing or exfiltration tests, as appropriate. Testing of individual joints for leakage by low pressure air or water shall conform to ASTM C1103. Prior to exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. Visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Engineer. An exfiltration test shall be made by filling the line to be tested with water so that a head of at least 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by the exfiltration test shall be zero (0). . When leakage exceeds zero, satisfactory correction shall be made and retesting accomplished.

3.7.2 Deflection Testing

No sooner than 30 days after completion of installation and final backfill, an initial post installation inspection shall be accomplished. Clean or flush all lines prior to inspection. Perform a deflection test on entire length of installed flexible pipeline on completion of work adjacent to and over the pipeline, including leakage tests, backfilling, placement of fill, grading, paving, concreting, and any other superimposed loads. Deflection of pipe in the installed pipeline under external loads shall not exceed limits in paragraph PLACING PIPE above as percent of the average inside diameter of pipe. Determine whether the allowable deflection has been exceeded by use of a laser profiler or mandrel.

- a. Laser Profiler Inspection: If deflection readings in excess of the allowable deflection of average inside diameter of pipe are obtained, remove pipe which has excessive deflection, and replace with new pipe. Initial post installation inspections of the pipe interior with laser profiling equipment shall utilize low barrel distortion video equipment for pipe sizes 48 inches or less. Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll static or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe. For initial post installation inspections for pipe sizes larger than 48 inches, visual inspection shall be completed of the pipe interior.
- b. Pull-Through Device Inspection: Pass the pull-through device through each run of pipe by pulling it by hand. If deflection readings in excess of the allowable deflection of average inside diameter of pipe are obtained, retest pipe by a run from the opposite direction. If retest continues to show excess allowable deflections of the average inside diameter of pipe, remove pipe which has excessive deflection, replace with new pipe, and completely retest in same manner and under same conditions. Pull-through device: The mandrel shall be rigid, nonadjustable having a minimum of 9 fins, including pulling rings at each end, engraved with the nominal pipe size and mandrel outside diameter. The mandrel shall be 5 percent less than the certified-actual pipe diameter for Plastic Pipe, 5 percent less than the certified-actual pipe diameter for Corrugated Steel and Aluminum Alloy, 3 percent less than the certified-actual pipe diameter for Concrete-Lined Corrugated Steel and Ductile Iron Culvert provided by manufacturer. When mandrels are utilized to verify deflection of flexible pipe products, the Agency will verify the mandrel OD through the use of proving rings that are manufactured with an opening that is certified to be as shown above.
- c. Deflection measuring device: Shall be approved by the Engineer prior to use.
- d. Warranty period test: Pipe found to have a deflection of greater than allowable deflection in paragraph PLACING PIPE above, just prior to end of one-year warranty period shall be replaced with new pipe and tested as specified for leakage and deflection. Inspect 100 percent of all pipe systems under the travel lanes, including curb and gutter. Random

inspections of the remaining pipe system outside of the travel lanes shall represent at least 10 percent of the total pipe footage of each pipe size. Inspections shall be made, depending on the pipe size, with video camera or visual observations. In addition, for flexible pipe installations, perform deflection testing on 100 percent of all pipes under the travel lanes, including curb and gutter, with either a laser profiler or 9-fin mandrel. For flexible pipe, random deflection inspections of the pipe system outside of the travel lanes shall represent at least 10 percent of the total pipe footage of each pipe size. When mandrels are utilized to verify deflection of flexible pipe products during the final post installation inspection, the Agency will verify the mandrel OD through the use of proving rings.

3.7.3 Post-Installation Inspection

One hundred percent of all reinforced concrete pipe installations shall be checked for joint separations, soil migration through the joint, cracks greater than 0.01 inches, settlement and alignment. One hundred percent of all flexible pipes (HDPE, PVC, CMP) shall be checked for rips, tears, joint separations, soil migration through the joint, cracks, localized bucking, bulges, settlement and alignment.

- a. Replace pipes having cracks greater than 0.1 inches in width or deflection greater than 5 percent deflection. An engineer shall evaluate all pipes with cracks greater than 0.01 inches but less than 0.10 inches to determine if any remediation or repair is required. RCP with crack width less than 0.10 inches and located in a non-corrosive environment (pH 5.5) are generally acceptable. Repair or replace any pipe with crack exhibiting displacement across the crack, exhibiting bulges, creases, tears, spalls, or delamination.
- b. Reports: The deflection results and final post installation inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design, grade, deviation from line, deflection and deformation of flexible pipe systems, inspector notes, condition of joints, condition of pipe wall (e.g. distress, cracking, wall damage dents, bulges, creases, tears, holes, etc.).

-- End of Section --

REFERENCES

**CALIFORNIA ENVIRONMENTAL QUALITY
ACT MITIGATION MONITORING AND
REPORTING PROGRAM**

**MITIGATION MONITORING AND REPORTING PROGRAM FOR THE
KNIGHTS LANDING FLOOD MANAGEMENT PROJECT, DRAINAGE INFRASTRUCTURE IMPROVEMENTS PROJECT**

BEST MANAGEMENT PRACTICES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
AIR QUALITY				
<p>AQ-1: Prior to and during construction, the project contractor would implement construction and dust control BMPs, in order to maintain the projects temporary construction and dust emissions within the District Rule 2.5 “Nuisance” guidelines. The following list of measures from the District’s handbook should be implemented as BMPs, where feasible:</p> <ul style="list-style-type: none"> • Water all active construction sites at least twice daily. Frequency should be based on the type of operation, soil, and wind exposure. • Haul trucks shall maintain at least 2 feet of freeboard. • Cover all trucks hauling dirt, sand, or loose materials. • Apply non-toxic tackifiers or soil binders (e.g. latex acrylic copolymer or tackifier hydroseed mix) to exposed areas after completing cut and fill operations. • Apply chemical soil stabilizers on inactive construction areas (e.g., disturbed lands within construction projects that are unused for at least four consecutive days). • Cover inactive storage piles. • Sweep streets if visible soil material is carried out from the construction site. • Treat accesses to a distance of 100 feet from the paved road with a 6-to-12-inch layer of wood chips or mulch. • Treat accesses to a distance of 100 feet from the paved road with a 6- inch layer of gravel. 	Prior to and During Construction	Contractor		
BIOLOGICAL RESOURCES				
<p>BIO-1: Contract specifications will include the following BMPs, where applicable, to reduce erosion and protect water quality during construction:</p> <ul style="list-style-type: none"> • Existing vegetation shall be protected in place, where feasible, to provide an effective form of erosion and sediment control; • Stabilizing materials shall be applied to the soil surface to prevent the movement of dust from exposed soil surfaces on construction sites as a result of wind, traffic, and grading activities; • Soil exposure shall be minimized through the use of temporary BMPs, groundcover, and stabilization measures; 	Prior to and During Construction	Contractor		

BEST MANAGEMENT PRACTICES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
<ul style="list-style-type: none"> The contractor shall conduct periodic maintenance of erosion- and sediment-control measures. Vehicle maintenance, staging and storing equipment, materials, fuels, lubricants, solvents, and other possible contaminants shall occur where water cannot flow into surface waters, or into sensitive habitats. Construction equipment shall not be operated in flowing water; if necessary, equipment buckets and arms may be used within flowing water. Raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life shall be prevented from contaminating soil or entering surface waters; Equipment used in and around surface waters shall be in good working order and free of dripping or leaking contaminants; and, Any surplus concrete rubble, asphalt, or other debris from construction shall be taken to an approved disposal site. 				
BIO-2: Prior to the start of construction activities, the project limits in proximity to sensitive natural habitats must be marked with high visibility Environmentally Sensitive Area (ESA) fencing or staking to ensure construction will not encroach into sensitive habitats. The project biologist will periodically inspect the ESA to ensure sensitive locations remain undisturbed.	Prior to and During Construction	Contractor		
BIO-3: Prior to arrival at the project site and prior to leaving the project site, construction equipment that may contain invasive plants and/or seeds must be cleaned to reduce the spreading of noxious weeds.	During Construction	Contractor		
BIO-4: All hydro seed and plant mixes shall consist of a biologist approved native seed mix.	During and Post Construction	Contractor		
BIO-5: The contractor must not use herbicides to control invasive, exotic plants or apply rodenticides during construction.	During Construction	Contractor		
BIO-6: To allow subterranean wildlife enough time to escape initial clearing and grubbing activities, equipment used during initial clearing and grubbing must be operated at speeds no greater than 3 miles	During Construction	Contractor		

BEST MANAGEMENT PRACTICES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
per hour.				
BIO-7: The contractor must dispose of all food-related trash in closed containers and must remove it from the project area each day during construction. Construction personnel must not feed or attract wildlife to the project area.	During Construction	Contractor		
HAZARDS AND HAZARDOUS MATERIALS				
HAZ-1: The project contractor shall prepare a Spill Prevention, Control, and Countermeasure Program (SPCCP) prior to the commencement of construction activities. The SPCCP shall include information on the nature of all hazardous materials that shall be used on-site. The SPCCP shall also include information regarding proper handling of hazardous materials, and clean-up procedures in the event of an accidental release. The phone number of the agency overseeing hazardous materials and toxic clean-up shall be provided in the SPCCP.	Prior to Construction	Contractor		
HYDROLOGY AND WATER QUALITY				
HYD-1: The project shall implement all erosion and sediment control BMPs and requirements of the Yolo County Stormwater Ordinance and Yolo County Improvements Standards, Section 11.	During Construction	Contractor		

MITIGATION MEASURES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
BIOLOGICAL RESOURCES				
<p>MM BIO-8: Implement Yolo HCP/NCCP General Construction and Operations and Maintenance Avoidance and Minimization Measures (AMMs):</p> <p><i>AMM3, Confine and Delineate Work Area.</i> Where natural communities and covered species habitat are present, workers will confine land clearing to the minimum area necessary to facilitate construction activities. Workers will restrict movement of heavy equipment to and from the project site to established roadways to minimize natural community and covered species habitat disturbance. The project proponent will clearly identify boundaries of work areas using temporary fencing or equivalent and will identify areas designated as environmentally sensitive. All construction vehicles, other equipment, and personnel will avoid these designated areas.</p> <p><i>AMM4, Cover Trenches and Holes during Construction and Maintenance.</i> To prevent injury and mortality of giant garter snake, western pond turtle, and California tiger salamander, workers will cover open trenches and holes associated with implementation of covered activities that affect habitat for these species or design the trenches and holes with escape ramps that can be used during non-working hours. The construction contractor will inspect open trenches and holes prior to filling and contact a qualified biologist to remove or release any trapped wildlife found in the trenches or holes.</p> <p><i>AMM5, Control Fugitive Dust.</i> Workers will minimize the spread of dust from work sites to natural communities or covered species habitats on adjacent lands.</p> <p><i>AMM6, Conduct Worker Training.</i> All construction personnel will participate in a worker environmental training program approved/authorized by the Conservancy and administered by a qualified biologist. The training will provide education regarding sensitive natural communities and covered species and their habitats, the need to avoid adverse effects, state and federal protection, and the legal implications of violating the FESA and NCCPA Permits. A pre-recorded video presentation by a qualified biologist shown to construction personnel may fulfill the training requirement.</p> <p><i>AMM7, Control Nighttime Lighting of Project Construction Sites.</i> Workers will direct all lights for nighttime lighting of project construction sites into the project construction area and minimize the lighting of natural habitat areas adjacent to the project construction area.</p> <p><i>AMM8, Avoid and Minimize Effects of Construction Staging Areas and Temporary Work Areas.</i> Project proponents should locate construction staging and other temporary work areas for covered activities in areas that</p>	During Construction	RD817 and Contractor		

MITIGATION MEASURES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
<p>will ultimately be a part of the permanent project development footprint. If construction staging and other temporary work areas must be located outside of permanent project footprints, they will be located either in areas that do not support habitat for covered species or are easily restored to prior or improved ecological functions (e.g., grassland and agricultural land).</p> <p>Construction staging and other temporary work areas located outside of project footprints will be sited in areas that avoid adverse effects on the following:</p> <ul style="list-style-type: none"> • Serpentine, valley oak woodland, alkali prairie, vernal pool complex, valley foothill riparian, and fresh emergent wetland land cover types. • Occupied western burrowing owl burrows. • Nest sites for covered bird species and all raptors, including noncovered raptors, during the breeding season. <p>Project proponents will follow specific AMMs for sensitive natural communities (Section 4.3.3, Sensitive Natural Communities) and covered species (Section 4.3.4, Covered Species) in temporary staging and work areas. For establishment of temporary work areas outside of the project footprint, project proponents will conduct surveys to determine if any of the biological resources listed above are present.</p> <p>Within one year following removal of land cover, project proponents will restore temporary work and staging areas to a condition equal to or greater than the covered species habitat function of the affected habitat. Restoration of vegetation in temporary work and staging areas will use clean, native seed mixes approved by the Conservancy that are free of noxious plant species seeds.</p>				
<p>MM BIO-9: Implement Yolo HCP/NCCP Sensitive Natural Communities AMMs:</p> <p><i>AMM9, Establish Buffers Around Sensitive Natural Communities.</i> The buffers for each sensitive natural community are as follows:</p> <ul style="list-style-type: none"> • <i>Alkali prairie and vernal pools:</i> The area necessary to provide the hydrologic conditions needed to support the wetlands within these natural communities (250 feet). Covered activities will avoid vernal pools or alkali seasonal wetlands by 250 feet, or other distance based on site specific topography to avoid indirect hydrologic effects. A buffer of less than 250 feet around vernal pools or alkali seasonal wetlands will be subject to wildlife agency concurrence that effects will be avoided. Considerations that may warrant a buffer of less than 250 feet may include topography (i.e., if the surrounding microwatershed extends less than 250 feet from the pool or wetland), intervening hydrologic barriers such as roads or 	During Construction	RD817 and Contractor		

MITIGATION MEASURES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
<p>canals, or other factors indicating that the proposed disturbance area does not contribute to the pool’s hydrology. Other considerations may include temporary disturbance during the dry season where measures are implemented to avoid disturbance of the underlying claypan or hardpan, and the area is returned to pre-project conditions prior to the following rainy season.</p> <ul style="list-style-type: none"> • <i>Valley foothill riparian</i>: One hundred feet from canopy drip-line. If avoidance is infeasible, a lesser buffer or encroachment into the sensitive natural community may be allowed if approved by the Conservancy and the wildlife agencies, based on the criteria listed in AMM1. Transportation or utility crossings may encroach into this sensitive natural community provided effects are minimized and all other applicable AMMs are followed. • <i>Lacustrine and riverine</i>: Outside urban planning units, 100 feet from the top of banks.⁸ Within urban planning units, 25 feet from the top of the banks. • <i>Fresh emergent wetland</i>: Fifty feet from the edge of the natural community. <p>AMM10, Avoid and Minimize Effects on Wetlands and Waters. Project proponents will comply with stormwater management plans that regulate development as part of compliance with regulations under National Pollutant Discharge Elimination System (NPDES) permit requirements. Covered activities that result in any fill of waters or wetlands will also comply with requirements under Section 404 of the Clean Water Act, State Water Resources Control Board (State Board), Fish and Game Code Section 1602, and Regional Board regulations. Other than requirements for buffers, minimizing project footprint, and species-specific measures for wetland-dependent covered species, this HCP/NCCP does not include specific best management practices for protecting wetlands and waters because they may conflict with measures required by the USACE, State Board, Regional Board, and CDFW.</p>				
<p>MM BIO-10: Implement applicable Yolo HCP/NCCP Covered Species AMMs:</p> <p>AMM16, Minimize Take and Adverse Effects on Habitat of Swainson’s Hawk and White-Tailed Kite. The project proponent will retain a qualified biologist to conduct planning-level surveys and identify any nesting habitat present within 1,320 feet of the project footprint. Adjacent parcels under different land ownership will be surveyed only if access is granted or if the parcels are visible from authorized areas.</p> <p>If a construction project cannot avoid potential nest trees (as determined by the qualified biologist) by 1,320 feet, the project proponent will retain a qualified biologist to conduct preconstruction surveys for active nests</p>	During Construction	RD817 and Contractor		

MITIGATION MEASURES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
<p>consistent, with guidelines provided by the Swainson’s Hawk Technical Advisory Committee (2000), between March 15 and August 30, within 15 days prior to the beginning of the construction activity. The results of the survey will be submitted to the Conservancy and CDFW. If active nests are found during preconstruction surveys, a 1,320-foot initial temporary nest disturbance buffer shall be established. If project related activities within the temporary nest disturbance buffer are determined to be necessary during the nesting season, then the qualified biologist will monitor the nest and will, along with the project proponent, consult with CDFW to determine the best course of action necessary to avoid nest abandonment or take of individuals. Work may be allowed only to proceed within the temporary nest disturbance buffer if Swainson’s hawk or white-tailed kite are not exhibiting agitated behavior, such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, and only with the agreement of CDFW and USFWS. The designated on-site biologist/monitor shall be on-site daily while construction-related activities are taking place within the 1,320-foot buffer and shall have the authority to stop work if raptors are exhibiting agitated behavior. Up to 20 Swainson’s hawk nest trees (documented nesting within the last 5 years) may be removed during the permit term, but they must be removed when not occupied by Swainson’s hawks.</p> <p>For covered activities that involve pruning or removal of a potential Swainson’s hawk or white-tailed kite nest tree, the project proponent will conduct preconstruction surveys that are consistent with the guidelines provided by the Swainson’s Hawk Technical Advisory Committee (2000). If active nests are found during preconstruction surveys, no tree pruning or removal of the nest tree will occur during the period between March 1 and August 30 within 1,320 feet of an active nest, unless a qualified biologist determines that the young have fledged and the nest is no longer active.</p>				
<p>MM BIO-11: Conduct Migratory Bird Pre-Construction Nesting Surveys</p> <p>If vegetation removal is required during the nesting season (February 1st – August 31st), a pre-construction nesting bird survey must be conducted within 7 days prior to vegetation removal. Within 2 weeks of the nesting bird survey, all vegetation cleared by the biologist will be removed by the contractor.</p> <p>A minimum 100-foot no-disturbance buffer will be established around any active nest of migratory birds and a minimum 300-foot no-disturbance buffer will be established around any nesting raptor species. The contractor must immediately stop work in the buffer area until the appropriate buffer is established and is prohibited from conducting work that could disturb the birds (as determined by the Project biologist and in consultation with wildlife agencies) in the buffer area until a qualified biologist determines the young have fledged. A reduced buffer can be established if determined appropriate by the Project biologist and approved by CDFW.</p>	Prior to Construction	Contractor		

MITIGATION MEASURES	Reporting Milestone	Reporting / Responsible Party	VERIFICATION OF COMPLIANCE	
			Initials	Date
CULTURAL RESOURCES				
<p>MM CR-1: Before any ground-disturbing work (including vegetation clearing, grading, and equipment staging) commences, a qualified archaeologist will conduct a mandatory cultural resources awareness training for all construction personnel. The training will cover the cultural history of the area, characteristics of archaeological sites, applicable laws, and the avoidance and minimization measures to be implemented. Proof of personnel attendance will be provided to overseeing agencies as appropriate. If new construction personnel are added to the proposed project, the contractor will ensure that the new personnel receive the mandatory training before starting work.</p>	Prior to Construction	County		
<p>MM CR-2: If unrecorded cultural resources are encountered during Project-related ground-disturbing activities, even in the absence of an onsite archaeological monitor, a qualified cultural resources specialist shall be contacted to assess the potential significance of the find. If an inadvertent discovery of cultural materials (e.g., unusual amounts of shell, animal bone, bottle glass, ceramics, structure/building remains) is made during Project-related construction activities, ground disturbances in the area of the find will be halted, and a qualified professional archaeologist will be notified regarding the discovery. The archaeologist will determine whether the resource is potentially significant per the CRHR and develop appropriate mitigation, such as avoidance or data recovery.</p> <p>If the find is determined to be an important cultural resource, the County will make available contingency funding and a time allotment sufficient to allow recovery of an archaeological sample or to implement an avoidance measure. Construction work can continue on other parts of the project while archaeological mitigation takes place.</p>	During Construction	County and Contractor		

GEOTECHNICAL DATA REPORT



WOOD RODGERS

August 2, 2022

Amended September 26, 2022

Project No. 3614008

Nicole Ortega-Jewel, PMP

MBK Engineers, Inc.

455 University Avenue

Sacramento, California 95825

RE: Geotechnical Letter
Knights Landing Flood Management Project
Town of Knights Landing, Yolo County, California

REF: Project Plans for Construction of
Knights Landing Flood Management Project
Small Communities Flood Risk Protection Program – Phase 2
Volume 2 of 2
Knight's Landing Drainage Improvement Plans
May 5, 2022

Dear Nicole:

We are pleased to present this geotechnical letter for the referenced project located in Knights Landing, California (Plate A-1a Vicinity Map). Our conclusions are based on the results of the field investigation, review of the referenced plans, and the Yolo County Improvement Standards for the design of the Knights Landing Drainage Improvements' element of the Knights Landing Flood Management Project.

PROJECT DESCRIPTION

The project consists of constructing drainage improvements along 2nd and Railroad Streets in Knights Landing. The drainage improvements include:

- Excavation of a new ditch along the north side of 2nd Street and the east side of Railroad Street.
- Installation of approximately 650 feet of RCP 18-inch diameter drainpipe between the two ditches.
- Construction of several 48-inch diameter manholes (SD-9-2) within the improvement corridor.

SCOPE OF SERVICES

The purposes of this investigation were to:

- Obtain information regarding the existing asphalt concrete thicknesses.
- Document existing base course and backfill material and thicknesses that may be identified as part of the roadway improvements.
- Identify existing subgrade soil types specific to Cal-OSHA regulations.
- Present findings and state conclusions specific to the designated work area.

EXPLORATION

The project area was explored on June 28 and 29, 2022, by advancing a series of four cores and four hand augers (HA) along the improvement corridor. Two additional hand augers were advanced next to the existing drainage culvert. Approximate locations of the explorations are shown on Plates 1b & 1c – Site Map and Approximate Exploration Locations. Maximum depth of hand auger advance extended to 4-feet below the existing ground surface.

Wood Rodgers’ personnel examined and classified soils in the field in general accordance with ASTM D2488 (Description and Identification of Soils). During exploration, representative bulk samples were placed in sealed plastic bags and returned to our Reno, Nevada laboratory for testing. Logs of Explorations are presented as Plate 2a through 2h in the attachments with this report. A USCS chart (ASTM D2487) has been included as Plate 3 - Unified Soil Classification and Key to Soil Descriptions.

LABORATORY TESTING

Soil testing performed in the Wood Rodgers’ laboratory was conducted in general accordance with the standards and methods described in Volume 4.08 (Soil and Rock; Dimension Stone; Geosynthetics) of the ASTM Standards. Samples of significant soil types were analyzed to determine in-situ moisture contents (ASTM D2216), plasticity indices (ASTM D4318). Results of the soil testing are presented on Plates 4a and 4b (attached) and in Table 1.

Table 1 - Summary of Test Data

Test Hole	Depth (Ft.)	Moisture (%)	%Gravel (+ #4)*	% Sand (#4- #200)	%Fines (-#200)	Liquid Limit	Plastic Index	USCS
ASTM Standard		D2216	D6913		D4318		D2487	
HA-1	0.75-2.5	9.7	15.0	44.2	40.8	22	8	SC w/ Gravel

Table 1 - Summary of Test Data

Test Hole	Depth (Ft.)	Moisture (%)	%Gravel (+ #4)*	% Sand (#4-#200)	%Fines (-#200)	Liquid Limit	Plastic Index	USCS
ASTM Standard		D2216	D6913			D4318		D2487
HA-3.2	0-4	5.5	27.4	42.4	30.2	24	9	SC w/ Gravel
HA-5	0-3	4.8	40.0	39.3	20.7	27	10	GC with Sand & Cobbles

* Since ASTM D2487 is limited by a maximum particle size of 3", the gradation test data presented is based on a maximum particle size of 3".

EXISTING STRUCTURAL PAVEMENT SECTIONS AND GENERAL SOIL CONDITIONS

Measured structural pavement sections (HA-1 to HA-4) have been summarized in Table 2. The existing section ranged between approximately 3 ½-inches to 6 ½-inches of hot-mix asphalt (HMA), capping approximately 3-inches of aggregate base (AB) in location HA-1. The hand auger could not extend through the base section at locations HA-2, HA-3, and HA-4. Refusal appeared to be met on either an old pavement layer or cement treated type base course. At locations HA-3 and HA-4, soil samples were obtained from the road shoulder. Along the proposed drain pipe alignment (Railroad Avenue), most of the subgrade soils consisted of clayey sand with gravel (SC). As encountered in HA-5 and HA-6, clayey gravel with sand (GC) was more prevalent in the area next to the existing culvert. Groundwater was not encountered in the explorations.

Table 2 - Summary of Structural Pavement Sections and Soil Profiles

Exploration ID	HA-1	HA-2	HA-3 ²	HA-4 ²	HA-5 ³	HA-6 ³
Exploration Depth (ft)	2.5	0.54	4 ²	4 ²	3	3
HMA Thickness (in)	4.5	6.5	3.5	3.5	N/E	N/E
Base Course Thickness (in)	3	SB ¹	SB ¹	SB ¹	N/E	N/E
Subgrade Soils (USCS)	SC	N/A	SC ²	SC ²	GC	GC

¹ Structural Base: Hand tool refusal encountered after asphalt coring, difficult to identify, possibly cement treated base or weathered asphalt layer.

² Soil sample obtained from soil road shoulder after hand auger refusal encountered at core location.

³ NE indicates Not Encountered at this location.

The subgrade soils encountered classified as Type C as defined by CalOSHA. The soils encountered in our explorations are suitable for reuse as trench backfill.

Nicole Ortega-Jewel, PMP
MBK Engineers, Inc.
August 2, 2022
Amended September 26, 2022
Page 4 of 4

SUMMARY

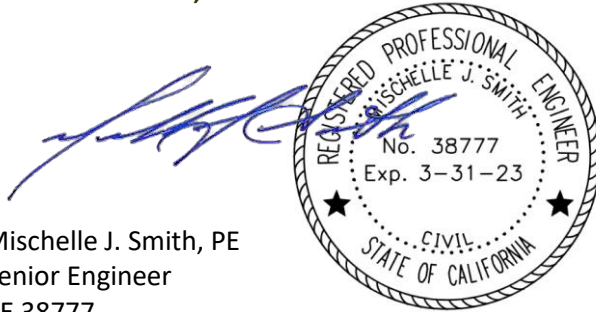
- Measured existing asphalt concrete (HMA) thicknesses are summarized in Table 2; an average thickness of 4.5-inches was determined.
- Measured base course and backfill thicknesses identified as part of the roadway improvements are presented in Table 2.
- Subgrade soil types encountered during the exploration program would be classified as Type C per Cal-OSHA regulations.
- Soils encountered in our explorations are suitable for reuse as trench backfill.

CLOSING

We appreciate the opportunity to provide our services and to prepare this geotechnical summary letter specific to the stated Scope of Services.

Sincerely,

WOOD RODGERS, INCORPORATED



Mischelle J. Smith, PE
Senior Engineer
CE 38777
Expires 03/31/2023

9/26/22



Justin M. McDougal
Associate

Attachments:

Geotechnical Plates

Plate 1a: Vicinity Map

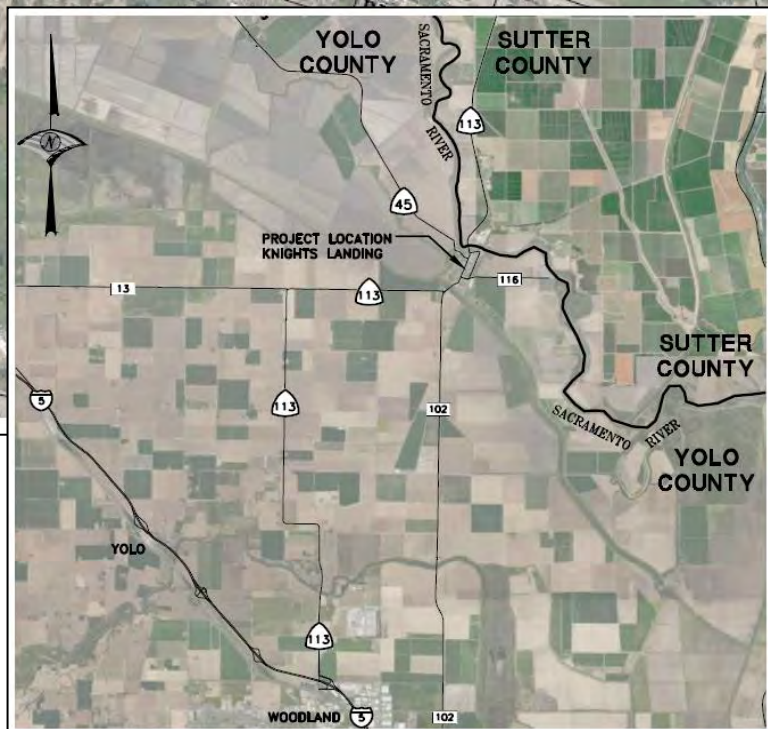
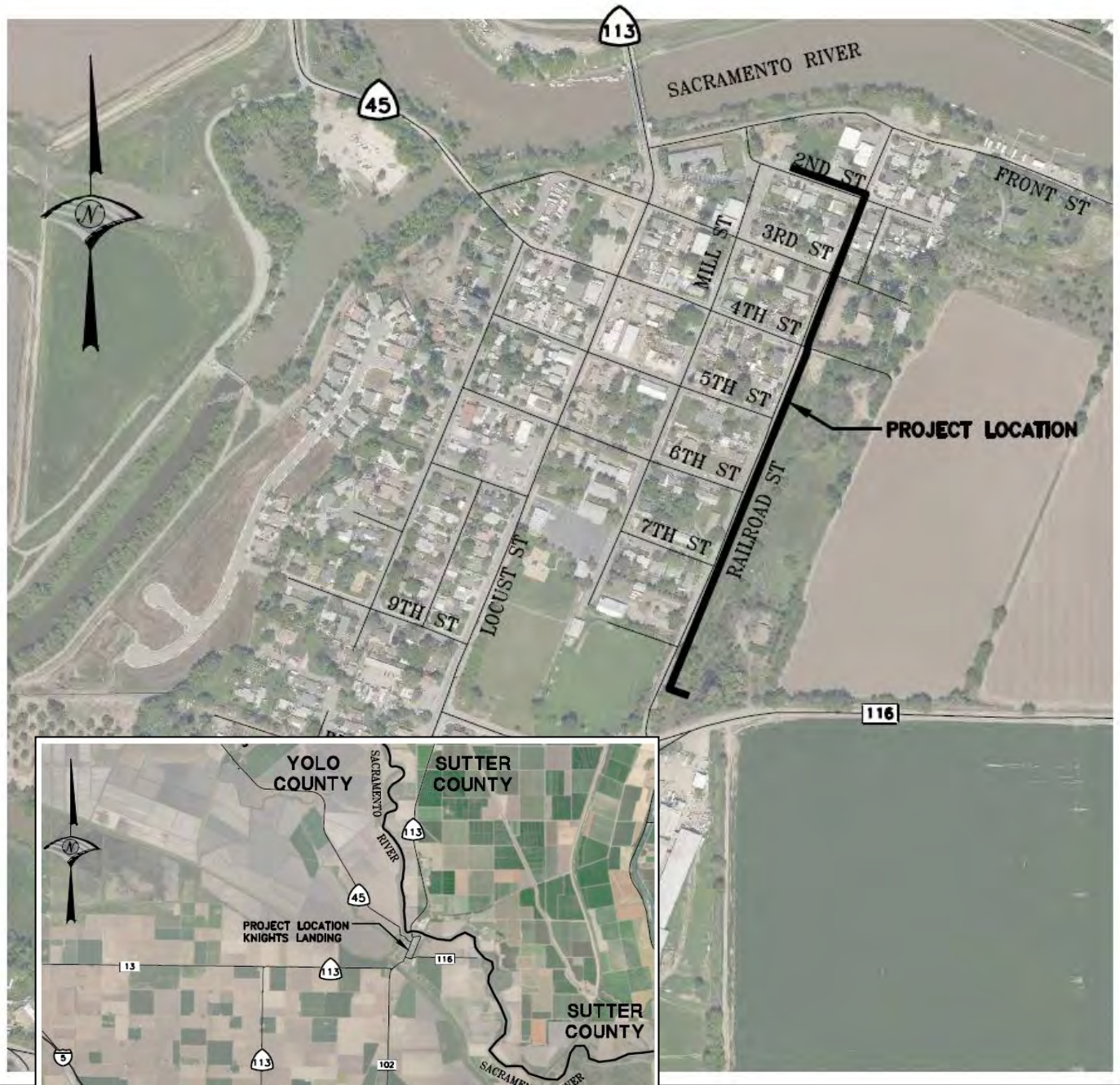
Plate 1b: Site Map with Approximate Exploration Locations

Plate 1c: Improvement Map with Approximate Exploration Locations

Plate 2: Logs of Explorations

Plate 3: Unified Soil Classification and Key to Soil Descriptions

Plate 4: Lab Results



Reference: Improvements Plans for Knights Landing Drainage Improvements, Wood Rodgers, dated 5/5/2022


WOOD RODGERS
 1361 Corporate Boulevard, Reno, NV 89502
 Phone 775.823.4068 Fax 775.823.4066

VICINITY MAP

Geotechnical Investigation
KNIGHTS LANDING
DRAINAGE IMPROVEMENTS
YOLO COUNTY, CA

Project No.: 3614008
 Date: 07/18/22

PLATE
1a

LEGEND

HA-1  APPROXIMATE HAND AUGER LOCATION

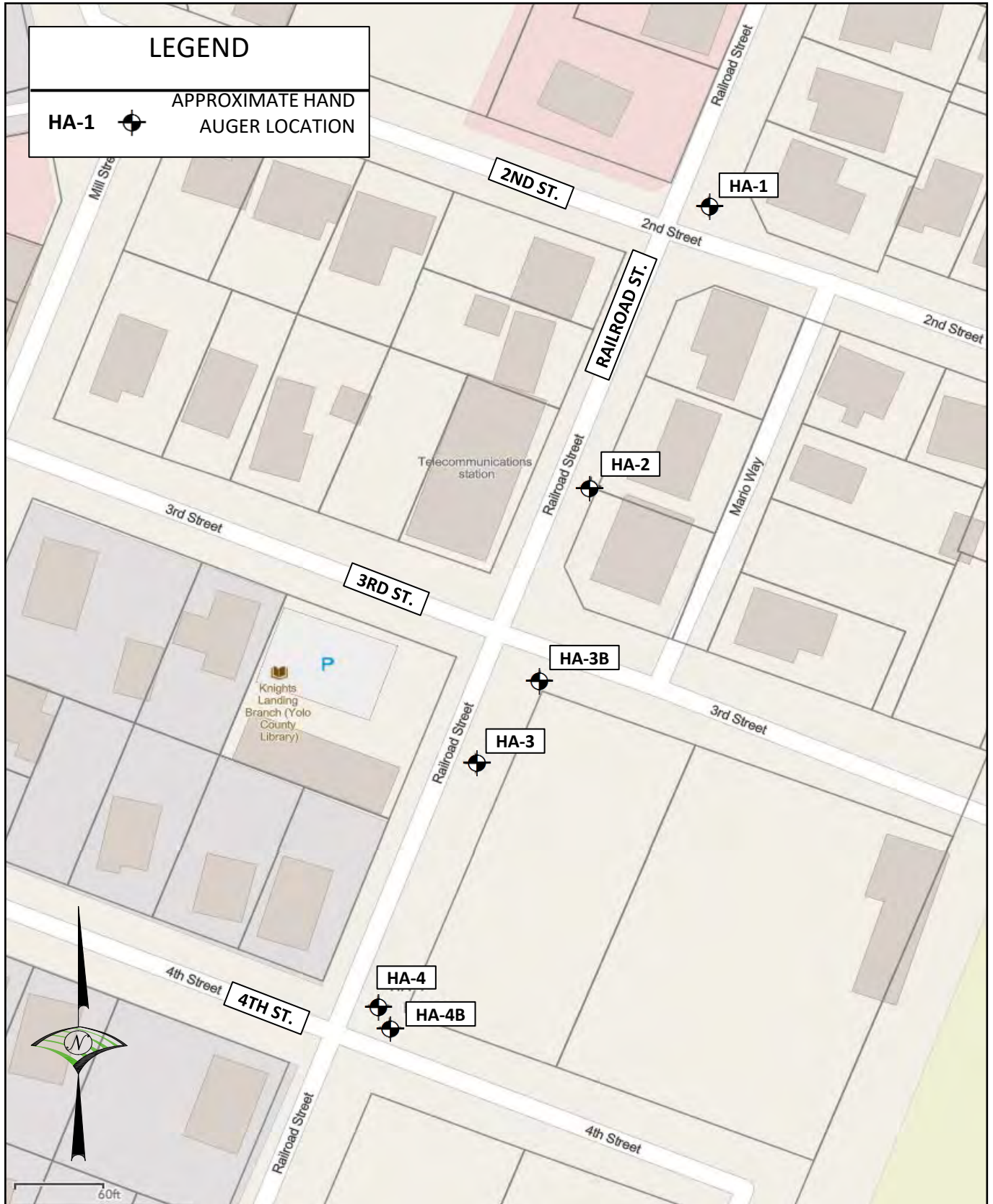


Image Reference: Open Street Map, Accessed 7/18/2022



WOOD RODGERS
 1361 Corporate Boulevard, Reno, NV 89502
 Phone 775.823.4068 Fax 775.823.4066

**SITE MAP &
 APPROXIMATE
 EXPLORATION
 LOCATIONS**

**Geotechnical Investigation
 KNIGHTS LANDING
 DRAINAGE IMPROVEMENTS
 YOLO COUNTY, CA**

Project No.: 3614008
 Date: 07/18/22

**PLATE
 1b**

LEGEND

HA-1  APPROXIMATE HAND AUGER LOCATION

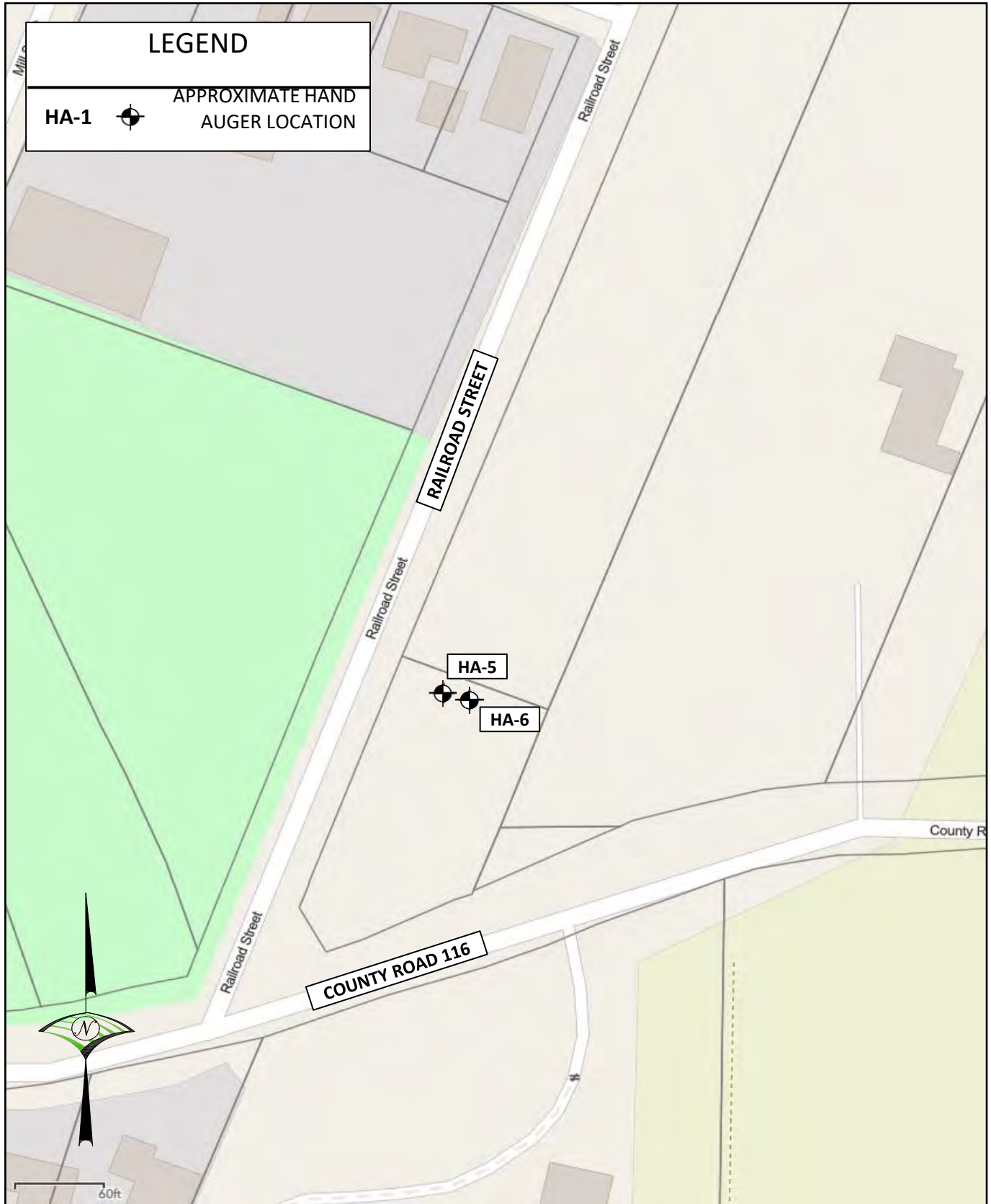


Image Reference: Open Street Map, Accessed 7/18/2022



WOOD RODGERS
1361 Corporate Boulevard, Reno, NV 89502
Phone 775.823.4068 Fax 775.823.4066

**SITE MAP &
APPROXIMATE
EXPLORATION
LOCATIONS**

**Geotechnical Investigation
KNIGHTS LANDING
DRAINAGE IMPROVEMENTS
YOLO COUNTY, CA**

Project No.: 3614008
Date: 07/18/22

**PLATE
1c**

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTION\DATA\JOBS\3000-S\3614 - MBK ENGINEERS\3614008 - KNIGHTS LANDING\GEO\TECH\GINT\KNIGHTS LANDING_IMP_PITS.GPJ



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-1

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/28/22 **COMPLETED** 6/28/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 36 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALTIC CONCRETE 4.5" (HMA)										
		AGGREGATE BASE 3", (AB)										
1		CLAYEY SAND WITH GRAVEL, (SC) very dense, slightly moist, medium brown, low plasticity	GB 1A					9.7	22	14	8	40.8
2												

Practical Refusal at 2.5 feet.
 Bottom of Borehole at 2.5 Feet.

Location Coordinates: 38.80134, -121.71703

Reference: GIS Mapping

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTION\DATA\JOBS\3000-S\3614_MBK_ENGINEERS\3614008_KNIGHTS_LANDING\GEOTECH\GINT\KNIGHTS_LANDING_IMP_PITS.GPJ



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-2

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/28/22 **COMPLETED** 6/28/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 37 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALTIC CONCRETE 6.5" (HMA)										
		Refusal on HMA/SB										

Practical Refusal at 0.5 feet.
 Bottom of Borehole at 0.5 Feet.

Location Coordinates: 38.80081, -121.7130

Reference: GIS Mapping

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTIONDATA\JOBS\3000-S\3614_MBK_ENGINEERS\3614008_KNIGHTS_LANDING\GEOTECH\GINT\KNIGHTS_LANDING_IMP_PITS.GPJ



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-3.1

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/28/22 **COMPLETED** 6/28/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 38 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALTIC CONCRETE 3.5" (HMA)										

Practical Refusal at 0.3 feet.
 Bottom of Borehole at 0.3 Feet.

Location Coordinates: 38.80029, -121.71757

Reference: GIS Mapping



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-3.2

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/28/22 **COMPLETED** 6/28/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 37 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
1		CLAYEY SAND WITH GRAVEL, (SC) medium dense, slightly moist, medium brown, low - medium plasticity										
2			GB 3B					5.5	24	15	9	30.2
3												
4												

Bottom of Borehole at 4.0 Feet.

Location Coordinates: 38.80044, -121.71742

Reference: GIS Mapping

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTION\DATA\JOBS\3000-S\3614-MBK ENGINEERS\3614008-KNIGHTS LANDING\GEO\GEO\GINT\KNIGHTS LANDING_IMP_PITS.GPJ

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTIONDATA\JOBS\3000-S\3614_MBK_ENGINEERS\3614008_KNIGHTS_LANDING\GEO\GEO\GINT\KNIGHTS_LANDING_IMP_PITS.GPJ



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-4.1

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/28/22 **COMPLETED** 6/28/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 33 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALTIC CONCRETE 3.5" (HMA)										

Practical Refusal at 0.3 feet.
 Bottom of Borehole at 0.3 Feet.

Location Coordinates: 38.79983, -121.71779

Reference: GIS Mapping



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-4.2

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/28/22 **COMPLETED** 6/28/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 34 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CLAYEY SAND WITH GRAVEL, (SC) medium dense, slightly moist, medium brown, low - medium plasticity										
1												
2												
3												
4			GB 4B									

Bottom of Borehole at 4.0 Feet.

Location Coordinates: 38.79979, -121.71776

Reference: GIS Mapping

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTION\DATA\JOBS\3000-S\3614 - MBK ENGINEERS\3614008 - KNIGHTS LANDING\GEO\GEO\GINT\KNIGHTS LANDING_IMP_PITS.GPJ



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-5

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 32 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0												
1		CLAYEY GRAVEL WITH SAND AND COBBLES, (GC) very dense, dry, light brown, medium plasticity	GB 5A					4.8	27	17	10	20.7
2												
3												

Bottom of Borehole at 3.0 Feet.

Location Coordinates: 38.79620, -121.71947

Reference: GIS Mapping

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTION\DATA\JOBS\3000-S\3614 - MBK ENGINEERS\3614008 - KNIGHTS LANDING\GEO\GINT\KNIGHTS LANDING_IMP_PITS.GPJ



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

HAND AUGER NUMBER HA-6

CLIENT MBK Engineers
PROJECT NUMBER 3614008
DATE STARTED 6/29/22 **COMPLETED** 6/29/22
DRILLING CONTRACTOR Wood Rodgers
DRILLING METHOD Hand Auger
LOGGED BY Seth Barton **CHECKED BY** Justin McDougal
NOTES: Elevations: Google Earth, 6/3/21

PROJECT NAME Knights Landing Improvements
PROJECT LOCATION Yolo County, California
GROUND ELEVATION 37 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NO FREE WATER ENCOUNTERED
AT END OF DRILLING --- NO FREE WATER ENCOUNTERED
AFTER DRILLING --- NO FREE WATER ENCOUNTERED

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	R-VALUE	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		CLAYEY GRAVEL WITH SAND AND COBBLES, (GC) very dense, dry, light brown, medium plasticity										
1			GB 6A									
2												
3												

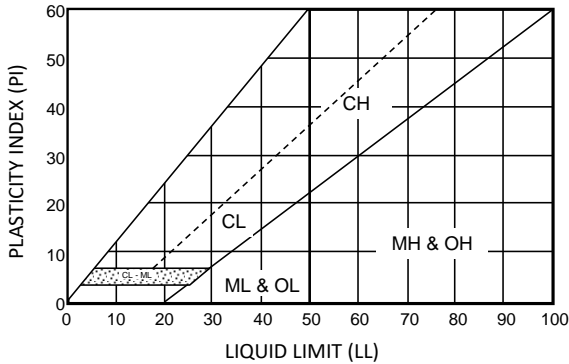
Bottom of Borehole at 3.0 Feet.

Location Coordinates: 38.79618, -121.71940

Reference: GIS Mapping

GEOTECH BH COLUMNS PLATE - GINT STD US LAB.GDT - 9/16/22 11:42 - \\WOODRODGERS.LOC\PRODUCTION\DATA\JOBS\3000-S\3614 - MBK ENGINEERS\3614008 - KNIGHTS LANDING\GEO\GEO\GINT\KNIGHTS LANDING_IMP_PITS.GPJ

MAJOR DIVISION				TYPICAL NAMES	
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVEL MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES		GW	WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
				GP	POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES		GM	SILTY GRAVELS, SILTY GRAVELS WITH SAND
				GC	CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SAND MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES		SW	WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
				SP	POORLY GRADED SAND WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES		SM	SILTY SANDS WITH OR WITHOUT GRAVEL
				SC	CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT 50% OR LESS			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
				OL	ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILT AND CLAY LIQUID LIMIT GREATER THAN 50%			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOLID, ELASTIC SILTS
				CH	INORGANIC CLAYS OR HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC SILTS OR CLAYS MEDIUM TO HIGH PLASTICITY
	HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS



CONSISTENCY		RELATIVE DENSITY	
SILTS & CLAYS	SPT BLOW* COUNTS (N)	SANDS & GRAVELS	SPT BLOW* COUNTS (N)
VERY SOFT	0 - 2	VERY LOOSE	0 - 4
SOFT	3 - 4	LOOSE	5 - 10
MEDIUM STIFF	5 - 8	MEDIUM DENSE	11 - 30
STIFF	9 - 15	DENSE	31 - 50
VERY STIFF	16 - 30	VERY DENSE	50 +
HARD	30 +		

* The Standard Penetration Resistance (N) in blows per foot is obtained by the ASTM D1585 procedure using 2" O.D., 1 3/8" I.D. samplers.

EXPLORATION PLASTICITY DESCRIPTIONS			
DESCRIPTION	RANGE	DESCRIPTION	RANGE
Nonplastic	<5	Medium	10-20
Low	< 10	Medium - High	15 - 25
Low - Medium	5 - 15	High	>25

DESCRIPTION OF ESTIMATED PERCENTAGES OF GRAVEL, SAND, AND FINES	
TRACE	Particles are present but est. < 5%
FEW	5% - 10%
LITTLE	15% - 20%
SOME	30% - 45%
MOSTLY	50% - 100%

NOTE: Percentages are presented within soil description for soil horizon with laboratory tested soil samples.

DEFINITIONS OF SOIL FRACTIONS	
SOIL COMPONENT	PARTICLE SIZE RANGE
BOULDERS	> 12 INCHES
COBBLES	3 to 12 Inches
GRAVEL	3 IN. TO NO. 4 SIEVE
COARSE GRAVEL	3 IN. TO 3/4 IN.
FINE GRAVEL	3/4 IN. TO NO. 4 SIEVE
SAND	NO. 4 TO NO. 200
COARSE SAND	NO. 4 TO NO. 10
MEDIUM SAND	NO. 10 TO NO. 40
FINE SAND	NO. 40 TO NO. 200
FINES (SILT OR CLAY)	MINUS NO. 200 SIEVE



UNIFIED SOIL CLASSIFICATION AND KEY TO SOIL DESCRIPTIONS

**Geotechnical Investigation
KNIGHTS LANDING
DRAINAGE IMPROVEMENTS
YOLO COUNTY, CA**

Project No.: 3614008
Date: 07/18/22

**PLATE
3**



Wood Rodgers Inc.
 1361 Corporate Blvd
 Reno NV 89521
 Telephone: 775-823-4068
 Fax: 775-823-4066

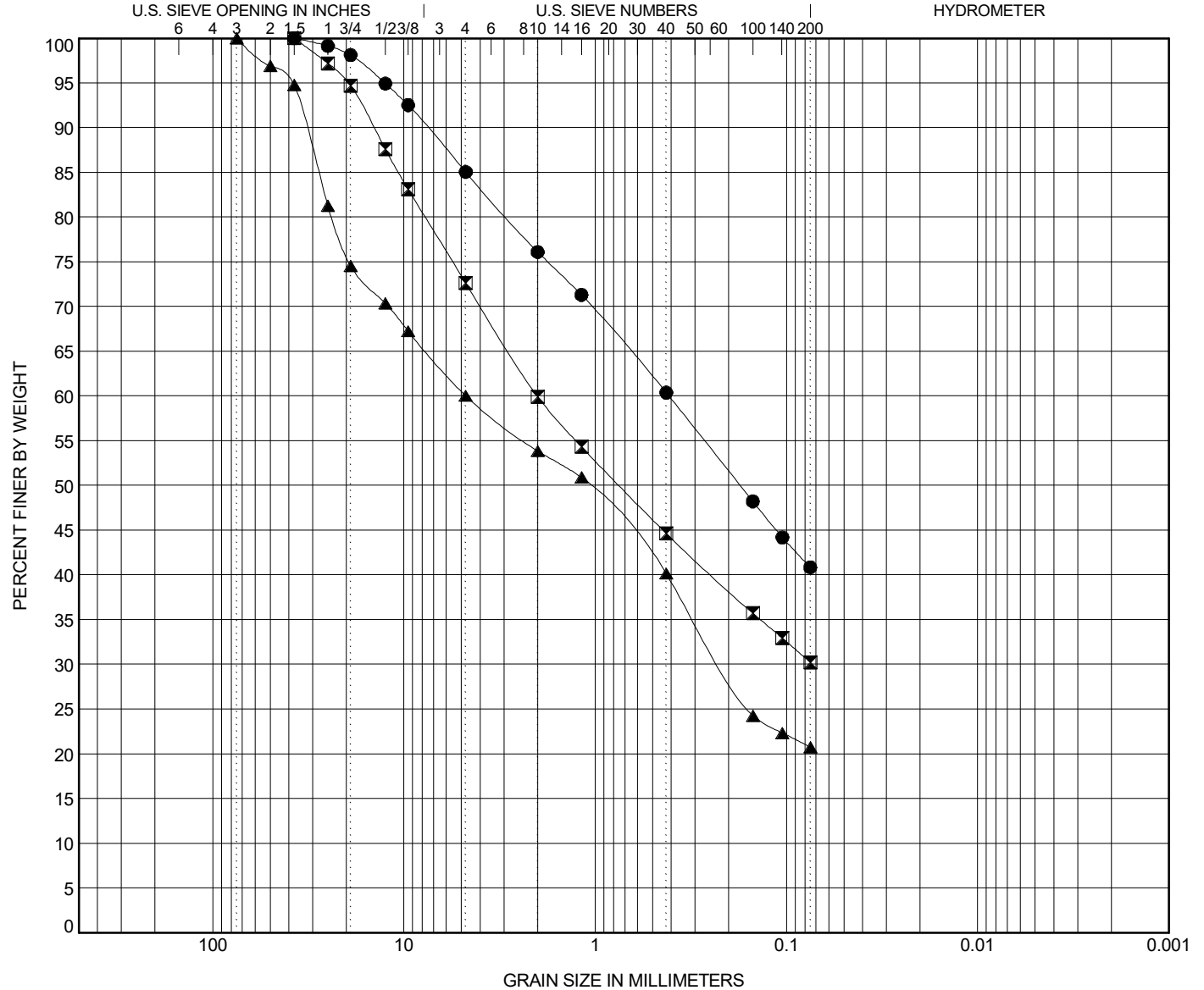
GRAIN SIZE DISTRIBUTION

CLIENT MBK Engineers

PROJECT NAME Knights Landing Improvements

PROJECT NUMBER 3614008

PROJECT LOCATION Yolo County, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

TEST PIT	DEPTH	Classification					LL	PL	PI	Cc	Cu
● HA-1	0.8	CLAYEY SAND with GRAVEL(SC)					22	14	8		
☒ HA-3.2	0.0	CLAYEY SAND with GRAVEL(SC)					24	15	9		
▲ HA-5	0.0	CLAYEY GRAVEL with SAND(GC)					27	17	10		

TEST PIT	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● HA-1	0.8	37.5	0.412			15.0	44.2		40.8
☒ HA-3.2	0.0	37.5	2.01			27.4	42.4		30.2
▲ HA-5	0.0	75	4.731	0.218		40.0	39.3		20.7

GRAIN SIZE DEPTH - GINT STD US LAB GDT - 7/19/22 08:01 - \\WOODRODGERS.LOC\PRODUCTIONDATA\JOBS\3000-S\3614_MBK_ENGINEERS\3614008_KNIGHTS LANDING\GEO\TECH\05 GINT\KNIGHTS_LANDING_IMP_PITS.GPJ

