

Request for Proposals to Provide Construction Implementation for

Agricultural Water Storage Ponds and Irrigation Infrastructure 4/10/2017

Contracting Entity

The San Mateo Resource Conservation District (RCD) is the contracting entity and project manager. The RCD helps people protect, conserve, and restore natural resources through information, education, and technical assistance programs. The work of the RCD is accomplished through strong voluntary partnerships with land owners and managers, technical advisors, area jurisdictions, government agencies, advocates, and others.

RCDs were established by the state of California to be locally governed special districts that act as focal points for local conservation efforts, using very diverse means to conserve natural resources on public and private lands. Established in 1939, San Mateo County's RCD was the first such district in California. For more information about the RCD, visit www.sanmateorcd.org.

Project Summary

The RCD seeks qualified contractors to construct two agricultural water storage ponds and associated irrigation infrastructure. The ponds will be built at Butano Farm and Harley Farm located in Pescadero, California. The intent of this project is to 1) enhance stream flows in Pescadero and Butano Creeks for the benefit of native steelhead and coho salmon and 2) increase water security and maintain viable agriculture on the properties.

Land Owners

Butano Farms: Peninsula Open Space Trust (POST)

Harley Farms: Dee Harley

Bid Process

Bids for the Butano Farm and Harley Farm Pond and Irrigation Projects in the Pescadero-Butano watershed will be received by the San Mateo Resource Conservation District (RCD) by 7:00 p.m. on May 1st, 2017 at the following email address: Joe@sanmateoRCD.org. Interested contractors can submit bids for one or both pond sites and/or may also include bids for irrigation designs at one or both sites.

A pre-bid site inspection will be held at both project sites on **Monday, April 17th, 2017 from 10:00 a.m. to 2:00pm.** Attendance at the pre-bid meeting is strongly suggested for all prospective bidders. If planning to attend, confirm with Joe Issel by email to joe@sanmateoRCD.org. Meeting location will be at the Butano Farm site (click for directions from Half Moon Bay).

The following plans, specifications, proposal forms, and sample contracting documents can be downloaded here:

1. Butano Farm:

- a. Pond designs and specifications
 - i. Geotechnical report
- b. Irrigation designs, specifications

2. Harley Farm:

- a. Pond designs and specifications
 - i. Geotechnical report
- b. Irrigation designs, specifications

3. Sample Contract

4. Bid Submittals

- a) Blank Bid Sheets:
 - a. Butano Farm Pond Component
 - b. Butano Farm Irrigation Component
 - c. Harley Farm Pond Component
 - d. Harley Farm Irrigation Component
- b) Authorized Bidders Statement Regarding Insurance coverage
- c) Authorized Non-Collusion Affidavit
- d) List of proposed suppliers and subcontractors.
- e) License and experience statement.

Selection Criteria

The RCD will consider the following when reviewing bids.

- 1. Cost effectiveness
- 2. Qualifications and relevant experience
- 3. References

Bidders are required to provide the following to meet qualifications for this bid notice:

- 1. A completed bid sheet. Use the blank bid sheet provided for each project component submitting a bid for:
 - a. Butano Farm Pond Component
 - b. Butano Farm Irrigation Component
 - c. Harley Farm Pond Component
 - d. Harley Farm Irrigation Component
- 2. Authorized Bidders Statement Regarding Insurance coverage. Use attached version.
- 3. Authorized Non-Collusion Affidavit. Use attached version.

- 4. List of proposed suppliers and subcontractors. Provide all information requested in the blank sheet provided.
- 5. License and experience statement. Provide all information requested in the blank sheet provided.
- 6. Submission of all bid materials by the deadline listed above.

Additional Construction Requirements

<u>Construction Timeline</u>: Construction can take place between approximately July 1st and October 15th, 2017. The timing for some of the irrigation infrastructure work will need to be agreed upon by the RCD and the landowners to ensure critical farming practices can continue as needed. However, the pond locations will be free and clear for construction to take place.

<u>Project Permitting</u>: A Stormwater Pollution Prevention Plan (SWPPP) is being developed for the Butano Farm project only. The SWPPP will be provided by Monday April 24th. The SWPPP will be finalized by the project Qualified SWPPP Developer (QSD) after selection of a Contractor for project construction. The Contractor will be responsible for providing Qualified SWPPP Practitioner (QSP) services during project construction.

<u>Biological Monitoring</u>: Contractors will be required to participate in a training on sensitive species that may be encountered during the project, and to adhere to all permit requirements. Biological monitors provided by the RCD will be present at some points during construction and will have authority to stop work if sensitive species are found.

Notice of Grant Funding: Bidders are notified that these projects are grant-funded. Butano and Harley Farms pond projects are funded by the Department of Water Resources (DWR, Grant Agreement # 4600010883). The DWR funds for these projects were appropriated through Proposition 84 round 3 of the Integrated Regional Water Management (IRWM) Implementation Grants. Funds for irrigation upgrades have been made available through the USDA Natural Resources Conservation Service (NRCS).

<u>Prevailing Wage Requirement and Labor Compliance Program</u>: This project is subject to prevailing wage requirements and a labor compliance program will be established by the RCD using a third-party consultant to oversee contractor compliance.

Eligibility requirements for bidding contractors for prevailing wage projects include:

- Be in good legal standing with no outstanding judgments or liens owed to workers or to the State of California.
- Not be <u>debarred from doing public works</u> by the United States Department of Labor or any state that has public works debarment laws.
- Have a California Contractors State License if one is required (non-construction contractors must provide their professional license number if one exists for their profession).

Visit http://www.dir.ca.gov/Public-Works/Contractors.html for more information.



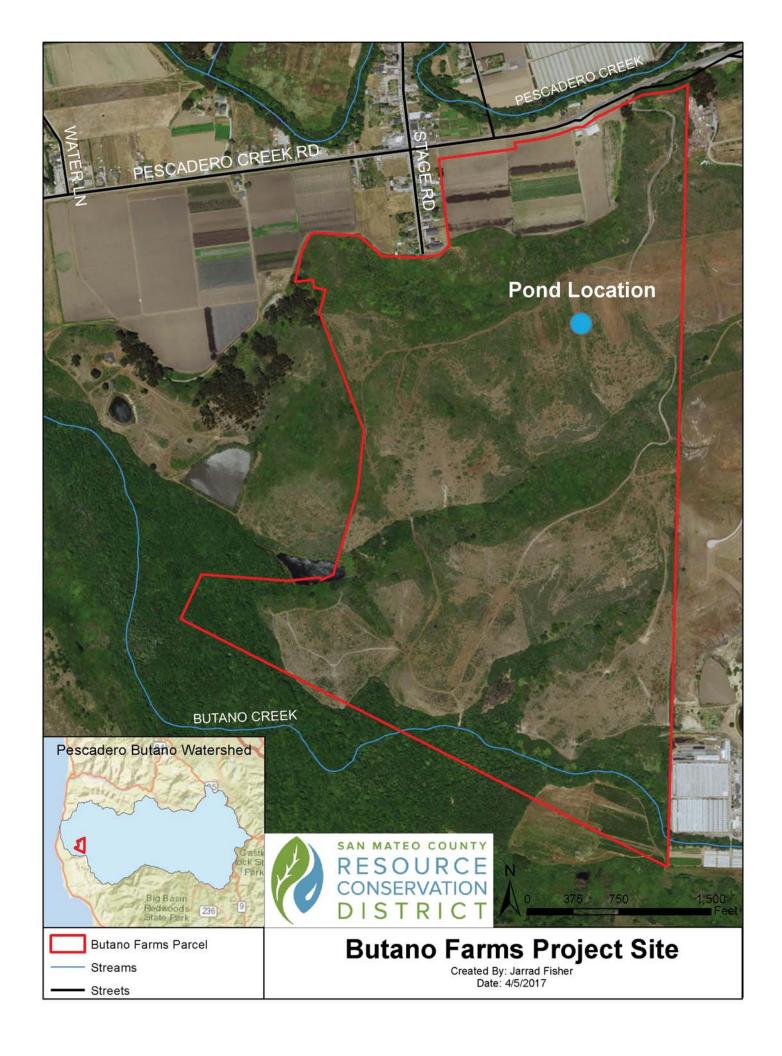
Butano Farm RFP Attachments 4/10/2017

- A.1 Site Maps
- A.2 Site Photos
- A.3 Pond Designs
- A.4 Pond Specifications
- A.5 Pond Site Geotechnical Investigation Report
- A.6 Irrigation Designs
- A.7 Sample Contract
- A.8 Required Bid Submittals
 - o Bid sheets
 - Pond Component
 - Irrigation Component
 - o Authorized Bidders Statement Regarding Insurance coverage. Use attached version.
 - o Authorized Non-Collusion Affidavit. Use attached version.
 - List of proposed suppliers and subcontractors. Provide all information requested in the blank sheet provided.
 - o License and experience statement. Provide all information requested in the blank sheet provided.

Submission of all bid materials is due by May 1st, 2017 by 7pm.

A.1 LOCATION MAPS





A.2 Butano Farm Site Photos





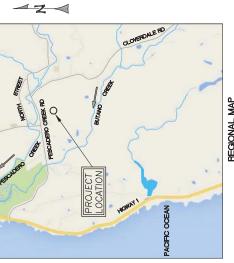
A.3 Pond Design



BUTANO FARMS POND (15.8 ACRE FEET)

100% DESIGN SUBMITTAL





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- SECTION OR DETAIL IS SHOWN.

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SECTION OR DETAIL IDENTIFICATION (NUMBER OR LETTER)

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SPINE TREE TO BE DETERMINED TYPICAL UNKNOWN WATER SURFACE ELEVATION YEAR

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ABBREVIATIONS

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CONCRETE

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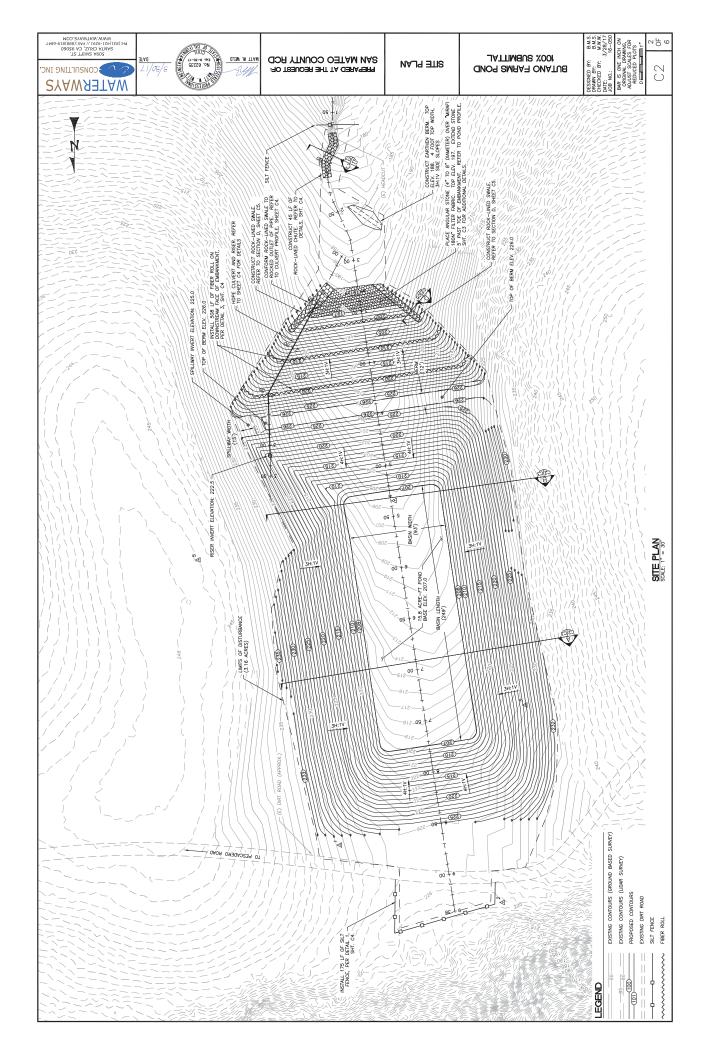
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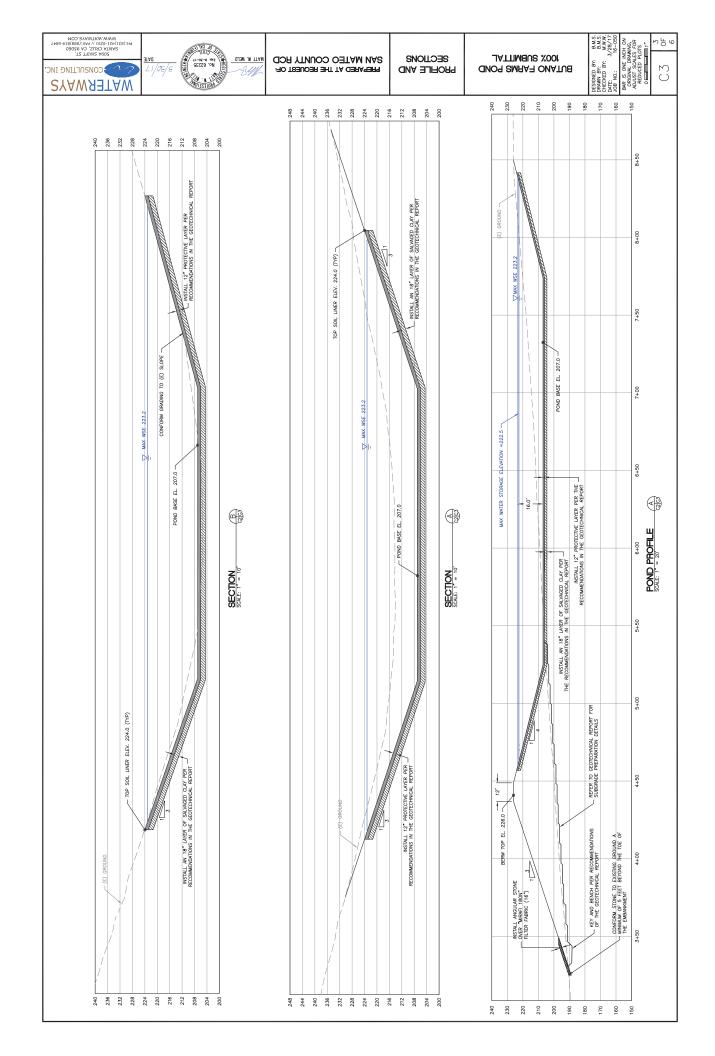
GENERAL NOTES

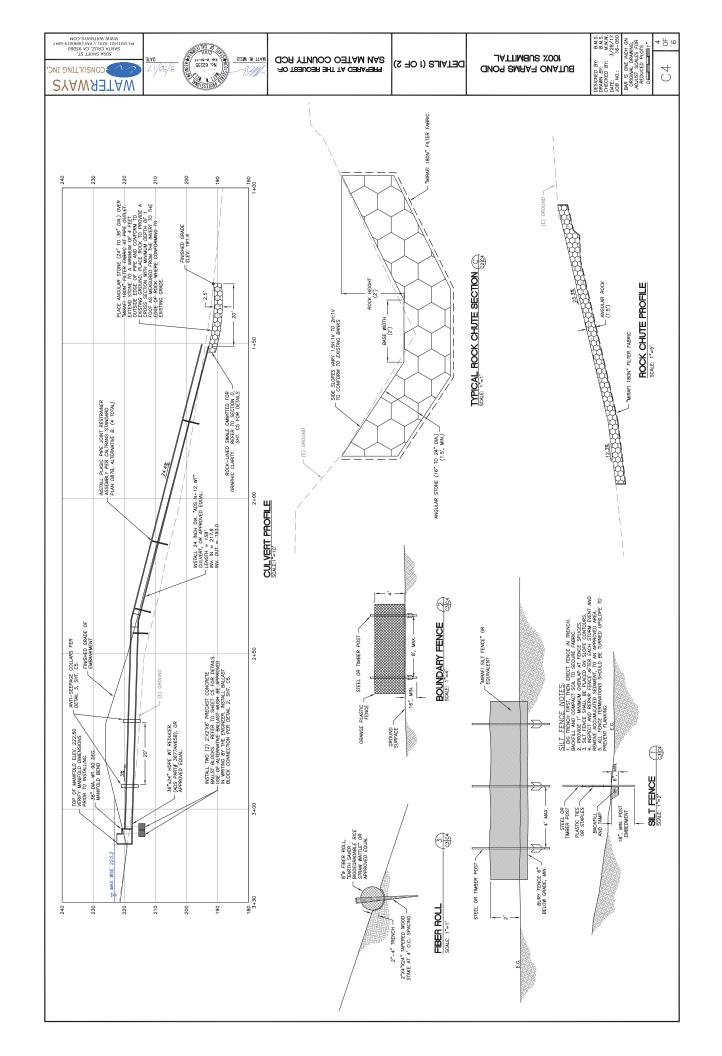
PREPARED AT THE REQUEST OF: SAM MATEO COUNTY RESOURCE CONSERVATION DISTRICT R25 MRAMONTES STREET SUITE 103 HALF MOON BAY, CA 94019

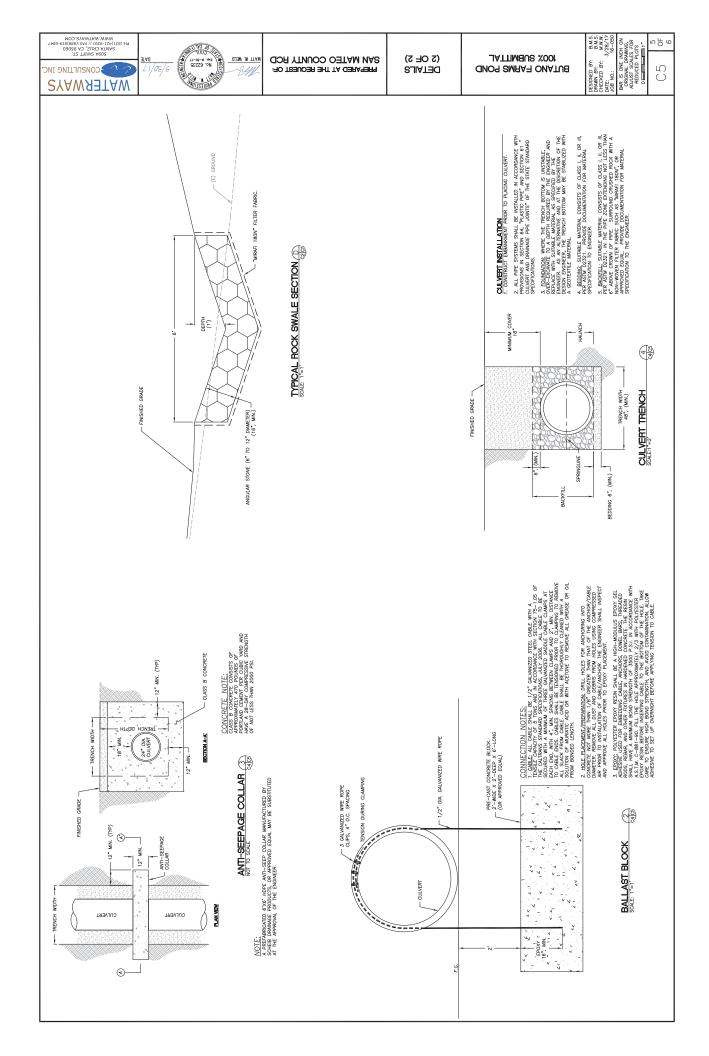
TOPOGRAPHIC MAPPING WAS PERFORMED BY: WATERWAYS CONSULTING, INC. 509A SMIPT STREET
SANTA CRUZ, CA 95060
SURVEY DATE: NOVEMBER 16, 2016.

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 - IF DISCREPANCIES ARE DISCOVERED BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.









NOTIFY THE EMBINEER AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE EMBINEER OR A DESIGNATED REPRESENTATIVE SHALL THE CONSTRUCTION PROCESS, AS NECESSARY TO ENSURE PROPER INSTALLATION PROCEDURES.

3. EXISTING UNDERGROUND UTILITY LOCATIONS:

A. CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.

THE STATE OF THE S PRIOR TO BEGINNING WORK, CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES. AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UNITILES, THENCE SIGNAL ROWS HEAVER GROUND, STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOST CONSTRUCTION. o.

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UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCUBATELY ON THE PLANS ON OT PROPERLY WARKED BY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.

UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

11. IF DISCREPANCIES ARE DISCOVERED BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

12. IT SHULL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LANS, ORDINANCES, CODES, REQUIREMENTA, AND STANDARDS WHICH IN ANY MAINER AFFECT THE COURSE OF CONSINCION OF THIS PROJECT, THOSE ENGAGED OF BIRKLYDED IN THE CONSTRUCTION.

AW TESTS, WSFECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE LANES, SHALL BE BOOK ET AN INDEPENDENT INSECTION COMPANY. USES STEE VISITS THE EDIMENTE ON OTH CONSTRUCTION FIFTIAL INSECTIONS, IT IS THE CONTINUENCY RESPONSEILLY TO BESIDEN THAT THE REQUIRED TESTS AND INSECTIONS, ARE PREPRIEDED.

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PROWDE, AT CONTRACTOR'S SOLE EXPENSE, ALL MATERIALS, LABOR AND EQUIPMENT REQUIRED TO COMPLY WITH ALL APPLICABLE PERMIT CONDITIONS AND REQUIREMENTS.

21 CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING AND LAYOUT, UNLESS OTHERWISE SPECIFIED.

22 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURPEY MONUMENTS OF PROPERTY CORNERS. DISTURBED WINNINGERS SHALL BE RESPONSIBLED FOR TO THER ORDINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED ONL. ENGRIEFE OF LAND SURPEYOR AT THE SOLE EMPIRES OF THE CONTRACTOR.

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JOB NO.:

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MATT W. WELD

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IN MATERIAL CONTAINING EXCESSIVE MOSTURE.
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WITH THE APPLICABLE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT, AND
TO GEOTECHNICAL INVESTIGATION REPORT BY:

CMAG ENGINEERING, INC. 62 HANGAR WAY, SUITE A WATSON/ILLE. CA 950.76 (831) 475-1411 JOB No. 16-139-SM

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AND/OR CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THIS PLAN AND/OR AS DIRECTED BY THE ENGINER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING TRENCHINGS OFFERTONS.

INCORPORATE ADEQUATE DRAINAGE PROCEDURES DURING THE CONSTRUCTION PROCESS TO ELIMINATE EXCESSIVE PONDING AND EROSION. 10.

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REMOVE ALL EXCESS SOILS TO AN APPROVED DUMP SITE OR DISPOSE OF ON SITE AT A LOCATION TO BE APPROVED BY THE ENGINEER, IN A MANNER THAT WILL NOT CAUSE EROSION.

CLEARING AND GRUBBING, SUBGRADE PREPARATION AND EARTHWORK SHALL BE PERFORMED ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, THESE DRAWINGS, AND 1TECHNICLA, SPECIFICATIONS.

THE EROSION CONTROL DEVICES ON THIS PLAN ARE A SCHEMATIC REPRESENTATION OF WHAT RECURRED. FEROSION CONTROL DEVICES MAY BE RECOATED, DELETED, OR ADDITIONAL ITEMS RECURRED EPENDING ON THE ACTUAL SOIL CONDITIONS ENCOUNTERED, AT THE DISCRETION IS ENGINEER.

16. MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION. 15. MAINTAIN ALL EROSION CONTROL DEVICES AND MODIFY THEM AS SITE PROGRESS DICTATES.

 CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS. 17. CLEAN DAILY ANY EROSION OR DEBRIS SPILLING ONTO A PUBLIC STREET.

19. BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING SITE DISTURBING ACTIVITIES.

SEEDING NOTES

SYBELEZ SECREBED AREA VEN RETSION FOR COME IN WASE I.

MACLONNE SELEMBED AREA VEN RETSION FOR SELEMBER SELEMBER

SEED APPLICATION RATE 200 LB/ACRE (5 LBS/1,000 SQ.FT.) TABLE 1, SEED MIX SEED TYPE HORDEUM VULGARE (CEREAL ANNUAL BARLEY)

18 LB/ACRE (0.5 LBS/1,000 SQ.FT.) FESTUCA RUBRA (RED FESQUE)

DUST CONTROL NOTES

1. THE CONTROL SHE RESPONSED ENR CONTROLS DUST CONTROL THROUGHOUT THE
SHALL BE RESPONSEDE EIOR THE RESULAR CLEMENT OF ALL MILD, THROUGH THE TRANSPARE EIOR THE REQUIRE CLEMENT OF ALL MILD, THROUGH THE TRANSPARE CLEMENT OF ALL MILD, THE CLEMENT SHE CLEMENT OF ALL MANCENT READS AND SIDEMALKS, AT LENST ONCE EVERY 24 HOURS WIFRY OFFERTRONS

ALL DISTURBED AREAS, INCLUDING UNPAVED ACCESS ROADS OR STORAGE PILES, NOT BEING ACTIVELY UNLIED FOR CONSTRUCTION PREPOSES, SHALL BE FIFTCINELY SHALLZED OF DUST EMISSIONS UNSING WAITEN, CHIRACAL STABLIZED OF DIST EMISSIONS UNSING WAITEN, CHIRACAL STABLIZED FOR SHALLS WE WEEKING GROUND COVER. 4

ALL GROUND-DISTURBING ACTIVITIES (E.G., CLEARING, ORUBBING, SCRAPING, AND EXCAVATION) SYALL BE EFFECTIVELY CONTROLLED OF FUGITIVE DUST EMISSIONS UTLIZING APPLICATION OF WATER OR BY PRE-SOAKING. m

ALL MATERIALS TRANSPORTED OFFSITE SHALL BE COVERED OR EFFECTIVELY WETTED TO LIMIT DUST EMISSIONS.

FOLOWING THE ADDITION OF MATERIALS TO, OR THE RELIVIAL OF MATERIALS FROM, THE SURFACES OF OUTDOOR STORAGE PLIES, SAID PILES SHALL BE EFFECTIVELY STABLIZED OF FUGITIVE DUST BEINSTONS UTILIZEN SUFFICIENT WATER OR CHEMICAL STABLIZER/SUFPRESANT. ONSITE VEHICLE SPEED ON UNPAVED SURFACES SHALL BE LIMITED TO 15 MPH

REQUIRED BY DISTURBED AREAS SHALL BE SEEDED PRIOR TO OCTOBER 15TH OR EARLIER AS I APPLICABLE PERMIT CONDITIONS.

9 9 9

A.4 Design Specifications

Technical Specifications

For

Butano Farms Pond

Prepared for San Mateo County Resource Conservation District

100% Submittal

March 30, 2017



FOR USE IN CONNECTION WITH

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION STANDARD

SPECIFICATIONS, CURRENT EDITION

Butano Farms Pond Technical Specifications 100% Submittal

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SECTION 015000 TEMPORARY FACILITIES AND CONTROLS (a.k.a. Mobilization & Demobilization)

1. GENERAL

1.1 DESCRIPTION

- A. The work covered by this section consists of the construction facilities and temporary controls, including mobilization and demobilization, as specified, as shown on the Drawings, or as otherwise directed by the Engineer. Work includes traffic control, temporary fencing type ESA, tree protection, and erosion control items not specifically addressed under other pay items.
- B. Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the site; for the establishment of all offices, and other facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site.
- C. Demobilization shall consist of work and operations necessary to disband all mobilized items and cleanup the site. The removal of all temporary crossings, ramps, access ways, roads, signs, and fencing; dewatering facilities; and temporary facilities or works, and the restoration of surfaces to an equal or better than existing condition shall also be included as part of demobilization.

1.2 RELATED SECTIONS

- 1. Section 015626, Temporary Fence Type ESA
- 2. Section 015713.02, Silt Fence

2. PRODUCTS - Not Used

3. EXECUTION

3.1 CONTRACTOR'S PLANT AND EQUIPMENT

- A. Security. Contractor shall, at all times, be responsible for security of their plant and equipment. Owner shall not be responsible for missing or damaged equipment, tools, or personal belongings.
- B. Construction Power and Communication Facilities. Contractor shall be responsible for providing sufficient electrical power and communication facilities to construct the work.
- C. Storage Facilities.
 - 1. Provide storage facilities for the protection of materials and supplies from weather, and shall keep the facilities clean and in proper order at all times.
 - 2. Provide a storage area for lubricants, oils, and hazardous materials with sufficient means to contain spills. Facilities, handling, and any required cleanup will comply with all current local, state, and federal standards. Petroleum products stored on the site shall be secured from vandalism.
- D. Sanitary Facilities. Maintain adequate toilet facilities at or near the work site.

- E. Solid Waste Handling. Provide sufficient solid waste handling facilities to maintain site in a clean, orderly condition.
- F. Water. Contractor shall provide all water necessary for construction and maintenance as specified. A water source will be discussed at the Pre-bid meeting.

3.2 MOBILIZATION AND DEMOBILIZATION

A. General. Perform mobilization and demobilization activities in accordance with the Drawings, and as specified.

3.3 PROJECT SIGNS

A. General. Erect project, safety and hard hat signs at each work site within five (5) days after commencement of work at that site.

3.4 EXCAVATION

A. The Contractor, and any subcontractor, is required to notify U.S.A. forty-eight hours in advance of performing excavation work, by calling the toll free number (800) 642-2444.

3.5 PROTECTIVE BARRIERS

- A. Protective barriers shall be erected around sensitive areas as designated on the Drawings or as directed by the Engineer. Barriers shall be constructed using bright orange plastic safety fencing (type ESA), per Section 015626, Temporary Fence Type ESA.
- B. Temporary fencing shall be maintained during construction. Except as directed by the Engineer, barriers shall be removed after completion of work.

3.6 BULLETIN BOARD

A. Provide a bulletin board at the project site, or in a location approved by the Engineer. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and other items required to be posted.

3.7 STAGING AREAS

- A. General. Staging areas at the project site are provided for the Contractor's use. By making this area available to the Contractor, the Engineer, and any other person or agency connected with the properties shall in no way be responsible or liable for any activity of the Contractor, subcontractors, or any individual or organization connected with the project.
- B. Alternative Staging Areas. Alternative sites must be acceptable to Owner, and the Contractor must make all arrangements for their use at the Contractor's expense, and in accordance with all local, State and Federal regulations.
- C. Additional Storage Areas. Should the Contractor require space in addition to that available onsite, the Contractor shall make arrangements for storage of materials and equipment in locations off the construction site, and shall provide the Engineer a copy of the letter of authorization for storage from the Owner.

3.8 DUST CONTROL

A. General. The Contractor shall be responsible for the control of dust within the limits of the project at all times. The Contractor shall take whatever steps are necessary to eliminate the

- nuisance of blowing dust. Responsibility for any damage to property, crops, or orchards from dust caused by the Contractor's operations shall be borne by the Contractor.
- B. Dust Control. Periodically, water or otherwise treat access roads and haul roads, as required to suppress dust. Cover or control water content of earthen materials being hauled, as required to control dust emissions. Cover or otherwise stabilize soil stockpiles to prevent erosion by wind.
- C. Cleanup. The Contractor shall keep all streets, roadways, and easements, as well as all ground adjacent to the project site, clean and free of dust, mud and debris resulting from the Contractor's operations. Daily cleanup throughout the project shall be required as the Contractor progresses with the work. Spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public street or private driveway or access road shall be removed immediately by the Contractor.

3.9 HAZARDOUS MATERIALS CONTROL AND SPILL PREVENTION PLAN

- A. General. Before starting work on the project, the Contractor shall submit for acceptance by the Engineer a Hazardous Materials Controls and Spill Prevention Plan. The Plan shall include provisions for preventing hazardous materials from contaminating soil or entering water courses and shall establish a Spill Prevention and Countermeasure Plan.
- B. Facilities. Provide staging and storage areas for equipment, as required to contain contaminants away from water courses. Provide a contained, locked storage facility for fuels, lubricants, construction chemicals and other hazardous materials and supplies stored at site. Provide a lined pit for concrete washdown, if necessary, located where spills or overflow cannot enter nearby watercourses. The pit shall be located a minimum of 75 feet from any flowing watercourse.
- C. Equipment Maintenance. Clean and maintain equipment to prevent any leakage of fuel and lubricants. Establish a designated equipment refueling area. All fueling and maintenance of vehicles and other equipment and staging area shall occur at least 75 feet from any riparian habitat or water body.
- D. Spills Countermeasures. Isolate work areas during in-water construction activities by using oil containment booms. Maintain a supply of oil booms, sorbent pads and other supplies to contain and clean spills. Contain and cleanup any hazardous material spills immediately and notify Engineer.

3.10 CONSTRUCTION SITE HOUSEKEEPING

A. Remove rubbish, trash, and debris from site on a regular basis. Transport and dispose of all rubbish and debris in accordance with all local regulations. Maintain staging area in an orderly manner. Regularly clean mud and debris, resulting from work at the site, from roadways. Sweeping and washing construction site sediment tracked onto roadways into roadside ditches is a violation. Cleanup and dispose of all concrete debris and washings when concrete work is complete.

3.11 PROTECTION OF EXISTING IMPROVEMENTS

A. Existing facilities, utilities, and property shall be protected from damage resulting from the Contractor's operations. Roadways and other improved surfaces shall be protected from damage by vehicles with tracks or lugs. Any damage resulting from the Contractor's operations shall be repaired by the Contractor to the condition which existed prior to the damage, and to the satisfaction of the Engineer, at no additional cost to the Owner.

3.12 RESTORATION OF STRUCTURES AND SURFACES

- A. Structures, Fencing, Equipment, and Pipework. The Contractor shall remove such existing structures, fencing, equipment, and pipework as may be necessary for the performance of the work, and shall rebuild, or replace, the items thus removed in as good a condition as found. Contractor shall repair any existing structures that were damaged as a result of the Work.
- B. Roads and Streets. Roadways used by the Contractor for hauling materials, equipment, supplies, etc., shall be cleaned and repaired if the condition of the roadway is damaged, or otherwise affected, due to the Contractor's operations.
- C. Curbs, Gutters, Driveways, and Sidewalks. All curbs, gutters, driveways, sidewalks, and similar structures that are broken, or damaged, by the installation of the work shall be reconstructed by the Contractor. Reconstruction shall be of the same kind of materials with the same finish, and in not less than the same dimensions as to original work. Repairs shall be made by removing and replacing the entire portions between joints or scores, and not merely refinishing any damaged part. All restoration work shall match the appearance of the existing improvements, as nearly as possible.
- D. Cultivated Areas and Other Surface Improvements. All cultivated and natural areas, either agricultural or lawns, and other surface improvements which are damaged by actions of the Contractor, shall be restored, including roadside drainage ditches, as nearly as possible, to their original conditions.

3.13 STORAGE OF MATERIALS AND EQUIPMENT

A. Materials and equipment shall be stored so as to ensure the preservation of their quality and fitness for the work. Stores of equipment and materials shall be located so as to facilitate inspection. The Contractor shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment, supplied by the Contractor, until completion and final acceptance of the Work by the Owner.

3.14 TRAFFIC CONTROL

- A. General. The Contractor shall be responsible for public safety and traffic control at all times.
- B. The Contractor shall furnish, install, and maintain temporary construction warning signs, flaggers, barricades, and other devices necessary to safeguard the general public and the work, and to provide for the safe and proper routing of all vehicular and pedestrian traffic within and through the limits of the project during the performance of the work.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Work under this section will be measured for payment on a lump sum basis.

4.2 PAYMENT

- A. The lump sum contract price for Construction Facilities and Temporary Controls, also known as Mobilization and Demobilization, will include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for mobilization; demobilization; and temporary facilities and controls.
- B. Payment will be made under:

Pay Unit Lump Sum

END OF SECTION

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SECTION 015626 TEMPORARY FENCE – TYPE ESA

1. GENERAL

1.1 DESCRIPTION

A. Work under this section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, and remove Temporary Fence – Type ESA, as shown on the Drawings, as specified, or as otherwise directed by the Engineer.

1.2 RELATED SECTIONS

- 1. Section 015000, Mobilization
- 2. Section 311100, Clearing and Grubbing
- 3. Section 312316, Stripping and Excavation

1.3 REFERENCES

A. State of California, Department of Transportation (CALTRANS) State Standard Specifications, current edition

1.4 SUBMITTALS

- A. Submit to the Engineer, for review, the following:
 - 1. Manufacturer's data for proposed fencing fabric.
 - 2. Manufacturer's data or descriptive literature for proposed fence posts.

2. PRODUCTS

2.1 MATERIALS

- A. High Visibility Fabric. High visibility fabric shall be machine produced, orange colored mesh manufactured from polypropylene or polyethylene. High visibility fabric may be made of recycled materials. Materials shall not contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. High visibility fabric shall be fully stabilized ultraviolet resistant and a minimum of four feet in width with a maximum mesh opening of 2" x 2". High visibility fabric shall be furnished in one continuous width and shall not be spliced to conform to the specified width dimension.
- B. Posts. Posts for temporary fence (Type ESA) shall be of one of the following:
 - 1. Wood posts shall be fir or pine, shall have a minimum cross section of 2" x 2", and a minimum length of 5.25 feet. The end of the post to be embedded in the soil shall be pointed. Wood posts shall not be treated with wood preservative.
 - 2. Steel posts shall have a "U," "T," "L," or other cross sectional shape that resists failure from lateral loads. Steel posts shall have a minimum weight of 0.75 pounds per linear foot and a minimum length of 5.25 feet. One end of the steel post shall be pointed and the other end shall have a high visibility colored top.

- C. Fasteners. Fasteners for attaching high visibility fabric to the posts shall be as follows:
 - 1. The high visibility fabric shall be attached to wooden posts with commercial quality nails or staples, or as recommended by the manufacturer or supplier.
 - Tie wire or locking plastic fasteners shall be used for attaching the high visibility fabric to steel posts. Maximum spacing of tie wire or fasteners shall be 24 inches along the length of the steel post.
- D. Used materials may be installed provided the used materials conform to these Specifications.

3. EXECUTION

3.1 INSTALLATION

- A. All fence construction activities shall be conducted from the work side of the ESA as shown on the Drawings or as flagged in the field by the Engineer.
- B. Posts shall be embedded in the soil a minimum of 16 inches. Post spacing shall be eight feet maximum from center to center and shall at all times support the fence in a vertical position.
- C. Temporary fence (Type ESA) shall be constructed prior to clearing and grubbing work, shall enclose the foliage canopy (drip line) of protected plants, and shall not encroach upon visible roots of the plants.
- D. Temporary fence (Type ESA) shall be located so that it is clearly visible, as determined by the Engineer.

3.2 MAINTENANCE

A. Temporary fence (Type ESA) that is damaged during the progress of the work shall be repaired or replaced by the Contractor the same day the damage occurs.

3.3 REMOVAL

- A. When Type ESA fence is no longer required, as determined by the Engineer, it shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the State Specifications, except when reused as provided in this section.
- B. Holes caused by the removal of temporary fence (Type ESA) shall be backfilled in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the State Specifications.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Temporary Fence – Type ESA will not be separately measured for payment.

4.2 PAYMENT

A. No separate payment will be made for Temporary Fence – Type ESA. Full compensation for all costs associated with this work shall be included in the contract price for Temporary Erosion Control and BMPs in accordance with Section 015713.

END OF SECTION

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SECTION 015713

TEMPORARY EROSION CONTROL AND BMP'S

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SECTION 015713 TEMPORARY EROSION CONTROL AND BMP'S

1. GENERAL

1.1 DESCRIPTION

- A. This work shall consist of temporary erosion control and water or air quality control measures, devices, and BMPs that may be shown on the Drawings, and as specified in the Contract Documents, Project Permit(s), Project SWPPP, Standard Specifications, these Technical Specifications, or as directed by the Engineer during the life of the contract. Temporary erosion control measures and other BMP's will also be required at staging/storage areas utilized during project construction. Said work is intended to provide prevention, control, and abatement of water and air pollution within the limits of the project and to minimize damage to the work, adjacent properties, streams or other bodies of water.
- B. Attention is directed to the "Storm Water Pollution Prevention Plan Implementation". Do not start work until the SWPPP, applicable plan sheets, schedules and methods of operation for temporary pollution control are reviewed and accepted by the Engineer and RWQCB. .
- C. Installation and maintenance of temporary erosion control measures, devices and BMPs shall conform to the requirements as shown on the Drawings stated within this section, the SWPPP, and RWQCB requirements.

1.2 RELATED SECTIONS

- 1. Section 015626, Temporary Fence Type ESA
- 2. Section 015713, SWPPP Implementation
- 3. Section 015713.02, Silt Fence
- 4. Section 015713.01, Fiber Roll
- 5. Section 312319, Dewatering
- 6. Section 015000, Mobilization

1.3 SUBMITTALS

2. PRODUCTS – Not Used

3. EXECUTION

3.1 GENERAL

A. Install temporary soil stabilization materials for water pollution control in all disturbed work areas that are considered inactive (i.e. excess of 14 days) or before forecast storm events. Should any temporary erosion control of this nature be required elsewhere as directed by the Engineer and/or regulatory agencies, install them within 48 hours of notification. Where applicable and upon acceptance of the Engineer, furnish and apply/install temporary mulch,

- temporary hydraulic mulch, temporary erosion control blankets, or temporary covers in conformance with the Standard Specifications and these Technical Specifications. Materials and construction methods shall comply with the Standard Specifications and these Technical Specifications.
- B. Maintain a temporary cover on all stockpiles at all times and install and maintain appropriate BMPs (sediment logs, filter fence, check dams, etc.) around the perimeter at the base of stockpile to control the potential runoff of any loose sediments and pollutants. Whenever a temporary cover is removed to perform other work, replace and secure the temporary cover within one (1) hour of stopping work.

3.2 MAINTENANCE

- A. Maintain all temporary erosion control measures, devices, and/or BMPs placed in the work for the duration of the project. Maintenance includes all Manufacturer recommendations, and includes but is not limited to the following:
 - 1. Immediately repair upon discovery damage to any temporary erosion control devices and/or BMPs during the course of the project at the Contractor's expense.
 - 2. Inspect temporary erosion control devices and/or BMPs routinely, immediately after each rainfall event, and at least daily during prolonged rainfall events. Make required repairs immediately.
 - 3. Inspect construction limit and tree protection fencing daily and repair, secure, and/or replace as necessary to maintain and preserve its intended purpose.
 - 4. Routinely inspect all signage as required for the project and repair or replace upon discovery of damage, vandalism, and/or missing parts.
 - 5. Should the filter fence fabric decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, replace fabric promptly.
 - 6. Should a sediment log decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, replace sediment log promptly.
 - 7. Replace single or group of gravel bag(s) when the bag material is ruptured or when the yarn has failed, allowing the bag contents to spill out.
 - 8. Routinely inspect stakes and/or rope used to secure a sediment log in place and repair as necessary if found to be loose or ineffective.
 - 9. Repair or replace damaged temporary gravel bag berm (or other measures which require gravel bags per the Project Drawings, Project Permits, these Technical Specifications and the SWPPP) on the same day when the damage occurs or is discovered.
 - 10. Remove sediment deposits and other debris when they reach approximately one-half the height of the sediment barrier (or as recommended by the Manufacturer) and dispose of in a manner acceptable to the Engineer, and in conformance with the SWPPP.
 - 11. Maintain temporary gravel bag berm (or other measures which require gravel bags per the Project Drawings, Project Permits, these Technical Specifications and the SWPPP) to provide a sediment holding capacity of approximately one-third the height of the gravel bag berm above the ground. When sediment exceeds this height or when directed by the

- Engineer, remove and dispose of sediment in a manner acceptable to the Engineer, and in conformance with the SWPPP.
- 12. Remove and dispose of sediment deposits remaining in place after the temporary erosion control measure and/or BMPs is no longer required in a manner acceptable to the Engineer, and in conformance with the SWPPP.

3.3 DUST CONTROL

- A. General. The Contractor shall be responsible for the control of dust within the limits of the project at all times. Take whatever steps are necessary to eliminate the nuisance of blowing dust. Responsibility for any damage to property, crops, or orchards from dust caused by the Contractor's operations shall be borne by the Contractor.
- B. Dust Control. Periodically, water or otherwise treat access roads and haul roads, as required to suppress dust. Cover or control water content of earthen materials being hauled, as required to control dust emissions. Cover or otherwise stabilize soil stockpiles to prevent erosion by wind.
- C. Cleanup. Keep all streets, roadways, and easements, as well as all ground adjacent to the project site, clean and free of dust, mud and debris resulting from the Contractor's operations. Daily cleanup throughout the project shall be required as the Contractor progresses with the work. Immediately remove spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public street or private driveway or access road.

3.4 HAZARDOUS MATERIALS CONTROL AND SPILL PREVENTION PLAN

- A. General. Before starting work on the project, submit for acceptance by the Engineer a Hazardous Materials Controls and Spill Prevention Plan. The Plan shall include provisions for preventing hazardous materials from contaminating soil or entering water courses and shall establish a Spill Prevention and Countermeasure Plan.
- B. Facilities. Provide staging and storage areas for equipment, as required to contain contaminants away from water courses. Provide a contained, locked storage facility for fuels, lubricants, construction chemicals and other hazardous materials and supplies stored at site. Provide a lined pit for concrete washdown (if necessary), located where spills or overflow cannot enter nearby watercourses or storm drains. The pit shall be located a minimum of 75 feet from any flowing watercourse.
- C. Equipment Maintenance. Clean and maintain equipment to prevent any leakage of fuel and lubricants. Establish a designated equipment refueling area. All fueling and maintenance of vehicles and other equipment and staging area shall occur at least 75 feet from any riparian habitat or water body.
- D. Spills Countermeasures. Isolate work areas during in-water construction activities by using oil containment booms. Maintain a supply of oil booms, sorbent pads and other supplies to

contain and clean spills. Contain and cleanup any hazardous material spills immediately and notify Engineer.

3.5 CONSTRUCTION SITE HOUSEKEEPING

A. Remove rubbish, trash, and debris from site on a regular basis. Transport and dispose of all rubbish and debris in accordance with all local regulations. Maintain staging area in an orderly manner. Regularly clean mud and debris, resulting from work at the site, from roadways. Cleanup and dispose of all concrete debris and washings when concrete work is complete.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Temporary Erosion Control and BMP's will be measured on lump sum basis.

4.2 PAYMENT

- A. The lump sum contract price for Temporary Erosion Control and BMP's will include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for temporary erosion control measures, devices, and BMPs, provisions and requirements as stated in the SWPPP, stockpile management, dust control, sweeping, and maintenance of all such water pollution control measures that may be shown on the Project Drawings, and as specified in the Contract Documents, Project Permit(s), Project SWPPP, Standard Specifications, these Technical Specifications, and as directed by the Engineer, and no additional compensation shall be allowed therefore.
- B. Payment will be made under:

Pay Item Pay Unit

Temporary Erosion Control and BMP's Lump Sum

END OF SECTION

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SECTION 015713.01 FIBER ROLL

1. GENERAL

1.1 DESCRIPTION

- A. Work under this Section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, remove and dispose of Fiber Roll, as shown on the Drawings, as specified in the Storm Water Pollution Prevention Plan, as specified herein, or as otherwise directed by the Engineer.
- B. Fiber Roll shall be furnished, installed, and maintained at the locations shown on the Drawings, as specified, and as indicated on the approved Storm Water Pollution Prevention Plan. Fiber Roll shall be installed on excavation and embankment slopes and other disturbed soil areas, active or non-active.

C. Related Sections

- 1. Section 015000, Mobilization
- 2. Section 312316, Stripping and Excavation
- 3. Section 015713, Temporary Erosion Control and BMPs

1.2 SUBMITTALS

- A. Submit to the Engineer, for review, the following manufacturer's data and Certification's:
 - 1. A certificate stating the name of the Fiber Roll manufacturer, product name, style compositions of filaments or yarns and other pertinent information to fully describe the geotextile, along with the manufacturer's certification of compliance with the material specifications contained herein.

2. PRODUCTS

2.1 MATERIALS

- A. Fiber Roll materials may generally be either of the two types indicated below, unless coir rolls are specifically specified on the Drawings. Where coir rolls are indicated on the drawings, straw rolls will not be allowed as a substitute.
- B. Coir Roll. Coir Roll shall be:
 - 1. A pre-manufactured roll made from coconut fiber encapsulated within a biodegradable jute, sisal, or coir fiber netting. The use of plastic/photodegradable netting shall not be allowed. The netting shall have a minimum durability of 2 years after installation. The netting shall be secured tightly at each end of the roll. Rolls shall be between eight inches and 12 inches in diameter. Rolls between eight inches and ten inches in diameter shall have a minimum weight of one pound per linear foot and a minimum length of 20 feet. Rolls between ten inches and 12 inches in diameter shall have a minimum weight of three pounds per linear foot and a minimum length of 10 feet.

C. Straw Roll. Straw Roll shall be:

1. A pre-manufactured roll made from 100% weed free rice straw and wrapped in a 100% biodegradable tubular 7 oz. Plain Burlap liner. The burlap is Medium Weight Natural Burlap with a 9 X 8 Warp & Fill, and a minimum weight of 7 oz. per square yard. Plastic

- netting will not be accepted as an alternate.
- 2. 9-inch rolls shall have a mimimum weight of approximately 1.6 pounds per foot.
- 3. 12-inch rolls shall have a mimimum weight of approximately 3.8 pounds per foot.
- D. Stakes. Wood stakes shall be a minimum of 2" x 4" x 24" (ripped diagonally) for Type 1 installation or a minimum of 1" x 2" x 24" in size for Type 2 installation. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots and other defects which would render them unfit for the purpose intended. Metal stakes shall not be used.
- E. Rope. Rope shall be biodegradable, such as sisal or manila, with a minimum diameter of 1/4 inch.

3. EXECUTION

3.1 INSTALLATION

- A. Fiber Roll shall be installed as follows:
- B. Type 1: Furrows shall be constructed to a depth between three inches and four inches, and to a sufficient width to hold the Fiber Roll. Soil excavated from the trench shall be placed on the uphill or flow side of the roll to prevent water from undercutting the roll. Stakes shall be driven through the center of the roll (perpendicular to the finished grade) at 36 inches apart along the length of the Fiber Roll and stopped at 12 inches from each end of the rolls. Stakes shall be driven to between two and three inches above the top of the roll.
- C. Type 2: Rope and notched stakes shall be used to restrain the Fiber Rolls against the slope. Stakes shall be driven into the slope until the notch is even with the top of the Fiber Roll. Rope shall be knotted at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the Fiber Roll tightly to the slope. Furrows will not be required.
- D. Fiber Roll shall be placed 10 feet apart along the slope for slope inclination (horizontal:vertical) of 2:1 and steeper, 15 feet apart along the slope for slope inclination between 2:1 and 4:1, 20 feet apart along the slope for slope inclination between 4:1 and 10:1, and a maximum of 50 feet apart along the slope for slope inclination of 10:1 and flatter.
- E. The bedding area for the Fiber Roll shall be cleared of obstructions including rocks, clods, and debris greater than one inch in diameter before installation.
- F. Fiber Roll shall be installed approximately parallel to the slope contour and the terminus of rows shall be angled up-slope at 45 degrees for a distance of three feet. Where fiber rolls meet, provide an overlap of two feet, with adjacent rolls tightly abutting each other.
- G. Fiber Roll shall be installed prior to seeding where used without slope protection fabric.
- H. Fiber roll shall be installed over fabric (after seeding) where slope protection fabric is specified.

3.2 MAINTENANCE

- A. The Contractor shall inspect all Fiber Roll immediately after each rainfall, and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected by the Contractor.
- B. The Contractor shall also make a daily review of the location of Fiber Roll in areas where construction activities have altered the natural contour and drainage runoff to ensure that the Fiber Rolls are properly located for effectiveness. Where deficiencies exist as determined by the Engineer, additional Fiber Rolls shall be installed as directed by the Engineer.

C. Damaged or otherwise ineffective Fiber Roll shall be repaired or replaced promptly. Fiber Roll shall be maintained to disperse concentrated water runoff and to reduce runoff velocities. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping Fiber Roll shall be repaired with additional stakes or replaced. Locations where rills and other evidence of concentrated runoff have occurred beneath the rolls shall be corrected. Fiber Roll shall be repaired or replaced within 24 hours of identifying the deficiency.

3.3 REMOVAL

A. Fiber Rolls shown on the Drawings shall remain in place after project completion, unless otherwise specified, and be allowed to naturally degrade.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Fiber Roll will be measured by the linear foot of Fiber Roll installed at the locations indicated on the Drawings, as specified, or as directed by the Engineer
- B. Fiber Roll that the Contractor installs for stabilization of stockpiles and staging areas, in addition to that shown on the Drawings, shall not be separately measured for payment.

4.2 PAYMENT

- A. Fiber Roll will be paid for at the contract price per linear foot, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to install, maintain throughout the construction, and, where specified, to remove Fiber Roll after site stabilization.
- B. Fiber Roll that the Contractor installs for stabilization of stockpiles and staging areas, in addition to that shown on the Drawings, shall be paid for under Temporary Erosion Control and BMPs, Section 015713.
- C. Fiber Rolls required or used on a short term basis that are not permanently staked in place or are anticipated to be moved on a daily or routine basis (such as areas immediately adjacent to trench excavations, temporary stockpiles, active areas for soil processing/screening operations, spill containment devices, etc.) shall be considered as included in prices paid for the various contract items of work involved, and no additional compensation will be allowed.
- D. Payment shall be made under:

Pay Item	Pay Unit
Fiber Roll	Linear Foot

END OF SECTION

INDEX SECTION 015713.02 SILT FENCE

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SECTION 015713.02 SILT FENCE

1. GENERAL

1.1 DESCRIPTION

- A. Work under this Section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, and remove silt fence, as shown on the Drawings, as specified in the Storm Water Pollution Prevention Plan, and as specified, or as directed by the Engineer.
- B. This Specification is applicable to the use of a geotextile as a vertical, permeable interceptor designed to remove suspended soil from overland water flow. The function of a temporary silt fence is to filter and allow settlement of soil particles from sediment-laden water. The purpose is to prevent the eroded soil from being transported off the construction site by water runoff.

1.2 RELATED SECTIONS

- 1. Section 312319, Dewatering
- 2. Section 015000, Mobilization
- 3. Section 312316, Stripping and Excavation
- 4. Section 015713, Temporary Erosion Control and BMP's

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D 4355 Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
 - 2. D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity.
 - 3. D 4632 Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - 4. D 4751 Test Method for Determining Apparent Opening Size of a Geotextile.
 - 5. D 4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 - 6. D 4873 Guide for Identification, Storage, and Handling of Geotextiles.

1.4 SUBMITTALS

- A. Submit to the Engineer for review, the following:
- B. Manufacturer's Data and Certification:
 - 1. The Contractor shall provide the Engineer a certificate stating the name of the silt fence manufacturer, product name, style, chemical compositions of filaments or yarns and other pertinent information to fully describe the silt fence fabric.
 - 2. The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the Specification.

 Documentation describing the quality control program shall be made available upon request.
 - 3. Manufacturing Quality Control (MQC) test results shall be provided upon request.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Silt fence fabric labeling, shipment and storage shall follow ASTM D 4873.
- B. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.
- C. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.
- D. Each silt fence roll shall be wrapped with a material that will protect the silt fence from damage due to shipment, water, sunlight, and contaminants.
- E. The protective wrapping shall be maintained during periods of shipment and storage. If the wrapping is damaged prior to installation, the outer wrap of silt fence material must be discarded before installation.
- F. During storage, silt fence rolls shall be elevated off the ground and adequately covered to protect them from the following: Site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperatures in excess of 71 deg C (160 deg F)m and any other environmental condition that might damage the silt fence.

2. PRODUCTS

2.1 MATERIALS

- A. At the Contractor's option, temporary silt fence shall be prefabricated or constructed with silt fence fabric, posts, and fasteners.
- B. Silt Fence Fabric. Silt fence fabric shall be geotextile manufactured from woven polypropylene or polymer material. Silt fence fabric may be virgin, recycled, or a combination of virgin and recycled polymer materials. No virgin or recycled polymer materials shall contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. Silt fence fabric shall conform to the following requirements:

Specification	Requirements
Width, inches, min.	36
Grab tensile strength, KN (25 mm grip in each direction)	0.45, min.
ASTM Designation: D 4632*	
Elongation, percent minimum in each direction	20, min.
ASTM Designation: D 4632*	
Permittivity, 1/sec., min.	0.1-0.15
ASTM Designation: D 4491	
Ultraviolet stability, percent tensile strength retained after 500 hours, min.	90, min.
ASTM Designation: D 4355 (xenon-arc lamp and water spray weathering method)	
* or appropriate test method for specific polymer	

- C. Posts. Posts for temporary silt fence shall be one of the following:
 - 1. Untreated fir or pine, a minimum of 2" x 2" in size, and four feet in length. One end of the post shall be pointed.
 - 2. Steel and have a "U," "T," "L," or other cross sectional shape that can resist failure from lateral loads. The steel posts shall have a minimum weight of 0.8-pound per foot and a minimum length of 4 feet. One end of the steel posts shall be pointed and the other

end shall be capped with an orange or red plastic safety cap which fits snugly to the steel post. The Contractor shall submit to the Engineer for approval a sample of the capped steel post prior to installation.

- D. Fasteners. Fasteners for attaching silt fence fabric to posts shall be as follows:
 - 1. When prefabricated silt fence is used, posts shall be inserted into sewn pockets.
 - 2. Silt fence fabric shall be attached to wooden posts with nails or staples as shown on the Drawings or as recommended by the manufacturer or supplier. Tie wire or locking plastic fasteners shall be used to fasten the silt fence fabric to steel posts. Maximum spacing of fasteners shall be eight inches along the length of the steel post.

3. EXECUTION

3.1 FIELD ASSEMBLY:

- A. The silt fence fabric shall be installed on the side of the posts facing the slope.
- B. The silt fence fabric at the bottom of the fence shall be buried in a "J" configuration to a minimum depth of 150 mm (six inches) in a trench so that no flow can pass under the silt fence. Mechanically pushing 12 inches of the silt fence fabric vertically through the soil may be allowed if the Contractor can demonstrate to the Engineer that the silt fence fabric will not be damaged and will not slip out of the soil resulting in sediment passing under the silt fence fabric.
- C. The trench shall be backfilled and the soil compacted over the upslope side of the silt fence fabric.
- D. When joints are necessary, filter fence fabric shall be spliced together only at a support post, with a minimum twelve (12) inches overlap and securely sealed or stitched.
- E. The Contractor must demonstrate to the satisfaction of the Engineer that the silt fence fabric can withstand a sediment load of 1/3 the height of the fence.
- F. The posts shall be placed at the spacing as shown on the Drawings. Post should be driven or placed a minimum of 450 mm (18 inches) into the ground. Depth shall be increased to 600 mm (24 inches) if fence is placed on a slope of 3:1 or greater. Where 450 mm (18 inches) depth is impossible to attain, the posts should be adequately secured to prevent overturning of the fence due to sediment loading.
- G. Support fence, if required, shall be fastened securely to the upslope side of the fence post. The support fence shall extend from the ground surface to the top of the silt fence fabric.
- H. When self-supported fence is used, the silt fence fabric shall be securely fastened to fence posts.
- I. Temporary silt fence shall be installed parallel with the slope contour in reaches not to exceed 500 feet. A reach is considered a continuous run of temporary silt fence from end to end or from an end to an opening, including joined panels. Each reach shall be constructed so that the elevation at the base of the fence does not deviate from the contour more than 1/3 of the fence height. The fence shall be placed such that water cannot runoff around the end of the fence; this may be accomplished by constructing end-returns that angle up the slope.
- J. The silt fence should be limited to handle an area equivalent to 90 square meters (100 sy) per three meters (ten feet) of fence. Caution should be used where the site slope is greater than 1:1 and water flow rates exceed three liters (0.8 gallons) per second per three meters (ten feet) of fence.

3.2 INSPECTION

- A. The Contractor shall inspect all temporary silt fences immediately after each rainfall, and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected by the Contractor.
- B. The Contractor shall also make a daily review of the location of silt fences in areas where construction activities have altered the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist as determined by the Engineer, additional silt fence shall be installed as directed by the Engineer. Damaged or otherwise ineffective silt fences shall be repaired or replaced promptly.
- C. Should the filter fence fabric decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fabric shall be replaced promptly.
- D. Sediment deposits shall either be removed when the deposit reaches one third the height of the fence, or a second silt fence shall be installed as directed by the Engineer.

3.3 REMOVAL

- A. The silt fence shall remain in place for the complete duration of the project as necessary to conform to the Project Permit(s) and SWPPP, or until the Engineer directs it be removed. Upon removal, the Contractor shall remove and dispose of any excess sediment accumulations, use hand tools to grade disturbed areas to drain in the pre-disturbance direction, and revegetate all bare areas in accordance with contract requirements. Trimming the silt fence fabric and leaving it in place will not be allowed.
- B. Removed silt fence may be used at other locations provided the silt fence fabric and other material requirements continue to be met to the satisfaction of the Engineer.
- C. Ground disturbance caused by the installation and removal of the temporary silt fence shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Temporary silt fence will not be separately measured for payment.

4.2 PAYMENT

A. No separate payment will be made for temporary silt fence. Full compensation for all costs associated with this work, as shown on the Drawings, as specified, or as directed by the Engineer shall be paid for under Section 015713, Temporary Erosion Control and BMPs.

END OF SECTION

INDEX SECTION 015723 STORM WATER POLLUTION PREVENTION PLAN IMPLEMENTATION

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SECTION 015723 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IMPLEMENTATION

1. GENERAL

1.1 DESCRIPTION

- A. The work covered by this section consists of implementation of the approved Storm Water Pollution Prevention Plan (SWPPP), as specified in the SWPPP, as specified in this Section, and in compliance with the requirements of the State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction and Land Disturbance Activities, Water Quality Order No. 2009-0009-DWQ, General Permit No. CAS000002, adopted September 2, 2009, and associated amendments (hereafter Construction General Permit (CGP).
- B. The project has been identified as Risk Level 1. Attention is directed to Attachments C of the CGP, which identify monitoring and reporting requirements for Risk Level 1. Risk Level 1 projects are required to meet the reporting and monitoring requirements of (Attachment C).
- C. The Contractor shall be responsible for penalties assessed on the Contractor or the Owner as a result of the Contractor's failure to comply with the provisions in the Construction General Permit or with the applicable provisions of the Federal, State, and local regulations and requirements. Penalties as used in this section shall include fines, penalties, and damages, whether proposed, assessed, or levied against the Owner or the Contractor, including those levied under the Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.
- D. The Contractor shall perform the role of Qualified SWPPP Practitioner (QSP), as outlined in the SWPPP.
- E. The Owner or their designated representative will perform the role of Qualified SWPPP Developer (QSD). Where referenced in this Section, the words "Engineer" and "QSD" are synonymous.
- F. Nothing in the terms of the Contract nor in these Technical Specifications shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code, or other applicable statutes relating to prevention or abatement of water pollution.
- G. All areas of exposed earth created by the Contractor, beyond what is shown on the Drawings, and referred to in the Technical Specifications or the SWPPP, shall also be subject to the provisions of this Section, except that the Contractor shall be fully responsible for all additional costs and liabilities associated with SWPPP Implementation in these areas.
- H. The SWPPP will be periodically amended by the QSD to reflect current site conditions. The Owner will not be liable to the Contractor for Contractor's failure to accept all or any portion of an amended or revised SWPPP program, nor for any delays to the Work due to the Contractor's failure to implement the amended SWPPP.
- I. The measures outlined in the SWPPP reflect the minimum requirements of the CGP. The Contractor is responsible to perform all additional work, beyond what is shown on the Drawings or the approved SWPPP at the time the contract is awarded, as necessary to meet changing or unforeseen site conditions and to comply with the CGP, at no additional cost to the Owner.

1.2 RELATED SECTIONS

- 1. Construction Facilities and Temporary Controls, Section 015000
- 2. Dewatering, Section 312319
- 3. Silt Fence, Section 0157130.2
- 4. Fiber Roll, Section 015713.01
- 5. Temporary Fence Type ESA, Section 015626
- 6. Seeding, Section 329200

1.3 REFERENCES

- A. State Water Resources Control Board (SWRCB) Order No. R2-2009-0009-DWQ, NPDES General Permit No. CAS000002, Storm Water Discharges Associated With Construction and Land Disturbance Activities, September 2, 2009, and associated amendments, hereafter Construction General Permit (CGP).
- B. The California Stormwater Quality Association (CASQA) "Stormwater Best Management Practice Handbook Portal: Construction" including Appendix B, "Storm Water Pollution Prevention Plan Outline" and Appendix D, "Field Monitoring and Analysis Guidance" and addenda thereto issued up to, and including, the date of advertisement of the Project, hereafter referred to respectively as the "Manuals." Copies of the Manuals and the National Pollutant Discharge Elimination System (NPDES) permits may be obtained by accessing the CASQA's Internet Web Site portal at:

http://www.cabmphandbooks.com/

C. Approved Project Storm Water Pollution Prevention Plan (SWPPP).

1.4 SUBMITTALS

- A. The Engineer's review and approval of Contractor's submittals shall not waive any contract requirements and shall not relieve the Contractor from complying with the CGP, the SWPPP, or Federal, State and local laws, regulations, and requirements.
- B. Submit to the Engineer, for review, Manufacturer's product information for materials proposed for use on site for implementation of the SWPPP.
- C. The **Owner's Representative** will submit permit registration documents (PRDs) necessary for coverage under the Construction General Permit (CGP), including but not limited to: the Notice of Intent (NOI), the SWPPP, appropriate fees, and other documents required by the CGP.
- D. Prior to start of work, the Contractor shall submit for approval the names and qualifications of qualified staff designated by the Contractor to implement the SWPPP, defined by the CGP as follows:
 - 1. Qualified SWPPP Practitioner (QSP): The Contractor's QSP shall have obtained the required registrations/certifications listed in Section VII of the CGP and successfully completed the SWRCB sponsored or approved QSP training course and QSP exam.
 - 2. If the QSP is no longer employed by the Contractor or is no longer associated with the Work, the Contractor shall notify the Owner's Representative within 24 hours, designate a replacement within 48 hours, and update the Storm Water Multi-Application & Reporting System (SMARTS) within 72 hours. The replacement QSP shall have the required QSP registrations/certifications listed herein.
- E. Submit to the Engineer, completed authorization form with name of proposed Data Submitters, to obtain approval by the Owner's Representative, acting as the legally responsible party (LRP), to upload data electronically into SMARTS. The quarterly inspection reports, Annual Reports, and all sampling results shall be uploaded onto SMARTS by the QSP or designated Data Submitter, following Owner Representative's review and approval.
- F. QSP shall prepare an Annual Report summarizing corrective actions, lab reports, sampling and analyses, and any corrective actions not implemented as per Section XVI of the Construction General Permit

- covering each yearly period in accordance with the permit conditions. QSP shall upload the Annual Report to SMARTS by August 15th, or within one week of final site stabilization, and shall immediately notify the QSD and LRP of upload. LRP or their designated representative shall review and provide comments within one week of upload to SMARTS. QSP shall address comments and revise report as necessary, prior to August 27th, to allow LRP's final review and acceptance prior to Sept. 1st deadline.
- G. The SWPPP shall contain a detailed schedule of anticipated construction activities. The QSP shall update the schedule monthly or as directed by the Engineer, and shall submit updates to the QSD for incorporation into the amended SWPPP.
- H. The SWPPP shall be amended by the QSD in accordance with the Construction General Permit, such as whenever there is a proposed field modification which may affect the site drainage patterns or potential discharge of pollutants to surface waters, groundwater, or a separate municipal storm sewer system. The changes shall be recorded by amending the SWPPP in accordance with the regulatory provisions for SWPPP amendment. The SWPPP shall also be amended to incorporate new measures whenever existing measures are deemed ineffective by the QSP, the QSD or regulatory agency inspectors. SWPPP amendments shall be performed and submitted to SMARTS by the QSD. The Contractor's designated QSP shall submit written notification of field modifications to the QSD for his use in amending the SWPPP, within 48 hours of their implementation.
- I. If directed by the Engineer or requested in writing by the Contractor and approved by the Engineer, changes to the pollution control measures specified in the SWPPP will be allowed, provided they comply with the CGP. The Contractor's designated QSP shall submit written documentation of these changes to the QSD for amendments to the SWPPP, within 48 hours of their implementation.
- J. The QSP shall perform all sampling and analyses required by the CGP and the SWPPP. QSP shall sample runoff regardless of whether the total rainfall exceeds the CGP qualifying storm event, but only needs to report the readings taken during a qualifying storm. Sampling and testing of water quality (discharges) shall be performed in accordance with sampling and analysis requirements of the CGP. In the event of exceedances, QSP shall immediately notify the QSD, and initiate corrective action. Documentation of such an event shall be submitted to QSD in writing within 24 hours.
- K. For potential violations of the NPDES permits, Contractor shall notify the Owner's Representative and initiate corrective action, documenting activity as required by law.
- L. The Contractor shall keep a copy of the approved SWPPP at the job site. The SWPPP shall be made available when requested by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests from the public shall be directed to the Engineer.
- M. Contractor shall notify the QSD of any RWQCB inspections within 24 hours of the inspection. The Contractor shall submit written notification to the QSD of any findings by the RWQCB, including verbal warnings.
- N. Contractor shall provide all information required to complete the SWPPP within 15 calendar days of when the contract is approved or prior to the issuance of the notice to proceed (whichever is sooner). This information shall include, but not be limited to, the following:
 - 1. List of subcontractors and material suppliers, SWPPP Section 103.2
 - 2. Construction schedule, SWPPP Section 105.1
 - 3. Project Work/Business hours, SWPPP Section 107.4
 - 4. List of sampling equipment (field meters), SWPPP Section 107.6.3
 - 5. Laboratory information, SWPPP Section 107.6.5
 - 6. Identify Data Submitters, SWPPP Appendix B

- O. After project initiation, as per the scheduling or deadlines outlined in the SWPPP, the Contractor shall submit to the Owner's Representative all data, reports, and other information required to fulfill the requirements of the SWPPP, which will include but not be limited to, the following:
 - 1. Verification that rain gauge has been installed, Section 107.2.2
 - 2. CSMP Weather Reports, Attachment 1
 - 3. Contractor personnel training for inspectors, and samplers, Section 103.3
 - 4. Rain Event Action Plan (prior to predicted storm event), Section 106.2
 - 5. NAL Exceedance notification to QSD and Approved Signatory and submit to SMARTS within 10 days of conclusion of storm event, Section 107.7.7
 - 6. NAL Exceedance report (if required by Regional Board), Section 107.7.7
 - 7. Non Compliance Report (if required), Section 109.3
 - 8. Annual Report
- P. Upon request, the Contractor shall provide copies of all inspection reports for the project to the Owner's Representative within 24 hours of such request.

1.5 **QUALITY ASSURANCE**

A. Comply with all applicable permits, laws, and the approved SWPPP.

2. PRODUCTS – Not Used

3. EXECUTION

3.1 GENERAL

- A. Contractor shall not begin site disturbing activities until the SWPPP has been approved for use, uploaded to SMARTS and a Waste Discharge Identification (WDID) Number received.
- B. Implementation of SWPPP measures shall be the first order of business upon site mobilization.
- C. The Contractor shall exercise every reasonable precaution to protect the watercourses within the Project area from pollution, including fuels, garbage, oils, chemicals, and other harmful materials, and shall conduct and schedule the operations so as to avoid introduction of these materials into the watercourses, in accordance with the CGP. Contractor shall coordinate water pollution control work with all other Work done on the Contract.
- D. The Contractor's designated QSP shall be:
 - 1. Responsible for implementation, repair, upgrades, or maintenance of pollution control measures.
 - 2. Responsible for sampling, monitoring, reporting, and record keeping, as outlined in the SWPPP.
 - 3. Responsible for preparation of Rain Event Action Plans (REAPs)
 - 4. Responsible for turbidity and PH testing..
 - 5. The primary contact for pollution control work.
 - 6. Have authority to mobilize crews to make immediate repairs to pollution control measures.
- E. If the QSD or QSP identifies a deficiency in any aspect of the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately (within 72 hours of identification). The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the QSD in writing, but not later than the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the Project shall be in noncompliance. Attention is directed to the Contract Documents for possible noncompliance penalties.
- F. The Contractor shall be responsible for notifying QSD, and conducting emergency response and cleanup in the event contaminated water reaches onsite catch basins, offsite catch basins, ditches, or creeks.

- All response measures shall be documented, and shall be inspected for effectiveness and maintained in good working order. Ineffective measures shall be repaired or replaced immediately at Contractor's cost and schedule expense.
- G. The weather forecast for the appropriate project's zip code shall be monitored and used by the Contractor on a daily basis. If there is any chance of rain forecast within 48 hours, the forecast shall be printed out and kept with the SWPPP. If the chance of precipitation is predicted to be greater than 50 percent, the necessary water pollution control practices shall be deployed prior to the onset of the precipitation, and monitoring shall increase, as required by law and outlined in the Construction General Permit. For Risk Level II and III locations within the project, a Rainfall Event Action Plan (REAP) shall be prepared as required by the SWPPP. The REAP shall be provided to the QSD within 72 hours of completion.
- H. The National Weather Service weather forecast is found at:

http://www.wrh.noaa.gov/mtr/

- I. The Contractor shall maintain a rain gage at the site at all times during construction. Rain gage readings shall be recorded daily and provided to the State Representative within 72 hours whenever the daily rainfall total is greater than 0.25 inches per day or whenever the rainfall is a part of a qualifying storm event as defined by the CGP.
- J. The Owner will not be responsible for delays caused by the Contractor's failure to conform to the approved SWPPP, this Section, or the CGP. The Owner's Representative may order the suspension of construction operations which create or have the potential to create water pollution, at the sole expense of the Contractor.
- K. The Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the State Specifications.

3.2 BEST MANAGEMENT PRACTICES (BMP'S)

- A. Contractor shall furnish sufficient personnel, materials and adequate equipment to perform the water pollution control maintenance work immediately and to work continuously until its completion. Water pollution control maintenance work shall consist of maintaining and replacing temporary water pollution control measures throughout the duration of the Contract until permanent stabilization measures are accepted by the Owner. Maintenance work and SWPPP shall be considered as integral functional practices to implement water pollution control.
- B. If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Owner's Representative may direct the Contractor to revise its operations and its SWPPP program. Such directions will be in writing and will specify the items of Work for which the Contractor's water pollution control measures are inadequate. No further Work shall be performed on said items until the water pollution control measures are adequate.
- C. Contractor shall be responsible throughout the duration of the Project for installing, constructing, inspecting, maintaining, removing and disposing of the water pollution control practices included in the SWPPP and any amendments thereto. Unless otherwise directed by the Engineer, the Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of Work ordered in conformance with the Contract Provisions. Requirements for installation, inspection, maintenance, removal, and disposal of water pollution control practices are specified in the Drawings, the SWPPP, the Manuals, and herein.

- D. Implementation of pollution control measures (BMPs) shall conform to the Drawings, the SWPPP, the CGP conditions, and these Specifications.
- E. Implementation of water pollution control practices may vary by season. The SWPPP, this Section, and the Manuals shall be followed for control practice selection of year round, rainy season and non-rainy season water pollution control practices.
- F. Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur or will occur during the ensuing 14 days. Non-active areas shall be protected as required within 14 days of cessation of soil disturbing activities or prior to the onset of precipitation, whichever occurs first.
- G. Contractor may be directed to apply permanent erosion control in small or multiple units as disturbed soil areas are deemed substantially complete by the QSD.
- H. Temporary and permanent BMP's shown on the Drawings represent a mandatory minimum level of treatment. Contractor shall be responsible for these BMP's in addition to all others required by the SWPPP, the CGP or as directed by the Engineer.

3.3 MAINTENANCE, INSPECTION AND REPAIR

- A. For all project Risk Levels, the QSP, or a approved substitute designated and trained by the QSP (QSP-substitute) shall inspect the site before a forecast storm (within 48 hours prior to a forecast storm), during the storm (at required intervals during extended rains), and after a storm (not later than 48 hours after rain event). Inspections shall be documented as specified in the SWPPP. Inspection forms shall be provided to the Owner's Representative within 72 hours of a request from the State Representative.
- B. Stormwater inspections shall be performed at all active areas and all areas with installed BMPs as required by permit and the SWPPP, and on a minimum weekly basis, year-round by the QSP or individual trained by the QSP. More frequent monitoring is required for rain events.
- C. Non-Stormwater inspections shall be performed quarterly by the QSP or QSP-substitute (quarterly inspection time periods are January-March, April-June, July-September, and October-December).
- D. The QSP or QSP-substitute shall conduct all inspections, sampling and analyses, as required by the CGP and the SWPPP, at all active areas and all areas with installed BMPs.
- E. If the Contractor or the Owner's Representative identifies a deficiency in any aspect of the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately (within 72 hours of identification). The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the Owner's Representative in writing, but not later than the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the Project shall be in noncompliance.
- F. Contractor shall provide Water Pollution Control training as required by the CGP. Documentation of training shall be provided to the Owner's Representative within one week of the training.
- G. The QSP shall inspect the pollution control measures to identify their effectiveness and implement repairs as required by the SWRCB.
- H. Contractor shall furnish sufficient personnel, materials and adequate equipment to perform the water pollution control maintenance work immediately and to work continuously until its completion. Water pollution control maintenance work shall consist of maintaining and replacing temporary water pollution control measures throughout the duration of the Contract until permanent measures are accepted by the Owner's Representative. Maintenance work and SWPPP shall be considered as integral functional practices to implement water pollution control. Failure to fully comply with the requirements

- of the Construction General Permit shall subject the Contractor to all fines, damages and job delays incurred due to failure to implement and properly update the SWPPP.
- If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Owner's Representative may direct the Contractor to revise its operations and its SWPPP program. Such directions will be in writing and will specify the items of Work for which the Contractor's water pollution control measures are inadequate. No further Work shall be performed on said items until the water pollution control measures are adequate and, if also required, a revised SWPPP program has been accepted.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. SWPPP Implementation is a lump sum pay item.

4.2 PAYMENT

- A. SWPPP Implementation will be paid for at the contract lump sum price for SWPPP Implementation, which will be considered payment in full for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work necessary to implement and maintain SWPPP measures and controls, including, sampling, analysis, reporting, and maintenance and removal of the measures through the end of the rainy season following completion of construction activities and submittal and approval of the Notice of Termination (NOT).
- B. During each estimated period the Contractor fails to conform to the provisions in this section, or fails to implement the control measures (BMPs) shown on the Drawings or specified elsewhere in these Specifications as items of work, the RCD will withhold 25 percent of the payment for that phase of the SWPPP implementation.
- C. Withholds for failure to perform SWPPP work will be in addition to all other withholds provided for in the contract. The RCD will return performance-failure withholds in the progress payment following the correction of noncompliance.
- D. Separate payment will not be made for implementation of BMPs in areas outside the project area and not specifically provided for in the SWPPP or in these Specifications.

Pay Item Pay Unit

SWPPP Implementation Lump Sum

END OF SECTION

INDEX SECTION 017123.16 CONSTRUCTION SURVEYING

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SECTION 017123.16 CONSTRUCTION SURVEYING

1. GENERAL

1.1 DESCRIPTION.

- A. The work required under this Section shall include, but is not limited to, all labor, tools, materials, equipment and incidentals required to perform construction surveying necessary to establish the lines and grades of the proposed work, as shown on the Drawings, as specified, or as directed by the Engineer.
- B. The Contractor's surveyor will be provided with the northing, easting and elevation of the control points existing in the field as shown on the Drawings. In addition, the Engineer of Record will also provide the Contractor's surveyor with the final linework file developed in AutoCAD Civil 3D. The Contractor's surveyor will be required to access AutoCAD in order to use the electronic files.
- C. The Engineer shall provide survey control for all lines and grades required for the construction of the proposed work from the established control points shown on the Drawings, as outlined below. The survey control shall be provided as one set of finished grade stakes.

1.2 WORK INCLUDED

- A. The Contractor shall preserve and protect all project survey control, construction stakes and reference points shown on the Drawings and located outside the limits of disturbance. Monuments, control or construction stakes disturbed by the Contractor shall be reestablished by the Contractor at his sole expense. The Contractor shall be responsible for procuring professional land surveying services as necessary to provide additional surveying or grade-setting required to construct this project.
- B. If the existing survey control network is disturbed, the Contractor's replacement of control points shall be performed by a California licensed Land Surveyor, or Civil Engineer authorized to practice land surveying as defined in the Professional Land Surveyors Act.
- C. The Contractor shall be solely responsible for the protection and maintenance of all existing and Contractor-established survey marks and monuments.

1.3 SUBMITTALS

A. The Contractor shall provide the name, license number, and documentation for the required minimum qualifications of the Land Surveyor to be employed by the Contractor for the Project, prior to any work being completed by the Contractor or Surveyor.

1.4 REFERENCES

A. State of California, Department of Transportation (CALTRANS) State Standard Specifications (current edition).

1.5 QUALITY ASSURANCE

- A. All Work must be performed to the satisfaction of the Engineer.
- B. The Engineer may, at his sole discretion, perform his own surveys for: verification of project control points, verification of lines and grades, and inspection of survey monument preservation. Contractor shall provide unrestricted access for the Engineer to spot-check the work. This does not relieve the Contractor of their responsibility to perform additional independent surveying, as need to complete the work.
- C. In the event that the construction staking reveals a design inconsistency or error, Contractor shall notify the Engineer immediately and shall not proceed with the work until directed by the Engineer.

2. PRODUCTS (Not Used)

3. EXECUTION

- A. The Engineer will establish the following reference points for the work shown on the Drawings.
 - 1. Staking to identify Staging Area limits.
 - 2. Offset stakes for referencing the the culvert pipe end point invert elevations.
 - 3. Offsets stakes for referencing the limits of grading.
- B. These points will be set once.
- C. Staking diagrams will be provided to the Contractor (.pdf) showing the location and elevation of all reference monuments.
- D. From this information, the Contractor shall establish all additional detailed surveys and measurements and establish markings or monuments necessary for their construction of the work, as dimensioned on the Drawings.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Construction Surveying will not be independently measured for payment.

4.2 PAYMENT

- A. No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with Construction Surveying shall be included in the contract price for related work.
- B. In the event that that Owner is required to replace control points disturbed by the Contractor in order to verify the accuracy of the Contractor's work, the cost of establishing and verifying control points disturbed by the Contractor will be borne by the Contractor. The cost of any such verification or replacement of bench marks and/or control survey points will be deducted from any monies due to the Contractor. The Contractor will not be allowed any adjustment in working days for such verification or replacement of survey control points.

END OF SECTION

INDEX SECTION 311100 CLEARING AND GRUBBING

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SECTION 311100 CLEARING AND GRUBBING

1. GENERAL

1.1 DESCRIPTION

- A. The work covered by this section consists of furnishing all labor, equipment, and materials necessary to perform the clearing and grubbing, the removal or disposal of all cleared and grubbed materials, and the filling of all grubbing holes, as specified, as shown on the Drawings, or as directed by the Engineer.
- B. Related Sections
 - 1. Section 015000, Mobilization
 - 2. Section 312316, Excavation
 - 3. Section 312323, Engineered Fill

1.2 REFERENCES

A. State of California, Department of Transportation (CALTRANS) State Standard Specifications, current edition.

2. PRODUCTS - Not Used

3. EXECUTION

3.1 CLEARING

- A. General. All work shall comply with Section 16, Clearing and Grubbing of the Standard Specifications.
- B. All trees, stumps, down timber, snags, brush, vegetation, old piling, stone, concrete rubble, abandoned structures, and similar debris shall be cleared within the limits of the construction extents, unless otherwise shown on the Drawings or directed by the Engineer.
- C. In areas where grubbing is not required, the clearing operations shall consist of the complete removal of all obstructions above the ground surface.
- D. Downed plant materials shall be removed from tree protection zones and protected natural resource areas by hand or with equipment located outside fencing. Contractor shall extract debris by lifting the material out, not skidding it across the soil surface,
- E. Trees. Where trees are approved for removal, trees shall be felled in such a manner as to avoid damage to trees left standing, to the existing structures and installations, as well as with due regard for the safety of employees and others. Stumps shall be removed to minimum depth of 4 feet, or to a point where remaining roots are less than 1.5 inches in diameter, whichever depth is greater. Trees located beyond the limits for clearing and grubbing that are not marked for removal, shall be protected from damage, as indicated on the Drawings and as specified.

- F. Vegetation. Vegetation to be removed shall consist of all heavy growth of brush and woody vegetation, unless shown otherwise on the Drawings or directed by the Engineer.
- G. Debris Removal. Abandoned foundations, rip rap, drainage materials, debris, and other unsuitable material and any other debris designated for removal on the Drawings shall be removed and disposed of in accordance with this section. Buried unsuitable debris encountered during excavations shall be removed and disposed of in accordance with Section 312316, Stripping and Excavation.

3.2 GRUBBING

- A. General. Grubbing shall consist of the removal of all stumps, roots, buried logs, old piling, old paving, concrete, abandoned utilities, timbers, fencing, and other objectionable matter encountered.
- B. Limits. Except as noted on the Drawings, the entire area within the limits of the footprint of the proposed grading limits, shall be thoroughly grubbed.
- C. Filling of Holes. All holes caused by grubbing operations, except in borrow areas, shall be excavated with 3 to 1 (horizontal to vertical) side slopes in conformance with Section 312316, Stripping and Excavation. The excavation shall then be backfilled with compacted embankment material in conformance with Section 312323, Engineered Fill.

3.3 DISPOSAL OF DEBRIS

- A. Cleared and Grubbed Materials. Except as hereinafter specified or otherwise indicated on the Drawings, all logs, brush, strippings, concrete, asphalt, timbers, slash, and other non-organic debris which are the products of the clearing and grubbing operations shall be disposed of. Remove any or all of the products of clearing and grubbing operations from the site and dispose of the material at other locations or through other sources arranged for, by, and at the expense of the Contractor, in accordance with applicable laws and ordinances.
- B. Clean woody plant material products of the clearing and grubbing operations not designated for salvage may be chipped and disposed of on site at the location shown on the Drawings, or as specified by the Engineer, subject to approval of the Owner.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Clearing and Grubbing will be measured as a lump sum pay item.

4.2 PAYMENT

- A. Clearing and Grubbing will be paid for at the lump sum contract price, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the clearing and grubbing operation as specified, including disposal or salvage of materials, and restoration of ground surfaces.
- B. Removal and disposal of buried debris, not encountered during grubbing operations, will be paid for in accordance with Section 02222, Excavation Unsuitable Debris.

C. Payment will be made under:

<u>Pay Item</u> <u>Pay Unit</u>

Clearing and Grubbing Lump Sum

END OF SECTION

INDEX SECTION 312316 STRIPPING AND EXCAVATION

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SECTION 312316 STRIPPING AND EXCAVATION

1. GENERAL

1.1 Description

- A. The work covered by this section consists of furnishing all labor, equipment, materials, and performing all operations necessary to complete Stripping and Excavation, as specified in the geotechnical report, as shown on the Drawings, or as directed by the Engineer. Work includes, but is not limited to the following:
 - 1. Stripping for removal of vegetation and surface organics.
 - 2. Excavation for removal of unsuitable material.
 - 3. Pond Excavation
 - 4. Topsoil salvage, storage and replacement
 - 5. Clay layer salvage, storage and replacement
 - 6. Other miscellaneous excavation incidental to the construction of the improvements.
- B. Over-excavation for placement of RSP (angular stone) is not included within this section, but is considered incidental to the work for which it is required.
- C. Related Sections
 - 1. Section 311100, Clearing and Grubbing
 - 2. Section 312323, Engineered Fill

1.2 References

- A. State of California, Department of Transportation (CALTRANS) State Standard Specifications (current edition).
- B. Geotechnical Engineering Investigation by:

CMAG Engineering, Inc.

PO Box 640

Aptos, CA 95001

(831) 475-1411

Job No. 16-139-SM

Dated: March 24, 2017

1.3 Quality Assurance

- A. Comply with all applicable permits and regulations.
- B. Contractor shall provide necessary construction staking and references points, as required to meet the specified tolerances for the work.

2. PRODUCTS – SECTION NOT USED

3. EXECUTION

3.1 General

- A. The Contractor shall protect existing utilities in performing any excavation work.
- B. The Contractor shall comply with all permit conditions in performing any excavation work.
- C. Contractor shall perform an independent earthwork estimate for the purpose of preparing bid prices for earthwork. Quantities indicated on the Drawings are approximate estimates provided only for permitting purposes and are not suitable for bidding purposes.
- D. The bid price shall include costs for any necessary export and proper disposal of excess or unsuitable earth materials off-site, at locations to be arranged and paid for by the Contractor.

3.2 Stripping

- A. Stripping. Strip surfaces of excavations and fill foundations of heavy growth of crops, grass, weeds and other vegetation as specified in Section 311100, Clearing and Grubbing. Greater depths of stripping may be necessary in selected areas to remove vegetation, as determined by the Engineer.
- B. Unless otherwise specified, the stripped materials shall be disposed of off-site, at locations to be arranged and paid for by the Contractor

3.3 Topsoil (salvage for protective layer)

- A. Topsoil work shall consist of excavating, windrowing or stockpiling topsoil, removing from windrows or stockpiles, spreading, and compacting topsoil as shown on the Drawings, as specified, or as directed by the Engineer.
- B. Topsoil shall be obtained from sources within the project as shown on the Drawings, as specified, or as directed by the Engineer.
- C. Attention is directed to Section 311100, Clearing and Grubbing, regarding the clearing of vegetation. Excavating topsoil shall not be performed in an area until clearing and grubbing has been completed in that area.

- D. Topsoil for the protective layer shall be obtained by removing the upper 6 inches (minimum) of highly organic material that includes all sod and plant material and removed from the site. The material between 6 inches and 12 inches below grade shall be salvaged for use as the protective layer over the clay liner. This material shall be stockpiled onsite at locations approved in writing by the Engineer and shown on the Drawings.
- E. Upon completion of the rough grading and clay layer placement, the protective layer shall be spread to a uniform depth of not less than 12 inches and compacted to the finished grade elevations shown on the Drawings, to the recommendations of the geotechnical report.
- F. Topsoil shall be placed on the designated areas and amended as specified before seeding or erosion control materials are applied.

3.4 CLAY (salvage for clay layer)

- A. Clay Salvage work shall consist of excavating, windrowing or stockpiling clay material, removing from windrows or stockpiles, spreading, and compacting clay material as shown on the Drawings, as specified in the geotechnical report, or as directed by the Engineer.
- B. Clay shall be obtained from sources within the project as shown on the Drawings, as specified in the geotechnical report, or as directed by the Engineer.
- C. Clay material shall be obtained by excavating and sorting of material from proposed excavation and embankment areas where shown on the plans or designated by the Engineer. The clay material, approved for use as a clay liner, shall be stockpiled onsite at locations approved in writing by the Engineer and shown on the Drawings.

3.5 Excavation

- A. General. Excavations shall extend into firm, undisturbed native soils as outlined in the geotechnical report. Excavation shall consist of removal of material for embankment foundation preparation, mass excavation and finish grading of the ponds, and other miscellaneous excavations to the lines and grades shown on the Drawings, or as directed by the Engineer. In the event that organic materials, yielding sub-grade (pumping) or other deleterious materials are encountered during foundation excavations, they shall be removed as directed by the Engineer.
- B. Control of Water. Water control shall be performed in accordance with project permit conditions, and Dewatering, Section 312319 of these Specifications. When water is encountered, either ground water or surface runoff, the Contractor shall furnish, install, maintain, and operate all necessary machinery and equipment required to keep the excavation reasonably free from water, as approved by the Engineer, until the placement of backfill material has been completed, inspected, and approved, and all danger of flotation and other

damage is removed. Water pumped from the excavation shall be disposed of in such manner as will not cause injury to public or private property, or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the Engineer. Water shall be controlled until work is complete.

- C. Excess Excavation. Care shall be exercised by the Contractor not to excavate below the grades shown on the Drawings, except as specified herein, and as directed by the Engineer. All excavations in excess of the grades shown on the Drawings which are not directed by the Engineer shall be backfilled with compacted embankment at the Contractor's expense, per Section 312323, Engineered Fill.
- D. Temporary Excavations. With exposure and drying, on-site soils may experience progressive sloughing if excavated near vertical and left un-shored during construction.
- E. Tolerances. The excavation tolerance shall typically be +0.1 feet to -0.2 feet from the grades shown on the Drawings, except within the low flow channel, where excavation tolerance shall be +0.1 feet to -0.1 feet from the elevations shown on the Drawings.

3.6 Unclassified Excavation.

A. Unclassified Excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature, which is not otherwise classified and paid for under Excavation of Unsuitables or Rock Excavation described below. Unclassified Excavation includes excavation required to reach finished grade. Over-excavation for the placement of materials (clay layer and protective/topsoil layer) or the removal of unsuitables, as described below under Excavation of Unsuitables, is not included in Unclassified Excavation.

3.7 Excavation of Unsuitables.

- A. Excavation of Unsuitables. Areas of unsuitable in-place soils, as determined by the Engineer, may also be encountered. Material shall not be classified as unsuitable solely based on moisture content. Material within the limits of Excavation, as described above under Unclassified Excavation, or within the limits of over-excavation for the placement of materials shall not be classified as unsuitable. The Contractor shall anticipate having to over-excavate areas of unsuitables as directed by the Engineer and dispose of materials. The actual locations of these excavations will be determined in the field by the Engineer. The side slopes of the excavations shall be no steeper than 1 to 1 (horizontal to vertical). The over-excavations shall be backfilled with embankment materials in accordance with Section 312323, Engineered Fill.
- B. Disposition of Unsuitable Materials. The excavated materials that are considered unsuitable based solely on moisture content shall be processed as necessary to meet specification requirements for suitability and used as embankment material. Materials which are unsuitable

based on organic content will be ordered wasted and shall be disposed of off-site in accordance to Section 7-1.13, "Disposal of Material Outside the Highway Right of Way", of the State Standard Specifications.

3.8 Rock Excavation

A. Rock Excavation. Rock excavation consists of the removal of hard igneous, metamorphic, and/or sedimentary rock in solid beds or masses in original or stratified position which can be removed only by continuous drilling, blasting or the use of pneumatic tools, and all boulders of 5 cubic yards in volume or larger. Material which can be loosened with a pick, frozen materials, soft laminated shale and hardpan, which for convenience or economy is loosened by drilling, blasting, wedging or the use of pneumatic tools, removal of concrete pavement and retaining walls, shall not be classified as rock excavation. When rock is encountered within the limits of the excavation, immediately notify the Owner and Engineer and do not proceed further until instructions are received and measurements made for the purpose of establishing the volume of rock excavation. Contractor shall note that blasting is not approved for this project. The need for specialized rock excavating equipment should be anticipated if rock is encountered.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Stripping. Stripping will not be separately measured for payment.
- B. Topsoil (Salvage for Protective Layer). Topsoil will not be separately measured for payment.
- C. Clay (Salvage for Clay Layer). Clay material will not be separately measured for payment.
- D. Unclassified Excavation. Unclassified Excavation will be measured by the cubic yard of Unclassified Excavation, based on the Dimensions shown on the Drawings. Unclassified Excavation is a Final Pay Item in accordance with Section 9-1.02C "Final Pay Item Quantities" of the Standard Specifications. Where the dimensions of any portion of the work are revised by the Engineer, or a portion of the work is eliminated, the change will be measured by the cubic yard.
- E. Excavation Unsuitable Materials. Excavation to remove materials that are designated by the Engineer as unsuitable for reuse will be measured by the cubic yard from the stripped foundation. Measurement will be based on surveyed cross sections before and after the excavation.
- F. Rock Excavation. Rock Excavation will be measured by the cubic yard of rock excavation, as determined by cross sections surveyed before and after the excavation

- G. Other Miscellaneous Excavations. All other excavations will not be measured for payment.
- H. Surveys: Construction staking will not be separately measured for payment.

4.2 PAYMENT

- A. Stripping. No separate payment will be made for stripping. All costs in connection with this work will be considered incidental to the contract price per cubic yard for Excavation.
- B. Topsoil (Salvage for Protective Layer). No separate payment will be made for excavating, windrowing or stockpiling, removing from windrows or stockpiles, spreading, and compacting topsoil. All costs in connection with this work will be considered incidental to the contract lump sum price for Unclassified Excavation.
- C. Clay (Salvage for Clay Layer). No separate payment will be made for excavating, windrowing or stockpiling, removing from windrows or stockpiles, spreading, and compacting clay material. All costs in connection with this work will be considered incidental to the contract lump sum price for Unclassified Excavation.
- D. Unclassified Excavation, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete Unclassified Excavation, as specified, including mass excavation and finish grading of channel banks and floodplains, to the lines and grades shown on the Drawings.
- E. Excavation Unsuitable Materials, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the excavation as specified, including dewatering, all handling of materials, and disposal of unsuitable materials.
- F. Rock Excavation, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the Rock Excavation as specified, including dewatering, all handling of materials, and disposal of unsuitable materials.
- G. No separate payment will be made for other miscellaneous grading incidental to the work. All costs in connection with this work will be considered incidental to the cost of construction of associated improvement.
- H. Surveys: No separate payment will be made for surveys or construction staking. All costs in connection with this work will be considered incidental to the contract price per cubic yard for Excavation.
- Mixing and offhaul of suitable materials for reuse or shall be paid for under Engineered Fill, Section 02226.

J. Payment will be made under:

<u>Pay Item</u> <u>Pay Unit</u>

Unclassified Excavation Cubic Yard (F)

Excavation – Unsuitable Materials Cubic Yard

Rock Excavation Cubic Yard

END OF SECTION

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SECTION 312319 DEWATERING

1. GENERAL

1.1 DESCRIPTION

- A. Furnish all labor, materials, equipment, and incidentals necessary to design, construct, operate, maintain, and remove all cofferdams, flumes shoring, diversions, filtration systems and/or other measures, including pumping, to dewater the construction site 24 hours a day during the entire field construction period, as shown on the Drawings, as specified, or as directed by the Engineer.
- B. Dewatering details on the Drawings (if provided) are schematic. The design and implementation of the Dewatering Plan is solely the responsibility of the Contractor.
 Contractor shall make their own independent evaluation of water sources (surface and groundwater) in preparing their Dewatering Plan.
- C. Dewatering shall comply with all project permit conditions, applicable laws and local ordinances.

1.2 RELATED SECTIONS

- 1. Section 015713.01, Fiber Roll
- 2. Section 015713, Temporary Erosion Control and BMP's

1.3 SUBMITTALS

1.4 QUALITY ASSURANCE

A. Comply with all applicable permits and regulations.

2. PRODUCTS

2.1 MATERIALS

- A. General. The Contractor shall be responsible for sizing and design of well points, pumps, drains, pipes and other dewatering facilities. Comply with Drawings and regulatory requirements.
- B. Imported Rock. Use only clean washed rock.
- C. Dewatering Facilities. Provide and operate dewatering facilities of suitable size and capacity. The use of equipment shall be consistent with the manufacturer's recommendations.
- D. Silt Fence. Comply with Section 015713.02, Silt Fence.

3. EXECUTION

3.1 GENERAL

A. Contractor is solely responsible for the design, construction, and maintenance and monitoring of the dewatering facilities. Comply with the Drawings, Specifications, and applicable permit conditions.

3.2 SEDIMENT CONTROL

- A. Materials. Earthen materials shall not be used within the flowing channel, with the exception of clean, washed rock.
- B. Discharge of diverted flow. Unless otherwise specified, a diversion must discharge into the same natural drainage way in which its headworks are located. Construct energy dissipators at diversion outlets, where necessary to prevent erosion at point of discharge.
- C. Discharge of Seepage/Groundwater. Discharge water from the dewatered construction site either by gravity or pumping in a manner to prevent excessive turbidity from entering Butano or Pescadero Creeks and to prevent scour and erosion outside of the construction site. Pumped water should be pre-filtered with sand/gravel pack around sumps for subsurface flows and a silt fence or hay bales around pumps for surface flow.
- D. Discharge pumped water into isolated local depressions, or temporary sediment basins. Where discharging water into the creek will create excessive turbidity, route water through a sediment interceptor or other facilities to remove sediment from water.

3.3 HAZARDOUS MATERIAL CONTROL

- A. General. Comply with the approved Hazardous Materials Control and Spill Prevention Plan (HMC&SPP) in accordance with Construction Facilities and Temporary Controls, Section 01500.
- B. Equipment and Lubricants. Steam-clean all equipment prior to its use. Inspect all equipment for cleanliness and fluid leaks prior to use and monitor during its use. Maintain equipment as required. Equipment refueling shall only take place in a designated, contained area.
- C. Isolation of Construction Area. Prior to performing work within flowing water, outside of cofferdams, install oil containment booms downstream of the work area. Maintain booms until completion of the work within the channel is complete.
- D. Spills. Maintain a supply of oil spill booms, sorbent pads, and other supplies to contain and clean spills. Comply with approved HMC&SPP should spills occur.

3.4 COFFERDAMS

A. General. The Contractor is solely responsible for the design, construction, maintenance, and monitoring of cofferdams, dikes and other isolation facilities. Cofferdams with an exposed height greater than 10 feet shall be designed by a Professional Engineer registered in the State of California, based on available soil data.

- B. Configuration. Cofferdam alignments, as shown on the Drawings, reflect the maximum allowable encroachment into the channel. Construct cofferdam alignments as shown or the Drawings, unless otherwise approved by Engineer. Provide cofferdams high enough to account for water surface fluctuations.
- C. Secondary Dikes/Seepage Control. Secondary dikes within the isolated construction area can be used to control seepage and groundwater around excavations, provided all dike materials are removed from the exposed channel upon completion, prior to re-watering the work area.

3.5 **DEWATERING**

- A. General. Remove water from construction area using pumping, well points, drains, or other approved methods. Discharge of water shall comply with 3.2.D. Construction water shall be segregated from seepage water and routed through sediment interceptors or other facilities to remove contaminants and sediment. Excavated slopes in the saturated soils may need to be retained, tied back, or otherwise stabilized. Refer to the Geotechnical Report.
- B. Well Points. Well points shall be designed to preclude the loss of fine soil by sand/gravel packing or other suitable means.
- C. Pumping Facilities. All pump intakes shall be screened to prevent the entrainment of fish, in accordance with project permit conditions. Pumps and discharge piping shall be suitable for the type of service provided and shall be a sufficient size and capacity to satisfactorily dewater work areas. Engines shall be muffled to avoid excess noise and pump intakes shall be fitted with screens as required.
- D. Power Supply. Consider the availability and reliability of power sources for dewatering operation in dewatering system design and make provisions for temporary or backup power supply as deemed necessary. Where the primary diversion is operated by pumping, provide a backup system with automatic controls capable of starting the backup upon failure of the primary system.
- E. Groundwater. Dewatering shall maintain water surfaces below the base of temporary excavations or trenches, to allow for visual inspection of the work, if requested by the Engineer. Lower groundwater tables within excavations for structures to a minimum of two (2) feet below foundations or as otherwise required to establish a firm, stable foundation. Control groundwater within excavation until completion of backfill operations.

3.6 WATER LEVELS DURING THE CONSTRUCTION PERIOD

- A. The Contractor shall be responsible for making an independent evaluation of site conditions. The Contractor's dewatering plan shall address all potential sources of surface and groundwater, including but not limited to overland flow (natural or managed), domestic water lines, irrigation tailwater, seepage, and direct rainfall.
- B. Construction Dewatering. Groundwater in excavations is discussed in the Geotechnical Report.

3.7 CLEANUP

A. Thoroughly clean up area to remove debris and contaminated materials. Remove fine sediments and restore disturbed area prior to removal of the dewatering facilities. Clean and round river run gravels or cobbles, if used in cofferdam construction, may be spread in the creek channel in lieu of removal, provided grading will not interfere with facility operation.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Dewatering will not be separately measured for payment.

4.2 PAYMENT

A. No separate payment will be made for Dewatering. Full compensation for all costs associated with this work, as shown on the Drawings, as specified, or as directed by the Engineer shall be included in the contract price for related work.

END OF SECTION

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SECTION 312323 ENGINEERED FILL

1. **GENERAL**

1.1 **DESCRIPTION**

- A. The work covered by this section consists of furnishing all plant, labor, and materials, and performing all operations necessary for the construction of Engineered fills (unless separately designated elsewhere), including surveying, salvage and placement of topsoil and clay materials, subgrade preparation, furnishing, loading, and on-site and off-site hauling of materials, processing, screening placement and compaction of Engineered Fill materials, construction of ramps, and other incidental earthwork as may be necessary to complete the Engineered Fills, as specified in the Geotechnical Report, as shown on the Drawings, as specified, or as otherwise directed by the Engineer.
- В. All grading shall comply with Section 19 of the Standard Specifications, and with the recommendations of the Geotechnical Investigation. Prior to beginning work, the Contractor shall be familiar with the geotechnical investigation. In the event of discrepancy between the report and the notes herein, the report shall prevail. It shall be the responsibility of the Contractor to visit the site and make his own interpretations with regard to materials, methods and equipment necessary to perform the work required for this project.
- C. Temporary erosion control and BMP's shall be installed and approved by the Engineer prior to beginning Engineered Fill Construction.
- D. The Contractor is responsible to locate, identify, and protect all existing utilities from damage.

1.2 **RELATED SECTIONS**

- 1. Section 312316, Stripping and Excavation
- 2. Section 311100, Clearing and Grubbing

1.3 **REFERENCES**

A. Geotechnical Engineering Investigation by:

> CMAG Engineering, Inc. PO Box 640 Aptos, CA 95001 (831) 475-1411 Job No. 16-139-SM

Dated: March 24, 2017

В. American Society for Testing of Materials (ASTM) Standards:

> Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Moistures Using 10 lb (4.54 kg) Rammer and 18-inch (457 mm) Drop

D2974	Test Method for the Organic Content of Soils
D6938	In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
D4318	Test Method for the Liquid Limit and Plastic Limit of Soils
D422	Particle-Size Analysis of Soils

- C. State of California, Department of Transportation (CALTRANS) State Standard Specifications, current edition.
- D. Surveys. All construction staking shall be performed by the Contractor. Survey control points are shown on the Drawings.
- E. NRCS Construction Specification 903 Engineered Fill, current edition.

2. PRODUCTS

2.1 MATERIALS

- A. Engineered Fill Materials. To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent engineered fill. The suitability of materials for specific purposes will be subject to the approval of the Engineer, as outlined in the geotechnical report, and in conformance with these specifications.
- B. Topsoil (Protective Layer for Pond Liner). To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of the top soil/protective layer. The suitability of materials for specific purposes will be subject to the approval of the Engineer, as outlined in the geotechnical report, and in conformance with these specifications.
- C. Clay (Clay Layer for Pond Liner). To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of the Clay layer. The suitability of materials for specific purposes will be subject to the approval of the Engineer, as outlined in the geotechnical report, and in conformance with these specifications.
- D. Surplus Materials. All surplus or unsuitable excavated materials will be designated as waste and shall be disposed in accordance with Section 312316, Excavation.
- E. Imported Engineered Fill. Importing of Engineered Fill material, if necessary or required to meet the grades and elevations shown on the plans, shall be considered included in the Contractor's bid for the various items of work involved and no additional compensation will be made therefore. Should such imported material be required, the Contractor shall notify the Engineer of the borrow site location at least 72 hours in advance, and provide an adequate sample size so the Engineer can verify the suitability of the material. All imported materials shall be proposed by the Contractor in writing in accordance with the submittal requirements of these Special Provisions and the Standard Specifications. The Contractor shall perform and/or submit all material testing reports and other data as necessary to provide the Engineer with established laboratory

- values for optimum moisture and maximum dry density, for any imported material requiring density testing. Any proposed engineered fill that deviates from the criteria stated herein, shall have written acceptance from the Engineer and geotechnical engineer prior to import or placement in the work.
- F. If a disagreement between the Contractor and the Engineer occurs over the suitability of materials, the Contractor shall perform laboratory testing to demonstrate compliance with the specifications. The failure of the Contractor to perform the testing shall not relieve the Contractor from the obligation to provide suitable materials.

3. EXECUTION

3.1 ENGINEERED FILL CONSTRUCTION

- A. General. Compacted Engineered Fill in Engineered Fills shall be placed in the dry and compacted as specified herein.
- B. Subgrade Preparation. Following Clearing and Grubbing, the subgrade surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the Engineered Fill, and the surface materials of the subgrade shall be compacted and bonded with the first layer of Engineered Fill.
- C. Surfaces for fill placement shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the Engineered Fill can be compacted against them to ensure a good bond between the fill and the subgrade. Fill shall not be placed until the required excavation and subgrade preparation has been completed.
- D. Fill shall not be placed on or in standing water, nor upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.
- E. If soft, wet, or pumping subgrade soils are present, the Engineer shall provide subgrade stabilization recommendations in the field during grading. Recommendations may include stabilization fabric, overexcavation, or placement of rock.
- F. Horizontal Layer Construction. The compacted Engineered Fill shall be constructed to a sufficient section so as to achieve the required compaction throughout the finished section. Materials to be compacted shall be placed or spread in layers not more than eight (8) inches in loose thickness prior to compaction. Materials excavated to form keyways or over-excavations, and suitable for use as Engineered Fill, shall be blended uniformly with other excavated soils or disposed of. All fill shall be keyed and benched as specified in the Geotechnical Report.
- G. Compaction. When, in the opinion of the Engineer, the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be scarified to a depth of 6 inches before the succeeding layer is placed thereon. The degree of compaction required is expressed as a percentage of the maximum dry density, based on laboratory test procedure, ASTM D 1557. The Engineered Fill shall be compacted to a minimum of 90% of the maximum dry density, unless otherwise specified in the geotechnical report, or as directed by the Engineer. Construction equipment shall be operated over each layer of fill to ensure that the required compaction is obtained. Special equipment shall be used if needed to obtain the required compaction. Heavy compaction equipment

shall not be operated within 2 feet of any structure. Fill adjacent to structures, pipe, conduits, and anti-seep collars shall be compacted to a density equivalent to that of the surrounding fill by means of hand tampers or plate vibrators. Hand directed tampers or compactors shall be used on areas not accessible to heavy compaction equipment, fills compacted in this manner shall be placed in layers not greater than 4 inches in thickness before compaction, and shall meet the same density requirement as for the adjacent area. All compaction testing shall be performed by the Owner, unless otherwise noted. The cost of re-testing of areas that have failed to meet specified compaction requirements shall be borne by the Contractor.

- H. Compaction of backfill adjacent to structures shall not be started until after the expiration of the following minimum time interval after placement of the concrete:
 - 1. Anti-seep, collars, conduits, and cantilever outlet bents

3 days

- I. Moisture Control. The moisture content required is expressed as a percentage, based on laboratory test procedure ASTM D 1557. The moisture shall be uniformly distributed throughout the layer prior to compaction and shall meet the requirements of the geotechnical report. If the material is not within the required moisture content, the Contractor will be required to moisture condition the soil. The moisture conditioning of fill materials shall be performed prior to placement in the section. The final minor moisture conditioning may be made on the fill, as required. Harrowing, or other approved methods will be required to work the moisture into the material until a uniform distribution of moisture is obtained. Water applied on a layer of fill shall be accurately controlled in amount and distribution so that free water will not appear on the surface during or subsequent to rolling. If the material is too wet for proper compaction or soft and yielding sub-grade is experienced (pumping), the Contractor will be required to aerate the material to a moisture content within the desired limits prior to compaction. If the top surface of the preceding layer of compacted fill or a subgrade or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond, it shall either be removed or scarified and moistened to an acceptable moisture content prior to placement of the next layer of fill.
- J. Dressing. Engineered Fill slopes shall be dressed by over-building and cutting back to the required grade. The Contractor may compact the shoulder of each lift during the placement of fill materials to assist in the subsequent dressing of the slopes.

3.2 POND LINER CONSTRUCTION

A. General. Compacted Clay Layer and Top Soil/Protective Layer shall be placed in the dry and compacted per the recommendations of the geotechnical report.

3.3 CROSS SECTIONS AND ZONING OF MATERIALS

- A. Standard Engineered Fill Sections. The dimensions, slopes, and zoning of materials shall conform to the sections shown on the Drawings and specified herein.
- B. Zoning of Materials. Unless otherwise specified, the Engineered Fill materials shall be homogeneous. The Engineered Fill shall be free of pockets, lenses, streaks, layers, etc. of different materials.

3.4 FINISH

- A. The finished grades shall transition naturally into adjacent existing grades to provide a functional and naturalistic finished surface. Due to the complex nature of the project and the desired aesthetic and functional features, not all details can be accurately represented on the Drawings. As a result, the Contractor may be directed by the Engineer to make minor adjustments to finish grades to best achieve these results. These adjustments may include smoothing or rounding conforms, or changing slope angles or daylight points as necessary to conform to the variable geometry inherent in natural topography. Compensation for this work shall be considered as included in the price paid for the various contract items of work involved, and no additional compensation will be allowed.
- B. After the placement of the engineered fills and spoils, the sides and top shall be dressed by final passage of compaction equipment or by dragging to give a smooth surface. The surface area shall be graded to provide surface drainage to flow to desired locations.

3.5 ROADS AND RAMPS

- A. Maintain Access. At locations where access roads to existing facilities are destroyed because of the work required under this contract, the Contractor shall provide temporary roads, if directed by the Engineer, to give access to fields and buildings during the construction period. Such facilities shall be removed to the extent required by the Engineer.
- B. Temporary Haul Roads. Temporary haul roads shall be constructed as required to transport materials from borrow source or excavation to Engineered Fill site. Temporary ramps to be constructed for the Contractors convenience need not comply with these foundation preparation and Engineered Fill construction requirements. Unless otherwise directed by the Engineer, temporary ramps shall be removed prior to completion of the work.

3.6 GRADE TOLERANCES

- A. Engineered Fill:
 - 1. General. Engineered Fills shall be constructed to the net grade and cross section shown on the Drawings.
 - 2. Grade Tolerances. At all points a tolerance of 0.2 (two-tenths) foot above, and 0.1 (zero) foot below the prescribed grade will be permitted in the final dressing, provided that any excess material is so distributed that the crown of the Engineered Fill drains in the desired direction and that there are no abrupt humps or depressions in surfaces. However, this tolerance above grade may be modified at locations where, in the opinion of the Engineer, such modifications will not impair the design or appearance of the project.

3.7 SLIDES

A. In the event of the sliding of any part of the Engineered Fill during its construction, or during the one year period after acceptance, the Contractor shall, upon written order of the Engineer, cut out and remove the slide and then rebuild that portion of the Engineered Fill.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Engineered Fill. Engineered Fill will be measured by the cubic yard of Engineered Fill, based on the dimensions shown on the Drawings. Engineered Fill is a Final Pay Item in accordance with Section 9-1.02C "Final Pay Item Quantities" of the Standard Specifications. Where the dimensions of any portion of the work are revised by the Engineer, or a portion of the work is eliminated, the change will be measured by the cubic yard.
- B. Pond Liner. Pond Liner will be measured as a lump sum pay item.

4.2 PAYMENT

- A. Engineered Fill, measured as specified above will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to construct compacted Engineered Fills as specified, including hauling of excavated materials from the source.
- B. Pond Liner, measured as specified above will be paid for at the lump sum contract price, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to construct the Pond Liner as specified, including hauling of excavated materials from the source.
- C. No payment will be made for the Engineered Fill foundation preparation, shrinkage of material or materials placed above the net grades and slopes as allowance for shrinkage.
- D. No separate payment will be made for incidental grading beyond the projected toe of the Engineered Fill cross section. The cost for this work shall be included in contract unit price for compacted Engineered Fill.
- E. No payment will be made for construction or removal of temporary roads or ramps.
- F. No additional payment will be made for costs associated with stabilizing unstable materials. The cost for this work shall be included in contract Lump Sum price for compacted Engineered Fill.
- G. Payment will be made under:

Pay Item Pay Unit
Engineered Fill Cubic Yard (F)
Pond Liner Lump Sum (LS)

END OF SECTION

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SECTION 329200 SEEDING

GENERAL

1.1 DESCRIPTION

A. Work covered under this section consists of furnishing all labor, tools, materials, equipment and incidentals required to perform Seeding, as specified, as shown on the Drawings, or as directed by the Engineer.

1.2 RELATED WORK

- A. The work described under this section is related to the following sections of the Specifications:
 - 1. Section 015713, Temporary Erosion Control and BMPs
 - 2. Section 312316, Excavation
 - 3. Section 312323, Engineered Fill

1.3 SUBMITTALS

- A. Submit to the Engineer, for review, the following:
 - 1. A representative one-ounce sample of each seed mixture supplied for the job, labeled as to content, purity, and germination percentage.
 - 2. Duplicate copies of invoices for all materials.

1.4 **QUALITY ASSURANCE**

- A. All seed shall be labeled in accordance with the California Food and Agricultural Code and shall be delivered to the site in sealed individual, unmixed bags with the vendor's certificate attached. Seed treated with mercury compounds shall not be used.
- B. Seed which has become wet, moldy, or otherwise damaged in transit or in storage, will not be acceptable.

2. PRODUCTS

2.1 MATERIALS

- A. Quantities shown on the Drawings represent pure live seed (pls).
- B. Seed shall be mixed on-site in the presence of the Engineer. At no time shall the seed mix contain noxious weed seed. Seed shall be maintained in optimal health and be protected at all times from animal damage; vandalism; inclement weather conditions, including drought, wind, and frost; toxic water; sunlight; moisture; or contact with vehicles, equipment, and tools and any other conditions that would damage or reduce the viability of the seed.
- C. Seed Mix. The seed mix and application rates are as shown on the Drawings. No substitutions are allowed without written consent of the Engineer.
- D. Straw Mulch. Straw mulch shall be derived from wheat or barley. The Contractor shall furnish evidence that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw obtained from outside the county in which it is to be used is delivered to the site of the work. Straw that has been used for stable bedding shall not be

used. Straw shall be free of mold. Straw shall be cured and dry with no water added after baling. Source must meet or exceed state certification standards for "weed free".

3. EXECUTION

3.1 PREPARATION

- A. General. Seed the areas disturbed by construction activities, as specified herein or as directed by the Engineer.
- B. Debris Removal. Prior to ground surface preparation operations remove and dispose of all wire, rubbish, stones, and other material which might hinder proper grading, and subsequent maintenance.
- C. Surface Preparation. Surfaces which are too hard or smooth to accept the seeding, as determined by the Engineer, shall be broken up to a minimum depth of 6 inches, by disking or other methods approved by the Engineer, until the condition of the soil is acceptable. When conditions are such, by reason of excessive moisture or other factors, that satisfactory results are not likely to be obtained, the work shall be stopped and shall be resumed only when directed. Slopes in excess of 25% shall be prepared by track-walking or equivalent method approved by the Engineer.

3.2 APPLICATION OF SEED

- A. Existing Features. During seeding operations, care shall be taken to avoid damaging existing facilities, vegetation to remain, or any other items on or around the planting areas.
- B. Seeding Areas: Apply seed to areas indicated on the Drawings, or as directed by the Engineer
- C. Time of Seeding: Perform all seeding between September 15th and October 1st of the year construction begins. The seeding operation shall be halted when, in the opinion of the Engineer, conditions of high winds, excessive moisture or other factors are not conducive to satisfactory results. Upon written request of the Contractor, and upon written approval of the Engineer, seeding may be done during off seasons provided that:
 - 1. The resulting stand of grass shall be at least equal to the stand that might be expected from planting during the normal season; and
 - 2. The establishment period shall be lengthened, as required, to produce the above specified stand at no additional cost to the Owner.
 - 3. Perform seeding prior to placement of erosion control fabric, where erosion control fabric is specified.
- D. Method of Seeding: Seeding may be performed mechanically in a dry condition or with hydroseeding equipment, at the Contractor's option.
- E. Broadcast Seeding. Broadcast seeding may be used in lieu of hydro-seeding or to reseed any previously hydro-seeded areas disturbed during planting operations. Seed shall be dry-applied by the following method:
 - 1. Broadcast seed at the rates specified on the Drawings, uniformly by hand, mechanical hand seeder, combination seed spreader and cultipacker, or other approved equipment. Where seed is broadcast by hand or mechanical hand seeder, half the seed shall be sown with the sower moving in one direction, and the remainder sown with the sower moving at right angles to the first sowing. Broadcast seeding shall not be done during windy weather.
 - 2. Rake seed into the soil to achieve a sowing depth of approximately 1/8 inch to 1/4 inch.

3. Following the application of seed, straw mulch shall be pneumatically applied or hand broadcast at the rate of 3,000 pounds per acre (typically 1.5 to 2 tons/acre), where erosion control fabric is not specified, and 500 lbs for acre where erosion control fabric will be used.

3.3 REPAIR

- A. General. When any portion of the ground surface becomes gullied or otherwise damaged following seeding within the period of Contractor's responsibility, repair the affected portion to re-establish the condition and grade of the soil prior to planting and then reseed as specified for initial planting, all at no cost to the Owner.
- B. Reseeding. When it becomes evident that the seeding has been unsuccessful, the Engineer will require that these areas be reseeded with the same seed and quantity as specified for the initial seeding. Complete reseeding within fifteen (15) days following notification and these areas shall be maintained by watering, as specified above, until the successful grass is established. Prepare the area to be reseeded as directed by the Engineer, to receive the reseeding.

3.4 FIELD QUALITY CONTROL

A. During the course of work or upon completion of the project, a check of the quantities of materials will be made against the areas treated, and if the minimum rates of application have not been met, the Engineer will require the distribution of additional quantities of those materials to make up the minimum applications specified.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Seeding will not be separately measured for payment.
- B. Areas disturbed by the Contractor and requiring seeding outside the designated limits of disturbance shall not be measured for payment.

4.2 PAYMENT

- A. Seeding will be paid for at the lump sum contract price, which price will include furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the Seeding as specified, as shown on the Drawings, or as directed by the Engineer.
- B. The cost of seeding areas outside the designated limits of disturbance shall be solely borne by the Contractor.
- C. Payment will be made under:

Pay Item Pay Unit
Seeding Lump Sum

END OF SECTION

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SECTION 334000 STORM DRAINAGE FACILITIES

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of preservation and protection of existing utilities, furnishing and installing the subsurface and surface storm drainage facilities as shown on the Drawings, as specified herein, or as otherwise directed by the Engineer. Work includes, but is not limited to the following:

Install all storm drain pipes, culverts, headwalls, inlets, grates, outlet energy dissipaters, ballast blocks, seepage collars, Angular Stone, geotextile fabric, and perform associated structural excavation, backfill, and compaction.

B. Related Sections

- 1. Section 312316, Stripping and Excavation
- 2. Section 312323, Engineered Fill
- 3. Section 017123.16, Construction Surveying

1.2 REFERENCES

A. State of California Department of Transportation (CALTRANS) Standard Specifications

1.3 SUBMITTALS

- A. Submit to the Engineer, for review the following:
 - Certificate(s) and other material testing data as necessary to validate the source of the Angular Stone and their conformance with the Standard Specifications and these Technical Specifications. Include all applicable test results for grading, specific gravity, resistance to degradation, absorption, durability index, and soundness (as described elsewhere in these Technical Specifications).
 - 2. A representative 5 cubic yard sample of each of the proposed Angular Stone specified herein shall be provided to the Engineer for approval, ten days prior to delivery of the remainder of material to the project site. The Engineer reserves to the right to reject said materials
 - 3. Manufacturer's product data and installation instructions for specified geotextile fabrics.
 - 4. Shop drawings showing dimensions, materials, reinforcement, penetrations, etc. of the proposed pond outlet structure components.
 - 5. HDPE Pipe. Manufacturer's catalog data and installation instructions for pipe materials. A Certificate of Compliance(s) for each type of plastic pipe furnished and proposed for installation. The certificate shall also certify that the plastic pipe and joints comply with the requirements of the specifications, and shall include the resin material cell classification, unit weight of pipe, average pipe stiffness, joint property requirements, and date of manufacture. Submit the manufacturer's certification or copy of plant audits and test results from the National Transportation Product Evaluation Program (NTPEP) for the current cycle of testing for each pipe diameter furnished and its conformance with AASHTO minimum requirements.

2. PRODUCTS

A. Comply with the Drawings and Section 61 of the State Standard Specifications.

- B. Pipe. Pipe shall be Type S, conforming to the provisions in Sections 64, "Plastic Pipe" and Section 61, "Culvert and Drainage Pipe Joints" of the Standard Specifications and this Section. Pipe shall be dual-walled high-density polyethylene (HDPE) pipe with a smooth (non-corrugated) interior surface, and shall have a Manning's roughness coefficient of 0.0 12
- C. Concrete. Comply with the notes on the Drawings.
- D. Angular Stone shall conform to Section 72-2.02 Materials of the State Standard Specifications. Stones shall be sound, durable, hard, resistant to abrasion and free from laminations, weak cleavage planes, and the undesirable effects of weathering. It shall be of such character that it will not readily disintegrate from the action of air, water, or the typical conditions experienced during handling and placing. All aggregate material shall be clean and free from deleterious impurities, including alkali, earth, clay, refuse, and adherent coatings.
- E. Backfill. Backfill shall comply with Section 64-1.02 of the Standard Specifications.
- F. Galvanized Wire Rope and Connectors: Comply with the notes on the Drawings.
- G. Ballast Blocks. Comply with the notes on the Drawings.

3. EXECUTION

3.1 GENERAL

A. The drainage materials shall be installed in accordance with the manufacturer's recommendations, as shown on the Drawings, as specified herein, and in conformance with the provisions in Section 64, "Plastic Pipe" of the Standard Specifications.

3.2 ANGULAR STONE

A. Stone protection shall be installed as shown on the Drawings.

3.3 PLASTIC PIPE.

- A. Conform to the provisions in Sections 64, "Plastic Pipe" and Section 61, "Culvert and Drainage Pipe Joints" of the Standard Specifications.
- B. Plastic pipe, fittings, gaskets, and other components shall be stored in a way that protects materials from the weather, heat sources, and corrosive liquids, in addition to protection from direct sunlight by storing in containers and/or covering with tarpaulins or other suitable materials. To minimize the potential for pipe shrinkage after installation, the temperature of pipe to be laid must not be more than five (5) degrees Fahrenheit higher than the ambient temperature of the trench. Should the Contractor not provide adequate cover of the pipe or install during changes in temperature the Engineer will not accept the pipe and the Contractor will be required to replace the pipe which is deemed unacceptable by the Engineer. The Contractor will bare all costs associated with the replacement and no additional compensation will be allowed for.
- C. Pipes shall be laid to the lines and grade shown on the Plans with the sections properly jointed, following generally accepted practices, the Manufacturer's recommendations, the Standard Specifications, these Special Provisions, and as directed by the Engineer. Care shall be taken not to damage pipe sections, joints, or gaskets during assembly. Contractor shall make use of pipe lubricant, installation stub, etc. and follow manufacture recommendations to ensure all pipe sections are pushed "home." A "come-along" or other similar method should be used; construction equipment such as an excavator bucket, etc. must not have direct contact with the plastic pipe end sections unless an installation stub and large timber or other suitable cushioning medium is utilized. Excavation and backfill shall conform to Section 19-3, "Structure Excavation and Backfill", of the Standard Specifications. Attention is directed to Section 64-

- 1.02B "Backfill" of the Standard Specifications for additional information specific to the gradation of structure backfill for plastic pipes. The Contractor shall clean the interior of the pipeline as work progresses and the pipeline shall be clear and free of debris and sediment before acceptance by the Engineer.
- D. The trench shall be excavated to the depth and width as necessary to allow for proper installation of the pipe and compaction of backfill material to the lines and grades as shown on the Project Plans and applicable details. The bottom of the trench shall be graded and prepared so as to provide a firm and uniform bearing for the pipe along its entire length. Where the trench bottom or immediate adjacent side walls are unsuitable (i.e. clay, peat, soft muck/refuse or bedrock/unyielding material unable to provide long-term pipe support), the Contractor shall excavate to a depth required by the Engineer and replace with suitable material as specified or directed by the Engineer. In addition and at the discretion of the Engineer, a geotextile material may be required to stabilize the bottom of the trench. In-situ trench foundation shall be no less than 90% standard proctor; any materials placed to stabilize trench bottom foundation shall be no less than 95% standard proctor. Suitable bedding material shall be Class I or II in accordance with ASTM D2321, or accepted native soils. Minimum bedding thickness shall be 6 inches. Suitable material for the initial backfill or pipe embedment (up to minimum 12 inches above top of pipe) including the haunch area and pipe zone shall be Class I or II in accordance with ASTM D2321. The final backfill section shall be structure backfill, aggregate base, or accepted native soils, as shown on the Plan details, and in conformance with Section 19-3, "Structure Excavation and Backfill", of the Standard Specifications. Any trench backfill shall be placed in uniform lifts (not to exceed 8 inches) and shall be compacted to a relative compaction of 95 percent. Where conditions (i.e. space constraints, poor trench wall soil qualities, etc.) are cause for the Contractor's inability to achieve the backfill compaction requirements, flowable fill or controlled low strength material (CLSM) shall not be placed in the work without prior acceptance of the Engineer.
- E. In situations where the plastic pipe is placed under asphalt concrete paving or other concrete surface improvement and the cover over the pipe, from top of pipe to top to finished grade is 18-inches or less, then structural backfill shall be slurry cement backfill.
- F. Allowable joint deflection or longitudinal bending is dependent on pipe size and/or joint design, and shall not exceed the pipe manufacturer's published limits. No deflection in pipe shall be allowed without prior written acceptance by the Engineer.
- G. Where pipes are installed in manholes, drainage inlets, junction boxes or other structures, the connection shall be at least equal to that of the pipe joint performance requirements. Soil-tight pipe joints are specified, the ends of the pipes shall be placed flush or cut off flush with the inside face of the structure, and be grouted in place with hydraulic cement "non-shrink" grout, unless otherwise directed by the Engineer. Performance of the pipe, fittings, and connections is highly dependent on proper installation procedures. Installation shall be in conformance with all manufacture recommendations, the Project Plans and applicable details, the Standard Specifications, these Special Provisions, and as directed by the Engineer. The costs for these connections (including all materials, adapters, gaskets, seals, band clamps, couplings, grout, concrete collars, etc.) shall be included in the associated bid item of work and no additional compensation will be allowed for. There will be no separate payment for the connections required for a complete construction of the project.
- H. Where pipes are to connect to existing pipes, proper couplings and methods shall be utilized to connect the plastic pipe to the existing pipe (including differing sizes and material), and the connection shall be at least equal to that of the pipe joint performance requirements. The connection shall be in conformance with all manufacturer recommendations, these Special Provisions, the Standard Specifications, and as directed by the Engineer. The costs for these

couplings (including all materials, gaskets, seals, grout, concrete collars, etc.) shall be included in the associated bid item of work and no additional compensation will be allowed for. There will be no separate payment for the couplings required for a complete construction of the project.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Drainage Facilities is a lump sum pay item.
- B. Angular Stone Protection. Angular Stone Protection will be measured by the cubic yard of Stone Protection, based on the dimensions shown on the Drawings. Stone Protection is a "Final Pay Item" in accordance with Section 9-1.015 "Final Pay Quantities" of the Standard Specifications. Where the dimensions of any portion of the work are revised by the Engineer, or a portion of the work is eliminated, the change will be measured by the cubic yard.

4.2 PAYMENT

- A. Drainage Facilities will be paid for at the lump sum contract price, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the drainage facilities, as specified, as shown on the Drawings, or as directed by the Engineer.
- B. Angular Stone Protection, measured as specified above, will be paid for at the contract price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the riprap placement, including subgrade preparation, geotextile fabric, processing work, backing, rock placement, excavation and fill.

Pay Item	<u>Pay Unit</u>
Drainage Facilities	Lump Sum
Angular Stone	CY(F)

END OF SECTION

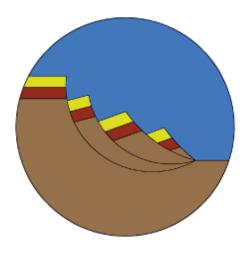
A.5 Geotechnical Investigation

GEOTECHNICAL INVESTIGATION

Butano Farms Regulating Reservoir Pescadero, San Mateo County, California

Submitted to:

Waterways Consulting, Inc. 509A Swift Street Santa Cruz, California 95060



Prepared by:

CMAG ENGINEERING, INC.

Project No. 16-139-SM March 24, 2017



CMAG ENGINEERING, INC.

P.O. BOX 640 APTOS, CALIFORNIA 95001 PHONE: 831.475.1411 WWW.CMAGENGINEERING.COM

> March 24, 2017 Project No. 16-139-SM

Waterways Consulting, Inc. 509A Swift Street Santa Cruz, California 95060

Attn: Matt Weld

SUBJECT: GEOTECHNICAL INVESTIGATION

Proposed Regulating Reservoir

Butano Farms, Pescadero, San Mateo County, California

Dear Mr. Weld:

In accordance with your authorization, we have completed a geotechnical investigation for the subject project. This report summarizes the findings, conclusions, and recommendations from our field exploration, laboratory testing, and engineering analysis. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

CMAG ENGINEERING, INC.



Adrian L. Garner, PE, GE Principal Engineer C 66087, GE 2814 Expires 6/30/18

Distribution: Addressee (4 Hard Copies; Electronic Copy)

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FIGURES AND STANDARD DETAILS

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APPENDICES

APPENDIX A

Field Exploration Program

APPENDIX B

Laboratory Testing Program

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed regulating reservoir at Butano Farms in Pescadero, San Mateo County, California.

The purpose of our investigation was to provide information regarding the surface and subsurface soil and bedrock conditions, and based on our findings, provide geotechnical recommendations for the design and construction of the proposed reservoir. Conclusions and recommendations related to geotechnical hazards, general site grading, embankment fill slopes, and the reservoir liner are presented herein.

1.1 Terms of Reference

CMAG Engineering, Inc.'s (CMAG) scope of work for this phase of the project included site reconnaissance, subsurface exploration, soil and bedrock sampling, installation and monitoring of piezometers, laboratory testing, engineering analyses, and preparation of this report.

The work was undertaken in accordance with Waterways Consulting, Inc. *Professional Services Agreement for Subconsultants* dated August 15, 2016.

The recommendations contained in this report are subject to the limitations presented in Section 8.0 of this report.

1.2 Site Location

The project site is located on the east side of Highway 1, southeast of the intersection of Stage Road and Pescadero Creek Road in Pescadero, San Mateo County, California. The site location is shown on the Site Location Map, Appendix A, Figure A-1.

1.3 Surface Conditions

The site is located on a ridge on the south side of Pescadero Creek Road. The crest of the ridge generally trends east-west. The proposed regulating reservoir is located on the south flank of the ridge in a topographical depression that descends to the south. A gully has formed within the depression, downslope of the proposed reservoir. The slope of the base of the depression, in the location of the proposed reservoir, is slight, descending to the south with an average slope of 3 to 4 degrees (5 to 7 percent). The side slopes are gentle to moderate with slopes that vary from 8 to 14 degrees (14 to 25 percent). The head of the gully is located approximately 230 feet south of the reservoir. The site is vegetated with grass and brush.

2.0 PROJECT DESCRIPTION

It is our understanding that the project consists of the construction of a 15.8-acre foot reservoir. The overall length and width of the reservoir is approximately 530 feet and 260 feet, respectively. The proposed reservoir will be achieved by cutting into the grades on the north end of the reservoir and constructing an embankment on the south end. In general, 3:1 H:V (horizontal to vertical) sides slopes (cut slopes) are proposed with 4:1 H:V embankment fill slopes. A 4:1 H:V cut slope is proposed on the north end. The embankment fill is to have an overall height of approximately 35 feet.

3.0 FIELD EXPLORATION AND LABORATORY TESTING PROGRAMS

Our field exploration program included drilling, logging, and interval sampling of 2 borings on December 9, 2016 and advancing, logging, and interval sampling of 5 test pits on November 16, 2016. The borings were advanced to depths of 11.5± feet and 15.5± feet below the existing grades. The test pits were advanced to depths varying from 6.5± feet to 10± feet below the existing grades. Two piezometers were installed and monitored from January through March 2017. Details of the field exploration program, including the Boring and Test Pit Logs, Figures A-4 through A-10, are presented in Appendix A.

4.0 SUBSURFACE CONDITIONS AND EARTH MATERIALS

4.1 General

The local geologic map (Brabb, E.E., 1993) depicts the site as underlain by Purisima Formation bedrock (Tpt; upper Miocene and Pliocene) consisting of greenish gray to white or buff, medium to very fine-grained sandstone and siltstone with some silty mudstone. The bedding is depicted as striking to the northwest, dipping 20 degrees to the northeast.

Two borings and five test pits were advanced in the vicinity of the proposed reservoir. The subsurface profile encountered in our field exploration generally consisted of colluvial soils overlying siltstone and sandstone bedrock within the depths explored. Complete subsurface profiles are presented on the Boring and Test Pit Logs, Appendix A, Figures A-4 through A-10. The boring and test pit locations are shown on the Boring and Test Pit Location Plan, Figure A-2.

Representative cross sections have been constructed based on the results of our field exploration program. See Appendix A, Figure A-11.

4.2 Colluvial Deposits - Qc

Colluvial deposits were encountered in all the borings and test pits. The deposits generally consisted of silts and clays with varying amounts of fine grained sand. The deposits varied in plasticity, consistency, and moisture. The plasticity varied from low to high and the consistency varied from stiff to hard. The results of our laboratory testing on a sample of the lean clay to silt indicated that the soil has low expansion potential. The colluvial deposits were generally moist at the time of our field exploration. The thickness of the deposits varied from approximately 2 to 8 feet thick, with the thickness increasing towards the center of the existing topographical depression (Table 1). Results of our laboratory testing are presented in Table 2.

Table 1. Thickness of Colluvial Deposits

Test Pit	Thickness (ft)
B-1	8
B-2	8
TP-1	8
TP-2	2
TP-3	2.5
TP-4	6.8
TP-5	6

Table 2. Laboratory Test Results of Colluvial Deposits - Black Lean CLAY to SILT

USCS	CL - ML
Percent Fines	92.4%
Consistency	Hard
Liquid Limit	40
Plastic Limit	14
Plasticity Index	26
Expansion Index	47
Expansion Potential	Low
Dispersive Characteristics	Intermediate to Dispersive

4.3 Purisima Formation Bedrock - Tpt

Purisima Formation bedrock was encountered in all the borings and test pits. The bedrock was encountered beneath the colluvium. The bedrock, within the depths explored, generally consisted of weathered siltstone and sandstone. The bedrock generally weathered to hard fat clay and elastic silt. The results of our laboratory testing indicated that the soil has high expansion potential. Results of our laboratory testing are presented in Table 3.

Table 3. Laboratory Test Results of Weathered Purisima Formation Bedrock

USCS	(CH - MH)	
Percent Fines	95.9%	
Cementation	Moderately Cemented	
Liquid Limit	52	
Plastic Limit	16	
Plasticity Index	36	
Expansion Index	104	
Expansion Potential	High	
Dispersive Characteristics	Non - Dispersive	

4.4 Groundwater

Groundwater was not encountered during our field exploration.

Perched Groundwater was encountered during our monitoring period over the winter of 2016 / 2017. The shallowest depth that the groundwater was encountered during our monitoring period was approximately 6 inches below grade in Piezometer P-1 in late January of 2017. It is our opinion that the groundwater was perched in the upper 4 to 5 feet.

It should be noted that groundwater conditions, perched or regional, may vary with location and may fluctuate with variations in rainfall, runoff, irrigation, and other changes to the conditions existing at the time our field investigation and monitoring was performed.

5.0 GEOTECHNICAL HAZARDS

5.1 Landsliding

5.1.1 General

The NRCS has prepared a document (NRCS, 2016) to address project feasibility as related to slope stability.

Our evaluation of the geotechnical hazards at the site are limited to a qualitative evaluation of landsliding of the steep slopes that descend to the north of the proposed reservoir. We have provided a discussion related to the steep slopes to the north of the site. We observed geomorphologic evidence of a questionable landslide to the west of the proposed regulating reservoir. We have also provided a discussion related to the potential hazards due to the questionable landslide.

Based on our limited, qualitative analysis, it is our opinion that the risk to the reservoir from landsliding is two fold:

- 1) The stability of the steep slopes to the north.
- 2) The stability of the questionable landslide to the west.

5.1.2 Steep Slopes to the North

Large scale and smaller scale slides and gullies were observed on the slope that descends to the north. We observed landsliding on the steep slope and prepared a Landslide Map (Figure 1). The features observed on the slopes are consistent with the findings of a subsurface investigation we performed at the base of the slope (CMAG, 2015). Layers of yellowish brown silty sand and sandy silt, consistent with material derived from Purisima Formation bedrock were observed in the upper 2 to 5 feet within the test pits advanced at the base of the slope.

The location of the reservoir, as depicted on Figure A-2, is set back from the steep slope to the north with the maximum water surface elevation approximately 100 feet from the crest of the slope. The subsurface profile generally consists of low permeability colluvium overlying weathered bedrock. The weathered bedrock generally consists of low permeability fat clays and elastic silts. Due to the extent of the weathering, no visible fracturing or bedding was observed within the test pits advanced for our field exploration. We recommend that a clay liner be constructed to decrease the potential for subsurface water migration. It is our opinion that the reservoir has a low potential to adversely affect the stability of the steep slopes to the north due to the location of the reservoir, the subsurface conditions, and the construction of a clay liner.

Geotechnical Investigation Butano Farms Regulating Reservoir San Mateo County, California March 24, 2017 Project No. 16-139-SM Page 6

It should be noted that we have no opinion, expressed or implied, as to the overall stability of the slopes to the north. However, as indicated above, landsliding has occurred on the slopes to the north. We did not perform a quantitative analysis of the slopes to the north, nor determine the potential for a landslide to adversely impact the reservoir. A geotechnical and geologic investigation, including, but not limited to geologic mapping, multiple small diameter borings, large diameter borings, laboratory testing, and analysis would be required to determine the stability of the steep slope. We can provide you with a proposal for such services upon request.

5.1.3 Questionable Landslide to the West

Based on our limited, qualitative analysis, it is our opinion that the regulating reservoir is located on the east margin of a questionable landslide (Figure 2). Subsurface water migration and/or modification of runoff discharge in the margin may contribute to destabilizing the landslide. Remobilization of the landslide may impact the reservoir.

Analyzing the stability of the questionable landslide was beyond the scope of our services for this project. To adequately investigate the potential for such a landslide to mobilize, re-mobilize, or to exist, a geotechnical and geologic investigation including, but not limited to, geologic mapping, numerous small diameter borings, large diameter borings, trenching, adequately spaced over the entire questionable landslide deposit, would be required. We can provide you with a proposal for such services upon request.

6.0 DISCUSSIONS AND CONCLUSIONS

The subsurface profile encountered in our field exploration consisted colluvial deposits overlying Purisima Formation bedrock.

The colluvial deposits generally consisted of silts and clays with varying amounts of fine grained sand. The thickness of the deposits varied from approximately 2 to 8 feet thick, with the thickness increasing towards the center of the existing topographical depression. Based on the results of our laboratory testing, it is our opinion that the on-site colluvium is a good candidate for use as liner. The in-situ moisture content of the colluvium, at the time of our field investigation, varied significantly. Moisture conditioning and blending of this layer, to provide a uniform material will be required prior to recompaction for use as a clay liner.

The results of our laboratory testing indicate that the weathered bedrock has a high expansion potential. Significant dessication cracking may occur if exposed.

Geotechnical Investigation Butano Farms Regulating Reservoir San Mateo County, California March 24, 2017 Project No. 16-139-SM Page 7

Shallow, perched groundwater was encountered during our monitoring period. It is our opinion that the moisture of the near surface colluvium, particularly at the base of the natural depression, will be wet (over-optimum moisture) in the rainy season, spring, and early summer.

We have provided a discussion of the risks associated with landsliding in Section 5.1.

7.0 RECOMMENDATIONS

7.1 General

Based on the results of our field investigation, laboratory testing, and engineering analysis, it is our opinion, from the geotechnical standpoint, the subject site will be suitable for the proposed development provided the recommendations presented herein are implemented during grading and construction. We do however, recommend that the risks associated with landsliding be considered and accepted by the owner. Additional geotechnical and geologic work will be required to better quantify the risks associated with landsliding. For a detailed explanation, see Section 5.1. We have provided a general summary below:

- It is our opinion that the reservoir has a low potential to adversely affect the stability of the steep slopes to the north.
- We have not provided an opinion of the potential for instability of the steep slopes to the north to adversely impact the reservoir.
- We have not provided an opinion of the potential for the questionable landslide to the west to adversely affect the reservoir.

We recommend that the reservoir be constructed with maximum side slopes (cut slopes) of 3:1 H:V (horizontal to vertical). It is our opinion that this angle will allow the liner to be placed as a continuous layer, including placement of material on the side slopes (bathtub construction). However, 3:1 H:V slopes represent the upper limit of the ability to construct the liner using bathtub construction methods. The stair step method may be required to achieve compaction.

We recommend that the reservoir be lined with the on-site black silt and clay (colluvium). We recommend that this layer be separated during excavation. The clay liner should be a minimum of 18 inches thick. The results of our laboratory testing indicate that the expansion potential of this layer is low, however, we recommend a 12 inch thick protective cover layer may be placed over the liner to help prevent the soil from drying out and provide erosion protection. Earthwork recommendations are provided in Section 7.2.2 and 7.2.3.

It is our opinion that the on-site soils are suitable for use as engineered fill to construct the embankment fill for the reservoir. We recommend that the embankment have maximum slopes of 4:1 H:V (horizontal to vertical). We recommend that rock slope protection be constructed at the toe of the downstream side of the embankment. Earthwork recommendations are provided in Section 7.2.4.

We recommend that the reservoir be constructed during the summer months due to the perched groundwater and the in-situ moisture condition of the near surface soils.

7.2 Site Grading

7.2.1 Site Clearing

Prior to grading, the areas to be developed should be stripped of any vegetation and cleared of any surface or subsurface obstructions, including any existing utility lines, stockpiled fills, and miscellaneous debris.

Surface vegetation and organically contaminated topsoil should be removed from areas to be graded. The required depth of stripping will vary with the time of year the work is done and should be observed by the Geotechnical Engineer. It is generally anticipated that the required depth of stripping will be 6 to 12 inches. See Section 7.2.4 for salvage of topsoil for use as a protective layer.

Holes resulting from the removal of buried obstructions that extend below finished site grades should be backfilled with compacted engineered fill compacted to the requirements of Subsection 7.2.2.

7.2.2 Preparation of the Clay Liner

The black silt and clay (colluvium) should be separated from the remaining on-site soils during excavation of the reservoir. This material should be processed to provide uniform engineered fill with a moisture content of 1 to 4 percent over optimum. The clods should be pulverized to 3 inches in maximum dimension. The material should be verified by our firm, prior to placement, to confirm the moisture content and observe the extent to which the soil was processed.

The bottom of the overexcavation should be observed by our firm prior to placement of the clay liner. If conditions allow, the bottom of the overexcavation should be scarified a minimum of 8 inches, moisture conditioned, and compacted to provide a firm working surface. However, wet conditions should be anticipated, geotextile, rock, or other means may be required to stabilize the base of the overexcavation.

The liner should be placed as engineered fill, compacted between 88 to 92 percent relative compaction. We recommend that the soil for the liner be compacted with a sheepsfoot compactor. The soil should be compacted by mechanical means in uniform loose lifts not exceeding 8 inches in thickness. The lifts should be continuous, across the reservoir, including the side slopes. Bonding should be achieved between lifts, by scarification or, depending on the compaction equipment, full penetration of the sheepsfoot teeth. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D1557.

The above recommended gradients do not preclude periodic maintenance of the slopes, as minor sloughing and erosion may take place.

The Geotechnical Engineer should observe the overexcavations and construction of the liner.

7.2.3 Preparation of the Protective Layer

The topsoil (strippings) between 6± inches and 12+ inches below grade should be separated from the remaining strippings on the site during excavation. The intent is to remove the upper 6± inches of highly organic material, sod, and plant matter. The material between 6± inches and 12+ inches should be processed to provided uniform fill with a moisture content of 1 to 4 percent over optimum. The clods should be pulverized to 3 inches in maximum dimension. The material should be verified by our firm, prior to placement, to confirm the moisture content and observe the extent to which the soil was processed.

The protective layer should be compacted between 85 to 88 percent relative compaction. We recommend that the soil for the protective layer be compacted with a sheepsfoot compactor. The soil should be compacted by mechanical means in uniform loose lifts not exceeding 8 inches in thickness. The lifts should be continuous, across the reservoir, including the side slopes. Bonding should be achieved between lifts, by scarification or, depending on the compaction equipment, full penetration of the sheepsfoot teeth. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D1557.

7.2.4 Embankment Slope Construction

The embankment fill slopes for the reservoir should have a maximum slope of 4:1 H:V (horizontal to vertical). These assumptions are based on using the on-site soils as engineered fill. If import fill is utilized to construct the embankments, alternative recommendations can be provided.

Geotechnical Investigation Butano Farms Regulating Reservoir San Mateo County, California March 24, 2017 Project No. 16-139-SM Page 10

The embankment slopes should be benched and keyed into the native soils. The base keyway (downslope leading key) should be a minimum of 15 feet wide and a minimum of 5 feet below grade, or 4 feet into firm material, whichever is greater. The base keyway should be sloped negatively at least 2 percent back into the slope. The base keyway should extend up the side slopes, stepped (negatively sloped benches and vertical steps) to achieve a minimum of 3 feet into firm material.

A keyway drain is required. The keyway drain should be constructed on the upslope side of the base key, from the bottom of the key to the next bench or 4 feet tall, whichever is less. The keyway drain does not need to extend up the side slopes. The keyway drain should consist of 4-inch diameter Schedule 40 PVC perforated pipe, embedded in approximately 3 ft³/linear foot of 3/8 inch to 3/4 inch, clean crushed gravel, enveloped in **Mirafi 180N filterfabric** or approved equivalent. The pipe should be 4± inches above the trench bottom; a gradient of 2± percent being provided to the pipe and trench bottom; discharging into suitably protected outlets. Perforations in fill slope backdrains are recommended as follows: 1/2 inch diameter, in 2 rows at the ends of a 120 degree arc, at 5 inch centers in each row, staggered between rows, placed downward.

All remaining benches beneath the embankment fill, including the side slopes, should be excavated to a minimum of 3 feet below existing grade, or 2.5 feet into firm material, whichever is greater. The remaining benches should be sloped negatively at least 2 percent back into the slope.

The fill material used for the lower section of the embankment should consist of the on-site fat clayey soils (weathered bedrock and lower colluvial soils). This material should be separated during excavation and processed as uniform engineered fill.

The bottom of the keyway, benches, and keyway drains should be observed by our firm prior to placement of engineered fill. Depending on the time of year of construction, wet conditions may be encountered. Additional excavation may be required if wet, soft conditions are encountered. Geotextile, rock, or other means may be required to stabilize the base of the keyway and benches.

The embankment slopes should be constructed with engineered fill compacted to a minimum of 90 percent relative compaction. The on-site soils may be used as engineered fill, however, depending on the time of year, the soil may require moisture conditioning prior to use as engineered fill. The soil should be verified by a representative of CMAG in the field during grading operations. All soils, both existing on-site and imported, to be used as fill, should contain less than 3 percent organics and be free of debris, gravel, and clods over 3 inches in maximum dimension.

Imported fill material should be approved by a representative of CMAG prior to importing. The Geotechnical Engineer should be notified not less than 5 working days in advance of placing any fill material proposed for import. Each proposed source of import material should be sampled, tested, and approved by the Geotechnical Engineer prior to delivery of any soils imported for use on the site.

All fill should be compacted with heavy vibratory equipment. Fill should be compacted by mechanical means in uniform horizontal loose lifts not exceeding 8 inches in thickness. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D1557. **The Geotechnical Engineer should observe the overexcavations, and placement of engineered fill.**

The above recommended gradients do not preclude periodic maintenance of the slopes, as minor sloughing and erosion may take place.

7.2.5 Utility Trenches

Bedding material should consist of sand with SE not less than 30 which may then be jetted.

The on-site soils may be utilized for trench backfill. See Section 7.2.4 for requirements for on-site fill material. Backfill of all exterior and interior trenches should be placed in thin lifts and mechanically compacted to achieve a relative compaction of not less than 90 percent per ASTM D1557. Care should be taken not to damage utility lines.

Anti-seep collars, drainage diaphragms, filter fabrics, and other means should be employed to prevent migration of water and backfill material. Recommendations can be provided upon request.

Trenches must be shored as required by the local regulatory agency, the State Of California Division of Industrial Safety Construction Safety Orders, and Federal OSHA requirements.

7.2.6 Vibration During Compaction

It is the contractor's responsibility to ensure that the process in which the engineered fill is placed does not adversely affect the neighboring parcels.

7.2.7 Excavating Conditions

We anticipate that excavation of the on-site soils may be accomplished with standard earthmoving and trenching equipment.

Wet conditions should be anticipated, geotextile, rock, or other means may be required to stabilize the base of the overexcavation. If constructed during, or shortly after the rainy season, difficult construction due to groundwater should be anticipated.

7.3 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical investigation. When completed, the Grading Plans should be reviewed by CMAG prior to submitting the plans and contract bidding. Additional field exploration and laboratory testing may be required upon review of the final project design plans.

7.4 Observation and Testing

Field observation and testing must be provided by a representative of CMAG to enable them to form an opinion regarding the adequacy of the site preparation, the adequacy of fill materials, and the extent to which the earthwork is performed in accordance with the geotechnical conditions present, the requirements of the regulating agencies, the project specifications, and the recommendations presented in this report. Any earthwork performed in connection with the subject project without the full knowledge of, and not under the direct observation of CMAG will render the recommendations of this report invalid.

CMAG should be notified at least 5 working days prior to any site clearing or other earthwork operations on the subject project in order to observe the stripping and disposal of unsuitable materials and to ensure coordination with the grading contractor. During this period, a preconstruction meeting should be held on the site to discuss project specifications, observation and testing requirements and responsibilities, and scheduling.

8.0 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory testing, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the borings drilled during our field investigation. Variation in soil, geologic, and groundwater conditions can vary significantly between sample locations. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer and the Geologist, and revised recommendations be provided as required. In addition, if the scope of the proposed construction changes from the described in this report, our firm should also be notified.

Geotechnical Investigation Butano Farms Regulating Reservoir San Mateo County, California March 24, 2017 Project No. 16-139-SM Page 13

Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

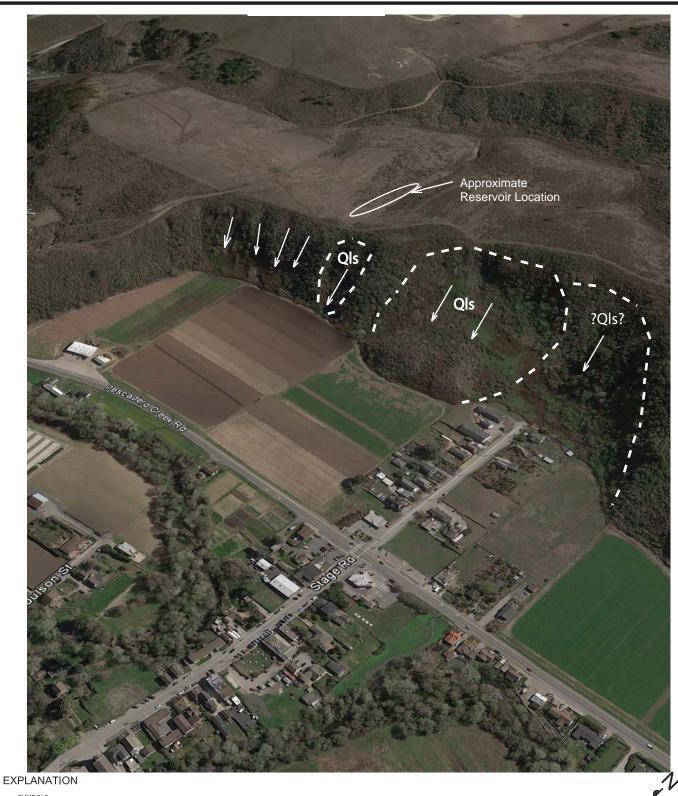
This report is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Architect and Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they be due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

REFERENCES

- ASTM International (2014). *Annual Book of ASTM Standards, Section Four, Construction*. Volume 4.08, Soil and Rock (I): D 420 D 5876.
- Brabb, E.E. (1993). *Preliminary Geologic Map of the Onshore Part of the Palo Alto* 1:100,000 Quadrangle, California. U.S. Geological Survey Open-File Report OF-93-271, Scale 1:62,500.
- CMAG Engineering, Inc. (March 6, 2015). Geotechnical Investigation, Proposed Regulating Reservoir, Pescadero, San Mateo County, California. Project No. 14-140-SM.
- NRCS (February 11, 2016). ENG-GEOLOGY Butano Pond #2, Geology Reconnaissance, San Mateo Co. File Code 210-16. 12pp.
- Waterways Consulting, Inc. (August 15, 2016). Professional Services Agreement for Subconsultant. 9pp.





LANDSLIDE - Arrows indicate general direction of downslope movement.

SMALL LANDSLIDE AND GULLY - Arrow indicates general direction of downslope movement and is centered over location of deposit.

BASEMAP: GOOGLE EARTH™

NOT TO SCALE CMAG LANDSLIDE MAP - OBLIQUE AERIAL PHOTO

FIGURE

Butano Farms Regulating Reservoir



EXPLANATION

SYMBOLS



LANDSLIDE - Arrows indicate general direction of downslope movement.

SMALL LANDSLIDE AND GULLY - Arrow indicates general direction of downslope movement and is centered over location of deposit.

BASEMAP: GOOGLE EARTH™

CMAG ENGINEERING

CMAG LANDSLIDE MAP - OBLIQUE AERIAL PHOTO

Butano Farms Regulating Reservoir

FIGURE

NOT TO SCALE

2

APPENDIX A

FIELD EXPLORATION PROGRAM

Field Exploration Procedures Page A-1

Site Location Map Figure A-1

Boring Location Plan Figure A-2

Key to the Logs Figure A-3

Logs of the Borings Figures A-4 and A-5

Logs of the Test Pits Figures A-6 through A-10

Cross Section A-A' and B-B' Figure A-11

Piezometer Monitoring Results Tables A-1 and A-2

Geotechnical Investigation Butano Farms Regulating Reservoir San Mateo County, California March 24, 2017 Project No. 16-139-SM Page A-1

FIELD EXPLORATION PROCEDURES

Subsurface conditions were explored by drilling 2 borings to depths of 11.5± and 15.5± feet below the existing grades. The borings were drilled with a tractor mounted drill rig equipped with 6 inch diameter solid stem augers. Subsurface conditions were also explored by advancing 5 test pits to depths between 6.5± and 10± feet below the existing grades. The test pits were advanced with an excavator equipped with a 3 foot wide bucket and an 18 inch wide bucket. The Key to The Logs, the Logs of the Borings, and the Logs of the Test Pits are included in Appendix A, Figures A-3 through A-10. The approximate location of the borings and test pits are shown on the Boring and Test Pit Location Plan, Figure A-2.

The earth materials encountered in the borings and test pits were continuously logged in the field by a representative of CMAG. Bulk and relatively undisturbed samples for identification and laboratory testing were obtained in the field. These samples were classified based on field observations and laboratory tests. The classification is in accordance with the Unified Soil Classification System (Figure A-3).

Representative samples within the borings were obtained by means of a drive sampler, the hammer weight and drop being 140 lb and 30 inches, respectively. These samples were recovered using a 3 inch outside diameter Modified California Sampler or a 2 inch outside diameter Terzaghi Sampler. The number of blows required to drive the samplers 12 inches are indicated on the Boring Logs. The N_{60} values are also indicated on the Boring Logs.

Representative cross sections were obtained for the subject site. See Cross Section A-A', and B-B', Figure A-11. For an explanation of the symbols and units on the cross sections, see Section 4.0 of the report.

Two piezometers were installed within boreholes advanced with 6 inch diameter solid stem augers to depths of 5± and 9± feet below the existing grades. The piezometers consisted of 1 inch diameter schedule 40 PVC pipe with screens located on the lower 5 feet and solid casing from the top of the screen to grade. Clean, graded, kiln dried Monterey Sand was used as filter sand, and was placed in the screen section of the pipe. 3/8 inch bentonite chips were used above the screen to grade. We monitored the piezometers from January through March of 2017. The results of our monitoring are presented in Tables A-1 and A-2. The approximate location of the piezometers are shown on the Boring and Test Pit Location Plan, Figure A-2.

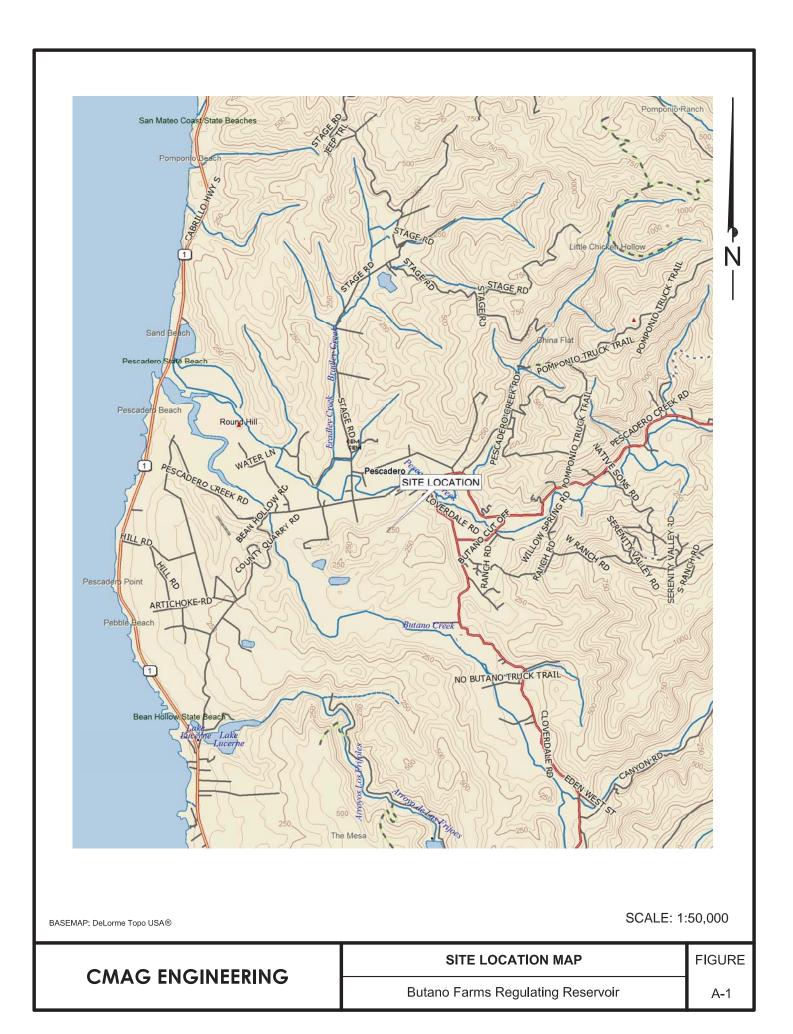
An infiltration test hole was advanced to a depth of $9.5\pm$ feet below the existing grade. The test hole was advanced with 6 inch diameter solid stem augers. Three inch diameter perforated pipe was installed within the test hole. The pipe was encased in 3/8 inch gravel to approximately 1.5 feet below the surface. The upper 1.5 feet was cased with 3/8 inch bentonite chips. During our monitoring of the site over the rainy season of 2016 / 2017, we observed water within the infiltration test hole, to the surface, preventing testing.

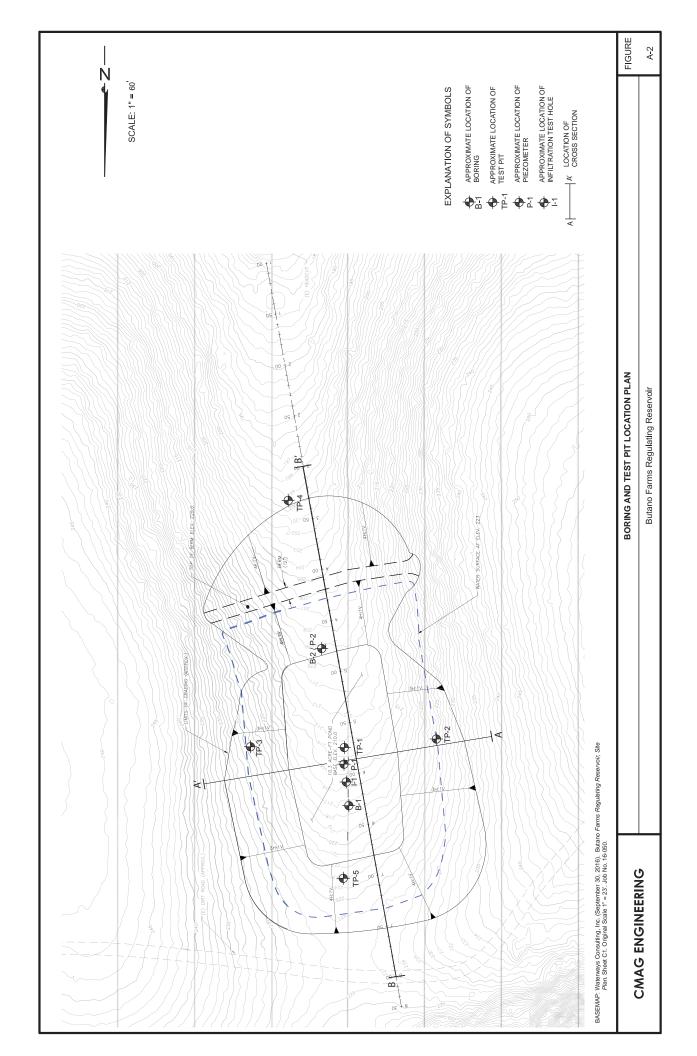
Table A-1. Piezometer Monitoring Results - Piezometer P-1

Piezometer	Date	Groundwater Depth Below Grade (ft)
P-1	1/9/17	0.7
P-1	1/23/17	0.5
P-1	3/16/17	1.7

Table A-2. Piezometer Monitoring Results - Piezometer P-2 / Boring B-2

Piezometer	Date	Groundwater Depth Below Grade (ft)
P-2 / B-2	1/9/17	-
P-2 / B-2	1/23/17	-
P-2 / B-2	3/16/17	-





KEY TO LOGS

	UNIF	FIED SOIL CL	_ASSIFICA	TION SYSTEM
Р	RIMARY DIVISION	IS	GROUP SYMBOL	SECONDARY DIVISIONS
	GRAVELS	CLEAN GRAVELS (Less than 5%	GW	Well graded gravels, gravel-sand mixtures, little or no fines
	More than half of the coarse	fines)	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
COARSE GRAINED	fraction is larger than the No. 4	GRAVEL	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
SOILS	sieve	WITH FINES	GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
More than half of the material is	SANDS	CLEAN SANDS (Less than 5%	SW	Well graded sands, gravelly sands, little or no fines
larger than the No. 200 sieve	More than half of the coarse	fines)	SP	Poorly graded sands, gravelly sands, little or no fines
	fraction is smaller than the No. 4	SAND	SM	Silty sands, sand-silt mixtures, non-plastic fines
	sieve	WITH FINES	SC	Clayey sands, sand-clay mixtures, plastic fines
			ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
FINE GRAINED		D CLAYS ess than 50	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
SOILS			OL	Organic silts and organic silty clays of low plasticity
More than half of the material is			MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
smaller than the No. 200 sieve		D CLAYS eater than 50	СН	Inorganic clays of high plasticity, fat clays
			ОН	Organic clays of medium to high plasticity, organic silts
HIG	HLY ORGANIC SC	DILS	Pt	Peat and other highly organic soils

		GRAIN	SIZE	LIMIT	S		
SILT AND CLAY		SAND		GRA	VEL	COBBLES	BOULDERS
SILT AND CLAT	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLES	BOOLDERS
No.	200 No.	40 No.	10 No	. 4 3/4	1 in. 3	in. 12	2 in.
		US	STANDARD	SIEVE SIZE			

RELATIVE DEN	ISITY				
SAND AND GRAVEL	BLOWS/FT*				
VERY LOOSE	0 - 4				
LOOSE	4 - 10				
MEDIUM DENSE	10 - 30				
DENSE	30 - 50				
VERY DENSE	OVER 50				

CONSISTENCY								
SILT AND CLAY	BLOWS/FT*							
VERY SOFT	0 - 2							
SOFT	2 - 4							
FIRM	4 - 8							
STIFF	8 - 16							
VERY STIFF	16 - 32							
HARD	OVER 32							

MOISTURE	CONDITION
D	RY
МС	DIST
W	ET.

BEDROCK	
(GROUP SYMBOL)	
Brackets Denote Bedrock	

^{*} Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

	LOG OF EXPLORATORY BORING										
Project No.: Project: Date: Logged By:			Bu Sa	Butano Farms Regulating Reservoir San Mateo County, California December 9, 2016 Method of Drilling: B-1 See Figure A-2, Boring and Test Pit Loc Elevation: Method of Drilling: Auger, 140lb. Downhole Safety						Solid Stem	
Depth (ft.)	Soil Type	Undisturbed	Bulk	2" Ring Sample Sample Sample Bulk Sample Terzaghi Split Spoon Sample Groundwater S 3" Shelt Tube Description	by	Blows / Foot	N ⁶⁰	Dry Density (pcf)	Moisture Content (%)	Other Tests	
 - 5 - 	CL CL/ML CH			Qc: Black Sandy Lean CLAY. Soft, Moist, Plastic. Black Sandy Lean CLAY and Sandy SILT. Moist, Stiff, Plastic. Sand - Fine Grained. Dark Gray and Dark Grayish Brown Fat CLAY with Sand. Very Stiff, Mo Plastic. Sand - Fine Grained.	oist,	16 34	11			Dispersion Dispersion	
 -10- 	(ML)			Tpt: Light Olive Brown SILTSTONE. Dense, Moist, Plastic. Moderately Cemented. Weathered to a Sandy Silt. Sand - Fine Graine Light Olive Brown SANDSTONE. Very Dense, Moist, Plastic. Weakly Cemented. Silty Sand . Sand - Fine Grained.	ed.	100	67	109.4	18.1	c' = 130 psf Φ' = 41°	
				Bottom of Boring at 15.5± ft. Groundwater Not Encountered. Boring Backfilled with Cuttings.		3	5:		21.0		
				CMAG ENGINEERING						FIGURE A-4	

LOG OF EXPLORATORY BORING										
Project No.	:	16-	-139-SM Boring:	B-2						
Project:		Bu	ano Farms Regulating Reservoir Location: See Figure A-2, Boring and Test Pit Location Plan							
		Sa	n Mateo County, California Elevation:							
Date:		De	cember 9, 2016 Method of Drilling:	Tracto	r Mou	nted [Orill Rig	g, 6in.	Solid Stem	
Logged By:		AL	G	Auger,	140lk	o. Dov	vnhole		/ Hammer	
Depth (ft.) Soil Type	Undisturbed	Bulk	Sample Sa	ulk nple Shelby 'ube	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests	
ML			Qc: Black Sandy SILT. Firm, Moist, Plastic. Sand - Fine Grained.							
CL/CH			Black Sandy Lean and Fat CLAY. Stiff, Moist, Plastic. Sand - Fine G	Grained.	20	15		16.2	Dispersion	
-5- CH 			Olive Brown and Very Dark Gray Sandy Fat CLAY. Very Stiff, Moist, Plastic. Sand - Fine Grained.	,	58		104.2	22.3	c' = 410 psf Ф' = 27°	
(ML- -10- SM) -			Tpt: Light Olive Brown SILTSTONE to SANDSTONE. Dense, Mois Plastic. Weakly Cemented. Weatherd to a Sandy Silt to Silty Sand. Sand - Fine Grained.	st,	36	24		19.9	Dispersion	
			Bottom of Boring at 11.5± ft. Groundwater Not Encountered. 1 in. Piezometer Installed. Well Screen from 9± to 4±ft.							
			CMAG ENGINEERING						FIGURE A-5	

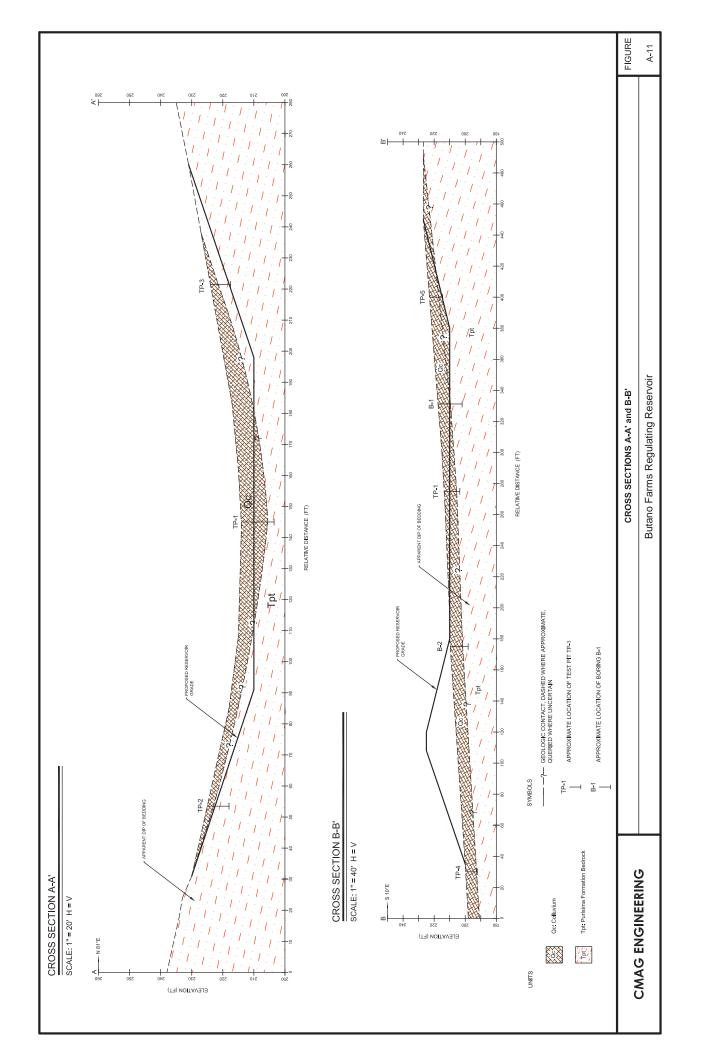
				LOG OF EXPL	ORATORY TEST	PIT					
Proj Date	Project No.: 16-139-SM Project: TP-1 Butano Farms Regulating Reservoir Location: See Figure A-2, Boring and Test Pit Location: San Mateo County, California Date: November 16, 2016 Logged By: ALG Test Pit: TP-1 Location: See Figure A-2, Boring and Test Pit Location: Method of Excavation: Excavator - 36" and 18" Bucket										
Depth (ft.)	Soil Type	Undisturbed	Bulk	2" Ring Sample 2.5" Ring Sample Terzaghi Split Spoon Sample Description	Bulk Sample Vater		Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
 	ML 		X X	Qc: Black Sandy SILT with Clay. Stiff, Moist Organics. Sand - Fine Grained. Black Sandy SILT. Stiff, Moist to Dry, Plastic.						15.4 10.9	
	CL-ML		×	Black Lean CLAY to SILT. Hard, Moist, Plast	iic.						LL=40 / PL=14 EI = 47 FC = 92.4%
- 5- 	CL-CH		×	Black Sandy Lean to Fat CLAY. Hard, Moist,	Plastic. Sand - Fine Gra	ained.				22.3	
	(CH- MH)		×	Tpt: Light Olive Brown SILTSTONE. Hard, Moderately Cemented. Weathered to a Fat C Trace Sand. Sand - Fine Grained.						20.3	
-10- - 15- 				Test Pit Terminated a Groundwater Not Enco Test Pit Backfille	ountered.						
	CMAG ENGINEERING										FIGURE A-6

	LOG OF EXPLORATORY TEST PIT									
Proj Date			Bu Sa	•		-2 Figure A-2, Boring and Test Pit Location Plan cavator - 18" Bucket				ocation Plan
Depth (ft.)	Soil Type	Undisturbed	Bulk	2" Ring Sample 2.5" Ring Sample Sample Terzaghi Split Spoon Sample Static Water Table Description		Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	ML		\times	Qc:Black Sandy SILT with Clay. Firm, Moist, Plastic. Sand - Fi	ine Grained.	ļ			20.4	
	ML		\times	Dark Grayish Brown Sandy SILT. Firm, Moist, Plastic. Sand - Fi	ne Grained.				8.8	
 - 5- 	(CH- MH)		X	Tpt: Olive Brown SILTSTONE. Hard, Moist. Moderately Cemer Weathered to a Fat Clay to Elastic Silt with Trace Sand. Sand - Grained.					14.5 19.2	
-10- -15-				Test Pit Terminated at 7± ft. Groundwater Not Encountered. Test Pit Backfilled.						
				CMAG ENGINEERING						FIGURE A-7

	LOG OF EXPLORATORY TEST PIT									
Proj Date			Bu Sa	-139-SM Test Pit: tano Farms Regulating Reservoir Location: n Mateo County, California Elevation: vember 16, 2016 Method of Excavation G		igure A-2, Boring and Test Pit Locat				ocation Plan
Depth (ft.)	Soil Type	Undisturbed	Bulk	2" Ring Sample 2.5" Ring Sample Bulk Sample Terzaghi Split Split Table Description		Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	ML		×	Qc: Black Sandy SILT with Clay. Stiff, Moist, Plastic. High Organics	S.				22.9	
	ML / CH		-	Black Sandy SILT grading to to Dark Gray Sandy Fat CLAY. Hard, N Plastic. Sand - Fine Grained.	Moist,				11.4 12.0	
 - 5- 	(CH- MH)		X	Tpt: Olive Brown SILTSTONE. Hard to Stiff, Moist. Moderately Cen Weathered to a Fat Clay to Elastic Silt with Trace Sand. Sand - Fine Grained.					20.4	LL = 52 PL = 16 EI = 104 FC = 95.9%
 - 10- - 15- 				Test Pit Terminated at 6.5 <u>+</u> ft. Groundwater Not Encountered. Test Pit Backfilled.						
	CMAG ENGINEERING									FIGURE A-8

	LOG OF EXPLORATORY TEST PIT										
Proj Date			Bu Sa	139-SM tano Farms Regulating Reservoir n Mateo County, California vember 16, 2016 G	Test Pit: Location: Elevation: Method of Excavation		ee Figure A-2, Boring and Test Pit Location				ocation Plan
Depth (ft.)	Soil Type	Undisturbed	Bulk	2" Ring Sample 2.5" Ring Sample Terzaghi Split Spoon Sample Description	Bulk Sample Water		Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	CL			Qc: Black Sandy Lean CLAY. Soft grading High Organics. Sand - Fine Grained.	g to Stiff, Moist, Plastic.						
	СН			Black Sandy Fat CLAY. Hard, Moist, Plastic Sand - Fine Grained.).					14.3	
	(011)			Total or D. Outotous H. L. H.							
	(CH)		×	Tpt: Olive Brown SILTSTONE. Hard, Mois Weathered to a Sandy Fat Clay. Sand - Fir						20.3	
- 10- - 15- 				Test Pit Terminated Groundwater Not En Test Pit Backfi	countered.						FIGURE
	CMAG ENGINEERING								FIGURE A-9		

				LOG OF EXPLORATO	RY TEST PI	Г				
Proj Date			Bu Sa	·	TP See Excavation: Ex	Figure A-2				ocation Plan
Depth (ft.)	Soil Type	Undisturbed	Bulk	2" Ring Sample 2.5" Ring Sample Sample Sample Sample Static Water Spoon Sample Description	le	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	CL		X	Qc: Black Sandy Lean CLAY. Stiff, Moist, Plastic. Sand	I - Fine Grained.				21.5	
	ML		×	Very Dark Gray Sandy SILT. Moist to Dry, Non Plastic. Sand - Fine Grained.					10.0	
	CL			Dark Gray Sandy Lean CLAY. Hard, Moist, Plastic. San	d - Fine Grained.					
	(CH)		×	Tpt: Olive Brown SILTSTONE. Hard, Moist. Moderate Weathered to a Fat Clay with Sand. Sand - Fine Graine	-				19.7 17.2	
- 10- - 15- 				Test Pit Terminated at 8.5± ft. Groundwater Not Encountered. Test Pit Backfilled.						
				CMAG ENGINEERIN	IG					FIGURE A-10



APPENDIX B

LABORATORY TESTING PROGRAM

Laboratory Testing Procedures	Page B-1
Direct Shear Test Results	Figures B-1 and B-2
Particle Size Distribution Test Results	Figures B-3 and B-4
Liquid Limit and Plastic Limit Test Results	Figure B-5
Expansion Index Test Results	Table B-1
Dispersive Characteristics Test Results	Table B-2

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LABORATORY TESTING PROCEDURES

Classification

Earth materials were classified according to the Unified Soil Classification System in accordance with ASTM D 2487 and D 2488. Moisture content and dry density determinations were made for representative, relatively undisturbed samples in accordance with ASTM D 2216. Results of moisture-density determinations, together with classifications, are shown on the Boring and Test Pit Logs, Figures A-4 through A-10.

Direct Shear

Consolidated drained direct shear tests were performed in accordance with ASTM D 3080 on representative, relatively undisturbed samples of the on-site earth materials. To simulate possible adverse field conditions the samples were saturated prior to shearing. A saturating device was used which permitted the samples to absorb moisture while preventing volume change. The direct shear test results are presented on Figures B-1 and B-2.

Particle Size Distribution

Particle size distribution tests were performed on representative samples of the underlying earth materials in accordance with ASTM D 422. The test results are presented on Figures B-3 and B-4.

Liquid Limit and Plastic Limit

Liquid limit and plastic limit tests were performed on representative samples of the underlying earth materials in accordance with ASTM D 4318. The test results are presented on Figure B-5.

Expansion

Expansion tests were performed on representative remolded samples of the on-site earth materials in accordance with the ASTM D 4829. The test results are presented in Table B-1.

Dispersive Characteristics

The dispersive characteristics of representative samples of the on-site earth materials were determined in accordance with ASTM D6572. The test results are presented in Table B-2.

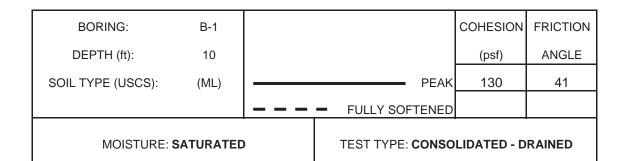
March 24, 2017 Project No. 16-139-SM Page B-2

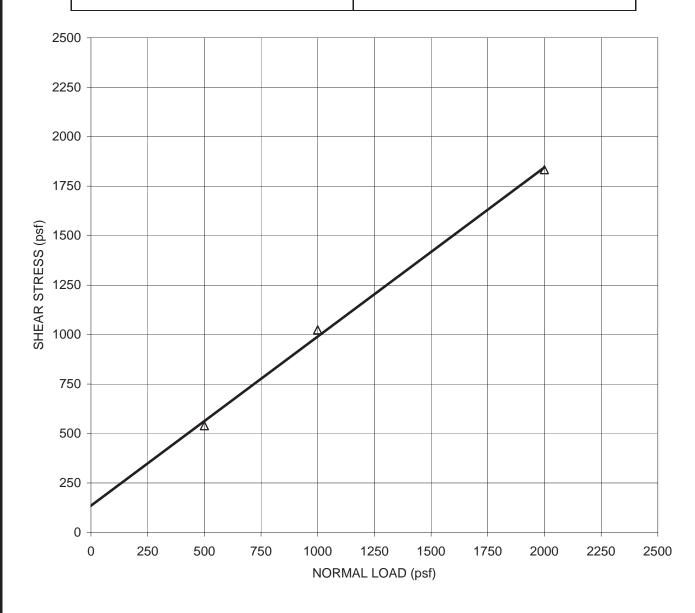
Table B-1. Expansion Index Test Results

Test Location	Soil Type	Expansion Index	Expansion Potential
TP-1 at 3.5 Feet	CL - ML	47	Low
TP-3 at 4 to 6 Feet	(CH - MH)	104	High

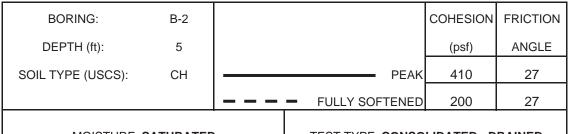
Table B-2. Dispersive Characteristics Test Results

Test Location	Classification	Results
B-1 at 2 Feet	ML	Intermediate
B-1 at 5 Feet	СН	Dispersive
B-2 at 2 Feet	CL	Intermediate
B-2 at 10 Feet	(ML)	Non - Dispersive

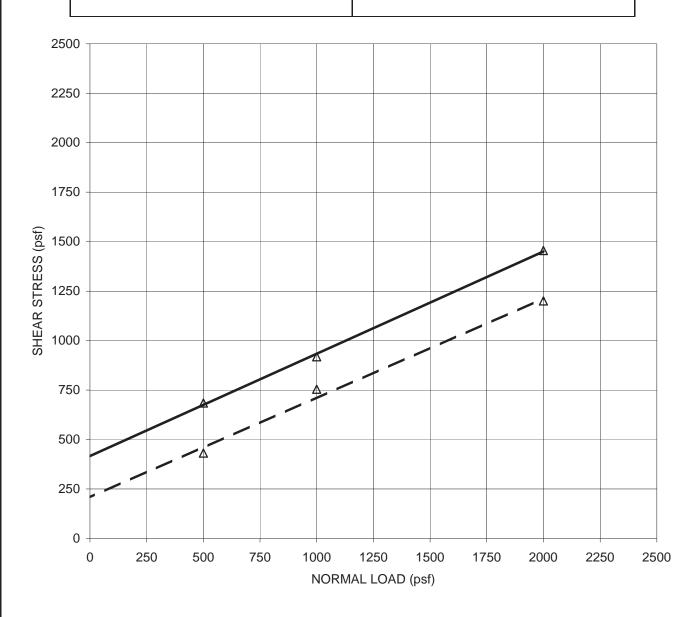




DIRECT	SHEAR	TEST	RESULTS	

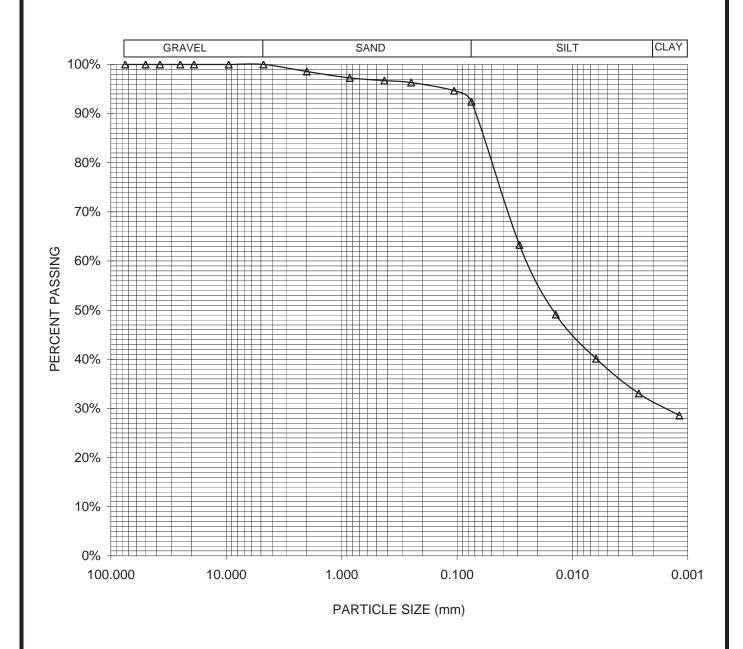


MOISTURE: **SATURATED** TEST TYPE: **CONSOLIDATED - DRAINED**



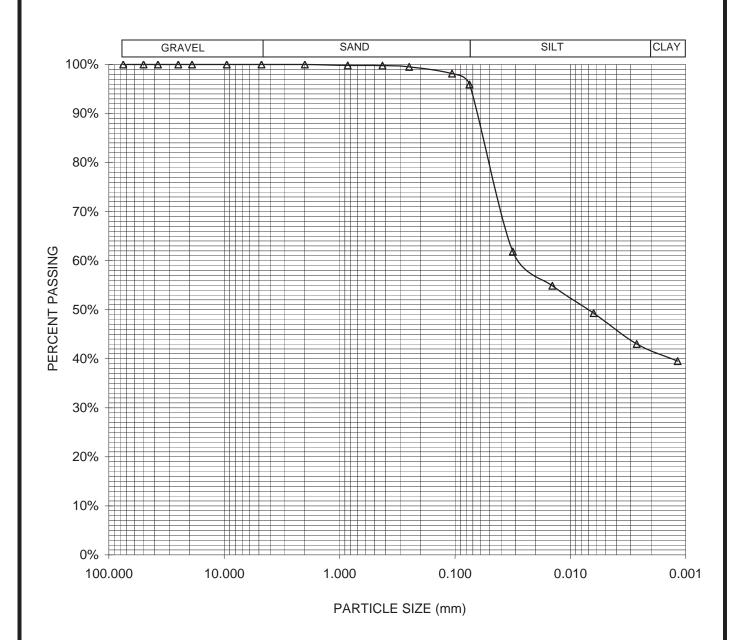
CMAG ENGINEERING	DIRECT SHEAR TEST RESULTS	FIGURE
CIVIAG ENGINEERING	Butano Farms Regulating Reservoir	B-2

BORING:	TP-1	PERCENT	PERCENT
DEPTH (ft):	3.5	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	ML	100.0%	92.4%

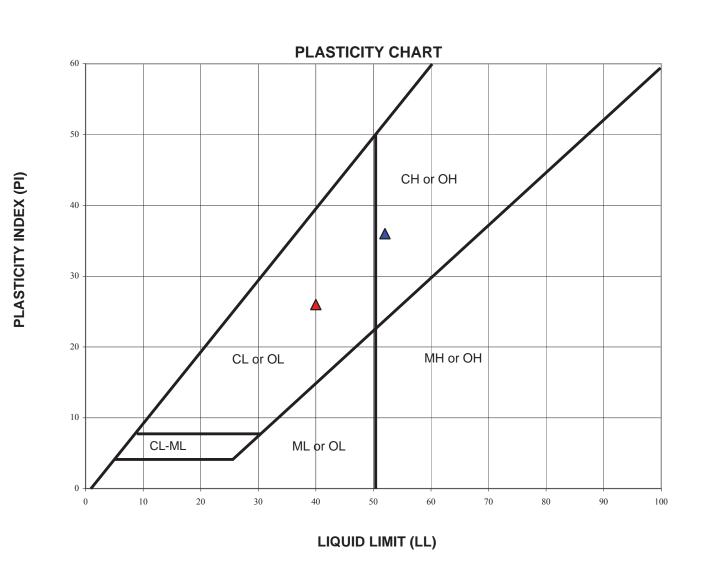


CMAG ENGINEERING	PARTICLE SIZE DISTRIBUTION	FIGURE
CIVIAG ENGINEERING	Butano Farms Regulating Reservoir	B-3

BORING:	TP-3	PERCENT	PERCENT
DEPTH (ft):	4 to 6	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	(MH)	100.0%	95.9%



CMAG ENGINEERING	PARTICLE SIZE DISTRIBUTION	FIGURE
CIVIAG ENGINEERING	Butano Farms Regulating Reservoir	B-4



K	ΕY

SYMBOL	BORING	DEPTH (FT)	PL	LL	PI
	TP-1	3.5	14	40	26
	TP-3	4 to 6	16	52	36

LIQUID / PLASTIC LIMIT TEST RESULTS

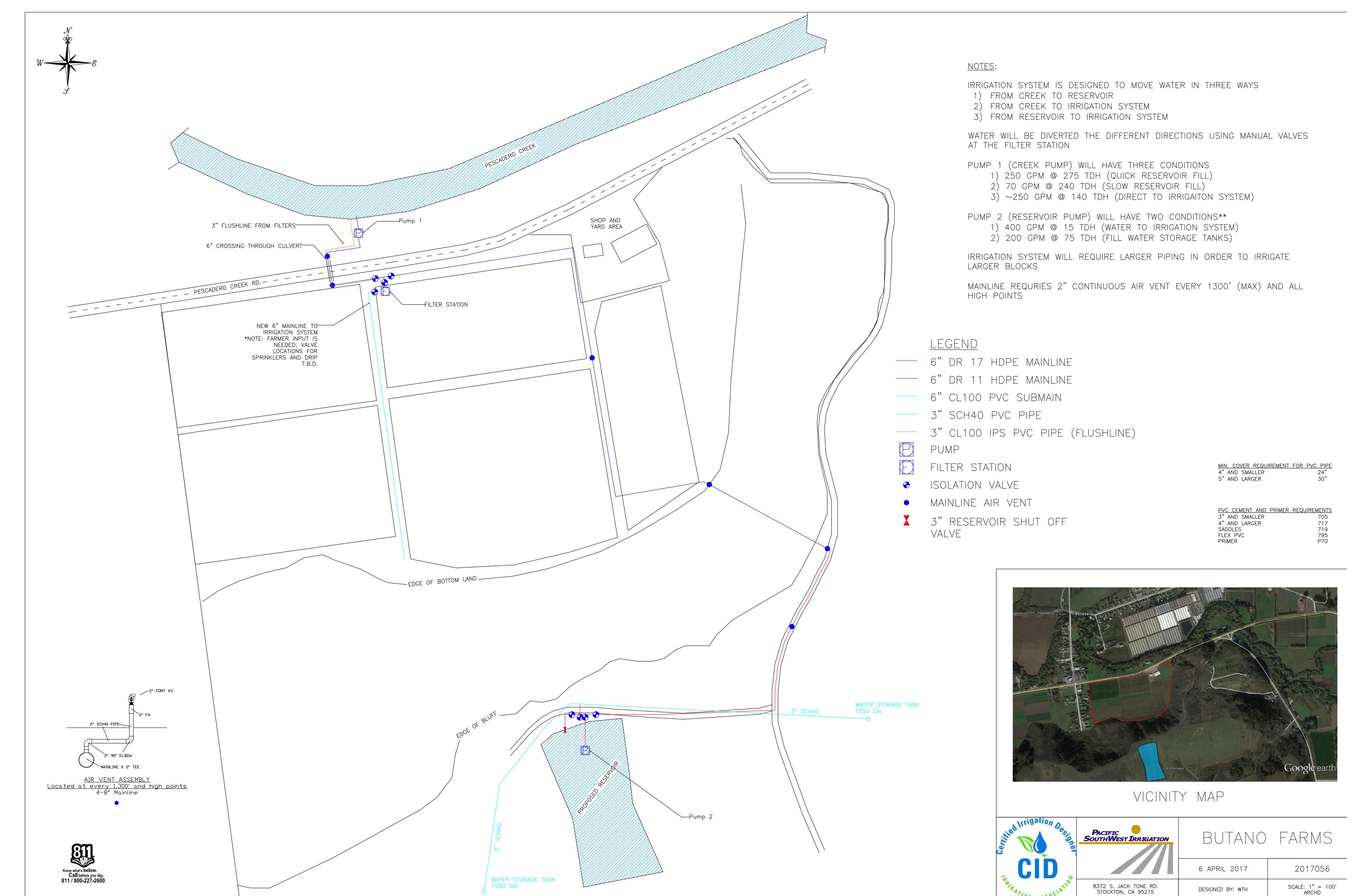
FIGURE

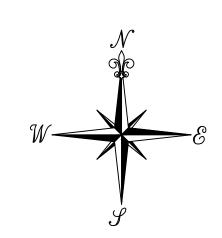
Butano Farms Regulating Reservoir

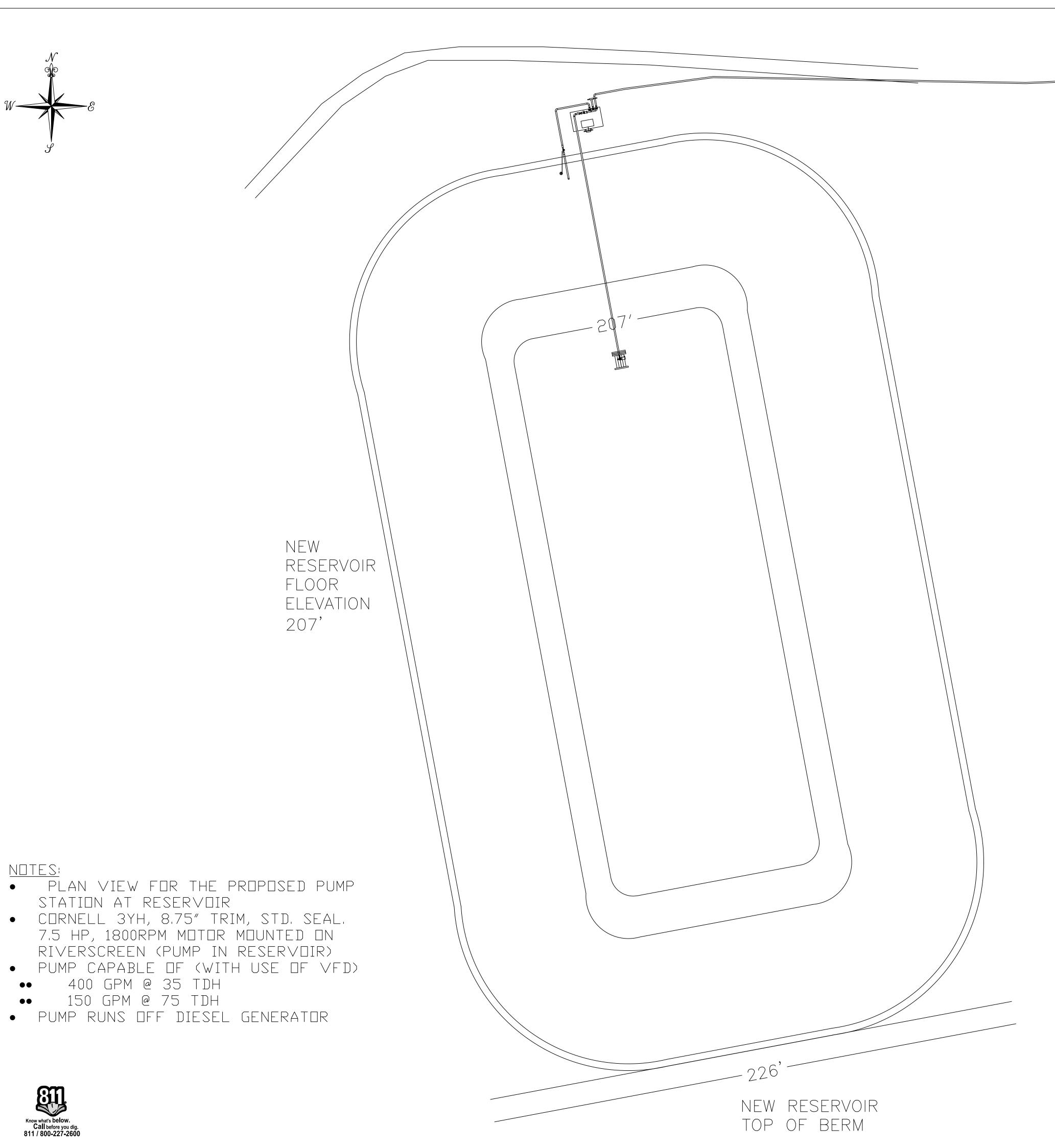
CMAG ENGINEERING

B-5

A.6 Irrigation Design

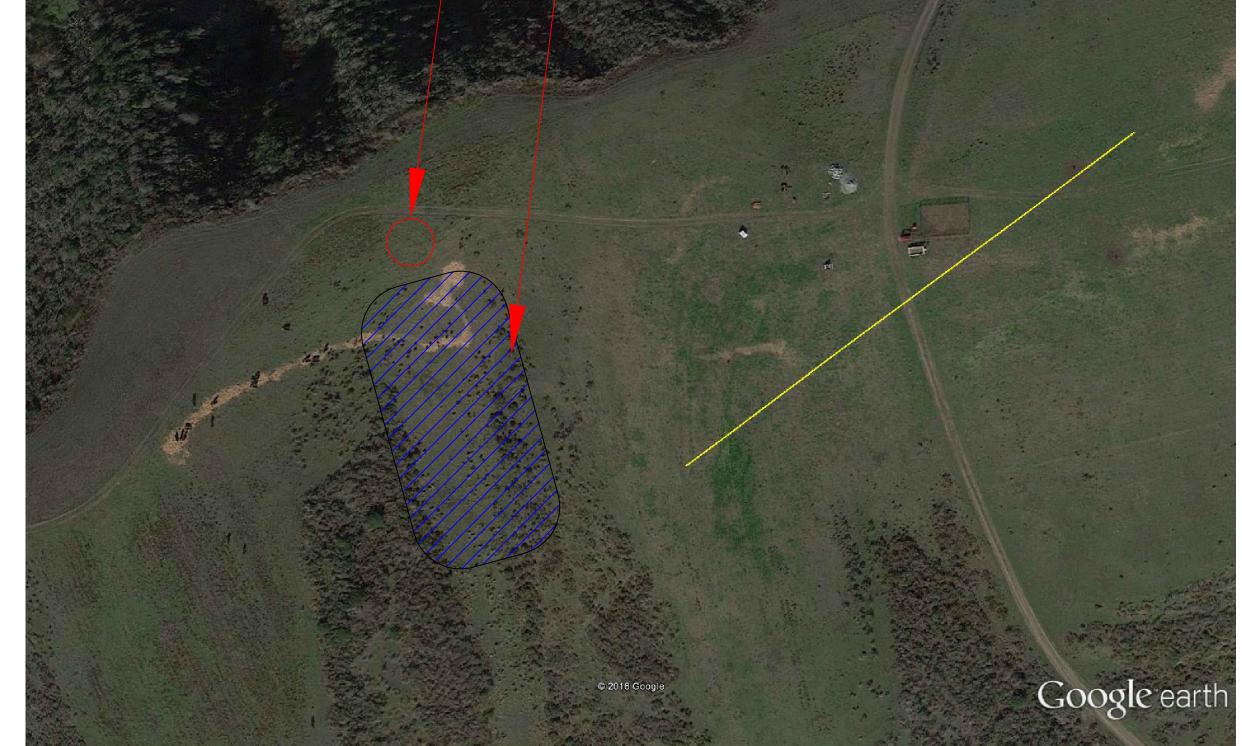






PROPOSED PUMP STATION LOCATION

PROPOSED RESERVOIR LOCATION





NOTES:



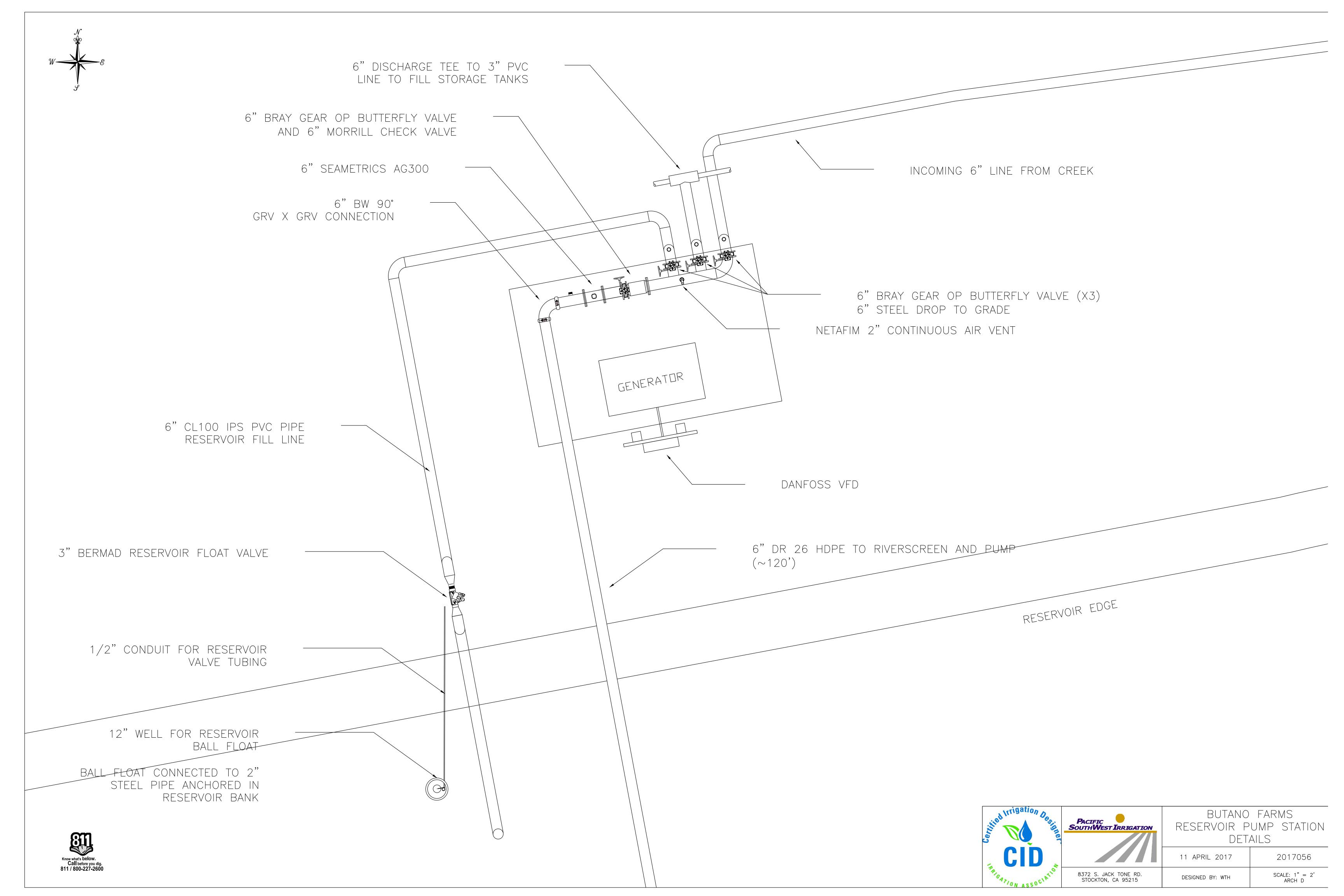
PACIFIC SOUTHWEST IRRIGATION

BUTANO FARMS RESERVOIR PUMP PLAN VIEW

10 APRIL 2017 2017056



DESIGNED BY: WTH SCALE: 1" = 1'







8372 S. JACK TONE RD. STOCKTON, CA 95215

11 APRIL 2017 2017056 SCALE: 1" = 8" ARCH D DESIGNED BY: WTH

PACIFIC BUTANO FARMS CREEK PUM

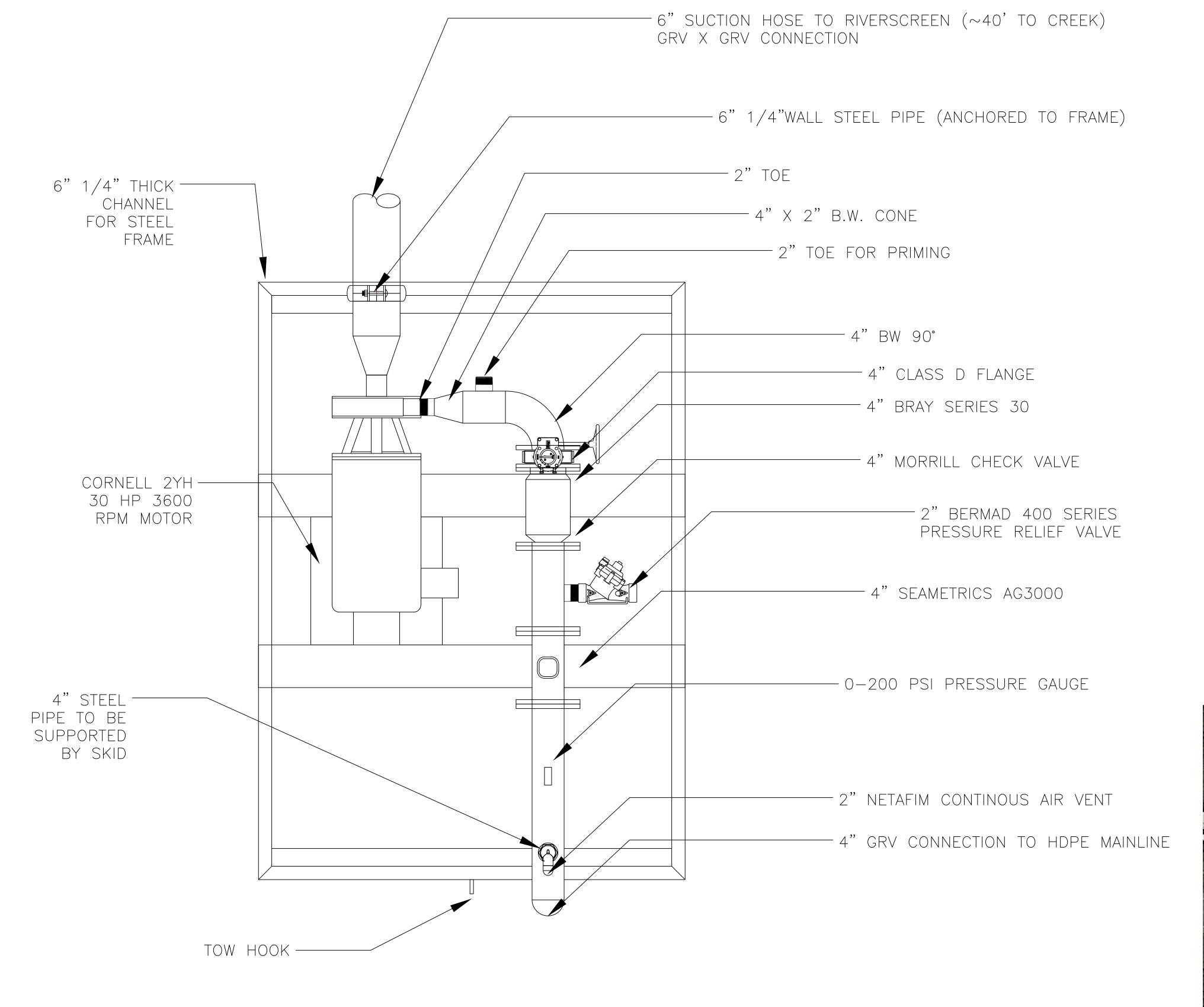
- $SH\square WN$

<u>NOTES:</u>

- 250 GPM @ 140 TDH
- CORNELL 2YH, 8.5" TRIM, STD. SEAL. 30 HP, 3600RPM MOTOR • PUMP CAPABLE OF (WITH USE OF VFD)

- 250 GPM @ 275 TDH
- 70 GPM @ 240 TDH
- SKID FRAME IS CONSTRUCTED W/ 6" 1/4" WALL CHANNEL • SKID TO HAVE 6" POCKETS FOR FORKLIFT STAKES CENTERED, AS

• PLAN VIEW FOR THE PROPOSED PORTABLE PUMP STATION.





PROPOSED SKID LOCATION



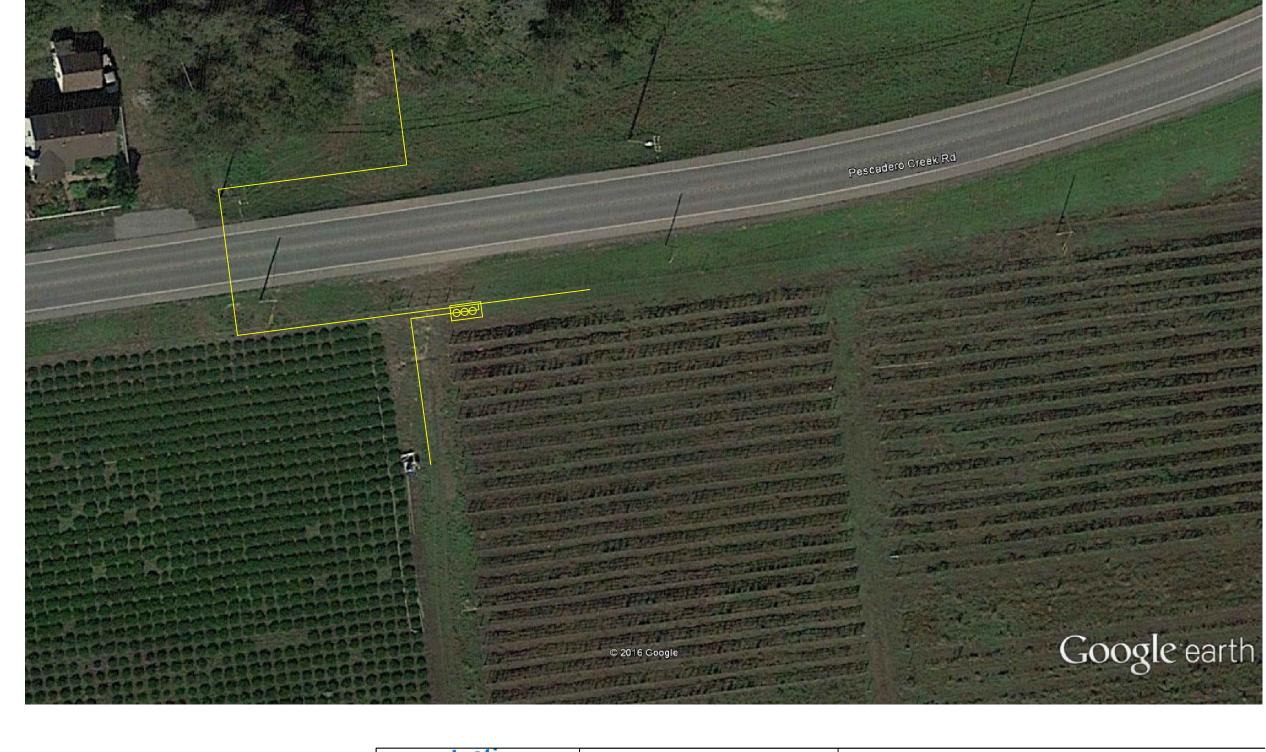
STEEL DISCHARGE -TO CREEK PUMP

4" SEAMETRICS AG300 FLOWMETER -

FL X GRV CONNECTION

STEEL DISCHARGE -TO IRRIGATION STYSTEM





NOTES:

- THIS IS A PLAN VIEW FOR THE PROPOSED FILTER STATION.
- MANUAL BUTTERFLY VALVES WILL BE USED TO MOVE WATER THREE DIFFERENT WAYS
- •• WATER FROM CREEK TO RESERVOIR
- •• WATER FROM CREEK TO IRRIGATION SYSTEM
- WATER FROM RESERVOIR TO IRRIGATION SYSTEM



- 2" BERMAD PRESSURE RELIEF VALVE

- NELSON 800 SERIES 3" P.R. VALVE

- LAKOS PRO-II 32" SAND MEDIA FILTERS

-4" BRAY 30 SERIES BUTTERFLY VALVE, GEAR OP

- 2" NETAFIM GUARDIAN AIR VENT

— 2" NETAFIM CONTINUOUS AIR VENT

- STEEL DISCHARGE TO FILL RESERVOIF FL X GRV CONNECTION

2017056

SCALE: 1" = 1'

- 4" STEEL PIPE

A Irrigation Design	PACIFIC SOUTHWEST IRRIGATION	
CID		2
PATION ASSOCIATION	8372 S. JACK TONE RD. STOCKTON, CA 95215	

8372 S. Jack Tone Rd Stockton, Ca 95215 Office: (209) 460-0450

Fax: (209) 982-1832



Butano Farms Irrigation System Bid Sheet

Item	Quantity	Unit	Cost/Unit	Total
Materials for Job (list attached)	1	LS		
Labor for Irrigation system installation				
(as per design)	1	LS		
			Total	

Notes:

- Quantities and locations shown in parts list and design are approximate, unforeseen utilities and customer requirements may alter design and installation
- Please complete materials list and include with bid
- "Riverscreen" in creek pump portion of bid may be substituted with equivalent fish screen, but make and model must be noted and approved

Stockton, CA 95215

Date	Estimate #
4/13/2017	24268

Name / Address
Butano Farms (no-app Pescadero)

Description	Qty
Butano Farms	
Creek pump and suction	
6" Riverscreen	1
6" Water Driven Power Drive	1
6" Foot Valve w/ Pressure Relief & Drain Valve	1
2" SCH40 STEEL PIPE	5
Stainless Steel wire rope 5/32", 2800lb	60
Wire rope clamp	4
6" Hose king nipple plain end	5
6" Steel Grooved x Plain End Adapter	6
6" Suction hose green	40
6" Grooved Coupler (Clamp)	3
6" 1/4" Wall	2
6" x 2½" Butt Weld Eccentric Reducer	1
2½" Steel Threaded Half Nipple	1
Cornell 2YH, 30 HP 3600 8.5" Trim, std. seal	1
6 x 20 Channel	40
2" Steel Threaded Half Nipple	1
4" x 2" Butt Weld Concentric Reducer	1
4" Butt Weld 90° Elbow	2
4" Class D steel flange	4
4" Bray Gear Operated Valve	1
4" Galvanized Flanged Check Valve	1
4" 3/16 Steel IPS Pipe	6
2" Steel Threaded Half Coupler	1
2" Continuous Combination Air Release Valve	1
1/4" Steel Threaded Half Coupler	2
2-1/2" Liquid Filled Pressure Gauge 0-200 psi	1
2" Steel Threaded Half Nipple	1

Subtot	al
Sales 1	Tax (7.75%)
Total	

_

Stockton, CA 95215

Date	Estimate #
4/13/2017	24268

Name / Address
Butano Farms (no-app Pescadero)

Description	Qty
Bermad 400 Series Pressure Relief Valve 2" angle thr.	1
4" SEAMETRICS FLANGED FLOWMETER W/INTEGRAL DISPLAY AND DATA LOGGER	1
4" Full Face Gasket	3
6" x 4" Butt Weld Concentric Reducer	1
6" Steel Grooved x Plain End Adapter	1
6" Grooved Coupler (Clamp)	1
5/8" x 2½" Bolt	24
5/8" x 4½" Bolt	8
5/8" Nut	32
3/4" x 520 ft - Teflon Tape	2
Danfoss 30HP VFD, wall mount enclosure, 230VAC 3PH	1
0-150 PSI transducer w/ 25' cable	1
RAYCAP Strikesorb	1
HARMONIC FILTER	1
**Note: more eletrical parts are needed, dependent upon existing service	
6" Mainline to reservoir pump station	2 400
6" HDPE DR 11 AWWA (40')	2,480
6" HDPE DR 17 AWWA (40')	1,300
4" HDPE DR 11 GRV x P.E.	4
6" X 4" SDR 11 IPS HDPE MOLDED REDUCER	4
6" HDPE DR 11 461 FL DOW	13
6" HDPE DR 11 45deg ELBOW	2
6" HDPE DR 11 22.5deg ELBOW	2
6" HDPE DR 11 GRV x P.E. 6" x 2" HDPE DR 11 TEE	9
2" HDPE DR 11 TEE 2" HDPE DR 11 GRV x P.E.	8
6" Grooved Coupler (Clamp)	5
O Grooved Coupler (Classip)	3
	-

Subtotal
Sales Tax (7.75%)
Total

Stockton, CA 95215

Quote

Date	Estimate #
4/13/2017	24268

Name / Address
Butano Farms (no-app Pescadero)

Description	Qty
2" groove PVC nipple	
2" Grooved Coupler (Clamp)	8
2" PVC 90° Elbow Schedule 40	10
2" Sch40 SW Pipe	100
2" PVC Female Adapter Socket x Fipt Schedule 40	8
2" Continuous Combination Air Release Valve	8
80# Quikrete Concrete Mix	84
Filter station	
4" Grooved Coupler (Clamp)	:
4" Steel Grooved x Plain End Adapter	:
4" Butt Weld 90° Elbow	
2" Steel Threaded Half Nipple	
2" Guardian Air Vent	
4" Class D flange	13
4" Bray Gear Operated Valve Series 30	
4" 3/16 Steel IPS Pipe	30
2" Steel Threaded Half Coupler	
2" PVC Plug Mipt Schedule 40	4
1/4" Steel Threaded Half Coupler	
2-1/2" Liquid Filled Pressure Gauge 0-200 psi	
2" Continuous Combination Air Release Valve	
4" x 3" Butt Weld Concentric Reducer	
3" Steel Grooved x Plain End Adapter	
3" Grooved Coupler (Clamp)	
Nelson Valve (A3B6C2D13E1H3)	
Bermad 400 Series Pressure Relief Valve 2" angle thr.	
	Subtotal
	Sales Tax (7.75%)

Total

Quote

Stockton, CA 95215

Date	Estimate #
4/13/2017	24268

Name / Address
Butano Farms (no-app Pescadero)

Description	Qty
PRO II 32" 3 Tank end feed Pattern 4' Manifolds	1
240-405 U.S. GPM	
4" SEAMETRICS FLANGED FLOWMETER W/INTEGRAL DISPLAY AND DATA LOGGER	
media sand #16	21
HUBBELL PS0509NBK SWIVEL MALE L/T CONN, 1/2"	2
1/2" HUBBELL B2050 POLYTUFF NM TUBING	5
1/2" FEMALE ADAPTER	3
PVC 1/2-TYPE-T COND FTG	2
1/2-PVC-SCHED-40 CONDUIT	180
PVC 1/2 TYPE LB COND FTG	3
½" x 2" PVC TOE Nipple Schedule 80	3
Orange TW Wire Nut	12
1/2" SCH 40 90 Degree Elbow (STANDARD RADIUS)	4
1/2" Terminal adapter	1
1/2" KO SEAL	1
1/2 STR L/T FLEX CONN	2
1/2" Liq. Flex Bulk (500' Reels)	10
Media Filter Backflush Wireing	
3" PVC 90° Elbow Schedule 40	9
3" PVC Tee Schedule 40	2
3" Sch40 SW Pipe	40
3" CL100 SW Pipe	520
2" x 3" PVC Reducing Male Adapter Mipt x Socket Schedule 40	2
2" (Brass) Gate Valve Threaded Full Port	1
3" x 3" x 2" PVC Reducing Tee Socket x Socket x Fipt Schedule 40	1
2" PVC Close Nipple TBE Schedule 80	1
2" Guardian Air Vent	1
3" View Tube	1

Subtotal
Sales Tax (7.75%)
Total

Stockton, CA 95215

Date	Estimate #
4/13/2017	24268

Name / Address
Butano Farms (no-app Pescadero)

Description	Qty
3/4" x 520 ft - Teflon Tape	4
5/8" x 4½" Bolt	32
5/8" x 2½" Bolt	8
5/8" Nut	40
paint	1
Mainline to drip and irrigation field	
4" groove PVC nipple	1
4" Sch40 Pipe	20
6" x 4" PVC Reducing Coupling Schedule 40	1
6" PVC 90° Elbow Schedule 40	2
6" CL100 SW Pipe	760
6" PVC Cap Socket Schedule 40	1
Need customer input for valve size and locations	
Reservoir valve station	
6" Steel Grooved x Plain End Adapter	5
6" Grooved Coupler (Clamp)	5
6" Class D flange	10
6" Bray Gear Operated Valve	4
2" Steel Threaded Half Nipple	4
2" Steel Threaded Half Coupler	1
2" Continuous Combination Air Release Valve	1
6" Galvanized Flanged Check Valve	
6" Full Face Gasket	3
6" 1/4" Wall	5
6" SEAMETRICS FLANGED FLOWMETER W/INTEGRAL DISPLAY AND DATA LOGGER	

Subtotal
Sales Tax (7.75%)
Total

Stockton, CA 95215

Date	Estimate #
4/13/2017	24268

Name / Address	
Butano Farms (no-app Pescadero)	

Description	Qty
6" Butt Weld 90° Elbow	
Riverscreen pump and suction line	
6" HDPE DR 11 GR x PE	10
6" IPS SDR 26 HDPE Pipe	120
8" Gravity Fed Riverscreen w/ Motor Drive	
Vertical Mount w/ (2) Floats	
Skid Options	
4" Flange x 8" OD Suction adapter (turned at 115 deg)	
Cornell 3YH, 1800 RPM, 7.5 HP, 8.75" Trim	
TEFC motor Adder	
8" Riverscreen crating	
3" Full Face Flange Gasket	
3" IPS ½" Steel Flange	
6" x 3" Butt Weld Concentric Reducer	
6" Steel Grooved x Plain End Adapter	
8" 80# PIP GB pipe	6
8" PIP PVC Cap #100 PSI	1:
8" x 6" x 8" float bracket	
10" Stainless Steel Strap	12
Stainless Steel wire rope 5/32", 2800lb	18
Wire rope clamps	
2" SCH40 STEEL PIPE	10
6" Discharge to reservoir w/ level control	
6" groove PVC nipple	
6" PVC Coupling Schedule 40	
6" PVC 90° Elbow Schedule 40	

Subtotal
Sales Tax (7.75%)
Total

Quote

Stockton, CA 95215

Date	Estimate #	
4/13/2017	24268	

Name / Address
Butano Farms (no-app Pescadero)

Description	Qty
6" CL100 SW Pipe	80
6" x 6" x 3" PVC Reducing Tee Schedule 40	2
6" x 2" PVC Reducer Bushing Spigot x Socket Schedule 40	2
2" PVC Close Nipple TBE Schedule 80	2
2" Guardian Air Vent	2
3" groove PVC nipple	2
3" Grooved Coupler (Clamp)	1
3" Bermad Level Control w/ Bi-Level Hydraulic Float GRV	1
8 mm tubing	40
1/2-PVC-SCHED-40 CONDUIT	40
1/2" SCH 40 90 Degree Elbow (STANDARD RADIUS)	2
12" CL100 SW Pipe	5
2" SCH40 STEEL PIPE	5
Generator, VFD and electrical components at reser	
Perkins 403D15G 13KW Diesel Generator Set w/ Sound Enclosure	1
Optional External 20 gal fuel tank	1
Danfoss 7.5HP VFD, wall mount enclosure, 230VAC 3PH	1
0-150PSI transducer, 25' cable	1
RAYCAP Strikesorb	1
Harmonic Filter	1
8-3 W/GROUND SUBMERSIBLE CABLE FLAT JACKETED H/D 500'	160
Note: More misc electrical fittings and wire from generator to VFD panel are needed	
Line from reservoir to storage tanks	
6" groove PVC nipple	1
6" CL100 SW Pipe	40
	l

Subtotal
Sales Tax (7.75%)
Total

Stockton, CA 95215

Date	Estimate #
4/13/2017	24268

Name / Address	
Butano Farms (no-app Pescadero)	

Description		Qty
6" PVC Coupling Schedule 40		1
6" PVC 90° Elbow Schedule 40		1
6" PVC Tee Schedule 40		1
6" x 3" PVC Reducer Bushing Spigot x Socket Schedule 40		2
3" Sch40 SW Pipe		1,400
6"x6"x10' pressure treated		8
# 4 Rebar grade		100
3" PVC 90° Elbow Schedule 40		12
3" PVC Coupling Schedule 40		10
3" PVC Male Adapter Mipt x Socket Schedule 40		4
3" PVC Threaded Utility Ball Valve with EPDM O-ring Seal		2
3" PVC Coupling Schedule 40		2
3" x 1½" PVC Reducer Bushing Spigot x Socket Schedule 40		2
1½" x 2" PVC TOE Nipple Schedule 80		2
LF Brass Valve only 1-1/2" FIPT x 3/8" Tap		2
Stainless Steel Rod 12" long x 3/8" x 1/4" Tap		2
8" Diameter x 1/4" Tap		2
Dark Green water storage tank, 1550 gal, 87" base		2
Misc, glue, etc.		
717 PVC Gray Glue - Gallon #10142		4
P-70 Purple Primer - Gallon #10221		2
MT-648 Empty Metal Can - Gallon #10010		1
705 PVC Clear Glue - Quart #10089		2
³ / ₄ " x 520 ft - Teflon Tape		4
80# Quikrete Concrete Mix		84
Enamel paint		1
Chip brush bristle plain wood handle		4
	Subtotal	\$0.00
	Colon Toy /7 7/	E0/\

A.7 IRWM Butano and Harley Bid Contract Sample

Sample Contract for Contractors

Pescadero Creek Streamflow Improvement Project at Butano and Harley Farms

SAN MATEO COUNTY RESOURCE CONSERVATION DISTRICT PROFESSIONAL SERVICES AGREEMENT WITH [CONTRACTOR]

THIS AGREEMENT ("Agreement"), made and entered into this _____ day of _____, 2016 is by and between the SAN MATEO COUNTY RESOURCE CONSERVATION DISTRICT, a subdivision of the State of California, hereinafter referred to as "RCD," and [CONTRACTOR], hereinafter referred to as "CONTRACTOR."

WITNESSETH:

WHEREAS, RCD entered into Agreement No.4600010883 with the California Department of Water Resources for the Drought Relief for South Coast San Mateo County program; and

WHEREAS, the [Project Name] is a component of the program; and

WHEREAS, RCD desires to use the professional services of CONTRACTOR; and

WHEREAS, CONTRACTOR has the professional and administrative ability to implement such services; and

WHEREAS, RCD and CONTRACTOR desire to set forth in writing the obligations and responsibilities of each party relating to the services;

NOW, THEREFORE, in consideration of the promises and mutual benefits which will accrue to the parties hereto in carrying out the terms of this Agreement, the parties agree as follows:

1. Scope of Services

- a. CONTRACTOR will, in accordance with the terms of this Agreement, perform the services set forth in Exhibit A, *Drought Relief for South Coast San Mateo County: Scope of Work for [CONTRACTOR]*, hereinafter referred to as "PROJECT", which is incorporated herein by reference. This Agreement is limited both in scope and duration, as herein specified.
- **2. Term of Agreement**. The term of this Agreement shall commence on [DATE] and terminate on [DATE], but shall not become effective until executed by the parties.
- **3. Performance Responsibilities.** CONTRACTOR shall complete the herein described services by no later than [DATE] unless a later date is agreed upon by the parties in writing. Time is and shall be of the essence in the performance of the specified services by CONTRACTOR.
- 4. Compensation.

- a. RCD agrees to pay CONTRACTOR an amount not to exceed [amount in writing], (\$xxxx) for the successful and timely completion of the specified services.
- b. In the event that the funding on which the above described contract services relies is materially reduced or made unavailable, despite the parties understandings and expectations that no such disruptions will occur, this Agreement will terminate immediately upon notice of such funding disruption by RCD to CONTRACTOR.
- **5. Billing and Payment Procedure.** CONTRACTOR will submit requests for payment along with documentation acceptable to the RCD no more frequently than monthly and no less frequently than quarterly. RCD will issue payment to CONTRACTOR within 30 days of payment to the RCD by the project funder.
- **6.** Cooperation. RCD and CONTRACTOR agree to cooperate in any way and every way or manner on the PROJECT. RCD will immediately transmit to CONTRACTOR any new information which becomes available or any change in plans. CONTRACTOR will likewise bring any new information, issues or concerns to the RCD's attention as soon as practicable.
- **7. Assignment**. Without the written consent of RCD, this Agreement is not assignable by CONTRACTOR in whole or in part.
- **8.** Conflict of Interest. The CONTRACTOR shall comply with all applicable State laws and rules pertaining to conflicts of interest, including but not limited to, Government Code Section 1090 and Public Contract Code 10410 and 10411. If requested by the State, CONTRACTOR may be required to file a Statement of Economic Interests (Fair Political Practices Commission Form 700) if it is determined that an individual is a consultant for Political Reform Act purposes.
- **9. Applicable Laws.** All work performed on behalf of the RCD, as set forth in this Agreement shall be performed in accordance with all applicable state and federal laws, regulations, policies, procedures, and standards.
- 10. Environmental Quality. CONTRACTOR shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act, Title 42 U.S.C. 1857 (H), Section 508 of the Clean Air Act, Title 33 U.S.C. 1368 Executive Order 11738, and Title 40 CFR Part 15. CONTRACTOR will comply with mandatory standards and policies related to energy efficiency which are contained in the State Energy Conservation Plan issued in compliance with the Conservation Act (Publ L. 94-163). CONTRACTOR will also comply with any special permit conditions prescribed by regulatory agencies for the Project.
 - a. The CONTRACTOR shall not be (1) in violation of any order or resolution not subject to review promulgated by the State Air Resources Board; (2) subject to cease and desist order not subject to review issued pursuant to Section 13301 of the Water Code for violation of waste discharge requirements or discharge prohibitions; or (3) finally determined to be in violation of provisions of and federal or State of California law relating to air or water pollution.
 - b. All activities covered by this contract must be in compliance with the California Environmental Quality Act (CEQA). (Public Resources Code §21000 et seq.)
- 11. No Benefit To Arise For Local Employees. Except as provided by State law, no member, officer, or employee of RCD or its designees or agents, and no public official who exercises authority over or has responsibilities with respect to the Project during their tenure or for one (1) year thereafter, shall have

any interest, direct or indirect, in any agreement or sub-agreement or the proceeds thereof, for work to be performed in connection with the services performed under this Agreement.

- **12. Independent Contractor Status.** The CONTRACTOR, and the officers, the agents and employees of the CONTRACTOR, in the performance of the Agreement, shall act in an independent capacity and not as officers, employees or agents of the RCD. Nothing in this Agreement is intended nor shall be construed to create an employer-employee relationship, a joint venture relationship.
- **13. Standard of Professionalism.** CONTRACTOR shall conduct all work consistent with professional standards for the industry and type of work being performed under this Agreement.
- **14. Ownership of Materials.** Except as otherwise expressly stated in Exhibit A, all materials and work products, including data collected for the Work produced as a result of this Agreement are the property of the RCD. Any final products distributed or produced will acknowledge the CONTRACTOR, RCD, and other Funding Agencies as reasonably requested by the RCD. The RCD shall be entitled to use and publish the work product and deliverables under this Agreement.
- 15. Indemnification. To the fullest extent permitted by applicable law, CONTRACTOR agrees to defend, at CONTRACTOR's expense and with counsel acceptable to RCD, indemnify, and save and hold harmless RCD and all of its officers, directors, employees and agents, from and against any and all claims, suits, losses, causes of action, damages, liabilities, and expenses of any kind whatsoever arising out of the performance or nonperformance of the CONTRACTOR's Work, including without limitation, all expenses of litigation and/or arbitration, court costs, and attorneys' fees, arising on account of or in connection with injuries to or the death of any person whomsoever, or any and all damages to property, regardless of possession or ownership, which injuries, death or damages arise from, or are in any manner connected with, the Work performed by or for the CONTRACTOR under this Agreement, or are caused in whole or part by reason of the acts or omissions or presence of the person or property of the Contractor or any of its employees, agents, representatives and or suppliers.

In addition, the Contractor shall indemnify and save harmless those public and private agencies ("grantors") which provided grant funds to RCD to complete this project, specifically the *State of California* and *California Department of Water Resources* and grantors' officers, agents and employees from any and all liabilities, claims, demands, damage or costs resulting from, growing out or, or in any way connected with or incident to this agreement, except for active negligence of such agency, it's officers, agents or employees. The duty of the Contractor to indemnify and save harmless includes the duty to defend as set forth in Civil Code Section 2778.

- **16. Insurance.** CONTRACTOR shall obtain and maintain for the duration of this Agreement, comprehensive general liability insurance and/or other insurance necessary to protect the parties hereto, and shall provide RCD with evidence thereof. CONTRACTOR shall have RCD and funding agencies [*California Department of Water Resources*] named as an additional insured on its insurance policy, which shall have minimum coverage limits as specified in Exhibit B, as is incorporated herein by reference. CONTRACTOR's above described insurance shall serve as the primary insurance coverage for any claim arising from or relating to the services to be performed hereunder. Neither the RCD, its partners or funders are responsible for any premiums or assessments on these policies.
- **17. Non-discrimination.** During the performance of this Agreement, CONTRACTOR will not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex (gender), sexual orientation, race, color, ancestry, religion, creed, national origin (including language use restriction), pregnancy, physical disability (including HIV and AIDS), mental disability, medical condition (e.g., cancer), age (over 40), marital status, and denial of medial and family care

leave or pregnancy disability leave. CONTRACTOR shall ensure that the evaluation and treatment of its employees and applicants for employment are free from such discrimination and harassment. CONTRACTOR will comply with the provisions of the Fair Employment and Housing Act (Gov Code 12990 (a-f) et seq.) and the applicable regulations promulgated there under (California Code of Regulations, Title 2, Section 7285 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code Section 12900 (a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations, are incorporated into this Agreement by reference and made a part hereof as if set forth in full. CONTRACTOR will give written notice of its obligations under this clause to labor organizations with which they have a collective bargaining or other Agreement.

- **18.** Americans with Disabilities Act: By signing this Agreement, CONTRACTOR assures that it is in compliance with the Americans with Disabilities Act (ADA) of 1990, (42 U.S.C., 12101 et seq.), which prohibits discrimination of the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.
- **19. Drug-Free Workplace Certification:** By signing this Agreement, CONTRACTOR hereby certify, under penalty of perjury under the laws of State of California, compliance with the requirements of the Drug-Free Workplace Act of 1990 (Government Code 8350 et seq.) and have or will provide a drug-free workplace by taking the following actions:
 - a. Publish a statement notifying employees, and subcontractors that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees, contractors, or subcontractors for violations, as required by Government Code Section 8355 (a)(1).
 - b. Establish a Drug-Free Awareness Program, as required by Government Code Section 8355(a)(2) to inform employees or subcontractors about all of the following:
 - i. The dangers of drug abuse in the workplace
 - ii. Grantee's policy of maintaining a drug-free workplace,
 - iii. Any available counseling, rehabilitation, and employee assistance programs, and
 - iv. Penalties that may be imposed upon employees and subcontractors for drug abuse violations.
 - c. Provide, as required by Government Code Sections 8355(a)(3), that every employee, contractor, or subcontractor who works under this Grant Agreement will receive a copy of Grantee's drug-free policy statement, and will abide by terms of the policy.
- **20. Notices.** Any notice required to be given pursuant to the terms and provisions of this Agreement shall be in writing and shall be sent first-class mail. Notice shall be deemed to be effective two (2) days after mailing to the following addresses:

To RCD: Kellyx Nelson, Executive Director

San Mateo County Resource Conservation District

625 Miramontes Street, Suite 103 Half Moon Bay, CA 94019

To CONTRACTOR: [CONTACT INFORMATION]

21. Rights in Data. CONTRACTOR agrees that all data including notes and other written and graphic work produced in performance of this Agreement are subject to the rights of the State of California.

The State shall have the right to reproduce, publish and use all such work, or any part thereof, in any manner and for any purpose whatsoever and to authorize others to do so.

- **22. Records.** CONTRACTOR is hereby notified of the rights of the auditors of the State of California to examine records of the CONTRACTOR and any subcontractors relative to the services and materials provided under this Agreement. The CONTRACTOR agrees to expeditiously provide throughout the term of this Agreement, such reports, data, information, and certifications as may be reasonably required by the RCD or by the State.
- **23. Amendments and Integration.** This Agreement supersedes all previous agreements or understandings, and constitutes the entire understanding between the parties with respect to the above referenced services, terms of compensation, and otherwise. This Agreement shall not be amended, except in a writing that is executed by authorized representatives of both parties.
- **24.** Compliance with Federal Regulations. As a grantee of the State of California, the RCD is obligated to warrant, represent that it and its contractors comply with: 1) all applicable provisions of Title 48 CFR Part 31; and 2) all general and special conditions contained in this Agreement.
- **25. Labor Code Compliance**: The CONTRACTOR will take all measures necessary to ensure compliance with applicable California Labor Code requirements, including, but not limited to Section 1720 *et seq.* of the California Labor Code regarding public works, labor compliance programs (California Labor Code Section 1771.5), and payment of prevailing wages for work done and funded pursuant to these Guidelines, including any payments to the Department of Industrial Relations under Labor Code Section 1771.3.

As a condition of receiving payments for this Project, the CONTRACTOR agrees to present to the RCD, or its designee, all applicable and necessary required documentation required to show compliance with a Labor Compliance Program, as required by the California Labor Code.

The RCD shall withhold any portion of a payment until all required forms and documentation of compliance of the Labor Compliance Program are properly submitted. In the event that certified payroll forms do not comply with the requirements of Labor Code Section 1720 et seq., the RCD may continue to hold sufficient funds to cover estimated wages and penalties under the contract.

- **26. Standards for Financial Management System**: CONTRACTOR shall maintain fiscal control and accounting procedures which are sufficient to:
 - a. Permit preparation of reports required by Title 48 CFR Part 31 (including those required by Title 48 CFR Part 31.40 and 31.41) and statutes authorizing the grant to the RCD;
 - b. Permit tracing of funds to a level of expenditures adequate to establish that such funds have not be used in violation of the restrictions and prohibitions of applicable statutes;
 - c. A requirement to this effect shall be placed in all subcontractors related to performance of work under this Agreement.
- **27. Termination.** This Agreement may be terminated for any of the following reasons:
 - a. If CONTRACTOR fails to perform the services hereunder agreed to the satisfaction of RCD, or otherwise fails to fulfill its obligations under this Agreement, immediately upon written notice from RCD; and
 - b. Upon notice from RCD to CONTRACTOR that the funding on which this Agreement is based has been materially disrupted or discontinued.

Date:	 Ву:	CONTRACTOR NAME
		CONTRACTOR BUSINESS NAME
Date:	 By:	Kellyx Nelson, Executive Director San Mateo County Resource Conservation District

IN WITNESS WHEREFORE, the parties agree to the foregoing terms and conditions and hereby enter into

this Agreement.

EXHIBIT A SCOPE OF WORK

EXHIBIT B INSURANCE

CONTRACTOR shall procure and maintain for the duration of this Agreement insurance against claims and injuries to persons or damages to property which may arise from or in connection with the work hereunder by CONTRACTOR, its agents, representatives, employees or subcontractors. The cost of such insurance shall be the sole responsibility of CONTRACTOR.

- 1. Minimum Scope of Coverage and Limits of Insurance:
 - a. Comprehensive General Liability: \$1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage.
 - b. Automobile Liability: \$500,000 combined single limit per accident for bodily injury and property damage.
 - c. Worker's Compensation: Limits as set forth in the Labor Code of the State of California.
- 2. Contractors Liability Insurance Policy shall contain the following clauses:
 - a. RCD is added as an additional insured as respects operation of the named insured formed under contract with RCD.
 - b. It is agreed that any insurance maintained by RCD shall apply in excess of, and not contribute with, insurance provided by this policy.
 - c. The insurer agrees to waive all rights of subrogation against RCD, its officers and employees for losses arising from work performed by CONTRACTOR for RCD.
- 3. Each insurance policy required herein shall be endorsed to state that coverage shall not be cancelled, limited, or non-renewed except after thirty (30) days written notice has been given to RCD. Certificates of insurance evidencing the coverage required by the clauses set forth above shall be filed with RCD within 10 working days to the effective date of this Agreement.

A.8 Required Bid Submittals

Bidders are required to provide the following to meet qualifications for this bid notice:

- 1. A completed bid sheet. Use the blank bid sheet provided for each project component submitting a bid for:
 - a. Pond Component
 - b. Irrigation Component
- 2. Authorized Bidders Statement Regarding Insurance coverage. Use attached version.
- 3. Authorized Non-Collusion Affidavit. Use attached version.
- 4. List of proposed suppliers and subcontractors. Provide all information requested in the blank sheet provided.
- 5. License and experience statement. Provide all information requested in the blank sheet provided.
- 6. Submission of all bid materials by May 1st, 2017 by 7pm.



BUTANO FARMS POND 15.8 ACRE-FT POND

BID SCHEDULE

3/28/2017

Job No: 16-050

TOTAL TOTAL **UNIT COST** CY(F) LIND CY(F) CY(F) r_S ည r_S rs P ۲ **ESTIMATED** QUANTITY 13,695 13,695 508 147 **MOBILIZATION & DEMOBILIZATION TEMPORARY EROSION CONTROL** ITEM **CLEARING AND GRUBBING** SWPPP IMPLEMENTATION **DRAINAGE FACILITIES ENGINEERED FILL ANGULAR STONE EXCAVATION** POND LINER FIBER ROLL SEEDING **SPECIFICATION** 015713.01 312316 312323 329200 311100 015713 015723 312323 334000 015000 334000 ITEM NO. 10 တ 4 5 9 ω Ξ N က

OPTIONAL BID ITEMS

Ç	Cλ
Unknown	Unknown
EXCAVATION - UNSUITABLE MATERIALS	ROCK EXCAVATION
312316	312316
12	13

NOTES:

- 1. Quantities shown are approximate only; the Contractor shall be responsible for all work indicated on the Drawings and prescribed in the Specifications.
- 2. In the event that the product of a unit price and an estimated quantity does not equal the extended amount stated, the unit price will govern and the correct product of the unit price and the estimated quantity shall be deemed to be the bid amount.

8372 S. Jack Tone Rd Stockton, Ca 95215 Office: (209) 460-0450

Fax: (209) 982-1832



Butano Farms Irrigation System Bid Sheet

Item	Quantity	Unit	Cost/Unit	Total
Materials for Job (list attached)	1	LS		
Labor for Irrigation system installation				
(as per design)	1	LS		
			Total	

Notes:

- Quantities and locations shown in parts list and design are approximate, unforeseen utilities and customer requirements may alter design and installation
- Please complete materials list and include with bid
- "Riverscreen" in creek pump portion of bid may be substituted with equivalent fish screen, but make and model must be noted and approved

BIDDER'S STATEMENT REGARDING INSURANCE COVERAGE

Bidder hereby certifies that he has reviewed the insurance coverage requirements specified in the Contract Specifications. Should he be awarded the contract for the work, Bidder further certifies that he can meet all the Contract Specifications requirements for insurance including insurance coverage of his subcontractors.

		Bidder
	Ву	
		Title
Date		_

NON-COLLUSION AFFIDAVIT

State of California)
) ss.	
RCD	
organization, or corporation; has not directly or indirectly and has not directly or indire anyone else to put in a sham not in any manner, directly o with anyone to fix the bid pri or cost element of the bid pri the public body awarding the statements contained in the b indirectly, submitted his or h divulged information or data	, being first duly sworn, deposes and says that he or she is the party making the foregoing bid that the bid is not made f of, any undisclosed person, partnership, company, association, that the bid is genuine and not collusive or sham; that the Bidder induced or solicited any other Bidder to put in a false or sham bid, ctly colluded, conspired, connived, or agreed with any Bidder or bid, or that anyone shall refrain from bidding; that the Bidder has r indirectly, sought by agreement, communication, or conference ice of the Bidder or any other Bidder, or to fix any overhead, profit, ce, or of that of any other Bidder, or to secure any advantage against a contract of anyone interested in the proposed contract; that all id are true; and, further, that the Bidder has not, directly or er bid price or any breakdown thereof, or the contents thereof, or relative thereto, or paid, and will not pay, any fee to any mpany, association, organization, bid depository, or to any member a collusive or sham bid.
	Bidder
	By
	Title
Date	

PROPOSED SUPPLIERS AND SUBCONTRACTORS

List of subcontractors and suppliers who will perform work or provide materials. Bidders are not required to use this form but shall provide all requested information using these specific headers. A summary of the subcontractor's qualifications is only required for subcontractors providing more than 20 percent of the overall scope of work.

Name	Address	Work Subcontracted	Qualifications of Subcontractor

LICENSE AND EXPERIENCE STATEMENT

The following outline is a record of the Bidder's experience in construction and restoration of a type similar in magnitude and character to that contemplated under this contract. Additional numbered pages outlining this portion of the proposal may be attached to this page. The Contractor must be properly licensed to perform the work in this project as determined by the State Contractor's License Board.

Contractor's License No:	
Class	Description
License Expiration date:	
These representations are be	ing made under the penalty of perjury.
Contractor's Signature	

Relevant Experience Statement: Include as an attachment to your proposal a statement describing relevant experience with implementing similar projects. Include specific examples of past projects similar in scope and magnitude.