

SPECIFICATIONS

ELKHORN RECHARGE FACILITY

BUDGET / ACCOUNT: 8870 / 8400 / 91761



Department of Public Works and Planning

CONTRACT NUMBER 24-03-C

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Agreement

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**COUNTY ADOPTION AND ACKNOWLEDGEMENT
PROJECT: ELKHORN RECHARGE FACILITY
CONTRACT NUMBER: 24-03-C**

Nathan Magsig, Chairman	5th District
Ernest Buddy Mendes, Vice Chairman	4th District
Brian Pacheco	1st District
Steve Brandau	2nd District
Sal Quintero	3rd District

Paul Nerland, County Administrative Officer

Steven E. White, Director _____ Date
Department of Public Works and Planning

Date Signed: _____



Supervising Engineer: _____ Sebastian Artal, PE 76724

FRESNO COUNTY
Department of Public Works and Planning
m/a 2220 Tulare Street, Suite 720
Fresno, CA 93721-2106

**COUNTY ADOPTION AND ACKNOWLEDGEMENT
PROJECT: ELKHORN RECHARGE FACILITY
CONTRACT NUMBER: 24-03-C**

Date Signed: _____

Consultant Engineer: _____ Kevin Johansen, PE C47444

PROVOST & PRITCHARD CONSULTING
455 W Fir Ave.
Clovis, CA 93611

DRAFT

NOTICE TO BIDDERS

Sealed proposals will be received at:

<https://www.bidexpress.com/businesses/36473/home>

and at the Fresno County Department of Public Works and Planning (Department), Office of the Design Engineer, Seventh Floor, Fresno County Plaza Building, 2220 Tulare Street, Fresno, CA 93721 until

**2:00 P.M., (1400 hours and 00 seconds)
Tuesday, October 8, 2024**

If you have any questions about bid submission, please contact us at DesignServices@fresnocountyca.gov or call (559) 353-4919 or (559) 600-4543.

Promptly following the closing of the bidding all timely submitted bids will be publicly opened and viewable via a livestream (the link for which will be posted at <http://www.fresnocountyca.gov/planholders>) for construction in accordance with the project specifications therefor, to which special reference is made as follows:

ELKHORN RECHARGE FACILITY

CONTRACT NUMBER 24-03-C

The work consists of, in general, of the construction of an approximately sixty-acre recharge basin and stockpile area at the site including basin excavation, compacted stockpile placement, placement of excess basin material, conveyance channel excavation, cast-in-place and precast concrete structures, furnishing and installing slides gates, propeller meters, rubber gasketed reinforced concrete pipe (RGRCP), County road crossing, and all other miscellaneous items to complete the work described in the Plans and Specifications to provide for a fully functioning recharge basin.

This project is funded by the American Rescue Plan Act (ARPA).

This project is subject to the contracting requirements and implementing regulations as amended in Title 13, Section 2449 General Requirements for In-Use Off-Road Diesel-Fueled Fleets, of the California Code of Regulations (13 CCR § 2449(i)). Bidders must submit a valid Certificate of Reported Compliance (CRC) issued by the California Air Resources Control Board at the time of bidding. Bidders are responsible for submitting their listed subcontractors' CRCs and any supporting documentation within five (5) calendar days of bid opening. Failure to submit the required CRCs may render a bid non-responsive.

Bidders may fill out a Request to be Added to Planholders list:

<https://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/Construction-Bidding-Opportunities/Request-to-Be-Added-to-the-Planholders-List-Form>

Requesters will then be listed as a planholder for the project on the website and receive notifications and addenda issued for the project.

Prospective bidders may also select the project on www.BidExpress.com. Those that demonstrate interest in the project will be added to the planholders list, and receive notifications and addenda issued for the project.

Planholder and exchange/publication names may be obtained from the Fresno County website at <http://www.fresnocountyca.gov/planholders>.

Electronic copies, in “.pdf” file format, of the official project plans and specifications, bid books and proposal sheets, and such additional supplemental project information as may be provided, are available to view, download, and print at <http://www.fresnocountyca.gov/planholders>.

If a bidder is unable to submit a bid via Bid Express, Bid Books, which contain bid proposal sheets necessary to submit a bid, may be obtained within the Specifications documents posted on the Fresno County website.

Electronic bids shall be submitted via the Bid Express website. Hardcopy bids shall be submitted in a sealed envelope addressed to the Department and labeled with the name of the bidder, contract number, name of the project, and the statement “Do Not Open Until The Time Of Bid Opening.”

Bid security in the amount of ten (10) percent of the amount of the bid, and in the form of a bid bond issued by an admitted surety insurer licensed by the California Department of Insurance, cash, cashier's check or certified check shall accompany the bid. You must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code section 20129(a)), prior to the bid opening. Bid security shall be made in favor of the County of Fresno.

Hardcopy bid bonds shall be submitted in a sealed envelope addressed to the Department and labeled with the name of the bidder, the name of the project and the statement “Do Not Open Until The Time Of Bid Opening – BID BOND”

A Summary of Bids and a list of subcontractors for the apparent low bidder will be posted at the above listed website, generally within 24 hours of the Bid Opening.

All questions regarding this project shall be in writing and shall be received by the Department of Public Works and Planning, Design Division, no later than 2:00 P.M. on the seventh (7th) calendar day before bid opening. Any questions received after this deadline will not receive a response unless the Department of Public Works and Planning elects to issue an addendum to revise the bid opening date. In the event that the bid opening date is revised, the deadline for questions will be extended to no later than 2:00 P.M. on the seventh (7th) calendar day before the revised bid opening date. Questions shall be submitted on the “Request for Clarification Form” provided on our website:

<http://www.fresnocountyca.gov/Departments/Public-Works-and-Planning/Construction-Bidding-Opportunities/24-03-C-Elkhorn-Recharge-Facility/Request-for-Clarification-Form>

Any changes to, or clarification of, the project plans and specifications shall be in the form of a written addendum issued to planholders of record. Questions that prompt a change or clarification shall be included in the addendum with the subsequent answer.

Any oral explanation or interpretations given to this project are not binding.

No contract will be awarded to a contractor who has not been licensed in accordance with the provisions of the Contractors State License Law, California Business and Professions Code, Division 3, Chapter 9, as amended, or whose bid is not on the proposal form included in the contract document. A valid California Contractor's License, **Class A (General Engineering) or C-12 (Earthwork and Paving)**, is required for this project.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at County of Fresno, Department of Public Works and Planning, 2220 Tulare Street, Sixth Floor, Fresno CA 93721-2104 and available from the California

Department of Industrial Relations' Internet web site at <http://www.dir.ca.gov/DLSR/PWD>. Future effective general prevailing wage rates, which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code section 12990.

Bids are required for the entire work described herein, including a bid for the base bid and a bid for each of the additive bids. The total amount of the base bid and additive bid is the cumulative sum of the bid amounts listed for the individual line items. Bids will be compared, for purposes of identifying the apparent low bidder for proposed award of the project, on the basis of the total of the base bid plus the total of all additive bids; provided however, that the ultimate scope of the project, as subsequently determined by the Board of Supervisors at the time of award, may or may not include all or any of the additive bids.

The successful bidder shall furnish a faithful performance bond in the amount of 100 percent of the contract amount and a payment bond in the amount of 100 percent of the contract amount. Each bond specified in this Notice (bid bond, faithful performance bond and payment bond) shall meet the requirements of all applicable statutes, including but not limited to those specified in Public Contract Code section 20129 and Civil Code section 3248.

Each bond specified in this Notice shall be issued by a surety company designated as an admitted surety insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and acceptable to the County of Fresno. Bidders are cautioned that representations made by surety companies will be verified with the California Department of Insurance. Additionally, the County of Fresno, in its discretion, when determining the sufficiency of a proposed surety company, may require the surety company to provide additional information supported by documentation. The County generally requires such information and documentation whenever the proposed surety company has either a Best's Key Rating Guide of less than **A** and a financial size designation of less than **VIII**. Provided, however, that the County expressly reserves its right to require all information and documentation to which the County is legally entitled from any proposed surety company.

Pursuant to Public Contract Code section 22300, substitution of securities for any moneys withheld by the County of Fresno to ensure performance under the contract shall be permitted.

The Board of Supervisors reserves the right to reject any or all bids.

Board of Supervisors, County of Fresno

Paul Nerland, County Administrative Officer

Bernice E. Seidel, Clerk of the Board

Issue Date: September 19, 2024

Special Provisions

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DIVISION I GENERAL PROVISIONS

1 GENERAL

1-1.01 GENERAL

Add to the beginning of Section 1:

The work is done in accordance with the 2023 *Standard Specifications*, 2023 *Standard Plans* and the following special provisions.

Where these special provisions indicate to replace, add to, delete, delete from, or otherwise modify a "section," or a portion thereof, the section or portion thereof to which such modification is to be applied is the section or portion thereof with the corresponding numbering in the 2023 *Standard Specifications*.

Except to the extent that they may conflict with these special provisions, revised standard specifications apply if included in the project details section of the book entitled "Specifications."

Revised standard plans apply if listed on the "List of Revised Standard Plans," if any, in these special provisions; or if shown or referenced on the project plans or in the project details section of the book entitled "Specifications."

In case of conflict between the *Standard Specifications* and these special provisions, the special provisions shall take precedence over and be used in lieu of such conflicting portions.

Add to the end of section 1-1.01:

Bid Items and Applicable Sections

REFER TO SECTION 01 22 00 EXPLANATION OF BID ITEMS

Add to section 1-1.06:

Abbreviations in the Bid Items and Applicable Sections are also used in the Bid Item List - Proposal 2.

Replace Section 1-1.07 with:

1-1.07 DEFINITIONS

1-1.07A General

Interpret terms as defined in the Contract documents.

1-1.07B Glossary

abandon: Render unserviceable in place.

acts of God: *Acts of God* as defined in Pub Cont Code § 7105.

activity: Task, event, or other project element on a schedule that contributes to completing the project. An activity has a description, start date, finish date, duration, and one or more logic ties.

adjust: Raise or lower a facility to match a new grade line.

aerially deposited lead: Lead primarily from vehicle emissions deposited within unpaved areas or formerly unpaved areas.

Authorized Facility Audit List: Caltrans-developed list of facilities. For the Authorized Facility Audit List, go the METS website.

authorized laboratory: Independent testing laboratory (1) not employed or compensated by any subcontractor or subcontractor's affiliate providing other services for the Contract and (2) authorized by the Department.

Authorized Material List: Caltrans-developed list of authorized materials. For the Authorized Material List go to the METS website.

Authorized Material Source List: Caltrans-developed list of authorized source materials. For the Authorized Material Source List go to the METS website.

base: Layer of specified material of planned thickness placed immediately below the pavement or surfacing.

basement material: Material in an excavation or embankment under the lowest layer to be placed.

bid item: Work unit for which the Bidder provides a price.

Bid Item List: List of bid items, units of measure, and the associated quantities. The verified Bid Item List is the Bid Item List with verified prices. The Contract Proposal (Proposal 2) of Low Bidder at the Department's website is the verified Bid Item List. After contract award, interpret a reference to the Bid Item List as a reference to the verified Bid Item List.

borrow: Fill acquired from an excavation source outside the described cut area.

1. **local borrow:** Material obtained by widening cuts or excavating from sources outside the planned or authorized cross section on the job site. The location of the local borrow is described or designated by the Engineer.
2. **imported borrow:** Borrow that is not local borrow.

bridge: Structure that:

1. Has a bridge number
2. Carries a (1) utility, (2) railroad, or (3) vehicle, pedestrian, or other traffic over, under, or around obstructions or waterways

building-construction contract: Contract that has *Building Construction* on the cover of the *Notice to Bidders and Special Provisions*.

California Test: Caltrans-developed test for determining work quality. For California Tests, go to the METS website.

Caltrans: State of California Department of Transportation

certificate of compliance: Certificate stating the material complies with the Contract.

Certified Industrial Hygienist: Industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

change order work: Work described in a Change Order, including extra work and work described in the Contract as change order work.

closure: Closure of a traffic lane or lanes, including shoulder, ramp, or connector lanes, within a single traffic control system.

commercial quality: Quality meeting the best general practices.

commercial source: Established business operating as a material source for the general public.

Contract: Written and executed contract between the Department and the Contractor.

Contract acceptance: Director's written acceptance of a completed Contract.

Contract time: Number of original working days as adjusted by any time adjustment.

Contractor: Person or business or its legal representative entering into a Contract with the Department for performance of the work.

controlling activity: Construction activity that will extend the scheduled completion date if delayed.

County: The County of Fresno

critical path: Longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path extends the scheduled completion date.

critical path method: Network-based planning technique using activity durations and relationships between activities to calculate a schedule for the entire project.

culvert: Structure other than a bridge that provides an opening under a roadway.

data date: Day after the date through which a schedule is current. Everything occurring earlier than the data date is as-built and everything on or after the data date is planned.

day: 24 consecutive hours running from midnight to midnight; calendar day.

1. **business day:** Day on the calendar except a Saturday and a holiday.
2. **working day:** Time measure unit for work progress. A working day is any 24-consecutive-hour period except:
 - 2.1. Saturday and a holiday.
 - 2.2. Day during which you cannot perform work on the controlling activity for at least 50 percent of the scheduled work shift with at least 50 percent of the scheduled labor and equipment due to any of the following:
 - 2.2.1. Adverse weather-related conditions.
 - 2.2.2. Traffic maintenance under the Contract.
 - 2.2.3. Suspension of a controlling activity that you and the Engineer agree benefits both parties.
 - 2.2.4. Unanticipated event not caused by either party, such as:
 - 2.2.4.1. Act of God
 - 2.2.4.2. Act of a public enemy.
 - 2.2.4.3. Epidemic.
 - 2.2.4.4. Fire.
 - 2.2.4.5. Flood.
 - 2.2.4.6. Governor-declared state of emergency.
 - 2.2.4.7. Landslide.
 - 2.2.4.8. Quarantine restriction.
 - 2.2.5. Issue involving a third party, including:
 - 2.2.5.1. Industry or area-wide labor strike.
 - 2.2.5.2. Material shortage.
 - 2.2.5.3. Freight embargo.
 - 2.2.5.4. Jurisdictional requirement of a law enforcement agency.
 - 2.2.5.5. Workforce labor dispute of a utility or nonhighway facility owner resulting in a nonhighway facility rearrangement not described and not solely for the Contractor's convenience. Rearrangement of a nonhighway facility includes installation, relocation, alteration, or removal of the facility.
 - 2.3. Day during a concurrent delay.
3. **original working days:**
 - 3.1. Working days to complete the work shown on the *Notice to Bidders* for a non-cost-plus-time-based bid
 - 3.2. Working days bid to complete the work for a cost-plus-time-based bid

Where working days is specified without the modifier *original* in the context of the number of working days to complete the work, interpret the number as the number of original working days as adjusted by any time adjustment.

deduction: Money permanently taken from a progress payment or the final payment. Deductions are cumulative and are not retentions under Pub Cont Code § 7107.

delay: Event that extends the completion of an activity.

1. **excusable delay:** Delay caused by the Department and not reasonably foreseeable when the work began, such as:
 - 1.1. Change in the work
 - 1.2. Department action that is not part of the Contract
 - 1.3. Presence of an underground utility main not described in the Contract or in a location substantially different from that specified
 - 1.4. Described facility rearrangement not rearranged as described, by the utility owner by the date specified, unless the rearrangement is solely for the Contractor's convenience
 - 1.5. Department's failure to obtain timely access to the right-of-way
 - 1.6. Department's failure to review a submittal or provide notification in the time specified
2. **critical delay:** Excusable delay that extends the scheduled completion date
3. **concurrent delay:** Occurrence of at least 2 of the following events in the same period of time, either partially or entirely:
 - 3.1. Critical delay
 - 3.2. Delay to a controlling activity caused by you
 - 3.3. Non-working day

Department: The Fresno County Board of Supervisors and its authorized representatives.

District Office: County of Fresno Department of Public Works and Planning

detour: Temporary route for traffic around a closed road part. A passageway through a job site is not a detour.

Director: Department's Chairman

disadvantaged business enterprise: Disadvantaged business enterprise as defined in 49 CFR 26.5.

dispose of: Remove from the job site.

divided highway: Highway with separated traveled ways for traffic, generally in opposite directions.

Engineer: The County's Director of Public Works and Planning, acting through their authorized designees.

early completion time: Difference in time between an early scheduled completion date and the work completion date.

environmentally sensitive area: Area within or near construction limits where access is prohibited or limited to protect environmental resources.

estimated cost: Estimated cost of the project as shown on the *Notice to Bidders*.

extra work: Any work, desired or performed, but not included in the original Contract.

federal-aid contract: Contract that has a federal-aid project number on the cover of the *Specifications*.

final pay item: Bid item whose quantity shown on the Bid Item List is the quantity paid.

finished grade: Final surface of the completed facility. If the work under the Contract includes stage construction, the relation between the finished grade and the work under the Contract is shown.

fixed cost: Labor, material, or equipment cost directly incurred by the Contractor as a result of performing or supplying a particular bid item that remains constant regardless of the item's quantity.

float: Difference between the earliest and latest allowable start or finish times for an activity.

1. **Department-owned float:** Time saved on the critical path by actions of the Department. It is the last activity shown on the schedule before the scheduled completion date.

force account work: Work ordered on a construction project without an existing agreement on its cost, and performed with the understanding that the contractor will bill the owner according to the cost of labor, materials, and equipment, plus a certain percentage for overhead and profit.

grading plane: Basement material surface on which the lowest layer of subbase, base, pavement, surfacing, or other specified layer is placed.

highway: Whole right-of-way or area reserved for use in constructing the roadway and its appurtenances.

holiday: Holiday shown in the following table:

Holidays	
Holiday	Date observed
Every Sunday	Every Sunday
New Year's Day	January 1 st
Birthday of Martin Luther King, Jr.	3rd Monday in January
Presidents' Day	3rd Monday in February
Cesar Chavez Day	March 31 st
Memorial Day	Last Monday in May
Juneteenth	June 19 th
Independence Day	July 4 th
Labor Day	1st Monday in September
Veterans Day	November 11 th
Thanksgiving Day	4th Thursday in November
Day after Thanksgiving Day	Day after Thanksgiving Day
Christmas Day	December 25 th

If January 1st, March 31st, June 19th, July 4th, November 11th, or December 25th fall on a Sunday, the Monday following is a holiday. If January 1st, March 31st, July 4th, November 11th, or December 25th fall on a Saturday, the preceding Friday is a holiday.

hours of darkness: Hours of darkness as defined in Veh Code § 280.

idle equipment: Equipment:

1. On the job site at the start of a delay
2. Idled because of the delay
3. Not operated during the delay

informal-bid contract: Contract that has *Informal Bid Authorized by Pub Cont Code § 10122* on the cover of the *Notice to Bidders and Special Provisions*.

job site: Area within the defined boundaries of a project.

Labor Surcharge and Equipment Rental Rates: Caltrans publication that lists labor surcharge and equipment rental rates.

landscaping: Practice of a landscaping contractor under 16 CA Code of Regs § 832.27.

material: Any product or substance specified for use in the construction of a project.

material shortage:

1. Shortage of raw or produced material that is area-wide and caused by an unusual market condition except if any of the following occurs:
 - 1.1. Shortage relates to a produced, nonstandard material
 - 1.2. Supplier's and the Contractor's priority for filling an order differs
 - 1.3. Event outside the United States for a material produced outside the United States
2. Unavailability of water that delays a controlling activity

material source facility audit: Self-audit and a Caltrans audit evaluating a facility's capability to consistently produce materials that comply with Caltrans standards.

median: Portion of a divided highway separating the traveled ways including inside shoulders.

milestone: Event activity that has zero duration and is typically used to represent the start or end of a certain stage of the project.

mobilization: Preparatory work that must be performed or costs incurred before starting work on the various items on the job site (Pub Cont Code § 10104).

modify: Add to or subtract from an appurtenant part.

narrative report: Document submitted with each schedule that discusses topics related to project progress and scheduling.

near critical path: Chain of activities with total float exceeding that of the critical path but having not more than 10 working days of total float.

obliterate: Place an earth cover over or root, plow, pulverize, or scarify.

Office engineer: The Director of Public Works and Planning for the County of Fresno

pavement: Uppermost layer of material placed on a traveled way or shoulder.

plans: Standard plans, revised standard plans, and project plans.

1. **standard plans:** Drawings standard to Department construction projects. These plans are in a book titled *Standard Plans*.
2. **revised standard plans:** New or revised standard plans. These plans are listed in the *List of Revised Standard Plans* in a book titled *Specifications*.
3. **project plans:** Drawings specific to the project, including authorized shop drawings. These plans also include a section titled *Project Details* of a book titled *Specifications*.

plant establishment period: Number of days shown on the *Notice to Bidders* for plant establishment.

quality characteristic: Characteristic of a material that is measured to determine conformance with a given requirement.

quality control plan: Contractor's plan to ensure QC.

reconstruct: Remove and disassemble and construct again at an existing or new location.

relocate: Remove and install or place in a new location.

remove: Remove and dispose of.

reset: Remove and install or place laterally at the same station location.

roadbed: Roadway portion extending from the curb line to curb line or the shoulder line to shoulder line. A divided highway has 2 roadbeds.

roadside: Area between the outside shoulder edge and the right-of-way limits.

roadway: Portion of the highway within the outside lines of curbs, sidewalks, slopes, ditches, channels, or waterways. A roadway includes the structures and features necessary for safety, protection of facilities, and drainage.

salvage: Remove, clean, and haul to a specified location.

schedule:

1. **baseline schedule:** Initial schedule showing the original work plan starting on the date of Contract approval. This schedule shows no completed work to date and no negative float or negative lag to any activity.
2. **revised schedule:** Schedule that incorporates a proposed or past change to logic or activity durations.
3. **updated schedule:** Current schedule developed from the accepted baseline and any subsequent accepted updated or revised schedules through regular monthly review to incorporate actual past progress.

scheduled completion date: Planned work completion date shown on the current schedule.

shoulder: Roadway portion contiguous with the traveled way for accommodation of a stopped vehicle, emergency use, and lateral support of base and surface courses.

small tool: Tool or piece of equipment not listed in Labor Surcharge and Equipment Rental Rates that has a replacement value of \$500 or less.

specifications: Standard specifications, revised standard specifications, and special provisions.

1. **standard specifications:** Specifications standard to Department construction projects. These specifications are in a book titled *Standard Specifications*.
2. **revised standard specifications:** New or revised standard specifications. These specifications are in a section titled *Revised Standard Specifications* of a book titled *Specifications*.
3. **special provisions:** Specifications specific to the project. These specifications are in a section titled *Special Provisions* of a book titled *Specifications*.

State: State of California, including its agencies, departments or divisions whose conduct or action is related to the work.

Structure Design: Offices of Structure Design of the Department of Transportation.

subbase: Layer of material between a base and the basement material.

subgrade: Roadbed portion on which pavement, surfacing, base, subbase, or a layer of any other material is placed.

submittal:

1. **action submittal:** Written and graphic information and samples that require the Department's response.
2. **informational submittal:** Written information that does not require the Department's response.

substantial defects: Defects plainly seen as damaged, displaced, or missing parts or improper functioning of materials, parts, equipment, or systems.

substructure: Bridge parts below the bridge seats, pier tops, and haunches for rigid-framed bridges or spring lines for arched bridges; includes abutment backwalls, abutment parapets, and wingwalls.

superstructure: Bridge parts except the substructure.

supplemental project information: Information relevant to the project, specified as supplemental project information, and made available to bidders.

surfacing: Uppermost layer of material placed on a traveled way or shoulders; pavement.

time impact analysis: Analysis using a CPM schedule developed specifically to demonstrate the effect a proposed or past change or delay has on the current scheduled completion date.

time-scaled network diagram: Graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

total bid: Sum of the item totals as verified by the Department; original Contract price.

total float: Amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

traffic: Pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel.

traffic lane: Portion of traveled way used for the movement of a single line of vehicles.

traveled way: Portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.

tunnel: Tunnel as defined in 8 CA Code of Regs § 8405 et seq.

unauthorized work: Work performed beyond the lines and grades described in the Contract or established by the Engineer or extra work performed without Department authorization.

unsuitable material: Material encountered below the natural ground surface in embankment areas or below the grading plane in excavation areas that the Engineer determines to be in any of the following conditions:

1. Of such unstable nature that it cannot be compacted to the specified density using ordinary methods at optimum moisture content.
2. Too wet to be properly compacted and cannot be dried before incorporating it into the work. Excessive moisture alone is not sufficient cause for determining that the material is unsuitable.
3. Inappropriate for the planned use.

withhold: Money temporarily or permanently taken from a progress payment.

work: Resources and activities required for Contract acceptance, including labor, materials, equipment, and the created product.

work plan: Detailed formulation of a program of action.

work zone: Area of a highway with construction, maintenance, or utility work activities.

1-1.08 DISTRICTS

Replace Section 1.08 with:

Not Used

Add to the end of Section 1-1.09

This project is not in a freeze-thaw area.

Replace Section 1-1.10 with:

1-1.10 PAVEMENT CLIMATE REGIONS

To help account for the effects of various climatic conditions on pavement performance, the State has been divided into 9 climate regions. The project's pavement climate region is Inland Valley.

Replace Section 1-1.11 with:

1-1.11 WEBSITES, ADDRESSES, AND TELEPHONE NUMBERS

Websites, Addresses, and Telephone Numbers

Reference or agency or department unit	Website	Address	Telephone no.
Authorized Material Lists Authorized Material Source Lists	https://dot.ca.gov/programs/engineering-services/authorized-materials-lists	--	--
CA Unified Certification Program's list of certified DBEs	https://dot.ca.gov/programs/civil-rights/dbe-search	--	--
<i>California MUTCD</i>	https://dot.ca.gov/programs/safety-programs/camutcd	--	--
Department	https://www.fresnocountyca.gov	2220 Tulare Street Design Division – Seventh Floor Fresno, CA 93721	(559) 600-9908
Department of Conservation, Office of Mine Reclamation	http://www.conservation.ca.gov/dmr/	--	--
Department of Industrial Relations	http://www.dir.ca.gov	455 Golden Gate Ave San Francisco CA 94102	--
Design Services - Contract Administration, Planholders, Bid Results	https://www.co.fresno.ca.us/planholders https://www.fresnocountyca.gov/planholders	2220 Tulare Street Design Division – Seventh Floor Fresno, CA 93721	Tel: (559) 353-4919 Fax: (559) 455-4609 Email: DesignServices@fresnocountyca.gov
Division of Accounting, Office of External Accounts Payable	https://dot.ca.gov/programs/accounting	Major Construction Payment and Information Unit Office of External Accounts Payable Division of Accounting Department of Transportation P.O. Box 168043 Sacramento, CA 95816-8043	(916) 227-9013
Division of Construction	http://www.dot.ca.gov/hq/construc/	--	--
Geotechnical Services	https://dot.ca.gov/programs/engineering-services	Geotechnical Services Department of Transportation 5900 Folsom Blvd Sacramento, CA 95819-4612	(916) 227-7000
METS	https://dot.ca.gov/programs/engineering-services	Materials Engineering and Testing Services Department of Transportation 5900 Folsom Blvd Sacramento, CA 95819-4612	(916) 227-7000
MPQP	https://dot.ca.gov/programs/construction/material-plant-quality-program	--	--

Office Engineer	--	Director of Public Works & Planning Fresno County 2220 Tulare St, 8 th Floor Fresno, CA 93721	(559) 600-4078
Office of Electrical Systems Regional Transportation Management Center	--	Office of Electrical Systems Regional Transportation Management Center 3165 Gold Valley Dr Rancho Cordova, CA 95742	
Offices of Structure Design, Documents Unit	--	MSC 9-4/41 Documents Unit Offices of Structure Design Department of Transportation 1801 30th St Sacramento, CA 95816-7006	(916) 227-0716
Publication Distribution Unit	--	Publication Unit Department of Transportation 1900 Royal Oaks Dr Sacramento, CA 95815-3800	--

Replace Section 1-1.12 with:

1-1.12 MISCELLANY

Make checks and bonds payable to the County of Fresno.

Replace Section 2 with:

2 BIDDING

2-1.01 GENERAL

Section 2 includes specifications related to bid eligibility and the bidding process.

2-1.02 BID INELIGIBILITY

A firm that has provided architectural or engineering services to the Department for this contract before bid submittal for this contract is prohibited from any of the following:

1. Submitting a bid
2. Subcontracting for a part of the work
3. Supplying materials

2-1.03 CONTRACTOR REGISTRATION

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

2-1.04–2-1.05 RESERVED

2-1.06 BID DOCUMENTS

2-1.06A General

The *Bid* book includes bid forms and certifications and may be requested from Design Services and are available online at <http://www.BidExpress.com>.

The *Specifications* includes the *Notice to Bidders*, project details, and special provisions.

The *Specifications*, project plans, and any addenda to these documents may be accessed at the planholders website at <https://www.fresnocountyca.gov/planholders>.

The *Standard Specifications* and *Standard Plans* may be accessed online at [2015 Caltrans Standard Specifications](#) and [2023 Caltrans Standard Specifications](#)

2-1.06B Supplemental Project Information

The Department makes the following supplemental project information available:

Supplemental Project Information	
Where Available	Description
Included in Project Details	<ul style="list-style-type: none">• Construction Funding Sign• Moore Twining Geotechnical Investigation Report Dated January 26, 2024

2-1.06C–2-1.06D Reserved

2-1.07 JOB SITE AND DOCUMENT EXAMINATION

Examine the job site and bid documents. Notify the Department of apparent errors and patent ambiguities in the plans, specifications, and Bid Item List. Failure to do so may result in rejection of a bid or rescission of an award.

Bid submission is your acknowledgment that you have examined the job site and bid documents and are satisfied with:

1. General and local conditions to be encountered
2. Character, quality, and scope of work to be performed
3. Quantities of materials to be furnished
4. Character, quality, and quantity of surface and subsurface materials or obstacles
5. Requirements of the contract

2-1.08 RESERVED

2-1.09 BID ITEM LIST

Submit a bid based on the bid item quantities the Department shows on Bid Item List.

2-1.10 SUBCONTRACTOR LIST

On the Subcontractor List form, list each subcontractor to perform work in an amount in excess of 1/2 of 1 percent of the total bid or \$10,000, whichever is greater (Pub Cont Code § 4100 et seq.).

For each subcontractor listed, the Subcontractor List form must show:

1. Business name and the location of its place of business.
2. California contractor license number for a non-federal-aid contract.
3. Public works contractor registration number.
4. Portion of work it will perform. Show the portion of the work by:
 - 4.1. Bid item numbers for the subcontracted work
 - 4.2. Percentage of the subcontracted work for each bid item listed
 - 4.3. Description of the subcontracted work if the percentage of the bid item listed is less than 100 percent

2-1.13–2-1.30 RESERVED

Replace section 2-1.31 with:

2-1.31 RESERVED

2-1.31 OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

Does not apply.

2-1.32 RESERVED

2-1.33 BID DOCUMENT COMPLETION AND SUBMITTAL

2-1.33A General

Complete forms in the *Bid* book.

Certain bid forms must be submitted with the bid and properly executed.

Certain other forms and information must be submitted either with the bid or within the prescribed period after bid opening as specified elsewhere in these special provisions.

Failure to submit the forms and information as specified results in a nonresponsive bid.

If an agent other than the authorized corporation officer or a partnership member signs the bid, file a Power of Attorney with the Department either before opening bids or with the bid. Otherwise, the bid may be nonresponsive.

Electronic Bids: Complete and submit the bid online at <http://www.BidExpress.com> (Section 2-1.33). Your electronic signature is your confirmation of and agreement to all certifications and statements contained in the Bid book. On forms and certifications that you submit through the electronic bidding service, you agree that each form and certification where a signature is required is deemed as having your signature.

Hardcopy Bid: Submit a hardcopy bid:

1. Under sealed cover
2. Marked as a bid
3. Identifying the contract number and the bid opening date
4. Use ink or typewriter

2-1.33B Bid Item List and Bid Comparison

Submit a bid based on the bid item quantities the Department shows on Proposal 2. Bids will be evaluated and the low bidder determined as indicated in the *Notice to Bidders*.

Do not submit an unbalanced bid. An unbalanced bid is one in which one or more bid items is/are considered by the Department to have been bid at an amount that is unreasonably high or unreasonably low. A bid may be considered to be non-responsive and may be rejected if it is considered by the Department to be unbalanced.

2-1.33C Bid Document Completion

Proposal items are identified by title and by the word "Proposal" followed by the number assigned to the proposal item in question. Proposal items are included in the *Bid Book*.

2-1.33C(1) Proposal 1 - Proposal to the Board of Supervisors of Fresno County

2-1.33C(2) Proposal 2 - Bid Item List

One or more sheet(s) or list(s) upon which the bidder completes the bid.

Fill out completely including a unit price and total for each unit price-based item and a total for each lump sum item.

Do not make any additions such as "plus tax", "plus freight", or conditions such as "less 2% if paid by 15th".

Use ink or typewriter for paper bids.

2-1.33C(3) Proposal 3 - Evaluation of Bid Item List

Describes how inconsistencies and irregularities are evaluated and corrected when Design Services reviews the Bid Item List.

2-1.33C(4) Proposal 4 - Bid Security and Signature

Submit one of the following forms of bidder's security equal to at least 10 percent of the bid:

- Cash
- Cashier's check
- Certified check
- Signed bidder's bond by an admitted surety insurer

Indicate type of bid security provided.

- Cash – Acceptable but not recommended. Cash is deposited in a clearing account and is returned to bidders by County warrant. This process may take several weeks.
- Cashier's or Certified Checks. This type of security is held until the bid is no longer under consideration. If submitted by a potential awardee, they will be returned when the contract is fully executed by the bidder and bonds and insurance have been approved.
- Bid Bonds - Must be signed by the bidder and by the attorney-in-fact for the bonding company. Provide notarized signature of attorney-in-fact accompanied by bonding company's affidavit authorizing attorney-in-fact to execute bonds. An unsigned bid bond will be cause for rejection.

Bonding companies may provide their own bid bond forms. Bid Security and Signature sections must be completed by the bidder and submitted with their bid.

Provide contractor's license information.

State business name and if business is a:

- Corporation - list officers
- Partnership - list partners
- Joint Venture - list members; if members are corporations or partnerships, list their officers or partners.
- Individual - list Owner's name and firm name style

Signature of Bidder - the following lists types of companies and corresponding authorized signers.

- Corporation - by an officer
- Partnership - by a partner
- Joint Venture - by a member
- Individual - by the Owner

If signature is by a Branch Manager, Estimator, Agent, etc., the bid must be accompanied by a power of attorney authorizing the individual to sign the bid in question or to sign bids more generally, otherwise the bid may be rejected.

Business Address - Firm's Street Address

Mailing Address - P.O. Box or Street Address

Complete, sign, and return with bid.

2-1.33C(5) Proposal 5 - Noncollusion Declaration

Must be completed, signed, and returned with bid.

2-1.33C(6) Proposal 6 - Public Contract Code Section 10285.1 Statement

Select "has" or "has not" in accordance with instructions on form, return with completed for with bid. Note that signing the bid constitutes signing this statement.

2-1.33C(7) Proposal 7 - Public Contract Code Section 10162 Questionnaire And Public Contract Code 10232 Statement

Select: "yes" or "no" accordance with instructions on form, include explanation if "yes" is selected. Return completed form with bid. Note that signing the bid constitutes signing this questionnaire and statement.

2-1.33C(8) Proposal 8 - Subcontractors

Sheet(s) or spaces where bidders list subcontractors. List each subcontractor to perform work in an amount in excess of 1/2 of 1 percent of the total bid (Pub Cont Code § 4100 et seq.).

The *Subcontractor List* submitted with the bid must show the name, location of business, work portions to be performed, and the contractor's license number for each subcontractor listed.

- Use subcontractor's business name style as registered with the License Board.
- Specify the city in which the subcontractor's business is located and the state if other than California.
- Description of the work to be performed by the subcontractor. Indicate with bid item numbers from the bid item list and/or work descriptions similar to those on bid item list.
- List license number and Department of Industrial Relations registration number for each subcontractor.

Upon request from Design Services, provide the following additional information within 24 hours of bid opening if not included on the *Subcontractor List* submitted with the bid:

- Complete physical address for each subcontractor listed.
- Percentage of the total bid or dollar amount associated with each subcontractor listed.

2-1.33C(16) Proposal 16 - Opt out of payment adjustments for price index fluctuations

Not used.

2-1.33C(17) Proposal 17 - Guaranty

Does not need to be signed with the bid. Part of the contract which must be signed by the contractor when contract is executed.

2-1.33C(18) Proposal 18 -Title 13, California Code of Regulations § 2449(i) General Requirements for In-Use Off-Road Diesel-Fueled Fleets

Contractors, if applicable, must submit valid Certificates of Reported Compliance with their bid. Subcontractor certificates will be due no later than 4:00 p.m. on the fifth (5th) calendar day after the bid opening if not submitted with the bid.

2-1.33D Electronic Bid Document Completion

Electronic versions of the bid book documents are available online at <http://www.BidExpress.com>, and may be submitted through that website.

You must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), prior to the bid opening.

Bidders submitting online may use one of the accepted electronic sureties (SurePath or Surety 2000) to submit their bid bond; or may submit cash, cashier's check, certified check, or a bidder bond to Design Services at 2220 Tulare St., Seventh Floor, Fresno, CA 93721. Those submitting bid bonds directly to Design Services must submit their bid bond:

1. Under sealed cover
2. Marked as a bid-bond
3. Identifying the contract number and the bid opening date on the cover

2-1.34 BIDDER'S SECURITY

Submit one of the following forms of bidder's security equal to at least 10 percent of the bid:

1. Cash
2. Cashier's check
3. Certified check
4. Signed bidder's bond by an admitted surety insurer

Submit cash, cashier's check, certified check, or bidder's bond with your bid.

2-1.35–2-1.39 RESERVED

2-1.40 BID WITHDRAWAL

1. An authorized agent may withdraw a bid before the bid opening date and time by submitting a written bid withdrawal request at the location where the bid was submitted. Withdrawing a bid does not prevent you from submitting a new bid. An authorized agent is an individual authorized to submit a bid.
2. After the bid opening time, you cannot withdraw a bid.

2-1.41–2-1.42 RESERVED

2-1.43 BID OPENING

The Department publicly opens and reads bids at the time and place shown on the *Notice to Bidders*.

2-1.44–2-1.45 RESERVED

2-1.46 DEPARTMENT'S DECISION ON BID

The Department's decision on the bid amount is final.

The Department may reject:

1. All bids
2. A nonresponsive bid

2-1.47 BID RELIEF

The Department may grant bid relief under Pub Cont Code § 5100 et seq. Submit any request for bid relief to Design Services.

2-1.48 RESERVED

2-1.49 SUBMITTAL FAILURE HISTORY

The Department considers a bidder's past failure to submit documents required after bid opening in determining a bidder's responsibility.

2-1.51 DISCLOSURE OF SELF-DEALING TRANSACTIONS

This provision is only applicable if the contractor is operating as a corporation (a for-profit or non-profit corporation) or if during the term of this agreement, the contractor changes its status to operate as a corporation.

Members of the contractor's Board of Directors shall disclose any self-dealing transactions that they are a party to while contractor is providing goods or performing services under this agreement. A self-dealing transaction shall mean a transaction to which the contractor is a party and in which one or more of its directors has a material financial interest. Members of the Board of Directors shall disclose any self-dealing transactions that they are a party to by completing and signing a Self-Dealing Transaction Disclosure Form which is included in *Project Details* of these special provisions.

In the event that the Contractor (to whom the project is awarded) is operating as a corporation or incorporates during the course of the construction contract, and any member of its board of directors is engaged or intends to become engaged in self-dealing transaction(s), each member of its board of directors who is engaged or intends to become engaged in a self-dealing transaction or transactions must complete and submit to the County a completed Self-Dealing Transaction Disclosure Form (in Project Details) for each such transaction prior to engaging therein or immediately thereafter.

3 CONTRACT AWARD AND EXECUTION

Replace Section 3 with:

3-1.01 GENERAL

Section 3 includes specifications related to contract award and execution.

3-1.02 CONSIDERATION OF BIDS

3-1.02A General

Bids will be compared on the basis listed in the Notice to Bidders.

3-1.02B Tied Bids

The Department breaks a tied bid with a coin toss:

3-1.03 CONTRACTOR REGISTRATION

No contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

3-1.04 CONTRACT AWARD

3-1.04A BID PROTEST PROCEDURES

Any bid protest must be submitted in writing and delivered by the Bidder by either of the following means: (1) via e-mail to DesignServices@fresnocountyca.gov; or (2) via certified mail, return receipt requested to the following address: Design Division, Department of Public Works and Planning, 2220 Tulare Street, Sixth Floor, Fresno, CA 93721.

The bid protest must be received no later than 5:00 p.m. of the seventh (7th) calendar day following the bid opening for any issues found within the bid itself, or 5:00 p.m. of the third (3rd) calendar day following the deadline for submittal of the specific bid document(s) placed at issue by the protest.

Any Bidder filing a protest is encouraged to submit the bid protest via e-mail, because the deadline is based on the Department's receipt of the bid protest. A bid protest accordingly may be rejected as untimely if it is not received by the deadline, regardless of the date on which it was postmarked. The Bidder's compliance with the following additional procedures also is mandatory:

- a. The initial protest document shall contain a complete statement of the grounds for the protest, including a detailed statement of the factual basis and any supporting legal authority.
- b. The protest shall identify and address the specific portion of the document(s) forming the basis for the protest.
- c. The protest shall include the name, address and telephone number of the person representing the protesting party.

- d. The Department will provide a copy of the initial protest document and any attached documentation to all other Bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
- e. The Board of Supervisors will issue a decision on the protest. If the Board of Supervisors determines that a protest is frivolous, the party originating the protest may be determined to be irresponsible and that party may be determined to be ineligible for future contract awards.
- f. The procedure and time limits set forth herein are mandatory and are the Bidder's sole and exclusive remedy in the event of a bid protest. Failure by the Bidder to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including the subsequent filing of a Government Code Claim or legal proceedings.

3-1.04B AWARD PERIOD

If the Department awards the contract, the award is made to the lowest responsible bidder within 54 calendar days after bid opening.

The Department may extend the specified award period if the Bidder agrees.

You may request to extend the award period by faxing a request to Design Services before 4:00 p.m. on or before the last day of the award period. If you do not make this request, after the specified award period:

1. Your bid becomes invalid
2. You are not eligible for the award of the contract

3-1.05 CONTRACT BONDS (PUB CONT CODE §§ 10221 AND 10222)

The successful bidder must furnish 2 bonds conforming to the requirements in the *Agreement* of these special provisions.

3-1.06 CONTRACTOR LICENSE

For a federal-aid contract, the Contractor must be properly licensed as a contractor from contract award through Contract acceptance (Pub Cont Code § 10164).

For a non-federal-aid contract:

1. Contractor must be properly licensed as a contractor from bid opening through Contract acceptance (Bus & Prof Code § 7028.15)
2. Joint venture bidders must obtain a joint venture license before contract award (Bus & Prof Code § 7029.1)

3-1.07 INSURANCE POLICIES

The successful bidder must submit copies of its insurance policies conforming to the requirements in the *Agreement* of these special provisions.

3-1.08 –3-1.10 RESERVED

3-1.11 PAYEE DATA RECORD

Complete and deliver to the Engineer a Payee Data Record form when requested by the Engineer.

3-1.12 RESERVED

3-1.14–3-1.17 RESERVED

3-1.18 CONTRACT EXECUTION

The successful bidder must sign the *Agreement*.

Deliver to Design Services:

1. Signed *Agreement*
2. Contract bonds
3. Documents identified in section 3-1.07
4. For a federal-aid contract, *Local Agency Bidder - DBE Information* form

Design Services must receive these documents before the 10th business day after the bidder receives the contract.

The bidder's security may be forfeited for failure to execute the contract within the time specified (Pub Cont Code §§ 10181, 10182, and 10183).

3-1.19 BIDDERS' SECURITIES

The Department keeps the securities of the 1st, 2nd, and 3rd low bidders until the contract has been executed. The other bidders' securities, other than bidders' bonds, are returned upon determination of the 1st, 2nd, and 3rd low bidders, and their bidders' bonds are of no further effect (Pub Cont Code § 10184).

4 SCOPE OF WORK

Replace Section 4-1.02 with:

4-1.02 INTENT

The Contract intent is to provide for work completion using the best general practices.

Nothing in the specifications, special provisions, Standard Specifications, or in any other Contract document voids the Contractor's public safety responsibilities.

Replace Section 4-1.07C with:

4-1.07C Reserved

Replace Section 4-1.13 with:

4-1.13 CLEANUP

Before final inspection, leave the job site neat and presentable and dispose of:

1. Rubbish
2. Excess materials
3. Falsework
4. Temporary structures
5. Equipment

Remove warning, regulatory, and guide signs when directed by the Engineer.

5 CONTROL OF WORK

Delete the 9th Paragraph of Section 5-1.01

Add the following before the last sentence in Section 5-1.02

Caltrans Standard Plans, City of Fresno Standard Drawings, and any other other-agency Standard Drawings included in the "Project Details" section of the book entitled "Specifications" have the same ranking as Standard Plans."

All other drawings in the "Project Details" section of the book entitled "Specifications" have the same ranking as Project Plans.

Tables and other documents in the "Project Details" section of the book entitled "Specifications" have the same ranking as Special Provisions. If a portion of a document in the Project Details section conflicts with the Special Provisions, the Special Provisions shall prevail.

Replace Section 5-1.09 with:

5-1.09 RESERVED

Replace Section 5-1.12 with:

5-1.12 ASSIGNMENT

No third-party agreement relieves you or your surety of the responsibility to complete the work. Do not sell, transfer, or otherwise dispose of any Contract part without prior written consent from the Department.

If you assign the right to receive Contract payments, the Engineer accepts the assignment upon the Engineer's receipt of a notice. Assigned payments remain subject to deductions and withholds described in the Contract. The Department may use withheld payments for work completion whether payments are assigned or not.

A pending or disapproved request for assignment does not relieve you of the responsibility to commence and pursue work timely and in strict accordance with contract documents.

Replace Section 5-1.13C with:

5-1.13C RESERVED

Replace Section 5-1.13D with:

5-1.13D RESERVED

Add the following paragraph to the end of section 5-1.16 with:

Submit Daily Log records to the Engineer weekly for the entire course of work unless the Engineer requests another interval.

Replace Section 5-1.20B(4) with:

5-1.20B(4) Contractor-Property Owner Agreement

Before procuring material from or disposing or stockpiling of material on non-highway property:

1. Provide proof that the property where materials are to be stockpiled or equipment parked/stored is appropriately zoned and/or permitted for the use proposed by the Contractor.
2. Obtain written authorization from each and every owner of the property where materials are to be stockpiled or equipment parked/stored.
3. Provide proof that the signor(s) of the authorization are the owners of the property.
4. Provide an executed release from the property owner(s) absolving the Department from any and all responsibility in connection with the stockpiling of materials or parking/storage of equipment on said property.
5. Obtain written permission from the Engineer to stockpile materials or park/store equipment at the location designated in said authorization.

Before Contract acceptance, submit a document signed by the owner of the material source or disposal site stating that the Contractor has complied with the Contractor-owner agreement.

Failure by the Contractor to provide written authorization shall result in the withholding of all funds due to the Contractor until said authorization is received by the County.

Replace Section 5-1.23A with:

5-1.23A General

Section 5-1.23 includes specifications for action and informational submittals.

Any submittal not specified as an informational submittal is an action submittal.

Submit action and informational submittals to the Engineer. Unless otherwise specified in these Specifications, submittals shall be provided via email in .pdf format.

Each submittal must have a cover sheet that must include:

1. Contract number
2. Project Name
3. Date
4. Submittals (and resubmittals if applicable) must be numbered sequentially
5. Structure number if applicable
6. Contractor
7. Person responsible for submitting the submittal
8. Signature of Contractor's representative sending submittal
9. Section number and/or item submittal is referencing
10. Pages of submittal, excluding cover sheet

The Department rejects a submittal if it has any error or omission.

If the last day for submitting a document falls on a Saturday or holiday, it may be submitted on the next business day with the same effect as if it had been submitted on the day specified.

Documents must be submitted in the English language.

Convert documents to US customary units.

Replace Section 5-1.26 with:

5-1.26 CONSTRUCTION SURVEYS

Refer to Section 01 57 50 of the Technical Specifications.

Replace Section 5-1.27E with:

5-1.27E CHANGE ORDER BILLS

Maintain separate records for change order work costs.

5-1.32 AREAS FOR USE

Occupy the highway only for purposes necessary to perform the work.

Defend, indemnify, and hold the Department harmless to the same extent as under section 7-1.05.

The Department does not allow temporary residences within the County right-of-way.

6 CONTROL OF MATERIALS

Replace section 6-1.05 with:

6-1.05 SPECIFIC BRAND OR TRADE NAME AND SUBSTITUTION

Unless substitution is expressly precluded in the special provisions, a reference to a specific brand or trade name establishes a quality standard and is not intended to limit competition. Unless the Department

has made a public interest finding expressly authorizing sole source procurement of a particular item, you may use a product that is equal to or better than the specified brand or trade name if authorized.

Submit a substitution request with a time period that:

1. Follows Contract award
2. Allows 30 days for review
3. Causes no delay

Include substantiating data with the substitution request that proves that substitution:

1. Causes no delay
2. Is of equal or better quality and suitability

If the special provisions disallow substitution of a particular item, provide the specified item and do not propose substitution.

7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Add after the last paragraph of Section 7-1.02C:

The following information is provided for the Contractor's information, and nothing herein or elsewhere within these special provisions shall be construed as limiting the Contractor's responsibility for complying with all applicable rules and regulations. In conformance with Title 13 § 2449(i), between March 1 and June 1 of each year, new valid Certificates of Reported Compliance for the current compliance year, as defined in section 2449(n) for the Contractor and all applicable subcontractors must be submitted. Submit new valid Certificates of Reported Compliance to the Engineer at least one week prior to the expiration date of the current certificate.

Replace the 2nd Paragraph of Section 7-1.02K(2) with:

The general prevailing wage rates and any applicable changes to these wage rates are available:

1. From Design Services
2. From the Department of Industrial Relations' Web site

Replace section 7-1.02K(3) with:

Keep accurate payroll records.

Submit a copy of your certified payroll records, weekly, including those of subcontractors. Include:

1. Each employee's:
 - 1.1. Full name
 - 1.2. Address
 - 1.3. Social security number
 - 1.4. Work classification
 - 1.5. Straight time and overtime hours worked each day and week
 - 1.6. Actual wages paid for each day to each:
 - 1.6.1. Journeyman
 - 1.6.2. Apprentice
 - 1.6.3. Worker
 - 1.6.4. Other employee you employ for the work
 - 1.7. Pay rate
 - 1.8. Itemized deductions made
 - 1.9. Check number issued

1.10. Fringe Benefits

2. Apprentices and the apprentice-to-journeyman ratio

Each certified payroll record must include a Statement of Compliance form signed under penalty of perjury that declares:

1. Information contained in the payroll record is true, correct, and complete
2. Employer has complied with the requirements of sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project
3. Wage rates paid are at least those required by the Contract

Submitted certified payrolls for hauling and delivering ready-mixed concrete must be accompanied by a written time record. The time record must include:

1. Truck driver's full name and address
2. Name and address of the factory or batching plant
3. Time the concrete was loaded at the factory or batching plant
4. Time the truck returned to the factory or batching plant
5. Truck driver's signature certifying under penalty of perjury that the information contained in this written time record is true and correct

Make certified payroll records available for inspection at all reasonable hours at your main office on the following basis:

1. Upon the employee's request or upon request of the employee's authorized representative, make available for inspection a certified copy of the employee's payroll record.
2. Refer the public's requests for certified payroll records to the Department. Upon the public's request, the Department makes available for inspection or furnishes copies of your certified payroll records. Do not give the public access to the records at your main office.

Make all payroll records available for inspection and copying or furnish a copy upon request of a representative of the:

1. Department
2. Division of Labor Standards Enforcement of the Department of Industrial Relations
3. Division of Apprenticeship Standards of the Department of Industrial Relations

Furnish the Department the location of the records. Include the street address, city, and county. Furnish the Department a notification of a location and address change within 5 business days of the change.

Comply with a request for the records within 10 days after you receive a written request. If you do not comply within this period, the Department withholds from progress payments a \$100 penalty for each day or part of a day for each worker until you comply. You are not assessed this penalty for a subcontractor's failure to comply with Labor Code § 1776.

The Department withholds from progress payments for delinquent or inadequate records (Labor Code § 1771.5). If you have not submitted an adequate record by the month's 15th day for the period ending on or before the 1st of that month, the Department withholds up to 10 percent of the monthly progress estimate, exclusive of mobilization. The Department does not withhold more than \$10,000 or less than \$1,000.

7-1.02K(4)i Apprenticeship Requirements for non-Federal Projects

- A. Pursuant to Sections 1770-1780 of the Labor Code of the State of California, the Director of the Department of Industrial Relations has determined the general prevailing rate of wages in the locality for each craft or type of worker needed to execute the work. Said wage rates pursuant to Section 1773.2 of the Labor Code are on file with the Clerk to the Fresno County

Board of Supervisors, and will be made available to any interested person on request. A copy of this wage scale may also be obtained at the following Web Site: www.dir.ca.gov/dlsr.

- B. Pursuant to Section 1775 of the Labor Code of the State of California, nothing in this Article shall prevent the employment of properly registered apprentices upon public works. Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she is employed, and shall be employed only at the work of the craft or trade to which he/she is registered.
- C. Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at Section 3070), Division 3, of the Labor Code, are eligible to be employed on public works. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she is training.

Replace Section 7-1.02M(2) with:

7-1.02M(2) Fire Prevention

Cooperate with local fire prevention authorities in eliminating hazardous fire conditions.

Obtain the phone numbers of the nearest fire suppression agency, California Department of Forestry and Fire Protection (Cal Fire) unit headquarters, United States Forest Service (USFS) ranger district office, and U.S. Department of Interior (USDI) BLM field office. Submit these phone numbers to the Engineer before the start of job site activities.

Immediately report to the nearest fire suppression agency fires occurring within the project limits.

Prevent project personnel from setting open fires that are not part of the work.

Prevent the escape of and extinguish fires caused directly or indirectly by job site activities

Except for motor trucks, truck tractors, buses, and passenger vehicles, equip all hydrocarbon-fueled engines, both stationary and mobile including motorcycles, with spark arresters that meet USFS standards as specified in the *Forest Service Spark Arrester Guide*. Maintain the spark arresters in good operating condition. Spark arresters are not required by Cal Fire, the BLM, or the USFS on equipment powered by properly maintained exhaust-driven turbo-charged engines or equipped with scrubbers with properly maintained water levels. The *Forest Service Spark Arrester Guide* is available at the district offices.

Each toilet must have a metal ashtray at least 6 inches in diameter by 8 inches deep half-filled with sand and within easy reach of anyone using the facility.

Locate flammable materials at least 50 feet away from equipment service, parking, and gas and oil storage areas. Each small mobile or stationary engine site must be cleared of flammable material for a radius of at least 15 feet from the engine.

Each area to be cleared and grubbed must be cleared and kept clear of flammable material such as dry grass, weeds, brush, downed trees, oily rags and waste, paper, cartons, and plastic waste. Before clearing and grubbing, clear a fire break at the outer limits of the areas to be cleared and grubbed. Other fire breaks may be ordered and are change order work.

Furnish the following fire tools:

1. 1 shovel and 1 fully charged fire extinguisher UL rated at 4 B:C or more on each truck, personnel vehicle, tractor, grader, or other heavy equipment.
2. 1 shovel and 1 backpack 5-gallon water-filled tank with pump for each welder.
3. 1 shovel or 1 chemical pressurized fire extinguisher, fully charged, for each gasoline-powered tool, including chain saws, soil augers, and rock drills. The fire tools must always be within 25 feet from the

point of operation of the power tool. Each fire extinguisher must be of the type and size required by the Pub Res Code § 4431 and 14 CA Code of Regs § 1234. Each shovel must be size O or larger and at least 46 inches long.

The pickup truck and operator must patrol the area of construction for at least 1/2 hour after job site activities have ended.

In addition to being available at the site of the work, the truck and operator must patrol the area of construction from noon until at least 1/2 hour after job site activities have ended. If the fire danger rating is very high or extreme, the truck and operator must patrol the area of construction while work is being done and for at least 1/2 hour after job site activities have ended.

Cal Fire, USFS, and BLM have established the following adjective class ratings for 5 levels of fire danger for use in public information releases and fire protection signing: low, moderate, high, very high, extreme. Obtain the fire danger rating daily for the project area from the nearest Cal Fire unit headquarters, USFS ranger district office, or BLM field office.

Arrangements have been made with Cal Fire, USFS, and BLM to notify the Department when the fire danger rating is very high or extreme. This information will be furnished to the Engineer who will notify you for dissemination and action in the area affected. If a discrepancy between this notice and the fire danger rating obtained from the nearest office of either Cal Fire or USFS exists, you must conduct operations according to the higher of the two fire danger ratings.

If the fire danger rating reaches very high:

1. Falling of dead trees or snags must be discontinued.
2. No open burning is permitted and fires must be extinguished.
3. Welding must be discontinued except in an enclosed building or within an area cleared of flammable material for a radius of 15 feet.
4. Blasting must be discontinued.
5. Smoking is allowed only in automobiles and cabs of trucks equipped with an ashtray or in cleared areas immediately surrounded by a fire break unless prohibited by other authority.
6. Vehicular travel is restricted to cleared areas except in case of emergency.

If the fire danger rating reaches extreme, take the precautions specified for a very high fire danger rating except smoking is not allowed in an area immediately surrounded by a firebreak and work of a nature that could start a fire requires that properly equipped fire guards be assigned to such operation for the duration of the work.

The Engineer may suspend work wholly or in part due to hazardous fire conditions. The days during this suspension are non-working days.

If field and weather conditions become such that the determination of the fire danger rating is suspended, section 7-1.02M(2) will not be enforced for the period of the suspension of the determination of the fire danger rating. The Engineer will notify you of the dates of the suspension and resumption of the determination of the fire danger rating.

Add between the 9th and 10th paragraphs of section 7-1.03:

07-15-16

If a height differential of more than 0.04 foot is created by construction activities at a joint transverse to the direction of traffic on the traveled way or a shoulder subject to public traffic, construct a temporary taper at the joint with a slope complying with the requirements shown in the following table:

Temporary Tapers

Height differential (foot)	Slope (horizontal:vertical)	
	Taper use of 14 days or less	Taper use of more than 14 days
Greater than 0.08	100:1 or flatter	200:1 or flatter
0.04–0.08	70:1 or flatter	70:1 or flatter

For a taper on existing asphalt concrete or concrete pavement, construct the taper with minor HMA under section 39-2.07.

Grind existing surfaces to accommodate a minimum taper thickness of 0.10 foot under either of the following conditions:

1. HMA material such as rubberized HMA, polymer-modified bonded wearing course, or open-graded friction course is unsuitable for raking to a maximum 0.02 foot thickness at the edge
2. Taper will be in place for more than 14 days

For a taper on a bridge deck or approach slab, construct the taper with polyester concrete under section 60-3.04B.

The completed surface of the taper must be uniform and must not vary more than 0.02 foot from the lower edge of a 12-foot straightedge when placed on its surface parallel and perpendicular to traffic.

If authorized, you may use alternative materials or methods to construct the required taper.

Replace Section 7-1.04 with:

7-1.04 PUBLIC SAFETY

7-1.04A GENERAL

You are responsible to provide for public safety.

Do not construct a temporary facility that interferes with the safe passage of traffic.

Control dust resulting from the work, inside and outside the right-of-way.

Move workers, equipment, and materials without endangering traffic.

Whenever your activities create a condition hazardous to the public, furnish, erect and maintain those fences, temporary railing, barricades, lights, signs, and other devices and take any other necessary protective measures to prevent damage or injury to the public.

Any fences, temporary railing, barricades, lights, signs, or other devices furnished, erected and maintained by you are in addition to those for which payment is provided elsewhere in the specifications.

Provide flaggers whenever necessary to ensure that the public is given safe guidance through the work zone. At locations where traffic is being routed through construction under one-way controls, move your equipment in compliance with the one-way controls unless otherwise ordered.

Use of signs, lights, flags, or other protective devices must comply with the *California MUTCD* and any directions of the Engineer. Signs, lights, flags or other protective devices must not obscure the visibility of, nor conflict in intent, meaning, and function of either existing signs, lights and traffic control devices, or any construction area signs.

Keep existing traffic signals and highway lighting in operation. Other forces within the Department will perform routine maintenance of these facilities during the work.

Cover signs that direct traffic to a closed area.

Install temporary illumination in a manner which the illumination and the illumination equipment does not interfere with public safety. The installation of general roadway illumination does not relieve you from furnishing and maintaining any protective devices.

Equipment must enter and leave the highway via existing ramps and crossovers and must move in the direction of traffic. All movements of workmen and construction equipment on or across lanes open to traffic must be performed in a manner that do not endanger the public. Your vehicles or other mobile equipment leaving an open traffic lane to enter the construction area must slow down gradually in advance of the location of the turnoff to give the traffic following an opportunity to slow down. When leaving a work area and entering a roadway carrying traffic, your vehicles and equipment must yield to traffic.

Immediately remove hauling spillage from a roadway lane or shoulder open to traffic. When hauling on roadways, trim loads and remove material from shelf areas to minimize spillage.

Notify the Engineer not less than 5 days before the anticipated start of an activity that will change the vertical or horizontal clearance available to traffic, including shoulders.

Do not store vehicles, material, or equipment in a way that:

1. Creates a hazard to the public
2. Obstructs traffic control devices

Do not install or place temporary facilities used to perform the work which interfere with the free and safe passage of traffic.

Temporary facilities that could be a hazard to public safety if improperly designed must comply with design requirements described in the Contract for those facilities or, if none are described, with standard design criteria or codes appropriate for the facility involved. Submit shop drawings and design calculations for the temporary facilities and show the standard design criteria or codes used. Shop drawings and supplemental calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

If you appear to be neglectful or negligent in furnishing warning devices and taking protective measures, the Engineer may direct your attention to the existence of a hazard. You must furnish and install the necessary warning devices. If the Engineer points out the inadequacy of warning devices and protective measures, that action on the part of the Engineer does not relieve you from your responsibility for public safety or abrogate your obligation to furnish and pay for these devices and measures.

Install Type K temporary railing or other authorized protective systems under any of the following conditions:

1. Excavations: Where the near edge of the excavation is within 15 feet from the edge of an open traffic lane
2. Temporarily unprotected permanent obstacles: When the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and you elect to install the obstacle before installing the protective system; or you, for your convenience and as authorized, remove a portion of an existing protective railing at an obstacle and do not replace such railing completely the same day
3. Storage areas: When material or equipment is stored within 15 feet of the edge of an open traffic lane and the storage is not otherwise prohibited by the Contract
4. Height differentials: When construction operations create a height differential greater than 0.15 feet within 15 feet of the edge of traffic lane

Installation of Type K temporary railing is not required if an excavation within 15 feet from the edge of an open traffic lane is protected by any of the following:

1. Steel plate or concrete covers of adequate thickness to prevent accidental entry by traffic or the public
2. Side slope where the downhill slope is 4:1 (horizontal: vertical) or less unless a naturally occurring condition
3. Barrier or railing

Offset the approach end of Type K temporary railing a minimum of 15 feet from the edge of an open traffic lane. Install the temporary railing on a skew toward the edge of the traffic lane of not more than 1 foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15-foot minimum offset cannot be achieved, the temporary railing must be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules must be installed at the approach end of the temporary railing.

Secure Type K temporary railing in place before starting work for which the temporary railing is required.

Where 2 or more lanes in the same direction are adjacent to the area where the work is being performed, including shoulders, the adjacent lane must be closed under any of the following conditions:

1. Work is off the traveled way but within 6 feet of the edge of the traveled way, and the approach speed is greater than 45 miles per hour
2. Work is off the traveled way but within 3 feet of the edge of the traveled way, and the approach speed is less than 45 miles per hour

Closure of the adjacent traffic lane is not required when performing any of the following:

1. Working behind a barrier
2. Paving, grinding, or grooving
3. Installing, maintaining, or removing traffic control devices except Type K temporary railing

Do not reduce an open traffic lane width to less than 10 feet. When traffic cones or delineators are used for temporary edge delineation, the side of the base of the cones or delineators nearest to traffic is considered the edge of the traveled way.

If a traffic lane is closed with channelizers for excavation work, move the devices to the adjacent edge of the traveled way when not excavating. Space the devices as specified for the lane closure.

Do not move or temporarily suspend anything over a traffic lane open to the public unless the public is protected.

7-1.04B WORK ZONE SAFETY AND MOBILITY

7-1.04B(1) POLICY

In order to ensure safe and efficient flow of traffic through work zones, the County of Fresno, via its General Plan, Transportation and Circulation Element, Policy TRA-1, has adopted the use of AASHTO Standards as supplemented by Caltrans and County Department of Public Works and Planning Standards.

7-1.04B(2) TRAFFIC MANAGEMENT PLAN

Perform traffic management shall be in accordance with Section 12, "TEMPORARY TRAFFIC CONTROL," of these special provisions.

7-1.04B(3) TEMPORARY TRAFFIC CONTROL PLAN

Prepare traffic control plan(s) in accordance with Section 12, "TEMPORARY TRAFFIC CONTROL," of these special provisions.

7-1.04B(4)PUBLIC INFORMATION

Provide notice to public agencies and others to the extent required, if any, elsewhere in these special provisions. The Engineer provides other noticing not identified to be performed by the Contractor.

Replace the word "State" with "County" where it occurs in Section 7-1.05C.

Replace the word "State" with "Department" in the 1st paragraph of Section 7-1.06B.

Replace the word "State" with "County" in the 5th paragraph of Section 7-1.06C.

Replace the word "State" with "the Department" in Section 7-1.06D(1).

Replace Section 7-1.06 with:

7-1.06 INSURANCE

7-1.06A General

Nothing in the Contract is intended to establish a standard of care owed to any member of the public or to extend to the public the status of a third-party beneficiary for any of these insurance specifications.

7-1.06B Casualty Insurance

Obtain and maintain insurance on all of your operations with companies acceptable to the Department as follows:

1. Keep all insurance in full force and effect from the start of the work through Contract acceptance.
2. All insurance must be with an insurance company with a rating from A.M. Best Financial Strength Rating of A or better and a Financial Size Category of VIII or better.
3. Maintain completed operations coverage with a carrier acceptable to the State through the expiration of the patent deficiency in construction statute of repose set forth in Civ Pro Code § 337.1.

7-1.06C Workers' Compensation and Employer's Liability Insurance

Under Labor Code § 1860, secure the payment of worker's compensation under Labor Code § 3700.

Submit to the Department the following certification before performing the work (Labor Code § 1861):

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

Contract signing constitutes certification submittal.

Provide Employer's Liability Insurance in amounts not less than:

1. \$1,000,000 for each accident for bodily injury by accident
2. \$1,000,000 policy limit for bodily injury by disease
3. \$1,000,000 for each employee for bodily injury by disease

If there is an exposure of injury to your employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act, or under laws, regulations, or statutes applicable to maritime employees, coverage must be included for such injuries or claims.

7-1.06D Liability Insurance

7-1.06D(1) General

Carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of you providing insurance for bodily injury liability and property damage liability for the following limits and including coverage for:

1. Premises, operations and mobile equipment
2. Products and completed operations
3. Broad form property damage (including completed operations)
4. Explosion, collapse, and underground hazards
5. Personal injury
6. Contractual liability

7-1.06D(2) Liability Limits/Additional Insureds

Refer to the *Agreement* of these special provisions

Additional insured coverage must be provided by a policy provision or by an endorsement providing coverage at least as broad as *Additional Insured* (Form B) endorsement form CG 2010 and CG 2037 (for completed operations), as published by the Insurance Services Office (ISO), or equivalent form as approved by the Department.

Replace the word “State” with “County” in Section 7-1.06D(3).

Replace the word “State” with “County” in Section 7-1.06D(4).

7-1.06D(3) Contractor's Insurance Policy is Primary

The policy must stipulate that the insurance afforded the additional insureds applies as primary insurance. Any other insurance or self-insurance maintained by the State is excess only and must not be called upon to contribute with this insurance.

7-1.06E Automobile Liability Insurance

Comply with requirements in the *Agreement* of these special provisions

7-1.06F Policy Forms, Endorsements, and Certificates

Provide your General Liability Insurance under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

7-1.06G NOT USED

7-1.06H Enforcement

The Department may assure your compliance with your insurance obligations. Ten days before an insurance policy lapses or is canceled during the Contract period you must submit to the Department evidence of renewal or replacement of the policy.

If you fail to maintain any required insurance coverage, the Department may maintain this coverage and withhold or charge the expense to you or terminate your control of the work.

You are not relieved of your duties and responsibilities to indemnify, defend, and hold harmless the State, its officers, agents, and employees by the Department's acceptance of insurance policies and certificates.

Minimum insurance coverage amounts do not relieve you for liability in excess of such coverage, nor do they preclude the State from taking other actions available to it, including the withholding of funds under this Contract.

7-1.06I Self-Insurance

Comply with the *Agreement* of these special provisions

Replace Section 7-1.07 with:

7-1.07 LEGAL ACTIONS AGAINST THE DEPARTMENT

7-1.07A General

If legal action is brought against the Department over compliance with a State or federal law, rule, or regulation applicable to highway work, then:

1. If the Department in complying with a court order prohibits you from performing work, the resulting delay is a suspension related to your performance, unless the Department terminates the Contract.
2. If a court order other than an order to show cause or the final judgment in the action prohibits the Department from requiring you to perform work, the Department may delete the prohibited work or terminate the Contract.

7-1.07C Claims

This section applies to non-seal coat projects which involve asphalt concrete paving. Pay for claims for personal property damage caused by your work. Claims are limited to:

1. 10 percent of the total bid

Within 30 days of the last working day placement of hot mix asphalt, do the following:

1. Process and resolve all claims reported or submitted to you by the public as follows:
 - 1.1. Within 3 business days of receipt of a claim, submit to the Department a copy of the claim, a written analysis of the claim, and a statement indicating whether or not you will pay the claim. If you reject a claim, provide the reasons for rejection in writing.
 - 1.2. If the claimant becomes dissatisfied with your handling of the claim, immediately refer the claimant to the local district claims office for assistance in resolving the claim.
2. Submit to the Department evidence of your paid claims.

All claims presented to the Department, (Govt Code § 900 et seq.) are processed and resolved by the Department as follows:

1. The claims are processed as formal government claims subject to all laws and policies and are resolved as the Department determines including referring the claim to you for handling.
2. If the Department approves settlement of a claim or is ordered to pay pursuant to a court order, the claim is paid from funds withheld from you.
3. Within 3 business days of the Department's determination that you are responsible for resolving the claim, the Department sends a copy of the claim to you for resolution or notifies you of the Department's decision to resolve the claim.

The Department withholds an amount not to exceed 5 percent of the total bid to resolve all claims. The amount is held no longer than 60 days following the last working day so that the Department has ample time to resolve any pending claims. After 60 days, any remaining amount withheld is returned to you.

If no withheld funds remain or have been returned, the Department may pay any claims and seek reimbursement from you through an offset or any other legal means. Any reimbursement or offset to be recovered from you, including all other paid claims, is limited to 10 percent of the total bid.

Section 7-1.07C does not limit your obligation to defend and indemnify the Department.

Add between the 1st and 2nd paragraphs of section 7-1.11A:

Comply with 46 CFR 381.7(a)–(b).

8 PROSECUTION AND PROGRESS

Replace Section 8 with:

8-1.01 GENERAL

Section 8 includes specifications related to prosecuting the Contract and work progress.

8-1.01A Work Hours

Perform all work on working days during daytime.

You may request approval to work on a holiday or on a non-working day. If, pursuant to such request, the Engineer authorizes you to work on a holiday or on a non-working day, you pay the actual cost incurred by the Department to perform all inspection, surveying, testing, and all other project-related work by the Department on such holiday or non-working day. Such payment will be deducted from monies due or which may become due to the Contractor.

Plan work so that all construction operations performed each day, including cleanup of the project site, establishment of appropriate traffic control and any other work necessary for the safety of the public shall be completed within the daytime hours.

Do not perform work during nighttime unless approved by the Engineer

Request approval to work during nighttime in writing and include the appropriate traffic control plan(s) and work plan(s) which clearly identify all provisions for illuminating all portions of the work site, including any flagging operations.

If you fail to complete work during the daytime hours, the Engineer may stop all work upon the onset of nighttime and order you to perform any and all work the Engineer deems necessary to ensure the safety of the public during the nighttime hours.

You are not entitled to any additional compensation or extension of the contract time as a result of the Engineer stopping the work due to the onset of nighttime.

8-1.02 SCHEDULE

8-1.02A General

Upon completion of all work, the Department returns the withholds associated with section 8-1.02 and makes a payment adjustment for work not performed in the same manner as work-character changes.

8-1.02B Level 1 Critical Path Method Schedule

8-1.02B(1) General

No pay item is provided for Level 1 Critical Path Project Schedule. Payment is considered to be included in the various items of work.

Before or at the preconstruction conference, submit a CPM baseline schedule.

For each schedule, submit:

1. Plotted original, time-scaled network diagram on a sheet at least 8-1/2 by 11 inches with a title block and timeline
2. A electronic copy in PDF (Adobe Acrobat compatible) format via email to the Engineer.

8-1.02B(2) Schedule Format

On each schedule, show:

1. Planned and actual start and completion dates of each work activity, including applicable:
 - 1.1. Submittal development
 - 1.2. Submittal review and acceptance
 - 1.3. Material procurement

- 1.4. Contract milestones and constraints
- 1.5. Equipment and plant setup
- 1.6. Interfaces with outside entities
- 1.7. Erection and removal of falsework and shoring
- 1.8. Test periods
- 1.9. Major traffic stage change
- 1.10. Final cleanup
2. Order that you propose to prosecute the work
3. Logical links between the time-scaled work activities
4. All controlling activities
5. Legible description of each activity
6. At least 1 predecessor and 1 successor to each activity except for project start and project end milestones
7. Duration of at least 1 working day for each activity
8. Start milestone date as the Contract approval date

8-1.02B(3) Updated Schedule

Submit a monthly updated schedule that includes the status of work completed to date and the work yet to be performed as planned.

You may include changes to updated schedules that do not alter a critical path or extend the scheduled completion date compared to the current schedule. Changes may include:

1. Adding or deleting activities
2. Changing activity constraints
3. Changing durations
4. Changing logic

If any proposed change in planned work would alter the critical path or extend the scheduled completion date, submit a revised schedule within 15 days of the proposed change.

8-1.02C–8-1.02F Reserved

8-1.03 PRECONSTRUCTION CONFERENCE

Attend a preconstruction conference with key personnel, including your assigned representative, at a time and location determined by the Engineer. Submit documents as required before the preconstruction conference.

Be prepared to discuss the topics and documents shown in the following table:

Topic	Document
Potential claim and dispute resolution	Potential claim forms
Contractor's representation	Assignment of Contractor's representative
DBE	Final utilization reports
Equipment	Equipment list
Labor compliance and equal employment opportunity	Job site posters and benefit and payroll reports
Material inspection	Notice of Materials to be Used form
Materials on hand	Request for Payment for Materials on Hand form
Measurements	--
Partnering	--
Quality control	QC plans
Safety	Injury and Illness Prevention Program and job site posters
Schedule	Baseline schedule and Weekly Statement of Working Days form
Subcontracting	Subcontracting Request form
Surveying	Survey Request form
Traffic control	Traffic contingency plan and traffic control plans
Utility work	--
Weight limitations	--
Water pollution control	SWPPP or WPCP
Work restrictions	PLACs
Action submittals	--

8-1.04 START OF JOB SITE ACTIVITIES

8-1.04A General

Provide signed contracts, bonds, and evidence of insurance timely as required.

This section, 8-1.04, "Start of Job Activities," does not modify remedies available to the Department should you fail to provide signed contracts bonds and insurance timely.

Submit a notice 72 hours before starting job site activities. If the project has more than 1 location of work, submit a separate notice for each location.

You may start job site activities before receiving notice of Contract approval if you:

1. Deliver the signed Contract, bonds, and evidence of insurance to the Department
2. Submit 72-hour notice
3. Are authorized by the Department to start
4. Perform work at your own risk
5. Perform work under the Contract

If the Contract is approved, work already performed that complies with the Contract is authorized.

If the Contract is not approved, leave the job site in a neat condition. If a facility has been changed, restore it to its former condition or an equivalent condition. The Department does not pay for the restoration.

8-1.04B Standard Start

Be prepared to begin work at the project site no later than the 20th business day after award of the Contract by the Department.

The Engineer may issue a notice to proceed as soon as the Contracts, including bonds and insurance certificates, have been approved.

Start work on the day shown in the notice to proceed, unless an early start has been approved.

The Engineer may issue a notice of commencement of contract time if you fail to provide Contracts, including bonds and insurance certificates or other required documents timely.

A notice of commencement of contract time does not authorize you to start work on the project site, but contract time begins to elapse on the date shown in the notice of commencement of contract time.

**Complete work before the expiration of
ONE HUNDRED (100) WORKING DAYS**

from the date shown in said Notice to Proceed, or in the Notice of Commencement of Contract Time, whichever comes first.

Complete all work, including corrective work and punch list work, prior to the expiration of the allotted working days. Working days continue to accrue until corrective work and punch list work is completed and accepted.

In the event that additive bid(s) are awarded, additional working days will be granted in accordance with the following:

Additive Bids if Awarded	Number of Additional Working Days
1	15
2	15
3	20

**Pay to the County of Fresno the sum of
FOUR THOUSAND DOLLARS (\$4,000.00)**

per day for each and every calendar day's delay in finishing the work, including corrective work and punch list work, in excess of the total number of working days prescribed above.

8-1.05 TIME

Contract time starts on the day specified in the notice to proceed or in the notice of commencement of contract time as described in section 8-1.04 or on the day you start job site activities, whichever occurs first.

Complete the work within the Contract time.

Meet each specified interim work completion date.

The Engineer issues a *Weekly Statement of Working Days* by the end of the following week.

The *Weekly Statement of Working Days* shows:

1. Working days and non-working days during the reporting week
2. Time adjustments
3. Work completion date computations, including working days remaining
4. Controlling activities

8-1.06 SUSPENSIONS

The Engineer may suspend work wholly or in part due to conditions unsuitable for work progress. Provide for public safety and a smooth and unobstructed passageway through the work zone during the suspension as specified in sections 7-1.03 and 7-1.04. Providing the passageway is force account work. The Department makes a time adjustment for the suspension due to a critical delay.

The Engineer may suspend work wholly or in part due to your failure to (1) fulfill the Engineer's orders, (2) fulfill a Contract part, or (3) perform weather-dependent work when conditions are favorable so that weather-related unsuitable conditions are avoided or do not occur. The Department may provide for a smooth and unobstructed passageway through the work during the suspension and deduct the cost from payments. The Department does not make a time adjustment for the suspension.

Upon the Engineer's order of suspension, suspend work immediately. Resume work when ordered.

8-1.07 DELAYS

8-1.07A General

To request a delay-related time or payment adjustment, submit an RFI.

8-1.07B Time Adjustments

The Department may make a time adjustment for a critical delay. The Engineer uses information from the schedule to evaluate requests for time adjustments.

To request an adjustment, submit a revised schedule showing the delay's effect on the controlling activity. If the delay has:

1. Occurred, submit records of the dates and what work was performed during the delayed activity
2. Not occurred, submit the expected dates or duration of the delayed activity

Update the schedule to the last working day before the start of the delay if ordered.

8-1.07C Payment Adjustments

The Department may make a payment adjustment for an excusable delay that affects your costs.

Only losses for idle equipment, idle workers, and moving or transporting equipment are eligible for delay-related payment adjustments.

The Engineer determines payment for idle time of equipment in the same manner as determinations are made for equipment used in the performance of force account work under section 9-1.04 with the following exceptions:

1. Delay factor in the *Labor Surcharge and Equipment Rental Rates* applies to each equipment rental rate.
2. Daily number of payable hours equals the normal working hours during the delay, not to exceed 8 hours per day.
3. Delay days exclude non-working days.
4. Markups are not added.

The Engineer determines payment adjustment for the idle workers under section 9-1.04B, but does not add markups.

The Engineer includes costs due to necessary extra moving or transporting of equipment.

The Department does not make a payment adjustment for overhead incurred during non-working days of additional construction seasons experienced because of delay.

8-1.08–8-1.09 RESERVED

8-1.10 LIQUIDATED DAMAGES

8-1.10A General

The Department specifies liquidated damages (Pub Cont Code § 10226). Liquidated damages, if any, accrue starting on the 1st day after the expiration of the working days through the day of Contract acceptance except as specified in sections 8-1.10B and 8-1.10C.

The Department withholds liquidated damages before the accrual date if the anticipated liquidated damages may exceed the value of the remaining work.

Liquidated damages are specified in section 8-1.04.

8-1.10B Failure to Complete Work Parts within Specified Times

The Department may deduct specified damages from payments for each day needed to complete a work part in excess of the time specified for completing the work part.

Damages for untimely completion of work parts may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Department does not simultaneously assess damages for untimely completion of work parts and for the whole work.

Damages accrue starting the 1st day after a work part exceeds the specified time through the day the specified work part is complete.

8-1.10C Failure to Complete Work Parts by Specified Dates

The Department may deduct specified damages from payments for each day needed to complete a work part in excess of the specified completion date for the work part.

Damages for untimely completion of a work part may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Department does not simultaneously assess damages for untimely completion of a work part and the whole work.

Damages accrue starting the 1st day after an unmet completion date through the day the work part is complete.

8-1.10D RESERVED

8-1.11–8-1.12 RESERVED

8-1.13 CONTRACTOR'S CONTROL TERMINATION

The Department may terminate your control of the work for failure to do any of the following (Pub Cont Code § 10253):

1. Supply an adequate workforce
2. Supply material as described
3. Pay subcontractors (Pub Cont Code §10262)
4. Prosecute the work as described in the Contract

The Department may also terminate your control for failure to maintain insurance coverage.

For a federal-aid project, the Department may terminate your control of the work for failure to include "Required Contract Provisions, Federal-Aid Construction Contracts" in subcontracts.

The Department gives notice to you and your surety at least 5 business days before terminating control. The notice describes the failures and the time allowed to remedy the failures. If failures are not remedied within the time provided, the Department takes control of the work.

The Department may complete the work if the Department terminates the Contractor's control or you abandon the project (Pub Cont Code § 10255). The Department determines the unpaid balance under Pub Cont Code § 10258 and the Contract.

At any time before final payment of all claims, the Department may convert a Contractor's control termination to a Contract termination.

8-1.14 CONTRACT TERMINATION

8-1.14A General

The Director may terminate the Contract if it serves the State's best interest. The Department issues you a written notice, implements the termination, and pays you.

8-1.14B Relief from Responsibility for Work

Upon receiving a termination notice:

1. Stop work
2. Notify subcontractors and suppliers of the Contract termination and stop Contract-related work
3. Perform the Engineer-ordered work to secure the job site for termination
4. Remove equipment
5. Subject to the Engineer's authorization, settle termination-related claims and liabilities involving subcontractors and suppliers; assign to the Department the rights, titles, or interests held by you with respect to these parties

8-1.14C Responsibility for Materials

Upon receiving a termination notice, protect unused material until:

1. You submit an inventory of materials already produced, purchased, or ordered but not yet used; include the location of the material.
2. The Engineer identifies materials that will be retained by the Department. Submit bills of sales or other records of material title.
3. The Engineer confirms that unused materials paid by progress payment and materials furnished by the State have been delivered and stored as ordered.
4. The titles are transferred for materials purchased by the Department.

Dispose of materials that will not be retained by the Department.

8-1.14D Contract Acceptance after Termination

The Engineer recommends Contract acceptance after determining the completion of:

1. Work ordered to be completed before termination
2. Other work ordered to secure the project before termination
3. Material delivery and title transfer

The Department pays you under section 9-1.17.

8-1.14E Payment Adjustment for Termination

If the Department issues a termination notice, the Engineer determines the payment for termination based on the following:

1. Direct cost for the work:
 - 1.1. Including:
 - 1.1.1. Mobilization.
 - 1.1.2. Demobilization.
 - 1.1.3. Securing the job site for termination.
 - 1.1.4. Losses from the sale of materials.
 - 1.2. Not including:
 - 1.2.1. Cost of materials you keep.
 - 1.2.2. Profit realized from the sale of materials.
 - 1.2.3. Cost of material damaged by:
 - 1.2.3.1. Act of God.
 - 1.2.3.2. Act of a public enemy.
 - 1.2.3.3. Fire.
 - 1.2.3.4. Flood.
 - 1.2.3.5. Governor-declared state of emergency.
 - 1.2.3.6. Landslide.
 - 1.2.3.7. Tsunami.
 - 1.2.4. Other credits.
2. Cost of remedial work, as estimated by the Engineer, is not reimbursed.
3. Allowance for profit not to exceed 4 percent of the cost of the work. Prove a likelihood of having made a profit had the Contract not been terminated.
4. Material handling costs for material returned to the vendor or disposed of as ordered.

5. Costs in determining the payment adjustment due to the termination, excluding attorney fees and litigation costs.

Termination of the Contract does not relieve the surety of its obligation for any just claims arising out of the work performed.

8-1.15–8-1.16 RESERVED

9 PAYMENT

Add Section 9-1.01A:

9-1.01A COMPENSATION

The bid items shown in the bid item list represent full compensation for performing all work. Full compensation for any work for which there is no bid item shall be considered to be included in the various items of work.

Replace Section 9-1.03 with:

9-1.03 PAYMENT SCOPE

The Department pays you for furnishing the resources and activities required to complete the work. The Department's payment is full compensation for furnishing the resources and activities, including:

1. Risk, loss, damage repair, or cost of whatever character arising from or relating to the work and performance of the work
2. PLACs and taxes
3. Any royalties and costs arising from patents, trademarks, and copyrights involved in the work

The Department does not pay for your loss, damage, repair, or extra costs of whatever character arising from or relating to the work that is a direct or indirect result of your choice of construction methods, materials, equipment, or manpower, unless specifically mandated by the Contract.

Payment is:

1. Full compensation for all work involved in each bid item shown on the Bid Item List by the unit of measure shown for that bid item
2. For the price bid for each bid item shown on the Bid Item List or as changed by change order with a specified price adjustment

Full compensation for work specified in divisions I, II, and X is included in the payment for the bid items unless:

1. Bid item for the work is shown on the Bid Item List
2. Work is specified as change order work

Work paid for under one bid item is not paid for under any other bid item.

Payment for a bid item includes payment for work in sections referenced by the section set forth by that bid item.

Notwithstanding anything to the contrary in these special provisions, full compensation for performing all work as shown, as specified, and as directed by the Engineer is considered to be included in the various bid items, and no additional payment will be made, except pursuant to a contract change order to perform work not shown and/or specified.

If one or more bid item(s) is/are not included, perform the work as shown and as specified and payment therefor is considered to be included in the various items of work.

If an alternative is described in the Contract, the Department pays based on the bid items for the details and specifications not described as an alternative unless the bid item is described as an alternative, in which case, the Department pays based on the details and specifications for that alternative.

The Department pays for change order work based on one or a combination of the following:

1. Bid item prices
2. Force account
3. Agreed price
4. Specialist billing

If the Engineer chooses to pay for change order work based on an agreed price, but you and the Engineer cannot agree on the price, the Department pays by force account.

If a portion of extra work is covered by bid items, the Department pays for this work as changed quantities in those items. The Department pays for the remaining portion of the extra work by force account or agreed price.

If the amount of a deduction or withhold exceeds final payment, the Department invoices you for the difference, to be paid upon receipt.

Pay your subcontractors within 10 days of receipt of each progress payment under Pub Cont Code §§ 10262 and 10262.5.

Replace Section 9-1.07 with:

9-1.07 PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS DOES NOT APPLY TO THIS PROJECT

Replace Section 9-1.16F with:

9-1.16F Retentions

The Department, once in each month, shall cause an estimate in writing to be made by the Engineer. The estimate shall include the total amount of work done and acceptable materials furnished, provided the acceptable materials are listed as eligible for partial payment as materials in the special provisions and are furnished and delivered by the Contractor on the ground and not used or are furnished and stored for use on the contract, if the storage is within the State of California and the Contractor furnishes evidence satisfactory to the Engineer that the materials are stored subject to or under the control of the Department, to the time of the estimate, and the value thereof. The estimate shall also include any amounts payable for mobilization. Daily extra work reports furnished by the Contractor less than 5 calendar days, not including Saturdays, Sundays and legal holidays, before the preparation of the monthly progress estimate shall not be eligible for payment until the following month's estimate.

The amount of any material to be considered in making an estimate will in no case exceed the amount thereof which has been reported by the Contractor to the Engineer on State-furnished forms properly filled out and executed, including accompanying documentation as therein required, less the amount of the material incorporated in the work to the time of the estimate. Only materials to be incorporated in the work will be considered. The estimated value of the material established by the Engineer will in no case exceed the contract price for the item of work for which the material is furnished.

The Department shall retain 5 percent of the estimated value of the work done and 5 percent of the value of materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the contract by the Contractor. The Department will not hold retention for mobilization or demobilization.

The Department shall pay monthly to the Contractor, while carrying on the work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the contract. No monthly estimate or payment shall be required to be made when, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the contract.

No monthly estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

Attention is directed to the prohibitions and penalties pertaining to unlicensed contractors as provided in Business and Professions Code Sections 7028.15(a) and 7031.

Add Section 9-1.23:

9-1.23 RESOLUTION OF CONTRACT CLAIMS

Public works contract claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a Contractor and a local public agency shall be resolved in accordance with the provisions of California Public Contract Code Sections 20104-20104.6, inclusive. In addition, California Public Contract Code Section 9204 requires that the procedure established therein shall apply to all claims (as therein defined) filed by a contractor in connection with a public works project. Accordingly, this contract expressly incorporates all of the terms and conditions of those statutory provisions, which are as follows:

California Public Contract Code Section 9204

(a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

(b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3)(A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

(ii) The Department of Transportation as to any project under the jurisdiction of that department.

(iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.

- (iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.
- (v) The Military Department as to any project under the jurisdiction of that department.
- (vi) The Department of General Services as to all other projects.
- (vii) The High-Speed Rail Authority.

(4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

(C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by

issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

(e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.

(f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

(g) This section applies to contracts entered into on or after January 1, 2017.

(h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

(i) This section shall remain in effect only until January 1, 2027, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2027, deletes or extends that date.

California Public Contract Code Sections 20104 – 20104.6

Section 20104

(a)(1) This article applies to all public works claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a contractor and a local agency.

(2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(b)(1) "Public work" means "public works contract" as defined in Section 1101 but does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.

(c) The provisions of this article or a summary thereof shall be set forth in the plans or specifications for any work which may give rise to a claim under this article.

(d) This article applies only to contracts entered into on or after January 1, 1991.

Section 20104.2

For any claim subject to this article, the following requirements apply:

(a) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(b) (1) For claims of less than fifty thousand dollars (\$50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(c) (1) For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

Section 20104.4

The following procedures are established for all civil actions filed to resolve claims subject to this article:

(a) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

(b) (1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act (Title 4 (commencing with Section 2016.010) of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

(2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

(3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but

does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.

(c) The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

Section 20104.6

(a) No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the contract.

(b) In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

Add Section 9-1.25:

9-1.25 SUPPLEMENTAL WORK

The Supplemental Work bid item is provided to compensate the Contractor for new and unforeseen work necessary to construct the project as designed and intended. Refer to Section 01 22 00 for measurement and payment.

12 TEMPORARY TRAFFIC CONTROL

Add to section 12-1.01:

The project requires obtaining Temporary traffic control encroachment permit from Caltrans Right-of-Way. The permit application fees for the traffic control shall be paid by the Contractor. Contractor shall obtain final fees and requirements from Caltrans before submitting the bid.

Contractor shall be responsible for coordinating the permit process, pay for required fees and obtain the permit. The cost of the coordination and fees shall be included in the various items of work. Should Caltrans require signed and stamped traffic control plan by a License Professional Engineer, the contractor shall be responsible to retain the engineer and pay necessary fees.

The contractor can download the Standard Encroachment Permit Application form TR-0100 at the link below:

<https://dot.ca.gov/programs/traffic-operations/ep/applications>

The contractor must submit the electronic copy of the permit application to Caltrans District 6 mailbox below:

District6EncroachmentPermits@dot.ca.gov

Replace section 12-1.04 with:

12-1.04 FLAGGING COSTS

You pay the cost of furnishing all flaggers, including transporting flaggers and furnishing stands and towers for flaggers to provide for the passage of traffic through the work as specified in sections 7-1.03 and 7-1.04.

Replace section 12-2 with:

12-2 CONSTRUCTION PROJECT FUNDING INFORMATION SIGNS

12-2.01 GENERAL

Details for construction project information signs are in *Project Details*.

Keep construction project information signs clean and in good repair at all times.

12-2.02 MATERIALS

Provide Construction project information signs, posts, and mounting hardware.

Construction project information signs must be wood post signs complying with section 82-3 of the Standard Specifications. Each sign shall be supported by two 16-foot tall 4x4 smooth wood posts, painted white.

Sign panels for construction project information signs must be 4 feet tall by 6 feet wide and made of 3/4 inch thick exterior grade plywood.

The background on construction project information signs must be painted white.

Text shall be black on a white background.

The size of the text and logos on construction project information signs must be as described in the Project Details. Do not add any additional information unless authorized.

12-2.03 CONSTRUCTION

Provide and Install a total of 1 construction project information signs at the location designated by the Engineer before starting major work activities visible to highway users.

The Contractor shall construct and maintain signage meeting the guidelines specified in the Project Details insert. The sign shall be prominently displayed in a location visible to the public.

Upon completion and acceptance of the work, the signs shall be removed and become the property of the Contractor.

Replace Section 12-3.01C with:

12-3.01C Construction

If channelizing devices are used on the project, perform all layout work necessary to place channelizing devices:

1. On the proper alignment
2. Uniformly at the location and spacing described
3. Straight on a tangent alignment
4. On a true arc in a curved alignment

If temporary traffic control devices are damaged, displaced, or stop operating or functioning as described from any cause during the progress of the work, immediately repair, repaint, or replace the components and restore them to their original locations and positions.

If ordered, furnish and place additional temporary traffic control devices. This work is not change order work if:

1. Required to conform with your traffic control plan

2. Required to conform with the MUTCD
3. Necessary for public safety or convenience as determined by the Engineer
4. Required to perform staged construction shown on the plans

Replace Section 12-3.03C with:

12-3.03C Construction

If plastic traffic drums are used on project, use 1 type of plastic traffic drum on the project.

Use the same type and brand of retroreflective sheeting for all plastic traffic drums used on the project.

Do not use sandbags or comparable ballast.

Moving plastic traffic drums from location to location if ordered after initial placement is not change order work if:

1. Required to conform with your traffic control plan
2. Required to conform with the MUTCD
3. Necessary for public safety or convenience as determined by the Engineer
4. Required to perform staged construction shown on the plans

Replace Section 12-3.10C with:

12-3.10C Construction

If barricades are used on the project, place each barricade such that the stripes slope downward in the direction road users are to pass.

Place each sand-filled bag near the ground level on the lower parts of the frame or stays to serve as ballast for the barricades. Do not place ballast on top of barricades or over any retroreflective barricade rail face that is facing traffic.

Do not remove barricades that are shown to be left in place at the time of work completion.

Moving a barricade from location to location is change order work if ordered after initial placement of the barricade unless.

1. Required to conform with your traffic control plan
2. Required to conform with the MUTCD
3. Necessary for public safety or convenience as determined by the Engineer
4. Required to perform staged construction shown on the plans

Replace Section 12-3.20C(1) with:

12-3.20C1 General

If Type K temporary rail is used on the project, before placing Type K temporary railing on the job site, paint the exposed surfaces of the railing with white paint complying with the specifications for acrylic emulsion paint for exterior masonry.

Place Type K temporary railing on a firm, stable foundation. Grade the foundation to provide a uniform bearing surface throughout the entire length of the railing.

Structure excavation and backfill must comply with section 19-3 except compaction of earth fill placed behind Type K temporary railing in a curved layout is not required.

Place and maintain the abutting ends of PC concrete units in alignment without substantial offset from each other.

The drilling of holes and bonding of threaded rods or dowels must comply with the specifications for drilling and bonding dowels in section 51-1.

Install a reflector on the top or face of the rail of each rail unit placed within 10 feet of a traffic lane. Apply adhesive for mounting the reflector under the reflector manufacturer's instructions.

Install a Type P marker panel at each end of railing placed adjacent to a 2-lane, two-way highway and at the end facing traffic for railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, install the marker at the end of the skew nearest the traveled way. Type P marker panels must comply with section 82 except you must furnish the marker panels.

After removing Type K temporary railing:

1. Restore the area to its previous condition or construct it to its planned condition if temporary excavation or embankment was used to accommodate the railing.
2. Remove all threaded rods or dowels to a depth of at least 1 inch below the surface of the concrete. Fill the resulting holes with mortar under section 51-1 except cure the mortar by the water method or by the curing compound method using curing compound no. 6.

If the Engineer orders a lateral move of Type K temporary railing and repositioning is not shown, the lateral move is change order work unless:

1. Required to conform with your traffic control plan
2. Required to conform with the MUTCD
3. Necessary for public safety or convenience as determined by the Engineer
4. Required to perform staged construction shown on the plans

Replace Section 12-3.22C with:

12-3.22C Construction

If crash cushion modules are used on the project, use the same type of crash cushion module for a single grouping or array.

Temporary crash cushion arrays must not encroach on the traveled way.

Secure the sand-filled modules in place before starting an activity requiring a temporary crash cushion.

Maintain sand-filled temporary crash cushions in place at each location, including times when work is not actively in progress. You may remove the crash cushions during the work shift for access to the work if the exposed fixed obstacle is 15 feet or more from the nearest lane carrying traffic. Reset the crash cushion before the end of the work shift.

Immediately repair sand-filled temporary crash cushion modules damaged due to your activities. Remove and replace any module damaged beyond repair. Repair and replacement of temporary crash cushion modules damaged by traffic are change order work.

You may place sand-filled temporary crash cushion modules on movable pallets or frames complying with the dimensions shown. The pallets or frames must provide a full-bearing base beneath the modules. Do not move the modules and supporting pallets or frames by sliding or skidding along the pavement or bridge deck.

Attach a Type R or Type P marker panel to the front of the temporary crash cushion if the closest point of the crash cushion array is within 12 feet of the traveled way. Firmly fasten the marker panel to the crash cushion with commercial quality hardware or by other authorized methods. Attach the Type R marker panel such that the top of the panel is 1 inch below the module lid. Attach the Type P marker panel such that the bottom of the panel rests upon the pallet or roadway surface if pallets are not used.

A lateral move of a temporary crash cushion module is change order work if ordered and the repositioning is not shown, unless required for staged construction.

Remove sand-filled temporary crash cushion modules, including sand, pallets or frames, and marker panels, at Contract acceptance. Do not install sand-filled temporary crash cushion modules in the permanent work.

Replace section 12-3.31C with:

12-3.31C Construction

If portable flashing beacons are used on the project, remove portable flashing beacons from the traveled way at the end of each night's work. You may store the flashing beacon at selected central locations within the highway where designated by the Engineer.

Moving portable flashing beacons from location to location if ordered after initial placement is change order work unless:

1. Required to conform with your traffic control plan
2. Required to conform with the MUTCD
3. Necessary for public safety or convenience as determined by the Engineer
4. Required to perform staged construction shown on the plans

Add to section 12-3.32C:

Start displaying the message ("ROADWORK START MONTH/DAY/YEAR" "EXPECT DELAYS") on the portable changeable message boards 7 days prior to the start of construction.

Start displaying the message on the portable changeable message sign 10 minutes before closing the lane.

Place the portable changeable message sign in advance of the 1st warning sign for each:

1. Stationary lane closure
2. Connector closure
3. Shoulder closure
4. Speed reduction zone

Replace Section 12-3.35B(6) with:

12-3.35B(6) User Interface

If the project includes an AWIS, the system must have a user interface to control the AWIS PCMS communications. The interface must be (1) software compatible with a Windows environment or (2) a web service accessed by a web browser.

Provide any software on a CD or other Engineer-authorized data-storage device.

The user interface must, at a minimum, provide the user with a list of AWIS PCMSs in the field, location information for each AWIS PCMS, and a real-time on-board display of the message in the field. Control options must, at a minimum, provide the user the ability to change the on-board messages and flash rate.

Replace Section 12-4 with:

12-4 MAINTAINING TRAFFIC

12-4.01 GENERAL

12-4.01A General

Section 12-4.01 includes general specifications for maintaining traffic through construction work zones.

If local authorities regulate traffic, notify them at least 5 business days before the start of job site activities. Cooperate with the local authorities to handle traffic through the work zone and to make arrangements to keep the work zone clear of parked vehicles.

12-4.01B Materials

Not Used

12-4.01C CONSTRUCTION

Furnishing and operating pilot cars is not change order work.

12-4.01D Payment

Not Used

12-4.02 TRAFFIC CONTROL SYSTEMS

12-4.02A General

12-4.02A(1) Summary

Section 12-4.02 includes specifications for providing a traffic control system to close traffic lanes, shoulders, and roadways.

A traffic control system for a closure includes the temporary traffic control devices described as part of the traffic control system. Temporary traffic control devices must comply with section 12-3.

12-4.02A(2) Definitions

designated holidays: Designated holidays are shown as "holidays" in Section 1-1.07B.

12-4.02A(3) Submittals

12-4.02A(3)(a) General

The Contractor shall prepare and submit to the County Construction Engineer for approval, a traffic control system plan indicating the means and methods he will employ to institute and maintain traffic control for all phases of the work within the project. The traffic control system plan shall be submitted to the County Construction Engineer as early as possible, preferably **five (5) working days** prior to pre-construction meeting. The Engineer will require five (5) working days to review the initial submittal of the traffic control system plan and an additional five (5) working days for each successive review.

No work at the project site whatsoever, including preparatory work such as the installation of construction project funding signs, shall commence until the traffic control system plan has been approved in writing by the Engineer. In the event that the traffic control system plan is not submitted timely, the Engineer may issue a notice of commencement of contract time prior to approval of the traffic control system plan, and working days will begin to accrue against the allotted contract time.

Late submittal of the traffic control plan or revisions thereafter required, due to the inadequacy of the plan, shall not be accepted as justification for the delay in the start of the working days for the project.

It shall be the Contractor's responsibility to provide, install, maintain, and remove any and all detour signage and traffic control devices and to obtain all permits, including permits from Caltrans, as may be necessary to establish detours as part of the contractor's traffic control plan.

Traffic will not be allowed to be limited to one direction when construction activities are not actively in progress. Providing, installing, maintaining, and removing all traffic control, including portable changeable message signs if required, obtaining and complying with all permits, and providing all traffic control operations shall be the responsibility of the contractor, and no additional compensation will be allowed therefor.

12-4.02A(3)(b) Closure Schedules

One-way traffic shall be controlled through the project in accordance with the California Manual MUTCD and Caltrans Standard Plans T-11 and T-13 entitled "Traffic Control System for Lane Closure on Multilane Conventional Highways" and "Traffic Control System for Lane Closure on Two Lane Conventional Highways," and these special provisions. Night closure will not be permitted.

When traffic is under one way control on unpaved areas, the cones shown along the centerline on the plan need not be placed.

Every Monday by noon, submit a closure schedule request for planned closures for the next week.

The next week is defined as Sunday at noon through the following Sunday at noon.

Submit a closure schedule request 5 days before the anticipated start of any job site activity that reduces:

1. Horizontal clearances of traveled ways, including shoulders, to 2 lanes or fewer due to activities such as temporary barrier placement and paving
2. Vertical clearances of traveled ways, including shoulders, due to activities such as pavement overlays, overhead sign installation, or falsework girder erection

Submit closure schedule changes, including additional closures, by noon at least 3 business days before a planned closure.

Cancel closure requests at least 48 hours before the start time of the closure.

The Department notifies you of unauthorized closures or closures that require coordination with other parties as a condition for authorization.

12-4.02A(3)(c) Contingency Plans for Closures

Submit a contingency plan for an activity that could affect a closure if a contingency plan is specified in the special provisions or if a contingency plan is requested.

If a contingency plan is requested, submit the contingency plan within 1 business day of the request.

The contingency plan must identify the activities, equipment, processes, and materials that may cause a delay in the opening of a closure to traffic. The plan must include:

1. List of additional or alternate equipment, materials, or workers necessary to ensure continuing activities and on-time opening of closures if a problem occurs. If the additional or alternate equipment, materials, or workers are not on the job site, specify their location, the method for mobilizing these items, and the required time to complete mobilization.
2. General time-scaled logic diagram displaying the major activities and sequence of the planned activities. For each activity, identify the critical event that will activate the contingency plan.

Submit revisions to a contingency plan at least 3 business days before starting the activity requiring the contingency plan. Allow 2 business days for review.

12-4.02A(4) Quality Assurance

Reserved

12-4.02B Materials

Not Used

12-4.02C Construction

12-4.02C(1) General

Traffic will be controlled by flagmen by eyesight, radio (walkie talkie) or baton. In the event these methods do not work satisfactorily, as determined by the Engineer, a pilot car will be required.

The Engineer may require a pilot car to be used during earthwork operations in preparation of the grading plane or other operations when the Contractor's operations cover an area beyond the line of sight, or beyond the range of radios or when the baton method does not function satisfactorily.

Work that interferes with traffic is limited to the hours when closures are allowed.

12-4.02C(3) Closure Requirements and Charts

12-4.02C(3)(a) General

Where 2 or more lanes in the same direction, including the shoulders, are adjacent to the area where the work is being performed, close the adjacent lane under any of the following conditions:

1. Work is off the traveled way but within 6 feet of the edge of the traveled way, and the approach speed is greater than 45 mph
2. Work is off the traveled way but within 3 feet of the edge of the traveled way, and the approach speed is less than 45 mph

Closure of the adjacent traffic lane is not required during any of the following activities:

1. Work behind a barrier
2. Paving, grinding, or grooving
3. Installation, maintenance, or removal of traffic control devices except for temporary railing

12-4.02C(3)(b) - 12-4.02C(3)(n)

Reserved

12-4.02C(3)(o) Closure of Conventional County Roads

The type and location of signs, lights, flags, flagmen, and other traffic control and safety devices shall be in accordance with the current edition of the California Manual on Uniform Traffic Control Devices (MUTCD) issued by the State of California, Department of Transportation (Caltrans).

Allow public traffic to pass through construction at all times unless otherwise specified herein.

Provide access to properties abutting the project site at all times.

When directed by the Engineer, traffic shall be routed through the work under one-way control.

Under one-way reversing traffic control operations, public traffic may be stopped in one direction for periods not to exceed 10 minutes.

Lane closure is defined as the closure of a traffic lane or lanes within a single traffic control system.

Provide a minimum of one paved traffic lane, not less than 11 feet wide, to be open for use by public traffic at all times.

The full width of the traveled way shall be open for use by public traffic when construction operations are not actively in progress.

Keep driveways and access roads accessible at all times.

Contractor may elect to close Elkhorn Ave to public traffic. Contractor will be allowed to close the road for a maximum period of 2 working days. You will notify the Engineer 5 working days prior to the date on which he intends to close the road. You are required, however, to provide access to property abutting the project along the line of work at all times where such access now exists.

It is agreed by the parties to the contract that should any roads remain closed for more than the number of working days specified, damage will be sustained by the County of Fresno, and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the County will sustain in the event of and by reason of such delay and it is, therefore, agreed that the Contractor will pay to the County of Fresno, the sum set forth in the following paragraph per day for each and every calendar day's delay in opening any of the roads to traffic in excess of the number of days prescribed and the Contractor agrees to pay said liquidated damages wherein provided for, and further agrees that Fresno County may deduct the amount thereof from any monies due or that may become due the Contractor under the contract.

Liquidated damages of TWO THOUSAND DOLLARDS (\$2000.00) per day are for each calendar day's delay in opening the roads beyond the time limit.

Should the contractor elect to close Elkhorn Ave, Contractor is required to submit a detour plan in conformance with Standard Specifications, these Special provisions and CAMUTCD. Any necessary requirements from Caltrans for setting up detour signs, potential Portable Message Signs and any other requirements shall be included in the Traffic Control plan bid item at no extra cost to the County of Fresno.

The seal coats shall not be applied to more than one-half of the width to be sealed at time, and the remaining half width to be kept free of obstructions and open for use by public traffic until the seal coat first applied is ready for use by traffic.

Asphaltic emulsion, asphalt concrete and asphalt rejuvenating agent shall not be applied to more than one-half of the width to be capped at a time, the remaining half-width to be kept free of obstructions and open for use by public traffic until the asphalt concrete cap, first applied, is ready for use by traffic.

12-4.02C(3)(o)–12-4.02C(3)(s) Reserved

12-4.02C(4)–12.4.02C(6) Reserved

12-4.02C(7) Traffic Control System Requirements

12-4.02C(7)(a) General

Control traffic using stationary closures.

If components of the traffic control system are displaced or cease to operate or function as specified, immediately repair them to their original condition or replace them and place them back in their original locations.

Vehicles equipped with attenuators must comply with section 12-3.23.

Each vehicle used to place, maintain, and remove components of a traffic control system on a multilane highway must have a Type II flashing arrow sign that must operate whenever the vehicle is used for placing, maintaining, or removing the components. For a stationary closure, vehicles with a Type II flashing arrow sign not involved in placing, maintaining, or removing the components must display only the caution display mode. If a flashing arrow sign is required for a closure, activate the sign before the closure is in place.

12-4.02C(7)(b) Stationary Closures

Except for channelizing devices placed along open trenches or excavations adjacent to the traveled way, remove the components of the traffic control system for a stationary closure from the traveled way and shoulders at the end of each work period. You may store the components at authorized locations within the limits of the highway.

If a traffic lane is closed with channelizing devices for excavation work, move the devices to the adjacent edge of the traveled way when not excavating. Space the devices as shown for the lane closure.

12-4.02C(7)(c) Moving Closures

For a moving closure, use a PCMS that complies with section 12-3.32 except the sign must be truck mounted. The full operational height to the bottom of the sign may be less than 7 feet above the ground but must be as high as practicable.

If you use a flashing arrow sign in a moving closure, the sign must be truck mounted. Operate the flashing arrow sign in the caution display mode if it is being used on a 2-lane, two-way highway.

12-4.02C(8) Traffic Control System Signs

12-4.02C(8)(a) General

Traffic control system signs must comply with section 12-3.11.

12-4.02C(8)(b) Connector and Ramp Closure Signs

Inform motorists of a temporary closing of a (1) connector or a (2) freeway or expressway entrance or exit ramp using:

1. SC6-3(CA) (Ramp Closed) sign for closures of 1 day or less
2. SC6-4(CA) (Ramp Closed) sign for closures of more than 1 day

SC6-3(CA) and SC6-4(CA) signs must be stationary mounted at the locations shown and must remain in place and visible to motorists during the connector or ramp closure.

Notify the Engineer at least 2 business days before installing the sign and install the sign from 7 to 15 days before the closure.

12-4.02C(10)–12-4.02C(11) Reserved

12-4.02C(12) Failure to Provide Traffic Control.

If you do not provide the traffic control and it becomes necessary for the Engineer to notify you of your duties according to the Standard Specifications and these special provisions, you will pay \$200 per 15-minute period or portion thereof to the County for all the time required to acquire the traffic control, including pilot car.

Such payment shall commence at the time notice of the improper traffic control condition is given to you or your authorized representative by the Engineer and shall terminate when the condition is corrected. Such payment will be deducted from your payment.

In addition, when it is necessary for the Engineer to perform the work, you will pay the actual cost for the performance thereof. Such amount will be deducted from the your payment. This will be in addition to any penalties imposed in these special provisions.

The provisions in this section will not relieve you from your responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.04, "Public Safety," of the Standard Specifications.

12-4.02D Payment

The Department pays for change order work for a traffic control system by force account for increased traffic control and uses a force account analysis for decreased traffic control.

Traffic control system for lane closure is paid for as traffic control system. Flagging costs are paid for as specified in section 12-1.04.

The requirements in section 4-1.05 for payment adjustment do not apply to traffic control system. Adjustments in compensation for traffic control system will be made for an increase or decrease in traffic control work if ordered and will be made on the basis of the cost of the necessary increased or decreased traffic control. The adjustment will be made on a force account basis for increased work and estimated on the same basis in the case of decreased work.

A traffic control system required by change order work is paid for as a part of the change order work.

Full compensation for furnishing and operating the pilot car, (including driver, radios, and any other equipment and labor required) shall be considered as included in the contract lump sum price paid for traffic control system and no further payment will be made.

12-4.03 FALSEWORK OPENINGS

Reserved

12-4.04 PEDESTRIAN FACILITIES

12-4.04A General

Section 12-4.04 includes specifications for providing temporary pedestrian facilities.

Temporary pedestrian facilities must comply with section 16-2.02.

12-4.04B Materials

Not Used

12-4.04C Construction

If pedestrian traffic is allowed to pass through work areas, provide a temporary pedestrian facility through the construction areas within the highway. Include a protective overhead covering as necessary to ensure protection from falling objects and drippings from overhead structures.

If an activity requires a closure of a walkway, provide another walkway nearby, off of the traveled way.

Where pedestrian openings through falsework are required, provide a temporary pedestrian facility with a protective overhead covering during all bridge construction activities.

12-4.04D Payment

Not Used

12-4.06–12-4.10 RESERVED

Replace the last sentence in the 1st paragraph of section 12-6.03A with:

On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width, the temporary pavement delineation must also include edge line delineation for traveled ways open to traffic.

Replace the 1st sentence in the 3rd paragraph of section 12-6.03A with:

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the temporary pavement delineation, including any underlying adhesive for temporary pavement markers, from the final layer of surfacing and from the pavement to remain in place.

Replace the introductory clause in the 1st paragraph of section 12-6.03C with:

On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width open to traffic where edge lines are obliterated and temporary pavement delineation to replace those edge lines is not shown, provide temporary pavement delineation for:

13 WATER POLLUTION CONTROL

Add to Section 13-1.01:

STATE WATER RESOURCES CONTROL BOARD (SWRCB) NOTICE OF INTENT FILING (NOI) FEE

Complete the NOI filing process started by the County on the SWRCB website using information available in the contract, field and website. The Engineer will link your plan to the project on the SWRCB website. Refer to Section 01 22 00 EXPLANATION OF BID ITEMS for payment.

The provisions of section 9-1.06 for increased or decreased quantities shall not apply to the "State Water Resources Control Board Notice of Intent" bid item.

The SWRCB website can be found at:

<https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.xhtml>

The dollar amount shown in the Proposal is an estimate only and shall be included in each bidder's proposal.

Replace 13-1.01A with:

13-1.01A Summary

Section 13-1 includes general specifications for preventing, controlling, and abating water pollution within waters of the State.

Information on forms, reports, and other documents is in the following Caltrans manuals:

1. Field Guide to Construction Site Dewatering
2. Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
3. Construction Site Best Management Practices (BMPs) Manual
4. Construction Site Monitoring Program Guidance Manual

You may view these manuals at the Stormwater and Water Pollution Control Information link at the Caltrans Division of Construction website or purchase them at the Caltrans Publication Distribution Unit.

A WPCP and a SWPPP must comply with the Caltrans Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual and must be prepared using the latest template posted on the Construction stormwater website.

Replace Section 13-1.01D(2) with

13-1.01D(2) Regulatory Requirements

Comply with the discharge requirements in the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities; Order No. 2009-000 9-DWQ, CAS000002 (Construction General Permit) and any amendments thereto issued by the SWRCB. The Construction General Permit may be found at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Discharges from manufacturing facilities, such as batch plants and crushing plants, must comply with the discharge requirements in the NPDES General Permit for Storm Water Discharges Associated with Industrial Activities; Order No. 2014-0057-DWQ, CAS000001 (Industrial General Permit), issued by the SWRCB. For the Industrial General Permit, go to the SWRCB website.

For a batch plant and crushing plant outside a job site or within a job site that serves one or more contracts, obtain coverage under the Industrial General Permit before operating a batch plant to manufacture concrete, HMA, or other material or a crushing plant to produce rock or aggregate.

This Project disturbs approximately 140 acres of soil.

Replace Section 13-1.01D(4)(b) with:

13-1.01D(4)(b) Qualifications

The WPC manager must:

1. Comply with the requirements provided in the Construction General Permit for:
 - 1.1. QSP if the project requires a WPCP
 - 1.2. QSD if the project requires a SWPPP
2. Complete the stormwater management training described at the Stormwater and Water Pollution Control Information link at the Caltrans Division of Construction website

Replace Section 13-2.04:

13-2.04 PAYMENT

The Department pays for prepare water pollution control program as follows:

1. Total of 50 percent of the item total upon authorization of the WPCP
2. Total of 90 percent of the item total upon work completion
3. Total of 100 percent of the item total upon Contract acceptance

Add to section 13-3.01A:

This project's risk level is 1.

Add between the 4th and 5th paragraphs of section 13-3.01C(2)(a):

The Central Valley Regional Water Quality Control Board will review the authorized SWPPP.

Replace Section 13-3.01C(5) with:

13-3.01C(5) Annual Certification

Submit an annual certification of compliance as described in the *Caltrans Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual* before July 15th of each year.

Replace Section 13-3.04:

13-3.04 PAYMENT

For a project with 60 original working days or less, the Department pays for prepare stormwater pollution prevention plan as follows:

1. Total of 75 percent of the item total upon authorization of the SWPPP, and the completed N.O.I has been posted in the SMARTS public access database for the project.
2. Total of 100 percent of the item total upon Contract acceptance, and the completed N.O.I has been posted in the SMARTS public access database for the project.

For a project with more than 60 original working days, the Department pays for prepare stormwater pollution prevention plan as follows:

1. Total of 50 percent of the item total upon authorization of the SWPPP, and the completed N.O.I has been listed in the SMARTS public access database for the project.
2. Total of 90 percent of the item total upon work completion
3. Total of 100 percent of the item total upon Contract acceptance, and N.O.T has been closed in the SMARTS public access database for the project.

The Department does not pay for the preparation, collection, laboratory analysis, and reporting of stormwater samples for nonvisible pollutants if WPC practices are not implemented before precipitation or if you fail to correct a WPC practice before precipitation.

The Department pays:

1. \$500 for each authorized rain event action plan
2. \$2,000 for each authorized stormwater annual report upon acceptance by RWQCB

The Department does not adjust the unit price for an increase or decrease in the quantity of:

1. Rain event action plan
2. Storm water sampling and analysis day
3. Storm water annual report

Replace Section 13-4.03G with:

13-4.03G Dewatering

Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities.

If dewatering is required, perform dewatering work as specified for the work items involved, such as a temporary ATS or dewatering and discharge.

If dewatering and discharging activities are not specified for a work item and you perform dewatering activities:

1. Conduct dewatering activities under the Caltrans *Field Guide for Construction Site Dewatering*.
2. Ensure any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
3. Discharge the water within the project limits. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.
4. Do not discharge stormwater or non-stormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Immediately notify the Engineer upon discovering any such condition.

Replace Section 13-5.04 with:

13-5.04 PAYMENT

The payment quantity for temporary soil stabilization bid items paid for by the area is the area measured parallel with the ground surface not including the additional quantity used for overlaps.

If there is no bid item for temporary soil stabilization measures, payment therefor is considered to be included in the bid item for prepare water pollution control program or in the bid item for prepare stormwater pollution prevention plan, as applicable.

Replace Section 13-6.04 with:

13-6.04 PAYMENT

The payment quantity for temporary sediment control bid items paid for by the length is the length measured along the centerline of the installed material.

The payment quantity, if any, for temporary fiber roll does not include the additional quantity used for overlaps.

The Department does not pay for the relocation of temporary drainage inlet protection during work progress.

If there are no bid items for installing or maintaining temporary sediment control measures, payment therefor is considered to be included in the bid item for prepare water pollution control program or in the bid item for prepare stormwater pollution prevention plan, as applicable.

Replace Section 13-7.03D with:

13-7.03D Payment

The Department does not pay for the relocation of temporary construction entrances or roadways during work progress.

If there are no bid items for installing or maintaining temporary construction entrances or roadways, payment therefor is considered to be included in the bid item for prepare water pollution control program or in the bid item for prepare stormwater pollution prevention plan, as applicable.

14 ENVIRONMENTAL STEWARDSHIP

Add after the 3rd paragraph of section 14-10.01:

Food scraps, paper wrappers, food containers, cans, bottles and all food related trash and litter must be removed from the project site at the end of each working day.

Replace the 7th paragraph of section 14-10.01 with:

Furnish and use closed-lid trash containers in the job-site yard, field trailers, and locations where workers gather for lunch and breaks.

Add Section 14-12.04:

14-12.04 RELATIONS WITH SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT (SJVAPCD)

You are responsible for compliance with all applicable SJVAPCD regulations and requirements. This section is provided for your information, and nothing herein or elsewhere within these special provisions shall be construed as limiting your responsibility for complying with all applicable rules and regulations.

In accordance with SJVAPCD Regulation VIII – Fugitive PM10 Prohibitions: Rule 8021, implementation of an SJVAPCD-approved dust control plan is required prior to commencement of any dust generating activities.

Prepare and submit dust control plan to accurately reflect your proposed operations. The Engineer completes the review within two working days after receipt thereof. In the event that the Engineer determines your submittal as incomplete or inadequate submit a corrected plan. The Engineer completes review of any re-submittal within two working days after receipt thereof.

Upon approval by the Engineer, submit the proposed dust control plan to the SJVAPCD. Pay to the SJVAPCD any fees which are required for the dust control plan. You are solely responsible for prompt preparation and submittal to the Engineer, and immediately upon approval by the Engineer, submittal to the SJVAPCD of the dust control plan.

Do not commence work until the SJVAPCD has approved or conditionally approved the dust control plan and the Engineer authorizes. When a modification to an approved dust control plan is under consideration do not perform work which is inconsistent with the approved dust control plan prior to receiving written approval.

Compensation for delays associated with review and approval of dust control plans is only considered in the event that: 1) the Engineer fails to review dust control plan submitted by the Contractor within two working days after submittal thereof by the Contractor; or 2) the SJVAPCD fails to review and to either approve or disapprove dust control plan within 30 calendar days after their receipt thereof. Disapproval of the dust control plan by the Engineer or by the SJVAPCD shall not be considered as a basis for an extension of contract time nor as the basis for any additional compensation. Only in the event that it is determined by the Engineer that the Contractor was unreasonably delayed, through no fault of the Contractor, will compensation for delays be considered in conformance with the provisions in Section 8-1.07, "Delays," of the Standard Specifications.

It is your responsibility to be fully informed of the requirements of the Dust Control Plan and all rules, regulations, plans and conditions that may govern your operations and to conduct the work accordingly.

You must comply with the Dust Control Plan approved by the SJVAPCD and accepted by the Engineer. Ensure the provisions of this section and SJVAPCD-approved modifications to the Dust Control Plan is made part of every subcontract executed pursuant to this contract.

Replace Section 14-12.05–14.12.08 With:

14-12.05–14.12.08 RESERVED

DIVISION III EARTHWORK AND LANDSCAPE

17 GENERAL

Replace the 4th paragraph in section 17-2.03A with:

Clear and grub vegetation only within the excavation and embankment slope lines.

Replace the 1st sentence in the 2nd paragraph in section 17-2.03B with:

Cut tree branches that extend over the roadway and hang within 20 feet of finished grade and as directed by the engineer.

Add to end of 17-2.03C:

Any trees with a trunk diameter greater than or equal to 4" will constitute as a "tree removal" and will have separate bid item. Any tree or shrub less than 4" shall be considered in the bid item for "clearing and grubbing".

19 EARTHWORK

Replace the first paragraph and list of Section 19-5.03B with:

Compact earthwork within County right-of-way to a relative compaction of at least 95 percent for at least a depth of:

1. 0.5 foot below the grading plane for the width between the outer edges of shoulders on excavation and embankments smaller than 2.5 feet above original grade.
2. 2.5 feet below the finished grade for the width of the traveled way plus 3 feet on either side (6 feet wider) on embankments.

Technical Specifications

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SECTION 01 00 05
SPECIFICATIONS

PART 1 GENERAL

1.1 GENERAL

- A. The Contractor shall keep on the job a copy of the Plans and Specifications and shall at all times give the Owner and Engineer access thereto.
- B. Anything mentioned in the Specifications and not shown on the Plans or shown on the Plans and not mentioned in the Specifications shall be of like effect as if shown or mentioned in both.
- C. The Contractor shall not take advantage of any errors, discrepancies or omissions which may exist in the Plans and Specifications but shall immediately call them to the attention of the Engineer whose interpretation or correction thereof shall be conclusive.
- D. In case of conflict between portions of the Contract Documents, the order of precedence of Contract Documents shall be:
 - First: Permits from other agencies as may be required by law.
 - Second: Addenda
 - Third: Special Provisions
 - Fourth: Revised Standard Specifications
 - Fifty: Standard Specifications
 - Sixth: Technical Specifications, Division 2 through Division 40
 - Seventh: Plans
 - Eighth: General Requirements, Division 01
 - Nineth: State Standard Specifications
 - Tenth: Reference Documents
- E. Change Orders, supplemental agreements and approved revisions to Plans and Specifications will take precedence over documents listed above. Detailed Plans shall have precedence over general Plans.
- F. Whenever any conflict appears in any portions of the Contract Documents, it shall be resolved by application of the order of precedence.

1.2 GENERAL REQUIREMENTS AND TECHNICAL SPECIFICATIONS

- A. For definitions of the Specifications categorized as General Requirements (Division 1) and Technical Specifications (Division 2 through Division 48) refer to Section 01 42 13 – Definitions and Abbreviations.

1.3 REFERENCE DOCUMENTS

- A. For a definition of Reference Documents and State Standard Specifications refer to Section 01 42 13 – Definitions and Abbreviations.

- B. Throughout the following Specification sections, references are made to various widely published, standard and commercial specifications, manuals, or codes of technical societies, organizations, or associations. These specifications are intended to amplify the descriptions of materials, equipment, and construction systems. The Contractor shall caution each of his Subcontractors to become familiar with the contents of the pertinent portions of these Reference Documents. The following Reference Documents are the most widely used, and are cited or referred to in each of the following sections of these Specifications:
1. American Society of Testing Materials (ASTM)
 2. American National Standards Institute (ANSI)
 3. American Standards Associations (ASA)
 4. American Concrete Institute (ACI)
 5. Federal Specifications, as applicable.
 6. California Building Code
 7. California Plumbing Code
 8. Caltrans State Standard Specifications
 9. National Electric Code
 10. Construction Safety Orders of the Division of Industrial Relations latest edition.
- C. Each citation of a Reference Document shall be construed to refer to the latest published revision of such specification as of the date of the invitation for bids and to such portions of it that relate and apply directly to the material or installation called for on this job. The Engineer will give no consideration to any claimed ignorance as to what a cited Reference Document contains, since such Subcontractor on a project of this scope is deemed to be experienced and familiar with his own trade to be experienced and familiar with his own trade's generally accepted, published standards of quality.
- D. Whenever references are made to any of the above-mentioned Reference Documents or testing methods in the governing Building Codes, the requirements of those Reference Documents shall govern, insofar as they are not in contravention with maxima or minima prescribed by documents designated in the Building Code.

1.4 LIST OF DRAWINGS

A. The Work shall conform to the following Drawings:

TITLE	SHEET NUMBERS	
GENERAL		
COVER SHEET	1	G-1
LEGEND ABBREVIATIONS AND NOTES	2	G-2
EXISTING SITE PLAN	3	G-3
EXISTING SITE PLAN CONVEYANCE CHANNEL AREA	4	G-4
EXISTING SITE PLAN – BASIN AREA	5	G-5
EXISTING SITE PLAN PERIMETER	6	G-6
DEMOLITION PLAN	7	G-7
CIVIL		
OVERALL SITE PLAN	8	C-1
STOCKPILE AREA SITE PLAN	9	C-2
STOCKPILE AREA SECTIONS	10	C-3
SITE PLAN PERIMETER	11	C-4
RECHARGE BASIN SITE PLAN	12	C-5
RECHARGE BASIN GRADING PLAN	13	C-6
GRADING BASIN SECTIONS	14	C-7
GRADING BASIN SECTIONS	15	C-8
CONVEYANCE CHANNEL PLAN & PROFILE	16	C-9
CONVEYANCE CHANNEL SECTIONS	17	C-10
CONVEYANCE CHANNEL SECTIONS	18	C-11
LIBERTY CANAL TURNOUT & ELKHORN CROSSING	19	C-12
CONVEYANCE CHANNEL OUTLET & BASIN INLET	20	C-13
CIVIL DETAILS		
CONSTRUCTION DETAILS	21	CD-1
CONSTRUCTION DETAILS	22	CD-2
CONSTRUCTION DETAILS	23	CD-3
CONSTRUCTION DETAILS	24	CD-4
CONSTRUCTION DETAILS	25	CD-5
FENCE DETAILS	26	CD-6
STRUCTURAL		
STRUCTURAL DETAILS	27	S-1
STRUCTURAL DETAILS	28	S-2
STRUCTURAL DETAILS	29	S-3
STRUCTURAL DETAILS	30	S-4

1.5 STATE STANDARD SPECIFICATIONS

A. For the purpose of this contract, the following terms or pronouns in place of them, used throughout the State Standard Specifications and defined in Section 1, Definition of Terms, of the State Standard Specifications, shall be as follows:

<u>TERMS</u>	<u>INTERPRETATION</u>
State	County of Fresno

Department	County of Fresno
Agency/Owner	County of Fresno
District	County of Fresno
Engineer	County of Fresno, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.
Department of Transportation	Caltrans, County of Fresno
Contractor	The person or persons, co-partnership or corporation, private or municipal, who have entered into a contract with the County of Fresno as party or parties of the second part, or his or her legal representative.

1.6 OCCUPATIONAL SAFETY AND HEALTH ACT

- A. The applicable standards of the American National Standards Institute and the National Fire Protection Association that have been adopted are hereby made a part of these Specifications as a whole and as mentioned in the various sections.
- B. Any errors, ambiguities, or inconsistencies of these standards with either the local codes, the Specifications, or the Drawings shall be brought to the attention of the Engineer.

1.7 COMPLIANCE WITH ALL LAWS AND CODES

- A. Contractor shall conform to and abide by all local city, county, state and federal laws, rules, regulations, including industrial safety laws. Such laws shall be considered as essential parts of these Specifications and, in the absence of definite requirements herein, the provisions of such rules and regulations shall be observed by the Contractor. If the Drawings and/or Specifications are at variance therewith, Contractor shall so notify Engineer promptly. Should the Contractor perform any work contrary to such laws, ordinances, rules and regulations he shall bear all costs arising therefrom.
- B. Where these Specifications, however, call for or describe materials workmanship or construction of a better quality, higher standard, or larger size than is required by said rules and regulations, the provisions of these Specifications shall take precedence over said rules and regulations. Contractor shall furnish, without any extra charge, all additional labor or materials, or both, when required for compliance with these rules and regulations.

END SECTION

SECTION 01 11 00

DESCRIPTION OF WORK AND SCHEDULE CONSTRAINTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The Work consists of furnishing all labor, materials, equipment, and incidentals necessary to construct a recharge basin and stockpile area at the site including basin excavation, compacted stockpile placement, placement of excess basin material, conveyance channel excavation, cast-in-place and precast concrete structures, furnishing and installing slides gates, propeller meters, rubber gasketed reinforced concrete pipe (RGRCP), County road crossing, and all other miscellaneous items to complete the work described in the Plans and Specifications to provide for a fully functioning recharge basin.
- B. The construction site is located in Fresno County, southeast of Caruthers. The site address is 500 E. Elkhorn Ave., Caruthers, CA 93609.
- C. The primary components are generally described as follows:
 - 1. Material procurement once Notice of Award is issued
 - 2. Excavation of recharge basin and conveyance channel
 - 3. Construct compacted stockpile area
 - 4. Placement of excess excavated material
 - 5. Construct Liberty Canal Turnout and Conveyance Channel Inlet, including Elkhorn Avenue road crossing
 - 6. Construct Conveyance Channel Outlet and Basin Inlet
 - 7. Furnish and install RGRCP
 - 8. Construction of perimeter chain link fencing
 - 9. County road crossing and traffic control plan

1.2 BEGINNING OF WORK

- A. Materials required for the Project are not anticipated to have overly long lead times, but the Contractor is encouraged to begin material procurement shortly after receipt of official Notice to Proceed from the Owner.
- B. The Contractor shall begin work within the time limits specified in Section 8-1.04 of the Special Provisions.

1.3 TIME OF COMPLETION

- A. The Contractor shall complete all phases of work within the time limits specified in Section 8-1.04 of the Special Provisions unless the period for completion is extended otherwise by the Contract Documents, or the County.

1.4 TIME CONSTRAINTS

- A. Contractor shall supervise, inspect, and direct the Work competently and apply such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the specific means, methods, techniques, sequence, or procedure of construction required to complete the project as specified by the Contract Documents. Contractor shall be responsible to see that the completed Work complies accurately with the Contract Documents.

1.5 ORDER OF WORK

- A. Contractor shall submit a schedule of work upon Notice to Proceed.
- B. Contractor shall submit a copy of the Encroachment Permit and approved Traffic Control Plan.

END SECTION

SECTION 01 11 05
ENGINEER'S STATUS DURING CONSTRUCTION

PART 1 GENERAL

1.1 OWNER'S REPRESENTATIVE

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in these Specifications and will not be changed without written consent of Owner and Engineer.

1.2 VISITS TO SITE

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Section 1.5, below. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.
- C. Review of the Work by the Engineer shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract.
- D. No oral or telephonic agreement or conversation with any officer, agent or employee of the Owner or the Engineer, or with the Engineer, either before or after execution of the Contract, shall affect or modify any of the terms or obligations contained in any of the Contract Documents.
- E. The Contractor shall pay the Owner for all overtime review in accordance with existing resolutions or fee schedules of the Owner, unless the charges for such inspection have been specifically waived in the Contract Documents. Overtime charges will be made for all reviews on Saturdays, Sundays and State holidays, and hours worked by the reviewer other than those of the normal working day.

1.3 AUTHORIZED VARIATIONS IN WORK

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided within the Contract Documents.

1.4 REJECTING DEFECTIVE WORK

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed. Neither this authority nor the Engineer's good faith judgment to reject or not reject any work shall subject the Engineer to any liability or cause of action by the Contractor, subcontractors, or any other suppliers or persons performing work on the Contract.

1.5 LIMITATIONS ON ENGINEER'S AUTHORITY AND RESPONSIBILITIES

- A. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- B. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- C. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.
- D. The limitations upon authority and responsibility shall also apply to, the Engineer's field representative, known as the Resident Project Representative, if any, and assistants, if any.

END SECTION

SECTION 01 11 10
COORDINATION OF WORK

PART 1 GENERAL

1.1 RESPONSIBILITY OF CONTRACTOR

- A. If any part of the Work depends for proper execution or results upon the work of others, the Contractor shall inspect and promptly report to the Engineer any apparent discrepancies or defects in such work of others that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the work of others as fit and proper except as to defects which may develop in the work of others after execution of the Work by the Contractor.

1.2 WORK INVOLVED WITH EXISTING SYSTEM

- A. Existing materials and equipment removed not designated to be salvaged for Owner in the execution of the Work shall become the property of the Contractor and shall be removed from, and disposed of, off the site by the Contractor in an acceptable and lawful manner.

1.3 COORDINATION OF WORK

- A. The Contractor shall maintain overall coordination for the execution of the Work. Based on the Construction Schedule prepared in accordance with these Specifications, he shall obtain from each of his subcontractors a similar schedule and shall be responsible for all parties maintaining these schedules or for coordinating required modifications.

END SECTION

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SECTION 01 20 00

MEASUREMENT & PAYMENT

PART 1 GENERAL

1.1 MEASUREMENT

- A. Unless otherwise specified in the Contract Documents, quantities of work shall be determined from measurements or dimensions in a horizontal plane. All measurements shall be made in accordance with United States Standard Measures and shall be measured on the basis of "in-place" quantities.
- B. After the work has been completed, the Engineer will make field measurements of unit price items in order to determine the quantities of the various items as a basis for payment. On all unit price items, the contractor will be paid for the actual amount of the work performed in accordance with the contract documents, as computed from field measurements.
- C. Work or quantities not listed in the description of bid items are considered incidental to other construction and will not be measured. Compensation for such incidental work is considered to be included in the various items of work bid.

1.2 INCREASED OR DECREASED QUANTITIES

- A. Increases or decreases in quantities shall be governed by the General Conditions.
- B. Earthwork quantities shown in the Bid Schedule are anticipated excavated quantities needed to construct the compacted stockpile areas, or to build the basin levees or conveyance channel embankments to the lines and grades shown and specified as detailed in the Plans and Specifications. For bidding purposes, a 25% consolidation and waste factor has been assumed. The earthwork quantities will be increased or decreased accordingly at the unit price bid as needed for construction of the compacted stockpile areas, basin levees and conveyance channel embankments to the lines and grades shown and specified as detailed in the Plans and Specifications. Excavated quantity payment will be made based on drone surveys of the excavated areas of the site to determine the actual cubic yardage of excavation. Pre-construction topography will be established by an initial drone survey of the basin area and the conveyance channel area to establish existing grades. After top soil removal a post -construction drone survey of the basin area will be made to determine the excavated yardage of top soil. After construction of the conveyance channel, a post-construction drone survey of the conveyance channel will be made to determine the excavated yardage of the conveyance channel. A post -construction drone survey of the basin area after basin excavation will be made to determine the excavated yardage of basin material by comparing to the post-construction survey after top soil removal, and to determine the yardage used in basin levee construction. The Contractor shall be responsible to provide an independent quantity calculation. Payment will be made on the excavated quantity with no allowance for swell factor when hauling material.

- C. All written requests for adjustment shall be made no later than five working days after notification by the Engineer that the item of work is complete.

1.3 FINAL PAY QUANTITIES

- A. Final pay quantities shall be in accordance with the General Conditions except as modified below.
- B. Final pay quantities will be designated only in the Bid Schedule and in Section 01 22 00 – Explanation of Bid Items and are not shown on the Plans.
- C. When an item of work is designated as a Final Pay Quantity on the Bid Schedule and/or in the Explanation of Bid Items, the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated.

If the dimensions of any portion of the item are revised, and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions.

If a final pay item is eliminated, the estimated quantity for the item will be eliminated.

If a portion of a final pay item is eliminated, the final pay quantity will be revised in proportion to the bid quantity represented by the eliminated portion of the item of work.

- D. The estimated quantity for each item of work designated as a Final Pay Quantity on the Bid Schedule and/or in the Explanation of Bid Items shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.
- E. In case of discrepancy between the quantity shown on the Bid Schedule for a final pay item and the quantity or summation of quantities for the same item shown on the plans, payment will be based on the quantity shown on the Bid Schedule.

1.4 PARTIAL PAYMENT

- A. Attention is directed to the payment provisions in Section 9 of the Special Provisions.
- B. Attention is directed to Section 9-1.06 of the State Standard Specifications which, except as modified herein, shall apply in its entirety.
 - 1. The Department shall retain 5 percent of the estimated value of the work done and 5 percent of the value of materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the contract by the Contractor. The Department will not hold retention for mobilization or demobilization.

2. Partial payments for materials on hand shall be based upon the value of material delivered on site, properly stored in a secured fenced area subject to, or under the control of, the owner and local agency, and unused. Contractor shall submit copies of invoices of materials to support values. Materials stored shall be installed within 60 days of delivery for payment eligibility.
- C. Measurement of partial soil excavation for monthly progress payments will be made by volumetric measurement of in-place soil excavated as measured by scraper loads or other agreed upon measure. If the agreed upon measurement method is by scraper load count, the Contractor shall submit equipment planned to be used for hauling material to determine the average volume per load considering swell factor, and payment will be based on counts of scraper loads during the month. Partial payment quantities will be agreed to by Contractor and Owner each month, and the last progress payment will be used to true up the excavated quantity after earthwork construction is complete and the final post-construction survey has been completed.
 - D. Payment shall not relieve the Contractor from its obligations under the Contract; nor shall such payment be construed as acceptance of any of the Work. Payment shall not be construed as transfer of ownership of any equipment or materials to the Owner. Responsibility of ownership shall remain with the Contractor who shall be obligated to protect any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the Work, except as provided in Section 7-1.15 of the State Standard Specifications.

1.5 FINAL PAYMENT

- A. The final earthwork quantities will be determined by comparing pre-construction and post-construction survey data of the excavated areas of the site as described in Section 1.2B above to determine the final payment quantities of the actual cubic yardage of excavation.
- B. Notice of Completion will be filed by the Engineer for acceptance of the project upon receipt of all release (lien waiver) submittals.

END SECTION

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SECTION 01 22 00 EXPLANATION OF BID ITEMS

PART 1 GENERAL

The Contract payment for the specified items of work as set forth in the Bid Schedule shall be full compensation for furnishing all labor, materials, methods or processes, implements, tools, equipment and incidentals and for doing all work involved as required by the provisions of the Contract Documents for a complete in place and operational system.

Unless otherwise specified in the Specifications, quantities of work shall be determined per each, or from measurements or dimensions in a horizontal plane. All materials shall be measured on the basis of "in place" quantities and paid for using the units listed in the bid schedule.

Except as noted, the Engineer will make field measurements of unit price items in order to determine the quantities of the various items as a basis for payment. On all unit price items, the contractor will be paid for the actual amount of the work performed in accordance with the contract documents, as computed from field measurements.

Work or quantities not listed in the description of bid items are considered incidental to other construction and will not be separately measured or paid for. Compensation for such work and/or material shall be included in the prices paid for other items of work.

1.1 BASE BID ITEMS

Bid Item 1 – Mobilization/Demobilization, Bonds, Insurance and Permits: This bid item is a lump sum bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, construction funding sign as shown in the Project Details of the specifications, permits not specifically included under a separate bid item, licenses, and fees required during the performance of the work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel, and incidentals from the project at the end of construction. All costs associated with this item shall be included in the lump sum price and no additional payment will be made. This bid item shall be paid as specified in Section 9 Payment and Sub-Section 9-1.16D Mobilization of the State Standard Specifications.

Bid Item 2 – Job Site Management: This bid item is a lump sum bid item for the cost of all work involved with job site management and includes full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved for construction of staging areas, barricades and other necessary safety requirements, construction and removal of temporary security fencing as needed, protection of existing facilities, spill prevention and control, material management, waste management, any required non-stormwater management and dewatering, and identifying, sampling, testing, handling, and disposal of hazardous waste resulting from Contractor activities, as specified in the Standard Specifications and the Special Provisions.

This item includes maintaining and providing the as-built documents, general

project clean up, and all costs for miscellaneous work shown and described in the Contract Documents that are not included in other bid items.

This item also includes providing for worker protection from caving ground in excavations and other hazards that may occur during construction. The Contractor shall comply with the provisions of the Construction Safety Orders, Tunnel Safety Orders, and General Safety Orders issued by the State of California Division of Industrial Safety, as well as all other applicable laws, ordinances and regulations, as they pertain to the protection of workers from the hazard of caving ground. The Contractor shall obtain a permit from the Division of Industrial Safety of the State of California prior to commencement of construction. This bid item will be paid for by Lump Sum, prorated, based on percentage of contract work completed.

Bid Item 3 – Traffic Control: This bid item is a lump sum bid for all materials, labor and appurtenances required to maintain traffic control measures within the project limits in accordance with the Standard Specifications and Special Provisions and as directed by the Engineer. The Contractor shall submit a traffic control plan for review and approval by the County. Traffic control provisions shall conform with Section 01 57 56 Traffic Control. Full compensation for furnishing all labor (including flagging), materials, tools, equipment, and incidentals, and for doing all work involved for the sole convenience, direction and safety of public traffic and pedestrians shall be included in this bid item. This bid item will be paid for by Lump Sum, prorated, based on percentage of contract work completed.

Bid Item 4 – Storm Water Pollution Prevention Plan (SWPPP) – Preparation and Implementation: This bid item is a lump sum bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), including preparing the SWPPP, uploading required documents on the SMARTS website, implementing, testing, monitoring and all other work associated with implementing the SWPPP and complying with State and Federal permit requirements, and removing water pollution control practices in accordance with the approved SWPPP as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. This item will be paid for by Lump Sum, prorated, based on the percentage of work completed.

Bid Item 5 – State Water Resources Control Board – Notice of Intent. This bid item is a unit price bid specifically provided to reimburse the Contractor for payment of the NOI filing fee charged by the SWRCB and paid by the Contractor after the Contractor has completed the NOI filing process started by the County. The amount paid for this bid item will be the fee only. No payment will be made for overhead or processing costs. Full compensation for any overhead and processing costs will be considered to be included in the various items of work, and no separate compensation will be made therefor.

The dollar amount shown in the Proposal is an estimate only and shall be included in each bidder's proposal. Payment for this bid item will be adjusted based on the actual fee paid. The provisions of Section 9-1.06 for increased or decreased quantities shall not apply to the "State Water Resources Control Board – Notice of Intent" bid item.

Bid Item 6 – Dust Control Plan (DCP) – Preparation and Implementation: This bid item is a lump sum bid and payment for this item shall include full compensation for all labor, materials, tools, equipment and incidentals required to prepare a Dust Control Plan (DCP), submit the DCP to the San Joaquin Valley Air Pollution Control District (SJVAPCD), address comments from the SJVAPCD, pay the necessary fees, and perform dust control measures within the project limits in accordance with these specifications. This bid item will be paid for by Lump Sum, prorated, based on percentage of contract work completed.

Bid Item 7 – Supplemental Work Allowance: This item is a unit price bid provided to account for supplemental work which may be required due to differing job site conditions not provided for on the Plans or in these Specifications and other unforeseen work which the Engineer determines is necessary to allow for the work required by the Contract Documents to proceed as intended without interruption. This item will be used only for this purpose. The dollar amount listed on the Bid Proposal Form is an estimated allowance set aside by the Owner and shall be included on each Bidder's Bid Proposal sheets.

Supplemental work shall be performed only upon direct written authorization from the Engineer and daily extra work reports shall be submitted to and approved by the Engineer. The Contractor shall maintain separate records for extra work performed in accordance with the provisions of Section 5-1.27, "Records," of the Standard Specifications and the special provisions.

The Contractor will be paid only for the value of completed supplemental work which has been authorized in writing by the Engineer.

The value of work, which the Owner may authorize under this item, may be less than the amount shown on the Bid Proposal sheet, and it could be that no supplemental work will be authorized at all. Accordingly, payments to the Contractor for supplemental work will likely differ substantially from the estimated Allowance which is included in the Bid Proposal. If no supplemental work is authorized or if no authorized supplemental work is performed, then no payments will be made to the Contractor under this Bid item and the Contract Price will be reduced by the full amount of the item included in the Bid Proposal for supplemental work. The provisions in Section 9-1.06, "Changed Quantity Pay Adjustments" of the Standard Specifications shall not apply to the item "Supplemental Work Allowance."

The value of supplemental work cannot exceed the amount shown on the bid proposal sheet. Additional work that requires compensation exceeding this allowance shall be subject to approval by the contract change order procedures of this Contract.

The Contractor shall have no claim for anticipated overhead or profit should the County fail to authorize any supplemental work or should the value of authorized supplemental work be less than anticipated by the Contractor.

Bid Item 8 – Site Demolition at Well Sites: This bid item is a lump sum bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of all work involved in demolition

and legal disposal of the existing miscellaneous pump equipment, pipe, concrete, and electrical equipment at two well sites as shown on the Plans and described in the Specifications. This bid item will be paid for by Lump Sum, prorated, based on percentage of overall contract work completed.

Bid Item 9 – Remove and Dispose of Existing PVC Irrigation Pipe Sections: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of all work involved in removal and legal disposal of existing sections of PVC irrigation pipe sections in locations noted on the Plans within the proposed basin area and in areas of conflict with the conveyance channel. Included in this bid item is potholing to determine the location and extent of the existing pipe sections in the basin area and conflict areas of the conveyance channel. This bid item will be paid for on a Unit Price basis per Lineal Foot of removed pipe.

Bid Item 10 – Remove and Dispose of Existing Asbestos Cement Pipe Section: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of all work involved in removal and legal disposal of an existing section of asbestos cement pipe in the location noted on the Plans within the proposed basin area. Included in this bid item is potholing to determine the location and extent of the existing pipe section in the basin area. The Contractor shall abide by all federal and state regulations regarding removal and proper disposal of Asbestos Cement pipe. This bid item will be paid for on a Unit Price basis per Lineal Foot of removed pipe.

Bid Item 11 – Clearing and Grubbing of Vegetation: This bid item is a lump sum bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of all work involved in clearing and grubbing vegetation within the project site and hauling stripped surface vegetation offsite as described in Section 31 11 00 Clearing and Grubbing of the Specifications. Clear and grub vegetation only within the immediate limits required for the construction of the contract facilities. This bid item will be paid by Lump Sum, prorated, based on percentage of work completed.

Bid Item 12 – Removal of Top Soil in Basin Area and Compacted Placement in Stockpile Areas: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required for removal of the top one foot of soil from the Basin Area that contains chopped up irrigation drip tape and placement and compaction in the bottom of the stockpile areas as detailed in the Plans and Specifications. This item shall include scarifying and recompacting areas to receive excavated material, placing, moisture conditioning, compacting, and providing all miscellaneous items for completing all work involved to remove top soil in the basin area and place in the bottom of the stockpile areas as detailed on the Plans and Specifications. This item will be paid for on a Unit Price basis per Cubic Yard of excavated material (refer to Section 01 20 00 – Measurement and Payment).

Bid Item 13 – Crush Demolished Soil Cement and Compacted Placement in Stockpile Areas: This bid item is a lump sum bid and payment for this item shall include full

compensation for all labor, materials, tools, equipment, and incidentals required for crushing the pile of existing soil cement previously removed by another contractor from the wastewater ponds to 3-inch maximum diameter and placement and compaction in the bottom of the stockpile areas as detailed in the Plans and Specifications. The volume of soil cement material to be crushed was approximately calculated to be around 5,000 cubic yards. This item shall include scarifying and recompacting areas to receive crushed soil cement, placing, moisture conditioning, compacting, and providing all miscellaneous items for completing all work involved to crush the existing pile of on-site soil cement removed from wastewater ponds to 3-inch maximum diameter and place and incorporate the crushed soil cement into the bottom of the stockpile areas as detailed on the Plans and Specifications. This bid item will be paid for by Lump Sum, prorated, based on percentage of contract work completed, and no further compensation will be allowed therefore.

Bid Item 14 – Conveyance Channel Excavation and Compacted Placement in

Stockpile Areas: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required for the construction of the Conveyance Channel to the lines and grades shown and specified, including levee fill in areas noted, as detailed in the Plans and Specifications. This item shall include preparation of the canal pad, excavating channel, scarifying and recompacting areas of fill, moisture conditioning, placing, compacting, finish grading the engineered fill, and providing all miscellaneous items for completing all work involved to construct the Conveyance Channel as detailed on the Plans and Specifications. Excess excavated material shall be placed and compacted in the bottom of the stockpile areas as detailed in the Plans and Specifications. This item will be paid for on a Unit Price basis per Cubic Yard of excavated material that is used for the construction of the Conveyance Channel (refer to Section 01 20 00 – Measurement and Payment).

Bid Item 15 – Basin Excavation and Compacted Placement on Basin Levee:

This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required for the construction of the Recharge Basin levees to the lines and grades shown and specified, as detailed in the Plans and Specifications. This item shall include preparation of the subgrade, scarifying and recompacting the subgrade, backfill, moisture conditioning, excavating the Recharge Basin (after top soil has been removed), placing, compacting, finish grading the engineered fill, and providing all miscellaneous items for completing all work involved to construct the Recharge Basin levees as detailed on the plans and Specifications. This item will be paid for on a Unit Price basis per Cubic Yard of excavated material that is used for the construction of Recharge Basin levees (refer to Section 01 20 00 – Measurement and Payment).

Bid Item 16 – Basin Excavation and Compacted Placement in Stockpile Areas:

This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required for excavation of the basin for the construction of the compacted Stockpile Areas A, B and C to the lines and grades shown and specified, as detailed in the Plans and Specifications. This item shall include preparation of the subgrade, scarifying

and recompacting the subgrade, backfill, moisture conditioning, excavating the Recharge Basin (after top soil has been removed), placing, compacting, finish grading the engineered fill, and providing all miscellaneous items for completing all work involved to construct the compacted Stockpile Areas A, B and C as detailed on the plans and Specifications. This bid item shall include the cost of building any necessary access roads for construction of the stockpile areas. Any overbuilding of the stockpile areas and trimming back to grades shown on the Plans shall also be included in the unit price. This item will be paid for on a Unit Price basis per Cubic Yard of excavated basin material that is used for the construction of Stockpile Areas A, B and C (refer to Section 01 20 00 – Measurement and Payment).

Bid Item 17 – Construct Liberty Canal Turnout/Conveyance Channel Inlet Structure:

This bid item is a lump sum bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to construct the cast-in-place reinforced concrete turnout structure, trash racks, turnout canal lining, turnout rip rap, 42-inch diameter slide gates, 42-inch diameter ASTM C361 B-25 RGRCP pipe, air vents, structure connection collars, pipe cutoff collar, 42-inch open flow propeller meters, reinforced concrete conveyance channel inlet structure, bollards, conveyance channel inlet canal lining, and conveyance channel inlet rip rap. This item shall include excavating, preparation of the subgrade including over-excavation, scarifying and recompacting the subgrade, subgrade placement and compaction, moisture conditioning, placing, backfill, compacting, and finish grading around the structures, trenching, bedding, protecting the existing AT&T cable, saw-cutting and/or grinding asphalt, slurry backfill in County right-of-way, re-paving Elkhorn Ave per County and State standards, placing reinforcing steel, forming, striping, curing concrete, and all other incidentals required to construct the Liberty Canal Turnout and Conveyance Channel Inlet Structure as detailed on the Plans and Specifications. This bid item will be paid for on a Lump Sum basis, prorated, based on the percentage of Work completed under this item.

Bid Item 18 – Construct Conveyance Channel Outlet/Basin Inlet Structure: This bid item is a lump sum bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to construct the cast-in-place reinforced concrete conveyance channel outlet structure, bollards, outlet structure canal lining, outlet rip rap, 48-inch diameter slide gate, 48-inch diameter ASTM C361 B-25 RGRCP pipe, air vents, structure connection collars, 84-inch concrete pump stand and concrete foundation, expanded metal cover, and basin inlet rip rap. This item shall include excavating, preparation of the subgrade including over-excavation, scarifying and recompacting the subgrade, subgrade placement and compaction, moisture conditioning, placing, backfill, compacting, and finish grading around the structures, trenching, bedding, placing reinforcing steel, forming, stripping, curing concrete, and all other incidentals required to construct the Conveyance Channel Outlet and Basin Inlet Structure as detailed on the Plans and Specifications. This bid item will be paid for on a Lump Sum basis, prorated, based on the percentage of Work completed under this item.

Bid Item 19 – Furnish & Install Chain Link Fence: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools,

equipment, and incidentals required to furnish and install new 6-foot high chain link fencing around the recharge basin, including all other related appurtenances as detailed on the Plans and Specifications. This bid item will be paid for on a Unit Price basis per Lineal Foot of chain link fencing furnished and installed.

Bid Item 20 – Furnish & Install Chain Link 24-foot Double Drive Gate: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to furnish and install a 24-foot wide double drive gate, including all other related appurtenances as detailed on the Plans and Specifications. This item will be paid for on a Unit Price basis per each double drive gate furnished and installed.

Bid Item 21 – Convert Existing Central Well Site to a Monitoring Well: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to modify and convert the existing Central Well site well to a monitoring well. This item includes furnishing and installing a lockable well cover on the well and installing protection bollards. This item will be paid for on a Unit Price basis per each existing well converted to a monitoring well.

Bid Item 22 – Convert Existing Northwest Well Site to a Monitoring Well: This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required to modify and convert the existing Northwest Well site well to a monitoring well. This item includes extending the well casing, constructing a concrete pad, furnishing and installing a lockable well cover on the well, and installing protection bollards. This item will be paid for on a Unit Price basis per each existing well converted to a monitoring well.

1.2 ADD ALTERNATE BID ITEMS

A11 – Additional Mobilization/Demobilization, Bonds, Insurance and Permits: This bid item is a lump sum bid for additional costs associated with Add Alternate Bid Item A12 and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits not specifically included under a separate bid item, licenses, and fees required during the performance of Add Alternate bid item A12 work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel, and incidentals from the project at the end of construction. All costs associated with this item related to the Add Alternate bid item A12 work shall be included in the lump sum price and no additional payment will be made. This bid item shall be paid as specified in Section 9 Payment and Sub-Section 9-1.16D Mobilization of the State Standard Specifications.

A12 - Basin Excavation and Compacted Placement in Stockpile Area D1 (N-S): This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required for excavation of the basin for the construction of the compacted Stockpile Area D1 to the lines and grades shown and specified, as detailed in the Plans and Specifications.

This item shall include preparation of the subgrade, scarifying and recompacting the subgrade, backfill, moisture conditioning, excavating the Recharge Basin, placing, compacting, finish grading the engineered fill, and providing all miscellaneous items for completing all work involved to construct the compacted Stockpile Area D1 as detailed on the plans and Specifications. This bid item shall include the cost of building any necessary access roads for construction of the stockpile area. Any overbuilding of the stockpile area and trimming back to grades shown on the Plans shall also be included in the unit price. This item will be paid for on a Unit Price basis per Cubic Yard of excavated basin material that is used for the construction of Stockpile Area D1 (refer to Section 01 20 00 – Measurement and Payment)

A21 – Additional Mobilization/Demobilization, Bonds, Insurance and Permits: This bid item is a lump sum bid for additional costs associated with Add Alternate Bid Item A22 and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits not specifically included under a separate bid item, licenses, and fees required during the performance of Add Alternate bid item A22 work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel, and incidentals from the project at the end of construction. All costs associated with this item related to the Add Alternate bid item A22 work shall be included in the lump sum price and no additional payment will be made. This bid item shall be paid as specified in Section 9 Payment and Sub-Section 9-1.16D Mobilization of the State Standard Specifications.

A22 - Basin Excavation and Compacted Placement in Stockpile Area D2 (E-W): This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required for excavation of the basin for the construction of the compacted Stockpile Area D2 to the lines and grades shown and specified, as detailed in the Plans and Specifications. This item shall include preparation of the subgrade, scarifying and recompacting the subgrade, backfill, moisture conditioning, excavating the Recharge Basin, placing, compacting, finish grading the engineered fill, and providing all miscellaneous items for completing all work involved to construct the compacted Stockpile Area D2 as detailed on the plans and Specifications. This bid item shall include the cost of building any necessary access roads for construction of the stockpile area. Any overbuilding of the stockpile area and trimming back to grades shown on the Plans shall also be included in the unit price. This item will be paid for on a Unit Price basis per Cubic Yard of excavated basin material that is used for the construction of Stockpile Area D2 (refer to Section 01 20 00 – Measurement and Payment)

A31 – Additional Mobilization/Demobilization, Bonds, Insurance and Permits: This bid item is a lump sum bid for additional costs associated with Add Alternate Bid Item A32 and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits not specifically included under a separate bid item, licenses, and fees required during the performance of Add Alternate bid item A32 work as specified. This item also includes demobilization, including the removal of all equipment, supplies,

personnel, and incidentals from the project at the end of construction. All costs associated with this item related to the Add Alternate bid item A32 work shall be included in the lump sum price and no additional payment will be made. This bid item shall be paid as specified in Section 9 Payment and Sub-Section 9-1.16D Mobilization of the State Standard Specifications.

A32 - Basin Excavation to ultimate depth and Placement of Excess Basin Material:

This bid item is a unit price bid and payment for this item shall include full compensation for all labor, materials, tools, equipment, and incidentals required for the construction of the ultimate depth Recharge Basin to the lines and grades shown and specified, as detailed in the Plans and Specifications. This item shall include excavating, hauling and placing excess material, and providing all miscellaneous items for completing all work involved to construct the Recharge Basin to ultimate depth as detailed on the plans and Specifications. Excavated material from construction of the Recharge Basin to the ultimate depth of elevation 231.0 that is not used in other bid items shall be hauled and placed on the western portion of the Site as shown on Plans and directed by the Engineer. This item will be paid for on a Unit Price basis per Cubic Yard of excavated material that is hauled and placed in the designated area and not used for the construction of other bid items (refer to Section 01 20 00 – Measurement and Payment).

END SECTION

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SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.1 PRECONSTRUCTION CONFERENCE

- A. Upon receipt of the Notice to Proceed, or at an earlier time if mutually agreeable, the Owner will arrange a preconstruction conference to be attended by the Contractor, Contractor's superintendent, the Owner, the Engineer or his representative, and representatives of utilities, major subcontractors, and others involved in the execution of the Work.
- B. The purpose of this conference shall be to establish a working understanding between the parties and to discuss the Construction Schedule, Critical Path Method format required, shop drawing submittals and processing, applications for payment and their processing, and such other subjects as may be pertinent for the execution of the Work.

1.2 PROGRESS MEETINGS

- A. The Engineer shall arrange and conduct progress meetings. These meetings shall be conducted weekly, unless designated otherwise and shall be attended by the Engineer or his representative, Contractor, Contractor's superintendent and representatives of all subcontractors, utilities, and others, that are active in the execution of the Work. The purpose of these meetings shall be to expedite the work of any subcontractor or other organization that is not up to schedule, resolve conflicts, and in general, coordinate and expedite the execution of the Work.
- B. The agenda of progress meetings shall include review of progress and schedule, of payment request, of the latest Construction Schedule update, and of the record documents.

1.3 PROGRESS AND SCHEDULE REVIEW

- A. The progress of the Work and the Construction Schedule shall be reviewed to verify:
 - 1. Actual start and finish dates of completed activities since the last progress meeting.
 - 2. Durations and progress of all activities not completed.
 - 3. Reason, time, and cost data for Change Order work that is to be incorporated into the Construction Schedule or payment request form.
 - 4. Payment due to the Contractor based on percentage complete of items in the submitted payment request.
 - 5. Reasons for, and duration of, required revisions in the Construction Schedule.

6. After each monthly update, the Contractor shall submit to the Engineer three (3) prints of the last accepted Construction Schedule, revised in accordance with the monthly review.

1.4 REVIEW OF PAYMENT REQUEST

- A. The Contractor shall have his copy of the payment request and all other data required by the Contract Documents completed prior to the progress meeting. The Engineer will process Contractor's payment request after satisfactory review of the schedule update.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END SECTION

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SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work described in this section includes general requirements and procedures related to the preparation and transmission of submittals to include Shop Drawings, Product Information, Calculations, Test Reports, Certificates, Samples, Manuals, and Record Drawings.

1.2 RELATED WORK

- A. General Conditions
- B. Section 01 31 19 – Project Meetings
- C. Section 01 77 00 – Closeout Procedures

1.3 GENERAL

- A. Submittal procedures shall be consistent with Caltrans Section 5-1.23.
- B. Contractor shall have completed the following work tasks before a submittal:
 - 1. Reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - 2. Determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - 3. Determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 4. Determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

1.4 TRANSMITTAL INFORMATION

- A. Each submittal document shall have a separate cover or transmittal. Transmittals shall include the following identification data, as applicable:
 - 1. Submittal number
 - 2. Contract number

3. Project name and location
4. Product identification
5. Applicable contract drawing number, specification section, and paragraph number
6. Stamp Space: Blank space of approximately 2-1/2 inches high by 4 inches wide adjacent to the identification data to receive Engineer's status stamp.
7. Contractor's certification statement as described below:
 - a. "Certification Statement: By this submittal, we hereby represent that we have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and we have checked and coordinated each item with other applicable approved drawings and all Contract requirements."
- B. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review of each such variation.
- C. Furnish neat, legible, and sufficiently explicit detail to enable proper review for Contract compliance.
- D. Contractor assumes all risks of error and omission.
- E. Work performed before acceptance, or not conforming to accepted submittals, shall be at Contractor's risk.
- F. Submittal requirements contained in this specification are in addition to specific submittal requirements contained in individual equipment specification sections.

1.5 *LIMITATIONS OF ENGINEER'S REVIEW*

- A. Engineer's review is only for the purposes of determining if the items covered by the submittals will conform to the requirements in the Contract Documents.
- B. Engineer's review will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
- C. Engineer's review of a separate item will not indicate acceptance of the assembly in which the item functions.
- D. Engineer's review of a Submittal shall not relieve Contractor from responsibility for any deviation from the requirements of the Contract Documents unless Contractor has given Engineer specific written notice of any deviation per the requirements of this Section. Engineer will document any such accepted variation from the requirements of the Contract Documents in a Field Order.

- E. Engineer's review of a Submittal, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

1.6 SUBMITTAL PROCESS

- A. Submittals shall be sent to the Engineer electronically through email or a file transfer system agreed upon by the Owner, Engineer, and Contractor during the Preconstruction Conference.
- B. Engineer will provide timely review of Submittals in accordance with the Schedule of Submittals agreed upon by the Owner, Engineer, and Contractor during the Preconstruction Conference.
- C. Submittals will be returned, marked with one of the following classifications:
 - 1. NO EXCEPTION TAKEN: Requires no corrections, no marks.
 - 2. MAKE CORRETIONS NOTED: Requires minor corrections. Items may be fabricated as marked without further resubmission. Resubmit 2 corrected copies to the Engineer.
 - 3. REVISE AND RESUBMIT: Requires corrections. Resubmit entire submittal following original submission with corrections noted. Allow time for checking and Engineer's appropriate action.
 - 4. REJECTED: Submitted information does not comply with the Contract Documents. No items shall be fabricated. Resubmit entire submittal following original submission with corrections noted.
 - 5. INFORMATION ONLY: Items in the submittal are saved in the project file for information only but were not reviewed by the Engineer.

PART 2 SUBMITTAL DOCUMENTS

2.1 SHOP DRAWINGS

- A. When requested submit, submit two (2) sets of shop drawings.

2.2 SAMPLES

- A. When requested or required by individual specification sections, submit one (1) sample of each item.
- B. Samples shall be representative of the actual material proposed for use in the project and of sufficient size to demonstrate design, color, texture, and finish.
- C. Permanently attach to each sample
 - 1. The submittal number

2. The contract number
 3. Project name and location
 4. Product identification
 5. Applicable contract drawing and specification section number
 6. Subcontractor's, vendor's and/or manufacturer's name, address, and telephone number.
- D. Certain samples may be tested for specific requirements by the Owner and/or Engineer prior to acceptance. Failure of sample to pass tests will be sufficient cause for refusal to consider further samples of the same brand and make.
- E. Rejected samples will be returned upon request, and resubmittals shall consist of new samples.

2.3 RECORD DRAWINGS

- A. Maintain 1 record copy of Contract Documents at site in good order and annotated to show revisions made during construction. Keep annotations current for possible inspection.
1. Make record drawings available to Engineer at all times during life of Contract.
 2. Drawings: Made part of record drawings and to include:
 - a. Contract Drawings: Annotate or redraft, as required, to show revisions, substitutions, variations, omissions, and discrepancies made or discovered during construction concerning location and depth of utilities, piping, ductbanks, conduits, manholes, pumps, valves, vaults, and other equipment. Make revisions and show on all drawing views with actual dimensions established to permanent points.
 - b. Working/Layout Drawings: When required as submittals, record actual layouts of conduit runs between various items of electrical equipment for power, control, and instrumentation; wire sizes, numbers, and functions; configuration of conduits; piping layouts; and duct layouts.
 3. Before preliminary inspection, furnish reproducible of record drawings. At completion of Contract and before final payment is made, furnish Engineer 1 set of reproducibles of finally accepted record drawings reflecting revisions herein described.

PART 3 EXECUTION

NOT USED

END SECTION

SECTION 01 42 13 DEFINITIONS AND ABBREVIATIONS

PART 1 GENERAL

- 1.1 *DEFINITIONS AND TERMS* - IN THE EVENT THAT THESE DEFINITIONS CONFLICT WITH THE DEFINITIONS IN SECTION 1-1.07 OF THE SPECIAL PROVISIONS, THE DEFINITIONS IN SECTION 1-1.07 SHALL PREVAIL. SEE SECTION 1-1.07 OF THE SPECIAL PROVISIONS FOR ADDITIONAL DEFINITIONS.
- A. Whenever in these Specifications, or in other Contract Documents, the following terms are used, the intent and meaning shall be interpreted as follows:
1. Board: County of Fresno Board of Supervisors, County of Fresno, Owner.
 2. Calendar Day: Every day shown on the calendar.
 3. Contractor: The word "Contractor" means the person, firm or corporation to whom the award is made. Subcontractors as such will not be recognized.
 - a. Where pronouns "he", "his", or "him" are used in reference to the Contractor, it shall be inferred to be inclusive of all genders.
 4. Contract Price: The total amount of money for which the Contract is awarded.
 5. Contract Unit Price: The Contractor's original bid for a single unit of an item of work in the Proposal.
 6. Contract Time: The number of calendar days for completion of the Work, including authorized time extensions. In the event a calendar date is specified for Project completion in lieu of a number of calendar days, the Work shall be completed by that calendar date. The Contract Time shall be computed by excluding the first and including the last day; and if the last day be Sunday or a legal holiday, that shall be excluded.
 7. Department: The Fresno County Board of Supervisors and its authorized representatives.
 8. Engineer: County of Fresno Director of Public Works and Planning, acting through their authorized designees.
 9. Equipment: (Construction) - All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of work. (Installed) - All material or articles used in equipping a facility as furnishings or apparatus to fulfill a functional design.
 10. General Conditions: As specified in the Special Provisions and/or Standard Specifications.

11. General Requirements: All specifications contained in Division 1 of the Caltrans Standard Specifications.
12. Notice: Any notice allowed or required to be given by the Owner may be given by the Engineer.
13. Owner: County of Fresno.
14. Person: Any individual, association, partnership, corporation, trust, joint venture or other legal entity.
15. Plans: The drawings, profiles, cross-sections, working drawings and supplemental drawings, or reproduction thereof, approved by the Engineer, which show the location, character, dimensions or details of the work.
16. Proposal: The offer of a Bidder when submitted on the Proposal form; properly signed and guaranteed.
17. Reference Documents: Bulletins, Rules, Methods of Analysis or Test, Codes, Standards, and Specifications of public or private agencies, Engineer Societies, or Industrial Associations. Reference shall be to the latest edition thereof, including Amendments, which are in effect and published at the time the Request for Bids is issued, unless a specific edition is identified, in which case reference shall be to such specific edition. Reference Documents are intended to amplify the descriptions of materials, equipment, and construction systems and are to be considered a part of the Contract Documents insofar as the various sections thereof are referred to hereinafter. Examples of Reference Documents are Federal Specifications, State Standard Specifications, and those of American Society of Testing Materials (ASTM), American National Standards Institute (ANSI), American Standards Associations (ASA), and American Concrete Institute (ACI).
18. Salvage: The protection storage, and/or removal of specified existing equipment, parts or materials during the work for retention and later use by the Owner.
19. Sanitary Sewer: Any conduit and appurtenances intended for the reception and transfer of sewage.
20. Specifications. Any or all of the specifications defined in this section and any addendums thereof. They are divided into four general categories: Special Provisions, General Requirements (Division 1), Technical Specifications (Division 2 through Division 46), and Reference Documents.
21. State: The State of California, including its agencies, departments or divisions whose conduct or action is related to the work.
22. State Standard Plans: State of California, Business and Transportation Agency, Department of Transportation, Caltrans, Standard Plans, latest revision.

23. State Standard Specifications: Standard Specifications for the project are those entitled "Standard Specifications, State of California, Business and Transportation Agency, Department of Transportation", current version, hereinafter referred to as the State Standard Specifications. These Specifications are to be considered a part of the Contract Documents insofar as they are not superseded by the Special Provisions and other provisions contained in Divisions 01, 02, 03, 05, 09, 31, 32, 33 and 40 of these Specifications.
24. Storm Sewer: Any conduit and appurtenances intended for the reception and transfer of storm water.
25. Street: Any public road, highway, parkway, freeway, alley, walk or right-of-way.
26. Surety: Any individual, firm or corporation bound with and for the Contractor for the acceptable performance, execution and completion of the Work, and for the satisfaction of all obligations incurred.
27. Utility: Tracks, overhead or underground wires, pipelines, conduits, ducts or structures, sewers or storm drains owned, operated or maintained in or across a public right-of-way or private easement.
28. Water Main: Any conduit and appurtenances intended for the distribution of water.
29. Working Day: Any weekday (Monday through Friday), not a designated national holiday, during which weather allows the Contractor to work four or more hours consecutively, starting no later than 10:00 AM.

1.2 REFERENCED STANDARDS

- A. The standards referred to, except as modified, shall have full force and effect as though printed in this Specification, and shall be the latest edition or revision thereof in effect on the bid opening date, unless a particular edition or issue is indicated. Copies of these standards are not available from the Owner. The Engineer will furnish, upon request, information as to how copies may be obtained.

1.3 LIST OF ABBREVIATIONS

- A. Abbreviations and terms, or pronouns in place of them, shall be interpreted as follows:

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ADC	Air Diffusion Council
AEIC	Association of Edison Illuminating Companies

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AFBMA	Antifriction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHA	American Hardboard Association
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ARI	American Refrigeration Institute
ASA	(now U.S.A.S.I., USA Standards Institute) Association & its Standard Specifications
ASAHC	American Society of Architectural Hardware Consultants
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America (formerly SCPI)
CAL/OSHA	California Occupational Safety and Health Administration
CALTRANS	California Department of Transportation
CBC	California Building Code
CCR	California Codes of Regulations
CDA	Copper Development Association
CEC	California Electrical Code
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CMAA	Crane Manufacturers Association of America
CMC	California Mechanical Code
CPC	California Plumbing Code
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard (U.S. Department of Commerce)
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Research Association
EI	Edison Electric Institute
EJCDC	Engineers' Joint Contract Documents Committee
EPA	Environmental Protection Agency
FED SPEC	Federal Specification

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FCI	Fluid Controls Institute
FGMA	Flat Glass Marketing Association
FIA	Factory Insurance Association
FM	Factory Mutual
FSA	Fluid Sealing Association
FTI	Facing Tile Institute
HEI	Heat Exchange Institute
HMI	Hoist Manufacturers Institute
HPMA	Hardwood Plywood Manufacturers Association
HTI	Hand Tools Institute
ICBO	International Conference of Building Officials
I-B-R	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IFI	Industrial Fasteners Institute
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
JIC	Joint International Conference (Hydraulic Institute)
MHI	Materials Handling Institute
MIL	Military Specification
MMA	Monorail Manufacturers Association
MSS	Manufacturers' Standardization Society
NAAMM	National Association of Architectural Metals Manufacturers
NACE	National Association of Corrosion Engineers.
MBBPVI	National Board of Boiler and Pressure Vessel Inspectors
NBHA	National Builders Hardware Association
NCSPA	National Corrugated Steel Pipe Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NEMI	National Elevator Manufacturing Industry
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NLA	National Lime Association
NPC	National Plumbing Code
NPT	National Pipe Thread
NRCA	National Roofing Contractors' Association
NRMCA	National Ready Mixed Concrete Association
NSC	National Safety Council
NSF	National Sanitation Foundation
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PFI	Pipe Fabrication Institute
PS	Product Standard

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RTI	Resilient Tile Institute (formerly AVATI)
SAE	Society of Automotive Engineers
SCPRF	Structural Clay Products Research Foundation
SI	International Systems of Units (Metric)
SIGMA	Sealed Insulating Glass Manufacturers Association
SFPA	Southern Forest Products Association
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPFA	Steel Plate Fabricators Association
SPI	Society of the Plastics Industry
SPTA	Southern Pressure Treaters Association
SSI	Scaffolding and Shoring Institute
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction (Greenbook)
UL	Underwriters' Laboratories
UPC	Uniform Plumbing Code
USBR	U.S. Bureau of Reclamation
USGS	United States Geological Survey
WCLA	West Coast Lumbermen's Association (Standard Grading and Dressing Rule)
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

END SECTION

SECTION 01 43 00
QUALITY CONTROL AND TESTING

PART 1 GENERAL

1.1 NOTICE OF DEFECTS

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- B. All defective Work may be rejected, ordered to be corrected, or accepted, at the discretion of the Owner and Engineer.

1.2 ACCESS TO WORK

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests shall have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith.

1.3 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be subject to the requirements of Section 01 35 00 – Material Substitution Procedures.

1.4 PROJECT SITE TESTING

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Except for specified material suitability tests, all initial routine tests of materials shall be at the expense of the Owner and shall be performed by an independent certified laboratory designated by the Owner. Whenever a specified percent relative compaction test is required and the material or portion thereof so tested fails to meet or exceed the relative compaction specified, all subsequent retesting shall be performed at the expense of the Contractor.
- C. All material suitability tests shall be at the expense of the Contractor. Testing shall be by an independent certified laboratory approved by the Engineer.

1.5 TEST STANDARDS

- A. All sampling, specimen preparation, and testing of materials shall be in accordance with the standards of nationally recognized technical organizations.
- B. The physical characteristics of all materials not particularly specified shall conform to the latest standards published by the ASTM, where applicable.

1.6 UNCOVERING WORK

- A. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without concurrence of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and recovered at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be re-observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall promptly correct said defects, including all work involved in uncovering and recovering the work, at no cost to the Owner.
 - 2. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction.

1.7 CORRECTION OR REMOVAL OF DEFECTIVE OR REJECTED WORK

- A. Upon receipt of notice, Contractor shall correct all defective or rejected Work and replace it with Work that is not defective, at no cost to the Owner.

1.8 ACCEPTANCE OF DEFECTIVE WORK

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so.
 - 1. If any such acceptance occurs, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted.
 - 2. Engineer shall determine the reasonableness of the diminished value of Work so accepted and Contractor shall pay all costs involved in making such determination.

END SECTION

SECTION 01 50 00

TEMPORARY FACILITIES

PART 1 GENERAL

1.1 GENERAL

- A. The Contractor shall provide all temporary facilities and utilities required for completion of the Work as well as safety precautions and programs. No attempt is made to set out in detail the Contractor's means or methods necessary to accomplish the tasks involved.

1.2 TEMPORARY UTILITIES

A. Water

- 1. The Contractor may make arrangements with the Owner to use municipal water where appropriate during construction. See Section 01 51 36 -- Watering of these specifications for details.
- 2. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water.

B. Sanitary Facilities

- 1. The Contractor shall provide suitable and adequate sanitary conveniences for the use his staff at the site of the Work. Such conveniences shall include chemical toilets or water closets and shall be located at appropriate locations at the site of the Work. All sanitary conveniences shall conform to the regulations of the public authority having jurisdiction over such matters. At the completion of the Work, all such sanitary conveniences shall be removed and the site left in a sanitary condition.
- 2. With respect to sanitation facilities, the Contractor shall cooperate with and follow directions of representatives of the Public Health Service and the State. State and County Public Health Service representatives shall have access to the Work, whether it is in preparation or progress, and the Contractor shall provide facilities for such access and inspection.

1.3 TEMPORARY CONSTRUCTION FACILITIES

- A. Construction hoists, shoring, and similar temporary facilities shall be of ample size and capacity to adequately support and move the loads to which they will be subjected. Railings, enclosures, safety devices, and controls required by law or for adequate protection of life and property shall be provided.
- B. Temporary supports shall be designed with an adequate safety factor to assure adequate load bearing capability. The Contractor shall submit design calculations

prepared by a professional registered engineer for staging and shoring prior to application of loads.

- C. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations from one hour before sunset each day to one hour after sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded in such a manner as to prevent person from falling, walking, or otherwise entering any excavation in any street, roadway, parking lot, treatment plant, or any other area, public or private.
- D. The Contractor shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, as a minimum, conform to the requirements of Cal/OSHA.
- E. At such time or times any temporary construction facilities and utilities are no longer required for the work, the Contractor shall notify the Engineer of his intent and schedule for removal of the temporary facilities and utilities, and obtain the Engineer's approval before removing the same. As approved, the Contractor shall remove the temporary facilities and utilities from the site as his property and leave the site in such condition as specified, as directed by the Engineer, and/or as indicated on the Plans.

1.4 ACCESS ROADS AND STAGING AREA

- A. Adequately access shall be maintained to all storage areas and other areas to which frequent access is required. The Contractor shall limit the location of his storage of equipment and materials outside of the project site. The Contractor shall make his own arrangements for space that may be required and bear all associated costs. The Contractor shall provide any temporary storage required for the protection of equipment and materials as recommended by manufacturers of such materials.
- B. Storage and protection:
 - 1. Materials and equipment shall be stored in accordance with supplier's written instructions, with seals and labels intact and legible. Exposed metal surfaces of valves, fittings and similar materials shall be coated with accordance with manufacturer's recommendations to prevent corrosion.
 - 2. Storage shall be arranged to provide access for inspection. The Contractor shall periodically inspect to assure materials and equipment are undamaged and are maintained under required conditions.

END SECTION

SECTION 01 51 36
WATERING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of furnishing, hauling, and applying water required for compaction of embankments, backfills, subgrade, and base course, and for landscaping, and other construction operation.

1.2 RELATED WORK

- A. Section 01 50 00 – Temporary Facilities
- B. Section 01 57 27 – Dust Control

1.3 REFERENCES

- A. State Standard Specifications Section 10-6, Watering

PART 2 PRODUCTS

2.1 WATER

- A. Free of debris, organic matter, and other objectionable substances.

PART 3 EXECUTION

3.1 WATER TRUCK

- A. At least 1,000-gallon capacity.
- B. Keep at least one water truck on site at all times, unless Engineer approves removal of the truck from the site before final completion.

3.2 APPLICATION

- A. Use pressure type distributors or a pipeline equipped with sprinkler system. Provide approved meter devices near points of discharge.
- B. Ensure a uniform application of water for optimum moisture content. Avoid excessive runoff and minimize water waste.
- C. The Contractor may water excavation areas before excavating. Drill full depth of excavation to make moisture determinations.
- D. If over watering occurs, de-water at no additional expense to the Owner.

3.3 SPECIAL CONTROLS

The Contractor shall take all reasonable means to minimize inconvenience and injury to the public by dust, noise, diversion of storm water, or other agencies under his control.

A. Dust Control

1. As specified in Section 01 57 27, Dust Control

B. Water

1. Water for construction purposes will be available at no cost to the Contractor from existing County owned wells located at the site. The existing on-site wells do not have electrical power or a working pump installed. The Contractor shall be responsible for furnishing and installing a portable pump and power source to lift water out of the well. The standing water level at the site is approximately 175 feet below ground surface. The Contractor may make arrangements to bring water to the site during construction if they do not want to supply pumping equipment to retrieve water from the on-site wells.
2. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water.
3. Full compensation for furnishing all labor, materials, tools and equipment and for doing all work involved in furnishing and applying water as required by the Contract Documents and Specifications, State Standard Specifications, shall be considered as included in the contract unit prices paid for other items of work and no additional allowance will be made therefore.

END SECTION

SECTION 01 55 26

TRAFFIC CONTROL PLAN

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of preparation of a Traffic Control Plan to provide for safe movement of vehicular, bicycle and pedestrian traffic around construction operations. The Contractor shall be solely responsible for providing all protective measures necessary.
- B. In addition to the following requirements, Contractor's Traffic Control Plan shall incorporate all elements required by the governmental agency responsible for issuing encroachment permits onto the road at issue, if those requirements differ from or exceed those set forth herein.

1.2 REFERENCES

- A. Caltrans Standard Specifications, current edition (State Standard Specifications)
- B. Caltrans Standard Plans, and Revised Standard Plans (State Standard Plans)
- C. California Department of Transportation (Caltrans) Manual of Uniform Traffic Control Devices, Current Edition
- D. AASHTO Roadside Design Guide, Current Edition
- E. U.S. Department of Transportation, Federal Highway Administration, (USDOT): Design Guidance: Accommodating Bicycle and Pedestrian Travel: a Recommended Approach

1.3 SUBMITTALS

- A. Submittals shall be in accordance with the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. The Traffic Control Plan shall be submitted prior to or at the Pre-Construction Conference, to allow sufficient time for the Engineer and the Owner to review the plan prior to Notice to Proceed. Note: If a Traffic Control Plan is provided in the Plans, it shall be considered to be a guideline only. Contractor shall be responsible for development, submittal and implementation of the final Traffic Control Plan under this paragraph and Section 01 57 56.
- C. The Traffic Control Plan submitted by the Contractor shall include specific detour routes, planned street closures, temporary signage, and flag persons if necessary, and a description of how Contractor plans to provide safe vehicle passage, as well as plans for the protection of pedestrians and bicyclists through the construction zone, throughout the duration of the project. The plan may be staged as appropriate to the scope of the construction work.

- D. Engineer shall review and comment on the Traffic Control Plan as any other submittal.
- E. The Traffic Control Authority, as defined in Section 01 57 56, which is the authority in charge of the subject roads, may also provide comments on the Traffic Control Plan within the same time period as allowed for submittal review.
- F. Once the Traffic Control Authority is satisfied with the Traffic Control Plan and any applicable fees have been paid by Contractor, the Traffic Control Authority will issue the relevant encroachment permit.

1.4 REQUIRED PERMITS

- A. Required Permits for this project include a Fresno County Encroachment Permit. Contractor shall pay the required permit fee, and all associated inspection fees. Costs for permits and inspection fees shall be included in Contractor's compensation under Bid Item No. 3 Traffic Control.

PART 2 PRODUCTS

- A. All products specified on the Traffic Control Plan shall conform to the requirements of Section 01 57 56, Traffic Control.

PART 3 EXECUTION

3.1 TRAFFIC CONTROL PLAN GUIDELINES

- A. Traffic Control Plan (TCP) shall be drawn on 24" x 36" plan sheets, unless otherwise approved by the Engineer. TCPs may be submitted in AutoCAD .DWG format, in PDF format, or in hard copy.
- B. TCP must use legible lettering and clear, contrasting, symbols for viewing or printing.
- C. Use a legend to define all signs and symbols and designate them with California MUTCD-standard nomenclature.
- D. Indicate Contractor's name, address, and telephone number. Include name and telephone number of the 24-hour contact person representing the Contractor.
- E. Indicate north arrow and bar scale.
- F. Show all nearby streets with street names.
- G. Show existing traffic signals and regulatory signs within the work area and affected construction zone.
- H. Show existing striping, pavement markings, painted crosswalks, and bike lanes within the work area and affected construction zone.

- I. Show existing curbs, gutters, sidewalks, driveways, and intersections in the construction work zone including areas affected by taper transition.
- J. Show dimensions for all existing striping and proposed traffic control area within the work area and affected construction zone.
- K. Show staging area and materials storage area, as appropriate.
- L. Indicate location of construction signs, barricades, and delineators.
- M. Label all taper lengths and widths, delineator spacing and sign spacing. Spacing of channelizing devices should not exceed 25 feet.
- N. Show existing and proposed temporary parking restriction zones and signs, as needed, within the work area.
- O. Road closures will require approval from the Engineer.
- P. Signs and barricades required to direct pedestrians through or around the construction work zone shall be shown on the TCP.

3.2 MANDATORY GENERAL NOTES

- A. All Traffic Control Plans shall include the following General Notes, as minimum conditions. Additional conditions may be added at the discretion of the Traffic Control Plan preparer.
- B. All traffic control devices shall conform to the latest edition of the California Manual on Uniform Traffic Control Devices (California MUTCD).
- C. The Engineer or his representative has the authority to initiate field changes to assure public safety.
- D. All traffic control devices shall be removed from view when not in use.
- E. Work hours shall be restricted to the period between 8:00 a.m. and 4:30 p.m., Monday through Friday, unless approved otherwise.
- F. Night work is not allowed.
- G. Trenches must be back filled or plated during non-working hours.
- H. Pedestrian controls shall be provided as shown on the plans.
- I. Temporary "NO PARKING" signs shall be posted 24 hours prior to commencing work.
- J. Access to driveways shall be maintained at all times unless other arrangements are made.
- K. The Contractor shall replace within 72 hours, all traffic signal loop detectors damaged during construction.

- L. The Contractor shall replace within 24 hours, all striping removed or damaged by construction work. (Striping may be replaced temporarily with tape.)
- M. All Workers shall be equipped with Personal Protective Equipment in compliance with the most recent version of the CAL/OSHA requirements, but at a minimum shall include an orange vest (or a reflective vest at night). All flaggers shall also be equipped with a hard hat, C28 "Stop/Slow" paddle and shall be trained in the proper fundamentals of flagging traffic.
- N. The Contractor shall maintain all traffic control devices 24 hours per day and 7 days per week.
- O. A minimum of one, twelve (12) foot travel lane in each direction shall be maintained for public traffic unless otherwise approved by Fresno County.
- P. A solar powered flashing arrow board shall be required on all arterial street lane closures.

END SECTION

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SECTION 01 57 19

ENVIRONMENTAL PROTECTION MEASURES

PART 1 GENERAL

1.1 GENERAL

- A. The Contractor shall implement the environmental protection measures described in the following sections, excepting those measures specifically identified to be completed by the Owner.

1.2 NOISE

- A. Noise generating equipment used during construction shall be restricted to the hours from 7:00 a.m. to 7:00 p.m., Monday through Friday, and 9:00 a.m. to 6:00 p.m. on Saturday and Sunday. Construction outside of these hours shall require written approval by the Owner. Effective mufflers shall be fitted to gas-powered and diesel-powered equipment.

1.3 BIOLOGICAL RESOURCES

- A. No evidence of threatened or endangered species has been found on or near the project site; however, if any evidence of threatened or endangered species is observed during the course of construction, the Contractor shall notify the Owner immediately.

1.4 CULTURAL RESOURCES

- A. Remains archaeological features or materials are unearthed during any phase of project activities, activities within fifty (50) feet of the find shall cease until Contractor has contacted the California State Historic Preservation Office (SHPO), and the significance of the resource has been evaluated. Any mitigation measures that may be deemed necessary must have the approval of SHPO, and shall be implemented, pursuant to the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation, 48 CFR 44716, by a "qualified" archaeologist representing the Contractor prior to the resumption of construction activities.
- B. If human remains are exposed by activity related to the project, the Contractor shall comply with California State Health and Safety Code, Section 7050.5, which states that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to California Public Resources Code, Section 5097.98.

1.5 AIR QUALITY

- A. Contractor shall abide with all applicable state, federal, and local codes and regulations for fugitive dust management and control. Refer to Section 01 57 27 – Dust Control.

1.6 *HYDROLOGY AND WATER QUALITY*

- A. Contractor shall abide with all applicable state, federal, and local codes and regulations for storm water management and control. Refer to Section 01 57 23 – Storm Water Pollution Prevention Plan.

END SECTION

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SECTION 01 57 23
STORM WATER POLLUTION PREVENTION PLAN

PART 1 GENERAL

1.1 WORK INCLUDES

- A. The Contractor shall apply for and obtain coverage under State of California Construction General Permit Order 2022-0057-DWQ, as applicable, at least three weeks before starting Work and shall implement storm water pollution prevention measures as prescribed in the Legally Responsible Person approved SWPPP to prevent sediment and/or pollutants from entering storm drains, streams, or water bodies throughout the duration of the Work in compliance with the permit requirements, including CalGreen Building Standards. Work shall be performed in accordance with all Federal, State, and local regulations. It is assumed that the project's total disturbed surface area is greater than 1 acre.
- B. The Contractor shall furnish and exercise every reasonable precaution to protect channels, storm drains, and bodies of water from pollution and provide all labor, materials, tools, and equipment necessary to prevent storm water pollution associated with construction activities, including preparation of Stormwater Pollution Prevention Plan (SWPPP) and amendments if necessary for CGP Compliance, installation, maintenance and final removal of all temporary and permanent erosion and sediment control measures, in accordance with the requirements of the Contract Documents.
1. The Legally Responsible Person (LRP) is the County of Fresno.
 2. The Approved Signatory for the LRP is representative designated by the County of Fresno.
 3. Contractor shall coordinate with Engineer and LRP to become a Data Entry Person for the purpose of the Project. This will allow Contractor to upload the required reports and plans to the SMARTS system. Each upload will still require certification by the LRP, and it shall be Contractor's responsibility to notify Engineer and LRP of each SMARTS upload so that LRP can make the necessary approval.
- C. **Penalties:** Failure to comply with this Section may result in significant fines and possible imprisonment. The Regional Water Quality Control Board (RWQCB) or other prosecuting authority may assess fines for each violation. Should the District be fined or penalized as a result of the Contractor failing to comply with this Section and applicable permit requirements, the Contractor shall reimburse the District for any and all fines, penalties and related costs.
- D. All costs for work required for compliance with this Section shall be included in the price bid for Storm Water Pollution Prevention Plan (SWPPP) – Preparation and Implementation.

1.2 REFERENCES

- A. California State Water Resources Control Board, Construction General Permit 2022-0057-DWQ, https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2022/wqo_2022-0057-dwq.pdf
- B. California Stormwater Quality Association (CASQA), <https://www.casqa.org/>

1.3 SUBMITTALS

- A. As specified in the General Conditions, Section 01 33 00 – Submittal Procedures, and Section 13 of the Special Provisions and Standard Specifications.
- B. Submittals for the SWPPP shall be completed and submitted at least three weeks prior to beginning work and within 5 days of issuance of the Notice of Award.
 - 1. The contractor shall submit the appropriate project type SWPPP, Risk Level/Type Level Determination, Post-Construction Calculations, Dewatering Plan(s), and any additional Permit Registration Documents required for submittal to SMARTS. Documents to be submitted to the State Water Board via the SMARTS system after approval of the LRP. All documents shall be kept onsite in either a job trailer or accessible lockbox.
 - 2. The contractor shall submit the Annual Report(s), Sampling and Analysis reports, Notice of Termination, and all other permit compliance documents required for submittal to SMARTS. Documents to be submitted to the State Water Board via the SMARTS system after approval of the LRP. All documents shall be kept onsite in either a job trailer or accessible lockbox.
- C. Certifications
 - 1. As applicable to the appropriate permit requirements:
 - a. Copy of the Certificate of Training issued by CASQA demonstrating qualification of the designated QSD or CBPELSG Licensed QSD Training Program proof of good standing.
 - b. Copy of the Certificate of Training issued by CASQA demonstrating qualification of the designated QSP(s) or CBPELSG Licensed QSD Training Program proof of good standing.
 - c. Copy of the Certificate of Training issued by the Project QSP demonstrating qualification of the designated QSP Delegate(s) Foundational **and** Site-Specific Training.
- D. Proof of project sign with SWPPP WDID number and the location to be displayed.
- E. Proof of installation of rain gauge on project site.

- F. Submit all required inspection reports including project photographs (weekly, quarterly, precipitation event (pre, during and post), quarterly, and sampling results) to Construction Manager, QSD, Engineer, and LRP within 24 hours of inspection.

1.4 QUALITY ASSURANCE

At minimum, the following measures shall be taken to help ensure control of storm water and non-storm water pollution. These measures shall not be construed to limit or override the measures set forth and called for in the SWPPP.

- A. Develop, submit to the QSD, and obtain approval from the RWQCB for site dewatering. Control the rate and effect of dewatering in such a manner as to avoid all objectionable settlement and subsidence and to assure the integrity of the finished work.
- B. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, establish reference points and observe at frequent intervals to detect any settlement that may develop. Conduct the dewatering operation in a manner that protects adjacent natural resources and facilities. Cost of repairing all damage to adjacent resources and facilities shall be the sole responsibility of the Contractor.
- C. Before commencing grading, excavation or filling in any part of the site, Contractor shall construct swales, diversion channels, inlet protection barriers, sedimentation traps, and other measures to guide runoff away from the work area and to capture eroded material before it reaches natural water courses. The measures shall be in accordance with the approved storm water pollution prevention plans.
- D. Arrange demolition activities to minimize erosion to the maximum practical extent. Clearing, excavation, and grading shall be limited to those areas of the Project site necessary for demolition. Minimize the area exposed and unprotected.
- E. Clearly mark and delineate the work limits activities. Equipment shall not be allowed to operate outside the limits of work or to disturb existing vegetation. Excavation and grading shall be completed during the dry season to the maximum extent possible.

1.5 GENERAL REQUIREMENTS

- A. The Contractor shall exercise care in preserving vegetation and protecting property, to avoid disturbing areas beyond the limits of the Work and promptly repair any damage caused by Contractor operations.
- B. The Contractor shall provide all necessary water pollution control devices to prevent, control, and abate water pollution, and implement good housekeeping pollution control measures to reduce the discharge of pollutants from the Site to the maximum extent practicable. These water pollution control devices include structural BMPs, drains, gutters, slope protection blankets and retention basins and shall be constructed concurrently with other Work at the earliest practicable time.
- C. Stockpiles of earth and other construction-related materials shall be protected from being transported from the Site by wind or water using covers or equivalent.

- D. The Contractor shall properly store and handle fuels, oils, solvents, and other toxic materials in a manner not to contaminate the soil or surface waters, enter the groundwater, or be placed where they may enter a live stream, channel, drain, or other water conveyance facilities. All approved toxic storage containers shall be protected from weather. Spills shall be cleaned immediately, and soiled materials shall be properly disposed of. Spills shall not be washed into live streams, channels, drains, storm drains, or other water conveyance facilities.
- E. Excess or waste concrete (including concrete decant water) shall not be washed onto bare ground, into the public way or any drainage systems. The concrete wastes shall be retained on-site until they can be appropriately disposed of or recycled. Concrete wastes shall not be washed into live streams, channels, drains, storm drains, other water conveyance facilities, bare ground or unapproved concrete washout containment areas.
- F. Non-stormwater runoff from equipment washing, vehicle washing, and any other activities shall be contained at the work site and properly disposed of. Non-stormwater runoff shall not be allowed to enter live streams, channels, drains, storm drains, or other water conveyance facilities.
- G. The Contractor shall prevent sediments and other materials to be tracked from the Site by vehicle traffic. Construction entrance roadways shall be stabilized to inhibit sediments from being deposited onto public ways. The Contractor shall immediately sweep up accidental depositions and not allow depositions to be washed away by rain or by any other means.

1.6 REGULATORY REQUIREMENTS

- A. The Contractor shall comply with the requirements of the State Water Resources Control Board (SWRCB), RWQCB, California Administrative Code, California Building Code, Owner and any other agencies having jurisdiction in storm water and non-storm water discharges and waste management.
- B. General Permit Registration Documents:
 - 1. The Contractor shall employ or contract with qualified personnel to prepare all compliance documents in accordance with the applicable regulatory requirements.
 - 2. All engineering calculations, reports, and drawings shall be prepared, and signed by a California licensed engineer in accordance with California Business and Professional Code Section 6700, et seq.
 - 3. The LRP's qualified personnel shall file the required documents, as necessary, through the SWRCB's Storm Water Multiple Application and Report Tracking System (SMARTS) website.
 - 4. The Contractor shall mail the appropriate application fee to the SWRCB no later than two (2) days after notification of submittal to the SWRCB via SMARTS. The Contractor shall affix the SWRCB Fee Statement Letter to the

application fee. The Contractor shall pay all amendment and/or annual fees for subsequent years as required by the CGP.

5. The Contractor shall not commence any construction work until a Waste Discharger Identification (WDID) number assigned by the SWRCB is received. The Contractor shall retain a copy of the WDID onsite, as evidence of the SWRCB acceptance of the PRDs/SWPPP/Waiver.
- C. The Contractor shall comply with the discharge and effluent prohibitions and limitations listing in the 2022 CGP.

1.7 STORM WATER POLLUTION PREVENTION PLAN IMPLEMENTATION

A. General Requirements:

1. Implementation of all BMPs shall be overseen by trained personnel employed or retained by the Contractor.
2. All required site monitoring and water testing, as necessary, shall be overseen by a QSP employed or retained by the Contractor.
3. All erosion and sediment control measures shall be implemented as specified in the SWPPP.
4. A copy of the SWPPP, including working details (fact sheets) for construction site BMPs and applicable amendments, shall be kept and maintained by the Contractor on the construction site and continuously updated in accordance with CGP requirements to reflect current site conditions throughout the duration of the project.

B. The Contractor shall implement all activities required by the CGP for the Type and/or Risk Level of the project as detailed in the SWPPP in accordance with the CGP. The SWPPP shall identify applicable best management practices (BMPs). All stormwater or non-stormwater pollution prevention activities specified in the SWPPP shall comply with the guidance provided in the "*Stormwater Best Management Practice Handbook, Construction*," August 2023 or more current edition, published by the California Stormwater Quality Association (CASQA).

1. The SWPPP shall detail the placement of physical BMPs required for installation and the methods used to comply with those BMPs. The Contractor's preferred techniques shall show how it will comply with the stated objectives of the SWPPP and the terms of the CGP.

C. Non-Stormwater Management: As specified in the CGP as appropriate to the project Risk Level, the SWPPP shall discuss any non-stormwater sources (i.e., landscaping, irrigation, pipe flushing, street washing and dewatering). In addition, the SWPPP shall include standard observation measures and BMPs, including BCT/BAT practices that are to be implemented in order to reduce the pollutant loading in the discharge waters.

- D. Amendments: All SWPPP amendments shall be prepared by the QSD at no additional cost to the Owner.
1. The Contractor shall, at no additional cost to the Owner, amend the SWPPP whenever there is a change in construction or operations which may affect the discharge of pollutants to stormwater. All fees as determined by the SWRCB will be paid by the Contractor.
 2. The Contractor shall, at no additional cost to the Owner, amend the SWPPP if it is in violation of any conditions of the CGP or has not achieved the general objective of reducing pollutants in stormwater discharges. All fees as determined by the SWRCB will be paid by the Contractor.
- E. Annual Reporting: The Contractor shall submit to the LRP an annual report and all required information for SMARTS data entry, no later than July 15th of each year. The LRP shall submit to the SWRCB via the SMARTS system in accordance with the requirements the CGP, including but not limited to: a summary and evaluation of all sampling and analysis results, original laboratory reports, chain of custody forms, a summary of all corrective actions taken during the compliance year and identification of any compliance activities or corrective actions that were not implemented. The LRP will certify the annual report by September 1st. A project of 90 days or more duration can require more than one Annual Report. See below.
1. An Annual Report is required while the Project is still under construction, if construction begins not later than June 1 of a calendar year and is not completed by September 1 of that same year.
 2. An Annual Report is required, without exception, within 90 days of or prior to the September 1 following project completion.
- Example: A project commencing on May 31 and completed on September 2 of the same year would require an annual report both by September 1 of the reporting year, and prior Notice of Termination submittal.
- F. Notice of Termination: Once construction is completed and the Site has been stabilized with final, sustainable cover, the QSP shall prepare a Notice of Termination (NOT), including a final site map, photos, and a final project Annual Report, shall obtain necessary signatures from the LRP and shall submit all through the State Water Board's SMARTS website within 80 days after all land disturbing activities end and construction is complete. The LRP will certify the Notice of Termination within 90 days of all land disturbing activities end and construction is complete via SMARTS in accordance with the CGP.

A Notice of Termination is distinct from an Annual Report. Both are required.

PART 2 PRODUCTS

2.1 GENERAL

- A. Materials furnished for BMPs shall meet the requirements of the California Stormwater Quality Association, *Stormwater Best Management Practice Handbook, Construction* – August 2023 edition (or most current version) unless otherwise indicated.
- B. Before the work begins, sufficient equipment shall be available on the site to assure that the operation and adequacy of the erosion control plans can be continuously maintained.

PART 3 EXECUTION

3.1 GENERAL DESCRIPTION

- A. The Contractor shall install and maintain all pollution, erosion, and sediment control measures and carry out inspections in accordance the approved SWPPP.
- B. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediately stockpile area by implementing applicable BMPs, including but not limited to construction of temporary toe-of-slope ditches and accompanying silt fences as necessary. If the BMPs proposed in the SWPPP prove inadequate to control sediment transport and erosion on the Site, the Contractor shall without delay implement additional provisions to obtain effective control. The SWPPP shall be updated to reflect the necessary changes as discussed in paragraph 1.7 above.
- C. The Contractor shall be responsible for taking the proper actions to prevent contaminants and sediments from leaving the project Site. The Contractor shall take immediate action if directed by the Construction Manager/LRP, or if the Contractor observes contaminants and/or sediments entering the storm drainage system, to prevent further stormwater from entering the system.

3.2 NOTIFICATION AND REPORTING

- A. If non-stormwater pollution occurs in the work area for any reason or when the Contractor becomes aware of any violation of this Section, the Contractor shall correct the problem and shall follow the requirements of the SWPPP for monitoring, control and reporting of non-stormwater discharges.

3.3 FIELD QUALITY CONTROL

- A. The Contractor shall maintain the BMPs and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures.

Should the QSP note any deficiencies in necessary BMPs during the course of

QSP's inspections and reporting, Contractor shall immediately repair or replace the defective BMPs as required by the QSP.

3.4 INSPECTIONS

- A. The Contractor's QSP shall inspect disturbed areas of the construction site, areas that have not been finally stabilized, areas used for storage of materials exposed to precipitation, stabilization practices, structural practices, other controls, and area where vehicles are stored and/or exit the Site at least weekly, and in accordance with CGP precipitation event inspection requirements. The QSP shall perform quarterly inspections per CGP requirements.
- B. The Contractor's QSP shall inspect discharge locations or points to ascertain whether BMPs are effective in preventing significant impacts to receiving waters. Inspect locations where vehicles exit the Site for evidence of offsite sediment tracking.
- C. If required by the Project's Risk Level, Contractor's QSP shall conduct necessary Precipitation Event Monitoring, Sampling, and Reporting as required under the CGP.
- D. Inspection Reports shall be in compliance with the requirements of the CGP for the specified Risk Level. Furnish the report to the Construction Manager, QSD, Engineer, and LRP within 24 hours of the inspection as a part of the Contractor's daily report or as a standalone report.
- E. The Contractor's trained personnel shall be responsible for site discharge sampling and reporting as required under the CGP. Sample analysis reporting shall be submitted to the LRP and QSD within 24 hours of receipt from the field sampler and/or the laboratory along with sampling locations (latitude/longitude) and other requirements listed in the SWPPP.
- F. A copy of the QSP's inspection report shall be maintained on Site.

3.5 RECORDS

- A. The Contractor shall retain records/copies of data used to complete the PRDs; the SWPPP and all attachments and amendments; compliance certifications; notifications of non-compliance; training; incidents such as spills or other releases, including photographs as available; sampling and analysis of discharges discovered through visual monitoring; all reports required by the CGP; BMP inspections and checklists, and maintenance and repair activities; and activity-based BMPs, such as good housekeeping, that have been implemented.
- B. After the work is complete and accepted by the Owner, submit to the Engineer and Owner all records/copies of documents required by the CGP, including, but not limited to, the records/copies of the documents noted above, and all documents uploaded to the SMARTS system.

3.6 MAINTENANCE OF TEMPORARY FACILITIES

- A. Inspect erosion and sediment control structures daily, including site exit locations, and as specified in the SWPPP.
- B. Sediment shall be removed from behind run off control structures after each storm, or as directed by the Engineer, LRP, QSD or QSP.
- C. If areas are seeded, Contractor shall examine those areas during and after major storms to check that grass is becoming established.

3.7 DISPOSAL OF SEDIMENT FROM STORM WATER POLLUTION CONTROL STRUCTURES

- A. Sediment excavated from temporary sediment control structures shall be disposed on the site with general fill or with topsoil. Sediment shall be allowed to dry out as required before reuse. All trash shall be removed before reuse.
- B. Contractor shall place the sediment removed from traps and other structures where it will not enter a storm drain or water course and where it will not immediately reenter the basin.

3.8 REMOVAL OF TEMPORARY STORM WATER POLLUTION CONTROL MEASURES

- A. In accordance with SWPPP requirements, temporary control measures shall be removed once all drainage area ground disturbance is completed, permanent drainage works have been constructed and full stabilization is achieved. Contractor shall not breach any temporary control structures until the associated catchment area is complete unless approved by the Engineer.

END SECTION

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SECTION 01 57 27

DUST CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of implementing measures to prevent air pollution during construction activities, in accordance with Federal, State, and local regulations, and in accordance with the Dust Control Plan (DCP). The DCP can be amended, by the Owner and/or Contractor, as needed should revisions be determined necessary during construction activities.

1.2 RELATED WORK

- A. Section 14 of Special Provisions and Standard Specifications
- B. Section 01 50 00 – Temporary Facilities
- C. Section 01 51 36 – Watering
- D. Division 2 – Existing Conditions
- E. Division 31 – Earthwork

1.3 REFERENCES

- A. San Joaquin Air Pollution Control District (SJVAPCD) Regulation VIII.
- B. Dust Control Plan Fee, Pursuant to the adoption of Rule 3135, Adopted October 20, 2005 and subsequent revisions, compliance assistance bulletins and editions regarding Rule 3135 and PM 10 regulations.

1.4 SUBMITTALS

- A. Submittals shall be in accordance with the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Submit, prior to beginning work and within 5 days of issuance of the Notice of Award a DCP.
 - 1. The DCP shall show proposed arrangements and methods for dust control. Show that the plans satisfy all SJVAPCD, State, and Federal Requirements.
 - 2. Provide proof that the DCP and required application fee has been submitted to the SJVAPCD for review and approval.

1.5 *QUALITY ASSURANCE*

- A. Control the rate and effect of watering in such a manner as to avoid all objectionable settlement and subsidence as approved by the Engineer and to assure the integrity of the finished work.
- B. Before commencing grading, excavation or filling in any part of the site, Contractor shall construct the required measures specified in the DCP.
- C. Arrange demolition activities to minimize dust to the maximum practical extent. Clearing, excavation, and grading shall be limited to those areas of the Project site necessary for construction. Minimize the area exposed and unprotected.
- D. Clearly mark and delineate the work limits activities. Equipment shall not be allowed to operate outside the limits of work or to disturb existing vegetation.

1.6 *REGULATORY REQUIREMENTS*

- A. Contractor shall comply with all provisions of the SJVAPCD regulations, as well as Federal and State regulations.
- B. The requirements of the Dust Control Plan shall apply continuously through the duration of the Contract.

PART 2 PRODUCTS

2.1 *EQUIPMENT*

- A. Before the work begins, sufficient equipment and resources shall be available on the site to assure that the operation and adequacy of the dust control measures can be continuously maintained.

2.2 *DUST CONTROL MEASURES*

- A. Water shall be available to the contractor for dust control as specified in section 01 50 00 – Temporary Facilities.
- B. Dust Suppressants shall be polymer emulsions or hygroscopic suppressants. Petroleum emulsions and bituminous materials will not be allowed.
 - 1. If dust suppressants other than water are utilized, Contractor shall submit SDS, Manufacturer's Usage Instructions, and certification by the manufacturer that the product is safe for ground application.
 - 2. If dust suppressants other than water are utilized, contractor shall notify owner 15 days prior to use for notification to the SJVAPCD.
- C. Gravel used for Gravel Pads shall be washed gravel, a minimum of one inch in diameter, and shall be placed a minimum of six inches deep.

PART 3 EXECUTION

3.1 GENERAL DESCRIPTION

- A. Coordinate procedures with Section 14 of Special Provisions and Standard Specifications.
- B. Dust control measures shall include, but may not be limited to: Water application, dust suppressant application, physical barriers limiting site access, reduction of vehicle speed on site, utilization of gravel pads, utilization of grizzlies, and wheel washers. If physical barriers are utilized, the Engineer shall approve the location, size, and type. Physical barriers shall be removed upon project completion.
- C. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent dust. Temporary measures shall be to Contractor's own design and Contractor shall be solely responsible for risks related to the management of dust control during construction.

3.2 METHODS

- A. As described in the DCP and approved by the Engineer.

3.3 MAINTENANCE OF TEMPORARY FACILITIES

- A. Inspect dust control facilities daily and as specified in the DCP.
- B. Sediment shall be removed from grizzlies, gravel pads, and/or paved surfaces as required by the DCP, or as directed by the Engineer.
- C. If areas are seeded, contractor shall examine those areas during or after major storms to check that grass is becoming established.

3.4 DISPOSAL OF SOIL FROM PAVED SURFACES AND DUST CONTROL DEVICES

- A. Soil excavated from temporary dust control structures shall be disposed on the site with general fill or with topsoil. Soil shall be allowed to dry out as required before reuse. Any trash shall be removed before reuse.
- B. Contractor shall place the sediment removed from traps and other structures where it will not enter immediately reenter the device or paved area.

3.5 REMOVAL OF TEMPORARY DUST CONTROL MEASURES

- A. Temporary control measures shall be removed once grading is completed and soils have stabilized.

3.6 RECORD KEEPING

- A. Contractor shall keep accurate records as required by the SJVAPCD of dust control methods utilized during the course of construction. The Contractor shall utilize the forms provided by the SJVAPCD, available on the SJVAPCD website.

- B. Contractor shall keep a copy of the approved DCP, any approved revisions, and all dust control records at the site.
- C. Contractor shall furnish upon request by the Owner, Engineer, or SJVAPCD Inspector the approved DCP, approved revisions, and dust control records.
- D. Contractor shall maintain dust control records for one year after project completion.

3.7 DUST CONTROL

- A. The Contractor shall take whatever steps, procedures, or means as are required to limit dust generated by his operations during the Work, including Saturdays, Sundays, and Holidays. Dust shall be controlled to the standards of the local governing agency or, in the absence of local standards, to the satisfaction of the Engineer. Dust control shall extend to any unpaved road which the Contractor or any of his subcontractors are using, to excavation or fill areas, to demolition operations, and to other activities. Control shall be by sprinkling, use of dust palliatives, modification of operations, or any other means acceptable to the local governing agency or, in the absence of same, the Engineer.
- B. If the dust control is not adequate in the opinion of the Engineer, this work may be done by others, and the cost shall be deducted from the total payment due the Contractor.

END SECTION

SECTION 01 57 50
CONSTRUCTION STAKES, LINES, AND GRADES

PART 1 GENERAL

1.1 LINES AND GRADE

- A. The Work shall be executed in accordance with the lines and grades indicated in the Contract Documents. Distances and measurements, except elevations and structural dimensions, shall be made on horizontal planes.

1.2 OWNER'S SURVEY SERVICES

- A. All construction surveying and staking for construction shall be coordinated with the County Survey Division.
- B. Construction surveying and staking for construction will be done by a Licensed Land Surveyor employed by the Engineer, at the Owner's expense. The Engineer will provide construction stakes for the features in the table below. Stakes will be provided at 50 foot intervals on curves and 100 foot intervals on straight lines. Additional detail staking layout and slope staking will be the responsibility of the Contractor.

Pipelines and Outlets	One set of Alignment Control Stakes (1 Trip)
Structures	One Set of Four Control Stakes per Structure (1 Trip, with Pipeline and Outlets Staking)
Recharge Basin	Basin hinge point (1 Trip)
Stockpile Areas	Toe of embankment (1 Trip)
Fencing	One Set of Horizontal Location Stakes (1 Trip, with Finish Grade Control Staking)

- C. Additional detail staking layout will be the responsibility of the Contractor. Additional trips shall be at the expense of the Contractor.
- D. The Contractor shall be responsible for preserving construction survey stakes, permanent survey monuments and bench marks for the duration of their usefulness. If any construction survey stakes permanent survey monuments or benchmarks are lost or disturbed and need to be replaced, such replacement shall be made by the Engineer at the expense of the Contractor.
- E. The Contractor shall notify the Engineer at least three (3) working days before he will require survey services in connection with laying out of any portion of the Work. The Contractor at his own expense shall dig all holes necessary for line and grade stakes prior to requesting survey services that depend on such digging.

1.3 *CONSTRUCTION STAKING*

- A. Engineer or Engineer's representative will provide project control monuments as shown on the Plans (vertical and horizontal) at the Owner's expense.
- B. All other construction staking necessary for the work shall be done by Contractor.

END SECTION

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SECTION 01 57 56
TRAFFIC CONTROL

PART 1 GENERAL

1.1 INTENT

- A. Contractor shall prepare and have approved a Traffic Control Plan as specified in Section 01 55 26 - Traffic Control Plan, and Section 12 of Special Provisions and Standard Specifications. The approving agency for the Traffic Control Plan (the Traffic Control Authority, or TCA) is the County of Fresno Public Works and Planning, Road Maintenance and Operations Division, (559) 600-4234.

1.2 WORK INCLUDED

- A. The work of this section consists of implementation of the Traffic Control Plan to provide for safe movement of vehicular, bicycle and pedestrian traffic around construction operations. The Contractor shall be solely responsible for implementing providing all protective measures necessary.
- B. All work shall conform with the provisions of Caltrans Standard Specifications, Section 12, "Temporary Traffic Control," and the California Manual of Uniform Traffic Control Devices, Part 6, and as more particularly specified below.
- C. The Contractor shall establish and maintain detours and conduct construction operations in such a manner as to minimize hazard, inconvenience and disruption to the public.
- D. The Contractor shall provide for protection of pedestrians and separation of pedestrians from construction operations at all times.
- E. The Contractor shall clean up the site each day after completing work and shall remove all traffic hazards. Daily traffic control measures shall continue until cleanup activities have been satisfactorily completed and the Contractor's equipment has been removed from the traveled way.
- F. The Contractor shall direct, divert and detour traffic through, around and adjacent to construction operations in accordance with the approved Traffic Control Plan.
- G. With the approval of the TCA, Contractor may revise the Traffic Control Plan as Contractor, Owner and/or Engineer determine necessary.
- H. Traffic control provisions shall conform with, but not limited to, the following requirements:
 - 1. The California Manual on Uniform Traffic Control Devices (MUTCD), latest edition, is hereby referred to and incorporated herein as though set forth in full. The Contractor shall be responsible for providing all necessary traffic control facilities, 24 hours per day, 7 days per week for the duration of the project involving street work.

2. The Contractor shall maintain pedestrian crossings with adequate visibility for approaching traffic.
3. The Contractor shall notify County Fire and Sheriff Departments, and County Road Maintenance and Operations Division at least forty-eight (48) hours in advance of any proposed lane closure. Any lane closures must have prior approval of the County of Fresno and have pre-notification warning signs in place seven (7) calendar days prior to said closure.
4. The Contractor shall obtain an encroachment permit and approval of a traffic control plan conforming to the requirements specified herein and the Caltrans encroachment permit requirements for any work encroaching in Caltrans right-of-way or affecting traffic flow in Caltrans right-of-way.
5. The Contractor shall submit a traffic control plan to the County of Fresno (and Caltrans if required) for review and approval. A copy of the approved traffic control plan shall be provided to the Engineer prior to the start of construction activities.
6. The Contractor shall strictly comply with, and will be solely responsible for, all required traffic control and devices as per approved plan and any revisions thereof. The Contractor shall inspect the traffic control setup at two-hour intervals, at a minimum, and correct all problems immediately.
7. The Contractor shall provide safe access for the County, County's representatives, and Caltrans (if applicable) inspection staff.
8. Specific traffic control measures associated with the work of this Contract are as follows:
 - a. Existing striping and road stencil work which conflicts with detour layout shall be removed. Conflicting signs shall be covered.
 - b. Where traffic is moved out of its normal position, traffic lanes must be a minimum of ten (10) feet wide. One (1) lane of traffic in each direction shall be maintained, at all times, unless approved otherwise by the County (and Caltrans).
 - c. Lane closures shall be limited between the hours of 9 AM to 4 PM to minimize disruptions to commuter traffic. All lane closures must be approved by the County (and Caltrans) in advance. The road shall be returned to two-way traffic outside of the hours specified above.
 - d. The Contractor may use trench plates to re-open the road to two-way traffic overnight, however, temporary trench resurfacing shall be placed after each road crossing is complete. Temporary trench resurfacing shall be maintained until permanent trench resurfacing is placed. Permanent trench resurfacing shall be scheduled and placed immediately following acceptance of water main, services and appurtenances installed.
 - e. Access to all local streets, businesses and residences shall be maintained at all times, except when the Contractor's operations must temporarily block access to driveways, the Contractor shall provide a minimum of forty-eight (48) hour written notice to the residents and minimize the duration of interruptions to driveway access.

1.3 REFERENCES

- A. Caltrans Standard Specifications, current edition (State Standard Specifications)
- B. Caltrans Standard Plans, and Revised Standard Plans (State Standard Plans)
- C. California Department of Transportation (Caltrans) Manual of Uniform Traffic Control Devices, Current Edition
- D. AASHTO Roadside Design Guide, Current Edition
- E. U.S. Department of Transportation, Federal Highway Administration, (USDOT): Design Guidance: Accommodating Bicycle and Pedestrian Travel: a Recommended Approach

1.4 SUBMITTALS

- A. Submittals shall be in accordance with the General Conditions and Section 01 33 00 – Submittal Procedures.

1.5 PERMITS REQUIRED

- A. An encroachment permit is required for this work, to be issued by the County. This fee shall be paid by Contractor, and shall be included in the Traffic Control bid item. No separate payment will be made.

PART 2 PRODUCTS

2.1 CONSTRUCTION SIGNS

- A. Construction signs shall conform to the standards of the California Manual on Uniform Traffic Control Devices (California MUTCD), current edition and Section 12, “Temporary Traffic Control,” of the State Standard Specifications.
- B. Temporary warning signs in construction areas shall have a black legend on an orange background. Color for other signs shall follow the standard for all highway signs.
- C. All signs used shall be reflectorized or illuminated.
- D. Covers for existing signs shall be constructed of plywood or metal. No holes shall be drilled into existing signs.

2.2 OTHER TRAFFIC CONTROL DEVICES

- A. In general, all, traffic control devices shall conform to the standards of the California MUTCD, current edition and Section 12, “Temporary Traffic Control,” of the State Standard Specifications.
- B. Cones and Delineators:

1. Cones shall consist of conical-shaped plastic devices which shall be 18 inches to 24 inches in height.
 2. Delineators shall consist of cylindrical plastic devices, which shall be 48 inches in height.
 3. Cones and delineators shall have flexible bases of suitable weight to ensure stability.
 4. Cones used during hours of darkness shall be internally illuminated or reflectorized meeting the requirements of the California MUTCD.
- C. Barricades
1. Barricades shall be Type I, Type II or Type III, as set forth in the California MUTCD.
 2. Barricades used during hours of darkness shall be reflectorized and equipped with flashers.
- D. Flaggers
1. Flaggers may be required to provide for public safety or the regulation of traffic, or by jurisdictional authorities; and if used, shall be properly equipped and certified.
- E. Signalized Traffic Control System
1. A signalized traffic control system must be installed to control two-direction alternating traffic at all times. Traffic control system shall be designed by a registered civil engineer and submitted to Caltrans for approval. The Contractor shall have workers onsite 24 hours per day and 7 days a week to monitor the traffic control setup continuously while lane closure maintained to ensure that traffic control system is working properly and correct any problems immediately.

PART 3 EXECUTION

3.1 GENERAL

- A. A minimum of 30 calendar days in advance, the Contractor shall implement a public outreach program to inform the community of disruption to traffic due to construction.

3.2 DIVERTING TRAFFIC

- A. Whenever construction operations obstruct the flow of vehicular traffic or present a hazard to vehicles operating in the vicinity of construction operations, the Contractor shall take appropriate action to warn, detour and otherwise protect approaching drivers and vehicles.

- B. Whenever construction operations obstruct the flow of pedestrian traffic or present a hazard to pedestrians, the Contractor shall take appropriate action to protect and separate pedestrians from the work area. Such action may include placement of barricades, warning signs, and/or provision of personnel as required to protect vehicles and pedestrians as conditions warrant.
- C. Keep traffic areas free of excavated material, construction equipment, pipe and other materials and equipment.
- D. Conduct operations in a manner to avoid unnecessary interference with public and private roads and drives and provide and maintain temporary access for businesses and residences. Provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel. When access to private driveways must be temporarily denied due to construction operations, notify the property owner or responsible party of such closure not less than 24 hours in advance of closure. Give notification in writing and include the estimated duration of the closure.
- E. The minimum separation between the edge of travel lane and the work area shall be six feet. A temporary protective K-rail barrier shall be installed if there is less than six feet of clearance between the work area and edge of travel lane.
- F. Notify the fire department, police/sheriff department, highway patrol, ambulance service, local school district, and transit 14 days before closing roadway or portion thereof. Notify said departments or agencies when streets are again passable for vehicles. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish Contractor's night emergency telephone numbers to the police or sheriff's department.
- G. Pedestrian and bicycle access along sidewalks and streets shall be kept open and safe from construction activities and traffic lanes.

3.3 *TRAFFIC CONTROL DEVICES*

- A. General
 - 1. Traffic control devices shall be provided in sufficient quantities and types as required providing safe and adequate traffic control.
 - 2. During hours of darkness, approved lights shall be included, in proper working order, to illuminate signs and hazards and alert approaching traffic.
 - 3. Barricades shall be furnished and maintained along all open trenches in contact with traffic.
 - 4. No work may begin on any day or at any time before traffic control devices have been placed.
- B. Placement
 - 1. All traffic control devices shall be placed in accordance with the California MUTCD and approved Traffic Control Plan.

2. Locations of devices shall be adjusted to suit the conditions and circumstances of each detour situation. In all cases, signs shall be placed to most effectively convey their messages to approaching traffic.

C. Maintenance of Devices

1. The Contractor shall maintain all traffic control devices, at proper locations and in proper working order, during construction operations and whenever a hazard resulting from Contractor's operations exists.
2. The Contractor shall adjust and revise traffic control devices, placement, etc., to suit changing conditions around construction operations.

D. Removal of Devices

1. Traffic control devices shall remain in place to alert approaching traffic of upcoming hazards.
2. After hazard has been removed, all traffic control devices shall be removed. Signs shall be removed, or their messages covered to the satisfaction of the Owner.

3.4 *NOTICE OF CHANGES*

- A. The Contractor shall notify the Owner in writing at least forty-eight (48) hours, excluding holidays and weekends, prior to instituting any lane closure or detour. The Contractor shall also notify the Owner in writing at least forty-eight (48) hours, excluding holidays and weekends, prior to opening lane closures or detours before moving to another excavation segment. At the end of each day's work, the Contractor shall inform the Owner of the status of all detours and/or lane or road closures.

3.5 *EMERGENCY VEHICLE ACCESS THROUGH DETOURS*

- A. During all detours and/or street closures the Contractor shall provide for movement of emergency vehicles through the work area whenever possible.

3.6 *ROADWAY USAGE BETWEEN OPERATIONS*

- A. Keep fire hydrants and water control valves free from obstruction and available for use.
- B. At all times when work is not actually in progress, Contractor shall make passable and shall open to traffic such portions of the project and temporary roadways or portions thereof as may be agreed upon between Contractor and Owner.
- C. The Contractor shall not be permitted to maintain any lane closure or road closure during non-working hours without first obtaining approval of the Owner.
- D. Restoration of Pavement

1. During non-working hours the Contractor shall restore travel lanes to their original alignment and configuration by means of backfilling and temporary pavement or bridging where possible.
2. The Contractor shall place "ROUGH ROAD" signs conforming to the California MUTCD at uneven temporary pavement or bridging.

3.7 *PARKING RESTRICTIONS*

- A. General: The Contractor shall post approved "NO PARKING" signs at all locations necessary to establish work areas and detour traffic.
- B. Signs:
 1. Signs shall read: "NO PARKING - CONSTRUCTION TOW-AWAY ZONE." Show hours of parking restriction.
 2. Signs shall be placed at least 24 hours in advance of restriction.

3.8 *PLATING OVER TRENCHES AND EXCAVATIONS*

- A. General:
 1. Plating shall be placed across all trenches and excavations in accordance with requirements of the specifications.
- B. Design of Plating:
 1. Plating for vehicular traffic shall be of sufficient width to accommodate the required number of travel lanes.
 2. Plating shall be designed to support H-20 vehicular traffic.
 3. All plating shall be set flush with travel surface or a satisfactory transition from travel surface to top of plating shall be provided.
 - a. A satisfactory transition shall mean a change in elevation between the levels of not less than twelve (12) inches horizontal to one (1) inch vertical.
 - b. Transition may be accomplished by means of temporary pavement.

END SECTION

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SECTION 01 77 00
CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 GENERAL

- A. It is the intent of these Contract Documents that the Contractor shall deliver a complete and operable facility capable of performing its intended functions and ready for use.

1.2 CLEANING

- A. Throughout the period of construction the Contractor shall keep the Work site free and clean of all rubbish and debris, and shall promptly remove from the site, or from property adjacent to the site of the Work, all unused and rejected materials, surplus earth, concrete, plaster, and debris, excepting select material which may be required for refilling or grading.

1.3 FINAL SITE CLEAN-UP

- A. Upon completion of the Work, and prior to final acceptance, the Contractor shall remove from the vicinity of the Work all paint, surplus material, and equipment belonging to him or used under his direction during construction.
- B. The Contractor shall restore to original condition all property not designated for alteration by these Contract Documents.

1.4 WASTE DISPOSAL

- A. The Contractor shall dispose of surplus materials, waste products, demolition materials, and debris. The Contractor shall transport and dispose of waste materials in accordance with applicable laws and regulations.

1.5 PROJECT RECORD DOCUMENTS

- A. The Contractor shall maintain at the site, available to the Owner and Engineer, one copy of the Contract Documents, Drawings, Shop Drawings, Change Orders, and other modifications in good order and annotated to show all changes made during construction. These Documents shall be delivered to the Engineer for the Owner upon completion of the Work.
- B. Record documents shall be reviewed during progress meetings to ascertain that all changes have been recorded.
- C. Store Record Documents separate from documents used for construction.

1.6 TOUCH-UP AND REPAIR

- A. The Contractor shall touch-up or repair finished surfaces on structures, equipment, fixtures, or installations that have been damaged prior to final acceptance. Surfaces on which such touch-up or repair cannot be successfully accomplished shall be completely refinished or in the case of hardware and similar small items, the item shall be replaced. Such items shall include, but not be limited to, the following:
1. Road surfaces
 2. Exposed structure surfaces
 3. Exposed equipment surfaces
 4. Exposed piping surfaces

1.7 EQUIPMENT START-UP

- A. After all acceptance tests have been completed by the Contractor and Owner but prior to final acceptance, the Contractor shall recheck all equipment for proper alignment and adjustment, check oil levels, re-lubricate all bearings and wearing points, and in general assure that all equipment is in proper condition for continuous operation.

1.8 OPERATION AND MAINTENANCE (O&M) MANUALS

- A. See Section 01 33 00 – Submittal Procedures.

1.9 FINAL EQUIPMENT CHECK

- A. After testing and before acceptance, all equipment shall be test run by the Owner for a minimum of 7 days to ensure proper operation. At the end of the test run each piece of machinery shall be lubricated and all components and couplings checked for proper alignment and adjustment.
- B. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.
- C. Provide submittals to the Owner required by other governing authorities.

1.10 MANUFACTURER'S CERTIFICATES OF PROPER INSTALLATION

1. The Contractor shall submit manufacturers' certificates of proper installation for all items of equipment.

PART 2 PRODUCTS

(Not Used)

County of Fresno
Elkhorn Recharge Facility Project

PART 3 EXECUTION

(Not Used)

END SECTION

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CONTRACT CLOSEOUT
01 77 00-3

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SECTION 02 01 20
PROTECTION OF UNDERGROUND
FACILITIES AND SURVEY MONUMENTS

PART 1 GENERAL

1.1 UNDERGROUND FACILITIES

- A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing underground facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such underground facilities, including Owner, or by others.
1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and
 2. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. Reviewing and checking all such information and data,
 - b. Locating all Underground Facilities shown or indicated in the Contract Documents,
 - c. Coordination of the Work with the owners of such underground facilities, including Owner, during construction, and
 - d. The safety and protection of all such underground facilities and repairing any damage thereto resulting from the Work.
- B. Not Shown or Indicated: If an underground facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated with reasonable accuracy in the Contract Documents, the following shall apply.
1. Contractor shall develop and execute a work-plan, subject to Engineer's approval to protect underground facilities.
 2. The Contractor shall expose, prior to staking and trenching, all existing utilities and existing facilities which may control proposed facility grades, and alignment. Two working days notice shall be given to the Engineer prior to commencing this work.
 3. Full compensation for all costs involved in locating, verifying, protecting, exposing, and otherwise providing for utilities shall be included in the amounts bid for the various items of work, and no separate payment shall be made therefore.

1.2 PROTECTION

- A. The Contractor shall not interrupt the service function or disturb the supporting base of any Utility by disrupting any facility identified in the Plans and Specifications without authority from the Owner or order from the Engineer. Where protection of such facilities is required to ensure support of utilities, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at the Contractor's expense.
- B. The Contractor shall be prepared at all times with labor, equipment and materials to make repair on damaged mains or Utility facilities. The Contractor shall immediately notify the Engineer and the Utility owner if he disturbs, disconnects or damages any Utility. The Contractor shall bear the costs of repair or replacement of any Utility facility described with reasonable accuracy in the Plans and Specifications that is damaged by the Contractor. No extra compensation will be made for the repair of any services or mains damaged by the Contractor, nor for any damage incurred if the neglect or failure of providing protective barriers, lights and other devices or means required to protect such existing utilities or facilities described with reasonable accuracy in the Plans and Specifications.

1.3 SURVEY MARKERS AND PERMANENT REFERENCE POINTS

A. Surveying and Permanent Survey Markers

The Engineer will take measurements to assure the preservation of survey markers (monuments and bench marks). The Contractor shall not disturb permanent survey markers without the consent of Engineer and shall bear the expense of replacing any that may be disturbed without permission.

- 1. Replacement of survey markers shall be done only by the Engineer.
- 2. If disturbing of markers cannot be avoided, the Owner shall pay the cost of replacing said markers.

B. Lot Corner Monuments

The Contractor shall preserve property line and corner survey markers except where their destruction is unavoidable and the Contractor is proceeding in accordance with accepted practice. Markers that are lost or disturbed by his operations shall be replaced at the Contractor's expense by the Engineer.

END SECTION

SECTION 02 41 00
DEMOLITION

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work of this section consists of demolition and removal of pavements, slabs, miscellaneous debris, signs, barriers, salvaged items, and portions of abandoned utilities. Includes all material, equipment, and tools to demolish and remove items as shown on these Plans, and to restore the demolished areas to a safe, and need area.
- B. Definitions:
 - 1. Portland Cement Concrete: A mixture of Portland cement, fine aggregate, coarse aggregate, admixtures (if used) and water, proportioned and mixed. Also, included is rebar.
 - 2. Asphalt Concrete: A mixture of liquid asphalt and graded aggregate used as paving material for roadways and parking lots.

1.2 WORK INCLUDED

- A. Repair and restoration of areas damaged due to demolition work.
- B. Salvaging of equipment for Owner.
- C. Removal of demolished materials from site.
- D. Remove existing piping and other existing structures as shown on the Plans to be removed.
- E. Properly dispose of all removed materials.
- F. Dewatering as needed in order to complete the proposed demolition.
- G. Removal of trees and landscaping as required for construction.

1.3 RELATED WORK

- A. Section 01 57 23 – Storm Water Pollution Prevention Plan
- B. Section 01 57 27 – Dust Control
- C. Section 03 03 00 – Cast In Place Concrete
- D. Section 31 11 00 – Clearing and Grubbing
- E. Division 31 – Earthwork

1.4 SEQUENCING

- A. Sequence work to minimize interference with overall construction activities and Liberty Canal water deliveries. Demolition shall be shown on the Project schedule.
- B. Portions of existing PVC irrigation pipelines within the basin area to be removed as noted on the Plans shall be located, excavated, and properly disposed of prior to the start of basin excavation.
- C. Portions of existing asbestos cement pipe within the basin area to be removed as noted on the Plans shall be located, excavated, and properly disposed of according to all Federal and State regulations prior to the start of basin excavation

1.5 REGULATORY REQUIREMENTS

- A. Obtain any required permits.
- B. Dispose of removed materials in an approved disposal or salvage facility.

1.6 REFERENCES

- A. Section 17-2 – Clearing and Grubbing, State Standard Specifications
- B. Section 19 – Earthwork, State Standard Specifications

1.7 SUBMITTALS

- A. As specified in the General Conditions Section 01 33 00 – Submittal Procedures
- B. Demolition plan including sequence of operations. The plan shall specifically address methods of demolition, schedule, sequence of demolition, and procedures for archeological monitoring. Demolition shall not proceed until the plan has been approved.

1.8 QUALITY ASSURANCE

- A. General: Take all necessary precautions with regard to safety in carrying out the demolition and site work. Erect suitable barriers around open excavations and fulfill all appropriate requirements of CAL/OSHA. Comply with safety requirements for demolition, ANSI A10.6-90.

1.9 PROJECT CONDITIONS

- A. Underground utilities exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
- B. Keep dust to a minimum at removal site and on haul roads. Use sprinklers or water trucks as necessary or as directed by the Engineer.
- C. Ensure safety of persons in demolition area. Provide temporary barricades as required.

- D. Excavations may encounter groundwater and require dewatering depending on the time of year and amount of seasonal run-off. Loose sands exposed in excavation sidewalls may be unstable and require shoring or lying back in accordance with OSHA requirements. Flowing sands may also be encountered in excavations below groundwater levels.

1.10 CLOSEOUT SUBMITTALS

- A. As specified in Section 01 77 00 – Contract Closeout.
- B. Show all capped and abandoned utility terminations and location of remaining facilities on project Record Drawings.

PART 2 PRODUCTS

2.1 REPAIR AND RESTORATION MATERIALS

- A. Concrete shall be as specified in Section 03 30 00 – Cast In Place Concrete.
- B. Backfill materials shall be as required by Section 19 – Earthwork, State Standard Specifications.
- C. Asphalt and concrete shall match existing materials and conditions.
- D. Asphalt and concrete shall be replaced in conformance with governing authority standards.

2.2 MATERIALS

- A. Items to be Salvaged and Relocated shall be salvaged and/or relocated as shown on the drawings, or as directed by the Engineer.
- B. Materials and items demolished and not designated for reuse, salvage or transfer to the Owner, as well as all debris, rubbish and other materials resulting from the demolition operations, shall become the property of the Contractor and shall be removed from the site within 48 hours of demolition.
- C. Storage or sale of the removed items will not be permitted at the site.

PART 3 EXECUTION

3.1 INSPECTION

- A. Prior to demolition, inspect the site conditions, verifying all governing dimensions, notes and specification. Notify the Engineer of any errors or omissions in the contract documents.
- B. Make such explorations and probes as are necessary to ascertain any required protection measures before proceeding with the demolition and removal work.

3.2 PREPARATION

- A. Protect existing, appurtenances, structures, which are not to be demolished.
- B. Prior to demolition work, all soil erosion control measures specified in Section 01 57 23 - Stormwater Pollution Prevention Plan (SWPPP) and inlet protection barriers shall be in place. Contractor shall provide appropriate measures to prohibit demolition debris and/or soil from entering any watercourse.
 - 1. Protect all buildings, structures, utilities, and vegetation to remain.

3.3 DEMOLITION REQUIREMENTS

- A. Conduct demolition to protect and minimize damage to structures and existing improvements.
- B. Conduct salvaging to protect and minimize damage to salvaged equipment.
- C. Execute the work in a careful, orderly and safe manner, with the least possible disturbance to the public. Cease operations immediately if adjacent work appears to be endangered. Do not resume operations until corrective measures have been taken.
- D. Pavement and Slabs:
 - 1. Remove completely all Portland cement concrete slabs-on-grade including, but not limited to, equipment pads, sidewalks, etc. If approved by the Engineer, the Contractor may crush Portland concrete for use as aggregate base.
 - 2. Saw cut existing asphalt concrete pavements cleanly in straight continuous lines. Remove asphalt concrete pavement as shown on the drawings.
 - a. Asphalt Concrete Milling Equipment: Milling machines shall be power operated, self-propelled machines capable of removing the desired thickness. They shall have sufficient power, traction and stability to accurately maintain depth of cut and slope.
 - 3. Any material thus processed shall conform to the specifications for Section 32 11 23 – Aggregate Base
 - 4. In areas that are demolished, but where no future roads or structures are shown, the exposed subgrade shall be scarified an additional 18 inches before placing backfill.
- E. Concrete and Masonry Structures: Remove structure to a minimum of 3 feet below grade. Break remaining portions to permit drainage. Remove completely if under proposed structures or roadways.

- F. Items to be Salvaged: Remove as directed by the Engineer. Remove carefully. All salvaged material remains the property of the Owner. Store where directed by the Engineer.
- G. Abandoned Utilities: Remove above ground utilities and terminate as approved by the utility company and the Engineer. Remove necessary portions of underground utilities to within 24 inches of excavation or final grade. Plug abandoned pipes and conduits with concrete plugs. Plugs shall be 6 inches or 2 times the pipe diameter in length, whichever is greater.
 - 1. Water lines shall be capped as close as possible to active mains.

3.4 SALVAGE EQUIPMENT

- A. Salvaged equipment shall be delivered to the Owner at a designated site within the project site. Salvaged equipment shall be placed on wood or concrete blocks so the equipment will be 4 inches minimum above ground elevation.

3.5 PRESERVATION

- A. If indicated or required, preserve trees, plants, rock outcroppings, or other features designated to remain. Protect trees and plants from damage; fell trees in a manner which shall not injure standing trees, plants and improvements which are to be preserved.

3.6 RESTORATION

- A. All demolition areas, staging/stockpiling, and open excavations shall be filled in accordance with the Earthwork Sections. Fill all open excavations deeper than one foot to an elevation to match the surrounding topography.
 - 1. New Construction Areas: As shown on drawings.

3.7 DISPOSAL

- A. As specified in Section 01 50 00 – Temporary Facilities.

END SECTION

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SECTION 03 05 10
LEAKAGE TESTING OF HYDRAULIC STRUCTURES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This work described in this section includes leakage testing of concrete structures subject to hydrostatic pressure.

1.2 RELATED WORK

- A. Section 01 51 36 – Watering
- B. Section 03 30 00 – General Concrete Construction
- C. Section 03 60 00 – Grout
- D. Section 07 92 00 – Caulking and Sealants
- E. Section 40 05 00 – Pipe and Fittings

1.3 REFERENCES

- A. None

1.4 SUBMITTALS

- A. Submit a testing schedule, including proposed plans for water conveyance, control, disinfection, and disposal in writing for approval a minimum of 14 days before testing is to start. The submittal shall include the contractor's plan for the release of water from structures after testing has been completed.

PART 2 PRODUCTS

2.1 MATERIALS

- A. The Contractor shall furnish and install all temporary fittings and equipment required for the completion of the testing described herein.
- B. Temporary valves, bulkheads, or other water control equipment and materials shall be as determined by the Contractor. No materials shall be used which would damage the structure or its future intended function.
- C. Pressure gauge(s) implemented for testing purposes shall be sufficiently detailed and in range to accurately read test pressure.
- D. All leakage testing shall be conducted using air or water, at the Contractor's option.

PART 3 EXECUTION

3.1 PREPARATION

- A. Contractor shall verify that concrete strength has attained at least 90 percent of its 28-day design strength prior to testing.
- B. Prior to testing, all hydraulic structures shall be cleaned by thoroughly hosing down all surfaces with a high pressure hose. All water, dirt, and foreign material accumulated in this cleaning operation shall be discharged from the structure or otherwise removed.
- C. Contractor shall verify that all valves or gates are fully closed and all pipe penetrations are temporarily plugged prior to conducting leakage test.

3.2 TESTING

- A. Fill the structure with water or air.
 - 1. If water is used, the structure shall be slowly filled with water, ensuring all air is expelled from the structure. The structure shall stand full of water for at least twenty-four (24) hours prior to testing to allow all air to escape.
- B. A minimum test pressure equal to six (6) psi shall be applied.
- C. The test pressure in the structure shall be maintained for twenty-four (24) hours. Test pressure shall be maintained at six (6) psi, at a minimum, during the test period. At no time during the test shall the pressure fall more than one (1) psi below the starting test pressure.
- D. The structure shall be considered to have passed the test if the pressure within the structure is within one (1) psi of the starting test pressure and no additional air or water has been introduced into the structure.
- E. If the structure fails to pass the leakage test, the Contractor shall empty the structure as acceptable to the Construction Manager and shall examine the exterior and interior for evidence of any cracking or other conditions that might be responsible for the leakage. Any cracks shall be repaired and sealed with polyurethane sealant in accordance with Section 03 30 00 – Cast-In-Place Concrete. Any evidence of leakage shall be repaired. Following these operations, the Contractor shall again test the hydraulic structure.
- F. Wet spots or other apparent seepage on the exterior areas or the wall faces shall not be acceptable. Wet spots are defined as spots where moisture can be picked up on a dry hand. Any cracks or other areas of apparent leakage, including wet spots on the wall or wall footing, shall be sealed with sealant system compatible with the defective area or other means acceptable to the Engineer. Allow the joint to set and cure following the cement manufacturer's instructions. Do not load the joint for at least 8 hours after joint assembly.

END SECTION

LEAKAGE TESTING OF HYDRAULIC STRUCTURES
03 05 10-2

SECTION 03 11 00
CONCRETE FORMWORK

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to furnishing and installing concrete formwork as described in this section of the Specifications, shown on the accompanying Plans, or reasonably implied therefrom. The work shall include, but is not necessarily limited to:
- B. Scope:
 - 1. Design of formwork, shoring and reshoring.
 - 2. Furnishing, erection, and removal of forms.
 - 3. Shoring, bracing, and anchorage of formwork.
 - 4. Openings for other work.

1.2 RELATED SECTIONS

- A. Section 03 15 00 – Concrete Accessories
- B. Section 03 20 00 – Concrete Reinforcing
- C. Section 03 30 00 – Cast-In-Place Concrete
- D. Section 03 39 00 – Concrete Curing

1.3 REFERENCES

- A. Industry Codes and Standards
 - 1. American Concrete Institute (ACI) Manual of Concrete Practice
 - ACI 117 Standard Tolerances for Concrete Construction and Materials and Commentary
 - ACI 301 Specifications for Structural Concrete for Buildings
 - ACI 318 Building Code Requirements for Structural Concrete
 - ACI 347 Guide to Formwork for Concrete
 - 2. Voluntary Product Standard
 - a. PS-1 – Construction and Industrial Plywood
- B. Western Wood Products Association (WWPA)

- C. American Plywood Association Design and Construction Guide
- D. Government Regulations
 - 1. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Regulations
 - a. OSHA 29 CFR Part 1926.701 Safety and Health Regulations for Construction
 - 2. Cal/OSHA Standards, Division of Industrial Safety, Construction Safety Orders, Article 29 Erection and Construction
 - a. Section 1717 Falsework and Vertical Shoring
- E. Air Quality Management District – Local AQMD
- F. Where reference is made to one of the above, the revision in effect at the time of bid opening shall apply.

1.4 SUBMITTALS

- A. As specified in General Conditions and Section 01 33 00 - Submittal Procedures.
- B. Provide concrete construction joints and expansion joints of the types and locations indicated. Submit for approval shop drawings showing proposed location and type of required construction for any joints not shown on the Drawings, and sequence of forming and concrete placing operations.
- C. Provide formwork, shoring and reshoring calculations for information only.

1.5 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to ACI 318 Section 26.11. Resultant concrete to conform to required shape, line and dimension. Design of formwork is Contractor's responsibility.
- B. The formwork shall be designed for the loads and lateral pressures outlined in Chapter 2 of ACI 347R, and lateral forces as specified by the CBC.
- C. Above grade forms for elevated slabs and for walls exceeding 4 ft. in height shall be designed by a professional Civil or Structural engineer registered in the State of California.
- D. Foundation concrete may be placed directly into neat excavations, provided foundation trench walls are sufficiently stable [subject to approval of DSA]. Otherwise, minimum formwork is mandatory to ensure clean excavations and properly formed surfaces immediately prior to and during placing of concrete.

1.6 COORDINATION

- A. Coordinate this Section with other Sections of work that require attachment of components to formwork.
- B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, Contractor shall adjust reinforcement positioning to accomplish required cover or otherwise request instructions from Architect before proceeding.

1.7 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies. The requirements of California Division of Occupational Safety and Health, Construction Safety Orders Section 1717 and OSHA Part 1926, Section 1926.701 apply to the Work of this Section, and the Contractor shall prepare and maintain at least one (1) copy of the required drawings at the site. Design of the structures shown on the Drawings does not include any allowance or consideration for imposed construction loads. Provide forms, shoring and falsework adequate for imposed live and dead loads, including equipment, height of concrete drop, concrete and foundation pressures, stresses, lateral stability, and other safety factors during construction.
- B. Standards and Tolerances. Employ formwork complying with ACI 347 Guide to Formwork for Concrete, except as exceeded by the requirements of regulatory agencies or as otherwise indicated or specified. Design and construct formwork to produce finished concrete conforming to tolerances given in ACI 117
 - 1. Form offset shall meet the requirements of Class C.

PART 2 PRODUCTS

2.1 FORM COATING

- A. Form coating compounds shall be biodegradable with a VOC level less than 50 grams/liter. Non-grain raising and non-staining resin or polymer type that will not leave residual matter on surface of concrete or adversely affect bonding to concrete of paint, plaster, mortar, protective coatings, waterproofing or other applied materials. Coatings containing mineral oils, paraffin, waxes, or other non-drying ingredients are not permitted. For concrete surfaces contacting potable stored water, use only coatings and form-release agents that are completely non-toxic.

2.2 LUMBER

- A. WWPA Structural Light Framing No. 1 or Structural Joists and Planks No. 1, or equal. Board forms, if used, shall be No. 2 Common or better, T&G or shiplap, S1S2E, or better.
- B. Plywood. APA - MDO (Medium Density Overlay) Plyform, Group 1, Exterior, PS-1, for exposed surfaces. APA - BB (No-overlay) Plyform, Class 1, Exterior, PS-1 for unexposed surfaces.

2.3 METAL FORM TIES

- A. Provide commercially manufactured, prefabricated rod, snap-off, or threaded internal disconnecting type of tensile strength to resist all imposed loads. Use only ties that leave no metal within 1½-inch of concrete surfaces after removal. Employ snap-off type ties having integral washer spreaders of diameter to fully close tie holes in forms.

PART 3 EXECUTIONS

3.1 FORM TYPES

- A. Smooth Surface Concrete. Use specified plywood or metal forms, as approved, for interior and exterior exposed above-grade concrete and all formed concrete in contact with liquids, waterproofing and protective coatings.
- B. General Concrete. Use either plywood or board forms for concealed surfaces, or form as specified for smooth surface concrete.

3.2 SHORING AND FALSE WORK

- A. Distribute loads properly over base area on which shoring is erected, either concrete slabs or ground; if on ground, protect against undermining or settlement, particularly against wetting of soils.
- B. Alignment. Construct forms to produce in finished structure all lines, grades, and camber, as required.

3.3 FORM CONSTRUCTION

- A. Erect formwork, shoring and bracing to achieve design requirements in accordance with requirements of ACI 318 Section 26.11.
- B. Build forms to exact shapes, sizes, lines, and dimensions as required to obtain accurate alignment, location and grades, and level and plumb work in finished structures. Provide for openings, offsets, keyways, recesses, moldings, chamfers, blocking, joint screeds, bulkheads, anchorages, and other required features. Make forms easily removable without hammering or prying against concrete. Use approved metal spreaders to provide accurate spreading of forms. Construct forms so that no sagging, leakage, or displacement occurs during and after pouring of concrete.
- C. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- D. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shoring. Conform to Title 8, Subchapter 4, Construction Safety Orders, CCR.
- E. Align joints and make watertight. Keep form joints to a minimum.

- F. Obtain approval before framing openings in structural members that are not indicated on Drawings.
- G. Form Joints and Tie Holes. Seal joints between form panels with specified calking compound. Unless form tie spreaders fully seal tie holes in forms, seal around ties with specified materials and prevent leakage of concrete mortar.
- H. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- I. Reuse. Clean and recondition form material before each reuse. Fill all holes, cracks and defects. Unsatisfactory material (in the opinion of the Construction Manager) shall be rejected and removed from the site.
- J. Provide $\frac{3}{4}$ " inch chamfers at all exposed outside corners in the maximum lengths possible. Use mill run chamfer strips surfaced all sides. Provide rounded top edges of sidewalks, walkways, and where directed.

3.4 ALLOWABLE VARIATIONS FOR FORMED SURFACES

- A. Tolerances: Per ACI 317 requirements.
- B. Surface irregularities, ACI 347R Class A, gradual or abrupt irregularities of 1/8 inch for exposed to view concrete. Class B, 1/4 inch for plaster cement finish.

3.5 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.6 EMBEDDED PARTS, OPENINGS AND HARDWARE

- A. Provide formed openings where required for items to be embedded in or passing through concrete work. No openings or embedded items permitted in structural slabs within 18 inches of columns. Conform to ACI 318 Section 26.11.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors and other inserts, whether indicated on the structural drawings or not.
- D. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.

- E. Install electrical conduits per the direction of the electrical contractor as not to reduce the strength of the construction. Support embedded pipes and conduits independently from reinforcing steel in a manner to prevent metallic contact and thereby prevent electrolytic deterioration. Place embedded pipes and conduits as nearly as possible to the centerline of the concrete section. Submit all conduit, piping and other wall penetrations, reinforcements and anchor bolt sizing and locations to Owner's review and approval.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.7 *FIELD QUALITY*

- A. Inspection of Forms: Check forms prior to placement of any concrete for grade and alignment.
- B. Control during Concrete Placement: Check forms during concrete placement and to promptly seal all mortar leaks and to correct all form movement or misalignment.

3.8 *REMOVAL OF FORMS AND SHORING*

- A. Do not remove forms or shoring until concrete has attained sufficient strength to support its own weight and all imposed construction and permanent loads.
- B. Form Removal. Minimum times for removal after concrete placement are as follows:

Beam sides but not shoring	3 days
Column forms and wall forms	2 days
Forms for supported slabs but not shoring	14 days
- C. Shoring and Falsework Removal. Do not remove shoring and falsework until 21 days after concrete placement, or until concrete has attained at least 90 percent of the 28 day design compressive strength as demonstrated by control test cylinders, but in no event, not sooner than 14 days.
- D. All form materials, during stripping of forms below finish grade, shall be removed and deposited unless otherwise approved by the Engineer.
- E. Restriction. Do not impose construction, equipment, or permanent loads on columns, supported slabs, or supported beams until concrete has attained the 28-day design compressive strength.
- F. Concrete Curing During Removals. Refer to Section 03 39 00 of these Specifications.

END SECTION

SECTION 03 15 00
CONCRETE ACCESSORIES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Furnish all materials, supplies, and performing all labor to furnish and install concrete accessories as described in this section of the Specifications, shown on the Plans. The work shall include, but is not necessarily limited to
1. Polyvinyl chloride waterstop.
 2. Hydrophilic waterstop
 3. Bentonite strip waterstop
 4. Preformed synthetic sponge rubber expansion joint material.
 5. Preformed bituminous fiber expansion joint material.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
1. D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
 2. D570 - Standard Test Method for Water Absorption of Plastics
 3. D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 4. D638 - Standard Test Method for Tensile Properties of Plastics
 5. D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
 6. D747 - Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam
 7. D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
 8. D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
 9. D2240 - Standard Test Method for Rubber Property—Durometer Hardness
- B. U. S. Army Corps of Engineers (USACE):

1. CRD-C-572, Specification for Polyvinyl Chloride Waterstop.

1.3 RELATED WORK

- A. Section 03 30 00 – Cast in Place Concrete
- B. Section 07 92 00 – Caulking and Sealants

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Product Data:
 1. Waterstops and Preformed Expansion Joint Material: Sufficient information on each type of material for review to determine conformance of material to requirements specified.
- C. Provide material certificates, shop fabrication and placement drawings, and schedule.
- D. Samples: Provide samples of each product to be supplied under this section.
- E. Manufacturer's Installation Instructions: For all materials specified under this section
- F. Quality Control Submittals:
 1. Certificates of Compliance:
 - a. Written certificates that waterstops and Preformed Expansion Joint Material supplied meet or exceed physical property requirements of this section.

1.5 QUALITY ASSURANCE

- A. Mock-Ups:
 1. Welding Demonstration:
 - a. Demonstrate ability to weld acceptable joints in polyvinyl chloride waterstop before installation of waterstop begins.
- B. Field Joints:
 1. Polyvinyl Chloride Waterstop Field Joints: Shall be free of misalignment, bubbles, inadequate bond, porosity, cracks, offsets and other defects which would reduce the potential resistance of the material to water pressure at any point. Replace defective joints, remove faulty material from the site.
- C. Inspections:
 1. Quality of welded joints will be subject to acceptance of the Engineer.

2. Polyvinyl Chloride Waterstop: The following defects that represent a partial list that will be grounds for rejection.
 - a. Any combination of offset or crack which will result in a net reduction in the cross section of the waterstop in excess of 1/16-inch or 15 percent of the material thickness, at any point, whichever is less.
 - b. Misalignment of the joint, which will result in misalignment of the waterstop in excess of 1/2-inch in 10 feet.
 - c. Porosity in the welded joint as evidenced by visual inspection.
 - d. Bubbles or inadequate bonding.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. Waterstops:

1. Polyvinyl Chloride Waterstops:
 - a. One of the following or Engineer approved equivalent:
 - 1) Vinylex Corporation, Kwik-Tie.
 - 2) Greenstreak Plastic Products Company, Inc.
 - b. Type: Ribbed Waterstop. Unless otherwise specified, joints shall be constructed as follows:
 - 1) Construction Joints: ribbed type, width to be 6 inches unless otherwise specified or shown on the plans, without center bulb.
 - 2) Expansion Joints: ribbed type, width to be 6 inches unless otherwise specified or shown on the plans, with hollow center bulb.
 - c. Provide polyvinyl chloride waterstops complying with following requirements:

Property	Test Method	Required Limits
Water absorption	ASTM D570	0.15% max
Tear Resistance	ASTM D624	200 lb/in (35 kN/m) min.
Ultimate Elongation	ASTM D638	350% min.
Tensile Strength	ASTM D638	2000 psi (13.78 Mpa) min.
Low Temperature Brittleness	ASTM D746	No Failure @ -35° F (-37° C)
Stiffness in Flexure	ASTM D747	600 psi (4.13 Mpa) min.
Specific Gravity	ASTM D792	1.45 max.
Hardness, Shore A	ASTM D2240	79 ±3

Tensile Strength after accelerated extraction	CRD-C 572	1850 psi (11.03 Mpa) min.
Elongation after accelerated extraction	CRD-C572	300% min.
Effect of Alkalies after 7 days: Weight Change Hardness Change	CRD-C572	between -0.10% / +0.25% +/- 5 points

2. Hydrophilic waterstop

- a. One of the following or Engineer approved equivalent:
 - 1) W. R. Grace and Company, Adcor ES
 - 2) Greenstreak Plastic Products Company, Inc., Hydrotite
- b. Performance Requirements as follows:

Chloroprene Rubber

Property	Test Method	Required Limits
Tensile Strength	ASTM D412	1300 PSI min.
Ultimate Elongation	ASTM D412	400% min.
Hardness (Shore A)	ASTM D2240	50 +/- 5
Tear Resistance	ASTM D624	100 lb/inch min.

Modified Chloroprene (Hydrophilic) Rubber

Property	Test Method	Required Limits
Tensile Strength	ASTM D412	350 PSI min.
Ultimate Elongation	ASTM D412	600% min.
Hardness (Shore A)	ASTM D2240	52 +/- 5
Tear Resistance	ASTM D624	50 lb/inch
Expansion Ratio	Volumetric Change - Distilled Water @ 70° F	3 to 1 min.

3. Bentonite Strip Waterstop

- a. One of the following or Engineer approved equivalent:
 - 1) Cetco, Waterstop, RX.
 - 2) Green Streak, Swell Stop

B. Prefomed Expansion Joint Materials:

1. Prefomed Synthetic Sponge Rubber Expansion Joint Material:

- a. Manufacturers: One of the following or Engineer approved equivalent:
 - 1) JD Russell Co, Reflex

- 2) W.R. Meadows, Sponge Rubber Expansion Joint
2. Preformed Bituminous Fiber Expansion Joint Material:
 - a. Conform to ASTM D994, preformed bituminous type, 1/2-inch thick
 - b. Manufacturers: One of the following or Engineer approved equivalent:
 - 1) JD Russell Co., Fiberflex
 - 2) W.R. Meadows, Fiber Expansion Joint

2.2 ACCESSORIES

- A. Adhesives and sealants:
 1. Provide as recommended by product supplier.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Waterstops - General:
 1. Waterstops shall be stored so as to permit free circulation of air around the waterstop material and to prevent direct exposure to sunlight.
 2. Install waterstops in concrete joints where indicated on the Drawings.
 3. Carry waterstops in walls into lower slabs and join to waterstops in slabs with appropriate types of fittings.
 4. In Water bearing Structures: Provide all joints with waterstops, whether indicated on the Drawings or not.
 5. Provide waterstops that are continuous.
 6. Set waterstops accurately to position and line as indicated on the Drawings.
 7. Hold and securely fix edges in position at intervals of not more than 24-inches so that they do not move during placing of concrete.
 8. Position the waterstop so that the center axis of the waterstop shall be coincident with the centerline of the joint, unless detailed otherwise.
 9. Do not drive nails, screws, or other fasteners through waterstops in vicinity of construction joints.
 10. Secure waterstop against movement at not more than 24-inches on centers.
 11. Terminate waterstops 3-inches from top of finish surfaces of walls and slabs unless otherwise specified or indicated on the Drawings.

12. When any waterstop is installed in the concrete on one side of a joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than two days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of sunlight during the entire exposure and until the exposed portion is embedded in concrete.
13. Use specific type in applications as indicated on the Drawings.
14. No scrap or recycled material shall be used.

B. Polyvinyl Chloride Waterstops:

1. Install waterstops so that joints are watertight.
2. Weld joints such as unions, crosses, ells, and tees, with thermostatically controlled equipment recommended by waterstop manufacturer.
 - a. The material shall not be damaged by heat sealing.
 - b. Make joints by overlapping then simultaneously cut the ends of the sections to be spliced so they will form a smooth even joint.
 - c. The continuity of the waterstop ribs and tubular center axis shall be maintained.
 - d. The splices shall have a tensile strength of not less than 60 percent of the unspliced materials tensile strength.
3. Butt joints of the ends of two identical waterstop sections may be made while the material is in the forms.
4. All joints with waterstops involving more than two ends to be joined together, and all joints that involve an angle cut, alignment change, or the joining of two dissimilar waterstop sections shall be prefabricated prior to placement in the forms, providing not less than 24-inch long strips of waterstop material beyond the joint.
5. Vertical crosses and tees shall be prefabricated by the manufacturer. Horizontal crosses or tees may be field or factory welded.
6. Split type waterstop will not be permitted except where specifically indicated on the Plans.

C. Hydrophillic Waterstops

1. Apply adhesive recommended by the manufacturer for the given application.
2. Cut coil ends square or at proper angle for mitered corners with a sharp blade to fit splices together without overlaps.

3. Splices and exposed cells shall be sealed using adhesives recommended by the manufacturer.
4. Provide minimum concrete cover per manufacturer's recommendations and in no instance less than 2 inches.
5. Surfaces shall be even, smooth, clean and dry.
6. Do not use when the head exceeds 150'

D. Bentonite Waterstops

1. Apply adhesive recommended by the manufacturer for the given application.
2. Maintain the minimum clear cover recommended by the manufacturer but in no instance less than 2 inches.
3. Butt splice by pressing ends together to ensure no separation or air pockets. Do not overlap the ends of the waterstops.
4. Remove release paper immediately prior to the second concrete pour.
5. Replace waterstop showing signs of premature swelling, discontinuity or debris contamination.

E. Preformed Expansion Joint Material:

1. Fasten expansion joint strips to concrete, masonry, or forms with adhesive. No nailing will be permitted, nor shall expansion joint strips be placed without fastening.
2. Install expansion joint filler in accordance with manufacturer's instructions.
3. Install joint filler ½ inch (13 mm) below the concrete surface.
4. Prior to sealing, slide expansion joint cap over the expansion joint.
5. Place concrete and screed to finish grade, allow adequate curing time before removing top of expansion joint cap. Pull cap free and discard.
6. Seal with joint sealant.

F. Joints:

1. Install construction and expansion joints as indicated on the Plans.

END SECTION

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SECTION 03 15 20
ANCHOR BOLTS AND POST-INSTALLED ANCHORS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of furnishing and installing all materials and equipment and providing all labor necessary to complete the work shown on the drawings and/or listed below and all other work and miscellaneous items not specifically mentioned but reasonably inferred for a complete installation, including all accessories and appurtenances required for a completed system.
- B. Cast-in-Place anchor bolts, anchor bolts and threaded rod anchors for epoxy grouting.
- C. Expansion anchors to be installed in hardened concrete.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 03 60 00 - Grout
- C. Section 05 50 00 – Fabricated Metal
- D. Section 05 12 00 – Structural Steel and Miscellaneous Metals

1.3 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.

1.4 GENERAL

- A. Unless otherwise specified or indicated on the drawings, all anchor bolts shall be cast-in-place bolts, shall have a diameter of at least 3/4 inch, and shall be headed and shall include a square washer a minimum of 1/4 inch thick and 2 inches square.
- B. Expansion anchors and threaded rod anchors indicated or accepted in lieu of cast-in-place anchor bolts for equipment or structural framing shall have a diameter of at least 3/4 inch and shall be ICC Evaluation Service Report listed.
 - 1. Unless otherwise specified or indicated on the drawings, or approved by the Engineer, all other expansion anchors shall have a diameter of at least 1/2 inch.

PART 2 MATERIALS

2.1 MATERIALS

- A. Nuts and washers for anchor bolts and expansion anchors shall be the same material as the bolts or anchors they are used with.

Application	Reference
A. Anchor Bolts and Nuts	
1. Carbon Steel	ASTM A307
2. Stainless Steel	IFI-104, Grade 304 or 316
3. Galvanized Steel	Carbon steel bolts and nuts; hot-dip galvanized, ASTM A153 and A385.
B. Threaded Rod Anchors and Nuts	
1. Carbon Steel	ASTM F1554, Grade 55 with ASTM A563 nuts
2. Stainless Steel	ASTM 593 with ASTM F594 nuts
3. Galvanized Steel	Carbon steel bolts and nuts; hot-dip galvanized, ASTM A153 and A385
C. Flat Washers	ANSI B18.22.1; of the same material as anchor bolts and nuts.
D. Expansion Anchors	
1. For Concrete	Fed Spec FF-S-325; wedge type, Group II, Type 4, Class 1 or 2; self-drilling type, Group III, Type 1; or nondrilling type, Group VIII, Type 1 or 2; Hilti Kwik Bolt TZ ICC ESR-1917, Simpson Strong-Bolt 2 ICC ESR 3037, or ICC approved equivalent.
E. Adhesive Anchors	Hilti HIT RE-500 V3 ICC ESR 3814, ITW Red Head A7+ICC ESR 3903 or ICC approved equivalent.

- B. Anchor bolts, threaded rod anchors, expansion bolts and adhesive anchors for buried service, splash zones, and immersion service shall be stainless steel. Anchor bolts, threaded rods and adhesive anchors for exterior use shall be hot dipped galvanized. Zinc coated expansion anchors shall not be used for buried, splash zone, immersion or exterior service.

PART 3 EXECUTION

3.1 ANCHOR BOLTS

- A. Anchor bolts shall be delivered in time to permit setting before the structural concrete is placed. Anchor bolts which are cast in place in concrete shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or supporting template.
- B. Anchor bolts and threaded rod anchors which are to be epoxy grouted shall be clean and free of coatings that would weaken the bond with epoxy.

- C. Two nuts, a jam nut, and a washer shall be furnished for anchor bolts and threaded rod anchors indicated on the drawings to have locknuts; two nuts and a washer shall be furnished for all other anchor bolts.
- D. Anti-seize thread lubricant shall be liberally applied to projecting, threaded portions of stainless steel anchor bolts and threaded rod anchors immediately before final installation and tightening of the nuts.

3.2 EXPANSION ANCHORS

- A. Expansion anchors shall be installed in conformity with the manufacturer's instructions and ICC Evaluation Service Report recommendations for maximum holding power, but in no case shall the depth of hold be less than four (4) bolt-hole diameters. The minimum distance between the center of any expansion anchor and an edge or exterior corner of concrete shall be at least four and one half (4-1/2) times the diameter of the hole in which the anchor is installed. Unless otherwise indicated on the Plans, the minimum distance between the centers of the expansion anchors shall be at least eight (8) times the diameter of the hole in which the anchors are installed.
- B. Anti-seize thread lubricant shall be liberally applied to threaded stainless steel components immediately before assembly.

3.3 ADHESIVE ANCHORS

- A. Adhesive anchors shall be installed in conformity with the manufacturer's instructions and ICC Evaluation Service Report recommendations. Anchors must be installed in holes drilled using carbide-tipped drill bits or diamond core drill bits. Should diamond core drill bits be used, the manufacturer's roughening tool must be used in conjunction with the bit.

END SECTION

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SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to furnishing and installing concrete reinforcing work as described in this section of the Specifications, shown on the accompanying Plans, or reasonably implied therefrom, except as hereinafter specifically excluded. The work shall include, but is not necessarily limited to:
1. Provide reinforcing work, complete as indicated, specified and required.
 2. Furnishing and placing bar and wire reinforcement for cast-in-place concrete.

1.2 RELATED WORK

- A. Section 03 11 00 – Concrete Formwork
- B. Section 03 30 00 – Cast-In-Place Concrete
- C. Section 03 41 00 – Precast Concrete Structures

1.3 REFERENCES

- A. Industry Codes and Standards
1. American Society for Testing and Materials (ASTM)
 - a. A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
 - b. A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - c. ASTM A706 - Specification for Deformed and Plain Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
 2. California Building Code (CBC)
 3. Concrete Reinforcing Steel Institute (CRSI)
 - a. Manual of Standard Practice (CRSI Manual)
 4. American Concrete Institute (ACI)
 - a. ACI 301 Specification for Structural Concrete

- b. ACI 315 - Details and Detailing of Concrete Reinforcing.
- c. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Provide material certificates, shop fabrication and placement drawings, and schedule for all reinforcing steel, imbedded items, form release and curing compounds.
 - 1. Shop Drawings. Submit shop drawings for reinforcing steel prepared in accordance with ACI Details and Detailing Reinforcing. Show layouts, bending diagrams, assembly diagrams, dimensioned types and locations of all bar laps and splices, and shapes, dimensions, and details of bar reinforcing and accessories. Include layout plans for bar supports and chairs, with typical details. Dimensions and quantities shown on the shop drawings are the responsibility of the Contractor and Owner's approval of shop drawings shall not constitute approval of dimensions and quantities thereon.

1.5 QUALITY ASSURANCE

- A. Code Requirements: Unless otherwise specified all work specified herein and as shown on the drawings shall conform to the applicable requirements of the California Building Code (CBC), and the State Standard Specifications.
- B. Standard: Reinforcing steel installations shall conform to the current specification requirements of the Concrete Reinforcing Steel Institute "Manual of Standard Practice" (herein referred to as the CRSI Manual) except as otherwise indicated or specified.
- C. Shop Quality Control:
 - 1. Provide Testing Laboratory with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.
- D. Field Quality Control: All continuous inspections shall be performed by "Special Inspectors" qualified and approved by Governing Building Code Authority or inspector as otherwise qualified and approved by the Owner. Reports as required by Code shall be prepared and submitted to Owner, Building Department, Design Professional in Responsible Charge and Contractor.
 - 1. Inspection of Reinforcing. Provide 48-hour advance notice to permit inspection of in-place reinforcement prior to closing forms, and refer to applicable requirements of Section 03 30 00 of these Specifications.

2. Concreting Operations. During concrete placing, assign construction personnel to inspect reinforcement and maintain bars in correct positions at each pour location.

E. COORDINATION

1. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCING

- A. Deformed bars conforming to ASTM A615, Type "S", in the grades as follows, and conforming to ACI 318 Chapter 20 and Section 26.6.
1. For No.4 and larger bars, use 60 ksi yield grade.
 2. For ties and stirrups, and No. 3 and smaller bars, use 40 or 60 ksi yield grade.

2.2 WELDED WIRE REINFORCEMENT

- A. Conform to ASTM A1064 in flat sheets, uncoated finish. 6 x 6 - W4.0 x W4.0 unless otherwise noted on drawings.

2.3 TIE WIRE

- A. Annealed steel, 16-gage minimum.

2.4 REINFORCING SUPPORT

- A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.
- B. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.
- C. Concrete Blocks: Approximately 3 inches dimension each side.

2.5 COUPLER SPLICE DEVICES

- A. Reinforcing bar coupler/splice devices which bear current ICC Evaluation Report Number, and which develop at least 125 percent of bar yield strength in tension may be used with Owner's approval in lieu of lapped bar-type splices. Submit for Owner's approval in each instance.

2.6 DOWELS

- A. Where and as designated on Drawings, provide reinforcing bar dowels in new work and for anchorage to existing concrete. For anchorage where shown or required to existing construction, use non-shrink epoxy type grout or deferred bolting devices as approved in each instance and conforming to "Product" Article requirements of this Specification.

2.7 FABRICATION AND DELIVERY

- A. Conform to CRSI Manual Chapters 6 and 7 except as otherwise indicated or specified and ACI 315 and 318. Bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and store at site so as not to damage material. Keep a sufficient supply of tested, approved, and proper reinforcement at site to avoid delays.
- B. Bending and Forming. Fabricate bars of indicated size and accurately form to shapes and lengths indicated and required by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not scheduled will be rejected. Rebending of bars is prohibited.

PART 3 EXECUTION

3.1 PLACING

- A. General: Comply with CBC and CRSI's "Manual of Standard Practice" for placing reinforcement, except no reduction of concrete cover is allowable for bars at concrete surfaces exposed in liquid or water-containing structures.
- B. Cleaning. Before placing reinforcing, and again before concrete is placed, clean reinforcement of loose mill scale, oil, or other coating that might destroy or reduce bond. Do not allow form coatings, release agents, bond breaker, or curing compound to contact reinforcement.
- C. Concrete coverage over reinforcing bars shall be in accordance with ACI 318 Section 20.5.1.3 unless otherwise shown on the Drawings. Measure the coverage to the outer edge of ties, stirrups, bar spacers, hangers, and like items, and detail and fabricate the reinforcing accordingly.
- D. Accommodate placement of formed openings.
- E. Securing in Place. Accurately place reinforcement and securely wire tie in precise position at all points where bars cross. Tie stirrups to bars at both top and bottom. Bend ends of binding wires inward, allowing no encroachment on the concrete cover; exercise special care at surfaces to remain exposed and unpainted. Support bars in accordance with CRSI Manual Chapter 3, Specifications for Placing Bar Supports, using approved chairs and supports.
- F. Splices. Provide wired contact lap splices unless otherwise indicated or approved. Provide lap lengths as indicated on the Drawings.
 - 1. Vertical Bars. Except as specifically detailed or otherwise indicated, splicing of vertical bars in concrete is not permitted except at the indicated or approved horizontal construction joints or as otherwise specifically detailed.
 - 2. Horizontal Bars. Except as specifically detailed or otherwise indicated, splicing of horizontal bars in concrete is not permitted except at the indicated or approved vertical construction joints or as otherwise specifically detailed.

3. Tie reinforcement splices and intersections per CBC and CRSI, Chapter 10- General Principles for Placing, Splicing and Tying Reinforcing Bars, unless otherwise shown on the Drawings.
- G. Welding. Welding of reinforcing bars may be permitted on case-by-case basis. All welding of reinforcing bars will be approved by the Engineers.
- H. Additional Reinforcing. Provide additional reinforcing bars at sleeves and openings as indicated on the Drawings.
- I. Welded Wire Reinforcement. Install necessary supports and chairs to hold in place during concrete pours. Straighten reinforcement to lay in flat plane and bend reinforcement as shown or required to fit work. Provide laps of no less than one complete mesh unless otherwise detailed. Tie every other wire at laps. Welded wire reinforcement rolls are not acceptable.
- J. During placing of structural concrete slabs, provide a full-time reinforcing steel placer to repair and replace reinforcing to its proper location. Provide additional chairs of the proper size available to place under bars displaced during the concrete pouring operation.

END SECTION

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SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to furnishing and installing concrete work as described in this section of the Specifications, shown on the accompanying Plans, or reasonably implied therefrom, except as hereinafter specifically excluded. The work shall include, but is not necessarily limited to:
1. All concrete placement and finishing.
 2. Installation of all reglets, bolts, anchors, sleeves, etc., whether furnished under this section or by others.
 3. The furnishing of all items required to be or shown on the Plans as embedded in concrete, which are not specifically required under other sections.
 4. Setting headers and screeds for finishing and protecting concrete.
- B. Where prior inspection and test of materials are required, documentary evidence, in the form of test reports, shall be furnished prior to the time the material is incorporated into the work. All rejected material shall be promptly removed from the premises.

1.2 RELATED WORK

- A. Section 03 11 00 – Concrete Formwork
- B. Section 03 15 00 – Concrete Accessories
- C. Section 03 15 20 – Anchor Bolts and Post-Installed Anchors
- D. Section 03 20 00 – Concrete Reinforcing
- E. Section 03 39 00 – Concrete Curing
- F. Section 03 41 00 – Precast Concrete Structures
- G. Section 03 60 00 – Grout
- H. Section 05 50 00 – Fabricated Metal
- I. Section 07 92 00 – Caulking and Sealants
- J. Section 09 90 00 – Painting and Coating

1.3 REFERENCES

- A. American Concrete Institute (ACI)
- B. American Society for Testing and Materials (ASTM)
- C. State Standard Specifications
- D. California Building Code (CBC)

1.4 DEFECTIVE WORK

- A. Work considered to be defective may be ordered, by the Engineer, to be replaced in which case the Contractor shall remove and replace the defective work at his expense. Work considered to be defective shall include, but not be limited to, the following:
 - 1. Concrete incorrectly formed, or not conforming to details and dimensions on the Plans or with the intent of these documents or concrete the surfaces of which are out of plumb or level.
 - 2. Concrete in which defective or inadequate reinforcing steel has been placed.
 - 3. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the Plans.
 - 4. Concrete below specified strength.

1.5 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Provide material certificates, mix designs including laboratory tests, shop fabrication and placement drawings, and schedule for all reinforcing steel, embedded items, form release and curing compounds.
- C. The Contractor shall provide a proposed concrete placement plan (to minimize the effects of cracking and differential settlement) to the Engineer, and gain approval of said plan, prior to ordering of reinforcing steel. As a minimum this plan shall contain the layout of horizontal and vertical construction joints, spaced no greater than 30 feet apart (unless specifically approved otherwise by the Engineer), and a pour schedule for the individual slab and wall pours. All construction joints shall be sized in conformance with the Typical Longitudinal Keys Detail and shall contain water stops as shown on the Construction Joint with Waterstop Detail.

PART 2 PRODUCTS

2.1 CONCRETE

- A. Concrete shall conform to Section 90 of the State Standard Specifications. Unless otherwise shown on the concrete note sheet or specified in other sections, all concrete shall contain not less than 658 pounds of Portland cement per cubic yard of concrete (7 sack) with a minimum 28-day compressive strength of 4,000 psi.
 - 1. Portland cement shall be Type II Modified or Type V.
 - 2. Water/cement ratio shall not exceed 0.45 (by weight).
 - 3. Slump at placement shall be 3 inches +/- 1 inch.
- B. Concrete for canal liner shall conform to Section 90 of the State Standard Specifications. Unless otherwise shown or specified, all concrete shall contain not less than 564 pounds of Portland cement per cubic yard of concrete (6 sack) with a minimum 28-day compressive strength of 3000 psi.
 - 1. Portland cement shall be Type II,
 - 2. Concrete shall contain 4% ±1% entrained air.
 - 3. Water/cement ratio shall not exceed 0.50 (by weight).
 - 4. Slump at placement shall be 4 inches.
- C. Concrete used for thrust blocks shall contain not less than 517 pounds of Type II Portland Cement per cubic yard of concrete (5 1/2 sack) with a slump of 4 inches +/- 1 inch with a minimum compressive strength of 2,500 psi.
- D. Concrete used for pipe encasement shall contain not less than 517 pounds of Type II Portland Cement per cubic yard of concrete (5 1/2 sack) with a minimum compressive strength of 2,500 psi.
- E. Slurry cement backfill used in lieu of compacted soil shall contain not less than 188-pounds of Type II Portland Cement per cubic yard of concrete (2 sack) and shall comply with Section 19 of the State Standard Specifications.
- F. Exposure Categories for Concrete shall be as follows:
 - 1. Thrust blocks, foundations and other concrete exposed to soil – F0, S1, W1, C1

2.2 AGGREGATE

- A. Aggregate for normal weight concrete shall conform to ASTM C33. Aggregates shall be free of dirt, clay balls, roots, bark and other deleterious substances and shall be thoroughly washed before use.

- B. The combined aggregates for concrete shall conform to the grading limits for the one-inch, maximum size specified in Section 90-1.02C(4)(d) of the State Standard Specifications, Combined Aggregate Grading.

2.3 WATER

- A. Water shall be clean and free from injurious amounts of acids, alkalis, salts, oils, organic materials or other deleterious substances.

2.4 FLYASH

- A. Fly Ash: ASTM C618, Class F
 - 1. Type of fly ash shall be compatible with the type of cement and the intended use of the concrete.
- B. The weight of fly ash conforming to ASTM C618 shall not exceed 25 percent of the total cementitious material.

2.5 ADMIXTURES

- A. Air Entraining: ASTM C260
- B. Water Reducing: ASTM C494, Type A or D
- C. Accelerating: ASTM C494, Type C or E
 - 1. No admixture containing any chloride ions is acceptable.
- D. Retarding: ASTM C494, Type B or D

PART 3 EXECUTION

3.1 REINFORCING STEEL

- A. Reinforcing shall comply with Section 03 20 00 – Concrete Reinforcement.

3.2 FORMS

- A. Formwork shall conform with Section 03 11 00 – Concrete Formwork.

3.3 PLACING

- A. All concrete shall be placed before it has taken its initial set and shall be placed in horizontal layers and in such a manner as to avoid segregation. The concrete adjacent to the forms and joints shall be thoroughly consolidated per ACI 309.
 - 1. Pumping equipment shall be of suitable type, without Y-sections, and with adequate pumping capacity.
 - 2. Loss of slump in pumping shall not exceed 1¹/₂".

3. Concrete shall not be placed through reinforcing that may cause separation of aggregates.
- B. The concrete shall be deposited as nearly as possible in its final position. Drop chutes and elephant trunks shall be used on drops greater than 5 feet. Concrete shall be placed at such a rate that all concrete in the same lift will be deposited on plastic concrete. The concrete comprising each unit of work shall be placed in a continuous lift.
- C. The Contractor shall notify the Engineer 24 hours (1 working day) prior to concrete placement.
 1. The form work and reinforcing steel placement shall be approved by the Engineer prior to ordering concrete.
- D. Form Removal. Minimum times for removal after concrete placement shall conform to 03 11 00 – Concrete Formwork.
- E. Construction Joints
 1. At ends of the first concrete pour, provide forms that positively locate any waterstop. Ensure the end forms of walls are removable without releasing the side forms. Provide seals around reinforcement and water stop to prevent mortar leaks.
 2. Overlap the hardened concrete of the first pour with forms for the second pour. Brace the ends of the forms against the hardened concrete to prevent joint offsets and mortar leakage. Align any exterior features required on the finished surface.

3.4 CONCRETE JOINTS

- A. General
 1. Provide joints:
 - a. As shown on the Drawings and as noted below in these Specifications.
 - b. As required for constructability
 - c. After favorable review of layout, sequence and concrete placement program.
 2. Provide minimum curing times before the second placement:
 - a. 2 days after the first concrete placement at the joint.
 - b. 10 days after each adjacent concrete placement, for infill pours or checkerboard placement pattern.
- B. Control Joints:

1. Space typical control joints in slabs on grade or suspended slabs not exceeding 10 feet, or as shown on the Drawings. Control joints shall not be provided in water containment structures.
2. If cast-in with the concrete, positively locate the preformed joint filler and hold rigidly in place during concreting.
3. If saw-cut, use a wheeled power saw as soon as the concrete surface is firm enough. Saw-cut control joints must be constructed within 8-hours after concrete placement. Fill the groove with sealant over a backer rod.

C. Construction Joints:

1. Produce quality concrete, with full continuity of reinforcing and water tightness across the joints.
2. Space typical slab joints not exceeding 30 feet in the direction of the transverse or secondary reinforcing, typically the smaller reinforcing nearer to the center of the slab thickness. Space typical vertical wall joints no more than 30 feet apart.
3. Provide all joints in walls and slabs, retaining liquids, or earth with 6-inch waterstops. Continue all reinforcing through the joint unless otherwise noted.
4. After the first concrete placement at the joint, do not walk on or disturb any reinforcing extending into the second placement area for at least 48 hours.
5. Before depositing new concrete on or against concrete that has hardened, clean and roughen the entire surface of the joint exposing clean coarse aggregate solidly embedded in mortar matrix. Provide typically 1/4-inch roughness or amplitude of the concrete surface measured from the top of the exposed aggregate to the bottom of pockets between stones.
6. Drench the prepared joint with clean water and remove prior to the concrete pour.
7. Use special care in vibrating adjacent to construction joints to ensure thorough consolidation of the concrete around the waterstops and against the hardened portion of the joint. Additional hand tamping may be required.
8. For joints that are shown on architectural drawings as having a continuous reveal or recess, leave the wood form or pour strip used to create the reveal or recess in place or re-insert before roughening. Prevent the next concrete placement from filling the reveal or recess.

D. Expansion Joints

1. Stop all steel reinforcing clear of the joint at each side.
2. Provide center bulb waterstop continuously around the joint in walls and slabs retaining liquids.

3. Prepare a smooth first concrete surface with all voids filled.
 4. Provide preformed joint filler, securely fastened to the existing concrete as directed by the Manufacturer.
 5. Install bond breaker and sealant after curing is completed and when directed.
- E. Bonding to Pre-existing Concrete: Mechanically roughen the old surface to a 1/4-inch amplitude, as defined in construction joint paragraph above. Apply epoxy bonding material prior to concreting, as recommended by the manufacturer.
- F. Waterstop
1. Restrict field splices to butt joints in straight runs. For PVC type, make by heat welding, using a splicing iron. For rubber, provide sleeve joints and glue. Follow the manufacturer's specifications.
 2. Positively locate and support in the forms so that concrete may be placed, consolidated, and vibrated on both sides of the embedded portion without displacement of the waterstop and without causing voids in the concrete. Protect the outstanding portion from damage during the first concrete pour and clean and positively support prior to the second pour. Place, consolidate and vibrate the second pour without displacement of the waterstop and without causing voids in the concrete.

3.5 CONCRETE CURING

- A. Exposed concrete surfaces shall be protected from premature drying in accordance with Section 03 39 00 – Concrete Curing.

3.6 FINISHING

- A. Defective and honeycombed surfaces shall be chipped back to such a depth to expose solid concrete. The surface shall be dampened and coated with a bonding agent and packed with mortar.
- B. Concrete Finishes for Vertical Wall Surfaces:
1. Form facing material shall produce a smooth, hard, uniform texture.
 - a. Use forms specified for surfaces exposed to view in accordance with the Plans and other Specification Sections.
 2. At a minimum, repair the following surface defects:
 - a. Tie holes
 - b. Honeycombs deeper than 1/4"
 - c. Air pockets deeper than 1/4"
 - d. Rock holes deeper than 1/4"

- e. Scabbing
 3. Chip or rub off fins exceeding 1/8" in height.
 4. Provide SF/ESF-3.0 finish and a smooth-rubbed finish for:
 - a. Walls being waterproofed, painted, coated with some other material.
 - b. Use at all exposed surfaces not specified to receive another finish.
- C. Related Uniform Surfaces (Except Slabs):
1. Strike smooth tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces after concrete is placed.
 2. Float surface to a texture consistent with that of formed surfaces.
 3. Continue treatment uniformly across unformed surfaces.
- D. Concrete Finishes for Horizontal Slab Surfaces:
1. General: Tamp concrete to force coarse aggregate down from surface. Screed with straightedge, eliminate high and low places, bring surface to required finish elevations; slope uniformly to drains. Dusting of surface with dry cement or sand during finishing processes not permitted.
 2. Slab Finish shall be as follows:
 - a. Surfaces intended to receive damp proofing or water proofing membranes: Float finish.
 - b. Floors intended to receive floor coverings and interior rooms: Trowel finish.
 - c. Sidewalks, garage floors, drive-throughs and ramps: Broom finish.
 - d. Exterior slabs, platforms, steps and landings, exterior and interior pedestrian ramps and interior stairs and all process equipment areas, not covered by other finish materials: Broom finish.
 3. Tolerance for finished surface shall not exceed $SO F_F=35$, $SO F_L = 25$.
 4. No tolerance will be allowed that will result in the maximum running, or cross, slope exceeding the requirements of the Americans with Disabilities Act.

3.7 TESTING

- A. Testing of concrete shall be as required by the Engineer and in accordance with ACI 301, Chapter 1.7.
1. All costs of initial testing will be paid by the Owner unless otherwise noted.

2. All costs involved, including those required by the Engineer, in retesting of concrete required because of a failure to meet these Specifications shall be at the expense of the Contractor.

3.8 *WATERTIGHTNESS OF CONCRETE WORK*

- A. It is the intent of this Specification to obtain concrete and grout with homogenous structure, which when hardened will have the required strength, is watertight, and resistance to weathering.

3.9 *HYDRAULIC TESTING OF STRUCTURES*

- A. It is the intent of this Specification to obtain concrete and grout with homogenous structure, which when hardened will have the required strength, watertightness, and resistance to weathering. Testing of structures shall be done in accordance with Section 03 05 10 – Leakage Testing of Hydraulic Structures.

END SECTION

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SECTION 03 39 00
CONCRETE CURING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to concrete curing.

1.2 RELATED WORK

- A. Division 03 – Concrete

1.3 REFERENCES

- A. State Standard Specifications, latest edition with amendments.

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.

PART 2 PRODUCTS

2.1 METHODS OF CURING

- A. Newly placed concrete shall be cured by the methods specified in Section 90-1.03B of the State Standard Specifications (SSS).
 - 1. 90-1.03B(2), Water Method
 - 2. 90-1.03B(3), Curing Compound Method
 - 3. 90-1.03B(4), Waterproof Membrane Method
 - 4. 90-1.03B(5), Forms-In-Place Method

PART 3 EXECUTION

3.1 CURING

- A. Exposed concrete surfaces shall be protected from premature drying by covering as soon as possible with canvas, plastic sheets with sealed joints, burlap, sand or other satisfactory materials and kept continuously moist; or, if the surfaces are not covered, they shall be kept continuously moist by flushing or sprinkling. Curing shall continue for a period of not less than 7 days after placing the concrete.

- B. If curing compound is used, it must be nontoxic and taste and odor free, and provide a paintable concrete surface. Curing compound shall include a dye and two (2) applications shall be made to insure coverage.
- C. Curing materials and methods require approval by the Engineer prior to use.

3.2 CURING PAVEMENT

- A. The entire exposed area of the pavement, including edges, shall be cured by the waterproof membrane method, or curing compound method using curing compound (1) or (2) as the Contractor may elect. Should the side forms be removed before the expiration of 72 hours following the start of curing, the exposed pavement edges shall also be cured. If the pavement is cured by means of the curing compound method, the saw-cut and all portions of the curing compound that have been disturbed by sawing operations shall be restored by spraying with additional curing compound.
- B. Curing shall commence as soon as the finishing process provided in Section 40-1.H(3), "Final Finishing," has been completed. The method selected shall conform to the provisions in SSS Section 90-1.03B, "Curing Concrete."
- C. When the curing compound method is used, the compound shall be applied to the entire pavement surface by mechanical sprayers. Spraying equipment shall be of the fully atomizing type equipped with a tank agitator that provides for continual agitation of the curing compound during the time of application. The spray shall be adequately protected against wind, and the nozzles shall be so oriented or moved mechanically transversely as to result in the minimum specified rate of coverage being applied uniformly on exposed faces. Hand spraying of small and irregular areas, and areas inaccessible to mechanical spraying equipment, in the opinion of the Engineer, will be permitted. When the ambient air temperature is above 60°F (15°C), the Contractor shall fog the surface of the concrete with a fine spray of water as specified in SSS Section 90-1.03B(2), "Water Method." The surface of the pavement shall be kept moist between the hours of 10:00 a.m. and 4:30 p.m. on the day the concrete is placed. However, the fogging done after the curing compound has been applied shall not begin until the compound has set sufficiently to prevent displacement. Fogging shall be discontinued if ordered in writing by the Engineer.

3.3 CURING STRUCTURES

- A. Newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, in conformance with the provisions in SSS Section 90-1.03B, "Curing Concrete."
- B. The curing compound method using a pigmented curing compound may be used on concrete surfaces of construction joints, surfaces that are to be buried underground, and surfaces where only Ordinary Surface Finish is to be applied and on which a uniform color is not required and that will not be visible from a public traveled way. If the Contractor elects to use the curing compound method on the bottom slab of box girder spans, the curing compound shall be curing compound (1), pigmented, Type 2, Class B.

- C. The top surface of highway bridge decks shall be cured by both the curing compound method and the water method. The curing compound shall be curing compound (1), pigmented, Type 2, Class B.
- D. Concrete surfaces of minor structures, as defined in SSS Section 51-7, "Minor Structures," shall be cured by the water method, the forms-in-place method or the curing compound method.
- E. When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer required. Application of water for this purpose will be paid for as extra work.

3.4 CURING PRECAST CONCRETE MEMBERS

- A. Precast concrete members shall be cured in conformance with any of the methods specified in SSS Section 90-1.03B, "Curing Concrete." Curing shall be provided for the minimum time specified for each method or until the concrete reaches its design strength, whichever is less. Steam curing may also be used for precast members and shall conform to the following provisions:
 - 1. After placement of the concrete, members shall be held for a minimum 4-hour pre-steaming period. If the ambient air temperature is below 50°F (10°C), steam shall be applied during the pre-steaming period to hold the air surrounding the member at a temperature between 50°F and 90 F (10°C and 32°C).
 - 2. To prevent moisture loss on exposed surfaces during the pre-steaming period, members shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.
 - 3. Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner as to prevent the loss of steam and moisture.
 - 4. Steam at the jets shall be at low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed 40°F (22°C) per hour. The curing temperature throughout the enclosure shall not exceed 150 F (65°C) and shall be maintained at a constant level for a sufficient time necessary to develop the required transfer strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.
 - 5. Temperature recording devices that will provide an accurate, continuous, permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per 200 feet of continuous bed length will be required for checking temperature.

6. Members in pretension beds shall be de-tensioned immediately after the termination of steam curing while the concrete and forms are still warm, or the temperature under the enclosure shall be maintained above 60 F (15°C) until the stress is transferred to the concrete.
7. Curing of precast concrete will be considered completed after termination of the steam curing cycle.

3.5 CURING SLOPE PROTECTION

- A. Concrete slope protection shall be cured in conformance with any of the methods specified in Section 90-1.03B, "Curing Concrete."
- B. Concreted-rock slope protection shall be cured in conformance with any of the methods specified in Section 90-1.03B, "Curing Concrete," or with a blanket of earth kept wet for 72 hours, or by sprinkling with a fine spray of water every 2 hours during the daytime for a period of 3 days.

3.6 CURING MISCELLANEOUS CONCRETE WORK

- A. Exposed surfaces of curbs shall be cured by pigmented curing compounds as specified in SSS Section 90-1.03B(3), "Curing Compound Method."
- B. Concrete sidewalks, gutter depressions, island paving, curb ramps, driveways, and other miscellaneous concrete areas shall be cured in conformance with any of the methods specified in SSS Section 90-1.03B, "Curing Concrete."
- C. Shotcrete shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in SSS Section 90-1.03B, "Curing Concrete."
- D. Mortar and grout shall be cured by keeping the surface damp for 3 days.
- E. After placing, the exposed surfaces of sign structure foundations, including pedestal portions, if constructed, shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in SSS Section 90-1.03B, "Curing Concrete."

END SECTION

SECTION 03 41 00
PRECAST CONCRETE STRUCTURES

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Work required under this section consists of furnishing and installing precast, reinforced concrete structures of the sizes and types called for on the Plans, complete with openings, inserts, and hardware.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast In Place Concrete
- B. Section 03 60 00 – Grout
- C. Section 05 50 00 – Fabricated Metal
- D. Section 07 92 00 – Caulking and Sealants
- E. Division 31 – Earthwork
- F. Section 33 11 12 – Reinforced Concrete Low-Head Pressure Pipe
- G. Section 40 05 00 – Pipe and Fittings

1.3 REFERENCES

- A. American Concrete Institute (ACI)
- B. American Society for Testing and Materials (ASTM)
- C. State Standard Specifications
- D. California Building Code (CBC)

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Manufacturer's descriptive details of the manufacturer's latest standard product proposed for use on this project, including, but not limited to:
 - 1. All principal dimensions.
 - 2. Knockout locations and dimensions.
 - 3. Hardware details.

4. Certification that the cement conforms to ASTM C150.
- C. Shop and erection drawings, including design criteria and calculations, locations and types of all inserts, and the locations of all openings and location and type of joints.
1. The calculations and design drawings shall be stamped and signed by a civil or structural engineer registered in the State of California.

1.5 DEFECTIVE WORK

- A. Work considered to be defective may be ordered, by the Engineer, to be replaced in which case the Contractor shall remove and replace the defective work at his expense.

PART 2 PRODUCTS

2.1 GENERAL

- A. Design all precast structures as specified herein and in accordance with the applicable requirements of ASTM C913, except that Type II modified Portland cement shall be used.
1. Comply with the provisions of Section 03 30 00 – Cast In Place Concrete.
- B. Structures shall be of the sizes and configurations shown on the Drawings, with openings as shown. Wall and floor thickness, roof thickness and joint location shall be determined by the fabricator.

2.2 STRUCTURES

- A. Precast concrete standpipe for the Conveyance Channel Outlet shall be RGRCP have a height of 13'-6" with an inside diameter of 84".

PART 3 EXECUTION

3.1 GENERAL:

- A. Precast structures shall be set vertically and in true alignment, at the elevations indicated and at the locations shown on the Plans
- B. All holes in sections used for handling purposes shall be thoroughly plugged with rubber plugs or mortar.
- C. If starter couplings are not supplied, place pipe sections flush on the inside of the structure wall, projecting outside sufficiently for proper connection with the next pipe section
- D. Follow manufacture's recommended installation procedures.

END SECTION

PRECAST CONCRETE STRUCTURES
03 41 00-2

SECTION 03 60 00
GROUT

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Epoxy grouting of anchor bolts and reinforcing bars to be installed in hardened concrete.
- B. Adhesive bonding of fresh concrete to existing hardened concrete surfaces.
- C. Installation of pipe and sleeve into existing concrete.
- D. Structure and Equipment leveling pads.

1.2 RELATED WORK

- A. Section 03 15 20 - Anchor Bolts and Expansion Anchors
- B. Section 03 30 00 - Cast-in-Place Concrete

1.3 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.

PART 2 PRODUCTS

Material Type	Approved Product
1. Non-shrinking Grout	L&M Chemical "Crystex", Gifford-Hill "Supreme", Master Builders "Masterflow 713 Grout" Sauereisen Cements "F-100 Level Fill Grout", U.S. Grout "Five Star Grout", UPCO "Upcon High Flow" or "Upcon Super Flow", or equal.
2. Epoxy Grout	
a. Adhesive, Moisture insensitive	
For floors and horizontal surfaces	Adhesive Engineering "Concressive 1539", Rescon "Concrete Bonder R616", or equal
For vertical walls or overhead applications, non-sagging consistency	Adhesive engineering "Concressive 1440" Rescon "Concrete Bonder R616" or equal
b. Aggregate	As recommended by the epoxy grout manufacturer
3. Epoxy Bonding Adhesive	Sikadur 32, Hi-Mod Master Builders Concressive Standard Liquid or equal.
4. Water	Clean and free from deleterious substances.

- A. Non-shrinking grout shall be furnished factory premixed, so only water is added at jobsite. Grout shall be mixed in a mechanical mixer. No more water shall be used than is necessary to produce a flowable grout.
 - 1. Cured grout shall have a minimum compressive strength of 3500 psi.
- B. Epoxy grout shall consist of a two component liquid epoxy adhesive of appropriate viscosity for the application and location and an inert aggregate filler component. Components shall be packaged separately at the factory and field mixed. All proportioning and mixing of the components shall be in accordance with the manufacturer's recommendations.
 - 1. Cured grout shall have a minimum compressive strength of 3500 psi.

PART 3 EXECUTION

3.1 PREPARATION

- A. The concrete surface to receive non-shrinking grout shall be saturated with water for 24 hours prior to grouting.
- B. Where indicated on the drawings, dowels shall be epoxy grouted in holes drilled into hardened concrete. Hole diameter shall be as recommended by the manufacturer. The embedment depth for epoxy grouted dowels shall be as indicated on the Plans.
- C. Holes shall be prepared for grouting as recommended by the grout manufacturer.
- D. The existing concrete surface to receive fresh concrete shall be clean and sound. The existing surface may be dry or damp, but free of standing water, free of dust, laitance, grease, airing compounds, and disintegrated materials. The existing concrete surface and rebar shall be sand blasted or cleaned by approved mechanical methods.

3.2 INSTALLATION

- A. Non-shrinking Grout
 - 1. Placement - Unless otherwise specified or indicated on the Plans, the thickness of grout shall be 1-1/2 inches. Grout shall be placed in strict accordance with the directions of the manufacturer.
 - 2. Edge Finishing - The grout shall be finished smooth in all locations where the edge of the grout will be exposed to view after it has reached its initial set. Except where indicated to be finished on a slope, the edges of grout shall be cut off flush at the base plate, bedplate, member, or piece of equipment.
 - 3. Curing - Non-shrinking grout shall be protected against rapid loss of moisture by covering with wet rags or polyethylene sheets. After edge finishing is complete, the grout shall be wet cured for at least 7 days.

4. Epoxy Grout - Dowels shall be clean, dry, and free of grease and other foreign matter at time of installation. The bars shall be set and positioned and the epoxy grout shall be placed and finished in accordance with the recommendations of the grout manufacturer. Particular care shall be taken to ensure that all spaces and cavities are filled with epoxy grout, without voids.
- B. Epoxy Bonding Adhesive: Pre-mix each component as specified by manufacturer. Mix only that quantity that can be applied within its pot life. Apply as specified by manufacturer.

END SECTION

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SECTION 05 05 20
BOLTS, WASHERS, ANCHORS AND EYEBOLTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section describes materials and installation of anchor bolts, connecting bolts, washers, drilled anchors, epoxy anchors, screw anchors, eyebolts, and stainless steel fasteners.

1.2 DESIGN CRITERIA

- A. Structural Connections: AISC Specification for Structural Steel Buildings (June 22, 2010), except connection details are shown in the Drawings.

1.3 REFERENCES

- A. American Institute of Steel Construction (AISC)
- B. American Society for Testing and Materials (ASTM)
- C. Research Council on Structural Connections (RCSC)

1.4 SUBMITTALS

- A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00 – Submittals.
- B. Submit manufacturer's catalog data and ICC Evaluation Service Reports for bolts, washers, and concrete anchors. Show dimensions and reference materials of construction by ASTM designation and grade.
- C. Submit anchor bolt layout drawings.

PART 2 PRODUCTS

2.1 GENERAL

- A. Anchor bolts, drilled anchors and epoxy anchors for buried service, immersion service and in splash zones shall be stainless steel. All other anchor bolts, drilled anchors and epoxy anchors shall be galvanized steel unless otherwise specified on the Plans.

2.2 ANCHOR BOLTS

- A. Steel anchor bolts shall conform to ASTM F1554, Grade 36, Class 1A or 2A unless otherwise indicated. Size, length and thread length shall be as shown on the Drawings.

- B. Bolts shall be provided with a head and two washers of a minimum of ¼ inch thick and 2 inches square. One washer shall be embedded in the concrete at the head of the bolt.
- C. Anchor bolts, nuts and washers shall be galvanized per ASTM F2329.

2.3 CONNECTION BOLTS

- A. Steel connection bolts shall conform to ASTM A325, Type 1 with the threads included in the shear plane.
- B. Provide galvanized bolts where shown in Drawings. Galvanizing of bolts, nuts, and washers shall be in accordance with ASTM F2329.

2.4 STAINLESS STEEL BOLTS

- A. Stainless steel bolts shall be ASTM A193, Grade B8 or ASTM F593, Type 316. Nuts shall be ASTM A194, Grade 316 or ASTM F594, Type 316. Use ASTM A194 nuts with ASTM A193 bolts; use ASTM F594 nuts with ASTM F593 bolts. Provide washer for each nut and bolthead. Washers shall be of the same material as the nuts.

2.5 LUBRICANT FOR STAINLESS STEEL BOLTS AND NUTS

- A. Lubricant shall be chloride free and shall be RAMCO TG-50, Anti-Seize by RAMCO, Huskey™ Lube-O-Seal by HUSK-ITT Corporation, or equal.

2.6 WASHERS

- A. Washers for bolts conforming to ASTM F1554 shall conform to ASTM F436, Type 1.
- B. Washers for bolts conforming to ASTM A307 shall conform to ASTM F844.
- C. Washers for bolts conforming to ASTM A325 shall be square or rectangular, tapered in thickness, smooth, hot-dipped galvanized, conforming to ASTM F436.
- D. Stainless steel washers shall be Type 316.

2.7 DRILLED ANCHORS

- A. Unless otherwise indicated in the Drawings, drilled anchors shall be 316 stainless steel wedge anchors as manufactured by ITW Red Head Trubolt+, Kwik Bolt TZ by Hilti, or equal. Anchors shall have ICC-approved testing.

2.8 EPOXY ANCHORS

- A. Epoxy anchors in concrete shall be 316 stainless steel threaded rod adhesive anchors. Adhesive shall be ITW Red Head Epcon S7, Hilti HIT RE 500-SD, or equal. Epoxy anchor assemblies shall be ICC approved.
- B. Epoxy anchors in grouted concrete masonry walls shall be 316 stainless threaded rods. Epoxy adhesive shall be Hilti HIT HY 70, Simpson ET-HP, or equal.

PART 3 EXECUTION

3.1 STORAGE OF MATERIALS

- A. Store material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.2 GALVANIZING

- A. Zinc coating for bolts, anchor bolts, and threaded parts shall be in accordance with ASTM F2329.

3.3 INSTALLING CONNECTION BOLTS

- A. Use steel bolts to connect structural steel members. Use stainless steel bolts to connect structural aluminum members.
- B. Install ASTM A325 bolts and washers per the RCSC "Specification for Structural Joints Using High Strength Bolts".
- C. Bolt holes in structural members shall be 1/16 inch in diameter larger than bolt size. Measure cast-in-place bolt locations in the field before drilling companion holes in structural steel beam or assembly.
- D. Slotted holes, if required in the Drawings, shall conform to AISC 360-10, Chapter J, Section J3, Table J3.3.
- E. Drive bolts accurately into the holes without damaging the thread. Protect boltheads from damage during driving. Boltheads and nuts or washers shall rest squarely against the metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to the bolt axis, provide beveled washers to give full bearing to the head or nut. Where self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off.
- F. Bolts shall be of the length that will extend entirely through but not more than 1/4 inch beyond the nuts. Draw boltheads and nuts tight against the work.

3.4 INSTALLATION OF STAINLESS STEEL BOLTS AND NUTS

- A. Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

3.5 INSTALLING ANCHOR BOLTS

- A. Anchor bolts shall be delivered in time to permit setting before the structural concrete is placed. Anchor bolts which are cast in place in concrete shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or supporting template.
- B. Preset bolts and anchors by the use of templates. Do not use concrete anchors set in holes drilled in the concrete after the concrete is placed for mechanical equipment.

Anchor bolts and threaded rod anchors which are to be epoxy grouted shall be clean and free of coatings that would weaken the bond with epoxy.

- C. Two nuts, a jam nut, and a washer shall be furnished for anchor bolts and threaded rod anchors indicated on the drawings to have locknuts; two nuts and a washer shall be furnished for all other anchor bolts.
- D. Anti-seize thread lubricant shall be liberally applied to projecting, threaded portions of stainless steel anchor bolts and threaded rod anchors immediately before final installation and tightening of the nuts.
- E. For static items such as storage tanks, use preset anchor bolts or drilled anchors with ICC report data.
- F. After anchor bolts have been embedded, protect projecting threads by applying grease and having the nuts installed until the time of installation of the equipment or metalwork.

3.6 *INSTALLING DRILLED ANCHORS*

- A. Minimum depth of embedment of drilled mechanical anchors shall be as recommended by the manufacturer, but no less than that shown in the Drawings.
- B. Prepare holes for drilled anchors in accordance with the anchor manufacturer's recommendations prior to installation.

3.7 *INSTALLING EXPOXY ANCHORS*

- A. Epoxy anchors shall be clean and free of coatings that would weaken the bond with epoxy.
- B. Minimum depth of embedment of epoxy anchors shall be as recommended by the manufacturer, but no less than that shown in the Drawings.
- C. Prepare holes for epoxy anchors in accordance with the anchor manufacturer's recommendations prior to installation.

END SECTION

SECTION 05 12 00
STRUCTURAL STEEL AND MISCELLANEOUS METALS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Fabricated items from metal shapes, plates, sheets, rods, bars or castings, and other wrought or cast metals except component parts of equipment.
- B. Structural steel shall include all structural members and fasteners.
- C. Floor plates, and gratings.
- D. Fabricated metal items that are indicated on the drawings but not mentioned specifically herein shall be fabricated in accordance with the applicable requirements of this section.

1.2 RELATED WORK

- A. Section 03 15 20 – Anchor Bolts and Expansion Anchors
- B. Section 03 30 00 – Cast-in-Place Concrete
- C. Section 03 60 00 – Grout
- D. Section 09 90 00 – Painting and Coating

1.3 REFERENCES

- A. Except as modified herein, all work specified herein shall comply with the applicable requirements of the following standards:
 - 1. California Building Code
 - 2. Aluminum Association
 - 3. American Institute of Steel Construction
 - 4. American Iron and Steel Institute
 - 5. American National Standards Institute
 - 6. American Society of Testing and Materials
 - 7. American Welding Society
 - 8. National Association of Architectural Metal Mfg.
 - 9. The applicable sections of OSHA code

1.4 SUBMITTALS

- A. Complete assembly, installation drawings, detailed specifications and data covering materials used and accessories forming part of the furnished product shall be submitted in accordance with the General Conditions and Section 01 33 00 - Submittals.
- B. All bolted connections and welds shall be properly identified on the detailed shop drawings.
- C. Submittals for high strength bolts and load indicator washers shall include statements from the bolt and washer manufacturers certifying satisfactory compliance with the governing standards and the specified tests.
- D. Welding procedures, welding procedure qualification records and welder qualifications shall be submitted as required.

1.5 INSPECTION AND TESTING

- A. All costs for any inspections and tests shall be coordinated and paid by the Owner.
- B. Contractor shall schedule testing with the testing laboratory so that tests and shop inspections may be made in sufficient time for approvals to be given prior to fabrication.
 - 1. Do not fabricate, use or deliver any steel to the site until it has been tested, or accompanied by a certificate of compliance issued by testing laboratory or by fabricator.
 - 2. All welding shall be done by AWS certified welders approved by the Engineer.
 - 3. Copies of all test reports shall be supplied to the Engineer.

1.6 TOLERANCES

- A. For materials, fabrications and erection shall not exceed those tolerances as set forth in the "Code of Standard Practice, American Institute of Steel Construction", as adopted and revised to date.

1.7 CLEANING AND STRAIGHTENING

- A. All material, before being fabricated, shall be thoroughly wire brushed, cleaned of all scale and rust, and shall be thoroughly straightened by methods that will not injure the material before being worked on. After punching or working the component parts of a riveted member, all twists or bends shall be removed before the parts are assembled. All finished members shall be free from twists, bends or open joints, when erected.

1.8 GAS CUTTING

- A. Gas cutting shall be done by machine when possible. All re-entrant corners shall be shaped notch free to a radius of at least one-half inch.

1.9 QUALITY ASSURANCE

- A. All welding procedures and operators for welding of steel and aluminum fabrications shall be qualified in accordance with the applicable provisions of AWS, and as set forth in the fasteners section.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be handled, transported, and delivered in a manner which will prevent bends, dents, significant coating damage, or corrosion. Damaged materials shall be promptly replaced.
- B. Structural and miscellaneous metals work shall be stored on blocking so that no metal touches the ground and water cannot collect thereon. The material shall be protected against bending under its own weight or superimposed loads.

PART 2 PRODUCTS

2.1 GENERAL

- A. Structural and miscellaneous metal work shall be fabricated in conformity with dimensions, arrangements, sizes, and weights or thicknesses specified or indicated on the drawings.

2.2 STRUCTURAL STEEL

A. Steel

- | | | |
|----|--|--|
| 1. | Shapes except Wide Flange, Plates, HSS tube and pipe, and Bars | ASTM A36 |
| 2. | Wide Flange Shapes | ASTM A992 |
| 3. | Sheets | ASTM A366 OR A569, zinc coated |
| 4. | Checkered Plate | ASTM A786 carbon steel, skid resistant pattern |
| 5. | HSS Round and Rectangular | ASTM A500 Grade B |
| 5. | Pipe | ASTM A120 OR A53, Type E or S, Grade B |
| 6. | Bolts and Nuts | ASTM A307 (unfinished) |
| 7. | Bolts and Nuts, High Strength | ASTM A325 Type 1 |
| 8. | Nuts, Heavy-Hex | ASTM A563, compatible with bolts |

- | | | |
|--|-------------------------|--|
| 9. | Nuts, Self-Locking | Prevailing torque type; IFI-100, Grade A |
| 10. | Washers | |
| | a. Flat | ANSI B18.22.1 |
| | b. Flat, Hardened | ASTM F436, Type 1 |
| | c. Lock | ANSI B18.21.1, helical spring type |
| 11. | Nuts, Self-Locking | Prevailing torque type; IFI-100, Grade A |
| 12. | Threaded Rods | ASTM A36 |
| 13. | Anchor Rods or Threaded | ASTM F1554 Grade 55 with heavy hex nuts |
| B. Stainless Steel | | |
| 1. | Plates | ASTM A167, Type 304, or ASTM A240, Type 316L |
| 2. | Bolts and Nuts | IFI - 104, Grade 303, 304, or 305 |
| 3. | Washers | |
| | a. Flat | ANSI B18.22.1 Type 316 |
| | b. Lock | ANSI B18.21.1, helical spring type, Type 316 |
| 4. | Anchors | ASTM F593 with ASTM F594 Nuts |
| C. Shop Coatings | | |
| 1. | Rust-Inhibitive Primer | Universal type; Cook "391-N-167 Barrier Coat", Koppers "No. 10 Inhibitive Primer", Tnemec 77 Chem-Prime", or Valspar "13-R-28 Chromox Primer." Devoe "Devran 203". |
| 2. | Epoxy Paint | Ameron "Amerlock 400 High Solids Epoxy Coating", Carboline "Carboguard 891", Tnemec "Series N140", or Devoe "Bar Rust 235H"; & "Devflex 4208". |
| 3. | Coal Tar Paint | Koppers "Bitumastic Super Service Black", Tnemec "46-449 Heavy Duty Black", or Valspar "High-Build Bituminous Coating 35-J-10." |
| 4. | Galvanizing | ASTM A123, A153, A385 |
| D. Except as otherwise specified or indicated on the drawings, all materials and work shall conform to the applicable provisions of the AISC "Steel Construction Manual" and AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings". | | |
| E. When required, all fabricating plants providing structural steel under these specifications shall be certified in accordance with the AISC Quality Certification Program for the required certification category. | | |

2.3 HIGH STRENGTH BOLTED CONNECTIONS.

- A. Unless otherwise required, bolted connections for structural steel, as defined in the AISC manual, shall be made with ASTM A325 high strength bolts conforming to the "Specifications for Structural Joints Using ASTM A325 or A490 Bolts" as approved by the Research Council on Structural Connections. The method of installation, pre-tensioning procedures, and bolting equipment and tools shall likewise conform to the above referenced ASTM standard.
- B. Field-welded connections will not be acceptable for structural steel unless indicated on the drawings.
- C. Bolt holes shall have a diameter nominally 1/16 inch larger than the nominal bolt diameter. Bolt holes for one ply only of vertical diagonal bracing connections may be oversized to a diameter nominally 3/16 inch larger than the nominal bolt diameter. If oversized holes are provided in an outer ply, a hardened flat washer shall be installed over each hole during bolting.
- D. Beveled washers shall be used when the bearing faces of bolted parts have a slope of 1:20 or greater with respect to a plane perpendicular to the bolt axis. Bolt length shall be increased as needed to accommodate the beveled washers.
- E. Except as otherwise required or specified herein, bolted connections shall be bearing type with threads excluded from the shear plane. Slip critical connections shall be used in diagonal bracing connections, where slip critical connections are indicated on the drawings, or where oversize holes or slotted holes parallel to the direction of the load are used.

PART 3 EXECUTION

3.1 WELDING

- A. Welding and related operations shall conform to applicable provisions of the Structural Welding Code, AWS D1.1, of the American Welding Society.
- B. All welding shall be performed in accordance with written procedures, using only those joint details which have prequalified status when performed in accordance with AWS D1.1.
- C. All welding shall be performed by welders qualified in accordance with the American Welding Society for steel welding and American Society for Mechanical Engineers Section IX for stainless steel welding. Welding procedure specifications qualification records, and welder qualification records shall be submitted as required.
 - 1. The operator, the welding equipment, the electrodes, the methods of making the welds as completed shall be approved by the inspector of the testing laboratory.

2. All welds shall be visibly inspected in accordance with AWS procedures. Additional inspection or testing shall be performed as indicated on the drawings.
- D. Welds not dimensioned on the drawings shall be sized to develop the full strength of the least strength component of the connection.
- E. Where structural or miscellaneous steel connections are welded, all butt and miter welds shall be continuous and, where exposed to view, shall be ground smooth. Intermittent welds shall have an effective length of at least 2 inches and shall be spaced not more than 6 inches apart.
- F. Surfaces to be welded and surfaces adjacent (within 2 inches) of a weld shall be free from loose or thick scale, slab, rust, moisture, grease, paint (except approved weldable primers) and other foreign materials that would prevent proper welding or release objectionable fumes.
- G. Defective welds or unsatisfactory parts shall be cut out and replaced.

3.2 *SURFACE COATING*

- A. Shop Painting
 1. All structural steel not encased in concrete shall be thoroughly cleaned, wire brushed, removing all scale and given one heavy coat of paint as specified in Section 09 90 00 – Painting and Coating.
 2. Structural steel parts not in contact, but inaccessible after assembly shall be painted with two coats before assembly as specified in Section 09 90 00 – Painting.
- B. Field Painting
 1. After erection, all parts where paint has been rubbed or burned off or where skips have occurred in shop painting, all field rivets, bolts and welded areas shall be painted as specified in Section 09 90 00 – Painting and Coating.

3.3 *INSTALLATION AND FIELD QUALITY CONTROL*

- A. All posts of railings shall be rigidly attached to concrete structures by approved anchors through railing post base plates. In any section, or run of railing, the center lines of all members shall be in true alignment lying in the same vertical frame.
- B. After installation, railings shall be checked for final alignment, using a tightly drawn wire for reference. The maximum misalignment tolerance for railing shall be 1/8 inch in 12 feet. Bent, deformed or otherwise damaged railings shall be replaced.

3.4 ADJUSTING AND CLEANING

- A. Items which have been given shop applied protective coatings that become damaged during erection or installation shall be repaired with the same or equivalent coating.

END SECTION

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SECTION 05 50 00
FABRICATED METAL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Provide metals work for trash rack, fencing, guard posts, and other miscellaneous metal works, complete as indicated, specified, and required.
1. Steel channel and/or angle frames and thresholds with anchors
 2. Guard post assemblies for removable and stationary types
 3. Miscellaneous iron and steel items indicated, specified, or required for completion of the Work, unless included under other Sections of the Specification
 4. Miscellaneous connections, anchors, bolts, clips, spacers, nuts, washers, shapes and inserts, as required
 5. Galvanizing, shop primer finishes for work of this Section as specified or required, including field touchups.

1.2 RELATED WORK

- A. Section 03 15 20 – Anchor Bolts and Expansion Anchors
- B. Section 03 30 00 – Cast-In-Place Concrete
- C. Section 09 90 00 – Painting and Coating

1.3 REFERENCES

- A. Industry Codes and Standards

American Institute of Steel Construction (AISC)

Specification for the Design, Fabrication and Erection of Steel for Buildings

Code of Standard Practice for Steel Buildings and Bridges

American Society for Testing and Materials (ASTM)

American Welding Society (AWS)

AWS D 1.1 Structural Welding Code Steel

- B. Government Regulations

U.S. Department of Labor, Occupational Safety and Health Administration (OSHA)

Cal/OSHA Standards

1.4 *QUALITY ASSURANCE*

- A. Unless otherwise specified all work specified herein and shown on the Drawings shall conform to the applicable requirements of the following specifications and codes:
1. Fabricate and erect miscellaneous metal work in accordance with the latest edition of the AISC "Specification for the Design, Fabrication and Erection of Steel for Buildings," and "Code of Standard Practice for Steel Buildings and Bridges."
 2. Inspections. Perform all field welding and field high strength bolting of structural steel assemblies under the inspection of the Engineer. Notify the Engineer at least 48 hours in advance of needed inspections. Provide copies of testing and inspection reports to the Engineer.

1.5 *SUBMITTALS*

- A. Furnish submittals, samples and material data in conformance with the General Conditions and Section 01 33 00 – Submittal Procedures.
1. Shop Drawings and Erection Drawings. Show materials and specification list, construction and fabrication details, layout and erection diagrams and method of anchorage to adjacent construction. Give location, type, size and extent of welding and bolted connections and clearly distinguish between shop and field connections. Coordinate shop drawings with related trades to ensure proper mating of assemblies.
 - a. Catalog work sheets showing illustrated cuts of item to be furnished, scale details and dimensions may be submitted for standard manufactured items.
 - b. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from Drawings. Where concrete, masonry or other materials must be set to exact locations to receive work, furnish assistance and direction necessary to permit other trades to properly locate their work. Where welded connectors, concrete, or masonry inserts are required to receive work, show on shop drawings exact locations required.
 2. Shop Painting Data. Submit product list with product data sheets of intended shop coats. These products shall be compatible with the products and manufacturers with those systems Specified in Section 09 90 00 – Painting and Coating.

PART 2 PRODUCTS

2.1 MATERIALS – GENERAL

A. Provide materials that are new, sound and conforming to the following:

Item	ASTM Standard No.	Class, Grade Type or Alloy No.
Cast Iron		
Cast Iron	A48	Class 40B
Steel		
Galvanized sheet iron or steel	A653	Coating G90
Black steel, sheet or strip	A569 A570	--
Coil (plate)	A635	--
Structural plate, bars, rolled shapes, and miscellaneous items (except W and HSS shapes)	A36	--
Rolled W shapes	A992	Grade 50
HSS Shapes	A500	Grade B
Standard bolts, nuts and washers	A307	--
High strength bolts, nuts and hardened flat washers	A325 A490	--
Eyebolts	A489	Type 1
Tubing, cold-formed	A500	--
Tubing, hot-formed	A501	--
Steel pipe	A53	Grade B
Stainless steel		
Plate, sheet and strip	A240	Type 304* or 316**
Bars and shapes	A276	Type 304* or 316**
Aluminum		
Flashing sheet aluminum	B209	Alloy 5005-H-14, 0.032 inches minimum thickness
Structural sheet aluminum	B209	Alloy 6061-T6
Structural aluminum	B209 B308	Alloy 6061-T6
Extruded aluminum	B221	Alloy 6063-T42
*Use Type 304L if material will be welded		
**Use Type 316L if material will be welded		

1. Anchor bolts:
 - a. Anchorages for all locations unless otherwise indicated on Drawings: Stainless steel, Type 316, Hilti HIT RE-500 V3 ICC ESR 3814 adhesive anchors, or Engineer approved equivalent.
 - b. Chemical bond or adhesive type DBDs, if approved by the manufacturer and the Engineer, are acceptable for anchorage of vibrating machinery or equipment.
2. Expansion Anchors.
 - a. Hilti Kwik Bolt TZ ICC ESR-1917, Standard Type or Engineer approved equivalent.
3. Galvanizing.
 - a. Iron and Steel. ASTM A123, with average weight per square foot of 2.0 ounces and not less than 1.8 ounces per square foot.
 - b. Ferrous Metal Hardware Items. ASTM A153 with average coating weight of 1.3 ounces per sq. ft.
 - c. Touch-up Material for Galvanized Coatings. Repair galvanized coatings marred or damaged during erection or fabrication by use of DRYGALV as manufactured by the American Solder and Flux Company, Galvalloy, Galvion, Rust-Oleum 7085 Cold Galvanizing Compound, or Engineer approved equivalent.
4. Welding Electrodes. Use welding electrodes conforming to AWS D1.1.
5. Shop Prime Paint. To assure compatibility with deferred field-applied paint or coating systems, for ferrous metals other than stainless steel, galvanized steel and cast iron, provide surface preparations and use shop prime paint product and manufacturer as painting or protective coating system intended for field application specified in Section 09 90 00 - Painting.
 - a. Do not shop prime portions of work immediately adjacent to intended field welds, or portions intended for embedment.

PART 3 EXECUTION

3.1 GENERAL FABRICATION AND INSTALLATION REQUIREMENTS

- A. Standards: Thoroughly clean ferrous metals of all loose scale and rust before being fabricated. Provide finished members free of twists, bends or open joints, and that present a neat workmanlike appearance when completed. Perform steel work conforming to the best practices set forth in the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.

1. Perform aluminum work conforming to the applicable requirements of “Specifications for Aluminum Structures, Aluminum Construction Manual” of the Aluminum Association.
- B. Welding: Perform all welding in accordance with the “Structural Welding Code-Steel,” AWS D1.1.
1. Use only welders qualified by tests in accordance with AWS B 3.0.
- C. General Fabrication and Installation
1. Using new stock of sizes specified or detailed, fabricate in shop producing high grade metal work. Form and fabricate to meet required conditions. Include clips, straps, bolts, screws, and other fastenings necessary to secure the work. Accurately make and tightly fit joining and intersections in true planes with adequate secure fastenings. Erect all metal work plumb, true on line and in its designated location. Grind and finish smooth field welds on exposed surface. Bolt or weld connections as indicated on Drawings. After installation, leave all work in a neat and clean condition, ready for field painting or coating.
 - a. The maximum misalignment tolerance for railing shall be 1/8 inch in 12 feet. Bent, deformed or otherwise damaged railings shall be replaced.
 2. Coordinate work of this Section with related trades. Particular attention is required for items to be embedded in concrete work. Provide all punching and drillings indicated or required for attachment of other work to that of this Section.
 3. Compliance with Safety Requirements: Dimensions required for the fabrication and installation of handrails, ladders, grating, plate, pipe hangers and etc. which are not shown on the Drawings, shall conform to the requirements of the Division of Occupational Health and Safety.
- D. Protection
1. Provide protection and repair of adjacent surfaces and areas which may become damaged as a result of work of this Section. Protect work performed hereunder until completion and final acceptance of project by the Owner. Repair or replace all damaged or defective work to original specified condition, at no additional cost to the Owner.
- E. Painting
1. Apply all products in strict conformance with manufacturer’s printed instructions.
 2. Provide one or more shop coats of paint on all ferrous metals, except cast-iron, ductile iron, stainless steel and galvanized metals. Before priming, thoroughly clean surfaces. Allow shop coats to dry before materials are

loaded for delivery to the job site. After erection, paint all areas where the shop coats have been rubbed off or omitted.

- a. See Section 09 90 00 – Painting and Coating of these specifications for surface preparation, prime coatings, finish painting and coatings.
3. Isolate aluminum members from contact with dissimilar metals, concrete and masonry to provide protection from electrolytic deterioration. Use non-absorptive tape or gaskets, heavy brush coat of approved zinc chromate primer made with a synthetic resin vehicle; or apply a heavy coat of approved alkali-resistant bituminous paint.

END SECTION

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SECTION 07 92 00
CAULKING AND SEALANTS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Sealing and caulking at locations specified and indicated on the Plans.
- B. All labor, materials, equipment, tools and incidentals necessary and required for the completion of the work.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 09 90 00 – Painting and Coating

1.3 REFERENCES

- A. American National Standards Institute/National Sanitation Foundation.
 - 1. ANSI/NSF Standard 61 - Drinking Water System Components - Health Effects.
- B. American Society for Testing Materials (ASTM):
 - 1. C 920 - Specification for Elastomeric Joint Sealants.
- C. Federal Specification (FS):
 - 1. FS TT-S-00227e - Sealing Compound, Elastomeric Type, Multi-Component.

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittals.
- B. Shop Drawings:
 - 1. Shop Drawings, Product Data, and Samples.
 - 2. Applicator's qualifications.
 - 3. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Manufacturer's recommendations for joint cleaner, primer, backer rod, tooling and bond breaker.

4. Certification from sealant manufacturer stating product being used is recommended for and is best suited for joint in which it is being applied.
 5. Warranty.
- C. Samples:
1. Cured sample of each color for Engineer's color selection. Color chart not acceptable.

PART 2 PRODUCTS

2.1 MATERIALS

A. POLYURETHANE COMPOUNDS

1. Exterior Applications: One or two component polysulfide liquid polymer base rubber compounds, which cure at normal temperature to a flexible firm rubber, tack-free, paintable, in gun grade or knife or trowel consistency, conforming to ASTM C920-11, Type S, Grade NS, Class 35 for use in types T₁, T₂, NT, M, O, G, I, A..
 - a. DAP "Premium Polyurethane Construction Adhesive Sealant", Sika "Sikaflex 1a" or "Sikaflex 2c NS", WR Meadows "Pourthane NS", or Engineer approved equivalent.
2. Color of caulking and sealants shall match color of adjacent work.
3. Interior Applications: Butyl based compound, smooth flowing, single component, architectural grade, synthetic, general purpose caulking compound, composed of 80-100% solids, butyl, non-oily, non-hardening, curing to a tack-free surface, paintable, in gun grade or knife or trowel consistency.
 - a. DAP Butyl-Flex, Sika Sikaflex 1a or Engineer approved equivalent.
4. Horizontal Applications. Elastomeric, one-component, self-leveling polyurethane sealant conforming to ASTM C920-11, Type S, Grade P, Class 25 for use in types T₁, T₂, NT, M, O, G.
 - a. "Pourthane SL" WR Meadows, "Sikaflex+ Self-Leveling Sealant" or Engineer approved equivalent
5. Color of caulking and sealants shall match color of adjacent work.

B. SILICONE SEALANTS

1. Where silicone sealant is shown or noted on Plans or noted in the Specifications, it shall be a one part, type S, in gun grade consistency.

- a. General Electrical 1200 Series, Dow Corning Number 795. or Engineer approved equivalent.
 2. Color of sealant shall match the color of adjacent work.
- C. ACRYLIC-LATEX SEALANTS
1. Permanently flexible, non-staining, and non-bleeding latex modified acrylic sealant compound.
 - a. Tremco Mono, Pecora Corp. Number AC-20, Sonneborn Sonolac or Engineer approved equivalent.
 2. Color of sealant shall match the color of adjacent work.
- D. PRIMERS
1. Primers shall be quick drying, colorless, non-staining sealer of type and consistency recommended by the manufacturer of the sealant material for the surfaces to be caulked and sealed.
- E. PACKING AND FILLERS
1. Closed-cell expanded sponge rubber manufactured from synthetic polymer neoprene base, or resilient polyethylene foam backer rod, compatible with the caulking compound used.
 - a. WR Meadows "Kool-Rod", Rubatex Corp. Rubatex-Cord or Engineer approved equivalent.
 2. Size: Minimum 25 percent greater than nominal joint width.

PART 3 EXECUTION

3.1 EXECUTION

A. SCHEDULE

1. Synthetic Rubber Sealing Compound (Polyurethane), Non-Sag:
 - a. Use where indicated on the Drawings.
 - b. Water-bearing and earth-bearing concrete structures.
 - c. Joints in masonry, concrete vertical surfaces, and metal-faced panels in vertical surfaces.
 - d. Joints between sheet metal flashing and trim.
 - e. Joints between sheet metal flashing and trim, and vertical wall surfaces.

- f. Small voids between materials requiring filling for weather tight performance in vertical surfaces.
 - g. Surfaces in contact with bituminous materials in vertical surfaces.
 - h. Perimeters of frames of doors, windows, louvers, pipe penetrations.
2. Synthetic Rubber Sealing Compound (Polyurethane), Self-Leveling:
 - a. Use where indicated on the Drawings
 - b. Expansion and control joints in masonry, concrete horizontal surfaces, and metal panels in horizontal surfaces
 - c. Small voids between materials requiring filling for weather tight performance in horizontal surfaces
 - d. Surfaces in contact with bituminous materials
 - e. Perimeters of frames, louvers, pipe penetrations in horizontal surfaces.
3. Silicone:
 - a. Use where indicated on the Drawings.
 - b. Joints and recesses formed where window, door, louver and vent frames, and sill adjoin masonry, concrete, stucco, or metal surfaces.
 - c. Door threshold bedding.
 - d. Moist or wet locations, including joints around plumbing fixtures.
 - e. Plenum joints.
 4. Acrylic Latex:
 - a. Use where indicated on the Drawings.
 - b. Interior joints with movement less than 7.5 percent and not subject to wet conditions.

B. STORAGE AND HANDLING

1. Deliver, store, and handle products in accordance with manufacturer's recommendations.
2. Do not use material older than 6 months old. Store materials at temperatures lower than 80 degrees Fahrenheit

C. APPLICATION AND WORKMANSHIP

1. Surface Preparation:

- a. Allow concrete to cure at least 14 days prior to applying caulking
- b. Joints and spaces to be caulked or sealed shall be completely cleaned of all dirt, dust, mortar, oil and other foreign materials which might adversely affect the caulking work. Where necessary, degrease with an approved solvent or commercial degreasing agent. Surfaces shall be thoroughly dry before application of caulking compounds.
 - 1) Preparation of surfaces to receive caulking compound shall conform to the caulking manufacturer's specifications.
- c. All joints shall be enclosed on three sides. Where adequate grooves for caulking have not been provided, suitable grooves shall be provided to the depth required or as indicated on Drawings and without damage to the adjoining work. No grinding shall be required on metal surfaces.

2. Application:

- a. General: Do not apply sealant on wet or frosty surfaces or when surface temperature is higher than 120 degrees Fahrenheit or lower than recommended by the manufacturer. Caulking and sealants shall be applied by experienced mechanics using specified materials and proper tools.
- b. Priming: Concrete, masonry, and other porous surfaces, and any other surfaces if recommended by the manufacturer, shall be primed before applying caulking and sealants.
- c. Packing: Joints and spaces deeper than ½-inch shall be filled with packing to within ½-inch of the surface. Then the joints shall be filed with caulking compound. There shall be a minimum of 3/8-inch in depth of caulking compound in all joints ½-inch in depth or deeper.
- d. Caulking and Sealant Compounds: Compounds shall not be used when they become too jelled to be discharged in a continuous flow from the gun. Modification of compounds by addition of liquids, solvents, or powders will not be permitted.
- e. Tools and Workmanship: Compounds shall be applied with guns, knives or trowels as required. Fill all voids and joints solid. Caulk around entire perimeter of each opening, unless shown or specified otherwise.
- f. Finishing: Caulked and sealed joints shall be neatly pointed on flush surfaces, and internal corners. Excess material shall be cleanly removed. Caulking where exposed, shall be free of wrinkles and

uniformly smooth. Caulking and sealing shall be complete before final coats of paint are applied.

3. Cleaning: Clean surfaces of all materials adjoining caulked and sealed joints of any smears of compound or other soiling due to caulking applications.
- D. Miscellaneous Caulking and Sealing Work: The entire extent of caulking and sealing work is not necessarily fully or individually described here. Caulking shall be provided wherever required to prevent light leakage as well as moisture leakage.

END SECTION

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SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Field painting including surface preparation, surface protection, clean up, and/or other appurtenant work as indicated in the Contract Documents.
- B. All labor, materials, tools and equipment, and incidentals necessary and required for their completion.
- C. All pipe, fittings, and structures are to be field coated except for those specific exceptions contained in this specification or identified on the drawings. The painting schedule included at the end of this specification summarizes the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the drawings are used to show exceptions to the schedules, to extend the limits of coating systems, or to clarify or show details for application of the coating systems.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 05 12 00 – Structural Steel and Miscellaneous Metals
- C. Section 05 50 00 – Fabricated Metal
- D. Section 40 05 00 – Pipe and Fittings

1.3 SUBMITTALS

- A. Shop Drawings, Product Data, and Samples: as specified in the General Conditions and Section 01 33 00 – Submittals.
 - 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Performance criteria as required by the Engineer to determine quality.
 - c. Manufacturer's installation instructions and environmental parameters.
 - d. Material Safety Data Sheets.
 - e. Color samples. Color to be determined by Owner.

1.4 AIR QUALITY REGULATORY COMPLIANCE

- A. All paint shall conform to the applicable air quality regulations at the point of application. Any paint material which cannot be guaranteed by the manufacturer to comply, whether specified by product designation or not, shall not be used.
- B. The volatile organic compound (VOC) of coatings materials limits set forth in Rule 460.1 of the San Joaquin Valley Unified Air Pollution Control District shall apply to this project. The manufacturers' products listed in paragraphs 3.01 and 3.02 of this section have been selected on the basis of their apparent compliance with Rule 460.1; however, it shall remain the Contractor's responsibility to ensure that all coatings materials furnished are in compliance with all regulatory agencies.
- C. The product listed may meet the VOC requirement in the unthinned (as shipped) condition, but may exceed the VOC requirement if thinned to the manufacturer's allowable recommendations. In this situation, the product is not to be thinned beyond the limit indicated in Rule 460.1, and if the product cannot be suitably thinned for the intended application method or temperature requirements, it will be necessary to use another manufacturer's product subject to acceptance by the Engineer.
- D. It shall be the responsibility of the Contractor to ensure the compatibility of the field painting products which will be in contact with each other or which will be applied over shop painted or previously painted surfaces. Paint used in successive field coats shall be produced by the same manufacturer. Paint used in the first field coat over shop or field primed surfaces, or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint.
- E. All paint used for intermediate and finish coats shall be guaranteed by the paint to be lead-free and mercury-free.

1.5 QUALITY OF WORK

- A. All finishes shall be applied by skilled workmen in accordance with the best practices and standards of the painting trade. Brushes, rollers, all equipment, and the techniques used in applying finishes shall be of sufficient quality to assure the specified results. Work not conforming to this Specification shall be corrected by touching up or refinishing as directed by the Engineer.
- B. It is the purpose and intent of this Specification to cover the complete paint finishing of all exterior and interior surfaces as scheduled or specified and all surfaces which normally require a paint finish for corrosion resistance, weather protection, finished appearance or utility. Finished surfaces shall be of the type of finish, color sheen film thickness and quality specified.

1.6 DELIVERY AND STORAGE

- A. Painting materials shall be delivered to site in manufacturer's original containers with labels intact and seals unbroken. Painting materials and equipment shall be stored and protected against freezing and mixed in rooms assigned for that purpose. No chemicals, unauthorized thinners, or other materials, not included in the paint

formulation shall be added to the paint for any purpose. All necessary precautions shall be taken to prevent fire. Rags or waste soiled with paint shall be removed from premises at end of each day's work, or shall be stored in covered metal containers.

1.7 EQUIVALENT PRODUCTS

- A. Whenever a coating is specified using the name of a proprietary product or the name of a particular manufacturer or vendor, the specified coating shall be understood as establishing the type and quality of coating desired.
- B. Other manufacturers' products will be accepted provided sufficient information is submitted to allow the Engineer to determine that the coatings proposed are equivalent to those named. Proposed coatings shall be submitted for review in accordance with the Section 01 30 00 – Submittals.
- C. Requests for review of equivalency will not be accepted from anyone except the Contractor, and such requests will not be considered until after the contract has been awarded.
- D. Specific products for various applications shall be as specified in Part 2. In addition to the products named in Part 2, equivalent products of the following manufacturers will also generally be acceptable:

Ameron
Carboline
Devoe
PPG (Pittsburgh)
Sherwin Williams Co.
Sinclair
Tnemec
Valspar

- E. Contractor shall provide verification that equivalent products are acceptable for the desired application.

1.8 REFERENCE STANDARDS

- A. SSPC – Society of Protective Coatings, Pittsburgh, PA
- B. ASTM – American Society For Testing And Materials, West Conshohocken, PA

PART 2 PRODUCTS

2.1 GENERAL

- A. All paint shall be the product of a recognized manufacturer exclusively engaged in the manufacture of painting material. All paints for wood and metal surfaces shall be well-ground and shall not skin, liver, curdle, or body excessively in the containers.

- B. The paint shall not show laps or unevenness of color or texture. When applied to vertical surfaces, it shall not sag.
- C. All exposed surfaces, including sides and edges, shall be painted. Hangers, brackets, fastenings and other miscellaneous items shall be painted with the same system as the adjacent material. Paint systems shall be in addition to shop primers.
- D. Paint shall be stored inside and shall be protected against freezing. No adulterant, unauthorized thinner, or other material not included in the paint formation shall be added to the paint for any purpose.
- E. Paint used in successive field coats shall be produced by the same manufacturer. Paint used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint. Any paint system shall be the product of a single manufacturer.
- F. All paint used for intermediate and finish coats shall be guaranteed by the paint manufacturer to be lead-free, mercury-free, and fume-proof. Where paint materials are referenced to Federal or military specifications, the reference shall define general type and quality required but is not intended to limit acceptable materials to an exact formulation.
- G. For each paint, the Contractor shall follow the paint manufacturer's specific application instructions. Upon the Engineer's request, the Contractor shall furnish the following application instructions.
 - 1. Surface preparation recommendations.
 - 2. Type of primer to be used.
 - 3. Maximum dry and wet mil thickness per coat.
 - 4. Minimum and maximum curing times between coats.
 - 5. Thinner to be used with each paint.
 - 6. Ventilation requirements.
 - 7. Atmospheric conditions during which the paint shall not be applied.
 - 8. Allowable methods of application.
 - 9. Maximum allowable moisture content and minimum age of plaster, concrete and wood surfaces at time of paint application.
 - 10. Curing time before submergence in water.
- H. The minimum number of coats and minimum total dry mil thickness of the system for each surface shall be as specified in the paint schedule.

2.2 PAINTING SCHEDULE

- A. A schedule is appended to this section listing the surface preparation, primer, finish and dry mil thickness to be used on each surface to be coated.

2.3 PRIMERS AND PRETREATMENT

- A. P-1 Epoxy Primer – Minimum dry thickness 4 mils. Devoe "Bar Rust 235H", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600", or Tnemec 69-1211 "Hi-Build Expoxoline."
- B. P-2 Rust Inhibitive, non-submerged – Minimum dry thickness 3 mils. Devoe "Devran 203 Waterborne Epoxy Primer", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600" or Tnemec 135 "Chem Build."
- C. P-3 Rust inhibitive, submerged – Minimum dry thickness 4.0 mils. Devoe "Bar Rust 235H", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600" or Tnemec 136 "Chem Build."
- D. P-4 Primer for Wood – Maximum of 400 sq. ft/gal. Devoe 2010-1200 "Ultra- Hide Durus Exterior Acrylic Primecoat", Sherwin Williams "A-100 Wood Primer B42W41" or Tnemec 151 "Elaso-Grip."
- E. P-5 Wallboard Primer – Maximum of 400 sq. ft/gal. Devoe 1060-1200 "Ultra- Hide Latex Primer- Sealer", Sherwin Williams "Preprite 200 Interior Latex Primer B28W200", or Tnemec 51-792 "PVA Sealer."
- F. P-6 High Build Acrylic – Maximum of 100 sq. ft/gal., Tnemec 180 WB Tneme-Crete, Sherwin Williams "Heavy Duty Block Filler B42W46".

2.4 INTERMEDIATE AND FINISH PAINTS

- A. F-1 Epoxy Resin - Minimum dry thickness 5 mils. Devoe "Bar Rust 235H", Sherwin Williams "Macropoxy 646 FC Epoxy B58-600", or Tnemec 69 "Hi-Build" epoxy.
- B. F-2 Gloss Acrylic Emulsion - Minimum dry thickness 2.0 mils Devoe " Devflex 4208 Waterbone Acrylic Enamel", Sherwin Williams "Shercryl Hi Performance Acrylic Gloss B66-300", or Tnemec 1028.
- C. F-3 Semi-gloss Acrylic Emulsion - Minimum dry thickness 2.5 mils Devoe "Devflex 4216 HP Waterborne", Sherwin Williams "Shercryl Hi Performance Acrylic Semi-Gloss B66-350", or Tnemec 1029 "Tuf Cryl".
- D. F-4 High Build Epoxy (Substitute for Coal Tar) - Minimum dry thickness 6 mils. Devoe "Devtar 5A HS", Sherwin Williams "Targuard Coal Tar Epoxy B69B60", or Tnemec "V69F Black"
- E. F-5 Polyurethane O - Minimum dry thickness 2 mils. Devoe "Devthane 379H Aliphatic Urethane Gloss Enamel", Sherwin Williams "Hi Solids Polyurethane CA B65j-300", or Tnemec 1075 "Endurasheild."

- F. F-6 Acrylic Epoxy – Minimum dry film thickness 4 mils. Tnemec 113 Tneme-Tufcoat, Sherwin Williams “ Waterbased Tile Clad Epoxy B73-100”.
- G. F-7 High Build Acrylic – Maximum of 100 sq. ft./gal. Tnemec 180 WB Tneme-Crete, Sherwin Williams “Heavy Duty Block Filler B42W46”.

2.5 ALUMINUM SURFACES

- A. All aluminum in contact with steel or concrete: Sherwin Williams “Macropoxy 646 FC Epoxy B58-600 series or approved equivalent.

2.6 SURFACES NOT TO BE PAINTED

- A. Except as otherwise required or directed, the following surfaces are to be left unpainted:
 - 1. Exposed surfaces of aluminum.
 - 2. Polished or finished stainless steel. Unfinished stainless steel shall be painted.
 - 3. Nickel or chromium.
 - 4. Galvanized surfaces, except piping, conduit, electrical conduit, pipe supports, fasteners, hangers, bracing, brackets, and accessories.
 - 5. Rubber and plastics, including fiberglass reinforced plastics.
 - 6. Precast concrete.

PART 3 EXECUTION

3.1 PRELIMINARY EXAMINATION

- A. Notify the Engineer in writing of any uncorrected defects in surfaces to be painted. Do not proceed with the finishing of surfaces in question until any discrepancies are corrected. No work on any surface shall be started, unless the surface has been inspected and approved for painting by the Engineer.

3.2 SURFACE PREPARATION

- A. The Contractor shall prepare the surfaces to be coated as specified under the paint schedule. Any surfaces to be coated which are not listed under the paint schedule shall be prepared in accordance with the manufacturer's instructions for the material to be applied.
- B. All grease, oil, dirt, and other contaminants which may affect the bond between the coating and the surface shall be removed by a cleaning agent which will leave the surface clean and dry.

- C. Cleaning and painting operations shall be performed in a manner which will prevent dust or other contaminants from getting on freshly painted surfaces.
- D. Surfaces shall be free of cracks, pits, projections, or other imperfections which would prevent the formation of smooth, unbroken paint film, except for concrete block construction where a rough surface is an inherent characteristic.
- E. When applying touch-up paint, or repairing previously painted surfaces, the surfaces to be painted shall be cleaned and sanded or wire brushed in such a manner that the edges of adjacent paint are feathered or otherwise smoothed so that they will not be noticeable when painted. All paint made brittle or otherwise damaged by heat or welding shall be completely removed.
- F. Hardware items such as bolts, screws, washers, springs, and grease fittings need not be cleaned prior to painting if there is no evidence of dirt, corrosion, or foreign material.
- G. All galvanized surfaces shall have a metal conditioner applied prior to the first prime coat.
- H. All surfaces to be finished shall be clean and dry before any materials are applied. Use a moisture meter to determine moisture content as follows. The moisture content shall be less than 18% for wood; 8% for concrete or plaster.
 - 1. Metal Surfaces – Where noted, the surface preparation for steel and other metals refer to the specifications for surface preparation by the latest revision of the Steel Structures Painting Council. All metal work shall be cleaned of grease, oil and dirt by solvent cleaning (SSPC-SP1). Do not use hydrocarbon based solvents for cleaning prior to use of acrylic materials.
 - a. Method SP-2: Surface shall be wire brushed where required to remove loose rust and dirt, etc. (SSPC-SP2)
 - b. Method SP-3: Removal of loose rust, loose mill scale and other detrimental foreign matter to degree specified by power wire brushing, power impact tools or power sanders. (SSPC-SP3)
 - c. Method SP-6: Blast cleaning until at least two-thirds of each element of surface area is free of all visible residues. (SSPC-SP6)
 - d. Method SP-10: Sandblast to near white condition. This method shall remove all rust and scale, but streaks and shadows in the metal will be acceptable. (SSPC-SP10)
 - 2. Wood Surfaces
 - a. Method W-1: All unprimed millwork delivered to the jobsite shall be given the specified first coat on all surfaces immediately upon arrival. Give all unprimed woodwork the specified first coat as soon as possible following installation. Prime any wood surface that is to be in contact with concrete, or a caulking material, with the specified first

coat material before installation. Unless specified otherwise, all casings and trim, and all woodwork shall be free of oil, dirt, loose fibers, etc., sealed with a sanding sealer recommended by the coating manufacturer, and sanded smooth and dusted thoroughly before application of the priming coat. Give all knots, pitch pockets and sappy areas a preliminary coat of Dutch Boy Knot Sealer, or approved equivalent, prior to application of the prime coat.

3. Galvanized Surfaces

- a. Method G-1: All galvanized surfaces shall be prepared for painting in strict conformity with the instructions of the manufacturer. All galvanized shall be cleaned per SSPC-SP7.

4. PVC Pipe

- a. Method V-1: All wax and oil shall be removed from PVC plastic surfaces by wiping with a solvent of the type used for the specified primer.

3.3 *PAINT APPLICATION*

- A. Apply all finishes evenly, free from sags, runs, crawls, brush marks, skips or other defects. Apply products at the proper consistency and do not thin or otherwise alter them except in accordance with the manufacturer's printed directions. All coats shall be applied in such manner as to produce an even film of uniform thickness completely coating all corners and crevices. All painting shall be done by thoroughly experienced workmen.
- B. Care shall be exercised during spraying to hold the nozzle sufficiently close to the surfaces being painted to avoid excessive evaporation of the volatile constituents and loss of material into the air, or the bridging over of crevices and corners. Spray equipment shall be equipped with mechanical agitators, pressure gauges, and pressure regulators. Nozzles shall be of proper size. Floors, roofs, and other adjacent areas and installations shall be satisfactorily protected by drop cloths or other precautionary measures. All over-spray shall be removed by approved methods or the affected surface repainted. Care shall be exercised to avoid lapping of paint on hardware of other unscheduled surfaces.
- C. Each coat of material shall be thoroughly dry before the application of a succeeding coat. In no case shall paint be applied at a rate of coverage per gallon which is greater than the maximum rate recommended by the manufacturer. Paint films showing sags, checks, blisters, teardrops, or fat edges will not be accepted. Paint containing any of these defects shall be entirely removed and the surface repainted.
- D. Sandpaper enamels and varnishes lightly between coats and dust thoroughly before the application of a succeeding coat.
- E. If the finish coat is to be colored, the prime coat and the intermediate coat shall be tinted to have a slight variation in color from each other and from the finish coat.

3.4 PRIMING

- A. Edges, corners, crevices, welds, and bolts shall be given a brush coat of primer before the specified spot or touch-up painting of metal surfaces. Special attention shall be given to filling all crevices with paint.
- B. Abraded and otherwise damaged portions of shop applied paint shall be repainted. Welded seams and other uncoated surfaces, heads and nuts of field installed bolts, and surfaces where paint has been damaged by heat, shall be given a coat of the specified primer. This patch, spot, or touch-up painting shall be completed, and shall be dry and hard, before additional paint is applied.

3.5 LATEX PAINT

- A. Latex paint shall be applied by brushing or rolling; spraying is not permitted. Latex paint shall not be thinned excessively.

3.6 MIXING AND THINNING

- A. Paint shall be thoroughly mixed each time any is withdrawn from the container. Paint containers shall be kept tightly closed except while paint is being withdrawn.
- B. Unless otherwise authorized, all paint shall be factory mixed to proper consistency and viscosity for hot weather application without thinning. Thinning will be permitted only as necessary to obtain recommended coverage at lower application temperatures. In no case shall the wet film thickness of applied paint be reduced, by addition of paint thinner or otherwise, below that represented by the recommended coverage rate.

3.7 FILM THICKNESS FOR FERROUS METALS

- A. It is intended that the dry film thickness and the continuity of painted ferrous metal surfaces be subject to continual field check by the Engineer. Dry film thickness shall be measured by the Contractor, using an approved Thickness Gauge, at locations selected by Engineer. Testing equipment provided shall be provided by Contractor and kept on site.
- B. Measurement of dry coating thickness shall conform with paint application Standard SSPC-PA2
- C. Thickness and Holiday Checking: Thickness of coatings and paint shall be checked with a non-destructive, magnetic type thickness gauge.
- D. Holiday Checking of all interior coated surfaces shall be tested with an approved holiday detection device. Non-destructive holiday detectors shall not exceed 100 volts nor shall destructive holiday detectors exceed the voltage recommended by the manufacturer of the coating system. For thicknesses between 10 and 20 mils (0.25mm and 0.50mm) a non-sudsing type wetting agent such as Kodak Photo-Flo, shall be added to the water prior to wetting the detector sponge. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations and re-tested. No pinholes or other irregularities will be permitted

in the final coating. Holiday detection devices shall be operated in the presence of the Engineer.

- E. Continuity shall be tested by a low voltage-wet sponge per RPO 188. Contractor shall perform continuity tests as required by the Engineer on surfaces that will be submerged.

3.8 *ATMOSPHERIC CONDITIONS*

- A. Apply all material to dry and properly prepared surfaces when weather conditions are favorable for painting. No materials shall be applied when the temperature of the materials is below 50° F, or when the temperature of the air, surface to be painted or substrate, is below (or likely to fall below) 50° F. Final ruling on the favorability of weather conditions shall be in accordance with the recommendations of the manufacturer and/or the Engineer.
- B. No coating or paint shall be applied to wet or damp surfaces, in rain, snow, fog, or mist, when the steel temperature or surrounding air temperature is less than five degrees above the dew point, nor in conditions not recommended by the manufacturer.

3.9 *REPAIRING DAMAGED PAINT ON EQUIPMENT*

- A. Painted surfaces on equipment, which have become damaged prior to acceptance by the Owner, shall be repainted with the same or equivalent paint used in the original application.

3.10 *PROTECTION OF SURFACES*

- A. Throughout the work the Contractor shall use drop cloths, masking tapes, and other suitable measures to protect all surfaces from accidental spraying, splattering, or spilling of paint. Contractor shall be liable for and shall correct and repair any damaged condition resulting from its operations or from the operations of all those who are responsible to the Contractor during the time its work is in progress and until the work is accepted. In case bituminous paints are spilled or dropped on any material except metals, the spots shall, after surface cleaning, be spot painted with aluminum paint prior to applying the specified paint. Any exposed concrete or masonry not specified to be painted which is damaged by paint shall be either removed and rebuilt or, where so authorized by the Owner, painted with two coats of masonry paint.

3.11 *CLEANUP*

- A. All cloths and cotton waste which might constitute a fire hazard shall be placed in metal containers or destroyed at the end of each work day. Upon completion of the work all staging, scaffolding and containers shall be removed from the site or destroyed in a manner approved by the Engineer.

3.12 PAINTING SCHEDULE

<u>SYSTEM</u>	<u>SURFACE</u>	<u>FINISH</u>			
		<u>SURF. PREP.</u>	<u>PRIME COAT</u>	<u>2ND COAT</u>	<u>3RD COAT</u>
1.	New ferrous metal in submerged or damp environment including all submerged mechanical components.	SP-10	P-1	F-1	F-1
2.	All exterior exposed new structural and miscellaneous steel. All exterior exposed surfaces of new piping, pumps, motors, electrical equipment and other unsubmerged mechanical and structural items.	SP-2 or 3	P-2	F-2	F-2
3.	All surfaces of new structural and miscellaneous steel pipe, pumps, motors and electrical equipment panels exposed inside building.	SP-6	P-2	F-3	F-3
4.	All interior exposed new galvanized metalwork including electrical conduit inside buildings, including fittings, boxes, supports and accessories.	G-1	P-3	F-3	F-3
5.	All exterior exposed new galvanized metalwork including roof flashings and other architectural items.	G-1	P-3	F-2	F-2
6.	Exposed new PVC piping	V-1	F-5	F-5	

<u>SYSTEM</u>	<u>SURFACE</u>	<u>FINISH</u>			
		<u>SURF. PREP.</u>	<u>PRIME COAT</u>	<u>2ND COAT</u>	<u>3RD COAT</u>
7.	All new buried valves and flanged joints and other buried miscellaneous ferrous piping and metal surfaces (excluding case iron pipe). All exterior surfaces of new cast iron and steel piping exposed in manholes, wet wells and similar locations, including valves, fittings, flanges, bolts, supports, and accessories. Miscellaneous new castings, including manhole rings and covers and manhole steps. (One coat, if not foundry dipped.)	SP-10	F-4	F-4	
8.	Interior wood	P-4	F-2	F-2	
9.	Exterior wood	P-4	F-3	F-3	
10.	Interior dry wall	P-5	F-6		
11.	Exterior concrete block	P-6	F-7		
12.	Concrete	P-6	F-7		

3.13 *CONFLICTS*

- A. When conflicting painting specifications or requirements are encountered in the contract documents, the more restrictive specifications or requirements shall be required.

END SECTION

SECTION 31 11 00 CLEARING AND GRUBBING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of clearing, grubbing, removing, and disposing of trees, roots, vegetation and miscellaneous debris on the ground surface.

1.2 RELATED WORK

- A. Section 01 57 23 – Storm Water Pollution Prevention Plan
- B. Section 01 57 27 – Dust Control
- C. Section 02 41 00 – Demolition
- D. Division 31 – Earthwork

1.3 REGULATORY REQUIREMENTS

- A. Dispose of removed materials in a legal manner at an approved disposal facility.

1.4 REFERENCES

- A. Section 15 – Existing Facilities, State Standard Specifications
- B. Section 19 – Earthwork, State Standard Specifications

1.5 DEFINITION

- A. **Unsuitable Material:** Unsuitable material is material determined to be:
 - 1. Impossible to compact to specified density using ordinary methods at optimum moisture content.
 - 2. Material containing trash, debris, oversized material or other foreign and objectionable materials. Areas within the recharge basin area without vegetation but that contain drip tape trash is considered Top Soil material and shall be placed in the bottom of the stockpile areas as shown on the Plans. Stockpiled soil cement shall be crushed and placed in the bottom of the stockpile areas along with the Top Soil material as shown on the Plans.
 - 3. Incapable of being compacted to Specified density using ordinary methods at optimum moisture content.
 - 4. Too wet to be properly compacted if circumstances prevent satisfactory in-place drying prior to incorporation into the work.

5. Non-native material containing a significant amount of permeable materials, such as sand or rock, that cannot be blended with other material and requires to be off hauled.
6. Expansive clays that cannot be mixed or treated and requires to be off hauled.
7. Otherwise unsuitable for the planned use.

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

- A. Clear the recharge basin area and specified stockpile areas by removing all existing improvements as described in Section 02 41 00 – Demolition, removing vegetative growth in areas not disced such as weeds, shrubs, roots, brush, and similar material, and removing gravel on the former wastewater pond levees.
- B. Grub the specified areas below the natural ground surface to a depth necessary to remove all boulders, stumps, roots, buried logs, and other objectionable material including rock and concrete.

3.2 PRESERVATION

- A. Not used.

3.3 SALVAGE EQUIPMENT

- A. Salvaged equipment shall be delivered to the Owner at a designated site.
- B. Equipment to be salvaged is designated in Section 02 41 00 – Demolition.

END SECTION

SECTION 31 23 00
EARTHWORK

PART 1 GENERAL

1.1 WORK INCLUDED

- A. All earthwork performed under this contract shall conform to the General Requirements set forth in this section, unless otherwise specified in other sections.
- B. Excavate earth and rock as necessary to allow the installation or construction of various items of work not including trenching, bedding, and backfill for utilities, regardless of character and subsurface conditions. Rock is defined in this section as any material in excavated areas that cannot be ripped and removed by conventional excavating equipment. In case of conflict with the determination of rock excavation, the Engineer shall have the final decision.
- C. Furnish all equipment, labor, and materials required for removal of rock from excavations. At the Contractor's option, rock removal may be done by mechanical equipment (hydraulic or pneumatic breakers).
- D. Haul, place, rough grade, compact, and finish grade excavated on-site material as engineered fill on those portions of the project site where it is necessary in order to construct the facilities, other than utilities, indicated on the Plans. This includes under structures and preparation of subgrade for concrete; drive roads as well as embankments.
- E. Dispose of unsuitable backfill material off-site or in designated areas, as directed by the Engineer.
- F. Prepare fill for compaction testing.

1.2 RELATED WORK

- A. Section 01 57 23 – Storm Water Pollution Prevention Plan
- B. Section 01 57 27 – Dust Control
- C. Section 03 30 00 – Cast-In-Place Concrete
- D. Section 31 11 00 – Clearing and Grubbing
- E. Section 31 23 17 – Trenching, Backfilling, and Compacting
- F. Section 31 23 35 – Disposal of Materials
- G. Section 32 11 23 – Aggregate Base

1.3 REFERENCES

- A. ASTM International (ASTM)
 - 1. C136 – Sieve Analysis of Fine and Coarse Aggregates
 - 2. D75 Standard Practice for Sampling Aggregates
 - 3. D1556 – Density of Soil and base rock in Place by Sand-Cone Method
 - 4. D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop
 - 5. D6938 – Density of soil and base rock in place by Nuclear method
 - 6. D2937 – Density of soil and in place by Tube method
- B. California Department of Transportation
 - 1. Section 15 – Existing Facilities, State Standard Specifications
 - 2. Section 18 – Dust Palliatives, State Standard Specifications
 - 3. Section 19 – Earthwork, State Standard Specifications
 - 4. Section 26 – Aggregate Bases, State Standard Specifications
- C. Code of Federal Regulations
 - 1. 29CFR1926, Subpart P – Excavations

1.4 SUBMITTALS

- A. Submit plans as required for worker protection against caving ground in excavations. Submittals shall be in accordance with Section 01 33 00 – Submittals Procedures.
- B. Submittals shall be in accordance with the Standard General Conditions and the Supplementary Conditions.
- C. Description of methods and equipment to be used for rock removal.

1.5 SAMPLES

- A. Submit samples under provisions of Section 01 43 00 – Quality Control and Testing.
- B. Submit 10 lb sample of each type of fill to testing laboratory, in airtight containers.

1.6 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.

1. Trenches shall have sloping, sheeting, shoring, and bracing conforming with 29CFR1926, Subpart P – Excavations, CAL/OSHA requirements, and the Contract Documents.
- B. Notify Engineer of unexpected subsurface conditions.
- C. Underground utilities may exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
- D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- E. Grade excavation top perimeter to prevent surface water run-off into excavation.

1.7 CONTROL AND DIVERSION OF WATER

- A. The Contractor shall furnish or procure all materials and labor required for constructing and maintaining all necessary cofferdams, channels, flumes, drains, sumps, and/or other temporary diversion and protective works and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work and for maintaining the foundations and other parts of the work free from water.
- B. Prior to beginning any work on the removal of water from foundations, the Contractor shall submit for the Engineer's approval a water control plan showing his proposed method for the removal of water from foundations and other parts of the work.
- C. Devices to control and divert water shall be adequately filtered to prevent the removal of fines from the soil.
- D. Repair any damage caused by the failure of any part of equipment to control and divert water. Remove temporary equipment to control and divert water when no longer needed for dewatering purposes.
- E. Provision of equipment to control and divert water shall be considered part of the project with no additional compensation allowed.
- F. Any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the Owner.

1.8 QUALITY ASSURANCE

- A. Compaction Testing:
 1. All compaction testing and reports shall be in accordance with Section 01 43 00 – Quality Control and Testing.
 2. Compaction tests will be performed for each lift or layer.
 3. Tests for compaction shall conform to ASTM D1557.

4. Compaction testing will be performed in accordance with State Standard Specifications, Section 19-6.03.
 5. Sample backfill materials per ASTM D75.
- B. In-Place Density:
1. Compacted backfill for structures and structure foundations: At least one test per lift or per 500 cubic yards placed, whichever is more frequent.
 2. Subgrade preparation including scarification and re-compaction of native soils: At least 1 test per lift per 1,000 sf of surface area or 500 cubic yards of fill placed, whichever is more frequent
 3. Embankments and building pads: At least 1 test per lift per 1,000 sf of surface area or every 200 lineal foot of embankment, or 2000 cubic yards of fill placed, whichever is more frequent.
 4. A greater frequency of testing may be required at the start of work or when new materials, crews, or equipment are introduced to the site. A lesser frequency can be utilized if approved by the Owner's Representative.
- C. Laboratory Index Testing:
1. Compacted backfill for structures, structure foundations: Maximum dry density and optimum moisture content, Plasticity Index, and Gradation (when applicable) shall be confirmed at least once for every 2,500 cubic yards of fill placed.
 2. Test every 10,000 square feet of engineered fill or aggregate base material placed for roadway embankment.
 3. In addition, at least one set of applicable index tests shall be performed for each distinct material type used as compacted fill at the site.
 4. Additional tests may be performed, as directed by the Owner's Representative, whenever deviations in material properties or quality of workmanship are suspected.
 5. Where compaction tests indicate failure to meet the specified compaction, the Contractor will rework the entire failed area until the specified compaction has been achieved at no cost to the owner.

1.9 DEFINITION

- A. Unsuitable Material: Unsuitable material is material determined to be:
1. Impossible to compact to specified density using ordinary methods at optimum moisture content.
 2. Material containing trash, debris, oversized material or other foreign and objectionable materials. Areas within the recharge basin area without

vegetation but that contain drip tape trash is considered Top Soil and shall be placed in the bottom of the stockpile areas as shown on the Plans. Stockpiled soil cement shall be crushed and placed in the bottom of the stockpile areas along with the Top Soil material as shown on the Plans.

3. Incapable of being compacted to Specified density using ordinary methods at optimum moisture content.
4. Too wet to be properly compacted if circumstances prevent satisfactory in-place drying prior to incorporation into the work.
5. Non-native material containing a significant amount of permeable materials, such as sand or rock, that cannot be blended with other material and requires to be off hauled.
6. Expansive clays that cannot be mixed or treated and requires to be off hauled.
7. Otherwise unsuitable for the planned use.

1.10 PROJECT CONDITIONS

- A. Underground utilities exist at this site, including an AT&T cable in the shoulder of Elkhorn Avenue. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
 1. Contractor to field verify depth and alignment of the existing AT&T cable. Maintain 0.5 ft clearance with proposed pipeline crossings.
- B. Arrange construction sequences to provide the shortest practical time that trenches will be open to avoid hazard to the public, and to minimize the possibility of trench collapse.
- C. Obtain all required permits and licenses before installing utilities and follow the rules and requirements of the authority having jurisdiction.

1.11 EXCAVATION CLASSIFICATION

- A. Expected material that will be excavated at this site has been identified in the Geotechnical Report.
- B. Regardless of the nature of material excavated, all excavation will be considered unclassified.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All backfill material shall be approved before use and be free of cinders, ashes, ice, frozen soil, large hard clods, organic debris, or other deleterious items.

- B. Engineered fill materials for all fill areas shall be as required by State Standard Specifications, Section 19-6.
- C. Fill for use in construction of levee embankments should be non-expansive, free of organic matter and granular in nature, within the following limits:

<u>Sieve Size</u>	<u>Percent Passing</u>
3 in.	100
1 1/2 in. (<i>For Structure Areas</i>)	95
No. 200	40
Liquid Limit	<40
Plasticity Index	<14
Expansion Index	<20

- D. All materials for levee embankments shall be non- to low-corrosive in nature.
- E. Before importing borrow, use all suitable material obtained from excavation work and recycling operations (if used). See Section 32 11 23 – Aggregate Base.
- F. Existing Embankment Materials / On-Site Material for Levee Construction
 - 1. Material for embankment construction shall be free from frozen material, debris, muck, detrimental quantities of organic materials, and other unsuitable materials. Only granular materials will be allowed. In addition, suitable material for embankments shall be able to be compacted to specified density using ordinary methods at optimum moisture. The presence of excessive moisture in otherwise suitable material is not, by itself, sufficient cause for determining that the material is unsuitable. The Contractor shall be responsible for aeration of excavation or embankment to satisfactory moisture content for compaction.
 - 2. All embankment and backfill material will be subject to approval by the Engineer.
- G. Material used for the canal embankment fill shall meet the following requirements:
 - 1. Consist of non-expansive soil (EL < 20).
 - 2. Consist of less than 3 percent organic content by weight.
 - 3. Contain a minimum fines content of 20%.
 - 4. Contain no rocks greater than 3-inches in dimension.
 - 5. Maximum Plasticity Index (PI) of 14.
 - 6. If expansive clays (PI greater than 20) are present, the material shall be mixed with lower plasticity material and/or treated with lime. If non-plastic material (PI less than 10) is present, the material shall be blended with higher plasticity material. The determination of the presence of high plasticity or low plasticity

material that will require treating and/or blending will be at the discretion of the Owner's Representative.

H. Aggregates:

1. Class 2 Aggregate Base: material as specified for 3/4" maximum grading in the State Standard Specifications, Section 26.
2. Material from concrete crushing operations may be used as granular backfill provided it meets the above requirements.
3. Gravel: Pit run, natural stone; free of shale, clay, friable materials and debris; graded in accordance with 1-1/2" x 3/4" aggregate grading in Section 90-1.02C, State Standard Specifications.

I. Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; No. 8 minimum to 3/8" maximum size per SSS Section 90-10C(4)(a).

J. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter, graded in accordance with ANSI/ASTM C136 within the following limits:

<u>Sieve Size</u>	<u>Percent Passing</u>
No. 4	75-100
No. 200	0-10

K. *CONCRETE SLURRY:*

Concrete slurry mix shall be as specified in Section 03 30 00 – Cast-in-Place Concrete.

L. ENGINEERED FILL MATERIAL UNDER STRUCTURES

1. Native granular soil materials may be used as engineered fill. Pulverized asphalt concrete or Portland cement concrete may be incorporated into engineered fill provided no rock pockets or voids are produced. Particles larger than three inches shall be removed from trench backfill, particles larger than six inches shall be removed from engineered fill.
2. All imported fill material placed in structural areas shall consist of predominantly granular soil that is non-expansive, and shall be approved by the Engineer prior to use.

2.2 WATER

A. As specified in Section 01 51 36 – Watering.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

- A. As specified in Section 31 11 00 – Clearing & Grubbing.

3.2 GROUND SURFACE PREPARATION

- A. Before excavation for and placing basin levee embankment, conveyance channel embankment, and compacted stockpile areas, complete all clearing, grubbing, and topsoil stripping. Scarify and re-compact the stripped ground to 90% maximum density surface. The scarification depth below new embankments and stockpile area shall be eight inches (8") as indicated on the Plans. Site stripping material shall be blended with other suitable fill material for reuse in project areas as indicated on the Plans.

3.3 INSPECTION

- A. Verify stockpiled fill to be reused is approved.
- B. Verify areas to be backfilled are free of debris, ice, or water, and ground surfaces are not frozen.

3.4 GENERAL

- A. Provide required shoring, sheeting, and slope layback necessary to protect the excavation, as needed, for the safety of the employees and as required by applicable State and Federal laws. Provide suitable barricades for public safety, regardless of trench depth.
- B. Upon completion of excavation and before placing forms or structures, notify the Engineer who will inspect the excavation and may take tests to determine soil-bearing values.
- C. Identify required lines, levels, contours, and datum.
 - 1. Stake and identify the extent of all earthwork operations prior to starting work.
- D. Use suitable material removed from excavation before placing backfill.
- E. Verify areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.
- F. Areas under structures or levee embankments shall be compacted to 90 percent of maximum density or 95 percent for Class 2 Ag Base below structures as shown on the Plans.
- G. Compacted stockpile areas and all other fill and disturbed surfaces shall be compacted to a minimum of 90 percent relative compaction unless noted otherwise.
- H. Contractor shall try to minimize compaction of the final recharge basin floor as much as possible.

3.5 *PREPARATION*

- A. Identify required lines, levels, contours, and datum.

3.6 *MOISTURE CONTROL*

- A. Water development, hauling, and application shall be in accordance with State Standard Specifications Section 10-6, Watering.

3.7 *EXCAVATION*

- A. Excavate the specified areas to construct the conveyance channel and the compacted stockpile areas to the lines and grades as shown on the Plans or as directed by the Engineer. The western portion of the basin area is to be excavated to elevation 231.0. The eastern portion of the basin area shall be excavated to construct the Base Bid items and further excavation shall occur if any Add Alternate bid items are awarded. The amount of excavation required to construct the Base Bid items and any Add Alternate bid items will depend on the actual consolidation and waste factor at the time of construction. The lines and grades shown for the eastern portion of the basin area and the quantities shown in the Bid Schedule assume a consolidation factor of 25%. If the actual consolidation and waste factor is different than 25%, the earthwork quantities will be increased or decreased accordingly as needed for construction of the compacted stockpile areas, basin levees and conveyance channel embankments to the lines and grades shown and specified as detailed in the Plans and Specifications.
- B. Place excavated material in basin levees, conveyance channel embankments, and compacted stockpile areas as shown in the Plans or as directed by Engineer. If Add Alternate bid item is awarded, place excess excavated material in area shown in the Plans or as directed by Engineer.
- C. If the Plans require placement of fill prior to pipe, or structure excavation, the fill shall first be constructed to the design grade shown for a distance each side of the pipe or structure of not less than five times the diameter of the pipe or the width of the structure after which the trench shall be excavated and the pipe or structure installed.
- D. Excavate for all foundations, slabs, and/or levee embankments. Remove any bushes, shrubs, stumps, roots, buried objects, or any objects that interfere with construction of structure foundations, or as required by the Engineer.
- E. Over excavation shall be required a minimum of 2 feet below all concrete structures, unless shown otherwise on the Plans.
- F. Beneath structures and levees, the exposed surface shall be scarified to a depth of eight inches, conditioned to optimum moisture content and compacted to at least 90 percent of the maximum dry density.
- G. If any existing foundations, roots, stumps, debris, waste materials, pipes, or similar items have been removed, the Contractor shall excavate below these portions to

solid undisturbed earth and foundations in these areas shall be built to necessary levels.

- H. If soil conditions in excavations are not in accordance with the geotechnical report and seem to indicate that footings need not be carried down as deep as shown, or must be carried deeper, the changes shall be made by the Contractor after approval by the Engineer.
- I. Engineered fill in over excavated areas shall be onsite fill material, free from organic materials or deleterious substances.
- J. For Canal excavation:
 - 1. Care shall be taken to prevent over breakage or loosening of material on bottoms or side slopes upon or against which lining is to be placed. Where the original ground surface is below the grade of the canal, the bottom of the canal shall be over filled, compacted, and subsequently trimmed to the underside of the lining as prescribed for constructing and compacting the canal embankments.
 - 2. Except as provided below, the canal shall be excavated to a subgrade and section as shown on the drawings to provide for the prescribed thickness of lining.
 - 3. If hardpan is penetrated during the excavation of the canal prism, the entire cross-section shall be lime treated to a depth of at least 2 feet, perpendicular to the finished surface.
 - 4. Where unsuitable material is encountered in the foundation, the material will be quantified by both the Owner's Representative and the Contractor, then the Contractor shall perform additional excavation to remove the unsuitable material and the unsuitable excavated material shall be wasted in accordance with Section 31 23 35 – Disposal of Materials.
 - 5. Areas of additional excavation shall be refilled with suitable material to the canal invert as prescribed for constructing and compacting canal and levee embankments. "Unsuitable Material" shall not be construed to be material in which moisture content is outside parameters established by these Specifications for acceptable foundation.
 - 6. The Contractor shall not be entitled to any additional allowance above the unit prices in the bid schedule on account of needing additional time for drying material; for rehandling excavated materials which have been deposited temporarily in stockpiles; delays or increased costs due to handling wet material; poor trafficability on the excavated areas, the haul roads, or the embankment; reduced efficiency of the equipment the Contractor elects to use; or on account of any other operations or difficulties caused by overly wet materials. No additional allowance above the unit prices bid in the schedule will be made because of variation in the proportions of wet and dry materials which are required to be excavated in order to obtain adequate suitable material.

7. Roads and Ramps

- a. In conjunction with construction of canal and levee embankments, construct access roads and earth ramps adjacent to the canal and structures. Place material from excavations as embankments for the roads and ramps.
- b. Where the width of a road is not shown in the Drawings it shall have width of not less than 15 feet. The work required for construction of access roads and for earth ramps shall include grading to a uniform surface equivalent to that obtainable with a motor grader to provide for safe travel with a two-wheel-drive automobile.

3.8 *ENGINEERED FILL AND EMBANKMENT CONSTRUCTION*

- A. Cut out soft areas of subgrade beneath roadways not readily capable of in-situ compaction. Backfill with Type A or Type B material and compact to density equal to requirements for subsequent backfill material.
- B. Unless otherwise noted, placement and compaction of engineered fill materials for all fill areas shall be performed according to the provisions of the State Standard Specifications, Section 19-6. Section 19-6.02A shall be amended to say that large rocky material or hard lumps larger than three inches in greatest dimension will not be allowed.
- C. Before placing embankment, scarify ground surface to a minimum depth of eight inches (8") to provide ample bond between old and new material, as shown on the Plans. Place embankment material in layers not exceeding eight inches, loose measurement.
- D. When necessary, compact subgrade surfaces to density requirements for roadway embankment backfill material.
- E. Use only unfrozen materials. Where compacting of earth materials is required, the materials shall be deposited in horizontal layers not more than eight inches thick. Compact each layer before placing the next layer. As the compaction of each layer progresses, continually level and manipulate to ensure uniform moisture and density. Add water to obtain optimum moisture content. Removal of excess water shall be accomplished through aeration by plowing, blading, disking, or other methods satisfactory to the Engineer. The excavation, placing, moistening, and compacting operations shall be such that the material will be uniformly compacted and will be homogeneous, free from lenses, pockets, streaks, voids, and laminations or other imperfections such that the materials when compacted will be blended sufficiently to secure the highest practicable density.
- F. Insofar as practicable, as determined by the Owner's Representative, moistening of the material shall be performed at the site of excavation; but if necessary, such moistening shall be supplemented by sprinkling at the site of compaction.
- G. Moisture Content for Clayey and Silty (Cohesive) Materials:

1. Prior to and during compaction operations, the materials shall have an above optimum moisture content, but not greater than three percentage points of optimum moisture content, and the moisture content shall be uniform throughout each layer. The optimum moisture content is defined as that moisture content which will result in the laboratory maximum dry density of the soil as determined using ASTM D1557.
 2. If the moisture content is less than optimum for compaction or is greater than optimum for compaction by more than three percentage points, the compaction operations shall not proceed, except with the specific approval of the Owner's Representative, until the material has been wetted or allowed to dry out, as may be required, to obtain a moisture content within the tolerances permitted above, and no adjustment in price will be made on account of any operations of the Contractor in wetting or drying the materials or on account of any delays occasioned thereby.
- H. Moisture Content for Cohesionless Free-draining Materials: Prior to and during compaction operations, the materials shall have a moisture content at least equal to the optimum moisture content and shall be uniform throughout each layer. The optimum moisture content is defined as that moisture content which will result in the laboratory maximum dry density of the soil as determined using ASTM D1557 (or ASTM D698).
- I. When the material has been conditioned as herein before specified, it shall be compacted by rollers or by hand or power tampers. Where hand or power tampers are used to compact soils in confined areas such as under pipe, they shall be equipped with suitably shaped heads to obtain the required density.
- J. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.
- K. Employ a placement method that will not disturb or damage underground pipe or conduits.
- L. Water packing or jetting shall not be allowed for compaction of any backfill.
- M. **ROLLERS**
1. Rollers used for compacting earth materials shall have staggered and uniformly spaced tamping feet and be of sufficient weight for proper compaction.
 2. The tamping heads and cleaner bars shall be properly maintained, and the spaces between the tamping feet shall be kept clear of materials which impair the effectiveness of the tamping rollers.

3.9 EXCAVATION FOR CONCRETE STRUCTURES

- A. Identify required lines, levels, contours, and datum.
1. Stake and identify the extent of all earthwork operations prior to starting work.

- B. Carefully excavate to the established lines and grades shown on the drawings, or as revised and approved by the engineer, to provide a firm, uniform, and unyielding foundation for the proposed structures.
- C. Excavations for all footings, piers, finished walls and grade beams shall be sufficiently large so that forms for concrete may be properly placed, removed, and inspected.
 - 1. Excavation for footings may be made to the net footing size plus two inches if the earth banks are sufficiently stable to remain in position until the concrete is in place and if approved by the Engineer.
- D. The bottoms of footings, piers, slabs, walls, and grade beams to receive concrete shall be level before placing concrete. All foundations shall rest on firm bearing in undisturbed soil, or on controlled compacted fill.
 - 1. The exposed subgrade surface shall be scarified to a depth of 8 inches, conditioned to optimum moisture content and compacted to at least 90 percent of the maximum dry density.
- E. Provide required shoring, sheeting, and slope layback necessary to protect the excavation, as needed, for the safety of the employees and as required by applicable State and Federal laws. Provide suitable barricades for public safety, regardless of trench depth.
- F. Upon completion of excavation and before placing forms or structures, notify the Engineer who will inspect the excavation and may take tests to determine soil-bearing values. If soil conditions in excavations are not in accordance with the geotechnical report and seem to indicate that footings need not be carried down as deep as shown, or must be carried deeper, the changes shall be made by the Contractor after approval by the Engineer.
 - 1. Over excavation shall be required a minimum of 2 feet below all concrete structures, unless shown otherwise on the Plans.
 - 2. Engineered fill in over excavated areas shall be onsite fill material, free from organic materials or deleterious substances.
- G. Use suitable material removed from excavation before placing backfill.
- H. Verify that stockpiled fill to be reused is approved by the Engineer.
- I. Verify areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.
- J. Unless otherwise shown in the Plans, all backfill shall conform to Section 19-3 of the State Standard Specifications.
- K. Do not place backfill against concrete until concrete has cured sufficiently to accept the load as determined by Section 19-3.03E of the State Standard Specifications.

- L. Place and compact common fill material in continuous layers not exceeding eight inches loose depth.
- M. Employ a placement method so not to disturb or damage pipes or utilities.
- N. Maintain optimum moisture content of backfill materials to attain required compaction density.

3.10 TRENCH EXCAVATION AND BACKFILLING

- A. Refer to Section 31 23 17 – Trenching, Backfilling, and Compacting.

3.11 UTILITY INSTALLATION

- A. Utility Installation: Shape the trench bottom to ensure uniform contact with the full length of the installed line and remove any sharp-edged materials that might damage the line. Compaction shall be maintained beneath the line.

3.12 SAND CEMENT SLURRY, CONCRETE ENCASEMENT AND THRUST BLOCKS

- A. Concrete
 - 1. Place as shown on the Plans and in accordance with Section 03 30 00 – Cast-In-Place Concrete.
- B. Slurry Cement
 - 1. Slurry Cement is also referred to as Controlled Low Strength Material (CLSM).
 - 2. Place as shown on the plans and in accordance with State Standard Specifications, Section 19-3.03F.

3.13 CONTROL OF WATER

- A. The contractor shall keep all excavation free from water. Furnish, install, maintain, and operate all necessary pumping and other equipment for dewatering of excavations. The contractor shall at all times have on the project sufficient pumping equipment for immediate use, including stand by pumps for use in case other pumps become inoperable
- B. The dewatering operation shall be continuous, so that the excavated areas are kept free from water during the construction, until backfill has been placed to a sufficient height to anchor the work against possible floatation.
- C. Dewatering devices shall be adequately filtered to prevent the removal of fines from the soil.
- D. Repair any damage caused by the failure of any part of the protective works. Remove temporary protective works when they are no longer needed for dewatering purposes.

- E. Any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the owner.
- F. Provision of dewatering and dewatering equipment shall be considered part of the project with no additional compensation allowed.

3.14 SURPLUS MATERIAL

- A. Unless otherwise specified, surplus excavated material shall be used to uniformly flatten basin floor slopes.

3.15 SHORING AND SHEETING

- A. Construct and maintain all shoring, sheeting, and slope layback necessary to protect the excavation, as needed, for the safety of the employees and as required by applicable State and Federal laws. Provide suitable barricades for public safety, regardless of trench depth.

3.16 DEWATERING

- A. Refer to Section 31 23 19 – Dewatering.

3.17 UNSUITABLE MATERIAL

- A. Unsuitable material shall be excavated and disposed of in a lawful manner off the project site in accordance with Section 31 23 35 – Disposal of Materials. All disposal shall be approved by the Engineer prior to initiating the work.

3.18 SURFACE FINISH WORK

- A. Open Areas: Grade all disturbed areas, blending with adjacent terrain without a noticeable break. Bring all sub-grades to specified contours, even and properly compacted.
- B. Drainage Swales: Restore drainage ditches and grade swales to appropriate line and grade, using approved surface erosion prevention techniques and as indicated on the Contract Documents.
- C. Clean Up: Remove all rubbish and excess material for disposal as approved, and leave area in a neat, satisfactory condition.

3.19 TOLERANCES

- A. Tolerances are defined as allowable variations from specified lines, grades, and dimensions. The intent of this paragraph is to establish tolerances that are consistent with modern construction practice, yet are governed by the effect that permissible variations may have upon the construction.
- B. Variations from specified lines, grades, and dimensions:

Finish Grading Tolerance:	±0.10 foot
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When subbase of base material to be placed on the grading plane is to be paid for by the ton, the grading plane at any point shall not vary more than	±0.10 foot
When the material to be placed on the grading plane is to be paid for by the cubic yard, the grading plane at any point shall be not more than	±0.05 foot
When aggregate base is to be placed on the grading plane, the grading plane at any point shall not vary more than	±0.05 foot
Variation in elevation for invert of canal and roads from those specified	±0.10 foot
Variation from specified width of section at any height	±0.25 foot
Departure from established alignment on tangents along the canal	0.30 foot
Departure from established alignment on curves along the canal	0.50 foot

- C. Variation is defined as the distance between the actual dimension and grade of the canal cross section or alignment and the specified position in plan for the canal cross section or alignment. Plus or minus variations indicate a permitted actual position up or down and in or out from the specified position in plan. Variations not designated as plus or minus indicate the maximum deviation permitted between designated successive points on the completed element of construction.

END OF SECTION

SECTION 31 23 17

TRENCHING, BACKFILLING AND COMPACTING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section includes material, testing, and installation for trench excavation, backfilling and compacting.

1.2 RELATED WORK

- A. Section 31 11 00 – Clearing and Grubbing
- B. Section 31 23 00 – Earthwork
- C. Section 40 05 00 – Pipe and Fittings

1.3 REFERENCES

- A. ANSI/ASTM C136 – Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D1556 – Density of Soil and base rock in Place by Sand-Cone Method.
- C. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Sol-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop.
- D. ASTM D6938 – Density of soil and base rock in place by Nuclear method.
- E. ASTM D2937 – Density of soil and in place by Tube method.
- F. Section 19 – Earthwork, State Standard Specifications.
- G. Section 26 – Aggregate Bases, State Standard Specifications.
- H. Geotechnical Engineering Investigation entitled Elkhorn Recharge Facility Project, Northeast Corner of Elkhorn Avenue and Highway 41, Fresno County, California, dated January 26, 2024.

1.4 SUBMITTALS

- A. Submit plans as required for worker protection against caving ground in excavations. Submittals shall be in accordance with the General Conditions and Section 01 33 00 – Submittals Procedures.

1.5 SAMPLES

- A. Submit samples under provisions of Section 01 43 00 – Quality Control and Testing.

1.6 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.
 - 1. Trenches shall have sloping, sheeting, shoring, and bracing conforming with 29CFR1926, Subpart P—Excavations, CAL/OSHA requirements, and the Contract Documents.
- B. Notify Engineer of unexpected subsurface conditions.
- C. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- D. When the pipe laying is not in progress, including the noon hours, close the open ends of pipe. Do not allow trench water, animals or foreign material to enter the pipe.

1.7 QUALITY ASSURANCE

- A. Compaction Testing:
 - 1. All compaction testing shall be in accordance with Section 01 43 00 - Quality Control and Testing.

1.8 CONTROL AND DIVERSION OF WATER

- A. General – The Contractor shall furnish or procure all materials and labor required for constructing and maintaining all necessary cofferdams, channels, flumes, drains, sumps, and/or other temporary diversion and protective works and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work and for maintaining the foundations and other parts of the work free from water.
- B. Plan – Prior to beginning any work on the removal of water from trenches, the Contractor shall submit for the Engineer's approval a water control plan showing his proposed method for the removal of water from trenches and other parts of the work.
- C. Dispose of the water in a manner that will prevent damage to the adjacent property and in accordance with regulatory requirements.
- D. Do not drain trench water through the pipeline under construction.

1.9 PROJECT CONDITIONS

- A. Underground utilities may exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
- B. Obtain all required permits and licenses before installing utilities and follow the rules and requirements of the authority having jurisdiction.

- C. Arrange construction sequences to provide the shortest practical time that the trenches will be open to avoid hazard to the public, and to minimize the possibility of trench collapse.

PART 2 MATERIALS

2.1 NATIVE EARTH BACKFILL

- A. Native earth backfill used above the pipe zone shall be fine-grained materials free from roots, debris, and rocks larger than 3 inches.

2.2 MATERIALS FOR TRENCH BACKFILLING

- A. Furnish required bedding, select backfill and backfill materials listed under the appropriate types of utility line in the sections to which this work relates.
- B. All fill material will be subject to the approval of the Engineer.
- C. Materials used in backfill, as shown in trench details, are defined as follows:
 - 1. Bedding: When rock, unstable material, or wet trench is encountered at the excavated grade for utility installation, bedding is required. Materials shall be predominantly sand and gravel, having a Plasticity Index less than 6.
 - a. Gradation as follows:

<u>Sieve Size</u>	<u>Percent Passing</u>
½ inch	100
No. 4	50-80
No. 200	10-25

- b. Bedding material shall have a Sand Equivalent of 30, per ASTM D2419.
 - 2. Bedding may be omitted if, in the opinion of the Engineer, the excavated trench bottom will adequately support and not damage the utility line.
 - 3. Select Backfill: Materials shall be predominantly sand and gravel, having a Plasticity Index less than 6.
 - a. Gradation as follows:

<u>Sieve Size</u>	<u>Percent Passing</u>
1½ inch	100
No. 4	50-80
No. 40	10-25

- b. Select backfill material shall have a Sand Equivalent of 30 per ASTM D2419.

4. Backfill: Soils that contain no rock larger than three inches at greatest dimension. If expansive clays are present, such content shall not exceed one-third of the material by volume, and shall be well mixed with non-cohesive soils.

2.3 *SELECT AND IMPORT MATERIAL IN PIPE AND BEDDING ZONE*

- A. Gravel: Pit run, natural stone; free of shale, clay, friable materials and debris; graded in accordance with 1½" x ¾" aggregate grading in Section 90-1.02C(4), State Standard Specifications.
- B. Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; 1/4-inch minimum to 5/8-inch maximum size.
- C. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter, graded in accordance with Section 19-3.02F(2), State Standard Specifications.
- D. Imported sand shall have a sand equivalent of 30 per ASTM D2419.

2.4 *SAND-CEMENT SLURRY*

- A. Sand-cement slurry backfill shall be as specified in Section 03 30 00 – Cast-in-Place Concrete.

2.5 *WATER FOR COMPACTION*

- A. Water shall be free of organic materials injurious to the pipe coatings, have a pH of 7.0 to 9.3, maximum chloride concentration of 500 mg/l, and a maximum sulfate concentration of 500 mg/l.

PART 3 EXECUTION

3.1 *GENERAL*

- A. Excavation and backfilling of trenches used for construction of communications, power, process piping, and water distribution and sewer systems shall conform to State Standard Specifications, Section 19, Earthwork.
- B. Excavation shall be by open cut except that short sections of a trench may be tunneled if the utilities can be safely and properly installed and backfill can be properly compacted in such tunnel sections.

3.2 *INSPECTIONS*

- A. Verify stockpiled material has been approved for reuse.
- B. Verify areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.

3.3 *PREPARATION*

- A. Identify required lines, levels, contours, and datum.

3.4 *AC PAVEMENT AND CONCRETE REMOVAL*

- A. Cut bituminous and concrete pavements, regardless of the thickness, curbs, gutters and sidewalks prior to excavation of trenches.
 - 1. Width of material removed shall be at least equal to the required width of the trench at ground surface.
 - 2. Width of material removed shall be as shown on the Plans.
 - 3. AC pavement and concrete rubble shall not be used for trench backfill.

3.5 *TRENCH EXCAVATION*

- A. Excavate the trench to the lines and grades shown on the Drawings for storm sewer, sanitary sewer, water, and other utilities and points of connection, with allowance for pipe thickness, sheeting and shoring if used, and for special bedding.
- B. Paved Areas: Cut existing pavement to full depth to a true line before excavation and maintain the edge suitable for repaving. Pavement removed shall not be used as backfill.
- C. Trenching Guidelines: Excavate the trench to the approximate level of the grade of the utility line to be installed, using adequate trench width and side slopes to safely accommodate worker access.
 - 1. Rocky Trench Bottom: Where ledge rock, hard pan, boulders, or sharp-edged materials are encountered, over excavate a minimum depth of 6 inches below the bottom of the utility exterior wall to permit adequate bedding preparation. The installed utility shall have at least 6 inches of clearance from any rock protrusion.
 - 2. Unstable Trench Bottom: Secure approval of depth of over-excavation and stabilization method. For wet trench construction, use approved method of dewatering through diversion, damming and pumping, well points, or underdrain systems. Dispose of removed fluidized materials as approved. Use bedding material to build a suitable foundation to within 6 inches of finished utility grade, prior to bedding with the specified material. Compact layers to 95 percent of maximum density in not greater than 6-inch layers. Do not proceed with utility installation until wet trench and unstable conditions are corrected to the satisfaction of the Engineer.
- D. Remove areas of sub-grade not readily capable of in-situ compaction.
 - 1. Backfill with Bedding or Select Backfill material and compact to density equal to requirements for subsequent backfill.

- E. Correct unauthorized excavation at no cost to Owner.
 - 1. If the trench is excavated below the required grade, refill any part of the trench excavated below the grade.
 - 2. Place the refilling material over the full width of trench in compacted layers not exceeding eight inches deep to the established grade with allowance for special bedding.
- F. Trench widths in the pipe zone shall be as shown on the drawings. If no details are shown, maximum width shall be 24 inches greater than the pipe outside diameter.
 - 1. Trench width at the top of the trench will not be limited except where width of excavation would undercut adjacent structures and footings. In such case, width of trench shall be such that there is at least two feet between the top edge of the trench and the structure or footing.
- G. Hand trim for bell and spigot pipe joints.
- H. Remove lumped soil, boulders and rock.
- I. Excavation shall not interfere with normal 45 degree bearing splay of foundations.
- J. During trench excavation, place the excavated material only within the working area. Do not obstruct roadways or streets. Conform to federal, state, and local codes governing the safe loading of trenches with excavated material.
- K. Foundation stabilization
 - 1. After the required excavation has been completed, the Engineer will inspect the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation be conducted in all areas within the influence of the pipeline where unsuitable materials exist at the exposed subgrade. Over excavation shall include the removal of all such unacceptable material that exists directly beneath the pipeline to a width 24 inches greater than the pipe outside diameter and to the depth required.

3.6 *LENGTH OF OPEN TRENCH*

- A. Limit the length of open trench to 600 feet in advance of pipe laying or amount of pipe installed in one working day.
- B. Complete backfilling, temporary or first layer paving, not more than 400 feet in the rear of pipe laying operation.

3.7 *TRENCH EXCAVATION IN EMBANKMENT AREAS*

- A. Construct and compact the embankment to an elevation one foot, minimum, over the top of the largest pipe or conduit to be installed prior to trench excavation.

3.8 UNSUITABLE MATERIAL

- A. Unsuitable material shall be excavated and disposed of in a lawful manner off the project site, all disposal shall be approved by the Engineer prior to initiating the work.

3.9 DEWATERING

- A. The Contractor shall keep all excavation free from water. Furnish, install, maintain, and operate all necessary pumping and other equipment for dewatering of excavations. The Contractor shall at all times have on the project sufficient pumping equipment for immediate use, including stand-by pumps for use in case other pumps become inoperable.
- B. The dewatering operation shall be continuous, so that the excavated areas are kept free from water during the construction, until backfill has been placed to a sufficient height to anchor the work against possible floatation.
- C. Dewatering devices shall be adequately filtered to prevent the removal of fines from the soil.
- D. Repair any damage caused by the failure of any part of the protective works. Remove temporary protective works when they are no longer needed for dewatering purposes.
- E. Any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the Owner.
- F. Provision of dewatering and dewatering equipment shall be considered part of the project with no additional compensation allowed.

3.10 TRENCH BACKFILLING

- A. Support pipe during placement and compaction of bedding fill.
- B. Backfilling and cleanup work shall be accomplished as sections of pipe or conduit are tested and approved. Vehicular travel through the work site shall be impeded or obstructed as little as possible.
- C. Compaction: Use vibratory compactors for sands and gravels (non-cohesive soils). Use mechanical tampers for sand and gravel containing a significant portion of fine-grained materials, such as silt and clay (cohesive soils). Hand tamp around pipe or cable to protect the lines until adequate cushion is attained. Puddling or water flooding for consolidation of backfill or compaction by wheel rolling will not be permitted.
- D. Bedding: Unless otherwise specified, compact the specified material to 95 percent of maximum density to the finished utility grade.
- E. Select Backfill: Fill by hand placement around the utility to just over half depth, and compact in a manner to ensure against lateral or vertical displacement. Place

select backfill to 12 inches above the utility line by hand placement in not more than 6-inch layers.

- F. Backfill: To minimize settling, soils shall be backfilled in layers, with each layer compacted prior to addition of the next layer. Unless otherwise specified, place and compact the specified material as follows:
 - 1. Vehicular Traffic Areas: Fill and compact in 8-inch maximum layers as follows:
 - a. From top of select backfill to two feet below top of subgrade, compact to 90 percent of maximum density.
 - b. From two feet below top of subgrade to top of subgrade, compact to 95 percent of maximum density.
 - 2. Non-traffic Areas: Fill and compact in 8-inch maximum layers to 90 percent of maximum density.
- G. Employ a placement method that will not disturb or damage pipe or utilities.
- H. Maintain optimum moisture content of backfill materials to attain required compaction density.
- I. Compact trench backfill to the specified relative compaction. Compact by using mechanical compaction or hand tamping. Do not use high impact hammer type equipment except where the pipe manufacturer warrants in writing that such use will not damage the pipe.
- J. Compact material placed within 12 inches of the outer surface of the pipe by hand tamping only.
 - 1. Carefully place the material around the pipe so that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe.
 - 2. Use particular care in placing material on the underside of the pipe to prevent lateral movement during subsequent backfilling.
- K. After pipe has been bedded, place pipe zone material simultaneously on both sides of the pipe, in maximum 8-inch lifts, keeping the level of backfill the same on each side.
- L. Do not use any axle-driven or tractor-drawn compaction equipment within 5 feet of building walls, foundations, and other structures.
- M. Do not permit free fall of the material until at least two feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pipe. Do not operate heavy equipment over the pipe until at least 3 feet of backfill has been placed and compacted over the pipe.

- N. Remove surplus backfill materials from site.
- O. Leave stockpile areas completely free of excess fill materials.

3.11 *TOLERANCES*

- A. Top Surface of Backfilling: ± 0.1 foot.

3.12 *SAND CEMENT SLURRY, CONCRETE ENCASEMENT AND THRUST BLOCKS*

- A. Place in accordance with the Contract drawings.

3.13 *COMPACTION REQUIREMENTS*

- A. Relative compaction requirements shall be as shown on the Plans.

END SECTION

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SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section includes designing, furnishing, installing, operating, maintaining, and removing a dewatering system. The system shall be of sufficient size and capacity to maintain a dry condition for construction of each part of the work without delaying construction operations. Control all water regardless of source. Comply with applicable environmental protection laws and requirements in operation of the dewatering system.

1.2 RELATED WORK

- A. Section 01 33 00 – Submittal Procedure
- B. Division 31 - Earthwork

1.3 DATA AVAILABLE

- A. Logs of test borings, test pits, and trench excavations performed are shown in the geotechnical report (see Section 31 23 00). The subsurface conditions from the test borings and excavations apply only to the locations of the borings and at the times of the explorations. The subsurface conditions elsewhere at the site and at the time of construction may be different.

1.4 SUBMITTALS

- A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Submit information on the proposed type of dewatering system including the arrangement, location and depths of system components.
- C. Complete description of equipment and instrumentation to be used with installation including operation and maintenance procedures.
- D. Type and sizes of desiltation equipment.
- E. Method of disposal of pumped water.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL

- A. Review and evaluate the available subsurface data for the project site with respect to required dewatering facilities, including any additional groundwater monitoring data required.
- B. Provide means and devices to remove promptly and dispose of water entering excavations and keep the bottoms of the excavations firm and free of standing water and side slopes stable until the pipeline or structures to be constructed are completed and/or the backfill to be placed therein has been placed.
- C. Perform the pumping and dewatering operations such that no disturbance to the bearing soil or to soil supporting any other work will result from the dewatering operations. The dewatering discharge shall not cause siltation or other negative environmental impact on natural waterways or other property; such discharge shall be in accordance with applicable federal, state, and local regulations.
- D. Operate the dewatering system continuously to prevent flotation of partially completed pipelines, structures or other work and flooding/excess wetting of work areas.

3.2 DEWATERING REQUIREMENTS

- A. Design, furnish, install, maintain, and operate a dewatering system which shall prevent loss of fines, boiling, quick conditions, or softening of foundation strata and maintain stability of bottoms of excavations so that every phase of the work can be performed in the dry with the exception of dredging. Prior to placement of concrete or pipe the subgrade shall be in a firm, well drained condition and of adequate and uniform load bearing nature to support construction personnel, materials, equipment and reinforcing steel mats without tracking, rutting, heaving or settlement. All soft, saturated or otherwise unsuitable material shall be removed and replaced with approved backfill.
- B. Water levels shall be a minimum of 2 feet below subgrade until all backfill is placed and compacted.

3.3 INSTALLATION AND OPERATION

- A. The location of every element of the dewatering system shall be such that interference with excavation and construction activity is minimized.
- B. Demonstrate to the Owner's Representative that the dewatering system meets the specified requirements.
- C. When the dewatering system does not meet the specified requirements and, as a consequence, loosening or disturbance of the foundations strata, instability of the slopes, or damage to the foundations or structures occurs, provide materials, labor, and work for restoration of foundations soil, fill soils, slopes, foundations, or structures at no cost to the Owner.

- D. When the dewatering system does not meet the specified requirements and consequently fill surfaces become too wet or the fill exceeds the specified moisture content, remove and replace the upper materials with materials placed and compacted to the specifications. Do not dry out overly wet fills resulting from failed or inadequate dewatering systems or mix with dry material and rework in-place to meet applicable fill specifications.

3.4 *STANDBY EQUIPMENT*

- A. Provide standby pumping and power equipment of sufficient capacity to maintain the dewatering system in an operable condition in the event of failure of any of the original equipment or power.

3.5 *DAMAGES*

- A. The Contractor shall be responsible for and shall repair without cost to the Owner any damage to work in place, other contractors' equipment, and the excavation, including damage to the bottom of the excavation due to heave and removal of material and pumping out of the excavated area that may result from the Contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.

3.6 *REMOVAL*

- A. Remove the components of the dewatering system from the site at the completion of the dewatering work.

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SECTION 31 23 35

DISPOSAL OF MATERIALS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Disposal of unsuitable material, concrete, asphalt concrete, rubbish, and other debris, as described below.

1.2 RELATED WORK

- A. Section 01 57 23 – Storm Water Pollution Prevention Plan
- B. Section 01 57 27 – Dust Control
- C. Section 03 33 00 – Cast-In-Place Concrete
- D. Division 31 - Earthwork

1.3 SUBMITTALS

- A. Submittals shall be in accordance with the General Conditions and Section 01 33 00 - Submittal Procedures.

1.4 GENERAL

- A. The Contractor shall be responsible for the cleanup and disposal of waste materials and rubbish. The disposal of waste materials and rubbish shall be in accordance with applicable Federal, State, and local laws and regulations, and with the requirements of this paragraph. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.
- B. The Contractor shall keep records of the types and amounts of waste materials produced, and of the disposal of all waste materials on or off the jobsite.
- C. The cost of disposing of waste materials other than unsuitable materials shall be included in the prices bid in the schedule for other items of work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 DISPOSAL OF EXCAVATED MATERIAL

- A. All excess excavated earth material, or surplus soil, shall remain onsite and placed as indicated on the Plans.

- B. All unsuitable material that is removed during clearing and grubbing operations and hauled off-site shall be properly disposed.

3.2 DISPOSAL OF CONCRETE AND A.C. SURFACING

- A. All concrete, A.C., and pavement removed from the project site shall be disposed of at a site obtained by the Contractor and approved by the Owner's Representative. No recyclable material shall be disposed of at any landfill. All disposable recyclable materials shall be disposed in a manner that facilitates recycling. Payment for disposal, including all costs of hauling, shall be as specified in the Technical Specifications or Explanation of Bid Items. The Contractor shall report quantities of disposed material in a manner that enables the Owner to utilize diverted quantities as diversion credits pursuant to California Integrated Waste Management Act of 1989 (Public Resources Code Sections 40000 et seq.)

3.3 DISPOSAL OF OTHER DEBRIS

- A. All pipe sections, pump equipment, electrical equipment, oil cake, wood debris, structure demolition, vegetation and any other debris removed from the project site (Bid Item 8 – Site Demolition at Well Sites, Bid Item 9 – Remove and Dispose of Irrigation Pipe Sections, and Bid Item 10 – Remove and Dispose of Existing Asbestos Cement Pipe Section) shall be legally disposed of at a site(s) obtained by the Contractor with prior written permission of the Owner's Representative. Contractor shall identify the proposed Disposal Site(s) at the pre-construction conference. Such Disposal Site(s) shall be a properly licensed and permitted facility pursuant to state and local regulations for purposes of accepting delivery of the respective materials. No recyclable material shall be disposed of at any landfill. All disposable recyclable materials shall be disposed in a manner that facilitates recycling. In addition to the following, a certificate of compliance stating disposal location and manner of disposal of recyclable materials shall be submitted to the Owner's Representative.
 - 1. Disposal of combustible materials shall be by removal from the construction area. Disposal of combustible materials by burning will not be permitted. Disposal of waste materials by burying will not be permitted.
 - 2. Waste materials shall be disposed of or recycled at a State approved disposal or recycle facility. The Contractor shall make any necessary arrangements with private parties, and State and county officials pertinent to locations and regulations of such disposal or recycle facilities, and shall pay any fees or charges required for such disposition.

3.4 CONTRACTOR'S DISPOSAL SITES

- A. Contractor shall make arrangements for disposing of the materials at the Disposal Site(s) and pay all costs involved. Arrangements shall include, but not be limited to, obtaining written authorization from the property owner of the Disposal Site(s) and before disposing of any material off the project site, Contractor shall furnish to the Owner's Representative the authorization or a certified copy thereof together with a written release from the property owner absolving the Owner from any and all responsibility in connection with the disposal of material on the property of the

Disposal Site(s). Before any material is disposed of on the Disposal Site(s), the Contractor shall obtain written permission from the Owner's Representative to dispose of the material at the location designated in the authorization.

- B. It is expressly understood and agreed that the Owner assumes no responsibility to the Contractor whatsoever by the granting of such permission and Contractor shall assume all risks in connection with the use of the Disposal Site(s). The Contractor is cautioned to make such independent investigation and examination as the Contractor deems necessary to be satisfied as to the quantity and types of materials which may be disposed of on the Disposal Site(s) and the status of any permits or licenses in connection therewith.
- C. Within 24 hours of removing the respective material from the project site for disposal, Contractor shall provide Owner's Representative with a certified copy of the weight slip from the Disposal Site obtained by Contractor upon delivery of such debris, and a certified statement from Contractor identifying the material constituting the debris and that it was disposed of at the Disposal Site (identifying the and name of the owner) in accordance with all laws and applicable regulations promulgated by Federal, State, regional, or local administrative and regulatory agencies.

3.5 DISPOSAL OF HAZARDOUS WASTE AND MATERIALS

- A. Materials or wastes, defined as hazardous by 40 CFR 261.3, or by other Federal, State, or local laws or regulations, used by the Contractor or discovered in work or storage areas, shall be disposed of in accordance with these specifications and applicable Federal, State, and local laws and regulations. Unknown waste materials that may be hazardous shall be tested, and the test results shall be submitted to the Owner's Representative for review.
- B. Waste materials known or found to be hazardous shall be disposed of in approved treatment or disposal facilities. Hazardous wastes shall be recycled whenever possible. A copy of all hazardous waste manifest shall be sent to the Owner's Representative.
- C. Waste materials discovered at the construction site shall immediately be reported to the Owner's Representative. If the waste may be hazardous, the Owner's Representative may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.
- D. If necessary, the Contractor will be required to conduct an environmental site assessment at the following Contractor use locations:
 - 1. All hazardous waste accumulation areas;
 - 2. All hazardous material and petroleum dispensing and storage areas where the aggregate storage of hazardous materials or petroleum at the site is or has been over 110 gallons.
 - 3. This site assessment shall be performed by a qualified environmental consultant or equivalent and shall document through appropriate analytical

sampling that the site is free of the effects of contamination (i.e., contaminant concentrations less than State action cleanup levels).

3.6 *CLEANUP*

- A. The Contractor shall keep work and storage areas free from accumulations of waste materials and rubbish, and before completing the work, shall remove all plant facilities, buildings, including concrete footings and slabs, rubbish, unused materials, concrete forms, and other like materials, which are not a part of the permanent work.
- B. Upon completion of the work, and following removal of construction facilities and required cleanup, work areas shall be regraded and left in a neat manner conforming to the natural appearance of the landscape.

END SECTION

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SECTION 31 37 10
RIPRAP

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of furnishing and placing rock riprap for embankment and channel protection.

1.2 REFERENCES

- A. Section 72 – Slope Protection, State Standard Specifications.

1.3 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Manufacturer's installation instructions for geotextile fabric.

PART 2 PRODUCTS

2.1 GEOTEXTILE FABRIC

- A. Non-woven drainage fabric, shall be Mirafi 140NC as manufactured by TenCate Geosynthetics, Pendergrass, GA 30567, or Engineer approved equivalent.
- B. Provide securing pins recommended by fabric manufacturer and fold back as shown on the drawings.

2.2 RIPRAP

- A. Riprap shall be Class No 2 as specified in Section 72-2.02 of the State Standard Specifications.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavate as shown and as necessary to accept variation in stone size. Obtain Contracting Officer's approval of subgrade before placing geotextile fabric or riprap.

3.2 GEOTEXTILE FABRIC

- A. Place on smooth, uniform slope, loosely enough to conform to minor surface irregularities. Follow manufacturer's recommendations for making laps and for fastening and securing. Repair or replace fabric that has been damaged to stone placement. Re-lay fabric that becomes dislodged.

3.3 *PLACEMENT*

- A. Placement shall be Method B as specified in Section 72-2.03C of the State Standard Specifications

END SECTION

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SECTION 32 11 23
AGGREGATE BASE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Furnish, spread, and compact aggregate base in roadways, driveways and other paved areas as shown on the Plans.
- B. The work of this section consists of furnishing and placing aggregate base material and/or lean concrete base materials, and filler if required, on the prepared subgrade.

1.2 RELATED WORK

- A. Division 31 - Earthwork
- B. Section 32 12 13 – Bituminous Prime and Tack Coat
- C. Section 32 12 16 – Asphalt Concrete Paving

1.3 REFERENCES

- A. Section 10-6 – Watering, State Standard Specifications.
- B. Section 26 – Aggregate Bases, State Standard Specifications.
- C. Section 28-2 - Lean Concrete Base, State Standard Specifications.
- D. ANSI/ASTM C136 – Sieve Analysis of Fine and Coarse Aggregates.
- E. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop.
- F. ANSI/ASTM D1556 – Density of Soil and Base Rock in Place by Sand-Cone Method.
- G. ASTM D6938 – Density of Soil and Base Rock in Place by Nuclear Method.

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. If materials are obtained from a commercial source, submit certification from the supplier certifying that aggregate base course meets the requirements of this section.
- C. Copies of certified weight tickets for each load of aggregate delivered to the project site.

1.5 QUALITY ASSURANCE

A. Relative Compaction:

1. All costs for initial compaction tests shall be borne by the Owner. All areas that fail to meet the minimum compaction requirements shall be reworked as required by the Engineer and retested until minimum compaction requirements are obtained.
2. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project. Testing will be required as directed by the Engineer. Test locations shall be determined by the Engineer upon notification from the Contractor that the grade is ready for tests. Contractor shall be present when samples of bedding, select backfill, and backfill materials are gathered for analysis or testing.

B. Compaction tests will be performed for each lift or layer.

C. Tests for compaction shall conform to references listed in Part 1.3 of this section.

D. Sample backfill materials per ASTM D75.

E. Compaction testing will be performed in accordance with Section 19-5 of the State Standard Specifications.

1. The Contractor shall not proceed with work over the area being tested until results have been verified by the Engineer. Immediately upon completion of each compaction test, a copy of the results shall be given by the testing laboratory to the Engineer.

F. The percentage composition by weight shall conform to Class 2 aggregate base determined by Test Method No. Calif. 202, modified by Test Method No. Calif. 905 if there is a difference in specific gravity of 0.2 or more between the coarse and fine portion of the aggregate or between blends of different aggregates.

G. Aggregate base shall also conform to the following quality requirements:

<u>Tests</u>	<u>Test Method Calif. No</u>
R-Value	301
Sand Equivalent	217
Durability Index	229

H. Quality Control shall be under the provisions of Section 01 43 00 – Quality Control.

PART 2 PRODUCTS

2.1 MATERIALS

A. AGGREGATE BASE

1. Class 2 Aggregate Base, $\frac{3}{4}$ -inch maximum; as per Section 26-1.02B, State Standard Specifications.
2. Crushed Portland cement concrete which meets the gradation requirements of State Standard Specification Section 26, Class 2 Aggregate Base, $\frac{3}{4}$ -inch maximum, may be used as aggregate base course under new pavements.
3. Aggregate for Class 2 aggregate base shall be free from organic material and other deleterious substances.

B. RECYCLED AGGREGATE BASE COURSE

1. Recycled aggregate base course material shall not be used.

C. AGGREGATE SUBBASE

1. Class 2 Aggregate subbase; as per Section 25-1.02B, State Standard Specifications.
2. Crushed Portland cement concrete which meets the gradation requirements of State Standard Specification Section 25, Class 2 Aggregate Subbase may be used as aggregate subbase course under new pavements.
3. Aggregate for Class 2 aggregate subbase shall be free from organic material and other deleterious substances.

D. WATER

1. As specified in Section 01 51 36, Watering.
2. At the time aggregate base is spread, it shall have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the materials.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

- A. As specified in Division 31 - Earthwork and 01 51 36, Watering.

3.2 SPREADING

- A. The aggregate base course material shall be deposited and spread to the required compacted thickness by means that will maintain the uniformity of the mixture. The aggregate base course shall be free from pockets of coarse or fine material.
- B. Deliver aggregate base to the area to be paved as a uniform mixture and spread each layer in one operation.
- C. Aggregate base placed at locations which are inaccessible to the spreading equipment shall be spread in two layers by any means to obtain the specified results.
- D. The aggregate shall not be treated with lime, cement or other chemical materials before the Durability Index test has been performed.
- E. The surface of the finished aggregate base at any point shall not vary more than ± 0.05 -foot from the grade shown.

3.3 PLACING

- A. If the required compacted depth of the aggregate base course exceeds 6 inches, place course in two or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

3.4 MIXING

- A. Mixing shall be in accordance with one of the methods set forth in State Standard Specifications, Section 28-4.03B.

3.5 MOISTURE CONTROL

- A. When spread, aggregate base shall have a moisture content sufficient to obtain the specified compaction.

3.6 SURFACE FINISHING

- A. Use a smooth steel wheel roller for the final rolling of top surface base course. Water surface and evenly spread loose stones before final rolling. Make minimum of two complete passes over area to embed stones. Correct soft spots developed during rolling.
- B. Compacted aggregate base course surface shall be smooth and free from waves and other irregularities. Unsatisfactory portions of base course shall be corrected, at no additional expense to the Owner.

3.7 MATERIAL ACCEPTANCE REQUIREMENTS

- A. Acceptance will be based on periodic samples and tests taken following mixing and before placing.

3.8 TOLERANCES

- A. Surface: The finished surface of the base course will be tested with a 10-foot straightedge or other device. The variation between any two contacts with the surface shall not exceed ± 0.05 feet.
- B. Width: Plan dimension, ± 0.10 feet.
- C. Thickness: Plan dimension, ± 0.05 feet.
- D. Any areas not complying with these tolerances shall be reworked to obtain conformity, at no additional expense to the Owner.

3.9 MAINTENANCE

- A. Maintain base course in a satisfactory condition until surfaced or until final acceptance.

END SECTION

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SECTION 32 12 13
BITUMINOUS PRIME COAT AND TACK COAT

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Prime Coat work consists of applying an application of asphalt or asphalt cutback, as specified, to the complete and compacted aggregate base course prior to placement of hot mix asphalt concrete.
- B. Tack Coat work consists of an application of asphalt cutback between asphalt layers. Applying a very light application of asphalt emulsion diluted with water as a tack between asphalt layers to create an adhesive surface for new asphalt concrete pavement to adhere to, and applied to all existing vertical surfaces where new pavement is to be surfaced.
- C. All work shall conform to all Fresno County standards and requirements.

1.2 RELATED WORK

- A. Division 31 – Earthwork
- B. Section 32 11 23 – Aggregate Base
- C. Section 32 12 16 – Asphalt Concrete Paving

1.3 REFERENCES

- A. Section 94 – Asphaltic Emulsions, State Standard Specifications
- B. Fresno County Standards

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures
- B. Two copies of manufacturer's certification for each load certifying the bituminous material is of the type, grade, and quality specified.
- C. One sample of asphalt cutback, in accordance with AASHTO T40-78, shall be taken for each load delivered to the project sites. Samples shall be stored in clean, airtight sealed containers at a temperature of not less than 40°F, until tested.

1.5 PROJECT CONDITIONS

- A. Apply bituminous material only during daylight hours, when surface is dry, temperature is above 50°F, and weather is not foggy or rainy.

PART 2 PRODUCTS

2.1 BITUMINOUS TACK COAT

- A. Asphalt for tack coat shall be RS-1 or RS-2, for Anionic asphalt emulsion or CRS-2 for Cationic asphalt emulsion.
 - 1. Engineer shall select which asphalt emulsion shall be used. Use tack coat between asphalt lifts only if applied surface has been in place over 24 hours, or has been in service.

PART 3 EXECUTION

3.1 GENERAL

- A. Protect the surface of sidewalks, curbs, other structures, and trees adjacent to the area being treated from being spattered or marred. If surfaces become spattered, clean in accordance with manufacturer's recommendations.
- B. Do not clean or discharge distributor outside the project limits of work.

3.2 DISTRIBUTOR

- A. Bituminous distributor and equipment for heating bituminous material shall be designed, equipped, maintained, and operated so that bituminous material, at even heat, may be applied uniformly on variable widths of surface up to 15 feet at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard, with uniform pressure, and with an allowable variation from any specified rate not to exceed 0.02 gallon per square yard. Distributor equipment shall include a tachometer, pressure gauges, accurate volume measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank contents. Distributors shall be equipped with a power unit for the pump, and a full circulation spray bar adjustable laterally and vertically.
- B. When applying tack and prime coats, take care to give the surface a very light, even application of asphalt.

3.3 PREPARATION OF SURFACE

- A. Immediately before applying the tack or prime coat, remove loose material, dirt, clay or other objectionable material. Take particular care in cleaning the outer edges of the strip to be treated, to ensure that the prime or tack coat will adhere.
- B. Do not apply Prime Coat or Tack coat so far in advance that it might lose its adhesiveness as a result of being covered with dust or other foreign material.

3.4 APPLICATION

- A. Tack Coat: Apply tack coat uniformly at the rate of 0.10 gallon per square yard, at specified temperature. Apply within 24 hours preceding placement of the covering course.

- B. Tack coat of asphaltic emulsion shall be furnished and applied in conformance with the provisions in Section 94, State Standards Specifications and shall be applied to all vertical surfaces of existing pavement, curbs gutters and construction joints in the surfacing against which additional material is to be placed, and to other surfaces designated in the special provisions.

END SECTION

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SECTION 32 12 16

ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work of this section consists of constructing one or more surface courses composed of a mixture of aggregate, filler if required, asphalt material and placed on a prepared base to lines, grades and details, as shown on the plans and covered within these specifications. This section includes asphalt patching for areas where utility lines cross existing paved surfaces, trench resurfacing, saw cutting and resurfacing additional paving widths as required in the contract or under permit requirements.
- B. Mix aggregate and asphalt binder at a central mixing plant. Haul, spread, and compact the mixture for paved areas as shown and as specified.
- C. Upon completion of all paving, finish the entire roadway. Trim and shape cut and fill slopes to produce smooth surfaces and uniform cross sections. Clean the finished pavement of all dirt and foreign material.
- D. Cross sections of paving shall be as indicated in the Plans.
- E. All work shall conform to Fresno County standards and requirements.

1.2 RELATED WORK

- A. Division 31 – Earthwork
- B. Section 32 11 23 – Aggregate Base

1.3 REFERENCES

- A. Section 22 – Finishing Roadway, State Standard Specifications
- B. Section 39 – Asphalt Concrete, State Standard Specifications
- C. Section 92 – Asphalt Binders, State Standard Specifications
- D. Section 94 – Asphaltic Emulsions, State Standard Specifications
- E. Section 96 – Geosynthetics, State Standard Specifications

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Certificates:

1. Certification from the supplier that the asphalt concrete is of correct type and meets requirements of this section.
2. Job mix formula shall be submitted with certification that the mix formula meets the requirements of Standard Specification Specifications Section 39, Asphalt Concrete. The job mix formula shall include definite single values for:
 - a. The percent of aggregate passing the specified sieve, based on dry weight of aggregate.
 - b. The percent of bituminous material to be added, based on the total weight of the mix.
 - c. Kind and amount of chemical additives (anti-stripping, hydrated lime, etc.) as established by the design procedure.
 - d. Maximum theoretical density.
 - e. Temperature ranges for the bituminous material at the point of mixing with the aggregates and bituminous mixture at the paving machine.

1.5 QUALITY ASSURANCE

- A. Asphalt concrete supplier to prepare a mix design; to recommend adjustments to the proportions of the mix, as necessary, to conform to the mix design; and to consult with the Contractor and the Engineer during paving as required.
- B. Testing required to, determine compliance for the work of this section shall be performed by an independent testing laboratory, approved by the Engineer and appointed and paid for by the Contractor. The independent testing laboratory shall be used to sample and test asphalt concrete at the job sites. One test shall be taken for each paving period and at least one test every four hours. As a minimum, results of the test shall include items A, B, C and E of the job mix formula submittal.
- C. Density: Acceptable density of the in-place asphalt concrete pavement shall be 95 percent of the optimum values as determined from the mix design formula. Field sampling and density determination shall be made in accordance with an accepted nuclear procedure.
- D. Testing shall be performed in such a manner that will least encumber the performance of the work. The Contractor shall cooperate by rerouting equipment or by temporarily closing the immediate work area to be tested.
- E. Contractor shall instruct the testing laboratory to provide the test results to the Engineer immediately in the field and a copy of the written report sent directly to the Engineer.

PART 2 PRODUCTS

2.1 ASPHALTS

- A. Asphalt binder to be mixed with aggregate shall be liquid asphalt PG 64-10, conforming to State Standard Specifications Section 92, Asphalt Binders.
- B. Asphalt Concrete shall be Type A, in accordance with State Standard Specifications 39-2.02.

2.2 AGGREGATE

- A. The combined aggregate grading of the asphalt concrete shall be Type A, 3/4-inch maximum grading, per Section 39-2.02B(4)(b), of the State Standard Specifications.

2.3 PAVEMENT REINFORCING FABRIC

- A. Reinforcing fabric shall be non-woven, conforming to Section 96-1.02J, "Paving Fabric", of the State Standard Specifications.
- B. Fabric shall be protected from damage during storage, handling and installation in accordance with manufacturer's requirements.

2.4 FORMS

- A. Redwood header boards shall be two inches wide by six inches deep (nominal measurement).
- B. Metal forms shall be submitted to Engineer for approval prior to use.

PART 3 EXECUTION

3.1 GENERAL

- A. The pavement section shall comply with Fresno County Standards and as shown on the Plans.
- B. Prior to any paving and surfacing operations, all pipes and conduits shall be installed and properly backfilled as shown.

3.2 STORAGE

- A. Storage of materials shall comply with the requirements of Section 39, State Standard Specifications.

3.3 MIXING

- A. Mixing shall conform to the approved mix design.
- B. The weight of asphalt binder to be mixed with aggregate shall be between 3 percent and 7 percent of the weight of the dry aggregate.

3.4 *SUBGRADE*

- A. Subgrade shall conform to Section 39-2.01C(3)(b), State Standard Specifications.
- B. Unless otherwise specified, the upper six inches of subgrade beneath the structural section shall be scarified, moisture conditioned as necessary and compacted to at least 95 percent relative density.

3.5 *EQUIPMENT*

- A. Spreading and compacting equipment shall conform to State Standard Specifications Section 39-2.01C(2), Spreading and Compacting Equipment.

3.6 *PLACING AND COMPACTING*

- A. Placing and compacting shall conform to State Standard Specifications Section 39-2.05A(3)(d), Placing and Compacting Hot Mix Asphalt.
- B. Apply mixture only during hours of daylight; when air temperature is 50 degrees F or higher; when surfaces to be paved are dry and free of frost, snow or ice; and when precipitation is not imminent.

3.7 *FORMS*

- A. Wood or metal. Place true to line and grade, and anchor securely. Use adequately sized forms or prevent bulging and bending while the bituminous surface is being worked.

3.8 *COLD PLANE ASPHALT CONCRETE PAVEMENT*

- A. Existing asphalt concrete shall be cold planed at the locations and to the dimensions shown on the plans and in accordance with these special provisions.
- B. The depth, width and shape of the cut shall be as indicated on the typical cross sections or as directed by the Engineer. The final cut shall result in a uniform surface conforming to the typical cross sections. The road surfacing to remain in place shall not be damaged in any way.
- C. The depth shown on the plans for cold plane wedge cuts along existing concrete gutter are to be measured from the surface of the concrete gutter. In some cases where a prior overlay surface was constructed above the gutter lip, the actual depth of cut will exceed the dimension shown on the Plans.
- D. The Contractor shall remove existing pavement overlay from the top surface of gutters adjacent to any area specified to be cold planed.
- E. The planing machine shall be self-propelled and especially designed and built for grinding flexible pavements. It shall plane without tearing or gouging the underlying surface and blade material in a windrow. Drum lacing patterns shall permit a grooved or smooth surface finish as selected by the Engineer and the drum shall be totally enclosed in a shroud to prevent discharge of any loosened material into adjacent work areas. A zero (0) to three (3) inches deep cut to predetermined grade

may be required on one (1) pass. The machine shall be adjustable as to crown and depth. The equipment shall meet the standards set by the San Joaquin Valley Air Pollution Control District and the Air Quality Act of 1969 for noise and air pollution.

- F. The Contractor shall provide a smaller machine to trim areas inaccessible to the larger machine at manholes, curb returns and intersections. The smaller machine shall be equipped with a 12-inche wide cutting drum mounted on a three-wheel chassis allowing it to be positioned without interrupting traffic or pedestrian flow. Jack hammering areas not accessible to grinding machine will not be allowed.
- G. The surface tolerance produced shall be such that a ten-foot straight edge laid laterally will indicate variances of less than three-eighths ($3/8$) inch. The Contractor shall remove all loosened material from the roadway each day before leaving the site of the work.
- H. The Contractor shall protect structures and provide necessary traffic control and barricades as required by the Engineer.
- I. Temporary oil-sand ramps shall be constructed at intersecting streets, and along longitudinal joints, immediately after cold planing and prior to opening the lanes to traffic. Cold planing operations shall not commence until temporary oil-sand is on site with workers to place material.
- J. Cold planing cuts across travel lanes shall be the last cuts made at each side. After removal of loosened material from such cuts, temporary ramps shall be constructed of oil-sand at the deep end of cuts before opening the lane to traffic.
- K. Irregular, gouged, ripped or damaged areas, as determined by the Engineer, shall not be accepted. All such areas shall be repaired by methods approved by the Engineer, prior to resurfacing operations. The Engineer, at his discretion, may require substitution of planing machine and/or operating personnel if the cold-planed surface does not meet these specifications.
- L. Existing traffic detector loops damaged during cold plane operations will be returned to their original condition.
- M. After conducting cold planing operations on a given street, the Contractor shall begin pavement operations on that street within seven calendar days. Deviations from this requirement must be requested in writing and approved by the Engineer prior to the beginning of planing operations.

3.9 MISCELLANEOUS AREAS

- A. Paving miscellaneous areas shall conform to State Standard Specifications Section 39-2.01C(9), Miscellaneous Areas and Dikes.

3.10 FINISHING PAVED AREAS

- A. Finishing roadway and parking areas shall conform to the provisions of State Standard Specifications Section 22, Finishing Roadways.

3.11 TRENCH RESURFACING

- A. At areas where asphalt concrete had been removed due to pipeline construction, trench shall be resurfaced with asphalt concrete. Unless otherwise noted, asphalt concrete resurfacing shall match the existing thickness of the asphalt and base course removed.
 - 1. Base course shall be as specified in Section 32 11 23, Aggregate Base, and in this Section.
- B. If an edge of a trench resurfacing occurs within three feet of an existing edge of pavement, lip of gutter or the face of curb, or if no gutter is present, the Contractor shall remove all existing paving to the lip of gutter or curb face and or, edge of existing pavement and resurface with the applicable trench resurfacing section. The limits of removal are minimum requirements.
- C. If during the Contractor's operations pavement is disturbed outside the limits of removal, Contractor shall make the necessary repairs at no additional cost to the Owner.

3.12 ACCEPTANCE REQUIREMENTS

- A. Surface Tolerance: The variation between any two contacts with the surface shall not exceed ± 0.015 foot in 10 feet. Correct all humps or depressions exceeding the specified tolerance by removing defective work and replacing it with new material at no additional expense to the Owner.
- B. A uniform compacted thickness shall be obtained for each course equal to or greater than the thickness shown. Individual tests shall not vary by more than ± 0.02 foot.
- C. Width: Plan dimension, ± 0.02 foot.
- D. Thickness: Plan dimension, ± 0.02 foot.

END SECTION

SECTION 32 31 00
FENCING

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Provide all labor, materials and equipment and perform all operations necessary to install chain link fencing and gates as specified, shown on the Plans, or as directed.

1.2 RELATED WORK

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Division 31 - Earthwork

1.3 REFERENCES

- A. Section 80 – Fences, State Standard Specifications

1.4 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittal Procedures

PART 2 PRODUCTS

- A. Chain Link shall conform to State Standard Specifications Section 80-3.02
- B. Right of Way fence shall conform to State Standard Specifications Section 80-3.

PART 3 EXECUTION

3.1 FENCES AND GATES

- A. Installation shall be in accordance with State Standard Specifications, Section 80, and with State Standard Plans Drawing A85, A85A and as indicated on the Plans.
- B. Relocation and installation of other fencing materials shall be in accordance with the plans and standard construction practices.

3.2 GATES

- A. Gates shall conform with the requirements of State Standard Specifications Section 80-10, Gates.

END SECTION

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SECTION 33 11 12
REINFORCED CONCRETE LOW-HEAD PRESSURE PIPE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section includes design, manufacture, fabrication, materials, installation, and testing of reinforced concrete low-head pressure pipe provided in accordance with ASTM C361 and this specification and subjected to internal hydrostatic heads not exceeding 125 feet. Size range is 12 through 144 inches in diameter.

1.2 RELATED WORK

- A. Section 09 90 00 – Painting and Coating
- B. Division 31 - Earthwork
- C. Section 40 05 00 – Pipe and Fittings

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO)
- B. American Society of Mechanical Engineers (ASME)
- C. American Society for Testing and Materials (ASTM)
- D. American Water Works Association (AWWA)

1.4 SUBMITTALS

- A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's affidavit of compliance with the cited standards, e.g., ASTM C361.
- C. Submit test reports on shop testing performed per ASTM C361.
- D. Submit methods for lifting, handling, shipping, and storing pipe such that pipe will not be cracked or otherwise damaged during lifting, handling, shipping, and storing.
- E. Submit profile layout schedule including:
 - 1. Order of installation and closures.
 - 2. Pipe invert station and elevation at each change of grade and alignment.
 - 3. Pipe internal diameter, wall thickness and details of reinforcement, and design internal head or pressure.

4. Locations of closures for length adjustment, connections to structures, and construction convenience.
 5. Locations of manholes and other points of access for placement of mortar lining at field joints.
 6. The limits of each reach of concrete encasement or installation in casing.
- F. Submit drawings and schedules showing details of the core, reinforcing steel size and spacing, and bonding bars. Provide details of specials, elbows, fittings, and cast-in-place specials.
- G. Submit manufacturer's joint design calculations and details. Include critical dimensions of the gasket-bearing surfaces when a rubber gasket pipe joint is used including joint gap and joint tolerances. Indicate maximum allowable joint angular deflection. Submit complete joint design calculations indicating stresses at all design conditions. Submit gasket calculations indicating maximum and minimum sealing pressures. Submit manufacturer's data sheet for gaskets supplied showing dimensions and chemical composition. Submit test reports on physical properties of rubber used in gaskets.
- H. Submit test reports on shop testing required herein and in referenced standards. Submit affidavit of compliance with these specifications and all specified standards.
- I. Submit certificate that cement complies with ASTM C150, designating type. Submit type and amount of concrete admixture, including natural pozzolans and fly ash, if used.
- J. Submit welder qualifications, welding procedure specifications, and welding procedure qualifications.
- K. Submit mill test certificates identifying chemical and physical properties of each heat of reinforcing steel. Submit test reports for reinforcing welds.
- L. Submit concrete mix designs. Include petrographic analysis of concrete.
- M. Submit test reports of concrete test cylinders at 28 days.
- N. Submit reports of radiographic tests on steel joint rings.
- O. Provide written certification that the joint lubricant conforms to all requirements of ASTM C361.

1.5 INSPECTION

- A. The manufacturer shall inspect materials and production of pipe, fittings, and special pieces and shall document such inspection to the satisfaction of the Engineer. Quality control inspection of as-manufactured bell and spigot dimensions shall be made using a pole-mounted micrometer "measuring stick" and not a "pi" tape. Measurement shall be made at no less than six positions of each bell and each spigot prior to shipment of pipe to ensure that joints fit properly and conform to manufacturer's design joint dimensions.

- B. The Owner or his representative will witness the inspection of materials, production, and testing of pipes, fittings, and special pieces at manufacturer's plant. The Owner's Representative shall have free access to those parts of the manufacturer's plant that are necessary to determine compliance with this specification.

1.6 SPECIALS

- A. A special is defined as any piece of pipe other than a normal full-length straight section. This includes, but is not limited to, manhole sections, short pieces, adapter sections with special ends, sections with outlets, elbows, etc.

PART 2 PRODUCTS

2.1 DESIGN CRITERIA

- A. Obtain the following information from the drawings:
 - 1. Elevation of the pipe invert and of the completed ground.
 - 2. Alignment of the pipeline.
 - 3. Location of outlets, connections, and special appurtenances.
 - 4. Nominal internal diameter, ID.
 - 5. Pipe class.
- B. Provide cast-in-place concrete-encased steel pipe sections at the location of manway vaults or where shown in the drawings.
- C. Design joint such that joint shall pass proof-of-design test as outlined in ASTM C497, Section 13. Conduct joint test on a minimum of 1 out of every 100 joints of each diameter, length, and design class furnished for the project.
- D. Calculate the earth load on the pipe based on the Marston theory of earth loads on underground conduits for rigid pipe. Assume the unit weight of soil to be minimum 125 pounds per cubic foot. Compute earth loads assuming a projection condition with the following assumptions:
 - 1. The product "Ku" has a value of 0.165, where "K" is the ratio of active lateral pressure to vertical pressure and "u" is the coefficient of internal friction of the fill material.
 - 2. The settlement ratio has a value of 0.8.
- E. The vertical live load shall be based on AASHTO HS-20 loading.
- F. Design the pipe for the external loads in combination with the design internal pressure as outlined in ASTM C361, Appendix X2.

2.2 FITTINGS AND SPECIALS

- A. Fittings and specials shall be either fabricated steel with cement-mortar lining or constructed the same as the pipe.
- B. Reinforced concrete fittings with an angle of 30 degrees or less shall be two-piece. Fittings with an angle of greater than 30 degrees shall be three-piece. Minimum radius shall be 2.5 times the pipe diameter (2.5D) unless otherwise indicated.

2.3 GASKETS FOR BELL AND SPIGOT JOINTS

- A. Provide natural or synthetic rubber gaskets per ASTM C361.
- B. Rubber gasketed joints shall conform to the requirements of ASTM C443, capable of withstanding a constant pressure of up to the Head Class rating of the pipe. Rubber gaskets shall be lubricated with the lubricant recommended and supplied by the manufacturer of the pipe.

2.4 STEEL FOR JOINTS, JOINT RINGS, AND BONDING BARS

- A. Bells and Bell Bands: ASTM A570, Grade 30 or 33; ASTM A283, Grade C or D.
- B. Spigots: ASTM A675, Grade 50 or 60.
- C. Filler Bars: ASTM A576, Grade 1012; ASTM A663, Grade 50.
- D. Butt Straps: ASTM A283, Grade D.

2.5 TYPE OF PIPE ENDS

- A. Design and manufacture pipe joints to be watertight under all service conditions and at the extremes of pipe manufacturer's tolerances. If pipe with beveled joint ends is to be supplied, only the spigot end shall be beveled. Rubber gaskets shall be confined in such a manner that slight movement of the pipe or hydrostatic pressure cannot displace the gasket and so that when the joint is assembled, the gasket is compressed to form a watertight seal. Joints shall be designed so that the gasket will not be required to support the weight of the pipe. Do not use joints that utilize shoulders on the bell or spigot to confine the gasket.
- B. Pipe 48 inches and larger in diameter shall be furnished with double spigot grooves and gaskets. Two joint test tubes per spigot shall be provided between the spigot grooves to allow for testing of the joint following jointing.
- C. Bell reinforcement shall be adequate to support the adjacent pipe weight without cracking, assuming that the adjacent pipe is supported at the extreme end only. Bell reinforcement shall be adequate to resist maximum gasket forces at maximum spigot outside diameter and minimum bell outside diameter as established by the pipe manufacturer and documented in the submitted joint dimension input form. Bell and spigot shall have adequate strength to resist cracking under normally anticipated installation loads.

- D. Pipe joints shall be designed to allow a deflection no less than that equal to the joint open at one point on the inside 1.25 inches greater than the normal closure and the side opposite at the normal closure.

2.6 *SHOP HYDROSTATIC TEST*

- A. Test pipe and specials per ASTM C361.

2.7 *PIPE AND JOINT LEAKAGE TESTS*

- A. The pipe manufacturer shall supply testing ports to perform joint testing confirming to current ASTM C76 and C361 standards. The Contractor shall use liquid Teflon at all fittings. Test ports shall be located at the invert and soffit of the pipe. The test port located at the invert of the pipe shall be used to fill the area between gaskets with water. The test port at the soffit of the pipe shall be used to bleed the air. After successful testing is completed, Contractor to install flush mounted plugs at each test port. Each joint shall be manufactured with testing ports for pressure testing.
- B. Conduct proof of design tests to demonstrate a watertight joint at the maximum angular deflected condition. Test the maximum bell inside dimension and minimum spigot inside dimension, and test the minimum bell inside dimension and maximum spigot outside dimension. Vertical support for each section shall be provided so that no support exists directly under the joint and the reaction of the spigot on the bell is equivalent to not less than the weight of one-half the weight of one pipe section. The pipe sections shall be joined together to produce a gap concentrically around the pipe of 1 inch greater than the normal closure.
- C. The pipe shall then be subjected to an internal pressure not less than 30 feet of water. Internal pressure shall be determined at the centerline of the pipe. The pressure shall be maintained for a period of four hours.
- D. The leakage through the joint shall not exceed 1.0 gallon per hour for all-concrete joint and zero for a steel ring joint.
- E. The same test shall then be repeated with the end of one pipe lowered, to produce a gap at the top of the pipe of not less than 1 1/2 inches. Gap is defined as the distance the joint is open from normal closure measured on the inside of the pipe.
- F. If the joint being tested does not meet the leakage requirements, make any necessary modifications to the joint details and retest the joint.

2.8 *PRODUCT MARKING*

- A. Plainly mark each length of straight pipe and each special at the bell or spigot end to identify:
 - 1. The name or trademark of the manufacturer.
 - 2. Class and size of pipe, as indicated by applicable specifications.
 - 3. Conformance with ASTM standards.

4. The design head.
5. Type of cement
6. Date of manufacture, if applicable
7. The proper location of the pipe item by reference to the layout schedule. For beveled pipe, show the degree of bevel and the point on the circumference to be laid uppermost.

2.9 *SHOP-APPLIED ORGANIC ZINC PROTECTIVE COATING FOR STEEL JOINT RINGS*

- A. Use System No. 18 per Section 09 90 00.

2.10 *CEMENT SLURRY FOR CRACK REPAIR*

- A. Prepare a cement slurry with volumetric proportions of one part water, one part acrylic latex concrete additive, and one and one-half parts portland cement. The slurry shall be well blended and of creamy consistency. Mix only enough to use in one hour.

PART 3 EXECUTION

3.1 *FABRICATING BELL AND SPIGOT JOINTS*

- A. General: Provide watertight joints under all conditions of service, including expansion, contraction, and ordinary earth settlement. Electrically bond steel joints to the reinforcing cages.
- B. Forming the Bell: Form the bell round and true.
- C. Forming the Spigot: Form the spigot round and true and to an outside diameter less than the inside diameter of the bell ring.
- D. Welding: Use flash welding to form a continuous bell-and-spigot ring in an automatic welding machine in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII, Pressure Vessels. Conduct a radiographic test of the flash weld of three bell and three spigot rings and report the result to the Owner. After welding, smooth the ring on its contact face by grinding the weld flush with the adjacent surfaces.
- E. Final Sizing: Check steel joint rings for size and shape on templates before incorporating in core.
- F. Hold the joint rings circular and center on the pipe axis during the fabrication of the pipe.
- G. Tolerances: Limit the annular space in rubber gasket joints between the outside of the spigot ring and the inside of the bell ring contact surface, measured radially, to the tolerances stated in the submitted USBR Joint Dimension Input Form.

3.2 *OUTLET ASSEMBLIES*

- A. Pipe ends for sections with outlets shall be the same bell-and-spigot joints as the standard pipe sections.

3.3 *SHOP-APPLIED JOINT RING PROTECTIVE COATING*

- A. Paint the exposed portion of steel joint rings with organic zinc coating per Section 09 90 00, System No. 18.

3.4 *FORMS*

- A. Pipe forms shall be steel made with butt joints throughout. The surfaces of the forms adjacent to the pipe walls shall be smooth and true. Forms shall be sufficiently tight with gaskets provided at all form joints to prevent leakage of wet concrete. The forms shall be braced and sufficiently stiff to withstand, without detrimental deformation, all operations incidental to the placement and compaction of concrete within the form. Construct the form and end rings so that the pipe, when manufactured, will have circular and cylindrical inner surfaces so that they may be stripped from the pipe without damage to the pipe or to its surfaces. Clean and apply release agent to forms before each filling. Discard or repair defective forms and end rings.

3.5 *METHOD OF MANUFACTURE*

- A. Manufacture the pipe using the vertically cast method. The transporting and placing of concrete shall be by methods that will prevent the separation of the concrete materials and the displacement of reinforcement steel in the forms. When placing the concrete in the forms, vibrate the concrete continuously with internal or external mechanical vibrators at the rate of not less than 6,500 vibrations per minute for wet cast pipe and 3,400 vibrations per minute for dry cast pipe.

3.6 *CURING*

- A. Cure pipe in accordance with ASTM C361.

3.7 *REINFORCEMENT*

- A. Fabricate reinforcement as two rigid cages of bars or wire. Do not use elliptical reinforcing. Fabricate transverse reinforcements either as complete hoops, welded or lapped, or as a continuous helix. If the transverse reinforcement is formed as a cylindrical helix, finish off both ends of the cage as a complete hoop.
- B. Splices shall be either welded or lapped and tightly wired. Either lap or butt welds may be used, but the weld shall develop the full strength of the bar, and when required by the Owner's Representative, the pipe manufacturer shall submit for testing samples of welds proposed for use. The lap of unwelded splices shall extend 30 diameters when bars or rods are being used for reinforcement and 40 diameters when wire is being used.
- C. Hold the cage of reinforcement in its circular shape and maintain the cage in place within the forms during the placing and consolidating of the concrete. Supports between the reinforcement and the forms that are to be exposed in the finished pipe

shall be made of stainless steel. Where the pipe design is shown in the drawings, the type, extent, and positioning of the longitudinal steel indicated shall be considered a minimum requirement. Whether pipe details are shown in the drawings or not, the pipe manufacturer shall be responsible for providing enough longitudinal steel to provide a cage sufficiently rigid to retain its shape and position in the forms during the manufacturing process.

- D. Provide size and uniformly spaced longitudinal reinforcement such that it makes the cage rigid and supports the transverse reinforcement firmly in place in the forms during placing and consolidation of the concrete. In no case shall reinforcement be less in area than 0.2% of the gross cross-sectional area of the concrete. Manufacture the pipe with sufficient longitudinal reinforcement to allow the finished pipe to be handled without damage during installation in the construction of the pipeline. Where the pipe joint construction requires the use of a bell, continue the minimum specified number of bars into the bell. Where two cages are used, divide the longitudinal reinforcement approximately equally between the two cages.
- E. Place the reinforcing steel in the wall of the pipe in such a manner that the end hoops of the transverse reinforcement and the ends of the longitudinal reinforcement shall not be more than 1 inch $\pm 1/4$ inch from the extreme end concrete faces of the bell end of pipe.

3.8 SIZES AND DIMENSIONAL TOLERANCES

- A. Minimum pipe length shall be five feet. Maximum pipe length shall not exceed 16 feet.
- B. Pipe shall be round and true and shall have smooth and dense finished surfaces. The internal diameter of any portion of each piece of pipe shall not vary more than $\pm 1\%$ and shall not exceed $3/8$ inch from the nominal diameter shown on the manufacturer's joint data form. The wall thickness shall not be less than that determined in the design by more than 5% and shall not exceed a $3/16$ -inch deviation. A wall thickness more than that required in the design will not be cause for rejection, as long as the reinforcement is properly placed.
- C. Accurately place reinforcement steel in the concrete wall of the pipe. The placement of steel shall not vary from the position in the pipe wall shown in the joint dimension input form by more than $\pm 1/4$ inch. In no case shall the cover over any reinforcement be less than 1 inch. Variations in laying lengths of two opposite sides of pipe shall not be more than $3/8$ inch in any length of pipe except where beveled pipe is used. The under run in length of a section of pipe shall not be more than $1/2$ inch in any length of pipe.
- D. End Squareness: Pipe ends shall lie in planes perpendicular to the longitudinal centerline of the pipe, except for bevel-end pipe used for bends. Spigot ends shall be true to such plane within +0 inch, - $1/4$ inch, and bell ends within $\pm 1/4$ inch. Pipe ends of bevel-end pipe shall be true to the bevel plane within the above tolerances.
- E. Inside Offset: When laid and joined in trench, maximum offset on the inside at any joint shall not exceed 0.75% of the inside diameter of the pipe or $1/2$ inch, whichever is less.

3.9 BASIS OF ACCEPTANCE

- A. Basis of acceptance shall be in accordance with ASTM C361 and the following: "Freedom of defects" shall also include the ability of the pipe joints to be assembled in the field and pass the joint leakage tests.
- B. Joints shall be confirmed within tolerances stated in the submitted USBR Joint Dimension Input Form prior to delivery. Measure the outside diameter of each spigot at no less than six locations using a pole-mounted caliper with micrometer accurate to 0.001 inch and mark on the pipe the dimensions as measured. Measure the inside diameter of each bell at no less than six locations using a pole-mounted micrometer and shall mark on the pipe the measured dimensions.

3.10 CAUSES FOR REJECTION

- A. Pipe is rejected for any of the following reasons:
 - 1. Transverse reinforcing steel found to be in excess of 1/4 inch out of specified position in any direction after the pipe is molded.
 - 2. A shattering or flaking of concrete at a crack.
 - 3. Bubble voids (bug holes) on the interior and exterior surfaces of the pipe exceeding 1/4 inch in depth unless pointed with mortar.
 - 4. Unauthorized application of any wash coat of cement or grout.
 - 5. A deficiency greater than 6% from the specified wall thickness. The deficiencies in wall thickness permitted herein do not apply to gasket contact surfaces. Tolerances of such contact surfaces shall be submitted for review.
 - 6. A variation of the pipe barrel from the specified internal diameter in excess of 1% or interior surfaces that have been reworked after placing of the concrete.
 - 7. A piece broken from the end projections of the pipe that has a circumferential length exceeding 60 degrees of the circle, extends into the body of the pipe, or extends into the gasket contact surfaces for a circumferential length in excess of six inches (measured at the midpoint of the gasket contact surface on the bell end and at the inner shoulder of the gasket groove at the spigot end). If two or more pieces are broken from an end projection, the total length of such broken pieces on any end shall not exceed 90 degrees of the circle, and there shall be a distance of at least nine inches of sound concrete between breaks. The total length of broken pieces that extend into the gasket contact surfaces of gasketed joint pipe shall not exceed a circumferential length of six inches. If less than six inches of sound concrete exists between two individual breaks, the two breaks shall be considered as one continuous break. Repair of such defects not exceeding the above limitations shall be made by Method III. Unsound portions of end projections shall be removed, and if the pieces removed do not exceed the above limits, the pipe may be similarly repaired.

8. Defects that indicate imperfect molding of concrete or any surface defect indicating honeycomb or open texture (rock pockets) greater in size than an area equal to a square with a side dimension of two and one-half times the wall thickness or deeper than two times the maximum graded aggregate size or a local deficiency of cement resulting in loosely bonded concrete, the area of which exceeds in size the limits as provided in Paragraph 7 above. Sand rings occurring at the ends of the pipe may be repaired for the full circumference.
9. Any of the following cracks:
 - a. A crack having a width of 0.01 inch or more throughout a continuous length of 12.0 inches or more.
 - b. Any crack extending through the wall of the pipe and having a length in excess of the wall thickness.
 - c. Any crack showing two visible lines of separation for a continuous length of two feet or more or an interrupted length of three feet or more anywhere in evidence, both inside and outside, except where such cracks occur during the external loading test.
 - d. Any crack which extends through the bell of the pipe.
 - e. When required by the Owner's Representative, any crack 0.01 inch wide or wider that is not a cause for rejection shall be filled with neat cement grout composed of cement mixed with water to a fluid consistency.
10. Failure to meet the size and dimensional tolerances stated herein. Failure to meet the joint tolerances shown for the joint design on the manufacturer's joint data form.
11. Failure to meet the leakage test requirements.

3.11 REPAIR OF IMPERFECTIONS

- A. Method I, Repair by Pneumatically Applied Mortar: Do not use pneumatically applied mortar when the repair extends to a depth greater than the embedment of the reinforcing steel. Repair with nonshrink mortar. Unless other methods are approved in writing by the Owner's Representative, this is the only method of repair allowed.
 1. Preparation of Surface To Be Repaired: Prepare surfaces to which pneumatically applied mortar is to be applied in the same manner as described under Method II, except bevel the edges of the area from which unsound or imperfect concrete is removed so as not to entrap rebound.
 2. Placement of Mortar:
 - a. Do not include rebound in the repair. Turn the pipe so that the area being repaired is at the side of the pipe in a near vertical position to permit rebound to fall clear.

- b. Before repairing grooved concrete spigots, replace the snap ring and retain in position until the repair has attained sufficient strength to assure no damage to the gasket groove by its removal.
 - c. Build up areas repaired with pneumatically applied mortar in excess of the dimension required and then carefully trim to correspond with adjacent surfaces.
 3. Curing: Cure surfaces to which pneumatically applied mortar have been applied in the same manner as described under Method II.
- B. Method II, Repair by Hand-Placed Mortar:
 1. Preparation of Surfaces To Be Repaired:
 - a. Remove unsound or imperfect concrete by chipping. Edges where concrete has been chipped out shall be sharp and square with the surface, leaving no feathered edges. Wash the chipped area with water to remove all loose material and concrete dust.
 - b. Keep surfaces within the trimmed areas wet for several hours, preferably overnight, before the repair replacement is made. Surfaces in areas to be repaired shall be damp, but not wet, when the material is applied.
 2. Placement of the Mortar:
 - a. The mortar used for the repair shall contain the same proportions of cement and sand as the mix from which the pipe was made.
 - b. This mortar shall be preshrunk by mixing it to a plastic consistency as far in advance of its use as possible. Make and age trial mixes to determine the longest period the mortar's use can be delayed while retaining sufficient plasticity to permit good workmanship.
 - c. Immediately prior to the application of the mortar, thoroughly scrub the damp surface of the area to be repaired with a small quantity of neat cement grout, using a wire brush. Sweep away remaining loose sand particles immediately before application of the mortar.
 - d. Compact the mortar into the space to be filled, taking care to eliminate air pockets and to secure bond at the edges. Shape and finish the surfaces to correspond with the adjacent surfaces of the pipe.
- C. Method III, Bonding Mortar Repairs With Epoxy Resin Adhesives:
 1. Preparation of Surfaces To Be Repaired:
 - a. Remove unsound or imperfect concrete by chipping. If hand-placed mortar is to be used, leave the edges sharp and square with the surface. If pneumatically applied mortar is to be used, bevel the edges.

- b. Keep the area to be repaired dry. Remove loose material and concrete dust remaining after the chipping operation by means of an air jet.
- c. Prime the prepared area with the epoxy resin compound, taking care to ensure intimate contact with the base material. Apply mortar before the epoxy resin compound sets. Apply mortar by either Method I or Method II as described above.

3.12 STORAGE AND DELIVERY

- A. Do not transport to the jobsite more than two weeks in advance of installing. Do not deliver pipe unless it can be installed in the sequence of the submitted layout schedule. Deliver the pipe alongside the pipe laying access road over which the pipe trailer-tractors can travel under their own power. Place the pipe in the order in which it is to be installed and secure it from rolling.

3.13 INSTALLING PIPE SPOOLS IN CONCRETE

- A. Install pipes in walls and slabs before placing concrete.
- B. Install pipe without springing, forcing, or stressing the pipe or any adjacent equipment or structure.

3.14 VERTICAL CURVES

- A. For curved profile, use straight or beveled pipe of normal or one-half normal lengths pulled partially open on one side of the joint or use pipes with a bend of up to five degrees next to the joint ring. Design pipes with a bend in excess of five degrees as specials.
- B. Do not pull a joint more than one-half of the watertight extensibility provided by the bell-and-spigot design.

3.15 INSTALLING BURIED PIPING

- A. When installing piping in trenches, do not deviate more than one inch from line or 1/4 inch from grade. Measure for grade at the pipe invert.

3.16 FIELD HYDROSTATIC TESTING

- A. Hydrostatically test piping for leakage in accordance with Section 40 05 00 – Pipe and Fittings.

END SECTION

SECTION 35 20 16

WATER CONTROL GATE

PART 1 GENERAL

1.1 WORK INCLUDED

- A. The work required under this section consists of related items necessary and required to complete the work. The Contractor shall provide all items, and operations, including all labor, materials, equipment, and incidentals necessary for completion of work.
- B. Furnish and install canal gates in the Liberty Canal Turnout
 - 1. 2 – 42" Diameter Model 101C, as manufactured by Fresno Valves & Castings or equivalent.
- C. Furnish and install canal gate in the Conveyance Channel Outlet
 - 1. 1 – 48" Diameter Model 20-10C, as manufactured by Fresno Valves & Castings or equivalent.

1.2 RELATED WORK

- A. Section 03 15 20 – Anchor Bolts and Expansion Anchors
- B. Section 03 30 00 – Cast In Place Concrete
- C. Section 09 90 00 – Painting and Coating

1.3 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittals.
- B. Acknowledgment that products submitted meet the requirements of standards referenced.
- C. Operation and Maintenance Manuals:

1.4 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Society for Testing Materials (ASTM):
 - a. A126, Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - b. A276, Stainless and Heat-Resisting Steel Bars and Shapes.
 - c. D4020 UH MWP

- d. B139, Phosphor Bronze Rod, Bar and Shapes
- e. B209, Aluminum and Aluminum Alloy Sheet and Plate.
- 2. American Water Works Association (AWWA):
 - a. C513-05, Open Channel, Fabricated-Metal Slide Gates and Open-Channel, Fabricated-Metal Weir Gates.
 - b. C560-00, Cast-Iron Slide Gates.
- 3. Powered Gates
 - a. National Electrical Manufacturers Association (NEMA):
 - 1) 250, Enclosures for Electrical Equipment.
 - 2) ICS 6, Enclosures for Industrial Control and System.
- 4. NFPA Style MF1.

PART 2 PRODUCTS

2.1 CANAL SLIDE GATES

- A. Slide gates shall be Model 101C or Model 20-10C (as indicated), flat back, as manufactured by Fresno Valves & Castings or Engineer approved equivalent.
- B. Gate rails shall be stainless steel. Gate stem shall be stainless steel, rising type. Gate slide and seating surface shall be bronze.
- C. Provide gates, including lift, designed with a minimum safety factor of five. Provide rising stems on all gates.

2.2 GATE OPERATORS AND LIFTS

- A. General
 - 1. Refer to Drawings for sizes, operator type, and other requirements.
 - 2. All gates shown on the plans to be manually operated shall be designed with adequate stem length and frame hardware, to accept electric actuators in the future.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Canal slide gates shall be installed as shown on the Plans and as detailed in the manufacturer's specifications and installation instructions.

1. Gate frames shall be bolted to concrete structures so that the frames are plumb and the slides operate properly.
 2. Gate frames shall be secured within 12 inches of the top of the headwall.
- B. All gate operators, manual or electric, shall be installed so that the operating nut is located three (3) feet above finished grade, or 1 foot above top of structure, whichever is the higher elevation, unless otherwise noted on the plans.

3.2 TESTING

- A. All gates shall be tested for proper operation after installation
1. All tests shall be performed under both manual and electrical (where applicable) operation.
 2. All tests shall be performed in the presence of the Engineer.
- B. The above tests will be repeated by the County after water has been returned to the system, and the Contractor will be informed of the results.

END SECTION

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SECTION 40 05 00
PIPE AND FITTINGS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Furnish, install, and test all water, utility, pipe, fittings, and appurtenances as indicated and as specified.

1.2 RELATED WORK

- A. Section 03 05 10 – Leakage Testing of Hydraulic Structures
- B. Section 03 30 00 - Cast-In-Place Concrete
- C. Section 09 90 00 - Painting and Coating
- D. Division 31 - Earthwork
- E. Section 33 11 12 – Reinforced Concrete Low-Head Pressure Pipe

1.3 REFERENCES

- A. California Plumbing Code
- B. American Water Works Association Standards

1.4 SUBMITTAL REQUIREMENTS

- A. Submit shop drawings in accordance with the General Conditions.
- B. Submit manufacturer's catalog data. Show manufacturer's model number.
- C. Submit dimensions including wall thickness and materials of construction by reference standard and grade. Submit information on interior and exterior coatings as applicable.

1.5 QUALITY ASSURANCE

- A. All work performed under this section shall meet all recommendations and requirements of AWWA, California Plumbing Code, NFPA 24, ASTM D2774, and all other applicable national, state, local, standards and regulations.

PART 2 PRODUCTS

2.1 RUBBER GASKETED REINFORCED CONCRETE PIPE (RGRCP)

- A. See Section 33 11 12 – Reinforced Concrete Low-Head Pressure Pipe.

2.2 STEEL PIPE

- A. General: Steel pipe 12-inches in diameter and smaller shall conform to the requirements of ASTM A53, and shall be "Standard Weight".
- B. Joints: Pipe 4-inches in diameter and larger shall be flanged, plain end, or beveled end. Where shown on the Plans, the pipe shall be flanged, plain end, or beveled end for flanged coupling adapters or field welding. Field welding of plain end and beveled end joints shall be in accordance with AWWA C206 and AWWA C200. Flanges shall be standard 150 psi flanges meeting the requirements of ANSI B16.1. Flanges shall be furnished with flat faces. Unless otherwise stated, bolts shall comply with ASTM A307, except for bolts installed underground which shall be Type 316 stainless steel, Grade B, conforming to the requirements of ASTM A320.
- C. Pipe smaller than 4 inches shall have screwed or grooved joints unless shown otherwise on the Plans.
- D. Fittings: All fittings shall be either cast or fabricated steel with flange or beveled end where specified. Steel fittings shall comply with AWWA C208 or Schedule 40, as indicated on the Plans, and welding of said fittings shall comply with AWWA C206. The fitting wall thickness shall be no less than the adjoining pipe wall thickness. The Contractor may substitute welded fittings for flanged fittings or screwed fittings unless the particular joint requires a specific end for compatibility with a valve or special fitting, with Engineer approval.
- E. Unless otherwise specified or noted in the Plans, all steel pipe shall be Hot-Dipped galvanized.

2.3 STAINLESS STEEL TUBING

- A. Stainless steel tubing shall be made of Type 316 L stainless steel to the requirements of ASTM A269, of minimum 1/4-inch inside diameter, or as indicated, for the test pressure required. The fittings shall be swage ferrule design of Type 316 L stainless steel, of the double acting ferrule design, providing both a primary seal and a secondary bearing force. Flare bite or compression type fittings are not acceptable.

2.4 FLEXIBLE SLEEVE COUPLINGS

- A. Flexible sleeve couplings shall be one of the following, or Engineer approved equivalent:
 - 1. Romac Industries, Inc., Style 400 for 12" and larger pipe or XR501 Extended Range Coupling, 4" thru 12" pipe size.
 - 2. Dresser, Inc., Style 38 for Steel Pipe, and Style 253 Wide- Range for Steel, PVC, Copper, and Cast/Ductile Iron pipe.
 - 3. Smith Blair, Inc., Series 411 or Wide-Range 461
- B. Center sleeves shall comply with the following

Nominal Pipe Diameter	Minimum Sleeve Length
6 inch and smaller	Manufacturer's Standard
8 through 14 inch	7 inch
14 inch and larger	10 inch

2.5 CONCRETE FOR THRUST BLOCKS

- A. As specified in Section 03 30 00 – Cast-In-Place Concrete. Concrete thrust blocks to be provided at all pipeline bends, whether or not shown on the Plans.

2.6 FASTENERS

- A. All fasteners shall include washers under both bolt head and nut unless the use of washers is incompatible with the fitting design.
- B. Unless otherwise noted, all bolts, tie rods, and T-bolts used to secure flanges, fittings, and couplings located underground or submerged in liquid shall be Type 304 or 316 stainless steel per ASTM A320 or ASTM A193. Nuts shall be 304 or 316 stainless steel per ASTM A194 and washers shall be ASTM F436 Type 3.
- C. Unless otherwise noted, all bolts, tie rods, and T-bolts used to secure flanges, fittings, and couplings located indoors, above grade, and in vaults shall be carbon steel conforming to ASTM A307, Grade B with ASTM A563, Grade A nuts and ASTM F436 washers. Bolts, nuts, and washers shall be hot dipped galvanized in accordance with ASTM F2329. Stainless steel meeting the requirements of Paragraph B shall also be acceptable.

PART 3 EXECUTION

3.1 HANDLING AND DISTRIBUTION OF MATERIALS

- A. Delivery: Handle pipe carefully to ensure delivery at the project site in sound, undamaged condition. Contractor shall replace damaged pipe at no additional expense to the Owner.
- B. Storage: Do not store materials directly on the ground. Adequately support piping to prevent warping. Use protective covers where pipe may be damaged by direct sunlight.
- C. No more than one week's supply of material shall be distributed in advance of pipe laying operations, unless otherwise approved or required.
- D. Before laying, pipe shall be inspected for cracked, broken, or defective pieces. Such pieces shall be rejected. Pipe shall be carefully lowered into the trench to prevent damage. All dirt or other foreign matter shall be removed from inside the pipe before lowering into the trench.

3.2 COATING

- A. Unless otherwise indicated in Part 2, all pipe and fittings shall be coated in accordance with specification 09 90 00.

3.3 *INSTALLATION OF BURIED PRESSURE PIPING*

- A. General: Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's instructions.
- B. Handling: The pipe shall be protected to prevent entrance of foreign materials during laying operations. When laying is not in progress, open pipe ends shall be protected with a watertight plug or other approved means to exclude water or foreign material.
- C. Alignment:
 - 1. Mains shall be installed to the grades and elevations indicated and shall have a minimum cover of 36-inches from the top of the pipe to existing ground or paved surface unless otherwise indicated.
 - 2. The allowable angle of deflection at any joint shall not exceed the amount recommended by the pipe manufacturer for the particular pipe size used. Deviation of any pipe section from the line and grade indicated shall not exceed 1/2-inch.
- D. Joints:
 - 1. Pipe shall be assembled and joined in accordance with the manufacturer's published instructions for the type of pipe and joint used. All portions of the joints shall be thoroughly cleaned before the sections of pipe are assembled. The ends of each pipe shall abut against the next pipe section in such a manner that there shall be no unevenness of any kind along the bottom half of the interior of the pipe. Where mechanical joints are used, the pipe shall be marked in such a manner that it can be determined after installation that the pipe is properly seated.
 - 2. Where flexible couplings are used as expansion joints, the ends of the pipes shall be separated 1-inch to allow for expansion. The welded seam at the end of each coupled steel pipe shall be ground smooth for approximately 12-inches. Couplings shall be centered on pipe ends. Runs of pipe containing flexible couplings shall be properly blocked, anchored or tied to the structure to prevent joints from separating.
 - 3. Mechanical restrained joints shall be installed in accordance with joint manufacturer's instructions and recommendation.

3.4 *THRUST BLOCKS OR MECHANICAL RESTRAINED JOINTS*

- A. Thrust blocks shall be used only where specifically allowed on the drawings or with prior approval by the Engineer.
- B. Place concrete thrust blocks at all tees, elbows, plugs, and other locations where unbalanced forces exist in underground pipe in accordance with details shown. Place blocks between undisturbed ground and fitting to be anchored. Place blocking so that pipe and fittings will be accessible for repairs. Thrust blocks shall be of such

size as to give bearing against undisturbed vertical earth banks sufficient to absorb the thrust from line pressure, allowing a maximum earth bearing pressure of 1,500 pounds per square foot per foot of depth below natural grade or as shown.

- C. Restrained joint fittings may be used in-lieu of thrust blocks, at the discretion of the Engineer. Contractor shall submit shop drawings showing methods of joint restraint for each type of restrained joint fitting to be used including the length of pipe having restrained push-on joints on all pipes which connect to the restrained fitting.
- D. When it is necessary to restrain push-on joints adjacent to restrained fittings, a harness restraint device shall be used. All harnesses shall have a pressure rating equal to that of the pipe on which it is used. Harness assemblies including tie bolts conform to ASTM A536.

3.5 *INSTALLATION OF EXPOSED PIPING*

- A. General - Pipe shall be installed as specified, as indicated on the Plans or, in the absence of detail piping arrangement, in a manner acceptable to the Engineer.
- B. Pipe shall be cut from measurements taken at the site and not from the Plans. All necessary provisions shall be taken in laying out piping to provide throughout for expansion and contraction. Piping shall not obstruct openings or passageways. Pipes shall be held free of contact with building construction so as not to transmit noise resulting from expansion.
- C. The inside of all pipe, valves, and fittings shall be smooth, clean, and free from blisters, loose mill scale, sand, dirt, and other foreign matter when erected. The interior of all lines shall be thoroughly cleaned, to the satisfaction of the Engineer, before being placed in service.
- D. In all piping except air piping, insulating fittings shall be provided to prevent contact of dissimilar metals.
- E. Pipe Joints - Pipe joints shall be carefully and neatly made in accordance with the requirements that follow.
 - 1. Threaded - Pipe threads shall conform to ANSI/ASME B1.20.1, NPT, and shall be full and cleanly cut with sharp dies. Not more than three threads at each pipe connection shall remain exposed after installation. Ends of pipe shall be reamed, after threading and before assembly, to remove all burrs.

Threaded joints in plastic piping shall be made up with Teflon thread tape applied to all male threads. Threaded joints in stainless steel piping shall be made up with Teflon thread sealer and Teflon thread tape applied to all male threads. At the option of the Contractor, threaded joints in other piping may be made up with Teflon thread tape, thread sealer, or a suitable joint compound. Thread tape and joint compound or sealers shall not be used in threaded joints that are to be seal welded.

Threaded joints in steel piping for chlorine service shall be made up with Teflon thread tape or paste applied to all male threads.

2. Compression - Ends of tubing shall be cut square and all burrs shall be removed. The tubing end shall be fully inserted into the compression fitting and the nut shall be tightened not less than 1-1/4 turns and not more than 1-1/2 turns past finger tight, or as recommended by the fitting manufacturer, to produce a leak tight, torque-free connection.
3. Flared - Ends of annealed copper tubing shall be cut square and all burrs shall be removed prior to flaring. Ends shall be uniformly flared without scratches or grooves. Fittings shall be tightened as required to produce leak tight connections.
4. Soldered and Brazed - Where solder fittings are specified for lines smaller than 2 inches, joints may be soldered or brazed at the option of the Contractor. Joints in 2 inch and larger copper tubing shall be brazed.
5. Flanged - Flange bolts shall be tightened sufficiently to slightly compress the gasket and effect a seal, but not so tight as to fracture or distort the flanges. A plain washer shall be installed under the head and nut of bolts connecting plastic pipe flanges. Anti-seize thread lubricant shall be applied to the threaded portion of all stainless steel bolts during assembly. Connecting flanges shall have similar facings, i.e., flat or raised face.
6. Welded - Welding shall conform to the specifications and recommendations contained in the "Code for Pressure Piping", ANSI B31.1.
7. Grooved Couplings - Grooves for grooved couplings shall be cut with a specially designed grooving tool. Grooves cut in steel pipe shall conform to flexible grooving dimensions as set forth in AWWA C606 and shall be clean and sharp without burrs or check marks.

3.6 ACCEPTANCE TESTS AND INSPECTION FOR GRAVITY PIPING

A. General

1. All testing and inspection shall be performed after final backfill and compaction operations are complete. If the Contractor so desires, he may pretest the lines at his own expense, but final testing must be performed after compaction requirements have been approved.
2. If any of the tests or inspections covered in this section indicates that sewers require repair, then after repairs are complete, all testing and inspection shall be performed again. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

B. Low-Pressure Air Test

1. Supply air to the test section slowly. A constant pressure of 3.5 psig shall be reached and maintain internal pressure of at least 3.0 psig for at least five (5) minutes.

2. After the stabilization period, disconnect the air supply. A pressure loss of 0.5 psig is used to compute the allowable pressure loss using the following formula.
3. The minimum allowable time in minutes for such a pressure drop is determined from the formula $T_{\min} = 0.000183D^2L$, where:
 - a. D = Nominal inside diameter of pipe (inches)
 - b. L = Length of pipe test section (feet)
4. Regardless of the formula, the minimum time allowed for pressure drop shall be eight (8) minutes.
5. The pressure gage for monitoring the air pressure shall have a minimum division of 0.10 psi increments.
6. A valid test is when the air pressure is released from the opposite end of the inlet air entry connection with an air release apparatus outlet connection.
7. Adjustment of Pressure for Groundwater. Should the pipe section being tested lie below the local groundwater table, the test pressures shall be raised in proportion to the depth of the centerline of the pipe below the water table. Additional pressure (beyond the 3.5 psig specified above) shall be added at the rate of 0.433 psig per foot of depth below groundwater.

3.7 ACCEPTANCE TESTS FOR BURIED PRESSURE PIPING

A. General

1. All testing and inspection shall be performed after final backfill and compaction operations are complete. If the Contractor so desires, he may pretest the lines at his own expense, but final testing must be performed after compaction requirements have been approved.
- B. In general, tests shall be conducted in accordance with AWWA C600 and C651 except as otherwise herein specified.
- C. All newly installed sections of buried pressure piping shall be pressure and leakage tested as described herein.
1. For buried pressure pipelines, tests shall be made on two or more valved sections not to exceed 2,500 feet in length. The Contractor shall furnish all necessary equipment, material and labor required.
 2. Tests shall be made after the trench has been backfilled and compacted, but not until at least 5 days have elapsed since any thrust blocks in the section have been poured.
 3. The pipe shall be slowly filled with water and ensuring all air expelled from section being tested. The line shall stand full of water for at least twenty-four hours prior to testing to allow all air to escape. A test pressure equal to 1.5

times the design pressure, of the pipe measured at the point of lowest elevation pressure, or 100 psi, whichever is greater, shall be applied.

4. The test pressure in the line shall be maintained for a period of 2 hours. Test pressure shall be maintained within 5 psi during the test period. Conduct a leakage test concurrently with the pressure test. Leakage is defined as the volume of water that must be supplied into the newly laid pipeline to maintain pressure within +/- 5 psi of the test pressure after it is filled and purged of air. The water required to maintain test pressure shall be measured by means of a graduated barrel, drum, or similar device at the pump suction or through a meter.

Allowable leakage at the specified test pressure shall not exceed the amounts allowed by AWWA C600, $L = \frac{SD\sqrt{P}}{148,000}$

Where:

L = Allowable fluid loss, in gallon per hour.

S = Length of pipe tested, in feet.

D = Nominal diameter of the pipe, in inches.

P = Average test pressure during the hydrostatic test, in pounds per square inch (psi).

Hydrostatic testing allowance per 1,000 ft. of pipeline in gph.

PSI	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
200	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29
175	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15
150	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99
125	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81
100	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62

5. Should testing disclose any visible leaks or leakage greater than that allowed, the defective joints or pipe shall be located, repaired, and re-tested until satisfactory. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

END OF SECTION

SECTION 40 91 24
PROPELLER METER

PART 1 GENERAL

1.1 *WORK INCLUDED*

- A. Furnish and install two (2) open propeller flow meters as indicated in the Plans.

1.2 *RELATED WORK*

- A. Division 03 - Concrete
B. Section 40 05 00 – Piping and Fittings

1.3 *GENERAL*

- A. Equipment furnished and installed under this section shall be placed in operating condition in full conformity with drawings, specifications, engineering data, instructions and recommendations of the equipment manufacturer unless exceptions are noted by the Engineer.
- B. This unit shall be furnished and installed complete with all anchors and supports; all mechanical and electrical equipment required for proper operation, and all additional materials or construction required by manufacturers design.

1.4 *SERVICE CONDITIONS*

- A. Open Flow Propeller Meter

1. Open flow propeller meter shall include the following features as indicated below:

	<u>New</u>
No. of Units	2
Flow meter Size, inches, diameter	42
Flow range, gpm	2,200-22,000
Accuracy within flow range, percent	± 2

2. The meter shall be a 42" McCrometer M1700 open flow meter installed per the Plans and manufacturer's requirements or approved equivalent.
3. The new flowmeter shall have a rate of flow indicator calibrated in gallons per minute, and a totalizer in Acre Feet.

1.5 SUBMITTALS

- A. As specified in the General Conditions and Section 01 33 00 – Submittals.
- B. Complete data, and detailed drawings of the equipment.

PART 2 PRODUCTS

2.1 OPEN FLOW PROPELLER METER

- A. The new open propeller meters shall be 42" McCrometer M1700 open flow meters or approved equivalent.
- B. The open flow meters shall be constructed of stainless steel and incorporate bronze mounting brackets that permit simple installation and removal.
- C. Propeller bearings shall be stainless steel and shall be factory lubricated for the life of the meter.
- D. The register shall be hermetically sealed within a die cast aluminum case including a domed acrylic lens and hinged lens cover with locking hasp.
- E. Mechanical register indicating instantaneous flow in gallons per minute and totalizer in acre-feet.

PART 3 EXECUTION

3.1 INSTALLATION

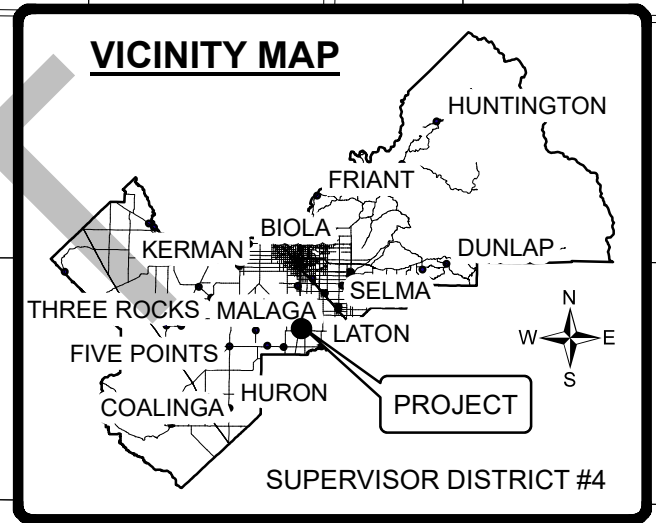
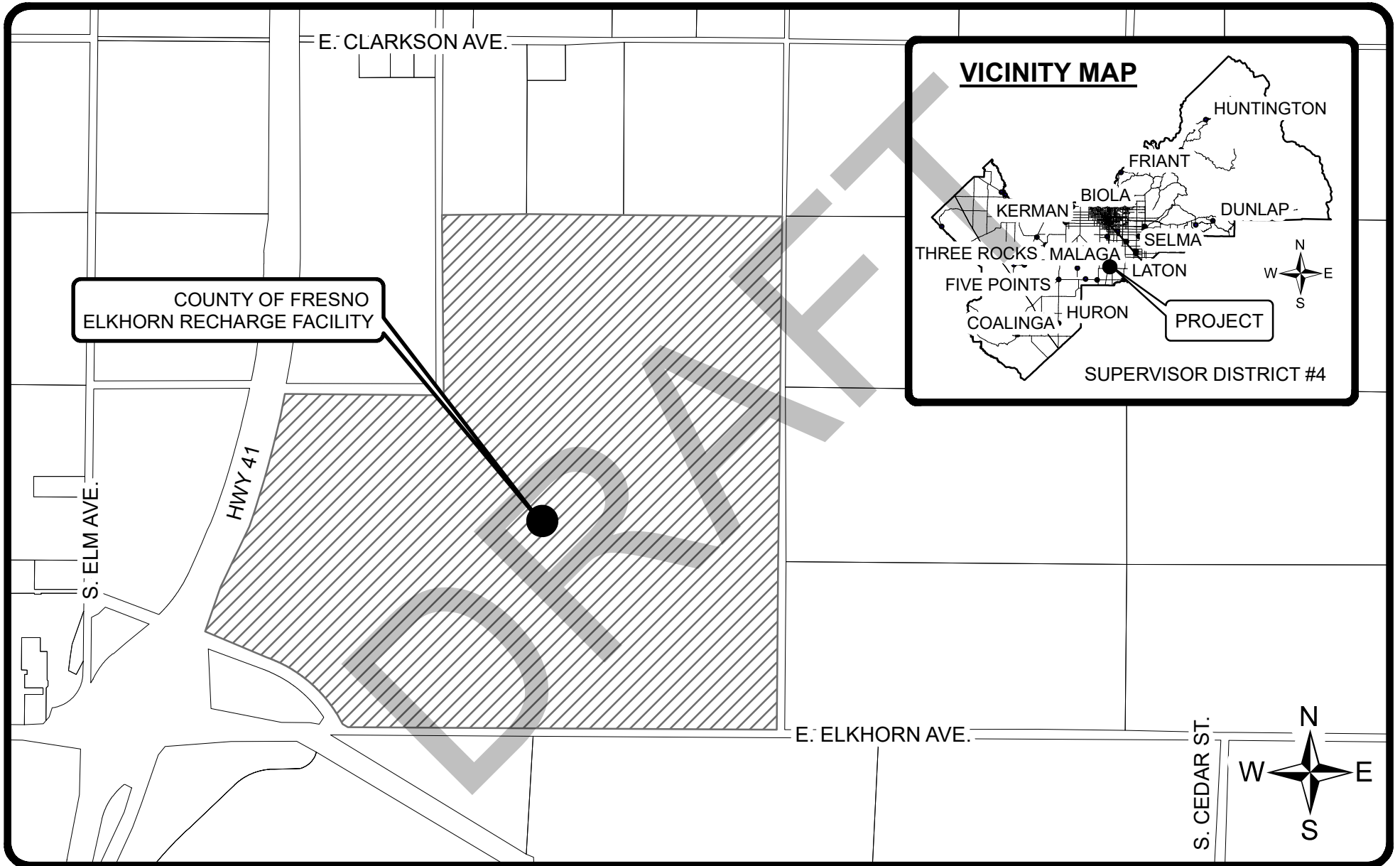
- A. The new propeller meters shall be installed in as indicated in the Plans and per manufacturer's requirements.
- B. Following the completion of installation, the new flow meters shall be tested for proper operation using clean water. At least 20000 gallons shall be passed through the meter during the test. Readings on totalizer shall be recorded to verify accuracy of meter.

END SECTION

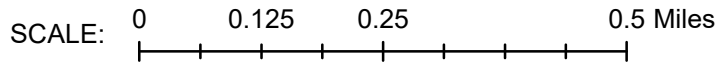
Project Details

DRAFT

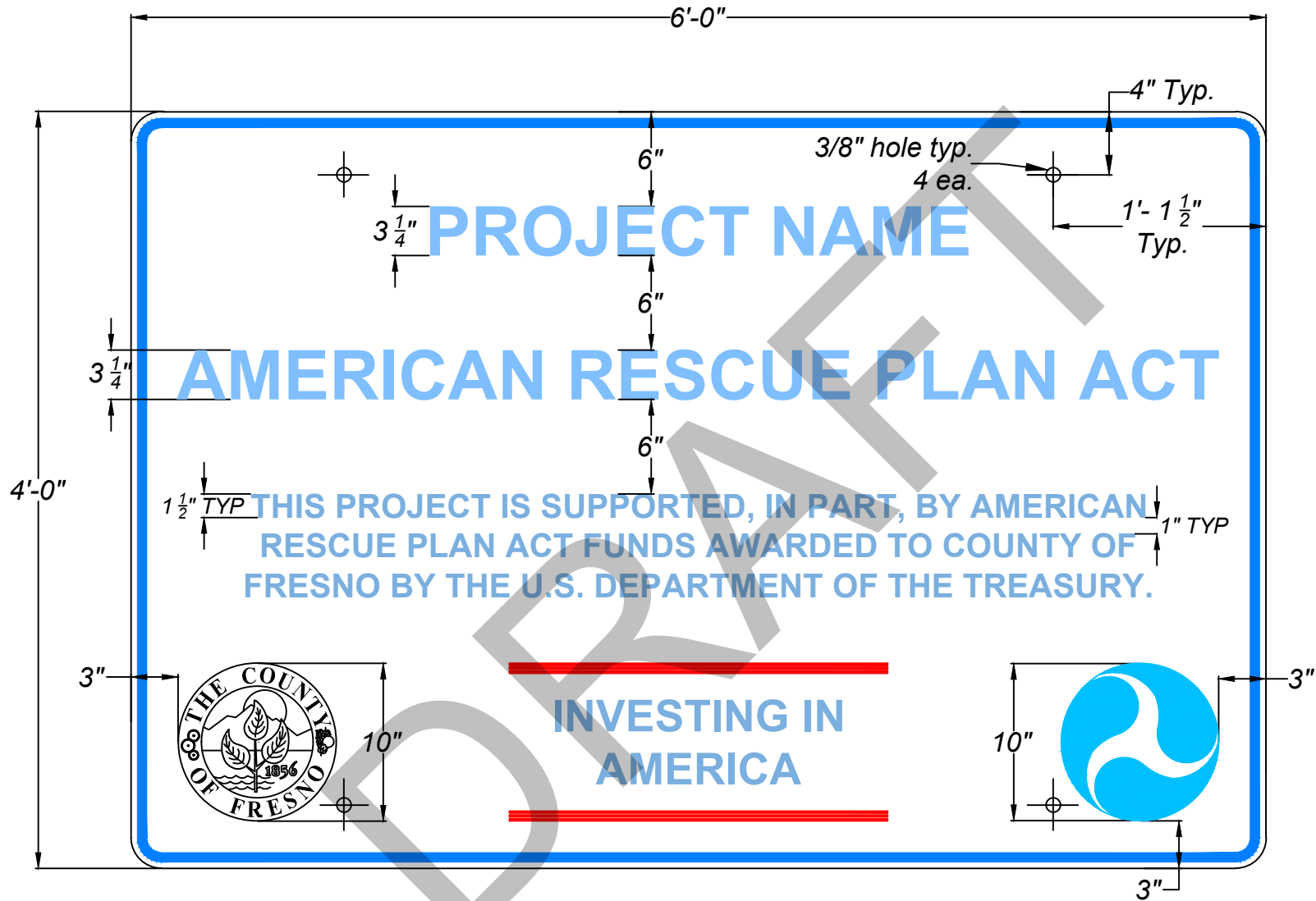
**PROJECT
COUNTY OF FRESNO
ELKHORN RECHARGE FACILITY**



DEPARTMENT OF PUBLIC WORKS
AND PLANNING



LOCATION MAP



	DATE:	SCALE: NONE		DEPARTMENT OF PUBLIC WORKS AND PLANNING
DESIGNED: N/A		DRAWING NO. XX		CONSTRUCTION PROJECT FUNDING SIGN
DRAWN: R.O.J.				
CHECKED: S.A.				



GEOTECHNICAL ENGINEERING INVESTIGATION

ELKHORN RECHARGE FACILITY PROJECT

NORTHEAST CORNER OF ELKHORN AVENUE

AND HIGHWAY 41

FRESNO COUNTY, CALIFORNIA

Project Number: A55568.01

For:

Mr. Kevin R. Johansen, P.E.
Provost & Pritchard Consulting Group
455 West Fir Avenue
Clovis, California 93611-0242

January 26, 2024



January 26, 2024

A55568.01

Mr. Kevin R. Johansen, P.E.
Provost & Pritchard Consulting Group
455 West Fir Avenue
Clovis, California 93611-0242

Subject: **Geotechnical Engineering Investigation
Elkhorn Recharge Facility Project
Northeast Corner of Elkhorn Avenue and Highway 41
Fresno County, California**

Dear Mr. Johansen:

We are pleased to submit this geotechnical engineering investigation report prepared for the proposed Elkhorn Recharge Facility Project planned for Fresno County Department of Public Works and Planning, to be located northeast of the corner of Elkhorn Avenue and Highway 41 in Caruthers, Fresno County, California. The contents of this report include the purpose of the investigation, scope of services, background information, investigative procedures, our findings, evaluation, conclusions, and recommendations.

We appreciate the opportunity to be of service. If you have any questions regarding this report, or if we can be of further assistance, please contact us at your convenience at (800) 268-7021.

Sincerely,
MOORE TWINING ASSOCIATES, INC.

Shaun Reich, EIT
Project Engineer

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**GEOTECHNICAL ENGINEERING INVESTIGATION
ELKHORN RECHARGE FACILITY
NORTHEAST CORNER OF ELKHORN AVENUE
AND HIGHWAY 41
FRESNO COUNTY, CALIFORNIA**

Project Number: A55568.01

1.0 INTRODUCTION

This report presents the results of a geotechnical engineering investigation for the improvements planned for the Elkhorn Recharge Project, located northeast of the corner of Elkhorn Avenue and State Route 41, near Caruthers, in Fresno County, California. Moore Twining Associates, Inc. (Moore Twining) was authorized by Provost & Pritchard to perform this geotechnical engineering investigation.

The contents of this report include the purpose of the investigation and the scope of services provided. The site history, previous studies, site description, and anticipated construction are discussed. In addition, a description of the investigative procedures used and the subsequent findings obtained are presented. Finally, the report provides an evaluation of the findings, general conclusions, and related recommendations. The report appendices contain the drawings (Appendix A), the logs of borings (Appendix B), and the results of laboratory tests (Appendix C).

The Geotechnical Engineering Division of Moore Twining, headquartered in Fresno, California, performed the investigation.

2.0 PURPOSE AND SCOPE OF INVESTIGATION

2.1 Purpose: The purpose of the investigation was to conduct an exploration program, evaluate the data collected during the field investigation and laboratory testing, and provide geotechnical engineering recommendations for project design.

- 2.1.1 Recommendations for 2022 California Building Code seismic coefficients and earthquake spectral response acceleration values;
- 2.1.2 Geotechnical parameters for use in design of the drainage structures, (e.g., soil bearing capacity, lateral earth pressures, settlement, etc.);
- 2.1.3 Analysis of slope stability to provide recommendations for grading of the canal and basin side slopes;
- 2.1.4 Analysis of fill slope stability for the earthen berms in the shooting range area;

- 2.1.5 Recommendations for site preparation including placement, moisture conditioning, and compaction of engineered fill soils;
- 2.1.6 Recommendations for temporary excavations, trench excavation, and trench backfill;
- 2.1.7 Discussion of potential liquefaction and seismic settlement impacts;
- 2.1.8 Conclusions regarding soil corrosion potential.

This report is provided specifically for the proposed improvements described in the Anticipated Construction section of this report. This investigation did not include a geologic/seismic hazards evaluation, seepage analysis, liquefaction analysis, scour analysis, environmental investigation, or environmental audit.

2.2 Scope: Our proposal, reference MTP23-0336, with a revised date of June 7, 2023, outlined the scope of our services. The actions undertaken during the investigation are summarized as follows.

- 2.2.1 A 60% progress Plan Set entitled Elkhorn Recharge Facility, prepared by Provost and Pritchard, dated August 7, 2023, was reviewed.
- 2.2.2 A report titled “Subsurface Exploration and Preliminary Assessment of Infiltration Characteristics, Proposed Recharge Basin Site Northeast Corner of Elkhorn Avenue and Highway 41, Fresno County, California,” prepared by Moore Twining, dated May 9, 2016, was reviewed.
- 2.2.3 A report prepared by our firm titled “Subsurface Exploration and Preliminary Assessment of Infiltration Characteristics; Proposed Recharge Basin; Northeast of Intersection of Elkhorn Avenue and Highway 41, Fresno County, California”, Final dated October 23, 2020, was reviewed.
- 2.2.4 A visual site reconnaissance and subsurface exploration were conducted.
- 2.2.5 Satellite images of the site from 1985 to 2023 from online sources, were reviewed.
- 2.2.6 Laboratory tests were conducted to determine selected physical and engineering properties of the subsurface soils encountered.
- 2.2.7 Mr. Kevin Johansen, P.E., (Provost & Pritchard) was consulted during the investigation.

- 2.2.8 The data obtained from the investigation were evaluated to develop an understanding of the subsurface soil conditions and the engineering properties of the subsurface soils.
- 2.2.9 This report was prepared to present the purpose and scope, background information, field exploration procedures, findings, evaluation, conclusions, and recommendations.

The scope of work did not include direct testing of the permeability or infiltration rates of the soils. The investigation did not include a hydrogeologic evaluation or estimates of a specific infiltration rate, nor did it include an assessment of other characteristics of the site which would need to be evaluated to assess the potential for groundwater recharge, such as groundwater quality, groundwater flow direction, land use, or an environmental site assessment.

3.0 BACKGROUND INFORMATION

The site description, site history, previous studies, and the anticipated construction are summarized in the following subsections.

3.1 Site Description: The overall project site is located at the northeast corner of Elkhorn Avenue and State Route 41 near Caruthers, in Fresno County, California. The overall site includes the shuttered Elkhorn Correctional Facility. The immediate site proposed to support the recharge basin is located within the northern portion of the overall property. This area was previously used for agricultural field crops with below-grade irrigation piping. Rodent burrow holes were observed throughout the project site. In addition, at the time of field investigation, an above-grade embankment area was observed within the northern-central portion of the basin which appeared to be about four (4) to five (5) feet above the surrounding grade surface. The embankment areas were fenced, so direct observations were not available. The embankments are assumed to have been constructed as several sewage treatment ponds with related piping and equipment associated with the former correctional facility. The sewage treatment ponds were comprised of several cells that are separated by earthen embankments. In addition, fencing for livestock enclosures and a former shade structure were located within the northeastern portion of the proposed recharge basin area.

In addition, underground concrete irrigation piping was observed in an east to west direction along the southern portion of the drainage basin. It is further assumed that concrete irrigation piping may be present in additional areas not immediately observed at the time of field reconnaissance.

At the time of our field reconnaissance, the overall site had been recently deeply tilled, thus preventing access with truck-mounted drill rig. Unpaved access-roads were located along the property edges. The Elkhorn Correctional Facility area was fenced and an asphalt paved roadway extends from this area to Elkhorn Avenue.

An abandoned well was observed within the northwestern portion of the site, adjacent to a concrete standpipe and various scattered piping and equipment. Another well and concrete pad was observed near the central portion of the conveyance canal alignment. The conveyance canal is proposed to be constructed to the west of the asphalt paved access roadway. At the time of our site reconnaissance, this alignment appeared to contain a ditch with depths of about three (3) to four (4) feet below site grade. The ditch and surrounding areas were observed to support tall dried grass, so the depth and width of the observed ditch is approximate. Soil spoils appeared to the west of the ditch alignment. At the northern portion of the ditch alignment, it appeared that an area was sloped for drainage.

3.2 Site History and Previous Studies: It is our understanding that the subject site has been historically used for agricultural purposes, and for the former Elkhorn Correctional Facility, which closed in 2009.

A report titled “Subsurface Exploration and Preliminary Assessment of Infiltration Characteristics, Proposed Recharge Basin Site Northeast Corner of Elkhorn Avenue and Highway 41, Fresno County, California,” prepared by Moore Twining, dated May 9, 2016, was reviewed. The exploration included three (3) borings and evaluation of soil conditions in the southwest portion of the project area (see Drawing No. 2 in Appendix A for the approximate boring locations). The report states: “On April 4, 5, and 6, 2016, two (2) borings were drilled to a depth of about 100 feet and one (1) boring was drilled to a depth of about 150 feet using a CME-75 hollow-stem auger drilling rig equipped with 6-5/8 inch outside diameter (O.D.) hollow stem augers....The majority (about 3/4) of the subsurface soils encountered in the test borings were granular soils described as silty sands, poorly graded sands, and poorly graded sand with silt. However, these soils were interbedded with clay soils which were described as lean clays and silty clays. Interbedded silt layers were also encountered. The clayey soils layers were typically estimated to be about 5 to 10 feet thick. The majority of the clay soils encountered in the borings were about 25 to 50 feet below site grade (BSG).

The silty sands, poorly graded sands, and poorly graded sand with silt were typically loose to medium dense to depths of about 30 feet BSG, as determined by standard penetration test (SPT) resistance, N-values, ranging from 3 to 17 blows per foot. Below a depth of about 30 feet BSG, the granular soils were medium dense, as determined by standard penetration resistance, N-values, ranging from 11 to greater than 50 blows per foot. The lean clays and silty clays were predominantly stiff to medium stiff, as determined by standard penetration resistance, N-values, ranging from 11 to 28 blows per foot, with medium stiff and hard clay encountered at varying depths. The silts were stiff to very stiff, as determined by standard penetration resistance, N-values, ranging from 15 to 29 blows per foot.

Groundwater was not encountered in the test borings drilled to maximum depth of about 150 feet BSG. Review of the Department of Water Resources (DWR) website and maps of lines of equal elevation in wells for various years between 2006 and 2011 (most recent data) suggest that the groundwater depth in the site area declined from about 115 feet BSG to a depth of 130 feet BSG during the period of 2006 to 2011.

In general, the subsurface soils encountered to the maximum depth explored (150 feet BSG) are indicative of generally favorable conditions for infiltration of water, such as for use of a recharge basin....About three quarters of the soils encountered consisted of granular soils which were described as silty sands, poorly graded sands, and poorly graded sand with silt which are favorable for infiltration of surface water. The granular soils were interbedded with clay soils which were described as lean clays and silty clays. Interbedded silt layers were also encountered. The clayey soils layers were typically estimated to be about 5 to 10 feet thick. The majority of the clay soils were encountered below depths of about 25 to 50 feet below site grade (BSG)...Based on the thickness, depth, and lack of continuity of the clay soils encountered, the clay soils do not appear to present a significant lateral restriction to downward migration of water when considering the overall size of the basin anticipated at the site (proposed 40 to 80 acre basin)."

A report titled "Subsurface Exploration and Preliminary Assessment of Infiltration Characteristics, Proposed Recharge Basin Site Northeast Corner of Elkhorn Avenue and Highway 41, Fresno County, California," prepared by Moore Twining, dated October 23, 2020, was reviewed. The exploration included five (5) borings and evaluation of soil conditions in the central and eastern portion of the project area. The report states: "On August 28th, 31st, and September 1st, 2020, five (5) borings were drilled to depths of about 50 feet below site grade (BSG) using a CME-75 hollow-stem auger drilling rig equipped with 6-5/8 inch outside diameter (O.D.) hollow stem augers....The subsurface soils encountered included interbedded silty sands, poorly graded sands, poorly graded sands with silt, silt, sandy silt, silty clay with sand, and lean clay. The silty sands, poorly graded sands, and poorly graded sands with silt comprised the majority of the soils encountered. These granular soils are significantly more permeable than the silts and clays (remainder of the soil types encountered). Silty sands, poorly graded sands, and poorly graded sands with silt comprised roughly 60 to 80 percent of the soils encountered, with remaining areas encountered a higher percentage (60 percent) of the soils which were estimated to have lower permeability; with only about 40 percent of the higher permeable soils (silty sands, poorly graded sands, and poorly graded sands with silt).

The silty sands, poorly graded sands, and poorly graded sand with silt were typically loose to medium dense to depths of about 30 feet BSG, as determined by standard penetration test (SPT) resistance, N-values, ranging from 4 to 23 blows per foot. Below a depth of about 30 feet BSG, the granular soils were typically in the medium dense range (standard penetration resistance, N-values, ranging from 10 to 30 blows per foot). The silts, sandy silts, silty clay with sand, and lean clays were predominantly stiff to very stiff, with standard penetration resistance, N-values, from 8 to 32 blows per foot, with medium stiff (N-value <8) and hard soils (N-value >32) encountered at varying depths.

With the exception of an approximate 1 foot thick layer of perched water (wet, silty sand soils) encountered in boring B-5 at a depth of about 40 feet BSG, groundwater was not encountered in the test borings drilled for this assessment, to the maximum depths drilled of about 51½ feet BSG.

Groundwater was not encountered in the test borings drilled within the southwest portion of the basin site in 2016, to a maximum depth of about 150 feet BSG.

Review of the Department of Water Resources (DWR) website and maps of lines of equal elevation in wells for several years from 2006 to 2011 suggest that the groundwater surface elevations at the site declined from about 125 feet AMSL to about 110 feet AMSL during that period. Review of the Department of Water Resources (DWR) website and maps of lines of equal elevation in wells (<https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels>) for Spring and Fall measurements made during the the years of 2013 to 2018 (most recent data) suggest that the groundwater surface elevations at the site declined from about 110 feet AMSL to about 90 feet AMSL during that more recent period. Considering the approximate average ground surface elevation at the site of 240 feet AMSL, the data indicates the depth to water below the site was about 150 feet BSG in 2018.

Historical groundwater information for three (3) individual wells at or near the site was obtained from the DWR website. Data for well 364902N1197907W001, located near the intersection of the Elkhorn Detention Facility access road and Elkhorn Avenue, indicates that the water surface elevations dropped from 120 feet AMSL (about 120 feet BSG) in March 2011 to 91 feet AMSL (about 149 feet BSG) in March 2019.

Data for well 364977N1197735W001, located near the northeast corner of the site, indicates that the water surface elevations consistently rose from 125 feet AMSL in 1995 to 170 feet AMSL in 1999, then dropped from 170 feet AMSL in 1999 to 127 feet AMSL in 2008. From 2008 to 2013, the groundwater surface elevation was relatively constant rising only slightly from 127 feet AMSL to 134 feet AMSL. Data for 2015 and 2016 indicate lower groundwater levels of 97 and 102 feet AMSL, respectively (about 143 and 138 feet BSG).

Data for well 364821N1197710W001, located about ½ mile south of the southeast corner of the site, indicates that the water surface elevations consistently declined from 171 feet AMSL in 1999 to 122 feet AMSL in 2008, then remained relatively constant at about 122 feet AMSL from 2008 to 2013. Data for 2015 and 2016 indicate lower groundwater levels of 90 and 100 feet AMSL, respectively. The data indicates that groundwater levels in the site area have dropped about 20 to 30 feet in the past 7 to 9 years.

At the time of preparation of this report, no previous geotechnical engineering, geological, or compaction test reports conducted for this site were provided for review. If these reports become available, the reports should be provided for review and consideration for this project.

3.3 Anticipated Construction: Per the referenced 60 percent Plan Set for the Elkhorn Recharge Project, the subject site is reported to be constructed with a below-grade recharge basin within an area of 47.2 acres to the toe of bank, an un-lined conveyance canal with metering structures, and a shooting range with earthen berms. It is our understanding that the proposed conveyance channel will bare and will connect the Liberty Canal, which is located south of Elkhorn Avenue, to the proposed below-grade recharge basin. The conveyance canal will be constructed with a turnout box, valving, and a debris grate at the Liberty canal, two (2) 42 inch diameter pipelines with a length of 144 linear feet leading to a concrete cutoff collar inlet leading to the conveyance canal with retaining walls, rip rap, and canal lining cutoff walls. The below-grade conveyance canal is reported to be constructed with a length of about 2,200 lineal feet and a top width of 42 feet, side-slopes of 2H:1V, an invert width varying from 22 feet at Station 12+03 (near the inlet structure) to an about 7 foot wide invert at Station 34+06 (near outlet structure). The depth varies from about 5 feet to about 9 feet. The un-lined conveyance canal is further reported to be designed for a water flow of 25 cubic feet per second. The conveyance canal further leads to a concrete outlet with retaining wall and valving. From the outlet, a single 48-inch diameter concrete pipe will extend about 23 lineal feet to an 84-inch diameter concrete standpipe, where an additional 245 lineal feet of 48-inch diameter reinforced concrete pipe will daylight at the recharge basin. The inlet and outlet structures are anticipated to include reinforced concrete pipe (RCP) with reinforced concrete head walls and wing walls (retaining walls). The retaining walls are reported to be constructed to heights up to 12 feet.

The overall recharge basin area is proposed to be excavated below-grade, with cut depths ranging from 11 to 14 feet below existing grades. The bank slopes are indicated on the referenced plans with side slopes of 4H to 1V. The spoils from the recharge basin excavation are planned to be used to construct berms within the shooting range.

The embankments within the shooting range are planned up to heights of 26-feet with a 2H:1V slope on the interior side and a 2H:1V slope on the exterior side.

It is also our understanding that bullets used in the shooting range will be periodically removed from sand which will be stockpiled in front the embankment.

Beyond the reinforced concrete piping constructed below Elkhorn Avenue connecting the Liberty canal to the conveyance canal inlet structure and connecting the conveyance canal outlet structure to the recharge basin, underground utilities and pavements are not anticipated as part of the project.

For the purpose of this report, maximum line loads of about 2 to 3 kips per foot are anticipated for design of continuous foundations associated with the concrete structure.

4.0 INVESTIGATIVE PROCEDURES

The field exploration and laboratory testing programs conducted for this investigation are summarized in the following subsections.

4.1 Field Exploration: The field exploration consisted of a site reconnaissance, drilling test borings, conducting standard penetration tests, and soil sampling.

4.1.1 Site Reconnaissance: The site reconnaissance consisted of walking the site and noting visible surface features. The reconnaissance was conducted by a staff engineer of Moore Twining on July 13th and 14th, 2023. The features noted are described in the background information section of this report.

4.1.2 Drilling Test Borings: Prior to drilling, the site was marked for Underground Service Alert for members to mark out the locations of existing public utilities. The locations of the test borings were coordinated with Provost and Pritchard.

The test borings were permitted through Fresno County Department of Public Health, Environmental Health Division (Well10084560) and as required, were backfilled with cement grout sealing material. Excess cuttings from drilling of soil borings were broadcast on-site.

On July 13th and 14th, 2023, nine (9) test borings were drilled within the areas of the conveyance channel and the recharge basin to depths ranging from 5 to 20 feet below site grade (BSG). The test borings were drilled using a truck-mounted CME-75 drill rig equipped with 6-5/8 inch outside diameter (O.D.) hollow-stem augers and a 4-inch diameter hand auger.

During the drilling of the test borings, bulk and relatively undisturbed samples of soil were obtained for laboratory testing. The test borings were drilled under the direction of a Moore Twining professional geotechnical engineer. The soils encountered in the test borings were logged during drilling by a representative of our firm. The field soil classification was in accordance with the Unified Soil Classification System, and consisted of particle size, color, and other distinguishing features of the soil.

The presence and elevation of free water, if any, in the borings were noted and recorded during drilling and immediately following completion of the borings.

Test boring locations were determined with reference to existing site features shown on the site plan. The locations, as described, should be considered accurate to within about 10 feet. After completion of drilling, the borings were backfilled with neat cement grout. The approximate locations of the borings are shown on Drawing No. 2 in Appendix A of this report.

4.1.3 Soil Sampling: Standard penetration tests were conducted in the test borings, and both disturbed and relatively undisturbed soil samples were obtained.

The standard penetration resistance, N-value, is defined as the number of blows required to drive a standard split barrel sampler into the soil. The standard split barrel sampler has a 2-inch O.D. and a 1 $\frac{3}{8}$ -inch inside diameter (I.D.). The sampler is driven by a 140-pound weight free falling 30 inches. The sampler is lowered to the bottom of the bore hole and set by driving it an initial 6 inches. It is then driven an additional 12 inches and the number of blows required to advance the sampler the additional 12 inches is recorded as the N-value.

Relatively undisturbed soil samples for laboratory tests were obtained by pushing or driving a California modified split barrel ring sampler into the soil. The soil was retained in brass rings, 2.5 inches O.D. and 1-inch in height. The lower 6-inch portion of the samples were placed in close-fitting, plastic, airtight containers which, in turn, were placed in cushioned boxes for transport to the laboratory. Soil samples obtained were taken to Moore Twining's laboratory for classification and testing.

4.2 Laboratory Testing: The laboratory testing was programmed to determine selected physical and engineering properties of selected samples of the soils encountered. The tests were conducted on disturbed and relatively undisturbed samples considered representative of the subsurface soils encountered.

The results of laboratory tests are summarized in Appendix C. These data, along with the field observations, were used to prepare the final test boring logs in Appendix B.

5.0 FINDINGS AND RESULTS

The findings and results of the field exploration and laboratory testing are summarized in the following subsections.

5.1 Surface and Subsurface Conditions: At the time of our field exploration, the surface in the recharge basin area and shooting range berm consisted of deeply tilled soil. The area of the conveyance channel appeared to be a former ditch that was covered with a heavy growth of seasonal grasses and weeds. At the time of our observations, the eastern portion of the basin, including the area of the existing embankments at the former sewage ponds and livestock fencing, was covered with a heavy growth of seasonal grasses and weeds. An abandoned well was observed within the western portion of the recharge basin. Another well was observed near the entrance to the Elkhorn Correctional facility gate. In addition, irrigation piping was observed to be aligned in an east to west direction along the southern portion of the drainage basin.

5.2 Soil Profile: The soil profile encountered at the boring locations varied. The near-surface soils encountered within the conveyance canal alignment (Borings B-1 through B-3) generally consisted of surficial silt with varying amounts of sand extending to depths ranging from 3½ feet to 8½ feet overlying a discontinuous layer of silty sand. The sandy silt and the discontinuous silty sand were further underlain by poorly graded sand extending to the maximum depth explored, 20 feet BSG. The near-surface soil encountered within the recharge basin (Borings B-4 through B-9) generally encountered a surficial layer of silty sand extending to depths ranging from 6 inches to 9 feet BSG. However, Boring B-7, hand augured in the central portion of the area proposed for the basin encountered a surficial layer of sandy silt extending to the maximum depth hand-augured, about 5 feet BSG. In addition, an isolated lens of lean clay was encountered within Boring B-9 at a depth of 6 inches extending to a depth of 3½ feet BSG. Below these varied soils, the remaining borings advanced around the basin area generally encountered sandy silt extending to depths ranging from 10 to 18½ feet BSG. The sandy silt was underlain by a discontinuous lens of silty sand further extending to depths ranging from 13½ to 18½ feet BSG. The sandy silt and the silty sand were underlain by poorly graded sand extending to a depth of 20 feet BSG, the maximum depth explored.

The foregoing is a general summary of the soil conditions encountered in the test borings drilled for this investigation. Detailed descriptions of the soils encountered at each test boring location are presented in the logs of borings in Appendix B. The stratification lines in the logs represent the approximate boundary soil types; the actual in-situ transition may be gradual.

5.3 Soil Engineering Properties: The following is a description of the soil engineering properties as determined from our field exploration and laboratory testing.

Native Silt with varying amounts of Sand: The native silt with varying amounts of sand soils encountered were described as stiff to hard, as indicated by standard penetration resistance, N-values, and SPT equivalent N-values (estimated by driving a California Modified split barrel sampler) ranging from 8 to 43 blows per foot. Ten (10) relatively undisturbed samples revealed dry densities of 80, 80.6, 93.9, 94.4, 97.4, 100.1, 104.6, 108, 110 and 110.6 pounds per cubic foot. The moisture content of the samples tested ranged from 2.9 to 19.8 percent. Two (2) direct shear tests resulted in internal angles of friction of 30 and 31 degrees, each with a cohesion value of 180 pounds per square foot, respectively. Two (2) atterberg limits tests indicated the samples were non-plastic.

Native Silty Sand: The native silty sand soils encountered were described as loose to medium dense, as described by standard penetration resistance, N-values, and SPT equivalent N-values (estimated by driving a California Modified split barrel sampler) ranging from 8 to 25 blows per foot. Two (2) relatively undisturbed samples revealed dry densities of 101.3 and 109.2 pounds per cubic foot. The moisture content of the samples tested ranged from 3 to 11 percent. One (1) direct shear test resulted in an internal angle of friction of 30 degrees and a cohesion value of 350 pounds per square foot. One (1) atterberg limits test indicated the sample was non-plastic.

Native Poorly Graded Sands: The native poorly graded sands encountered were described as loose to medium dense, as indicated by standard penetration resistance, N-values, and SPT equivalent N-values (estimated by driving a California Modified split barrel sampler), ranging from 7 to 18 blows per foot. Two (2) relatively undisturbed samples revealed dry densities of 90.5 and 91.4 pounds per cubic foot. The moisture content of the soils tested ranged from 1.4 to 4.0 percent. One (1) direct shear test resulted in an internal angle of friction of 29 degrees with a cohesion value of 320 pounds per square foot.

Native Lean Clays: A lens of native lean clay soils was encountered in Boring B-9 extending from a depth of ½-foot BSG to a depth of about 3½ feet BSG. An atterberg limits test indicated the sample was non-plastic.

Expansion Index Tests: The results of an expansion index test conducted on a near surface silty sand and sandy lean clay sample from boring B-9 indicated an expansion index of 1. The results of an expansion index test conducted on a near surface silty sand sample from boring HA-1 indicated an expansion index of 0.

Chemical Tests: Chemical tests performed on two (2) near surface soil samples resulted in pH values of 8.7 and 9.4; minimum resistivity values of 4,500 and 5,200 ohms-centimeter respectively; with both samples testing less than 0.004 percent detected percent by weight concentrations of sulfate; and less than 0.004 percent by weight concentrations of chloride.

5.4 Groundwater Conditions: Groundwater was not encountered in any of the borings to the maximum depth explored, 21½ feet BSG, during our July 13th and 14th, 2023 field exploration.

Recent groundwater data from the Department of Water Resources Sustainable Groundwater Management Act (SGMA) Data Viewer website, the groundwater contour depth at the site was observed to be about 180 feet BSG in the Spring 2023.

Based on our review of the Department of Water Resources website, a well located about 1 mile south of the site indicated groundwater observations began in March of 1969, and the depth to groundwater ranged from about 50 feet BSG in March of 1970 to the most recent depth of about 123 feet BSG in March, 2023. Furthermore, a well located about 1¼ mile south-southwest of the site indicated groundwater observations began in February of 1999, and has ranged from about 92 feet BSG in March of February 1999 to the most recent depth of about 179 feet BSG in March, 2023.

It should be recognized; however, that groundwater elevations fluctuate with time, since they are dependent upon seasonal precipitation, irrigation, land use, and climatic conditions as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered both during the construction phase and the design life of the project. The evaluation of such factors was beyond the scope of this investigation and report.

6.0 EVALUATION

The data and methodology used to develop conclusions and recommendations for project design and preparation of construction specifications are summarized in the following subsections. The evaluation was based upon the subsurface soil conditions encountered during this investigation and our understanding of the proposed construction. The conclusions obtained from the results of our evaluations are described in the Conclusions section of this report.

6.1 Existing Site Conditions: At the time of our field investigation, the area of the recharge basin, the conveyance channel, and the shooting range had been tilled and areas containing tall dry weeds were noted. In addition, existing site features included fencing, former wastewater ponds and equipment, livestock pens and shade structure, as well as below ground concrete irrigation piping and standpipes. As part of the proposed construction, the existing improvements will need to be removed from the areas of new improvements. As part of the site/subgrade preparation for areas of new improvements, soils which are disturbed from removal of existing improvements will also need to be excavated to expose undisturbed native soils prior to backfill of the excavations as engineered fill.

Depending on the time of construction, the subgrade soils in the former wastewater ponds may contain soils that are significantly above optimum moisture content and aeration and/or stabilization of the bottom of the excavations may be required to achieve compaction if embankments are planned in this area.

In addition, due to the previous excavation of the observed ditch, and the presence of an abandoned well and associated concrete pad, disturbed soils may be present in the area of the new conveyance channel. As part of site preparation, buried improvements and disturbed soils should be removed. All excavations should be backfilled with engineered fill.

6.2 Expansive Soils: One of the potential geotechnical hazards evaluated for this project is the expansion potential of the near surface soils. Over time, expansive soils will experience cyclic drying and wetting as the dry and wet seasons pass. Expansive soils experience volumetric changes (shrink/swell) as the moisture content of the clayey soils fluctuate. These shrink/swell cycles can impact foundations and lightly loaded slabs-on-grade when not designed for the anticipated expansive soil pressures.

The near surface soils encountered have a very low expansion potential. Thus, special measures are not anticipated to address an expansive soil condition.

6.3 Slope Stability Analysis: Slope stability analyses were conducted to evaluate the gross stability of the proposed embankment slopes proposed for the shooting range. The slope stability analyses were performed for representative cases of 16 to 26-foot tall berms slopes to be constructed with an interior slope with a repose of 2H to 1V and with exterior slopes with a repose of up to 2H to 1V. The slope inclinations and heights were based upon information provided by Mr. Kevin Johansen of Provost and Pritchard. Based on the information provided, the slope will include a crown with a width of about 20 feet to accommodate maintenance equipment.

The stability analyses were conducted using the computer program “Slide 5.0” developed by Rocscience using both the Modified Bishops Method and Spencer’s Method for rotational failure. The slope stability analyses conducted as part of this investigation were intended to assess the safety factors of potential gross slope failure surfaces. Furthermore, the analysis included a vehicular loading surcharge using a vertical uniform load of 250 pounds per square foot.

The analysis was conducted using a wet density of 125 pounds per cubic foot (pcf) assuming a compacted fill condition (about 90 percent of maximum dry density) and shear strength parameters consisting of an internal angle of friction of 29 degrees and 75 pounds per square feet (psf) cohesion. The shear strength was estimated based on the direct shear testing conducted as part of this investigation.

A seismic coefficient of 0.15 was used based on a 15 centimeter displacement criteria using the procedures outlined in the Recommended Procedures for Implementation of DMG Special Publication 117 “Guidelines for Analyzing and Mitigating Landslide Hazards in California,” prepared by the Southern California Earthquake Center, dated June 2002.

A minimum acceptable factor of safety of 1.5 was used for the global static case and 1.0 for the global psuedo-static (seismic) case.

The analysis indicated that slopes steeper than 2H to 1V slopes (interior) will require reinforcement with geogrid to meet the minimum factors of safety. If slopes steeper than 2H to 1V are planned, Moore Twining should be contacted to provide additional recommendations.

The factors of safety of the 26-foot tall, interior and exterior, 2H to 1V slopes of the shooting range berms were determined to be about 1.6 and 1.1 for global static and pseudo-static conditions, respectively, thus achieving the minimum required safety factors. If a slope steeper than a 2H:1V repose is required, this portion of the slope could also be reinforced with geogrid to achieve the minimum safety factors for stability.

Furthermore, the 2H:1V slopes of the canal (with a maximum depth of 9 feet BSG) as well as the 4H:1V slopes of the basin (with a maximum depth of 14 feet BSG) were analyzed and found to meet minimum factors of safety for global static case and global psuedo-static (seismic) case for dry and saturated conditions.

6.4 Volume Loss / Earthwork Shrinkage Estimate: Based on the densities of the relatively undisturbed samples obtained from the test borings, it is estimated the volume loss from cut to fill in the upper 15 feet within the proposed infiltration basin and embankment would range from about 6 percent to 18 percent. It should be noted that shrinkage estimates can be subject to significant variations from engineering estimates due to a variety of factors. These volume loss estimates are based only on density assumptions and do not consider other forms of loss (e.g., stripping, grubbing, spillage, waste or subsidence).

6.5 Surface Erosion Potential of Slopes: The majority of the near surface soils encountered and observed along the conveyance channel alignment consisted of fine-grained silt and coarse-grained sand soils, which possess limited cohesion. In general, the non- and low plastic near surface soils encountered are commonly moderately to highly susceptible to erosion.

The United States Department of Agriculture – Natural Resources Conservation Service – Online Web Soil Survey application provides an erosion factor K, indicating the general susceptibility of a soil to sheet and rill erosion by water. The estimates are based on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity. The erosion factor ranges from 0.02 to 0.69, the higher the value indicating the higher susceptibility to sheet and rill erosion by water. The application indicated that the site contains Calhi loamy sand, Hesperia fine sandy loam, Hesperia sandy loam, and Traver fine sand loam, with corresponding ratings of 0.15, 0.28, 0.24, and 0.37, respectively.

Excessive erosion could lead to sloughing of the side slopes and other negative impacts. Slopes such as those proposed for the project can require aggressive maintenance to maintain the channel shape and reduce surficial stability impacts. In general, flattening of slopes can be conducted to reduce the degree of maintenance and repair that is needed due to erosion. In addition, slope protection such as lining slopes, rip rap or other means is appropriate to reduce the potential for excessive erosion and repairs. Erosion protection of other earthen side slopes within the proposed conveyance channel and shooting range slopes would also be useful in reducing the extent of maintenance and repair associated with surface erosion.

6.6 Seismic Ground Rupture and Design Parameters: The site is not located in an Alquist-Priolo Earthquake Fault Zone. The nearest mapped active fault with surface rupture is the Great Valley Segment 13 and San Andreas fault, which are located about 53 and 54 miles west of the site, respectively. Therefore, the potential for fault rupture at the site is considered low.

Based on the 2022 CBC, a Site Class D represents the on-site soil conditions with an average standard penetration resistance, N-value, in the upper 100 feet below site grade between 15 and 50 blows per foot.

A table providing the recommended seismic coefficient and earthquake spectral response acceleration values for the project site is included in the Foundation Recommendations section of this report. A Maximum Considered Earthquake (geometric mean) peak ground acceleration adjusted for site effects (PGA_M) of 0.408g was determined for the site using the Ground Motion Parameter Calculator provided by SEAOC and OSHPD (<http://seismicmaps.org>). A Maximum Considered Earthquake magnitude of 6.3 was applied in the analysis based on deaggregation analysis (United States Geological Survey deaggregation website, Dynamic Conterminous U.S. 2014, V4.2.0).

6.7 Liquefaction and Seismic Settlement: Liquefaction and seismic settlement are conditions that can occur under seismic shaking from earthquake events. Liquefaction describes a phenomenon in which a saturated, cohesionless soil loses strength during an earthquake as a result of induced shearing strains. Lateral and vertical movements of the soil mass, combined with loss of bearing can result. Fine, well sorted, loose sand, shallow groundwater conditions, higher intensity earthquakes, and particularly long duration of ground shaking are the requisite conditions for liquefaction. One of the most common phenomena that occurs during seismic shaking is the induced settlement of loose, unconsolidated sediments. This can occur in unsaturated and saturated granular soils, however, seismic settlements are typically largest where liquefaction occurs (saturated soils).

Due to the depth of groundwater at this site (anticipated to be greater than 100 feet BSG), liquefaction is not considered a potential hazard at this site. Due to the presence of medium dense soils encountered in some of the borings and the relatively low seismicity at this site, the potential for dry seismic settlement is considered low.

6.8 Soil Corrosion: The risk of corrosion of construction materials relates to the potential for soil-induced chemical reaction. Corrosion is a naturally occurring process whereby the surface of a metallic structure is oxidized or reduced to a corrosion product such as iron oxide (i.e., rust). The metallic surface is attacked through the migration of ions and loses its original strength by the thinning of the member.

Soils make up a complex environment for potential metallic corrosion. The corrosion potential of a soil depends on numerous factors including soil resistivity, texture, acidity, field moisture and chemical concentrations. In order to evaluate the potential for corrosion of metallic objects in contact with the onsite soils, chemical testing of soil samples was performed by Moore Twining as part of this report. The test results are included in Appendix C of this report. Conclusions regarding the corrosion potential of the soils tested are included in the Conclusions section of this report based on the National Association of Corrosion Engineers (NACE) corrosion severity ratings listed in the Table No. 1, below.

**Table No. 1
Association of Corrosion Engineers (NACE) Corrosion Severity Ratings**

Soil Resistivity (ohm cm)	Corrosion Potential Rating
>20,000	Essentially non-corrosive
10,000 - 20,000	Mildly corrosive
5,000 - 10,000	Moderately corrosive
3,000 - 5,000	Corrosive
1,000 - 3,000	Highly corrosive
<1,000	Extremely corrosive

The results of soil sample analyses indicate that the near-surface soils exhibit a “corrosive to moderately corrosive” corrosion potential to buried metal objects.

Appropriate corrosion protection should be provided for buried improvements based on the corrosion potential of the soils tested. If piping or concrete are placed in contact with imported soils, these soils should be analyzed to evaluate the corrosion potential of these soils.

If the manufacturers or suppliers cannot determine if materials are compatible with the soil corrosion conditions, a professional consultant, i.e., a corrosion engineer, with experience in corrosion protection should be consulted to provide design parameters. Moore Twining does not provide corrosion engineering services.

6.9 Sulfate Attack of Concrete: Degradation of concrete in contact with soils due to sulfate attack involves complex physical and chemical processes. When sulfate attack occurs, these processes can reduce the durability of concrete by altering the chemical and microstructural nature of the cement paste. Sulfate attack is dependent on a variety of conditions including concrete quality, exposure to sulfates in soil, groundwater and environmental factors. The standard practice for geotechnical engineers in evaluation of the soils anticipated to be in contact with structural concrete is to perform laboratory testing to determine the concentrations of sulfates present in the soils. The test results are then compared with the exposure classes in Table 19.3.1.1 of ACI 318 to provide guidelines for concrete exposed to soils containing sulfates. It should be noted that other exposure conditions such as the presence of seawater, groundwater with elevated concentrations of dissolved sulfates, or materials other than soils can result in sulfate exposure categories to concrete that are higher than the concentrations of sulfate in soil. The design engineer will need to determine whether other potential sources of sulfate exposure need to be considered other than exposure to sulfates in soil. The sulfate exposure classes for soils from Table 19.3.1.1 are summarized in the below table.

Table No. 2
ACI Exposure Categories for Water Soluble Sulfate in Soils

Sulfate Exposure Class (per ACI 318)	Water Soluble Sulfate in Soil (Percent by Mass)
S0	Less than 0.10 Percent
S1	0.10 to Less than 0.20 Percent
S2	0.20 to Less than or Equal to 2.00 Percent
S3	Greater than 2.00 Percent

Common methods used to resist the potential for degradation of concrete due to sulfate attack from soils include, but are not limited to the use of sulfate-resisting cements, air-entrainment and reduced water to cement ratios. The laboratory test results for sulfates are included in Appendix C of this report. Conclusions regarding the sulfate test results are included in the Conclusions section of this report.

7.0 CONCLUSIONS

Based on the data collected during the field and laboratory investigations, our geotechnical experience in the vicinity of the project site, and our understanding of the anticipated construction, the following general conclusions are presented.

- 7.1 The site is considered suitable for the proposed construction with regard to support of the proposed improvements, provided the recommendations contained in this report are followed. It should be noted that the recommended design consultation and observation of clearing, and earthwork activities by Moore Twining are integral to this conclusion.
- 7.2 The near-surface soils encountered within the conveyance canal alignment (Borings B-1 through B-3) generally consisted of surficial silt with varying amounts of sand extending to depths ranging from 3½ feet to 8½ feet overlying a discontinuous layer of silty sand. The sandy silt and the discontinuous silty sand were further underlain by poorly graded sand extending to the maximum depth explored, 20 feet BSG. The near-surface soil encountered within the recharge basin (Borings B-4 through B-9) generally encountered a surficial layer of silty sand extending to depths ranging from 6 inches to 9 feet BSG. However, Boring B-7, hand augured in the central portion of the area proposed for the basin encountered a surficial layer of sandy silt extending to the maximum depth hand-augured, about 5 feet BSG. In addition, an isolated lens of lean clay was encountered within Boring B-9 at a depth of 6 inches extending to a depth of 3½ feet BSG. Below these varied soils, the remaining borings advanced around the basin area generally encountered sandy silt extending to depths ranging from 10 to 18½ feet BSG. The sandy silt was underlain by a discontinuous lens of silty sand further extending to depths ranging from 13½ to 18½ feet BSG. The sandy silt and the silty sand were underlain by poorly graded sand extending to a depth of 20 feet BSG, the maximum depth explored.
- 7.3 The proposed below grade inlet, open meter, and outlet structure may be supported on shallow spread foundations over the minimum depth of engineered fill recommended in the Site Preparation section of this report. In addition, loose sediment, muck and buried obstructions should be removed from the existing below-grade excavations as part of the site preparation.
- 7.4 Based on the slope stability analysis described in Section 6.3 of this report, the proposed berms in the shooting range area constructed to a slope of 2H:1V meet the minimum requirements for slope stability.
- 7.5 As discussed in Section 6.5 of this report, the on-site soils are susceptible to the potential for sheet and rill erosion. Where erosive flows occur, erosion protection should be provided.

- 7.6 Groundwater was not encountered in any of the borings to the maximum depth explored, 20 feet BSG, during our July 13th and 14th, 2023 field exploration. Nearby water wells indicate groundwater in the site area is deeper than 100 feet BSG (refer to Section 5.4 of this report).
- 7.7 Chemical testing of the near surface soil samples indicated the soils exhibit an “corrosive to moderately corrosive” corrosion potential.
- 7.8 Based on Table 19.3.1.1 - Exposure categories and classes from Chapter 19 of ACI 318, the sulfate concentration from chemical testing of soil samples falls in the S0 classification (less than 0.10 percent by weight) for concrete.

8.0 RECOMMENDATIONS

Based on the evaluation of the field and laboratory data and our geotechnical experience in the vicinity of the project, the following recommendations are presented for use in the project design and construction. However, this report should be considered in its entirety. When applying the recommendations for design, the background information, procedures used, findings, evaluation, and conclusions should be considered. The recommended design consultation and observation of clearing, demolition activities and earthwork operations by Moore Twining are integral to the proper application of the recommendations.

Where the requirements of a governing agency, utility agency, product manufacturer or material provider differ from the recommendations of this report, the more stringent recommendations should be applied to the project.

8.1 General

- 8.1.1 This report was prepared for the proposed improvements described in the Background Information section of this report. If improvements not described in this report are planned or if the proposed grading and construction changes, Moore Twining should be requested to prepare updated recommendations for these improvements.
- 8.1.2 When the foundation loads are known, this information should be provided to Moore Twining for review to confirm the recommendations for site preparation are suitable. In the event the foundation loads are different than anticipated, the recommendations in this report may need to be revised.
- 8.1.3 Moore Twining should be retained to review the project plans before the plans are released for bidding purposes so that any relevant recommendations can be presented.

- 8.1.4 A preconstruction meeting including, as a minimum, the owner, general contractor, excavation and foundation subcontractors, civil engineer, and Moore Twining should be scheduled by the general contractor at least one week prior to the start of work. The purpose of the meeting should be to discuss critical project issues, concerns and scheduling.
- 8.1.5 Contractor(s) bidding on this project should determine if the data are sufficient for accurate bid purposes. If the data are not sufficient, the Contractor should conduct, or retain a qualified geotechnical engineer to conduct, supplemental studies and collect more data as required to prepare accurate bids.
- 8.1.6 Rodent burrows were observed during our site observations. As part of the project, rodent burrows should be excavated and backfilled. In addition, a program should be established and maintained to prevent rodent activity and backfill rodent burrows.
- 8.1.7 A demolition plan should be prepared to identify existing surface and subsurface improvements that are to be demolished and/or removed as part of the project.
- 8.1.8 The contractor should be required to protect existing improvements in place that are to remain.

8.2 Slope Gradients, Erosion Protection and Maintenance

The following recommendations were prepared for the proposed embankment slopes for erosion protection and to improve the long term stability of the slopes.

- 8.2.1 Earthen berms are planned in the shooting range area up to a height of 26 feet and as steep as 2H:1V. Engineered fill slopes in the shooting range area without geogrid reinforcement may be graded at a maximum repose of 2H to 1V, or flatter for stability, and to reduce erosion and long-term maintenance. In the event slopes are planned at a repose steeper than 2H:1V, they should be reinforced using geogrid such as Tensar - UX1400 uniaxial geogrid, or equivalent. In addition, if vegetation is not implemented for erosion protection and surficial stability of slopes steeper than 2H:1V, an AASHTO M288 Class 1, nonwoven geotextile should be placed over the finished slope and Tensar BX1120, or equivalent, should be used to wrap the face of the slope between layers of geogrid. Design details for reinforced slopes would need to be developed in the event slopes steeper than 2H:1V are planned.

- 8.2.2 Develop and maintain site grades which will rapidly drain surface and runoff away from graded slopes- both during and after construction.
- 8.2.3 In order to reduce the potential for erosion of earthen slopes, erosion protection such as appropriate vegetation should be established and maintained on the slopes. Unvegetated slopes will be subject a higher potential for erosion, necessitating repairs.
- 8.2.4 Appropriate concrete cutoffs should be provided to protect inlet and outlet structures from erosion. Erosion protection of other earthen slopes would also be useful in reducing the extent of maintenance and repair associated with surface erosion. Slopes which are not protected will require a higher level of maintenance and erosion repair. Refer to the discussion in Section 6.5 of this report.
- 8.2.5 Slopes should be setback a sufficient distance from any improvements including pavements, utilities, structures, etc. to reduce the potential for damage as a result of slope movement, water infiltration or erosion.
- 8.2.6 The areas above the top of the side slopes of the basin should be graded to prevent concentrated runoff from flowing over the top of the basin side slopes.
- 8.2.7 If future erosion or instability in the form of slides, debris or earth flow, accelerated erosion, or other forms of slope instability occur, Moore Twining should be contacted to provide recommendations for repair, and the distressed areas should be repaired as soon as possible under the direction of Moore Twining. If instability is allowed to continue, these types of conditions could be an impact to the improvements.
- 8.2.8 Earthen embankments will be subject to erosion and regular maintenance should be provided to repair erosion features.

8.3 Site Preparation

- 8.3.1 Existing surface and subsurface improvements in the areas of proposed improvements should be removed in their entirety. As part of site preparation, all soils disturbed as a result of the demolition, removal of existing improvements, and voids made by burrowing animals, should be excavated to expose undisturbed, native soils. Upon verification of removal of the disturbed soils, the exposed bottom of the excavation should be scarified to a minimum of 8 inches, moisture conditioned and compacted as engineered fill to a stable condition, prior to placement and compaction of engineered fill to finished subgrade.
- 8.3.2 All surface vegetation, topsoil, organics, and debris should be removed from all areas of planned improvements. The general depth of stripping should be sufficiently deep to remove all root systems and soils with organic contents of more than 3 percent by dry weight. Any organic growth should not be disced into the soils. The actual depth of stripping should be reviewed by Moore Twining at the time of construction. It is possible that deeper stripping may be required if any roots larger than ¼-inch are encountered during grading and in localized areas, such as low areas where water may pond, or at locations of potential previously existing trees. Stripping should extend laterally a minimum of 5 feet outside the limits of the new improvements. These materials will not be suitable for use as engineered fill; however, stripped topsoil may be stockpiled and reused in landscape areas at the discretion of the owner.
- 8.3.3 Areas of new improvements should be prepared by removal of existing improvements which are not scheduled to remain, including pipelines, utilities, subsurface structures, foundations, etc. and all associated fill soils including existing trench backfill. Existing pipelines within influence of the new improvements should not be crushed in place and buried. The excavations to remove existing improvements should extend a minimum of 12 inches below the improvements to be removed, or to the depth to remove all soils disturbed as a result of the demolition and removal of existing features, whichever is greater. The resulting excavations should be cleaned of all loose or organic material, the exposed native soils should be scarified to a depth of 8-inches, aerated or moisture conditioned to near optimum and compacted as engineered fill, prior to backfill of the excavation.

- 8.3.4 Prior to placing concrete lining for the conveyance channel, the channel bottom subgrade should be prepared by over-excavated to 12 inches below the bottom of the finished channel lining, and to the depth required to remove all fill and disturbed soils, whichever is greater. After approval of the over-excavation by Moore Twining Associates, Inc., the bottom of the excavation should be scarified 8 inches in depth, moisture conditioned to slightly above optimum moisture content and compacted as engineered fill. In addition, the cut face of the conveyance channel slopes should be compacted to a minimum depth of 8 inches as engineered fill.
- 8.3.5 After stripping, excavation of loose material, and removal of existing subsurface improvements, the area of all the proposed drainage control structures such as inlet and outlet structures, wingwalls, etc. should be over-excavated to at least 18 inches below preconstruction site grades, 12 inches below the bottom of the foundations, and to the depth required to remove all fill and disturbed soils, whichever is greater. The over-excavation limits should include the entire structure footprint and a minimum of 5 feet beyond the foundations, whichever is further. After approval of the over-excavation by Moore Twining Associates, Inc., the bottom of the excavation should be scarified 8 inches in depth, moisture conditioned to slightly above optimum moisture content and compacted as engineered fill.
- 8.3.6 It is recommended that extra care be taken by the contractor to ensure that the horizontal and vertical extent of the over-excavation and compaction conform to the site preparation recommendations presented in this report. Moore Twining is not responsible for surveying to verify the horizontal and vertical extent of over-excavation and compaction. The contractor should verify in writing to the owner and Moore Twining that the horizontal and vertical over-excavation limits were completed in conformance with the recommendations of this report, the project plans, and the specifications (the most stringent applies). This verification should be provided prior to requesting approval of the bottom of excavation from Moore Twining or excavating for foundations.
- 8.3.7 After stripping, excavation of loose material, and removal of existing subsurface improvements, areas of new constructed earthen embankments should be over-excavated a minimum of 1 foot below existing grade and to the depth required to remove all fill and disturbed soils, whichever is greater. Upon approval of the excavation by Moore Twining, the bottom should be processed by scarification to a depth of 8 inches, moisture conditioned to slightly above optimum moisture content, and compacted to a minimum of 90 percent relative compaction prior to fill placement. However, if embankments are designed to retain water, open-graded rock should not be used for stabilization below embankments. Other approaches such as cement stabilization would be required in these cases.

- 8.3.8 All structure backfill and fill required to bring the site to final grades should be placed as engineered fill. In addition, all native soils over-excavated should be compacted as engineered fill.
- 8.3.9 During excavation of the conveyance channel and the basin, the excavation(s) should be observed by Moore Twining to confirm the soils exposed are consistent with those encountered and tested herein.
- 8.3.10 Construction/excavation of the recharge basin should be conducted so as to limit the impacts from construction equipment that may reduce the permeability of the soils. Grading equipment will compact the bottom of the basin during the course of the work to excavate the basin, which will reduce the permeability. In order to reduce this impact, excavation work conducted near the base of the basin should therefore be conducted using lower pressure equipment, such as tracked equipment that limit artificial densification of the soils. In addition, a program of deep ripping in two directions is recommended to be specified (or other approaches determined by the design engineer) as final preparation of the bottom of the recharge basin in order to loosen the soils at the bottom.
- 8.3.11 It is not recommended to use the recharge basin for collection of stormwater during construction of the project to reduce impacts from sediment loads, which can clog the pore spaces in the soils and further reduce the infiltration capacity.
- 8.3.12 The moisture content and density of the compacted soils should be maintained until the placement of concrete. If soft or unstable soils are encountered during excavation or compaction operations, our firm should be notified so the soils conditions can be examined and additional recommendations provided to address the pliant areas.
- 8.3.13 The Contractor should be responsible for the disposal of concrete, asphaltic concrete, soil, spoils, etc. (if any) that must be exported from the site. Individuals, facilities, agencies, etc. may require analytical testing and other assessments of these materials to determine if these materials are acceptable. The Contractor should be responsible to perform the tests, assessments, etc. to determine the appropriate method of disposal.

8.4 Engineered Fill

- 8.4.1 The on-site near surface soils encountered within the proposed drainage basin predominantly consisted of silt with varying amounts of sand, in addition to layers of silty sand and poorly graded sand. A near surface layer of sandy lean clay was encountered in boring B-9. The on-site soils will be suitable for use as engineered fill, provided they have an expansion index of less than 20, are free of organics (less than 3 percent by weight and no roots larger than 1/4 inch in diameter), irreducible material greater than 3 inches, and conditioning is performed so the moisture content of the soil is within the range recommended in this report. If soils other than those considered in this report are encountered, Moore Twining should be notified to provide alternate recommendations.
- 8.4.2 The compactability of the native soils is dependent upon the moisture contents, subgrade conditions, degree of mixing, type of equipment, as well as other factors. Based on the in-place densities obtained from the test borings, it is estimated the volume loss from cut to fill in the upper 15 feet within the proposed infiltration basin and embankment would range from about 6 to 18 percent. However, actual shrinkage estimates can be subject to significant variations from engineering estimates. These include the anticipated relative compaction of the material when placed as fill and the uniformity of the materials. These volume loss estimates are based only on density comparisons from insitu to the compacted condition and do not consider other forms of loss (e.g., stripping, grubbing, spillage, wastage or subsidence). The evaluation of such factors was beyond the scope of this report; therefore, they should be evaluated by the Contractor during preparation of bids and construction of the project.
- 8.4.3 Although not anticipated, imported fill soil should be non-contaminated, non-recycled, and granular in nature and contain enough fine-grained material (binder) to allow cutting "neat" footing trenches with all of the following acceptance criteria recommended.

Percent Passing 3-Inch Sieve	100
Percent Passing No. 4 Sieve	85 - 100
Percent Passing No. 200 Sieve	15 - 40
Expansion Index (ASTM D4829)	Less than 15
Organics	< 3% by weight
Sulfates	< 0.05 % by weight
Min. Resistivity	> 5,000 ohm-cm

- 8.4.4 Prior to importing fill, the Contractor shall submit test data that demonstrates that the proposed import soils comply with the recommended criteria for both geotechnical and environmental compliance. Also, prior to being transported to the site, the import material shall be certified by the Contractor and the supplier (to the satisfaction of the Owner) that the soils do not contain any environmental contaminants regulated by local, state or federal agencies having jurisdiction.
- 8.4.5 Imported and on-site engineered fill soils should be placed in loose lifts approximately 8 inches thick or less, moisture-conditioned to at least optimum moisture content, and compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.
- 8.4.6 Utility trench backfill should be placed in 8 inch lifts, moisture conditioned and compacted as engineered fill in accordance with the recommendations of section 8.4.5 of this report.
- 8.4.7 In-place density tests should be conducted in accordance with ASTM D6938 (nuclear density) at a frequency of at least:

**Table 3
Minimum Testing Frequency**

Area	Minimum Test Frequency
Mass Fills, Subgrade and Structure Backfill	1 test per 5,000 square feet per compacted lift, but not less than 2 tests per lift
Subgrade Below Shallow Spread Footings	1 test per compacted lift per footing
Utility Lines	1 test per 25 feet per compacted lift

- 8.4.8 Aggregate base shall comply with Class 2 aggregate base (AB) per the latest State of California Standard Specifications and may include recycled materials. Aggregate base shall be compacted to a minimum relative compaction of 95 percent in accordance with ASTM D1557 standards. Documentation that the aggregate base meets the project requirements (R-value, gradation, sand equivalent, durability, etc.) should be provided to the Owner.

- 8.4.9 Open graded gravel and rock material such as $\frac{3}{4}$ -inch crushed rock or $\frac{1}{2}$ -inch crushed rock should not be used as backfill including trench backfill. In the event gravel or rock is required by a pipe manufacturer for use as backfill, all open graded materials shall be fully encased in a geotextile filter fabric, such as Mirafi 140N, to prevent migration of fine grained soils into the porous material. Crushed rock should be placed in thin (less than 8 inch) lifts and densified with a minimum of three (3) passes using a vibratory compactor. Open graded gravel and rock material such as $\frac{3}{4}$ -inch crushed rock or $\frac{1}{2}$ -inch crushed rock should not be used as backfill near slopes, channels or basins where the increased permeability of the gravel material could create seepage or instability issues.

8.5 Conventional Shallow Spread Foundations for Drainage Control Structures

- 8.5.1 A structural engineer experienced in design of similar drainage structures should recommend the thickness, design details and concrete specifications for the drainage control structures based on the estimated settlements. The following should be anticipated for design: 1) a total static settlement of 1 inch; and 2) a differential static settlement of $\frac{1}{2}$ inch in 30 feet.
- 8.5.2 Foundations supported on engineered fill soils prepared as recommended in the Site Preparation section of this report may be designed for a maximum net allowable soil bearing pressure of 2,500 pounds per square foot for dead-plus-live loads. This value may be increased by one-third for short duration wind or seismic loads.
- 8.5.3 All footings should have a minimum depth of 18 inches below the lowest adjacent grade, or to a sufficient depth below the scour elevation, whichever is deeper. Foundations should be protected from scour where erosive flows occur. On a preliminary basis, if footings are constructed on sloping conditions such as the side of the channel, the footings should be stepped to a minimum depth of 24 inches below any point along the face of slope, or greater as required for protection from scour/erosion. Foundations which extend into sloping area should be reviewed by Moore Twining for appropriate application of the recommendations.
- 8.5.4 The following seismic factors were developed for the site using the Ground Motion Parameter Calculator developed by SEOAC and OSHPD (<http://seismicmaps.org>), based upon a Site Class D and a site latitude of 36.496409 degrees and a longitude of -119.782258 degrees. The data provided in Table No. 4 are based upon the procedures of ASCE 7-16. The data in Table No. 4 were not determined based upon a ground motion hazard analysis. The structural engineer should review the values in Table No. 4 and determine whether a ground motion hazard analysis is required for the

project considering the seismic design category, structural details, and requirements of ASCE 7-16. If required, Moore Twining should be notified and requested to conduct the additional analysis, develop updated seismic factors for the project, and update the following values.

**Table No. 4
 Seismic Design Coefficients**

Seismic Factor	2022 CBC Value
Site Class	D
Maximum Considered Earthquake (geometric mean) peak ground acceleration adjusted for site effects (PGA_M)	0.408g
Mapped Maximum Considered Earthquake (geometric mean) peak ground acceleration (PGA)	0.318g
Spectral Response At Short Period (0.2 Second), S_s	0.737
Spectral Response At 1-Second Period, S_1	0.266
Site Coefficient (based on Spectral Response At Short Period), F_a	1.211
Site Coefficient (based on spectral response at 1-second period) F_v	See Note
Maximum considered earthquake spectral response acceleration for short period, S_{MS}	0.892
Maximum considered earthquake spectral response acceleration at 1 second, S_{M1}	See Note
Five percent damped design spectral response accelerations for short period, S_{DS}	0.595
Five percent damped design spectral response accelerations at 1-second period, S_{D1}	See Note

*Note: Requires ground motion hazard analysis per ASCE Section 21.2 (ASCE 7-16, Section 11.4.8), unless an Exception of Section 11.4.8 of ASCE 7-16 is applicable for the project design

- 8.5.5 Foundation excavations should be observed by Moore Twining prior to the placement of steel reinforcement and concrete to verify conformance with the intent of the recommendations of this report. The Contractor is responsible for proper notification to Moore Twining and receipt of written confirmation of this observation prior to placement of steel reinforcement.
- 8.5.6 Cutoffs should be included at inlet and outlet pipes/structures to reduce erosion and to reduce seepage issues.
- 8.5.7 The bottom surface area of concrete footings or concrete slabs in direct contact with engineered fill can be used to resist lateral loads. An allowable coefficient of friction of 0.35 can be used for design.
- 8.5.8 For spread foundations, the allowable passive resistance of the engineered fill may be assumed to be equal to the pressure developed by a fluid with a density of 300 pounds per cubic foot for drained conditions and 185 pounds per cubic foot for hydrostatic/inundated conditions. These values assume level conditions. Footings near slopes should not assume any passive soil pressure is available.
- 8.5.9 For level backfill conditions behind retaining structures such as headwalls, wingwalls, etc., the active and at-rest pressures of the engineered fill may be assumed to be equal to the pressures developed by a fluid with a density of 45 and 65 pounds per cubic foot, respectively, for drained, level backfill conditions and 90 and 105 pounds per cubic foot, respectively for hydrostatic/inundated conditions. For 2H:1V sloping backfill conditions behind retaining structures, the active and at-rest pressures of the engineered fill may be assumed to be equal to the pressures developed by a fluid with a density of 77 and 80 pounds per cubic foot, respectively for drained backfill conditions and 110 and 115 pounds per cubic foot, respectively, for hydrostatic/inundated conditions. Drained conditions require the use of a subsurface drainage collection system. However, based on the nature of the new structures (within a conveyance channel), it is not anticipated that the structure backfill will be drained. If drained designs are proposed, Moore Twining should be contacted to review the structure and drainage details. These pressures also assume a level ground surface and do not include the surcharge effects of construction equipment, loads imposed by nearby foundations and roadways and hydrostatic water pressure. The at-rest pressure should be used in determining lateral earth pressures against walls which are not free to deflect. For walls which are free to deflect at least one percent of the wall height at the top, the active earth pressure may be used.

8.6 Shoring and Temporary Excavations

- 8.6.1 It is the responsibility of the contractor to provide safe working conditions with respect to excavation slope stability. The Contractor shall lay back the sides of all excavations, or the Contractor shall furnish, install and maintain all shoring, sheeting and bracing as required to support excavations and adjacent improvements for the protection and safety of all personnel working in excavations including the safety of the soil testing laboratory personnel entering the excavations to perform in-place density testing of bedding, haunching, and all backfill.
- 8.6.2 All shoring, sheeting and bracing shall conform to the requirements of Cal/OSHA and all local agencies having jurisdiction. The Contractor shall install, and subsequently remove shoring, sheeting and bracing in a manner that will protect the workmen and prevent instability and damage to the excavation or adjacent improvements as required in order to construct the project and to allow access to excavations for inspection personnel and in-place density testing. Moveable trench boxes or shields shall not be allowed as a substitute for shoring, sheeting or bracing systems as a method to provide access to soil testing personnel to conduct in-place density testing in trenches or other excavations for the project.
- 8.6.3 Shoring systems should be designed and stamped by a professional engineer with experience in designing shoring systems who is registered in the State of California. It is recommended temporary shoring systems be designed based on a unit weight of 130 pounds per cubic foot for soils above the groundwater level. Shoring design should incorporate and coordinate with the details of the dewatering plan and should also account for hydrostatic pressures below groundwater. A minimum active earth pressure coefficient value of 0.35 is recommended for shoring design. This value assumes a level ground surface and does not include the surcharge effects of construction equipment, loads imposed by nearby foundations, canals and roadway embankments. Additional lateral pressures will need to be included in the shoring design based on surcharge loading from slopes, groundwater, and other conditions as necessary.
- 8.6.4 Temporary excavations should be constructed in accordance with CAL OSHA requirements. Temporary cut slopes should not be steeper than 1.5 to 1, horizontal to vertical, and flatter if possible. If excavations cannot meet these criteria, the temporary excavations should be shored.
- 8.6.5 In no case should excavations extend below a 1.5H to 1V zone below existing utilities or below the toe of soil berms or embankments. Excavations which are required to be advanced below the 1.5H to 1V envelope should be shored to support the soils, foundations, and slabs.

- 8.6.6 The contractor should monitor adjacent improvements which are to remain for movement, cracking, settlement, or failure during the excavation operations. These include, but are not limited to underground pipelines and the existing canal embankments. If movement more than $\frac{1}{8}$ of an inch is noted during the construction operations, or to the limits determined by the design engineer, the Contractor shall notify the owner, the project civil engineer, and the Moore Twining immediately, and take action to correct the problem. The Contractor shall be responsible for repairing the damage at no cost to owner.

8.7 Pipelines and Trenches

- 8.7.1 Trenches can often become conduits for allowing surface water intrusion and subsequent seepage/migration along the trench. These increases in moisture contents can increase the potential for settlement of the trench backfill. Therefore, provisions such as providing cutoff collars or other means to prevent migration of water into the trenches, and along granular bedding/initial backfill materials should be included on the project plans.
- 8.7.2 For the purpose of design, a unit weight of 130 pounds per cubic foot may be assumed for the trench backfill soils compacted in accordance with the recommendations of this report.
- 8.7.3 Pipeline design should account for a minimum groundwater level and the potential hydrostatic uplift conditions, where applicable. At a minimum, design groundwater levels should be estimated by the pipe designer based on the information in this report, and any other available groundwater level data for the site.
- 8.7.4 Trenching should be conducted by excavation of a neat trench into native soils or engineered fill without disturbance to the bottom of the trench. The contractor shall either slope the excavation to create a stable sidewall, shore the excavation, or a combination of both. All trench subgrade soils disturbed during excavation, such as by accidental over-excavation of the trench bottom, or by excavation equipment with cutting teeth, should be compacted to a minimum of 90 percent relative compaction prior to placement of bedding material, or removed and the replaced with a stabilizing material such as 1 inch crushed rock encased in geotextile filter fabric. The contractor is responsible for notifying Moore Twining when these conditions occur and arrange for observation and testing prior to placement of pipe bedding. The contractor shall use such equipment as necessary to achieve a smooth, undisturbed surface at the bottom of the trench with no loose material at the bottom of the trench. If the trench is inadvertently dug below the design trench subgrade, the grade should be restored using engineered fill placed and compacted in accordance with this report.

- 8.7.5 The Contractor will be required to provide safe access to excavations for observations and earthwork testing to be conducted during all phases of the work.
- 8.7.6 If unstable material due to overly moist soils at the bottom of the proposed trench excavation encountered, these conditions will need to be stabilized whenever the bottom of the trench is soft, yielding, or unsuitable as a foundation for the pipe.
- 8.7.7 The trench width, type of pipe bedding, the type of initial backfill, and the compaction requirements of bedding and initial backfill material for trenches should be specified by the applicable design professional in compliance with the manufacturer's requirements, governing agency requirements and this report, whichever is more stringent. The width of the trench should provide a minimum clearance required for equipment to compact the haunching and initial backfill as well as to allow in-place density testing to be performed. As a minimum, it is recommended the pipe bedding consist of 6 inches of compacted (90 percent relative compaction) select sand with a minimum sand equivalent of 30 and meeting the following requirements: 100 percent passing the ½ inch sieve, a minimum of 90 percent passing the No. 4 sieve and not more than 10 percent passing the No. 200 sieve. The haunches and initial backfill (12 inches above the top of pipe) should consist of a select sand meeting these sand equivalent and gradation requirements that is placed in maximum 8-inch thick lifts and compacted to a minimum relative compaction of 90 percent using hand equipment. Onsite granular soils meeting the criteria specified above may be used for flexible pipe bedding and pipe zone backfilled placed in accordance with the recommendations of this report.
- 8.7.8 The final trench backfill, onsite granular soils and imported engineered fill (backfill placed above a level of 1 foot above the pipe) should be placed in loose lifts approximately 8 inches thick or less, moisture-conditioned to between optimum and over three (3) percent above optimum moisture content, and compacted to a dry density of at least 90 percent of the maximum dry density as determined by ASTM Test Method D1557. Where trenching under a road, final trench should be compacted to at least 95 percent of the maximum dry density as determined by the same method. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable. Lift thickness can be increased if the contractor can demonstrate the minimum compaction requirements can be achieved.

8.7.9 Open-graded rock such as a crushed gravel may not be used as trench backfill unless the material is fully encapsulated in a geotextile filter fabric (Mirafi 140N or equivalent) and the rock is placed in maximum 8 inch lifts and compacted with vibratory equipment. In addition, provisions such as providing cutoff collars or other means to prevent migration of water into the trenches, and along granular bedding/initial backfill materials should be included on the project plans.

8.7.10 Jetting of trench backfill is not allowed to compact the backfill soils.

8.7.11 It is recommended that the pipelines be inspected and tested in accordance with the recommendations of the design engineer after construction to verify that the pipelines are constructed properly, such as watertight joints, etc.

8.8 Corrosion Protection

8.8.1 Based on the resistivity values and the National Association of Corrosion Engineers (NACE) corrosion severity ratings listed in the table included in section 6.8 of this report, the analytical results of sample analyses, the soils exhibit a “moderately corrosive” and “corrosive” corrosion potential. Therefore, buried metal objects should be protected in accordance with the manufacturer's recommendations based on a “corrosive” corrosion potential. The evaluation was limited to the effects of soils to metal objects; corrosion due to other potential sources, such as stray currents and groundwater, was not evaluated. If piping or concrete are placed in contact with deeper soils or engineered fill, these soils should be analyzed to evaluate the corrosion potential of these soils.

8.8.2 Based on Table 19.3.1.1 - Exposure categories and classes from Chapter 19 of ACI 318, the sulfate concentration from chemical testing of soil samples falls in the S0 classification (less than 0.10 percent by weight) for concrete. Therefore, there are no restrictions required regarding the type, water-to-cement ratio, and strength of the concrete used for foundation and slabs due to the sulfate content.

8.8.3 These soil corrosion data should be provided to the manufacturers or suppliers of materials that will be in contact with soils (pipes or ferrous metal objects, etc.) to provide assistance in selecting the protection and materials for the proposed products or materials. If the manufacturers or suppliers cannot determine if materials are compatible with the soil corrosion conditions, a professional consultant, i.e., a corrosion engineer, with experience in corrosion protection should be consulted to design parameters. Moore Twining is not a corrosion engineer; thus, cannot provide recommendations for mitigation of corrosive soil conditions. It is recommended that a corrosion engineer be consulted for the site specific conditions.

9.0 DESIGN CONSULTATION

- 9.1 Moore Twining should be retained to review those portions of the contract drawings and specifications that pertain to earthwork and foundations prior to finalization to determine whether they are consistent with our recommendations. This service is not a part of this current contractual agreement.
- 9.2 It is the client's responsibility to provide plans and specification documents for our review prior to their issuance for construction bidding purposes. If Moore Twining is not afforded the opportunity for review, Moore Twining assumes no liability for the misinterpretation of our conclusions and recommendations. This review is documented by a formal plan/specification review report provided by Moore Twining.

10.0 CONSTRUCTION MONITORING

- 10.1 It is recommended that Moore Twining be retained to observe the excavation, earthwork, and foundation phases of work to determine that the subsurface conditions are compatible with those used in the analysis and design.
- 10.2 Moore Twining can provide observation and field testing to determine if the recommendations of the project geotechnical report are achieved. Upon completion of the work, a written summary of our observations will be provided, field testing and conclusions regarding the conformance of the completed work to the intent of the project geotechnical report. This service is not, however, part of this current contractual agreement.
- 10.3 The construction monitoring is an integral part of this investigation. This phase of the work provides the geotechnical engineer the opportunity to verify the subsurface conditions interpolated from the soil borings and make alternative recommendations if the conditions differ from those anticipated.
- 10.4 If Moore Twining is not retained to provide engineering observation and field-testing services during construction activities related to earthwork, foundations, pavements and trenches; then, Moore Twining will not be responsible for compliance of any aspect of the construction with our recommendations or performance of the structures or improvements if the recommendations of this report are not followed. It is recommended that if a firm other than Moore Twining is selected to conduct these services that they provide evidence of professional liability insurance satisfactory to the owner and review this report. After their review, the firm should, in writing, state that they understand the conclusions and recommendations of this report and agree to conduct sufficient observations and testing to ensure the construction complies with this report's recommendations. Moore Twining should be notified, in writing, if another firm is selected to conduct observations and field-testing services prior to construction

- 10.5 Upon the completion of work, a final report should be prepared by Moore Twining. This report is essential to ensure that the recommendations presented are incorporated into the project construction, and to note any deviations from the project plans and specifications. The client should notify Moore Twining upon the completion of work to prepare a final report summarizing the observations during site preparation activities relative to the recommendations of this report. This service is not, however, part of this current contractual agreement.

11.0 NOTIFICATION AND LIMITATIONS

- 11.1 The conclusions and recommendations presented in this report are based on the information provided regarding the proposed construction, and the results of the field and laboratory investigation, combined with interpolation of the subsurface conditions between boring locations.
- 11.2 The nature and extent of subsurface variations between borings may not become evident until construction.
- 11.3 If variations or undesirable conditions are encountered during construction, Moore Twining should be notified promptly so that these conditions can be reviewed and the recommendations reconsidered where necessary. It should be noted that unexpected conditions frequently require additional expenditures for proper construction of the project.
- 11.4 If the proposed construction is relocated or redesigned, or if there is a substantial lapse of time between the submission of our report and the start of work (more than 12 months) at the site, or if conditions have changed due to natural cause or construction operations at or adjacent to the site, the conclusions and recommendations contained in this report should be considered invalid unless the changes are reviewed and our conclusions and recommendations modified or approved in writing.
- 11.5 Changed site conditions, or relocation of proposed structures, may require additional field and laboratory investigations to determine if our conclusions and recommendations are applicable considering the changed conditions or time lapse.
- 11.6 The conclusions and recommendations contained in this report are valid only for the project discussed in the "Anticipated Construction" section of this report. The use of the information and recommendations contained in this report for structures on this site not discussed herein or for structures on other sites not discussed in this report is not recommended. The entity or entities that use or cause to use this report or any portion thereof for another structure or site not covered by this report shall hold Moore Twining, its officers and employees harmless from any and all claims and provide Moore Twining's defense in the event of a claim.

- 11.7 This report is issued with the understanding that it is the responsibility of the client to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, designers, contractors, subcontractors, and other parties having interest in the project so that the steps necessary to carry out these recommendations in the design, construction and maintenance of the project are taken by the appropriate party.
- 11.8 This report presents the results of a geotechnical engineering investigation only and should not be construed as an environmental audit or study.
- 11.9 Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally-accepted engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.
- 11.10 Reliance on this report by a third party (i.e., that is not a party to our written agreement) is at the party's sole risk. If the project and/or site are purchased by another party, the purchaser must obtain written authorization and sign an agreement with Moore Twining in order to rely upon the information provided in this report for design or construction of the project.

We appreciate the opportunity to be of service. If you have any questions regarding this report, or if we can be of further assistance, please contact us at your convenience.

Sincerely,

MOORE TWINING ASSOCIATES, INC.
Geotechnical Engineering Division



Shaun Reich, EIT
Project Engineer



Read L. Andersen, RGE
Geotechnical Division Manager



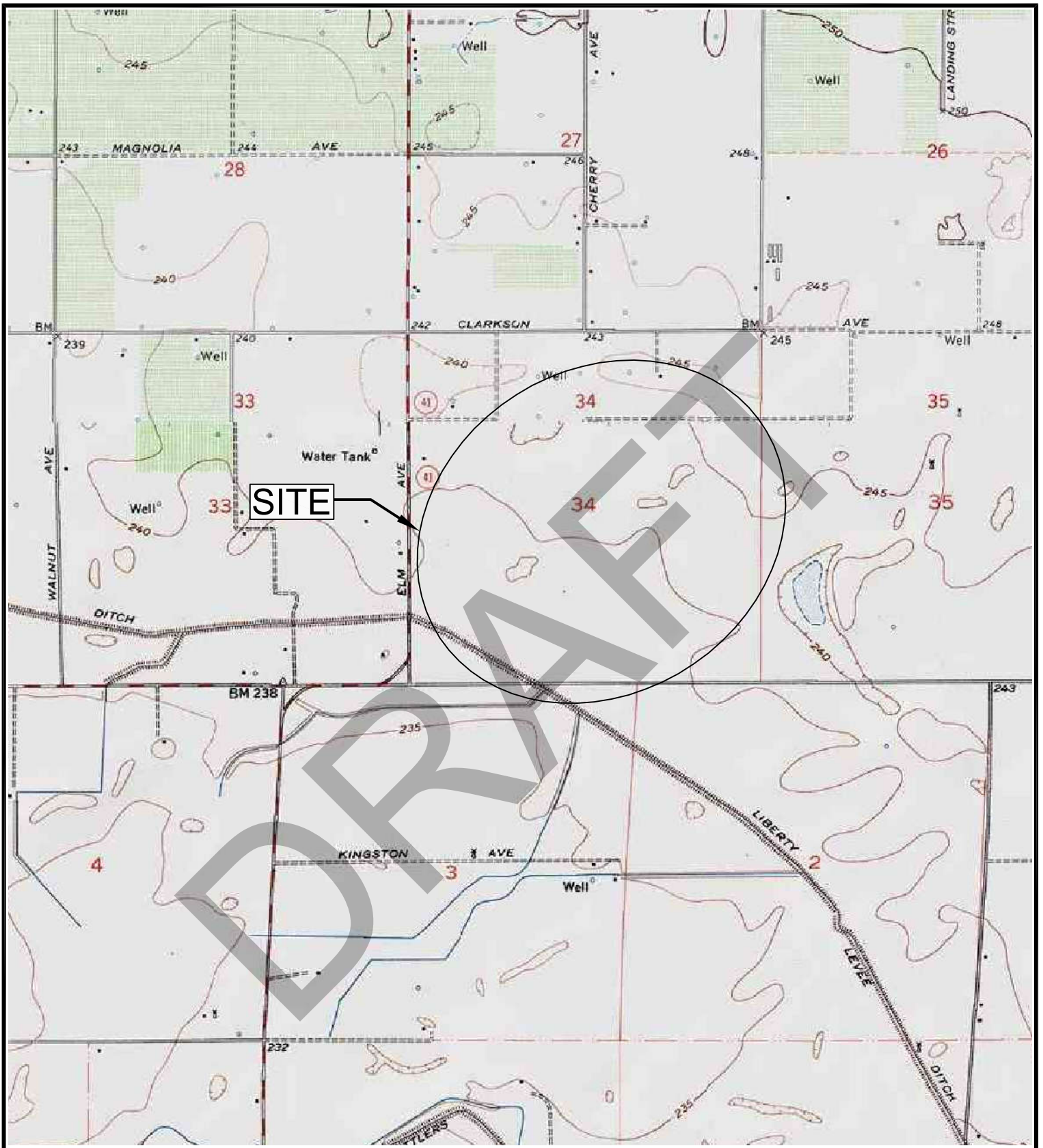
APPENDIX A

DRAWINGS

Drawing No. 1 - Site Location Map

Drawing No. 2 - Test Boring Location Map

DRAFT



SOURCE: U.S.G.S. TOPOGRAPHIC MAP, 7 ½ MINUTE SERIES
 RIVERDALE, CALIFORNIA QUADRANGLE 1954

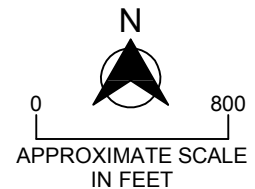
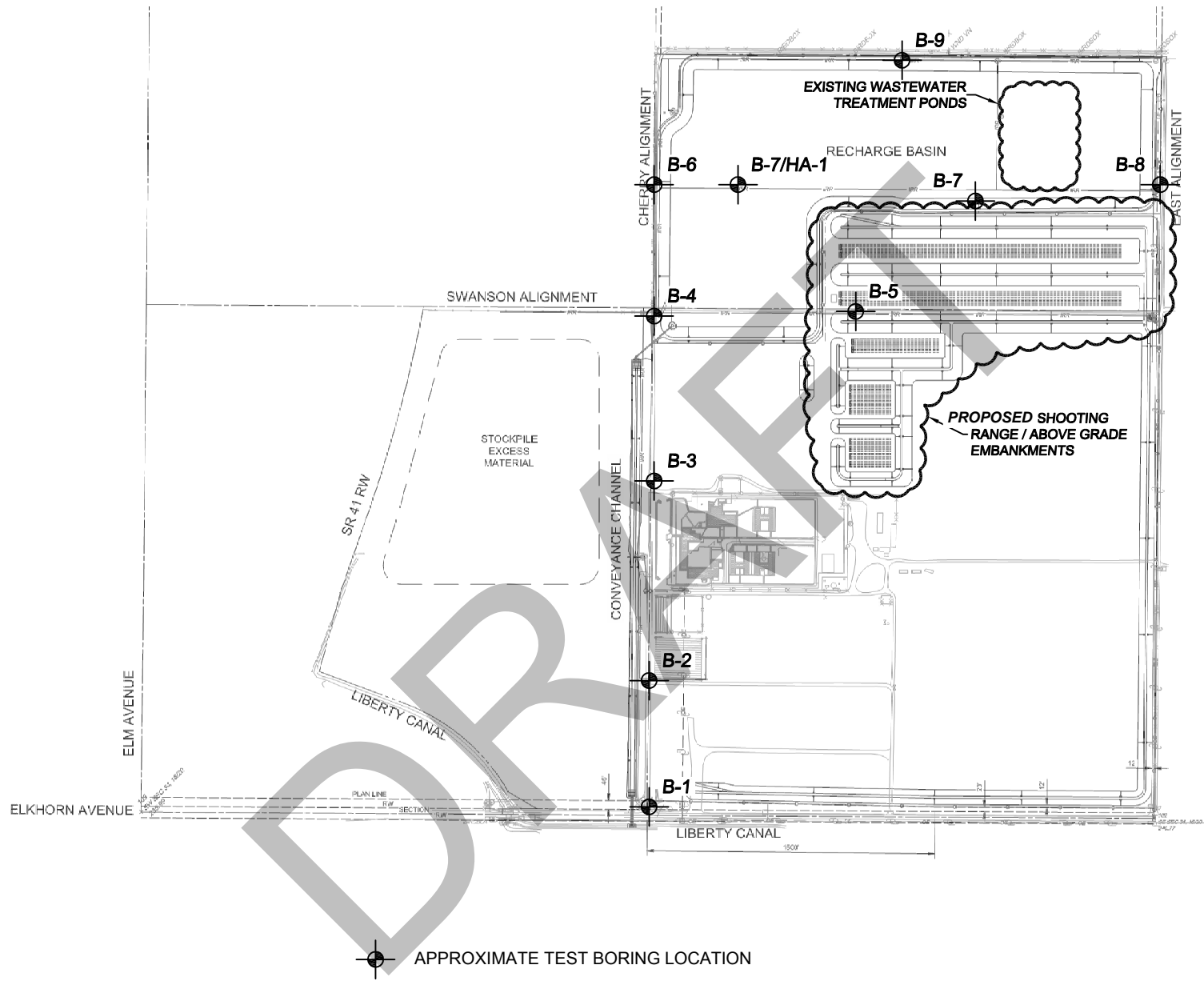


SITE LOCATION MAP
 ELKHORN RECHARGE PROJECT
 NORTHEAST OF INTERSECTION OF ELKHORN AVENUE AND
 HIGHWAY 41
 FRESNO COUNTY, CALIFORNIA

FILE NO: 55568-01-01	DATE: 11/21/2023
DRAWN BY: RM	APPROVED BY:
PROJECT NO. A55568.01	DRAWING NO. 1



**MOORE TWINING
 ASSOCIATES, INC.**



TEST BORING LOCATION MAP
 ELKHORN RECHARGE PROJECT
 NORTHEAST OF INTERSECTION OF ELKHORN AVENUE AND HIGHWAY 41
 FRESNO COUNTY, CALIFORNIA

FILE NO. 55568-01-02	DATE DRAWN: 11/21/2023
DRAWN BY: RM	APPROVED BY:
PROJECT NO. A55568.01	DRAWING NO. 2



APPENDIX B**LOGS OF BORINGS**

This appendix contains the final logs of borings. These logs represent our interpretation of the contents of the field logs and the results of the field and laboratory tests.

The logs and related information depict subsurface conditions only at these locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at these test boring locations. Also, the passage of time may result in changes in the soil conditions at these test boring locations.

In addition, an explanation of the abbreviations used in the preparation of the logs and a description of the Unified Soil Classification System are provided at the end of Appendix B.

DRAFT



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-1

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E.

Drill Type: CME 75

Date: 7/14/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	10/6" 12/6" 14/6"	ML	SANDY SILT; low moisture, with fine grained sand, non-plastic, brown Very stiff, moist	DD=110.6 pcf φ = 30° c = 180 psf	26	5.0
5	2/6" 3/6" 4/6"	SM	SILTY SAND; loose, moist, with fine grained sand, brown		7	3.0
10	4/6" 6/6" 10/6"	SP	POORLY GRADED SAND; medium dense, low moisture, fine to medium grained sand, brown	Sample Disturbed	16	2.1
15	6/6" 5/6" 4/6"		light brown		9	1.6
20	4/6" 6/6" 9/6"		Medium dense, light brown with iron-oxide staining		15	
			Bottom of Boring B-1 at 20 feet BSG			
25						

Notes: Boring backfilled with neat cement grout.

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-2

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E.

Drill Type: CME 75

Date: 7/14/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	2/6" 3/6" 12/6"	ML	SANDY SILT; stiff, moist, low plasticity, brown	DD=108 pcf	15	4.0
5	6/6" 9/6" 12/6"		Very stiff	DD=110 pcf	21	6.3
10	3/6" 3/6" 4/6"	SP	POORLY GRADED SAND; loose, moist, fine to medium grained sand, brown		7	4.0
15	3/6" 4/6" 6/6"		Medium dense, dark brown		10	
20			Bottom of Boring B-2 at 15 feet BSG			
25						

Notes: Boring backfilled with neat cement grout.

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-3

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E.

Drill Type: CME 75

Date: 7/14/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0		ML	SANDY SILT; stiff, moist, low to medium plasticity, brown	pH= 9.4 SR= ohm-cm SS= <0.0040% Cl= <0.0040% @ 1ft BSG DD= 104.6 pcf	17	13.2
5		SM	SILTY SAND; medium dense, moist, fine grained sand, damp, light brown		13	5.8
10		SP	POORLY GRADED SAND; loose, low moisture, fine to medium grained sand, brown	DD= 90.5 pcf ø = 29° c = 320 psf	14	1.6
15			Medium dense		12	1.4
20			Light brown		12	
20			Bottom of Boring B-3 at 20 feet BSG			
25						

Notes: Boring backfilled with neat cement grout.

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-4

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E./S.R.

Drill Type: CME 75

Date: 7/13/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0		SM	SILTY SAND; damp, medium dense, with fine grained sand, brown		11	
5		ML	SANDY SILT; stiff, low moisture, with fine-grained sand, light brown		9	2.9
10			Moist, light brown with iron-oxide staining	DD= 97.4 pcf ø = 31° c = 180 psf	12	14.6
15		SP	POORLY GRADED SAND; medium dense, low moisture, fine to medium grained sand, light brown	Sample Disturbed	17	2.4
20			Bottom of Boring B-4 at 20 feet BSG		14	
25						

Notes: Boring backfilled with neat cement grout.

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-5

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E./S.R.

Drill Type: CME 75

Date: 7/13/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0		SM	SILTY SAND; moist, loose fine to medium grained sand, dark brown	DD= 101.3 pcf	10	6.9
5		ML	SANDY SILT; hard, moist, with fine grained sand, gray to light brown with iron-oxide staining		43	
10		SM	Very stiff, increasing fine grain sand SILTY SAND; moist, fine with medium grained sand, brown	DD= 80 pcf -200= 71.6% Sand= 28.1% +4= 0.3%	36	14.6
15		SP	POORLY GRADED SAND; medium dense, low moisture, fine to medium grained sand, light brown		20	2.6
20			Bottom of Boring at 20 feet BSG		12	
25						

Notes: Boring backfilled with neat cement grout.

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-6

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E./S.R.

Drill Type: CME 75

Date: 7/13/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0		SM	SILTY SAND; loose, moist, fine to medium grained sand, dark brown	-200= 39.9% Sand= 60.1%	12	1.6
5			Medium dense, increase in fine sand with medium grained sand	@ 3.5' BSG DD= 109.2 pcf φ = 30° c = 350 psf	37	5.6
10		ML	SANDY SILT; very stiff, moist, with fine grained sand, light brown with iron-oxide staining	@ 8.5' BSG DD= 93.9 pcf	44	15.9
15		SM	SILTY SAND; medium dense, moist, with fine grained sand, light brown with iron-oxide staining		12	5.0
20		SP	POORLY GRADED SAND; medium dense, moist, fine to medium grained sand, light brown Bottom of Boring B-6 at 20 feet		14	
25						

Notes: Boring backfilled with neat cement grout.

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-7/HA-1

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E.

Drill Type: CME 75

Date: 7/13/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0		ML	SANDY SILT; damp, brown, low to non-plastic, light brown with iron-oxide staining	-200= 72.3% Sand= 27.7%		
5			Bottom of Boring HA-7 at 5 feet BSG			
10						
15						
20						
25						

Notes:

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-8

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E./S.R.

Drill Type: CME 75

Date: 7/13/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater
First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0		SM	SILTY SAND; medium dense, moist, with fine grained sand, light brown		11	5.9
5		ML	SANDY SILT; stiff, moist, with fine grained sand, light brown	DD= 100.1 pcf PI=NP LL=NV	15	16.5
10		SP	POORLY GRADED SAND; medium dense, moist, with fine grained sand, light brown	DD= 91.4 pcf	20	3.8
15			Increase in silt		13	
20			Bottom of Boring B-8 at 20 feet BSG		10	
25						

Notes: Boring backfilled with neat cement grout.

Figure Number



MOORE TWINING ASSOCIATES, INC.

Test Boring: B-9

Project: Proposed Elkhorn Recharge Facility

Project Number: A55568.01

Drilled By: J.C.

Logged By: J.E./S.R.

Drill Type: CME 75

Date: 7/13/2023

Auger Type: Hollow Stem (HSA) 6-5/8" Diameter

Elevation:

Hammer Type: Auto

Depth to Groundwater

First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0		SM	SILTY SAND; moist, fine to medium grained sand, light brown	PI= NP LL= NV EI= 1 SR= 4,500 ohm-cm pH= 8.7		
		CL	SANDY LEAN CLAY; moist, with fine grained sand, dark brown, low plasticity	SS= <0.0040% Cl= <0.0040%	39	26.4
5	9/6" 19/6" 20/6" 15/6" 15/6" 15/6"	ML	SANDY SILT; hard, moist, with trace fine grained sand, olive brown with iron-oxide staining Very stiff	@ 3.5ft BSG -200= 91.9% Sand= 8.1% @ 5.0ft BSG Remold ϕ = 33° c=230 psf PI=NP LL=NV Sand= 8.9% +4= 0.1% -200= 91%	30	19.8
10	5/6" 10/6" 15/6"			@ 8.5ft BSG DD= 94.4 pcf	25	13.2
15	7/9" 7/9" 9/6"	SM	Stiff SILTY SAND; medium dense, moist, fine to medium grained sand, brown	@ 13.5ft BSG DD= 80.6 pcf	16	19.8
20	3/6" 5/6" 6/6"	SP	POORLY GRADED SAND; medium dense, moist, fine to medium grained sand, tan		11	4.6
20			Bottom of Boring B-9 at 20 feet BSG			
25						

Notes: Boring backfilled with neat cement grout.

Figure Number

KEY TO SYMBOLS

Symbol Description

Symbol Description

Strata symbols

Soil Samplers

	ML: Silt		California Modified split barrel ring sampler
	SM: Silty sand		Standard penetration test
	SP: Poorly graded sand		
	CL: LEAN CLAY		

Notes:

1. Exploratory borings were drilled on and July 13 and 14, 2023 using a CME75 drill rig equipped with 6-5/8" outside diameter hollow stem augers and 4" diameter hand auger.
2. Groundwater was not encountered in any of the borings.
3. Boring locations were measured or paced from existing features.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. The "N-value" reported for the California Modified Split Barrel Sampler is the uncorrected field blow count. This value should not be interpreted as an SPT equivalent N-value.
6. Results of tests conducted on samples recovered are reported on the logs.

DD = Natural dry density (pcf)	LL = Liquid Limit (%)
+4 = Percent retained on the No. 4 sieve(%)	PI = Plasticity Index (%)
-200 = Percent passing the No. 200 sieve (%)	EI = Expansion Index
Sand = Percent passing the No. 4 sieve and retained on No. 200 sieve (%)	Gravel = Percent passing 3-inch & retained on No. 4 sieves(%)
pH = Soil pH	SR = Soil resistivity (ohms-cm)
SS = Soluble sulfates (%)	Cl = Soluble chlorides (%)
ϕ = Internal Angle of Friction (degrees)	c = Cohesion (psf)
pcf = Pounds per cubic foot	psf = Pounds per square foot
O.D. = Outside diameter	AMSL = Above mean sea level
N/A = Not applicable	N/E = Not encountered
BSG = Below Site Grade Elevation	NP = Not Plastic
NV = Not Viscous	

APPENDIX C

RESULTS OF LABORATORY TESTS

This appendix contains the individual results of the following tests. The results of the moisture content and dry density tests are included on the test boring logs in Appendix B. These data, along with the field observations, were used to prepare the final test boring logs in Appendix B.

These Included:

Moisture Content
(ASTM D2216)

Dry Density
(ASTM D2216)

Grain-Size
Distribution
(ASTM D422)

Atterberg Limits
(ASTM D4318)

Direct Shear
(ASTM D3080)

Moisture-Density
Relationship
(ASTM D1557)

Sulfate Content
(Caltest 417)

Chloride Content
(Caltest 422)

Resistivity
(ASTM D1125)

pH (Caltest 643)

To Determine:

Moisture contents representative of field conditions at the time the sample was taken.

Dry unit weight of sample representative of in-situ or in-place undisturbed condition.

Size and distribution of soil particles, i.e., sand, gravel and fines (silt and clay).

The consistency and "stickiness," as well as the range of moisture contents within which the material is "workable."

Soil shearing strength under varying loads and/or moisture conditions.

The optimum (best) moisture content for compacting soil and the maximum dry unit weight (density) for a given compactive effort.

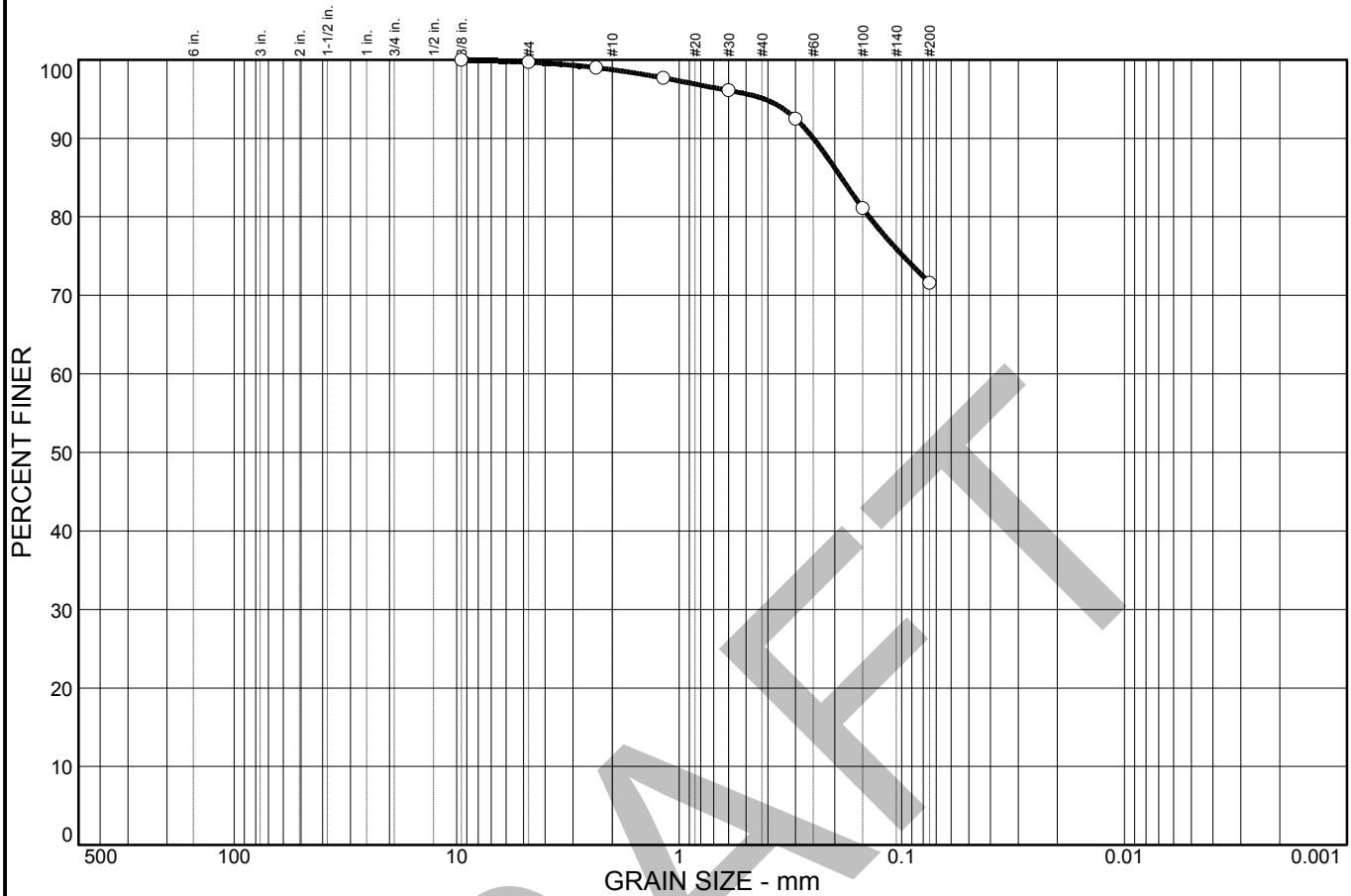
Percentage of water-soluble sulfate as (SO₄) in soil samples. Used as an indication of the relative degree of sulfate attack on concrete and for selecting the cement type.

Percentage of soluble chloride in soil. Used to evaluate the potential attack on encased reinforcing steel.

The potential of the soil to corrode metal.

The acidity or alkalinity of subgrade material.

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.3	1.0	3.6	23.5	71.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	99.7		
#8	99.0		
#16	97.7		
#30	96.1		
#50	92.5		
#100	81.1		
#200	71.6		

Material Description
Silt with sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₈₅= 0.187 D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= ML AASHTO=

Remarks

* (no specification provided)

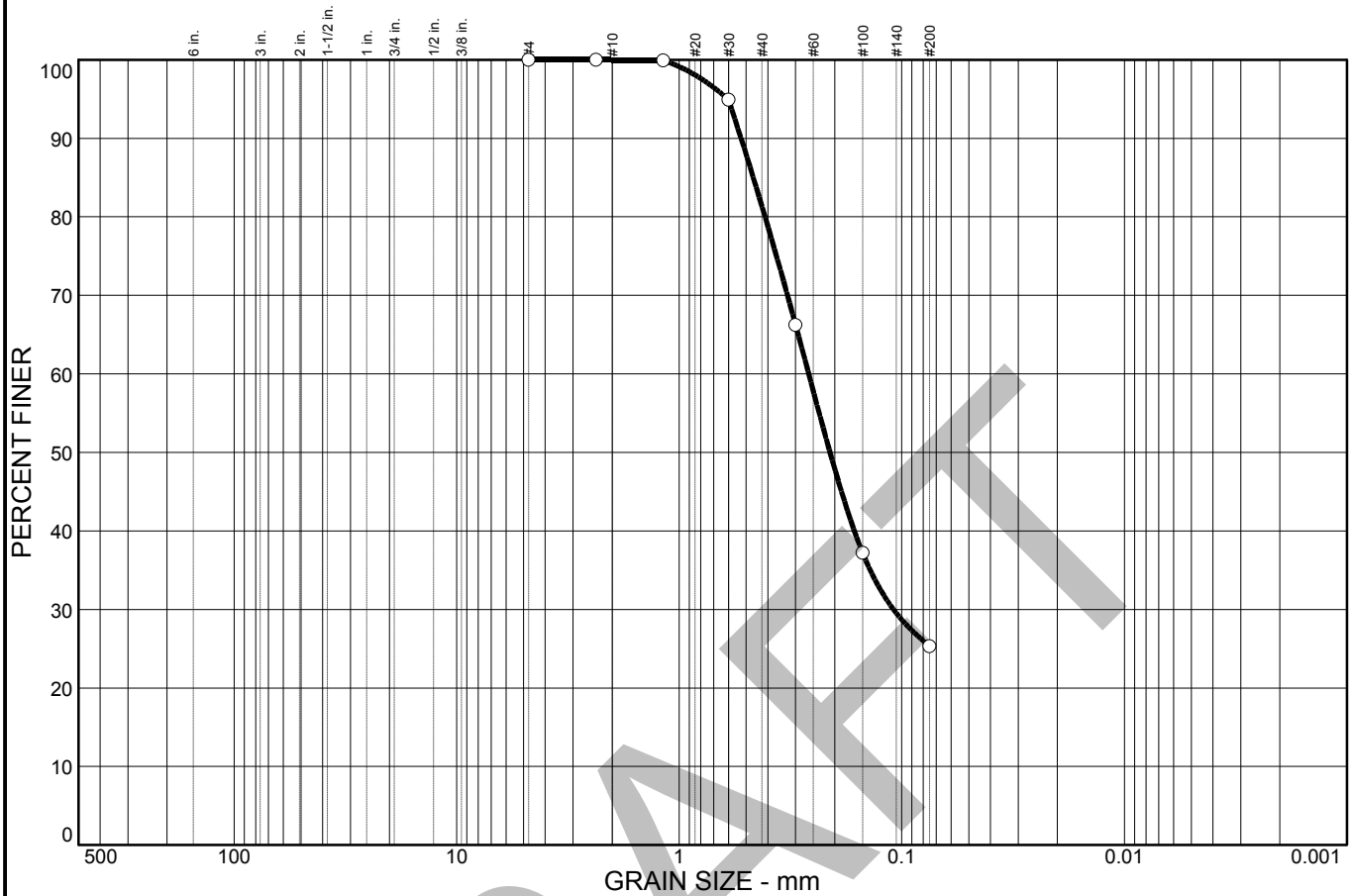
Sample No.: B-5
Location:

Source of Sample:

Date: 7/12/23
Elev./Depth: 8.5-10'

Moore Twining Associates, Inc. Fresno, CA	Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project Project No.: A55568.01
Figure	

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	18.7	56.0	25.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#16	99.9		
#30	94.9		
#50	66.2		
#100	37.2		
#200	25.3		

Material Description
Silty sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₈₅= 0.465 D₆₀= 0.262 D₅₀= 0.210
 D₃₀= 0.109 D₁₅= D₁₀=
 C_u=

Classification
 USCS= SM AASHTO=

Remarks

* (no specification provided)

Sample No.: B-5
Location:

Source of Sample:

Date: 7/12/23
Elev./Depth: 10'-13'

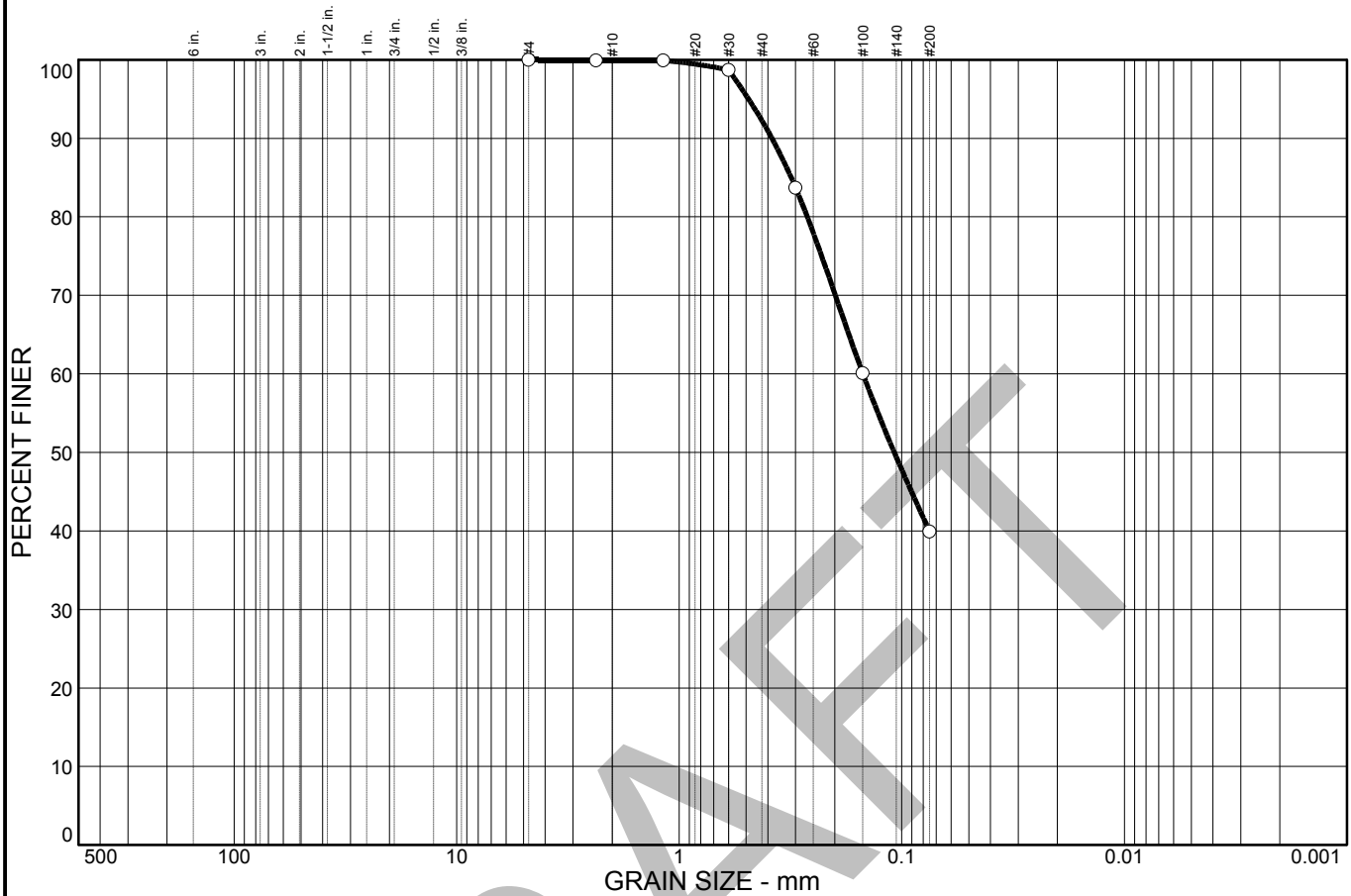
Moore Twining Associates, Inc.
Fresno, CA

Client: Provost & Pritchard Consulting Group
Project: Elkhorn Recharge Facility Project

Project No.: A55568.01

Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	7.7	52.3	39.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#16	99.9		
#30	98.7		
#50	83.7		
#100	60.1		
#200	39.9		

Material Description
Silty sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₈₅= 0.314 D₆₀= 0.150 D₅₀= 0.108
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= SM AASHTO=

Remarks

* (no specification provided)

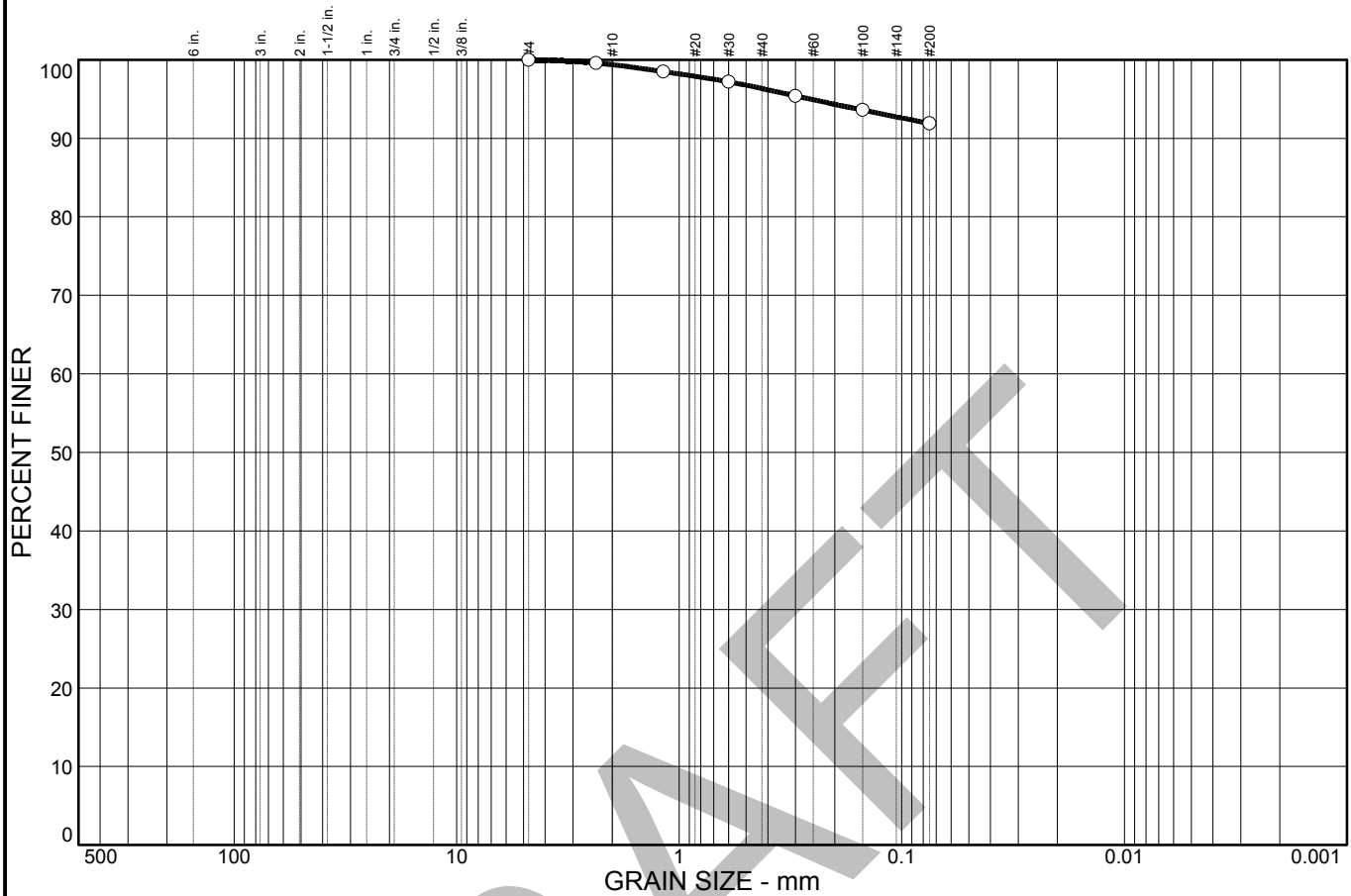
Sample No.: B-6
Location:

Source of Sample:

Date: 7/12/23
Elev./Depth: 1-2.5'

Moore Twining Associates, Inc. Fresno, CA	Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project Project No.: A55568.01
Figure	

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.6	3.0	4.5	91.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.6		
#16	98.5		
#30	97.2		
#50	95.4		
#100	93.6		
#200	91.9		

Material Description
Silt

Atterberg Limits
PL= LL= PI=

Coefficients
D₈₅= D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= ML AASHTO=

Remarks

* (no specification provided)

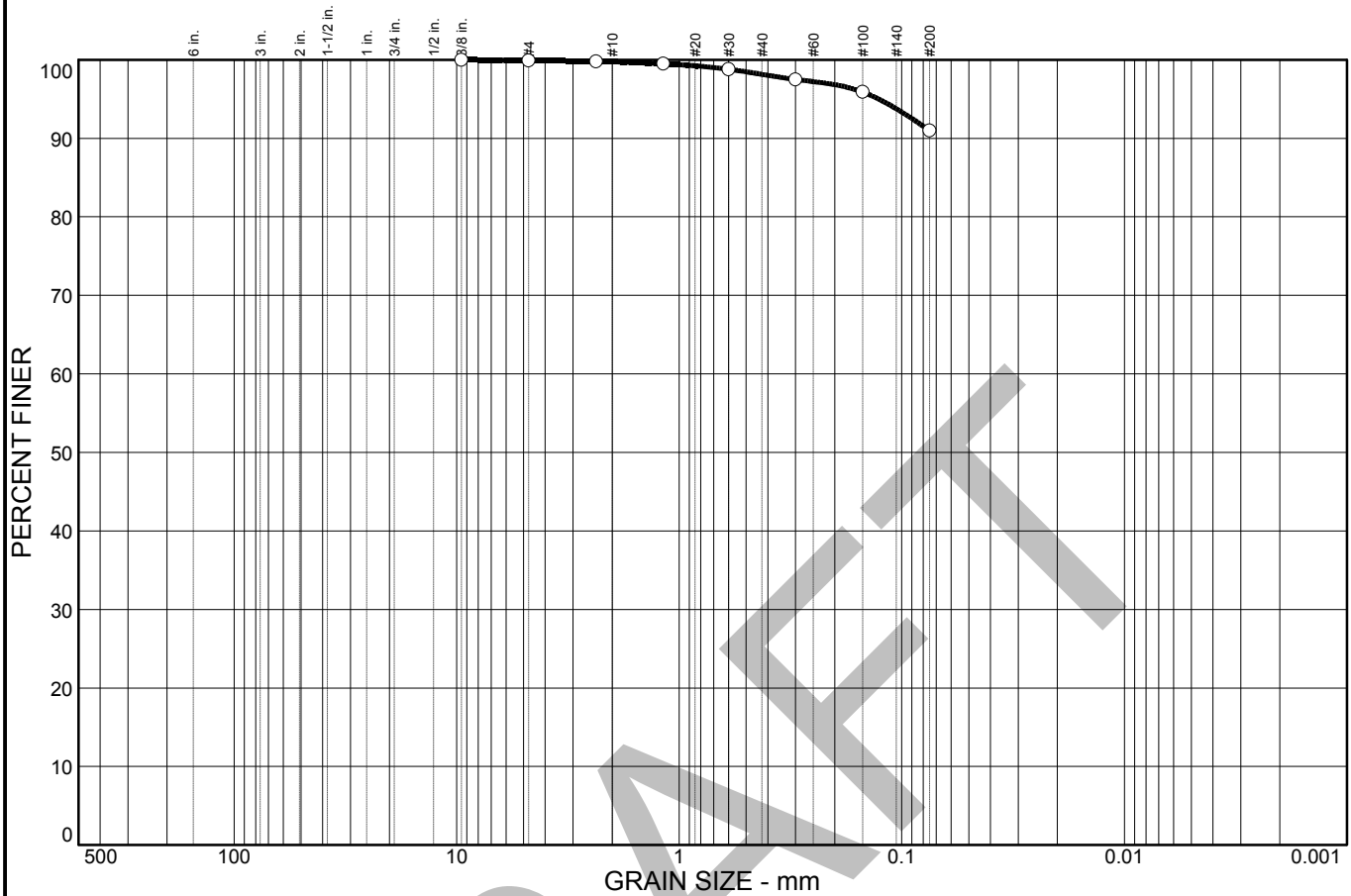
Sample No.: B-9
Location:

Source of Sample:

Date: 7/12/23
Elev./Depth: 3.5-5'

Moore Twining Associates, Inc. Fresno, CA	Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project Project No: A55568.01
Figure	

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.1	0.1	1.6	7.2	91.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	99.9		
#8	99.8		
#16	99.5		
#30	98.8		
#50	97.5		
#100	95.9		
#200	91.0		

Material Description
Silt

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₈₅= D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= ML AASHTO=

Remarks

* (no specification provided)

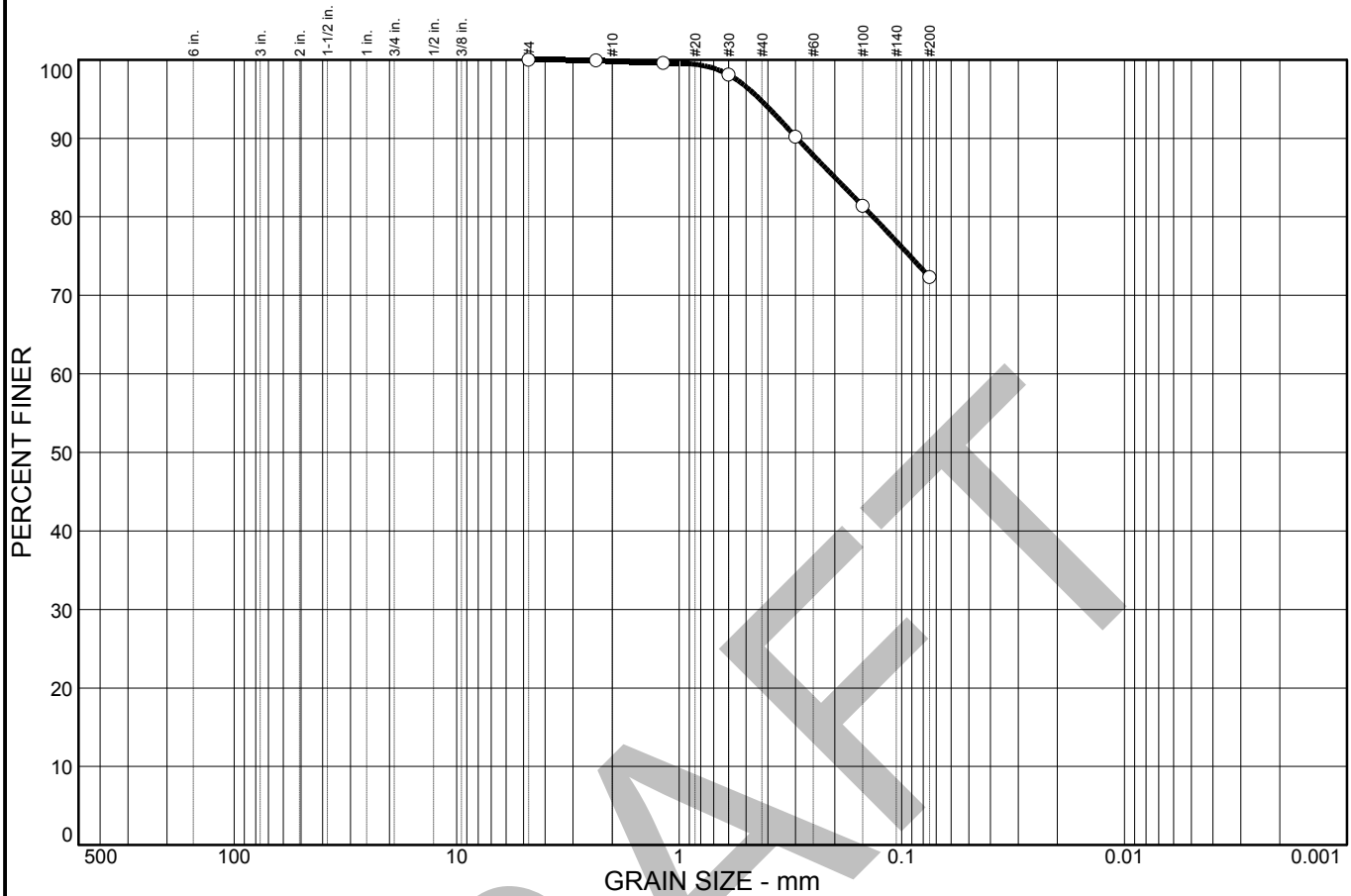
Sample No.: B-9
Location:

Source of Sample:

Date: 7/12/23
Elev./Depth: 5-6.5'

Moore Twining Associates, Inc. Fresno, CA	Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project Project No.: A55568.01
Figure	

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.2	5.1	22.4	72.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#16	99.6		
#30	98.1		
#50	90.2		
#100	81.4		
#200	72.3		

Material Description
Silt with sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₈₅= 0.200 D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= ML AASHTO=

Remarks

* (no specification provided)

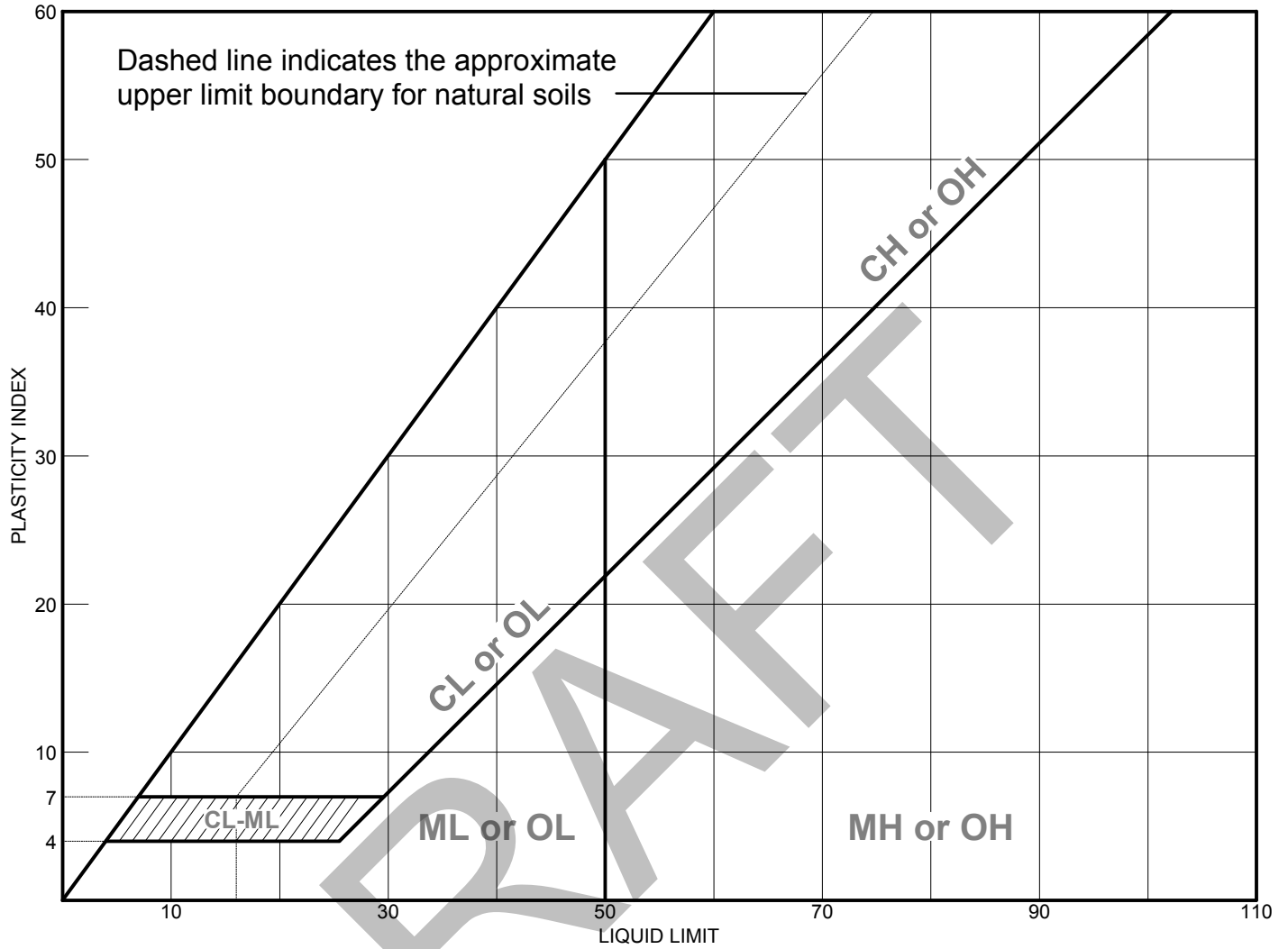
Sample No.: HA-7
Location:

Source of Sample:

Date: 7/12/23
Elev./Depth: 0-5'

Moore Twining Associates, Inc. Fresno, CA	Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project Project No: A55568.01
Figure	

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
Silt	NV	NP	NP			ML

Project No. A55568.01 **Client:** Provost & Pritchard Consulting Group

Project: Elkhorn Recharge Facility Project

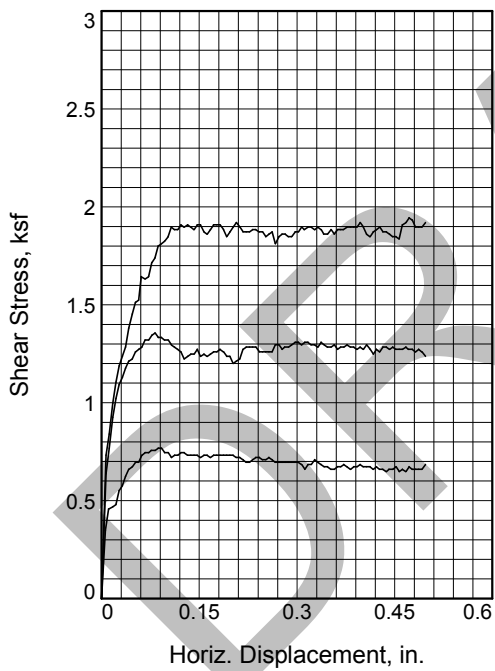
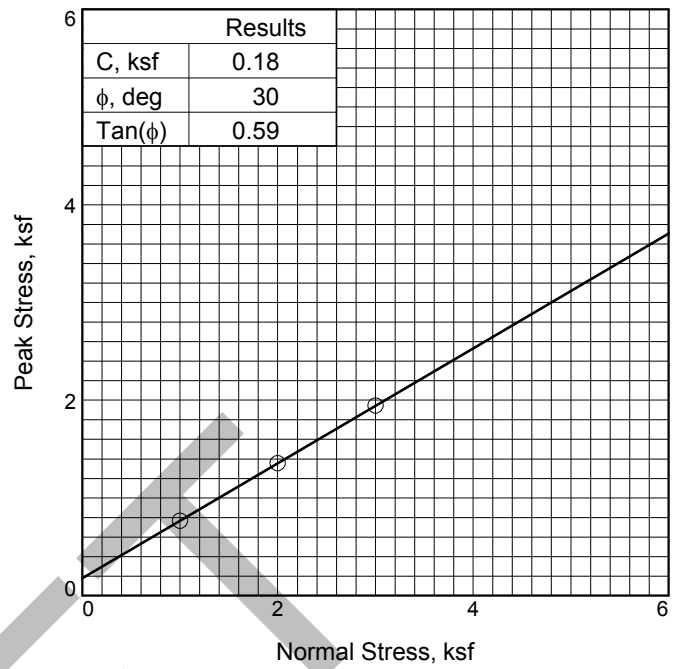
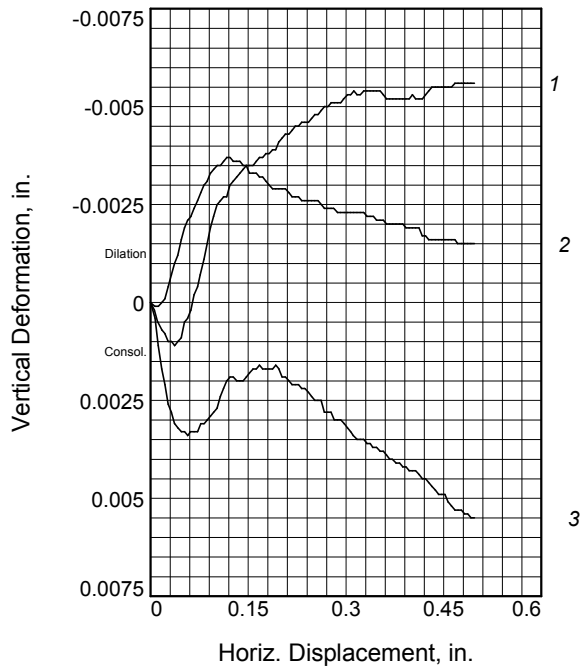
Source: **Sample No.:** B-8 **Elev./Depth:** 5-6.5'

Remarks:

•

Moore Twining Associates, Inc.
Fresno, CA

Figure



Sample No.	1	2	3	
Initial	Water Content, %	5.1	5.3	5.3
	Dry Density, pcf	111.3	114.0	115.3
	Saturation, %	27.6	31.3	32.1
	Void Ratio	0.4868	0.4510	0.4343
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.9	16.5	15.6
	Dry Density, pcf	111.4	114.2	115.6
	Saturation, %	98.0	97.8	95.6
	Void Ratio	0.4846	0.4484	0.4316
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
Normal Stress, ksf	1.00	2.00	3.00	
Peak Stress, ksf	0.77	1.36	1.94	
Displacement, in.	0.09	0.08	0.47	
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %	3.6	3.4	19.5	

Sample Type:
Description: Silt

Specific Gravity= 2.65
Remarks:

Figure _____

Client: Provost & Pritchard Consulting Group

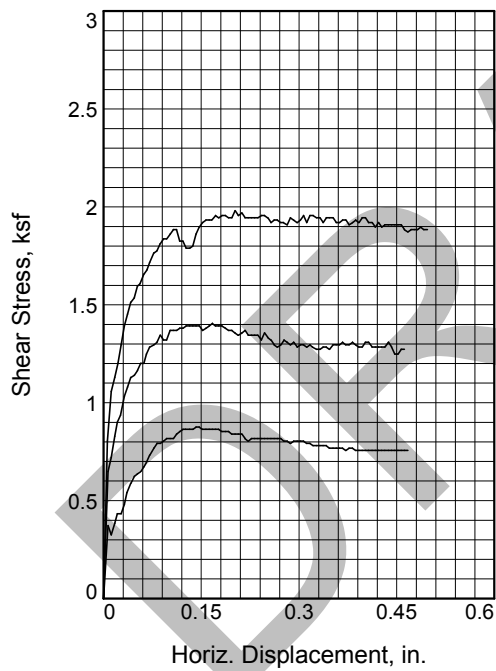
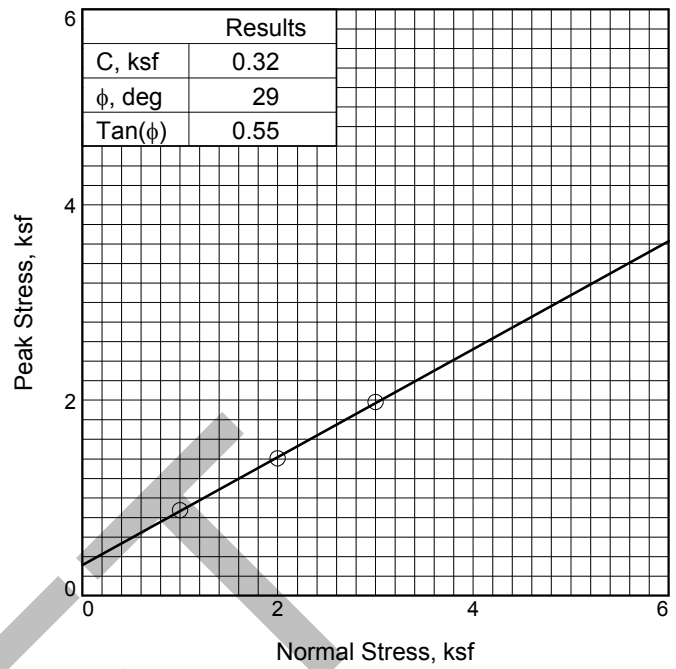
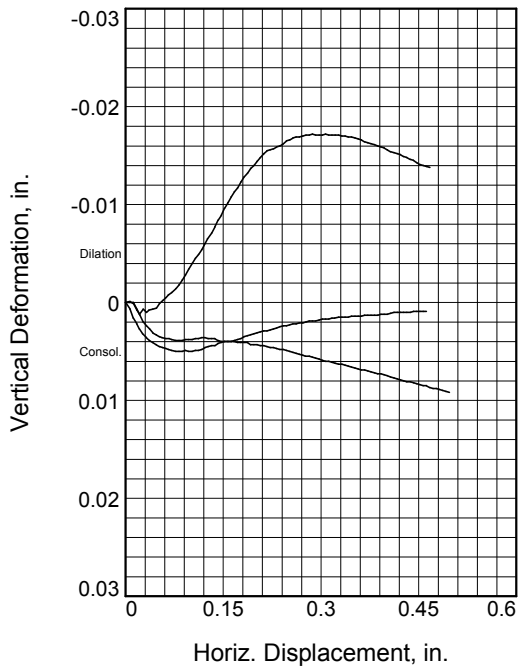
Project: Elkhorn Recharge Facility Project

Sample Number: B-1 **Depth:** 2-3.5'

Proj. No.: A55568.01

Date Sampled: 7/12/23

DIRECT SHEAR TEST REPORT
Moore Twining Associates, Inc.
Fresno, CA



Sample No.	1	2	3	
Initial	Water Content, %	1.6	1.7	1.8
	Dry Density, pcf	91.1	95.1	92.6
	Saturation, %	5.0	6.3	6.0
	Void Ratio	0.8164	0.7387	0.7871
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	29.2	26.2	27.6
	Dry Density, pcf	92.5	96.7	94.3
	Saturation, %	98.0	97.7	97.1
	Void Ratio	0.7892	0.7109	0.7549
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.98	0.98	0.98
Normal Stress, ksf	1.00	2.00	3.00	
Peak Stress, ksf	0.88	1.40	1.98	
Displacement, in.	0.14	0.17	0.20	
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %	5.9	6.9	8.4	

Sample Type:
Description: Silt

Specific Gravity= 2.65
Remarks:

Figure _____

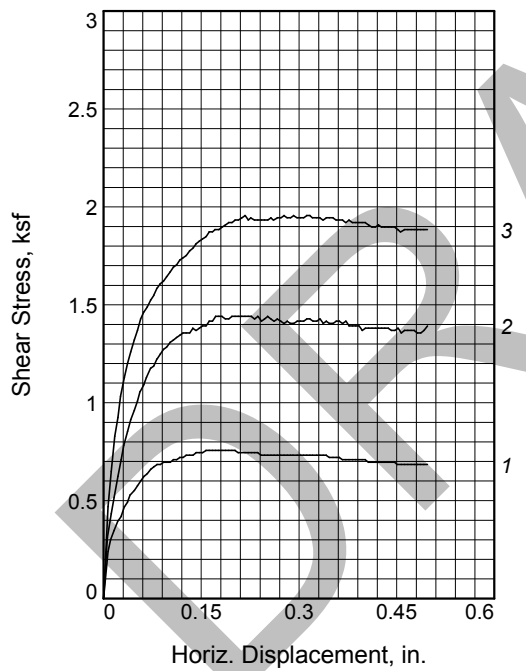
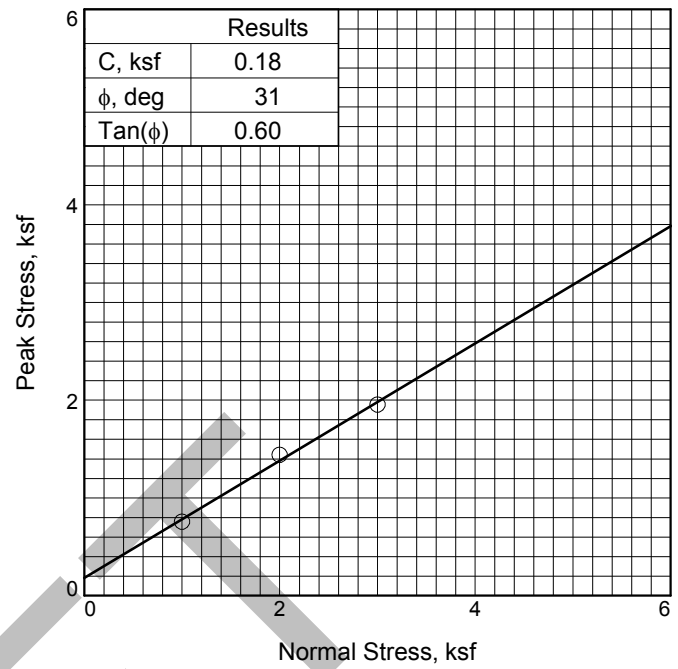
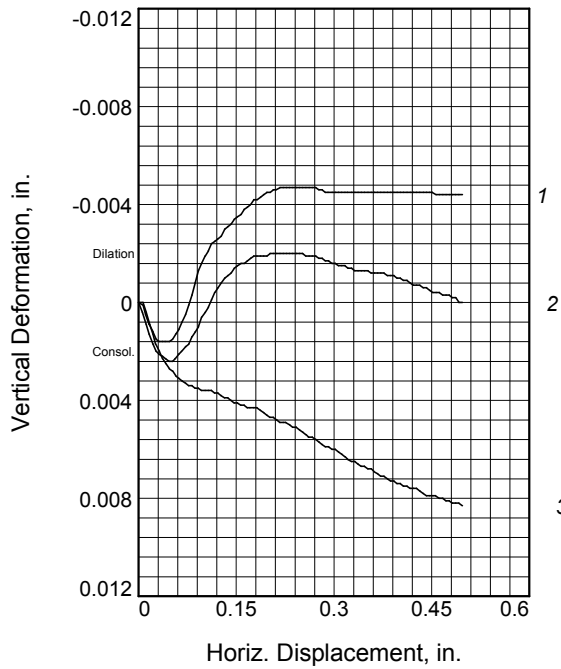
Client: Provost & Pritchard Consulting Group

Project: Elkhorn Recharge Facility Project

Sample Number: B-3 **Depth:** 8.5-10'

Proj. No.: A55568.01 **Date Sampled:** 7/12/23

DIRECT SHEAR TEST REPORT
Moore Twining Associates, Inc.
Fresno, CA



Sample No.	1	2	3	
Initial	Water Content, %	10.2	10.1	10.2
	Dry Density, pcf	84.6	80.1	81.7
	Saturation, %	28.3	25.0	26.3
	Void Ratio	0.9556	1.0652	1.0252
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	35.3	38.8	37.0
	Dry Density, pcf	84.7	80.3	81.8
	Saturation, %	98.0	96.9	96.0
	Void Ratio	0.9535	1.0610	1.0220
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
Normal Stress, ksf	1.00	2.00	3.00	
Peak Stress, ksf	0.76	1.44	1.96	
Displacement, in.	0.16	0.17	0.22	
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %	6.5	7.1	9.0	

Sample Type:
Description: Silt

Specific Gravity= 2.65
Remarks:

Figure _____

Client: Provost & Pritchard Consulting Group

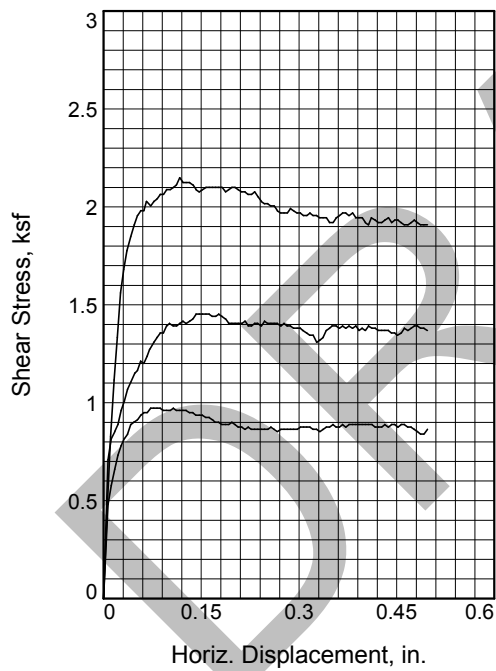
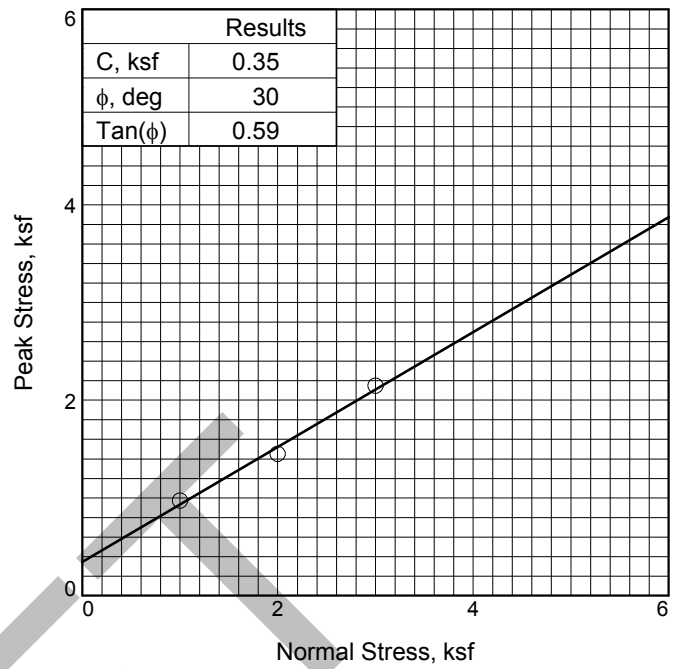
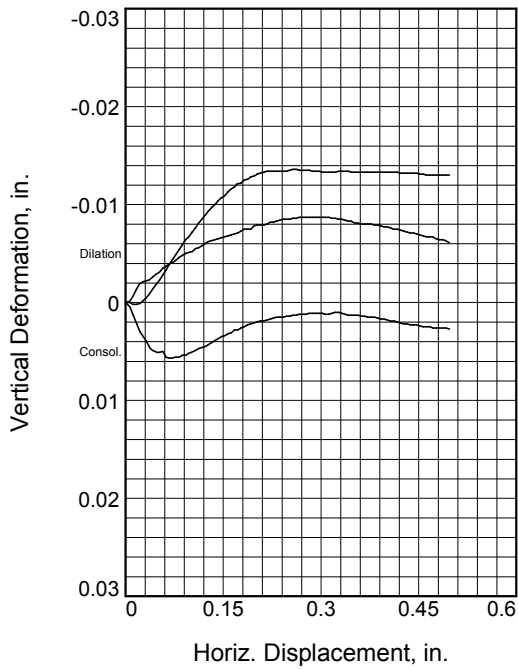
Project: Elkhorn Recharge Facility Project

Sample Number: B-4 **Depth:** 8.5-10'

Proj. No.: A55568.01

Date Sampled: 7/12/23

DIRECT SHEAR TEST REPORT
Moore Twining Associates, Inc.
Fresno, CA



Sample No.	1	2	3	
Initial	Water Content, %	8.6	8.5	8.6
	Dry Density, pcf	95.0	92.0	91.6
	Saturation, %	30.6	28.2	28.3
	Void Ratio	0.7417	0.7983	0.8065
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	27.1	29.0	28.1
	Dry Density, pcf	95.1	92.3	93.1
	Saturation, %	97.2	96.8	95.9
	Void Ratio	0.7391	0.7929	0.7776
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	0.98
Normal Stress, ksf	1.00	2.00	3.00	
Peak Stress, ksf	0.97	1.45	2.15	
Displacement, in.	0.07	0.14	0.12	
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %	3.0	5.9	4.8	

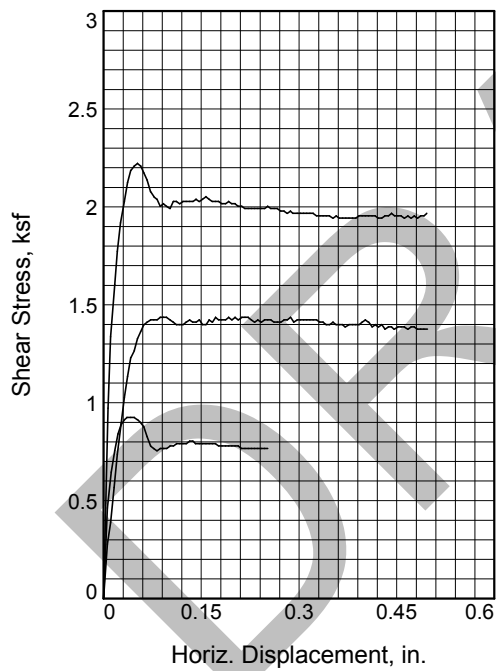
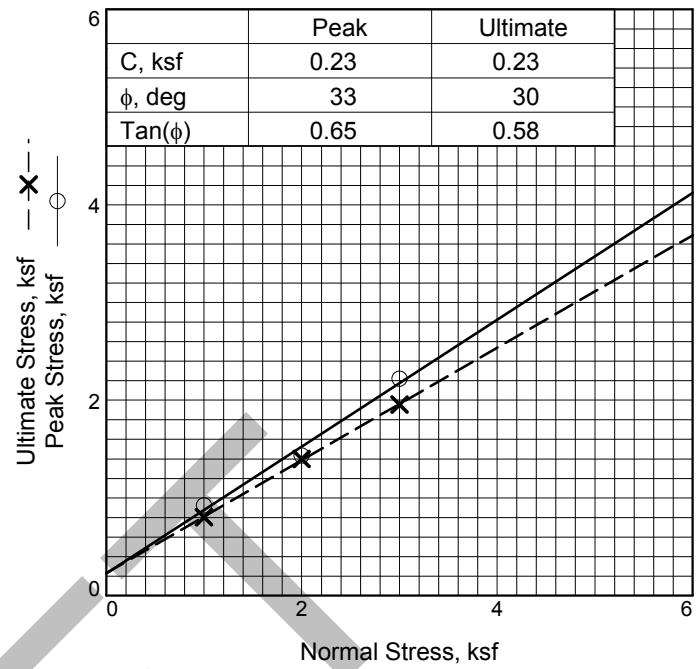
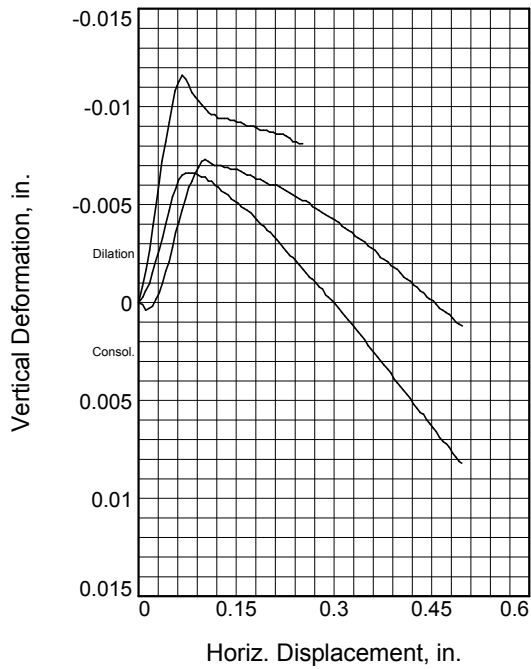
Sample Type:
Description: Silty sand
Specific Gravity= 2.65
Remarks:

Client: Provost & Pritchard Consulting Group
Project: Elkhorn Recharge Facility Project
Sample Number: B-6 **Depth:** 3.5-5'

Proj. No.: A55568.01 **Date Sampled:** 7/12/23

DIRECT SHEAR TEST REPORT
 Moore Twining Associates, Inc.
 Fresno, CA

Figure _____



Sample No.	1	2	3	
Initial	Water Content, %	13.3	12.6	12.7
	Dry Density, pcf	107.4	107.1	106.9
	Saturation, %	64.9	61.4	61.6
	Void Ratio	0.5408	0.5452	0.5482
	Diameter, in.	2.40	2.41	2.40
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.1	19.0	19.0
	Dry Density, pcf	108.8	108.6	108.4
	Saturation, %	97.5	96.4	95.5
	Void Ratio	0.5200	0.5234	0.5261
	Diameter, in.	2.40	2.41	2.40
	Height, in.	0.99	0.99	0.99
Normal Stress, ksf	1.00	2.00	3.00	
Peak Stress, ksf	0.92	1.44	2.22	
Displacement, in.	0.04	0.09	0.05	
Ultimate Stress, ksf	0.80	1.40	1.95	
Displacement, in.	0.13	0.06	0.39	
Strain at peak, %	1.5	3.6	2.2	

Sample Type:

Description: Silt

LL= NV

PI= NP

Specific Gravity= 2.65

Remarks: Remolded to 90% of 120.1 pcf (Max. Dry Density & 13.1% (2% above Optimum M.C.)

Figure _____

Client: Provost & Pritchard Consulting Group

Project: Elkhorn Recharge Facility Project

Sample Number: B-9

Depth: 5-10'

Proj. No.: A55568.01

Date Sampled: 7/12/23

DIRECT SHEAR TEST REPORT
Moore Twining Associates, Inc.
Fresno, CA



EXPANSION INDEX TEST, ASTM D4829

MTA PROJECT NAME: Elkhorn Recharge Facility Project REPORT DATE: 8/25/2023
 TEST DATE: 7/12/2023
 MTA PROJECT NO.: A55568.01
 SAMPLE I.D.: B-9 @ 0-4
 SAMPLED BY: JE / SR
 SAMPLE DATE: 7/12/2023 TESTED BY: TD

MATERIALS DESCRIPTION: Silt
 % PASSING # 4 SIEVE 100

<u>Initial Moisture Determination:</u>		<u>Final Moisture Determination:</u>	
Pan + Wet Soil Wt., gm	<u>250.0</u>	Wet Soil Wt., lbs	<u>0.9632</u>
Pan + Dry Soil Wt., gm	<u>230.0</u>	Dry Soil Wt., lbs	<u>0.8484</u>
Pan Wt., gm	<u>0.0</u>		
Initial % Moisture Content	<u>8.7</u>	Final % Moisture Content	<u>13.5</u>

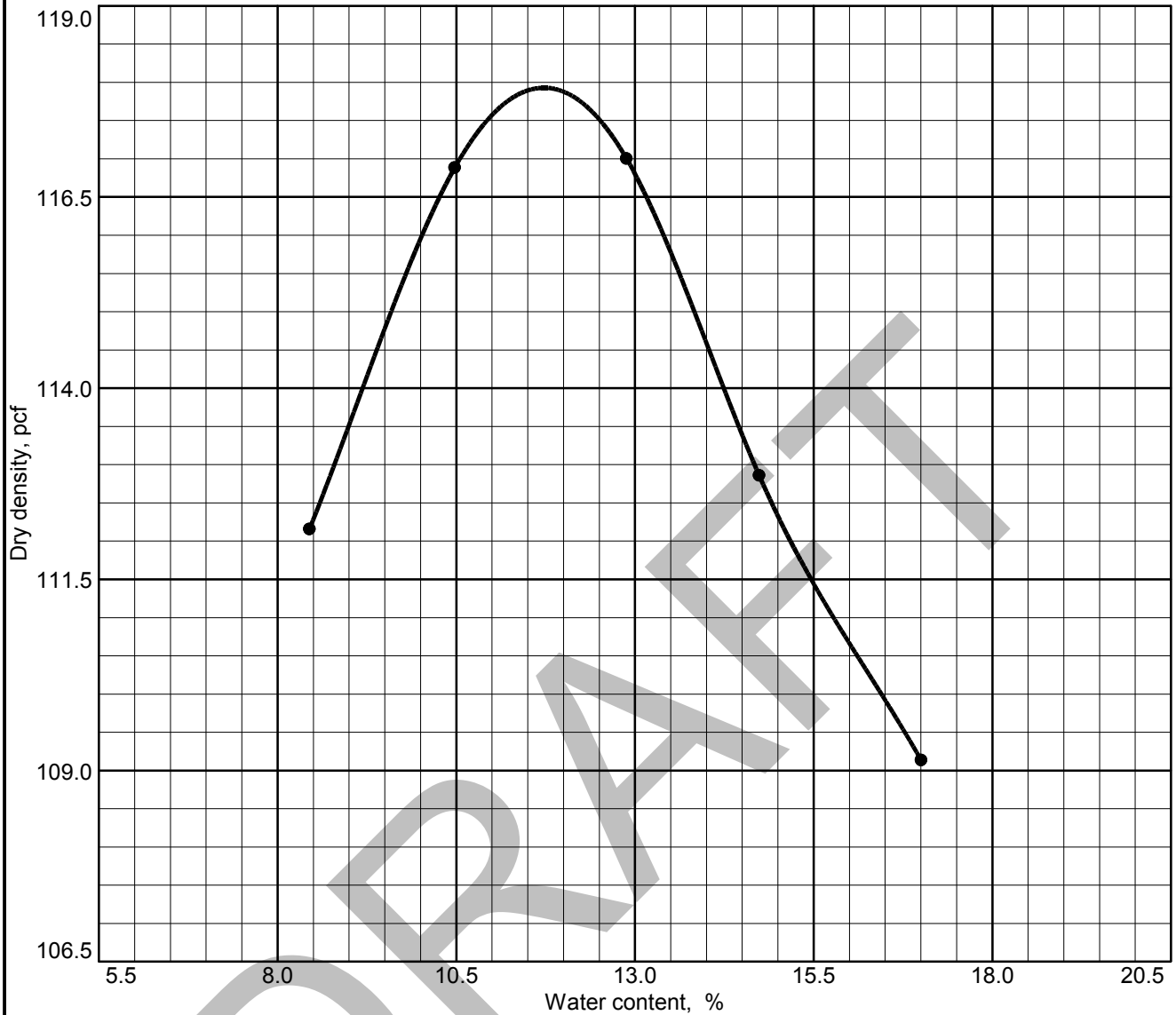
<u>Initial Expansion Data:</u>		<u>Final Expansion Data:</u>	
Ring + Sample Wt., lbs	<u>0.9222</u>	Ring + Sample Wt., lbs	<u>0.9632</u>
Ring Wt., lbs	<u>0.0000</u>	Ring Wt., lbs	<u>0.0000</u>
Remolded Wt., lbs	<u>0.9222</u>	Remolded Wt., lbs	<u>0.9632</u>
Remolded Wet Density, pcf	<u>126.8</u>	Remolded Wet Density, pcf	<u>132.3</u>
Remolded Dry Density, pcf	<u>116.7</u>	Remolded Dry Density, pcf	<u>116.5</u>

<u>Expansion Data:</u>	<u>Initial Volume</u>	<u>Final Volume</u>
Initial Gage Reading, in:	<u>0.00727222</u>	<u>0.007282</u>
Final Gage Reading, in:		
Expansion, in:		
Expansion Index	<u>1</u>	Comments: <u>Very Low Expansion Potential</u>

Classification of Expansive Soils. (Table No.1 From ASTM D4829)

<u>Expansion Index</u>	<u>Potential Expansion</u>
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

COMPACTION TEST REPORT



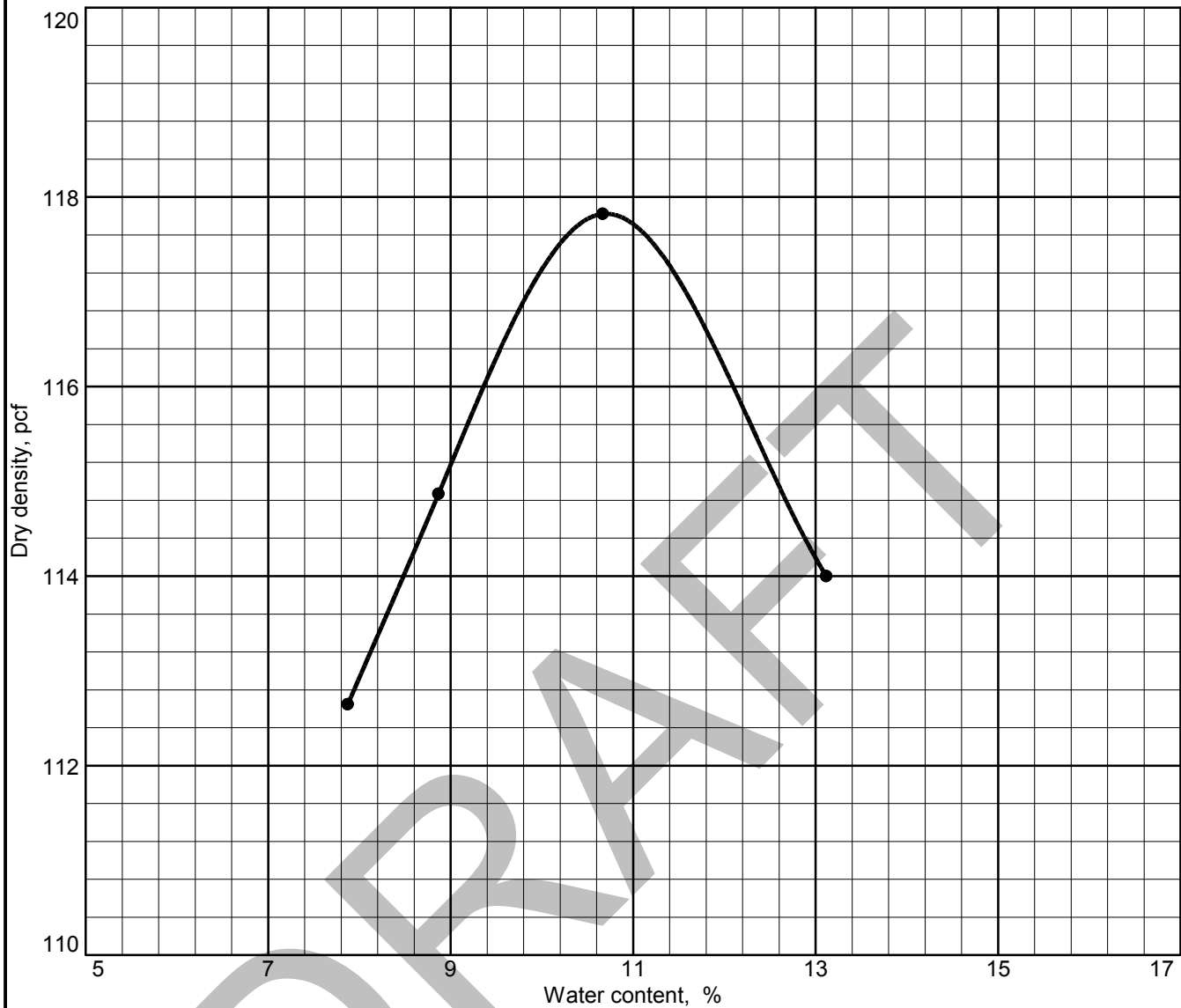
Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
1-5'	ML							

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 117.9 pcf Optimum moisture = 11.7 %	Silt with sand
Project No. A55568.01 Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project ● Source: Sample No.: B-3 Elev./Depth: 1-5' <div style="text-align: center; border: 1px solid black; padding: 5px;"> Moore Twining Associates, Inc. Fresno, CA </div>	Remarks:

Figure

COMPACTION TEST REPORT

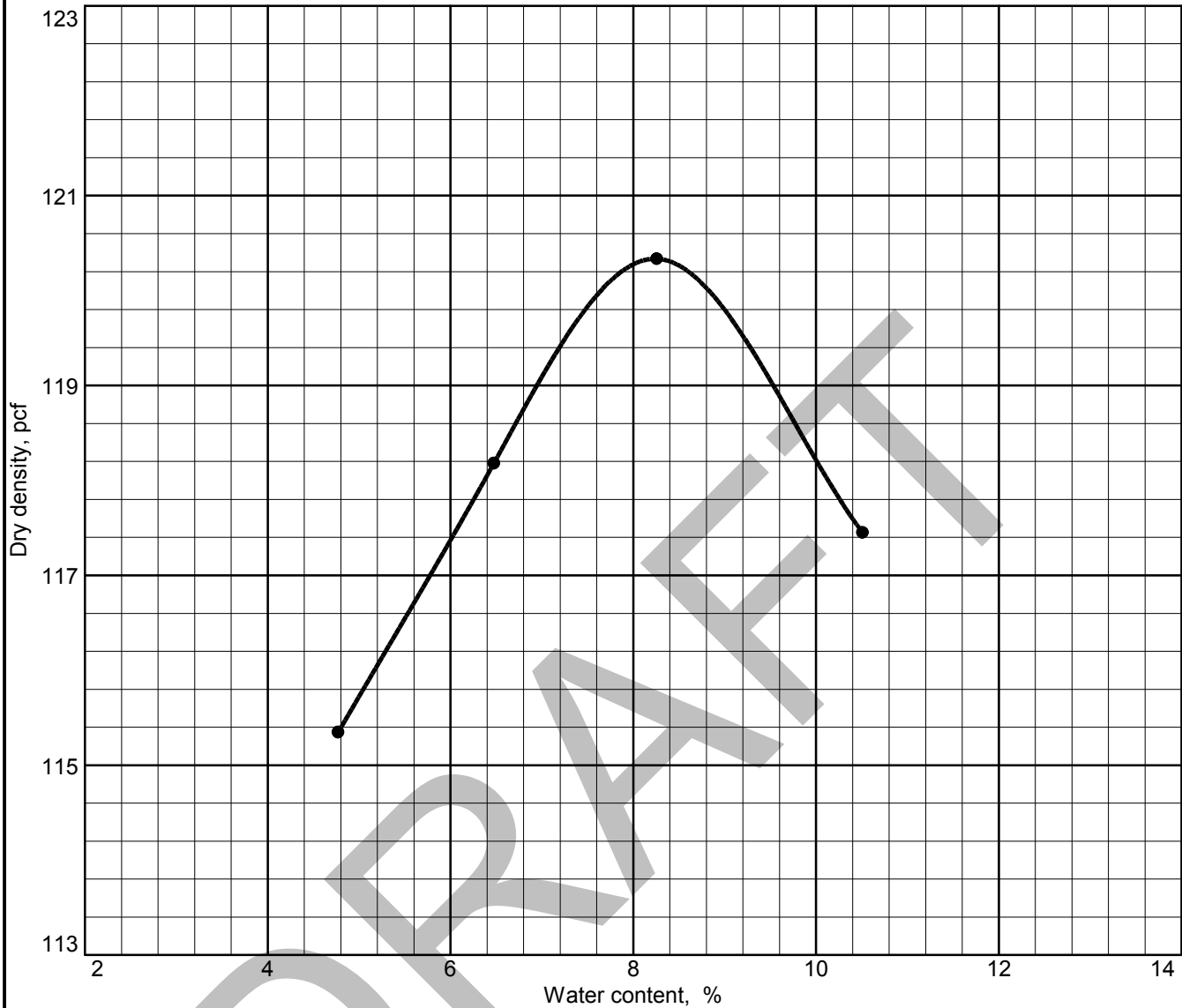


Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
8-10'	SP							

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 117.8 pcf Optimum moisture = 10.7 %	Poorly graded sand
Project No. A55568.01 Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project ● Source: Sample No.: B-3 Elev./Depth: 8-10' <div style="text-align: center; padding: 5px;"> Moore Twining Associates, Inc. Fresno, CA </div>	Remarks: <div style="text-align: right; padding-right: 10px;">Figure</div>

COMPACTION TEST REPORT

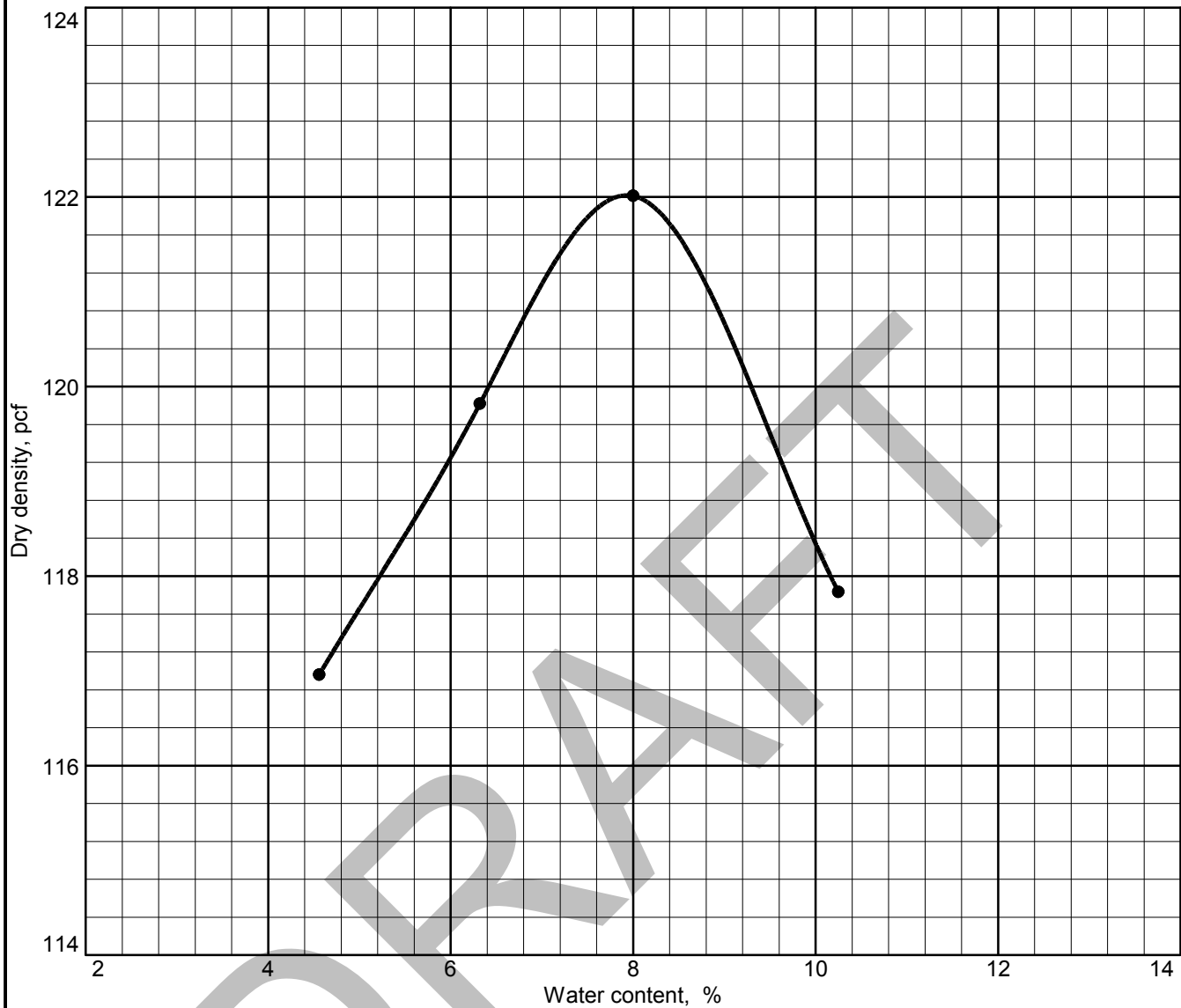


Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0-5'	SM							

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 120.3 pcf Optimum moisture = 8.2 %	Silty sand
Project No. A55568.01 Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project ● Source: Sample No.: B-6 Elev./Depth: 0-5' <div style="text-align: center; padding: 5px;"> Moore Twining Associates, Inc. Fresno, CA </div>	Remarks: <div style="text-align: right; padding-top: 10px;">Figure</div>

COMPACTION TEST REPORT



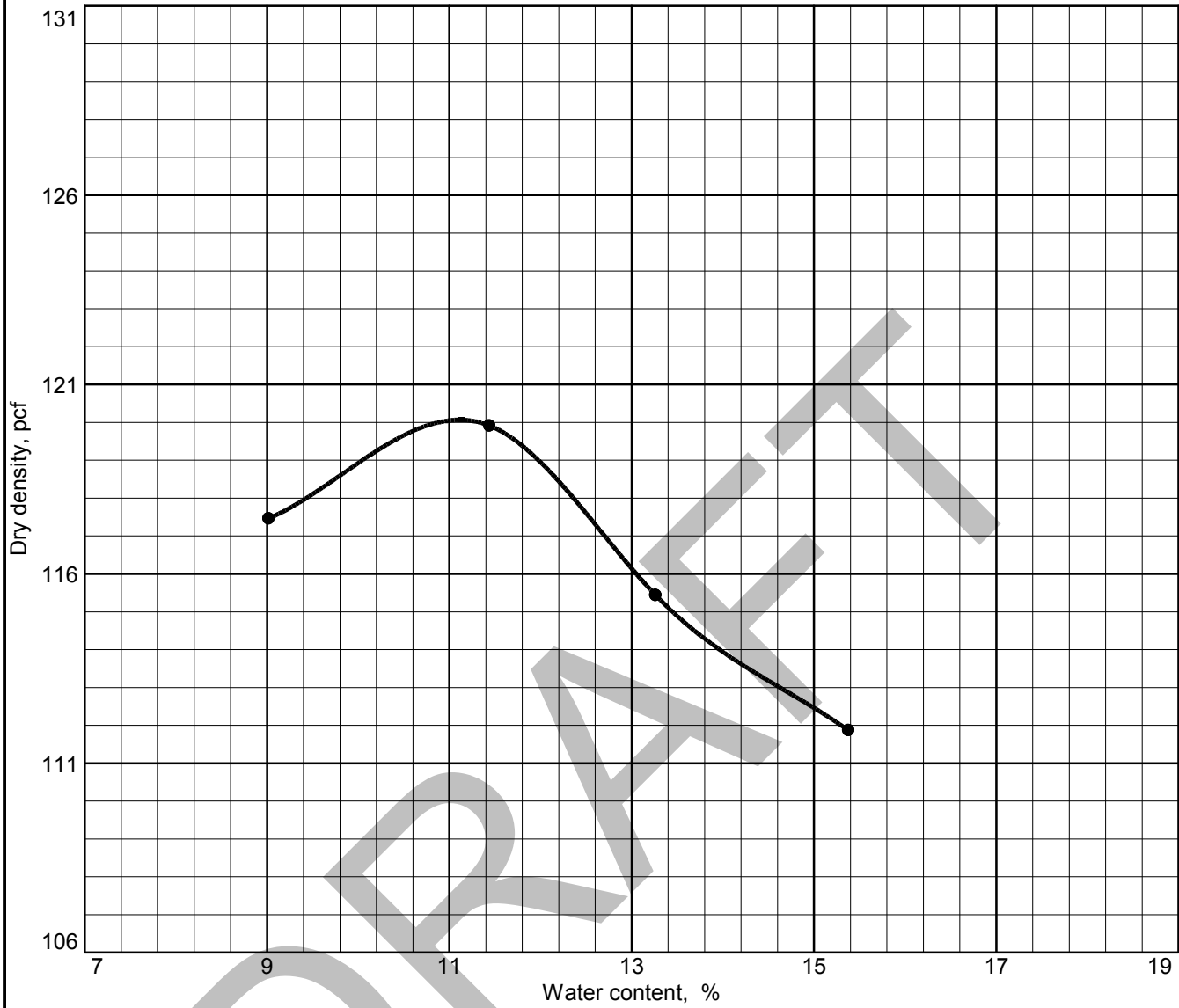
Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0-5'	SM							

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 122.0 pcf Optimum moisture = 7.9 %	Silty sand
Project No. A55568.01 Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project ● Source: Sample No.: B-8 Elev./Depth: 0-5'	Remarks:
Moore Twining Associates, Inc. Fresno, CA	

Figure

COMPACTION TEST REPORT



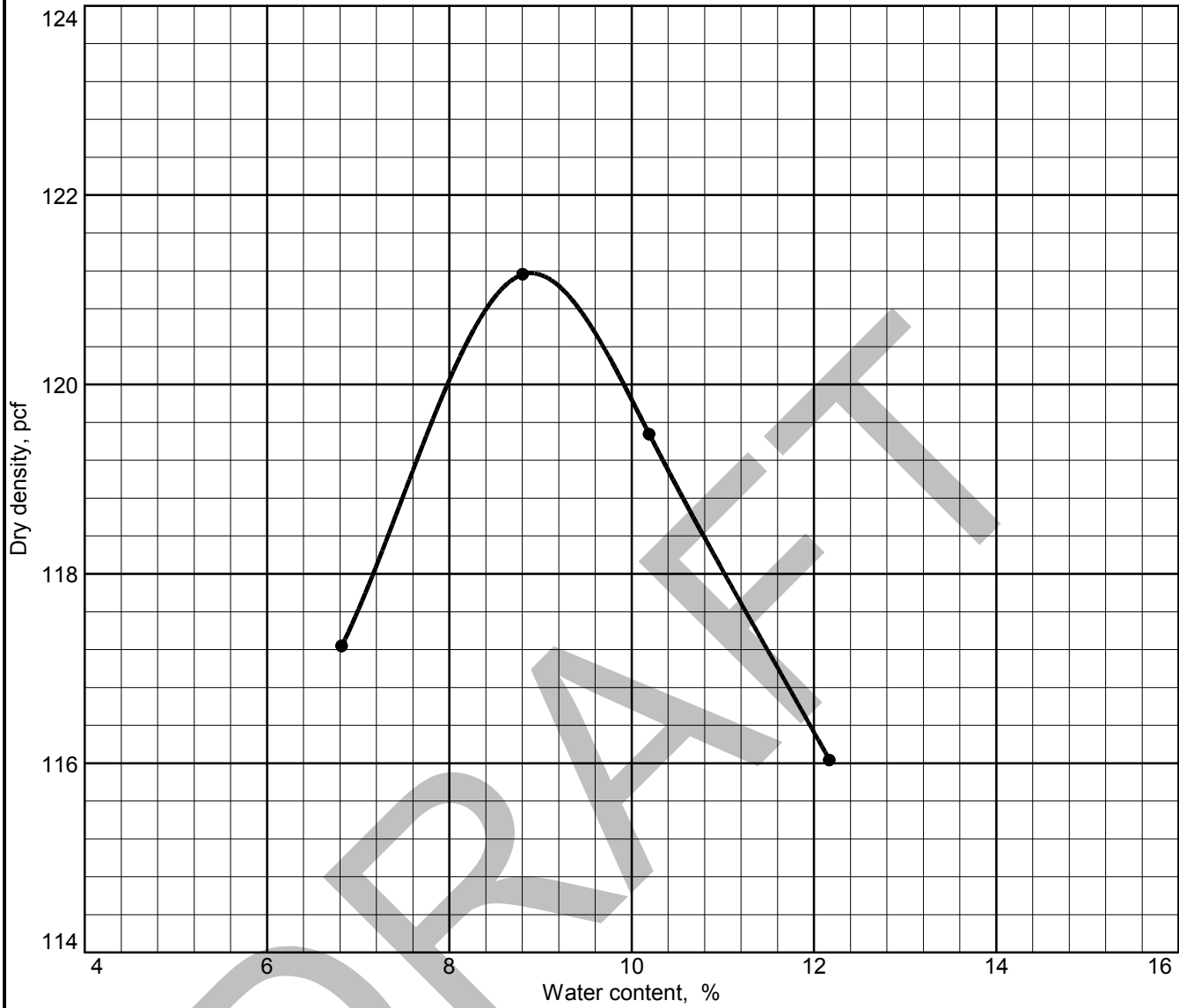
Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
	ML							

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 120.1 pcf Optimum moisture = 11.1 %	Silt
Project No. A55568.01 Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project ● Source: Sample No.: B-9 Elev./Depth: 5-10'	Remarks:
Moore Twining Associates, Inc. Fresno, CA	

Figure

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0-5'	ML						0.0	72.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 121.2 pcf Optimum moisture = 8.9 %	Silt with sand
Project No. A55568.01 Client: Provost & Pritchard Consulting Group Project: Elkhorn Recharge Facility Project ● Source: Sample No.: HA-7 Elev./Depth: 0-5' <div style="text-align: center; border: 1px solid black; padding: 5px;"> Moore Twining Associates, Inc. Fresno, CA </div>	Remarks: <div style="text-align: right; margin-top: 20px;">Figure</div>



Project Name: Elkhorn Recharge Facility Project Report Date: 8/25/2023
Project Number: A55568.01 Sample Date: 7/12/2023
Subject: Minimum Resistivity, ASTM G187 Sampled By: JE / SR
Material Description: Silty sand Tested By: RS
Location: B-3 @ 1-5' Test Date: 8/8/2023

Laboratory Test Results, Minimum Resistivity - ASTM G187

<u>Total Water Added, mls</u>	<u>Resistivity, Ohm-cm</u>
100 mls	38,000
125 mls	27,000
150 mls	21,000
175 mls	7,100
200 mls	5,500
225 mls	5,300
250 mls	5,200
275 mls	5,400

Remarks: Min. Resistivity is 5,200 Ohm-cm



Project Name: Elkhorn Recharge Facility Project Report Date: 8/25/2023
Project Number: A55568.01 Sample Date: 7/12/2023
Subject: Minimum Resistivity, ASTM G187 Sampled By: JE / SR
Material Description: Silt Tested By: RS
Location: B-9 @ 0-4' Test Date: 8/9/2023

Laboratory Test Results, Minimum Resistivity - ASTM G187

<u>Total Water Added, mls</u>	<u>Resistivity, Ohm-cm</u>
100 mls	20,000
125 mls	7,800
150 mls	6,000
175 mls	5,000
200 mls	4,600
225 mls	4,600
250 mls	4,500
275 mls	4,500
300 mls	4,500

Remarks: Min. Resistivity is 4,500 Ohm-cm

August 21, 2023

Work Order #: **JH07030**

Shaun Reich
MTA Geotechnical Division
2527 Fresno Street
Fresno, CA 93721

RE: Elkhorn Recharge Facility Project

Enclosed are the analytical results for samples received by our laboratory on **08/07/23** . For your reference, these analyses have been assigned laboratory work order number **JH07030**.

All analyses have been performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, Moore Twining Associates, Inc. (MTA) is not responsible for use of less than complete reports. Results apply only to samples analyzed.

If you have any questions, please feel free to contact us at the number listed above.

Sincerely,

Moore Twining Associates, Inc.



Lauren Cox
Client Services Representative

MTA Geotechnical Division
2527 Fresno Street
Fresno CA, 93721

Project: Elkhorn Recharge Facility Project
Project Number: A55568.01
Project Manager: Shaun Reich

Reported:
08/21/2023

Analytical Report for the Following Samples

Sample ID	Notes	Laboratory ID	Matrix	Date Sampled	Date Received
B-3 @ 1-5		JH07030-01	Soil	08/07/23 12:53	08/07/23 12:53
B-9 @ 0-4		JH07030-02	Soil	08/07/23 12:53	08/07/23 12:53

DRAFT

MTA Geotechnical Division
2527 Fresno Street
Fresno CA, 93721

Project: Elkhorn Recharge Facility Project
Project Number: A55568.01
Project Manager: Shaun Reich

Reported:
08/21/2023

B-3 @ 1-5
JH07030-01 (Soil)

Analyte	Result	Reporting Limit	Units	Batch	Prepared	Analyzed	Method	Flag
Inorganics								
Chloride	ND	0.0040	% by Weight	[CALC]	08/21/23	08/21/23	[CALC]	
Chloride	ND	40	mg/kg	B3H1405	08/14/23	08/21/23	Cal Test 422	
pH	9.4	0.10	pH Units	B3H1405	08/14/23	08/21/23	Cal Test 643	
Sulfate as SO4	ND	0.0040	% by Weight	[CALC]	08/21/23	08/21/23	[CALC]	
Sulfate as SO4	ND	40	mg/kg	B3H1405	08/14/23	08/21/23	Cal Test 417	

B-9 @ 0-4
JH07030-02 (Soil)

Analyte	Result	Reporting Limit	Units	Batch	Prepared	Analyzed	Method	Flag
Inorganics								
Chloride	ND	0.0040	% by Weight	[CALC]	08/21/23	08/21/23	[CALC]	
Chloride	ND	40	mg/kg	B3H1405	08/14/23	08/21/23	Cal Test 422	
pH	8.7	0.10	pH Units	B3H1405	08/14/23	08/21/23	Cal Test 643	
Sulfate as SO4	ND	0.0040	% by Weight	[CALC]	08/21/23	08/21/23	[CALC]	
Sulfate as SO4	ND	40	mg/kg	B3H1405	08/14/23	08/21/23	Cal Test 417	

Notes and Definitions

- PREP Modified preparation by pulverizing sample to pass #40 sieve and soaked for a minimum of 12 hours using a minimum dilution ratio of 1:10
- ND Analyte NOT DETECTED at or above the reporting limit
- mg/kg milligrams per kilogram (parts per million concentration units)

COC Info	Was temperature within range? Chemistry $\leq 6^{\circ}\text{C}$ Micro $<10^{\circ}\text{C}$ Temp $^{\circ}\text{C}$ if samples were taken today, is there evidence that chilling has begun? Recvd $^{\circ}\text{C}$		Did all bottle labels agree with COC? Was a sufficient amount of sample received? Were correct containers and preservatives received for the tests requested?		Were there bubbles in VOA vials? (Volatiles Only) Was PM notified of discrepancies? PM: By/Time:		Yes No	
	Yes	No	Yes	No	Yes	No	Yes	No
Do samples have a hold time <72 hours? 125ml (A) 250ml (B) 1liter (C) 40ml VOA (V)	Yes	No	Yes	No	Yes	No	Yes	No
Bacti Na ₂ S ₂ O ₃								
None (P)								
None (AG)								
None (CG) 500ml								
Cr6 Buffer (P) Borate Carbonate Buffer								
Dissolved Oxygen 300ml (P)								
HNO ₃ (P)								
HCl (AG)								
H ₂ SO ₄ (P)								
H ₃ PO ₄ (AG)								
NaOH (P)								
NaOH + ZnAc (P)								
Na ₂ S ₂ O ₃ (AG)								
Na ₂ S ₂ O ₃ (CG)								
Na ₂ S ₂ O ₃ 250ml (Brown P) 549								
Thio/K Citrate								
NH ₄ Cl (AG) 552								
Other:								
Client Own								
Low Level Hg/Metals Double Bag								
Plastic Bag								
Glass Jar: 125 / 250 / 500								
Soil Tube: Brass / Steel / Plastic								
5g Encore								
1G Cubitaner								

Bottles Received

Labeled by MM @ _____ Labels checked by YB @ 1315

SELF-DEALING TRANSACTION DISCLOSURE FORM

(1) Company Board Member Information:

Name: _____ Date: _____

Job Title: _____

(2) Company/Agency Name and Address:

(3) Disclosure (Please describe the nature of the self-dealing transaction you are a party to)

(4) Explain why this self-dealing transaction is consistent with the requirements of Corporations Code 5233 (a)

(5) Authorized Signature

Signature: _____ Date: _____

SELF-DEALING TRANSACTION DISCLOSURE FORM INSTRUCTIONS

In order to conduct business with the County of Fresno (hereinafter referred to as “County”), members of a contractor’s board of directors (hereinafter referred to as “County Contractor”), must disclose any self-dealing transactions that they are a party to while providing goods, performing services, or both for the County. A self-dealing transaction is defined below:

“A self-dealing transaction means a transaction to which the corporation is a party and which one or more of its directors has a material financial interest.”

The definition above will be utilized for purposes of completing the disclosure form.

- (1) Enter board member’s name, job title (if applicable), and date this disclosure is being made.
- (2) Enter the board member’s company/agency name and address.
- (3) Describe in detail the nature of the self-dealing transaction that is being disclosed to the County. At a minimum, include a description of the following:
 - a. The name of the agency/company with which the corporation has the transaction; and
 - b. The nature of the material financial interest in the Corporation’s transaction that the board member has.
- (4) Describe in detail why the self-dealing transaction is appropriate based on applicable provisions of the Corporations Codes.
- (5) Form must be signed by the board member that is involved in the self-dealing transaction described in Sections (3) and (4).

BID BOOK

ELKHORN RECHARGE FACILITY

BUDGET / ACCOUNT: 8870 / 8400 / 91761



Department of Public Works and Planning

CONTRACT NUMBER 24-03-C

BID BOOK TABLE OF CONTENTS

ELKHORN RECHARGE FACILITY CONTRACT NUMBER 24-03-C

PROPOSAL NUMBER(S)	TITLE
NOT APPLICABLE	INSTRUCTIONS FOR COMPLETING THE BID BOOK
1	PROPOSAL TO THE BOARD OF SUPERVISORS OF THE COUNTY OF FRESNO
2	BID ITEM LIST
3	EVALUATION OF BID ITEM LIST
4	BID SECURITY
5	NON-COLLUSION DECLARATION
6	PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT
7	PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE AND PUBLIC CONTRACT CODE 10232 STATEMENT
8	SUBCONTRACTORS
9 - 16	NOT USED
17	GUARANTY
18	TITLE 13, CALIFORNIA CODE OF REGULATIONS § 2449(I) GENERAL REQUIREMENTS FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS

INSTRUCTIONS FOR COMPLETING THE BID BOOK FOR NON-FEDERAL AID PROJECTS

General

Complete forms in the Bid book.

Submit an electronic bid online at <http://www.BidExpress.com> or submit a hardcopy bid:

1. Under sealed cover addressed to the Department and labeled with the name of the bidder, contract number, the name of the project and the statement 'Do Not Open Until The Time Of Bid Opening.'
2. Marked as a bid
3. Identifying the contract number and the bid opening date

Certain bid forms must be submitted with the bid and properly executed.

Certain other forms and information must be submitted either with the bid or within the prescribed period after bid opening as specified elsewhere in these special provisions.

Failure to submit the forms and information as specified results in a nonresponsive bid.

If an agent other than the authorized corporation officer or a partnership member signs the bid, file a Power of Attorney with the Department either before opening bids or with the bid. Otherwise, the bid may be nonresponsive.

Bid Item List and Bid Comparison

Submit a bid based on the bid item quantities the Department shows on the Bid Item List. Bids will be evaluated and the low bidder determined as indicated in the *Notice to Bidders*.

Bid Document Completion

Proposal items are identified by title and by the word "Proposal" followed by the number assigned to the proposal item in question. Proposal items are included in the *Bid Book*.

Proposal to the Board of Supervisors of Fresno County – Proposal 1

Provided for information.

Bid Item List – Proposal 2

One or more sheet(s) or list(s) upon which the bidder completes the bid.

Fill out completely including a unit price and total for each unit price-based item and a total for each lump sum item.

Do not make any additions such as "plus tax", "plus freight", or conditions such as "less 2% if paid by 15th".

Use ink or typewriter for paper bids.

Evaluation of Bid Item List – Proposal 3

Describes how inconsistencies and irregularities are evaluated and corrected when Design Services reviews the Bid Item List.

Bid Security and Signature – Proposal 4

Submit one of the following forms of bidder's security equal to at least 10 percent of the bid:

- Cash
- Cashier's check
- Certified check
- Signed bidder's bond by an admitted surety insurer

Indicate type of bid security provided.

- Cash – Acceptable but not recommended. Cash is deposited in a clearing account and is returned to bidders by County warrant. This process may take several weeks.
- Cashier's or Certified Checks. This type of security is held until the bid is no longer under consideration. If submitted by a potential awardee, they will be returned when the contract is fully executed by the bidder and bonds and insurance have been approved.
- Bid Bonds - Must be signed by the bidder and by the attorney-in-fact for the bonding company. Provide notarized signature of attorney-in-fact accompanied by bonding company's affidavit authorizing attorney-in-fact to execute bonds. An unsigned bid bond will be cause for rejection.

Bonding companies may provide their own bid bond forms. The Bid Security and Signature sections must be completed by the bidder and submitted with their bid.

Acknowledge Addenda

Provide contractor's license information.

State business name and if business is a:

- Corporation - list officers
- Partnership - list partners
- Joint Venture - list members; if members are corporations or partnerships, list their officers or partners.
- Individual - list Owner's name and firm name style

Signature of Bidder - the following lists types of companies and corresponding authorized signers.

- Corporation - by an officer
- Partnership - by a partner
- Joint Venture - by a member
- Individual - by the Owner

If signature is by a Branch Manager, Estimator, Agent, etc., the bid must be accompanied by a power of attorney authorizing the individual to sign the bid in question or to sign bids more generally, otherwise the bid may be rejected.

- Business Address - Firm's Street Address
- Mailing Address - P.O. Box or Street Address
- Complete, sign, and return with bid.

Noncollusion Declaration – Proposal 5

Must be completed, signed, and returned with bid.

Public Contract Code Section 10285.1 Statement – Proposal 6

Select "has" or "has not" in accordance with instructions on form, return completed form with bid. Note that signing the bid constitutes signing this statement.

Public Contract Code Section 10162 Questionnaire And Public Contract Code 10232 Statement – Proposal 7

Select "yes" or "no" accordance with instructions on form, include explanation if "yes" is selected. Return completed form with bid. Note that signing the bid constitutes signing this questionnaire and statement.

Subcontractors – Proposal 8

Sheet(s) or spaces where bidders list subcontractors. List each subcontractor to perform work in an amount in excess of 1/2 of 1 percent of the total bid or \$10,000, whichever is greater (Pub. Contract Code § 4100 et seq.).

The *Subcontractor List* submitted with the bid must show the name, location of business, work portions to be performed, the contractor's license number and the public works contractor registration number issued pursuant to Labor Code Section 1725.5, for each listed subcontractor.

- Use subcontractor's business name style as registered with the License Board.
- Specify the city in which the subcontractor's business is located and the state if other than California.
- Description of the work to be performed by the subcontractor. Indicate with bid item numbers from the bid item list and/or work descriptions similar to those on bid item list.
- List license number for each subcontractor.

Upon request from Design Services, provide the following additional information within 24 hours of bid opening if not included on the *Subcontractor List* submitted with the bid:

- Complete physical address for each subcontractor listed.
- Percentage of the total bid or dollar amount associated with each subcontractor listed.
- Department of Industrial Relations registration number.

Proposal 9 - Proposal 15 – Not Used

Proposal 16 – Not Used

Guaranty - Proposal 17

This document may, but does not need to be, submitted with the bid. It is part of the contract documents and must be separately signed and submitted by the contractor to whom the award is made, together with the executed Agreement.

Title 13, California Code of Regulations § 2449(i) General Requirements for In-Use Off-Road Diesel-Fueled Fleets – Proposal 18

Contractors, if applicable, must submit valid Certificates of Reported Compliance with their bid. Subcontractor certificates will be due no later than 4:00 PM on the fifth (5th) calendar day after the bid opening if not submitted with the bid.

PROPOSAL TO THE COUNTY OF FRESNO

hereinafter called the Owner

ELKHORN RECHARGE FACILITY

The work embraced herein shall be done in accordance with the 2023 Standard Specifications and with the 2023 Standard Plans, of the State of California, Department of Transportation insofar as the same may apply and in accordance with these special provisions.

Except to the extent that they may conflict with these special provisions, revised Standard Specifications apply to the extent included in the section entitled "Project Details" of the book entitled "Specifications."

The work to be done is shown on a set of Plans, Department File No. 11330, entitled: "Elkhorn Recharge Facility".

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any other person, firm or corporation; that they have carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to; and they propose and agrees if this proposal is accepted, that they will contract with the Owner to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that they will take in full payment therefor the following unit prices, to-wit:

Fresno County Department of Public Works and Planning

Bid Item List - Proposal 2

Contract #

23-03-C

Contract Name

Elkhorn Recharge Facility

Base Items

Item ID	Quantity	Unit	Unit Price	Total
1	1	LS	\$	\$
Mobilization/Demobilization, Bonds, Insurance & Permits				
2	1	LS	\$	\$
Job Site Management				
3	1	LS	\$	\$
Traffic Control				
4	1	LS	\$	\$
Storm Water Pollution Prevention Plan (SWPPP) - Preparation and Implementation				
5	1,500	\$	\$1	\$1,500
State Water Resources Control Board - Notice of Intent				
6	1	LS	\$	\$
Dust Control Plan (DCP) - Preparation and Implementation				
7	25,000	\$	\$1	\$25,000
Supplemental Work Allowance				
8	1	LS	\$	\$
Site Demolition at Well Sites				
9	800	LF	\$	\$
Remove and Dispose of Existing PVC Irrigation Pipe Sections				
10	150	LF	\$	\$
Remove and Dispose of Existing Asbestos Cement Pipe Section				

Item ID	Quantity	Unit	Unit Price	Total
11	1	LS	\$	\$
Clearing and Grubbing of Vegetation				
12	93,160	CY	\$	\$
Removal of Top Soil in Basin Area and Compacted Placement in Stockpile Areas				
13	1	LS	\$	\$
Crush Demolished Soil Cement and Compacted Placement in Stockpile Areas				
14	17,270	CY	\$	\$
Conveyance Channel Excavation and Compacted Placement in Stockpile Areas				
15	11,440	CY	\$	\$
Basin Excavation and Compacted Placement on Basin Levee				
16	519,810	CY	\$	\$
Basin Excavation and Compacted Placement in Stockpile Areas				
17	1	LS	\$	\$
Construct Liberty Canal Turnout / Conveyance Channel Inlet Structure				
18	1	LS	\$	\$
Construct Conveyance Channel Outlet / Basin Inlet Structure				
19	8,207	LF	\$	\$
Furnish & Install Chain Link Fence				
20	1	EA	\$	\$
Furnish & Install Chain Link 24-foot Double Drive Gate				
21	1	EA	\$	\$
Convert Existing Central Well Site to a Monitoring Well				
22	1	EA	\$	\$
Convert Existing Northwest Well Site to a Monitoring Well				
Base Bid Items Total (Items 1 through 22):				\$

Additive 1

Item ID	Quantity	Unit	Unit Price	Total
---------	----------	------	------------	-------

23	1	LS	\$	\$
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Additional Mobilization/Demobilization, Bonds, Insurance & Permits

24	99,690	CY	\$	\$
----	--------	----	----	----

Basin Excavation and Compacted Placement in Stockpile Area D1 (N-S)

Additive Bid Items Total (Items 23-24): \$

Additive 2

Item ID	Quantity	Unit	Unit Price	Total
---------	----------	------	------------	-------

25	1	LS	\$	\$
----	---	----	----	----

Additional Mobilization/Demobilization, Bonds, Insurance & Permits

26	93,750	CY	\$	\$
----	--------	----	----	----

Basin Excavation and Compacted Placement in Stockpile Area D2 (E-W)

Additive Bid Items Total (Items 25-26): \$

Additive 3

Item ID	Quantity	Unit	Unit Price	Total
---------	----------	------	------------	-------

27	1	LS	\$	\$
----	---	----	----	----

Additional Mobilization/Demobilization, Bonds, Insurance & Permits

28	201,720	CY	\$	\$
----	---------	----	----	----

Basin Excavation to ultimate depth and Placement of Excess Basin Material

Additive Bid Items Total (Items 27-28): \$

Total Bid (Base Bid Items + Additive Items) Items 1 through 28: \$

EVALUATION OF BID PROPOSAL ITEM LIST

Abbreviations used in the bid proposal sheet are identified in Section 1-1.06, "Abbreviations," of these special provisions.

Bids are required for the entire work. Bids will be compared on the basis indicated in the Notice to Bidders. The bidder shall set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

- (a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount as the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price;
- (b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentage-wise the unit price or item total in the Owner's Final Estimate of cost.

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise, if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Cents symbols also have no significance in establishing any unit price or item total since all figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Bids on lump sum items shall be item totals only; if any unit price for a lump sum item is included in a bid and it differs from the item total, the items total shall prevail.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the Owner, and that discretion will be exercised in the manner deemed by the Owner to best protect the public interest in the prompt and economical completion of the work. The decision of the Owner respecting the amount of a bid, or the existence or treatment of an irregularity in a bid, shall be final.

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, with surety satisfactory to the Owner, within eight (8) days not including Saturdays, Sundays and legal holidays, after the bidder has received notice of award of the contract, the Owner, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the Owner.

BID SECURITY AND SIGNATURE

Bid Security

Accompanying this proposal is security (check one only) in amount equal to at least ten percent (10%) of the total amount of the bid:

Bid Bond (); Certified Check (); Cashier's Check (); Cash (\$)

Addenda Acknowledgement

Bidder has and acknowledges the following addenda: _____

Bidder Signature

Business Name _____

Note: If bidder or other interested person is a corporation, state legal name of corporation. If bidder is a co-partnership, state true name of firm.

Business Owners and Officers Names _____

Note: If bidder or other interested person is:

- a corporation, list names of the president, secretary, treasurer and manager thereof
- a partnership, list names of all individual co-partners composing firm.
- an individual, state first and last name in full.

Names of Owners and Key Employees _____

Note: List majority owners of your firm. If multiple owners, list all. Also include anyone, including key employees, who are actively promoting the contract. (SB1439)

Licensed in accordance with an act providing for the registration of Contractors:

Class _____ Contractor License No. _____ Expires _____

DIR Registration Number _____

Business Address: _____

Zip Code

Mailing Address: _____

Zip Code

Business Phone: (_____) _____ Fax Number: (_____) _____

Email Address _____

Signature of Bidder: _____ Dated: _____

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, his or her signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Owner prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

Proposal 4

Contract Number 24-03-C

To the County of Fresno:

NONCOLLUSION DECLARATION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID*

The undersigned declares:

I am the _____ of
(Owner, Partner, Corporate Officer (list title), Co-Venturer)

_____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, and has not paid, and will not pay, any person or entity for that purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____, 2024,

at _____, _____.”
[city] [state]

(Signature)

(See Title 23 United States Code Section 112; Calif Public Contract Code Section 7106)

*NOTE: Completing, signing, and returning the Non-Collusion Declaration is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

PUBLIC CONTRACT CODE

Public Contract Code Section 10285.1 Statement

In conformance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury under the laws of the State of California that the bidder has ____, has not ____been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The bidder must place a check mark after "has" or "has not" in one of the blank spaces provided. The above Statement is part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Public Contract Code Section 10162 Questionnaire

In conformance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Yes _____ No _____

If the answer is yes, explain the circumstances in the following space.

Public Contract Code 10232 Statement

In conformance with Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement and Questionnaire.

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

BIDDER: _____

SUBCONTRACTORS:

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the total bid presented herewith **or \$10,000, whichever is greater**. Each listed subcontractor's name, location of business and description of work, and both their contractor's license number and public works contractor registration number, issued pursuant to Section 1725.5 of the Labor Code, are **REQUIRED**, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

<p>SUBCONTRACTOR: _____</p> <p>Business Address: _____</p> <p>Class ____ License No. _____ DIR Registration No. _____</p> <p>Item No. or Description of Work: _____</p> <p>Dollar Amount _____ OR Percentage of Total Bid _____</p> <p>Email Address: _____</p>
<p>SUBCONTRACTOR: _____</p> <p>Business Address: _____</p> <p>Class ____ License No. _____ DIR Registration No _____</p> <p>Item No. or Description of Work: _____</p> <p>Dollar Amount _____ OR Percentage of Total Bid _____</p> <p>Email Address: _____</p>

SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No _____
Item No. or Description of Work: _____
Dollar Amount _____ **OR** Percentage of Total Bid _____
Email Address: _____

SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No. _____
Item No. or Description of Work: _____
Dollar Amount _____ **OR** Percentage of Total Bid _____
Email Address: _____

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SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No _____
Item No. or Description of Work: _____
Dollar Amount _____ **OR** Percentage of Total Bid _____
Email Address: _____

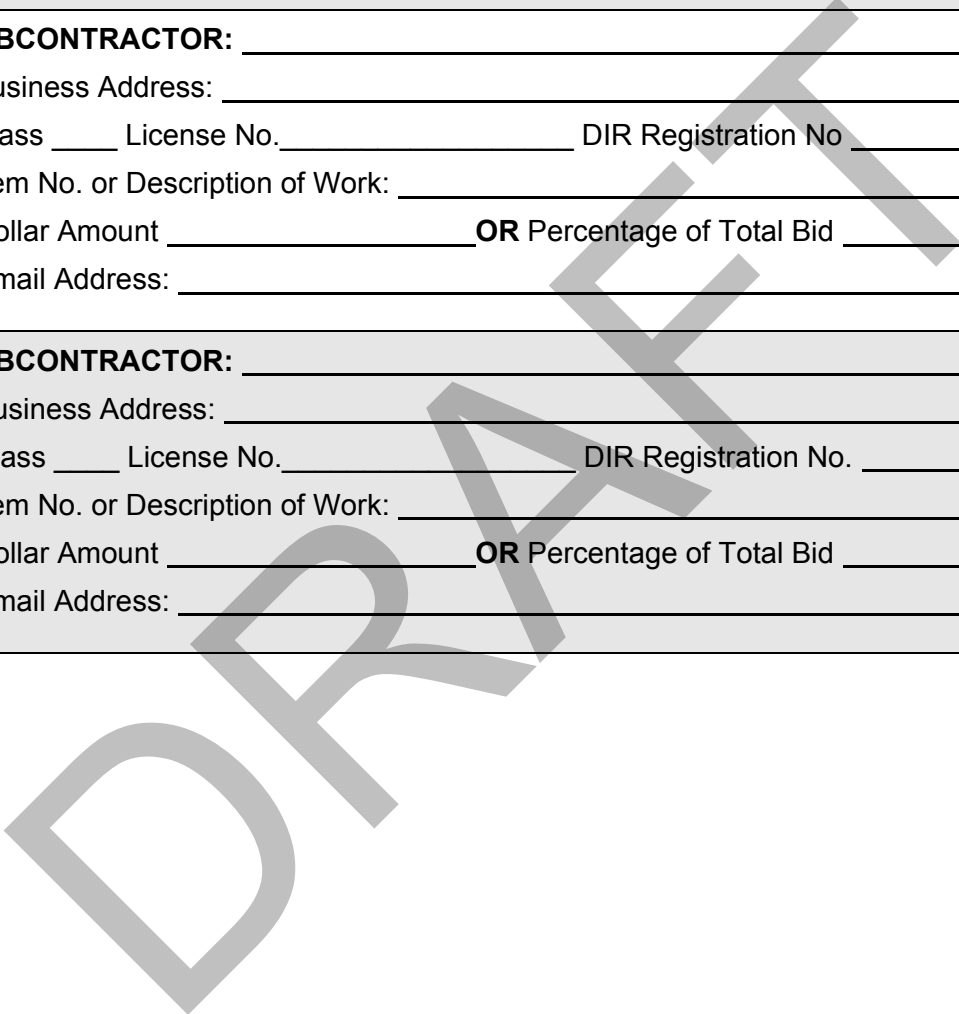
SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No _____
Item No. or Description of Work: _____
Dollar Amount _____ **OR** Percentage of Total Bid _____
Email Address: _____

SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No _____
Item No. or Description of Work: _____
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Email Address: _____

SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No. _____
Item No. or Description of Work: _____
Dollar Amount _____ **OR** Percentage of Total Bid _____
Email Address: _____

SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No. _____
Item No. or Description of Work: _____
Dollar Amount _____ **OR** Percentage of Total Bid _____
Email Address: _____

SUBCONTRACTOR: _____
Business Address: _____
Class ____ License No. _____ DIR Registration No. _____
Item No. or Description of Work: _____
Dollar Amount _____ **OR** Percentage of Total Bid _____
Email Address: _____



(This guaranty shall be executed by the successful bidder in accordance with instructions in the special provisions. The bidder may execute the guaranty on this page at the time of submitting his bid.)

G U A R A N T Y

To the Owner: County of Fresno

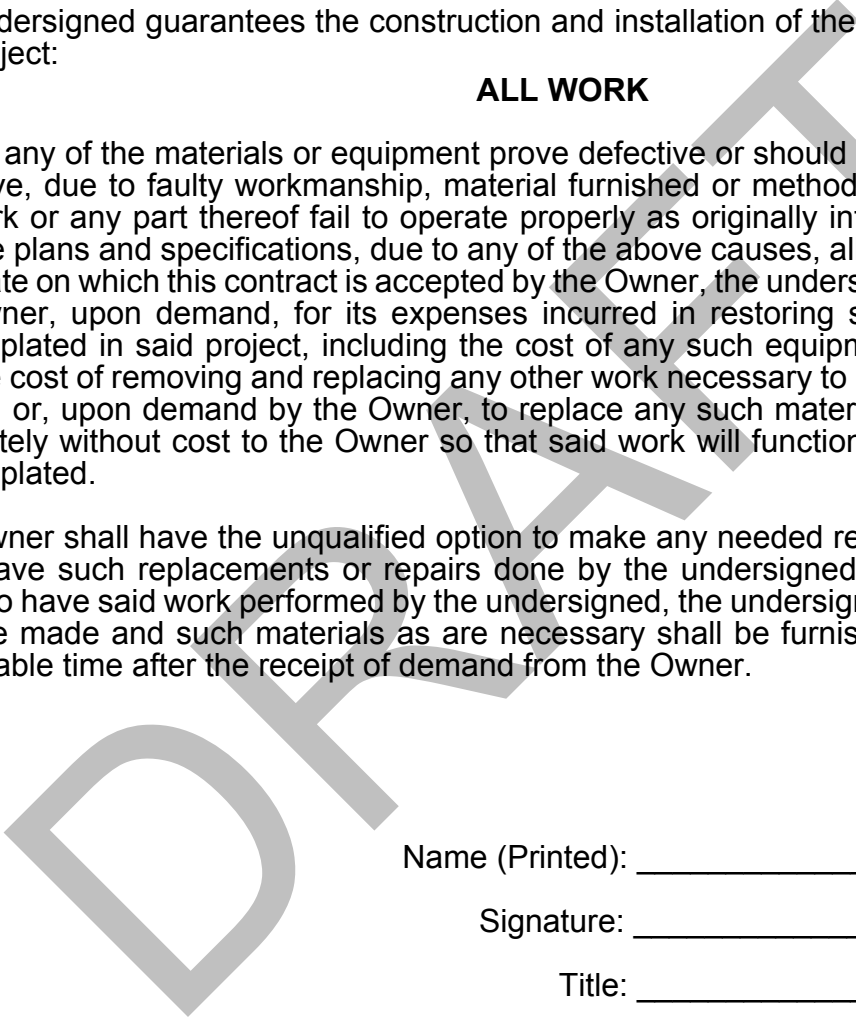
CONTRACT NUMBER 24-03-C

The undersigned guarantees the construction and installation of the following work included in this project:

ALL WORK

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner.



Name (Printed): _____

Signature: _____

Title: _____

Date: _____

Contractor: _____

TITLE 13, CALIFORNIA CODE OF REGULATIONS § 2449(I) GENERAL REQUIREMENTS FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS

In conformance with Title 13 § 2449(i), bidders will be required to attach copies of valid Certificates of Reported Compliance for the fleet selected for the contract and their listed subcontractors.

Before May 15th of each year, the prime contractor must collect a new valid Certificate of Reported Compliance for the current compliance year, as defined in section 2449(n), from all fleets that have an ongoing contract with the prime contractor as of March 1 of that year. Prime contractors must not write contracts to evade this requirement. Annual renewals must be provided to the Resident Engineer at least one week prior to the expiration date of the current certificate.

<https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-contracting-requirements>

Choose all that apply:

- Bidder’s Certificate of Reported Compliance has been attached to the bid.
- Bidder does not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4).
- Listed subcontractors’ certificates have been attached or will be submitted within five (5) calendar days of the bid opening.
- The following subcontractors do not have a fleet subject to this regulation as outlined in Section 2449(i)(1)-(4):

_____	_____
_____	_____
_____	_____
_____	_____

FAILURE TO PROVIDE THE CERTIFICATES OF REPORTED COMPLIANCE AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE.

AGREEMENT

THIS AGREEMENT made at Fresno, in Fresno County, California, by and between _____ hereinafter called the Contractor, and the County of Fresno hereinafter called the Owner.

WITNESSETH: That the Contractor and the Owner, for the consideration hereinafter named, agree as follows:

ARTICLE I. The Contractor agrees to furnish all labor and materials, including tools, implements, and appliances required, but excluding such materials as are mentioned in the specifications to be furnished by the Owner, and to perform all the work in a good and workmanlike manner, free from any and all liens and claims of mechanics, materialmen, teamsters, subcontractors, artisans, machinists, and laborers required for:

ELKHORN RECHARGE FACILITY

CONTRACT NUMBER: 24-03-C

All in strict compliance with the plans, drawings and specifications therefor prepared by the Owner, and other contract documents relating thereto.

ARTICLE II. The Contractor and the Owner agree that the Notice to Bidders and Special Provisions, the Wage Scale (Prevailing Wages), the Plans and Drawings, Addenda and Bulletins thereto, and the Proposal (Bid Book) hereto attached, together with this Agreement, form the contract, and they are as fully a part of the contract as if hereto attached or herein repeated.

All portions of the Standard Specifications of the State of California, Department of Transportation, dated 2015, which are not in conflict with this contract shall be deemed a part of the specifications as though fully therein set forth; provided, however, that revisions to the said Standard Specifications shall apply only to the extent, if any, included in the Project Details of these specifications or as otherwise incorporated directly herein. No part of said specifications which is in conflict with any portion of this agreement, or which is not actually descriptive of the work to be done thereunder, or of the manner in which said work is to be executed, shall be considered as any part of this agreement, but shall be utterly null and void.

ARTICLE III. The Owner agrees to pay the Contractor in current funds for the performance of the contract the sum of _____ **DOLLARS AND xx/100** (_____._____) it being understood that said price is based upon the estimated quantities of materials to be used as set forth in the Proposal, except where provisions are made in the contract documents whereby the estimated quantities shall constitute the final quantity; that upon completion of the project the final contract prices shall be revised by change order, if necessary, to reflect the true quantities used at the stated unit price thereof as contained in the Contractor's Proposal hereto attached. Payments on account thereof will be made as set forth in the special provisions.

ARTICLE IV. If the Contractor should be adjudged a bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed on account of his or her insolvency, or if he or she or any of his or her subcontractors should persistently violate any of the provisions of the contract, or if he or she should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he or she should fail to make prompt payment to subcontractors or for material or

labor, or persistently disregard laws, ordinances or the instructions of the Engineer, then the Owner may, upon certificate of the Engineer when sufficient cause exists to justify such action, serve written notice upon the Contractor and his surety of its intention to terminate the contract, and unless within five days after the serving of such notice, such violations shall cease and satisfactory arrangements for correction thereof be made, the contract shall, upon the expiration of said five days, cease and terminate.

In the event of any such termination, the Owner shall immediately serve written notice thereof upon the surety and the Contractor, and the surety shall have the right to take over and perform the contract, provided, however, that if the surety within ten (10) days after the serving upon it of notice of termination does not give the Owner written notice of its intention to take over and perform the contract or does not commence performance thereof within the ten (10) days stated above from the date of the serving of such notice, the Owner may take over the work and prosecute the same to completion by contract or by any other method it may deem advisable, for the account and at the expense of the Contractor, and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plant and other property belonging to the Contractor as may be on the site of the work and necessary therefor. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expenses of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner, as herein provided and damage incurred through the Contractor's default, shall be certified by the Engineer.

ARTICLE V. To the fullest extent permitted by law with respect to any work required to be done under this contract, the Contractor will indemnify and hold harmless the COUNTY OF FRESNO, STATE OF CALIFORNIA, CONSULTANTS and all other participating public agencies, whether or not said agencies are named herein, who have jurisdiction within the areas in which the work is to be performed, and all officers and employees of the Owner, the County, the State, the United States and said other participating agencies, from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to COUNTY in connection with the performance, or failure to perform, by CONTRACTOR, its officers, agents or employees under this Agreement, and from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to any person, firm or corporation who may be injured or damaged by the performance, or failure to perform, of CONTRACTOR, its officers, agents or employees under this Agreement. In addition, CONTRACTOR agrees to indemnify COUNTY for Federal, State of California and/or local audit exceptions resulting from non-compliance herein on the part of CONTRACTOR.

CONTRACTOR agrees to indemnify, save, hold harmless, and at COUNTY'S request, defend the COUNTY, its officers, agents, and employees from any and all costs and expenses, damages, liabilities, claims, and losses occurring or resulting to COUNTY in connection with the performance, or failure to perform, by CONTRACTOR, its officers, agents, or employees under this Agreement, and from any and all costs and expenses, damages, liabilities, claims, and losses occurring or resulting to any person, firm, or corporation who may be injured or damaged by the performance, or failure to perform, of CONTRACTOR, its officers, agents, or employees under this Agreement.

The Certificate of Insurance shall be issued in duplicate, to the COUNTY OF FRESNO and all other participating agencies, whether or not said agencies are named herein, who contribute to the cost of the work or have jurisdiction over areas in which the work is to be performed and all officers and employees of said agencies while acting within the course and scope of their duties and responsibilities.

In the event CONTRACTOR fails to keep in effect at all times insurance coverage as herein provided, the COUNTY may, in addition to other remedies it may have, suspend or terminate this Agreement upon the occurrence of such event.

All policies shall be with admitted insurers licensed to do business in the State of California. Insurance purchased shall be purchased from companies possessing a current A.M Best Company rating of A FSC VII or better.

Without limiting the COUNTY'S right to obtain indemnification from CONTRACTOR or any third parties, CONTRACTOR, at its sole expense, shall maintain in full force and effect, the following insurance policies or a program of self-insurance, including but not limited to, an insurance pooling arrangement or Joint Powers Agreement (JPA) throughout the term of the Agreement:

A. Commercial General Liability

Commercial General Liability Insurance with limits not less than those shown in the following table:

Liability Insurance Requirements

Total bid	For each occurrence ^a	Aggregate for products/completed operation	General aggregate ^b	Umbrella or excess liability ^c
≤ \$1,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$5,000,000
> \$1,000,000 ≤ \$10,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$10,000,000
> \$10,000,000 ≤ \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$15,000,000
> \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$25,000,000

^aCombined single limit for bodily injury and property damage.

^bThis limit must apply separately to your work under this Contract.

^cThe umbrella or excess policy must contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

This policy shall be issued on a per occurrence basis. COUNTY may require specific coverages including completed operations, products liability, contractual liability, Explosion-Collapse-Underground, fire legal liability, or any other liability insurance deemed necessary because of the of the nature of this contract.

Such Commercial General Liability insurance shall name the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned. Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by COUNTY, its officers, agents and employees shall be excess only and not contributing with insurance provided under CONTRACTOR's policies herein. This insurance shall not be cancelled or changed without a minimum of thirty (30) days advance written notice given to COUNTY. CONTRACTOR shall obtain endorsements to the Commercial General Liability insurance policy naming COUNTY as an additional insured and providing for a thirty (30) day prior written notice of cancellation or change in terms or coverage.

Within eight (8) days from date CONTRACTOR executes this Agreement, CONTRACTOR shall provide certificates of insurance and endorsement as stated above for all of the foregoing policies, as required herein, to the County of Fresno, or to designservices@fresnocountyca.gov, stating that such insurance coverages have been obtained and are in full force; that the County of Fresno, its officers, agents and employees will not be responsible for an premiums on the policies; that such Commercial General Liability insurance names the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned; that such coverage for additional insured shall apply as primary insurance an any other insurance, or self- insurance shall not be cancelled or changed without a minimum of thirty (30) days advance, written notice given to COUNTY.

CONTRACTOR shall obtain endorsements to the Commercial General Liability insurance naming the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned. Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by COUNTY, its officers, agents, and employees shall be excess only and not contributing with insurance provided under CONTRACTOR'S policies herein. This insurance shall not be cancelled or changed without a minimum of thirty (30) days advance written notice given to COUNTY.

B. Automobile Liability

Comprehensive Automobile Liability Insurance with limits of not less than One Million Dollars (\$1,000,000) per accident for bodily injury and property damage. Coverage should include owned and non-owned vehicles used in connection with this Agreement and all applicable endorsements.

C. Professional Liability

If CONTRACTOR is a licensed professional or employs professional staff, (e.g., Architect, Engineer, Surveyor, etc.) in providing services, Professional Liability Insurance with limits of not less than One Million Dollars (\$1,000,000.00) per occurrence, Three Million Dollars (\$3,000,000.00) annual aggregate with a provision for 3 year tail coverage.

D. Worker's Compensation

A policy of Worker's Compensation insurance as may be required by the California Labor Code.

ARTICLE VI. Contractor represents that he has secured the payment of Worker's Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provisions of said Code. Contractor shall supply the Owner with certificates of insurance, in duplicate, evidencing that Worker's Compensation Insurance is in effect and providing that the Owner will receive ten days' notice of cancellation. If Contractor self-insures Worker's Compensation, Certificate of Consent to Self-insure should be provided the Owner.

ARTICLE VII. The Contractor shall forthwith furnish in duplicate, a faithful performance bond in an amount equal to 100% of the contract price and a payment bond in an amount equal to 100% of the contract price, both bonds to be written by a surety company acceptable to the Owner and in the form prescribed by law.

The payment bond shall contain provisions such that if the Contractor or his subcontractors shall fail to pay (a) amounts due under the Unemployment Insurance Code with respect to work performed under the contract, or (b) any amounts required to be deducted, withheld and paid over to the Employment Development Department and to the Franchise Tax Board from the wages of the employees of the Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, then the surety will pay these amounts. In case suit is brought upon the payment bond, the surety will pay a reasonable attorney's fee to be fixed by the court.

ARTICLE VIII. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

Except as provided in Labor Code section 1725.5(f), no contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

Except as provided in Labor Code section 1725.5(f), no contractor or subcontractor may be awarded a contract for public work on a public works project or engage in the performance of work on any public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

Contractor shall comply with all applicable laws and regulations relating to wages and employment, including all requirements imposed by the California Department of Industrial Relations (DIR). Contractor shall cooperate with County to furnish timely all information necessary for County's completion of the form required to be submitted by County when registering the Project on the DIR website; and County thereafter shall provide to Contractor the "Project ID Number" assigned by DIR in order to facilitate Contractor's submission to DIR of its certified payrolls for the Project, in the manner required and using such form as may be prescribed by DIR, in accordance with the provisions of Labor Code section 1771.4(a)(3).

ARTICLE IX: Governing Law – Venue for any action arising out of or relating to this Agreement shall be in Fresno County, California. This Agreement shall be governed by the laws of the State of California.

ARTICLE X: EXECUTIVE ORDER N-6-22: Under Executive Order N-6-22 as a contractor, subcontractor, or grantee, compliance with the economic sanctions imposed in response to Russia's actions in Ukraine is required, including with respect to, but not limited to, the federal executive orders identified in the EO and the sanctions identified on the U.S. Department of the Treasury website (<https://ofac.treasury.gov/sanctions-programs-and-country-information/ukraine-russia-related-sanctions>). Failure to comply may result in the termination of contracts or grants, as applicable. Specially Designated Nationals and Blocked Persons List (SDN) (<https://ofac.treasury.gov/specially-designated-nationals-and-blocked-persons-list-sdn-human-readable-lists>).

This Contract, **24-03-C**, was awarded by the Board of Supervisors on _____. It has been reviewed by the Department of Public Works and Planning and is in proper order for signature of the Chairman of the Board of Supervisors.

IN WITNESS WHEREOF, they have executed this Agreement this _____ day of _____, 2024

(CONTRACTOR)

COUNTY OF FRESNO
(OWNER)

By _____

By _____
Nathan Magsig, Chairman
of the Board of Supervisors of the
County of Fresno

Title _____

ATTEST:
Bernice E. Seidel
Clerk of the Board of Supervisors
County of Fresno, State of California

By _____
Deputy

