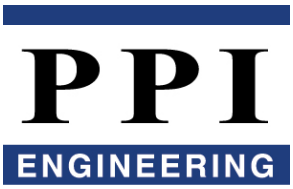
CONSTELLATION BRANDS INC.
2155 RAMAL ROAD

WATER STORAGE RESERVOIR DESIGN



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CONSTELLATION BRANDS INC.
2155 RAMAL ROAD

WATER STORAGE RESERVOIR DESIGN

AND

SPECIFICATIONS

REVISED APRIL 2023

PREPARED BY:

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CALIFORNIA 94558
(707) 253-1806

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Notice to Bidders / Additional Information

1. The Bid Schedule enclosed in these Specifications shall be completed and submitted with bid. Bid must include all associated taxes or fees for completion of the reservoir excepting those associated with obtaining a Grading Permit from Napa County. Bids shall include a proposed work schedule / estimate of time for completion and Contractor's availability.

2. A Bid Bond and / or Performance Bond is not required.

3. Bidders must satisfy themselves by personal examination of the project site, Plans and Specifications. Bidder's are responsible for generating their own earthwork quantities for bidding purposes.

4. Bids shall be submitted to:

   PPI Engineering
   2800 Jefferson Street
   Napa, CA 94558
   ATTN: Matt Bueno

   No later than 12:00 noon on _____

5. Selection of the winning bidder shall be at the sole discretion of Constellation Brands Inc. (Owner). Owner reserves the right to reject any or all bids, and does not guarantee that the project being bid will be awarded.

6. Owner reserves the right to change the scope of project at any time, including after awarding of Contract. Contractor's bid price will be adjusted according to the unit prices included in the Bid Schedule.

7. Contractor shall confirm water source for construction prior to completing bid and shall include any costs associated with pumping or transferring of water in bid price.

Bidder's Proposal – Sheet 1 of 2

Item	Description	Cost
Earthwork & all incidentals *	including all earthwork for reservoir embankments, excavation of reservoir and construction of embankments. Cost should include all necessary equipment, labor, and materials and any other costs incidental to construction of the reservoir and appurtenances to the lines and grades shown on the Plans and as directed in Specifications exclusive of the items listed separately below.	$_____ L.S.
Overflow Pipe & Pipe Level Spreader	including all materials and labor for installation of the overflow pipe through reservoir to outlet location and rip-rap as shown on the Plans and Details and as directed in the Specifications.	$_____L.S.
Subdrains & Recycled Water Pipeline	including all materials and labor for installation of the subdrain system which includes all drainage pipelines, Overflow Structure, and a portion of the recycled water pipeline as shown on Plans and Details.	$_____L.S. $_____L.F.
Synthetic Liner / underlayment	including all materials and labor for installation of the synthetic liner and underlayment as shown on the Plans and Details and as directed in the Specifications. Also, installation of 5-each HDPE ladders at locations shown on Plans.	$_____L.S.

Continued – See Page BP-2

Bidder's Proposal – Sheet 2 of 2

Item	Description	Cost
Fill Pipes -	including all materials and labor to install one 8" diameter purple C900 Fill Pipe.	$_____ L.S.
Erosion Control -	including straw and seed, wattles, jute netting, and all labor and incidental materials to winterize all disturbed areas on project site.	$_____ L.S.
Total		**$_____**

* Assume for bidding purposes 4.5-foot average depth of overexcavation under embankment except for keyway where overexcavation shall average 6.5-feet deep.

List all subcontractors that are to perform work on this project:

Name Description of work to be performed

_____

_____

_____

Implementation Schedule: List the estimated time for completion of this project and your availability to start work on this project:

_____

_____

_____

_____

Signature Date Contractor's License Number

CARNEROS VISTA RANCH
2155 RAMAL ROAD

WATER STORAGE RESERVOIR DESIGN

NARRATIVE

1. Project Description

This narrative addresses the development of an approximately 75-acre-foot water storage reservoir on the Constellation Brands Inc. property located at 2155 Ramal Road in Napa. The water storage reservoir will be used for vineyard irrigation. The ranch is located in the Agricultural Watershed (AW) zoning district on APN 047-271-002 which consists of approximately 258 acres per the Napa County Assessor's Office.

The location of the water storage reservoir and work associated with its construction will be completed within the footprint of an existing fallow vineyard block that was removed under Track II ECP #P20-00169. The proposed reservoir footprint is approximately 6.5 acres. The reservoir will be constructed in the summer of 2023.

The site is located in the Napa River Watershed. The elevations at the proposed reservoir site range from approximately 70 feet to 100 feet above mean sea level per the topographic mapping. Ground slopes within the project boundary range between 1 and 15 percent. The topographic mapping was provided by PPI Engineering via a ground survey performed in April 2022.

Multiple site visits of the property were performed by Jim Bushey and Matt Bueno of PPI Engineering throughout 2022 to evaluate the Reservoir site and to collect photographic documentation. Photographs of pre-project conditions can be found in Appendix A.

2. Natural and man-made features onsite including streams, lakes, reservoirs, roads, drainage, and other areas that may be affected by the proposed activity.

a) No natural or man-made features are expected to be adversely affected by this project. There is a blue line stream in the vicinity but it will not be affected by the project.

b) Ramal Road is adjacent to the project site and is the main point of access to the site.

3. Location and source of water for Reservoir.

a) Recycled water from Napa Sanitation District will be the source of water for the reservoir.

4. Soil/Geotechnical investigation.

a) A site-specific soil investigation was performed by PJC & Associates, the soil/geotechnical report is attached.

5. Proposed erosion control measures and methods

1. Upon completion of construction, contractor shall be responsible for seeding and straw mulching all disturbed soils. Seed and mulch on slopes greater than 25%, including embankments, shall be jute netted beginning October 15 of the year of construction. Seed shall be dwarf barley and shall be broadcast at a rate of 150 pounds per acre. Straw mulch shall be applied at a rate of 4,000 pounds per acres. Where straw mulch and jute netting are required, straw shall be applied after seeding is completed. Jute netting shall be applied over the straw mulch with seams running perpendicular to the slope and shall be stapled in place according to the stapling schedule supplied with the jute netting.

2. Straw wattles shall be installed the year of construction in the locations shown on the Plans and as shown on the detail. Wattles shall be stockpiled on-site prior to commencing construction activities and shall be installed immediately in the event rainstorm activity has been forecast during the construction season.

3. If construction is not completed by October 15 of the year of construction, additional temporary erosion control measures shall be installed and maintained until grading is completed and permanent erosion control measures installed. Temporary measures shall be as directed by Engineer in field.

4. The site entrance shall be stabilized with 3-4" crushed rock to prevent tracking of soil offsite.

2000 GENERAL

PART I

1.1 PROJECT ENGINEER

The work covered by these specifications shall be performed under the observation of the Project Engineer, who shall be retained by the Owner. The Project Engineer will be present at the site intermittently to observe the work. Upon completion of the project, the Contractor and Owner shall be notified in writing by the Project Engineer of any unacceptable work. In the event that work performed by the Contractor does not meet the requirements of these specifications, the Contractor shall repair the work using all necessary means to ensure that the completed work meets the requirements of these specifications. All such required repair work shall be done at the Contractor's own expense. The Project Engineer's costs for observing the repair of unsatisfactory work performed by the Contractor will be billed to the Owner. The Owner will pay the Project Engineer and then deduct the amount for observing and testing the repair of unsatisfactory work from moneys due, or that may become due to the Contractor.

1.2 GEOTECHNICAL ENGINEER

The Project Geotechnical Engineer shall periodically observe and test certain aspects of the construction. See Section 2200, "Earthwork", including Section 2200, Part I, 1.3, Project Geotechnical Engineer.

1.3 SYNTHETIC LINER CQA MONITOR

The work covered by Section 2500, "Synthetic Liner" shall be performed under the observation of a CQA Monitor as specified in that section of these specifications. The Owner shall retain the CQA Monitor.

1.4 CONSTRUCTION STAKING

Prior to commencing construction, Owner shall retain the services of a licensed surveyor to provide staking as necessary to construct reservoir. In addition to initial slope staking, Surveyor will set, at the Owner's expense, necessary stakes and hubs to construct the overflow pipeline and storm drain system upon substantial completion of the embankment. Any additional staking by the Surveyor will be at the Contractor's expense and shall be deducted from final payment to the Contractor.

1.5 PRE-CONSTRUCTION MEETING

Prior to commencing construction, a pre-construction meeting shall take place on-site. At a minimum, the following persons will be present at the pre-construction meeting:

- Owner or Owner's Representative
- Contractor
- Contractor's Foreman that will run job, if other than Contractor
- Project Engineer
- Project Geotechnical Engineer
- Surveyor

1.6 DISCREPANCIES

Any discrepancies between the Plans, Details, Geotechnical Report, or any part of these Specifications are unintentional and shall immediately be brought to the attention of the Project Engineer prior to continuing any work.

1.7 STANDARDS AND SPECIFICATIONS

Any standards or specifications referred to in these Specifications shall refer to the latest version available at the time of construction.

1.8 RESPONSIBILITIES OF THE CONTRACTOR

A. The Contractor agrees that in accordance with generally accepted construction practices, Contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project, including the safety of all persons and property. The requirement shall be made to apply continuously and not be limited to normal working hours. Contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged, in connection with the performance of the work on this project, excepting liability arising from the sole negligence of design professional.

B. The Contractor shall be responsible for controlling dust and mud generated from construction activities. The Contractor shall not allow dust or mud to obstruct vehicular traffic on any public roadways. The Contractor shall be responsible for cleaning vehicles prior to leaving the site as required by the California Highway Patrol.

C. The Contractor shall be responsible for following all applicable safety laws including those issued by CAL-OSHA. The Contractor alone shall be responsible for the safety of his equipment and methods and for any damage or injury that may result from their failure, improper construction, maintenance or operation.

D. Contractor shall be responsible for installing any necessary sediment retention structures should construction activities continue beyond October 15 of the year of construction.

E. Contractor shall keep work site clean and free of rubbish and debris throughout the project. Materials and equipment shall be removed immediately from the site upon completion of the project.

1.9 EXISTING UTILITIES & IMPROVEMENTS

At least two working days prior to beginning any excavation on the project, Contractor shall contact Underground Service Alert (USA) at 1-800-642-2444 and request field location of any existing utilities.

In addition to utilities, there are significant existing improvements on the property including but not limited to vineyard and trellis, structures, irrigation systems, and fences. Contractor shall take precautions to prevent damage to any existing improvements at the project site. Any damage shall be repaired at the Contractor's expense. Damage to any existing piping systems including water, gas or septic shall be repaired immediately and shall not be left un-repaired over night.

1.10 PROSECUTION OF WORK

Unless otherwise provided, the contract time shall commence upon issuance of a Notice to Proceed by the Owner. The work shall start at the date agreed upon between the Owner and Contractor and shall be diligently prosecuted beginning on that date. Work shall be completed within the time frames submitted with the Contractor's bid for project. If weather conditions prevent completion of work within specified time frames, Owner may extend completion date of project.

1.11 PAYMENT

Any work performed on the project in which the quantities vary from those shown on the Plans and Details shall be immediately brought to the attention of the Project Engineer and Owner. Prior to execution of work, the Owner and Contractor shall agree on compensation. Final payment for the project shall not be made until the Engineer has performed a final observation of the site to verify substantial compliance with the Plans and Specifications.

2200 EARTHWORK

PART I GENERAL

1.1 DESCRIPTION

A. This section consists of all clearing, stripping, grubbing, excavation, subgrade preparation, and placement and compaction of embankment fill, and all incidental work necessary to complete the earthworks to conform to the lines and grades shown on the plans. Embankment and liner fill construction shall consist of placement, spreading, moisture conditioning, blending, and compaction of fill materials.

B. Earthwork shall conform to these specifications as well as the recommendations and specifications contained in the Soils Report prepared by PJC & Associates, Inc., dated October 28, 2022 and entitled:

Geotechnical Investigation
Proposed Carneros Vista Reservoir
Duhig Road
Napa, CA

This report is herein incorporated into these specifications by reference. Any discrepancies between these specifications and this Soils Report are unintentional and shall immediately be brought to the attention of the Project Engineer.

1.2 DEFINITIONS

A. Standard Specifications: Where used in these specifications, "Standard Specifications" shall mean the State of California Department of Transportation (Caltrans) Standard Specifications, most recent version. All work shall be carried out in conformance with the Standard Specifications unless otherwise specified herein.

B. Relative Compaction: Where used in these specifications, relative compaction is the ratio expressed as a percentage of the required in-place dry density of the material to its maximum dry density as determined in the laboratory using ASTM D1557.

C. Optimum Moisture Content: Where used in these specifications, optimum moisture content is the moisture content of the material expressed in percent (by dry weight) corresponding to its maximum dry density as determined in the laboratory using ASTM D1557.

D. Soil Subgrade: Where used in these specifications, soil subgrade shall mean any area on which embankment and/or liner materials are to be placed.

E. Completed Course: Where used in these specifications, completed course shall mean the excavation surface, or the surface of a layer of fill that has been prepared as specified, and that is ready for the next layer or phase of the work.

F. Fill Processing and Moisture Conditioning: Where used in these specifications, fill processing comprises all methods necessary to provide fill materials meeting the specified material gradations. Fill processing may include selective excavation, disking, blading, tilling, crushing, blending, and/or removal of oversize and/or deleterious materials, as required. Moisture conditioning comprises all methods necessary to add and uniformly distribute water or remove water from a fill material to bring it to moisture content as specified by these specifications.

G. Well Graded: Where used in these specifications, well graded shall mean a mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes. Well graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters. Well graded is used to define a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

1.3 PROJECT GEOTECHNICAL ENGINEER

The work covered by these specifications shall be performed under the observation of the Project Geotechnical Engineer, who shall be retained and paid by the Owner. The Project Geotechnical Engineer will be present at the site intermittently to observe the work, and to perform field and laboratory tests to evaluate material quality and compaction. The Contractor shall cooperate with the Project Geotechnical Engineer in performing the observations and tests. At the completion of the work, the Project Geotechnical Engineer will submit a report to the Owner, including a tabulation of all tests performed. In the event that work performed by the Contractor does not meet the requirements of these specifications, the Contractor shall repair the work using all necessary means to ensure that the completed work meets the requirements of these specifications. All such required repair work shall be done at the Contractor's own expense. The Project Geotechnical Engineer's costs for observing and testing the repair of unsatisfactory work performed by the Contractor will be billed to the Owner. The Owner will pay the Project Geotechnical Engineer and then deduct the amount for observing and testing the repair of unsatisfactory work from moneys due, or that may become due to the Contractor.

1.4 SAFETY

The Contractor shall be solely responsible for performing all earthwork in a safe manner; and provide appropriate measures to retain excavation sideslopes and prevent rock falls to ensure that persons working in or near the excavation are protected. The Contractor shall comply with all applicable codes, ordinances, statutes, and bear sole responsibility for the penalties imposed for noncompliance.

PART II MATERIALS

2.1 CLEARING, STRIPPING, AND GRUBBING

A. Clearing: Clearing shall consist of the removal of all trees, shrubs, and other vegetation that is not designated to remain. Cleared materials shall be removed from areas to be graded and shall be disposed of in areas designated by the Owner.

B. Stripping: Stripping shall consist of the removal of weeds, grasses, and organic topsoil. Stripped materials shall not be reused as compacted fill and shall either be removed from the site or stockpiled for later use in an area designated by the Owner.

C. Grubbing: Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots, or root systems greater than 2 inches in diameter or thickness to a depth of 6 inches below the ground surface. Grubbed materials shall be removed from areas to be graded and shall be disposed of in areas designated by the Owner.

2.2 EMBANKMENT FILL MATERIAL

All embankment fill material shall be free of deleterious material and rocks or lumps larger than 6 inches in greatest dimension. All embankment fill material shall be approved by the Project Geotechnical Engineer prior to its use, shall be well graded, and shall conform to the following gradation as determined by ASTM D7928 and ASTM D1140:

Sieve Size	**Percent Passing**
6 inch	100
4 inch	85-100
No. 200	30-100

2.3 ONSITE MATERIALS

A. Onsite materials meeting the requirements of these specifications may be used as embankment fill. All deleterious and oversize material shall be removed prior to use. Onsite materials may require selective excavation, and may need to be segregated, crushed, blended, and moisture conditioned to meet the requirements of these specifications.

B. Onsite materials with moisture contents substantially wet of optimum will need to be disced, harrowed, plowed, bladed, or otherwise mechanically processed to bring the material to the specified moisture content for placement and compaction. Use of chemical admixtures is not permitted.

C. Add water to onsite materials that have moisture contents dry of optimum to bring the material to the specified moisture content for placement and compaction. Insofar as

practicable, add water to the material at the site of the excavation or stockpile; supplement by sprinkling the fill. Use blades, discs, harrows, and other mechanical means as appropriate to thoroughly mix the water to ensure that the specified moisture content is attained throughout each lift of the fill.

2.4 IMPORTED MATERIALS

A. Imported material, if required, shall be tested and approved by the Project Geotechnical Engineer prior to use. All imported materials specified in this section are subject to the following requirements:

1. All tests necessary for the Contractor to locate an acceptable source of imported material shall be made by the Contractor. Certification that the material conforms to these specifications along with copies of the test results from a qualified commercial testing laboratory shall be submitted to the Project Geotechnical Engineer for approval at least 4 days before the material is required for use. Final acceptance shall be based on tests made on samples of material taken from the completed and compacted course. All testing for final acceptance will be performed by the Project Geotechnical Engineer.

2. If tests conducted by the Project Geotechnical Engineer indicate that the material does not meet Specification requirements, material placement shall be terminated until corrective measures are taken. Material that does not conform to these specifications that is placed in the work shall be removed and replaced at the Contractor's sole expense. Sampling and testing performed by the Contractor shall be done at the Contractor's sole expense.

PART III EXECUTION

3.1 WEATHER CONDITIONS

No soil shall be placed and compacted during periods of rain or on ground that is not drained of free water or is frozen. Soil that has been stockpiled and wetted by rain or by any other cause shall not be placed and compacted until its moisture content is within the limits specified or approved by the Project Geotechnical Engineer.

3.2 EQUIPMENT

A. Compaction equipment shall be of suitable mechanical type and adequate to obtain the densities specified, and shall provide satisfactory breakdown on materials to form a dense, well-graded fill. Flooding or jetting shall not be allowed.

B. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it shall deliver the manufacturer's rated compactive effort. If

inadequate densities are obtained, larger and/or different types of additional equipment shall be provided by the Contractor. Hand-operated equipment shall be capable of achieving the specified densities.

C. Equipment for applying water shall be of a type and quality adequate for the work, shall not leak, and shall be equipped with a distributor bar or other approved device to assure uniform application. Equipment for mixing and drying out material shall consist of blades, discs, or other approved equipment.

3.3 SPILLS, DUST, AND EROSION CONTROL

A. Spills: The Contractor shall prevent spills when hauling on or adjacent to any public street or highway. In the event that a spill occurs, the Contractor shall remove all spilled material and sweep, wash, or otherwise clean such streets or highways as required by local City and County authorities and/or the State of California.

B. Dust and Erosion Control: The Contractor shall take all necessary precautions to prevent a dust nuisance to adjacent public or private properties, and to prevent erosion and transport of soil to downstream or adjacent properties that may be caused by work under this Contract. All damage so caused shall be corrected or repaired by the Contractor at the Contractor's expense.

C. Owner's Prerogative: In the event of the Contractor fails to take necessary precautions or to make corrections or repairs promptly, the Owner may take such steps as deemed necessary and deduct the cost of the same from the moneys due to the Contractor. Any such action or lack of action on the part of the Owner in no way alters or relieves the Contractor of the responsibility for proper protection of the work, for preventing or cleaning spills, or for dust and erosion control.

3.4 CLEARING, STRIPPING, AND GRUBBING

A. Clearing: The areas to be graded shall be cleared of all grass, brush, roots, rubbish, and debris.

B. Stripping: Topsoil containing grass, roots, and other vegetation shall be removed. These materials shall not be reused as compacted fill.

C. Grubbing: Roots and other vegetation greater than 2 inches in diameter shall be grubbed and removed to a depth of 6 inches below the ground surface.

3.5 EXCAVATION BELOW GRADE/REMOVAL OF EXISTING EMBANKMENTS

Soft, compressible, or loose soils encountered at the embankment subgrade shall be excavated to expose competent materials on which fill may be placed. The Project Geotechnical Engineer shall observe and approve the embankment subgrade prior to placement of fill. Existing reservoir embankments, if present, shall be completely removed prior to placement of any fill. Subgrade in these areas shall be observed by Geotechnical Engineer prior to placement of any fill.

3.6 GROUNDWATER CONTROL

Provide and operate equipment adequate to keep all excavations and trenches free of water. Remove all water during periods when pipe is being laid, during the placing of embankment fill, and at such other times as required for efficient and safe execution of the work. Avoid settlement or damage to adjacent property. Dispose of water in a manner that shall not damage adjacent property. When dewatering open excavations, dewater from outside the structural limits and from a point below the bottom of the excavation. Design groundwater control systems to prevent removal of fines from existing ground. The Contractor shall install, operate, and maintain all drains, sumps, wells, pumps, and other means necessary to maintain water levels at least 4 feet below excavations during construction to facilitate excavation and fill placement.

3.7 EXCAVATION

Perform all excavation of every description, regardless of the type, nature, or condition of material encountered, as specified, shown, or required to accomplish the construction. Transport excavated material to where it shall be stockpiled, or used as fill. Finished surfaces of completed excavations shall be true to the lines and grades shown, or as required to accomplish the work, and the prepared surface shall be smooth, firm, and unyielding. All loose material shall be removed. All depressions shall be filled with embankment fill, placed and compacted as specified.

3.8 SUBGRADE MOISTURE CONDITIONING AND COMPACTION

After completion of excavation, and prior to subgrade preparation, proof-roll the excavation surfaces to detect soft or loose zones. Notify the Project Geotechnical Engineer prior to commencement of proof-rolling. If soft or loose zones are found, excavate the soft or loose material to a depth accepted by the Project Geotechnical Engineer, then fill and compact as specified for similar areas of embankment. The subgrade exposed by stripping or excavation shall be scarified to the depth specified in the Soils Report and as shown on the Details, moisture conditioned to between optimum moisture content and 3 percent above optimum moisture content, and compacted as specified in the Soils Report and as shown on the Details.

3.9 BENCHING

Embankment fill shall be benched into the prepared surface on slopes inclined steeper than 6:1 (horizontal:vertical). Benches cut for construction of embankment shall be less than 5 feet high, and shall be sloped no steeper than 0.75:1. The exposed bench surface shall be scarified to the depth specified in the Soils Report, moisture conditioned as specified, and compacted as specified in the Soils Report.

3.10 FILL PLACEMENT, MOISTURE CONDITIONING, AND COMPACTION

A. The Contractor shall obtain the Project Geotechnical Engineer's approval of the completed course prior to placing the next layer, or proceeding with the next phase of work. Embankment fill shall be placed in layers 8 inches or less in loose

thickness, moisture conditioned as specified, and compacted with a sheepsfoot roller or other approved equipment. Embankment fill shall be moisture conditioned and compacted as specified in the Soils Report. Smooth-wheeled, or rubber-tired compactors will not be permitted. All fill shall be placed in horizontal layers. Unless otherwise approved in writing by the Project Geotechnical Engineer, construct the embankment in horizontal layers across its full length and width before placing the next layer.

B. If field density tests indicate that specified compaction and/or moisture content has not been attained, the fill shall be reconditioned, as necessary, and re-compacted as specified prior to placing additional fill. The Contractor shall be responsible for placing, moisture conditioning, and compacting approved material in accordance with these specifications. The Contractor shall adjust haul rates, or furnish additional spreading, moisture-conditioning, and/or compaction equipment, or make any other adjustments until a satisfactory fill meeting the requirements of these specifications is obtained.

C. If pipelines are to be laid in embankment, construct embankment to an elevation 2 feet above the top of proposed pipeline prior to excavating for the pipeline.

D. During all compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of fill. Maintain moisture content uniform throughout the lift. At the time of compaction, the water content of the material shall be as specified by these specifications.

3.11 FILL SLOPES

Fill slopes shall be true to the lines and grades shown, and shall be overfilled and trimmed back to a firm, smooth surface free of loose material.

3.12 FINISH / NON-STRUCTURAL FILL

A. The completed surface of all excavations and fills shall be true to the lines and grades, and shall be smooth and unyielding. Any deviations from the lines and grades shown shall be corrected by excavating or filling as specified.

B. Upon completion of structural fill, all excess cut material and strippings shall be placed where shown on the Plans as directed by the Project Geotechnical Engineer. Non-structural fill shall be graded such that it uniformly drains and does not affect natural drainage patterns. No ponding shall be allowed within non-structural fill. Non-structural fill less than 5-feet in depth shall be placed in 12” maximum horizontal lifts and shall be compacted to 85% relative compaction per ASTM D1557. For non-structural fills greater than 5-feet in depth, the portion of fill below a depth of 5-feet shall be compacted to 90% relative compaction and shall be placed in accordance with structural fill specifications above. No roots or organic matter larger than 6” in diameter shall be allowed in non-structural fill.

C. Where non-structural fills are placed on slopes of 5:1 or greater and fills are greater than 2-feet in height, fill shall be keyed and benched into native slope as directed in field by Geotechnical Engineer.

3.13 SYNTHETIC LINER SUBGRADE

A. For installation of the synthetic liner, the liner subgrade shall be scarified as directed by the Project Geotechnical Engineer, moisture conditioned, and compacted to 90% relative compaction per ASTM D1557. The liner subgrade should be processed to have no particles greater than ½ - inch in diameter, moisture conditioned to between optimum and 4 percent above optimum moisture content, and compacted to 90% relative compaction. Fine finishing of the subgrade may include both raking and hand grooming to remove angular rock fragments and gravel from the slope prior to placement of the liner or liner underlayment (if required). Alternately, material meeting the requirements for fine finished subgrade can be segregated during reservoir excavation for later placement as an 8-inch thick fine-finished, compacted subgrade. Benching is not required for the fine finished synthetic liner subgrade. However, the inboard slopes and reservoir bottom should be roughened to provide bonding between the fine-finished subgrade layer and the underlying compacted soil or bedrock. If soil is to be imported, a sample shall be provided to the Project Geotechnical Engineer for approval prior to the delivery of the soil.

B. Upon completion of the subgrade preparation described in Section 3.13.A, the surface of the compacted fine-finished layer shall be rolled with a smooth steel drum roller prior to placement of the liner underlayment.

3.14 FIELD QUALITY CONTROL

A. The Project Geotechnical Engineer will observe the clearing, stripping, and grubbing operations, and will determine the required depth of stripping and the required extent of grubbing. In addition, the Project Geotechnical Engineer will observe the excavation, moisture-conditioning, and compaction operations. The Project Geotechnical Engineer will perform field and laboratory tests to determine if the materials used in the work meet the requirements of the specifications.

B. The Project Geotechnical Engineer will determine in-place density and moisture content by any one or combination of the following methods: ASTM D1556, D2216, D6938 or other methods selected by the Project Geotechnical Engineer. The Contractor shall cooperate with this testing work by leveling small test areas designated by the Project Geotechnical Engineer. Backfill all test areas at Contractor's sole expense. The frequency and location of testing shall be determined solely by the Project Geotechnical Engineer. The Project Geotechnical Engineer may test any lift of fill at any time, location, or elevation.

3.15 GUARANTEE OF WORK

A. Notwithstanding observation and testing of the work by the Project Geotechnical Engineer, the Contractor warrants that all construction will be of good quality, that the work will be free from defects in material or workmanship, and that the work will conform to the specification requirements. Work not conforming to specification requirements may be considered defective.

B. This warranty by the Contractor is in addition to any warranties or guarantees required elsewhere in the Contract, or in the specifications for specified items of equipment or materials. This warranty shall be in effect notwithstanding any disclaimers, or limiting or conditional terms contained in such separate warranties furnished by manufactures or suppliers. In addition, after final payment to the Contractor, the Contractor shall not be relieved or excused from responsibility for breach of warranty.

3.16 AUTHORITY OF THE PROJECT GEOTECHNICAL ENGINEER

A. Under the direction of the Project Engineer, the Project Geotechnical Engineer shall decide all questions that may arise as to the quality or acceptability of embankment materials placed and compacted, and all earthwork performed. The Project Geotechnical Engineer shall decide all questions as to the manner of performance and rate of progress of earthwork, and all questions that may arise as to the interpretation of the earthwork specifications. The Project Geotechnical Engineer will have the final authority to reject all earthwork that does not conform to the requirements of these specifications.

B. Work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on the plans or indicated in the specifications. Although measurement, sampling, and testing may be considered evidence as to such conformity, the Project Geotechnical Engineer shall be the sole judge as to whether the earthwork or materials deviate from the plans and specifications.

3.17 OBSERVATION OF CONSTRUCTION

A. The Project Geotechnical Engineer shall at all times have safe access to the work during its construction, and shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of the specifications. All work done and all materials furnished shall be subject to the Project Geotechnical Engineer's observation.

B. The observation of the construction or materials by the Project Geotechnical Engineer shall not relieve the Contractor of any obligations to fulfill its Contract as prescribed. Work and materials not meeting such requirements shall be corrected, and unsuitable work or material may be rejected, notwithstanding that such work or materials have been previously reviewed by the Project Geotechnical Engineer, or that payment therefore has been made.

C. The Project Geotechnical Engineer may order re-examination of questioned work at any time before final acceptance. If so ordered, the work shall be uncovered by the Contractor. If such work is found to be in accordance with the Contract, the Contractor will be paid for the cost of uncovering, removal, recovering, and replacing the parts removed. If such work so exposed or examined is not in accordance with the Contract, the uncovering, removal, recovering, and replacement shall be at the Contractor's sole expense. Work that has been covered prior to observation by the Project Geotechnical Engineer does not qualify as re-examined work; the Project Geotechnical Engineer may order it uncovered for observation without payment of costs.

D. The Contractor shall give due notice to the Project Geotechnical Engineer before placing fill so that the Project Geotechnical Engineer may observe the materials and installation. The observations performed by the Project Geotechnical Engineer shall not relieve the Contractor of its responsibility to conduct comprehensive inspections of the work and to furnish materials and perform work in conformance with the requirements of these specifications.

3.18 CORRECTION, REMOVAL, OR REJECTED WORK

A. The Contractor shall promptly correct work rejected by the Project Geotechnical Engineer as failing to conform to the requirements of the specifications so that it does comply. The Contractor shall bear the costs of correcting such rejected work, including additional testing, inspections, and compensation for the Project Geotechnical Engineer's services and expenses made necessary thereby.

B. The Contractor shall remove from the site portions of the work that are not in accordance with the specifications, or which are not corrected by the Contractor, all at the Contractor's own expense. If the Contractor fails to promptly correct nonconforming or rejected work, the Owner may cause such work to be remedied, removed, or replaced, and the costs thereof will be deducted from any monies due or that may become due the Contractor. Failure on the part of the Project Geotechnical Engineer to reject nonconforming work shall not be construed to imply acceptance of such work.

2300 OVERFLOW PIPE

PART I GENERAL

1.1 DESCRIPTION

This section consists of all materials, excavation, fabrication, concrete work, backfill and all incidental work associated with construction of the overflow pipe as shown on the Plans. In addition to these specifications, overflow pipe construction shall conform to the Plans and Details.

1.2 DEFINITIONS

A. Riser: Where used in these specifications, "Riser" shall mean the vertically oriented portion of the overflow pipeline.

B. Overflow Pipeline: Where used in these specifications, "Overflow pipeline" shall mean the structure used to outlet water from within the reservoir to a protected outlet, including the riser and horizontal pipeline through and below the embankment.

C. Apron: Where used in these specifications, "Apron" shall mean the concrete pad surrounding the riser.

PART II MATERIALS

2.1 PIPE

A. Riser, outlet pipe and all fittings shall be gasketed, water-tight non-perforated dual wall corrugated polyethylene pipe (CPP). CPP shall conform to AASHTO M294 and ASTM F667.

2.2 CONCRETE & REINFORCEMENT STEEL

A. Concrete for construction of the apron shall be Portland cement concrete with a minimum compressive strength of 3000 psi.

B. Concrete for use as encasement around the outlet pipe, anchors and cutoff collars shall be Portland cement concrete with a minimum compressive strength of 2000 psi. Concrete for pipeline encasement shall have a 6" slump and shall be adequately moist to easily flow around the outlet pipeline and adhere to trench walls.

C. Reinforcement steel shall conform to ASTM A615. Rebar shall be clean of oil and rust prior to placement.

2.3 TRENCH BACKFILL MATERIAL

A. Trench backfill material above the outlet pipe shall meet requirements for structural fill as specified in Section 2200, "Earthwork."

PART III EXECUTION

3.1 EXCAVATION AND OVERFLOW PIPE INSTALLATION

A. Except where otherwise stated in these Specifications, installation of corrugated polyethylene pipe shall conform to ASTM D2321.

B. The excavation for the overflow pipeline within the embankment shall be made into compacted structural fill. Fill shall extend a minimum of 24" above the top of the pipeline prior to excavation of the trench for the pipeline.

C. The overflow pipe and riser shall be well supported on the trench bottom with concrete blocks or other means acceptable to the Project Engineer. The trench bottom shall be clean of any loose debris or clods. Gaps larger than ¼" in size will not be allowed at pipe joints. All CPP pipe joints, including those encased in concrete, shall be fully gasketed.

D. Construction staking shall be provided by the Project Engineer and Surveyor. Elevations of pipes shall be as shown on the Plans. Invert elevations may be a maximum of 0.05 feet above or 0.10 feet below design elevation. No reverse grades shall be allowed.

3.2 CONCRETE PLACEMENT

A. Prior to placement of encasement concrete, pipeline shall be anchored in place in order to prevent the pipeline from moving or floating during placement of concrete. During placement of concrete, concrete shall be vibrated in place in order to ensure that concrete flows around spillway riser and outlet pipe. Concrete shall not be excessively vibrated such that concrete components begin to separate. Care shall be taken during placement of concrete to prevent debris from falling into the trench or concrete.

B. If multiple trucks will be required in order to deliver the necessary concrete, trucks shall be scheduled adequately such that successive pours are not allowed to begin to cure. Cold joints within the encasement will not be allowed. If Contractor chooses to pour the apron as a separate pour, dowels shall be installed in the concrete encasement to tie the apron to the encasement. Dowels shall be made of #4 steel rebar placed 8" on center around the perimeter of the riser pipeline.

C. The upper surface of concrete encasement shall be roughened with a shovel or other means such that the first lift of earthen backfill adheres to the concrete encasement. Concrete encasement shall not be smoothed with a trowel or any other means prior to curing.

D. Concrete shall be allowed to cure for seven days prior to any equipment activity being allowed over the top of the pipeline. Contractor may, upon Civil Engineer's approval, utilize admixtures in order to reduce required curing time. Contractor shall provide necessary submittals at least 3 days prior to pouring concrete in order to obtain approval.

E. The concrete apron shall be reinforced with steel rebar as specified on the Details. Rebar shall be uniformly supported with concrete or metal supports such that the curtain is located at the middle of the slab. Splices of horizontal bars shall be staggered and shall overlap a minimum of 30 bar diameters.

2400 SUBSURFACE DRAINAGE SYSTEM

PART I GENERAL

1.1 DESCRIPTION

This section consists of all materials, excavation and installation associated with installation of a subsurface drainage system below the reservoir bottom. In addition to these specifications, the subsurface drainage system shall conform to the Plans and Details.

1.2 DEFINITIONS

A. Subdrain: Where used in these specifications, "Subdrain" shall mean a buried perforated pipeline encased in envelope material backfill unless specified as "Solid" on Plans.

B. Envelope material: Where used in these specifications, "Envelope material" shall mean a self-filtering, highly permeable material that is placed around and above subdrains.

PART II MATERIALS

2.1 PIPE

A. Pipe and fittings for subdrains shall consist of perforated PVC well casing pipe conforming to ASTM F480, ASTM D1785, and ASTM D2241 or dual wall, perforated Corrugated Polyethylene Pipe (DWCPP) meeting AASHTO M252M and ASTM F667.

B. Pipe and fittings for any pipe specified as solid or non-perforated shall be S40 PVC pipe conforming to ASTM F480, ASTM D1785 and ASTM D2241 or if DWCPP is used, AASHTO M 252M and ASTM F667.

2.2 ENVELOPE MATERIAL

A. Envelope material shall be Class 2 Permeable Material as described in Cal Trans Standard Specifications, Section 68.

PART III EXECUTION

3.1 EXCAVATION AND SUBDRAIN INSTALLATION

A. Due to the shallow depth, all subdrains below pond bottom shall be installed upon completion of all grading or use of large equipment on pond bottom. Contractor shall be responsible for protecting subdrains from damage upon completion of construction of drains and during installation of synthetic liner.

B. Excavation of trenches for subdrain piping shall be as shown on the Plans. Trenches shall be clean prior to placement of pipe and envelope material.

C. For perforated subdrains, a minimum of 0.25 feet of envelope material shall be placed below the pipeline and on both sides of the pipe between the pipe and the trench wall. Envelope material shall extend to top of trench. Care shall be taken during construction of the subdrains to keep the envelope material, both stockpiled and in place, clean of any dirt or debris. Loader operator shall take care not to pickup soil when excavating envelope material from stockpiles.

D. Construction staking shall be provided by the Project Engineer and Surveyor. A gradual variation of no more than 1.0 foot will be allowed from the staked alignment. Elevations of pipes shall be as shown on the Plans. Invert elevations may be a maximum of 0.05 feet above or 0.10 feet below design elevation. No reverse grades shall be allowed.

2500 SYNTHETIC LINER

PART I GENERAL

1.1 GENERAL

A. A synthetic liner shall be installed in the reservoir as shown in the Plans and as described in these Specifications. The synthetic liner shall be High Density Polyethylene (HDPE), textured on one side. All connections, seams and welds shall be made in accordance with these Specifications. The synthetic liner shall be textured on one side and the textured side of the material shall be installed facing up. Any discrepancies between these Specifications and the Manufacturer's recommendations are unintentional and shall be brought to the attention of the Engineer prior to construction.

B. The work covered by these Specifications consists of furnishing and installing an HDPE geomembrane as a pond liner. The Contractor is advised that acceptance and approval of the geomembrane is a phased process that includes Manufacturer's certifications, Manufacturer's quality control testing, conformance testing conducted by an independent testing laboratory selected by the quality control monitor, and non-destructive and destructive seam testing. It is a requirement of these Specifications that the Manufacturer's certifications and quality control test results for the geomembrane, raw resin and extrudate rod or bead shall be received, reviewed and approved by the Engineer prior to shipment of these materials to the site. It is the installation Contractor's responsibility to provide the Engineer with all the required documentation and test results specified herein.

C. The installation Contractor shall supply all labor, tools, equipment and materials to install the HDPE geomembrane liner as shown on the project drawings. Installation shall be performed under constant direction of a single field installation supervisor who shall remain on-site and be in charge of liner layout, seaming, testing, repairs and all other activities throughout the installation.

D. The Manufacturer shall furnish complete written instructions for the storage, handling, installation, and seaming of the geomembrane in compliance with the Plans and Specifications as set forth herein.

1.2 QUALIFICATIONS

A. The Manufacturer of the geomembrane shall have produced HDPE geomembrane for the past three years with a minimum of 20,000,000 square feet of similar lining material for hydraulic lining installations.

B. The installation Contractor shall have installed a minimum of ten projects over the past three years totaling a minimum of 5,000,000 square feet of HDPE geomembrane for similar type projects.

C. The installation supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in this document.

D. The master seamer shall have completed a minimum of 1,000,000 square feet of HDPE geomembrane seaming using the type of seaming apparatus proposed for use on this project.

PART II MATERIALS

2.1 SUBMITTALS

A. Prior to any material being shipped to the site, the following items must be submitted to the Engineer:

B. Samples and specifications of materials to be used.

C. Resin data:

- Statement of production dates
- Certification that resin meets the specification
- Certification that resin is from one manufacturer
- Copy of quality control test data from resin supplier and manufacturer

D. HDPE geomembrane:

- Statement of production dates
- Certification that geomembrane meets these Specifications
- Manufacturer's quality control test data
- Statement certifying that no reclaimed polymer is added
- List percentages of processing aids, antioxidants and other additives
- Notched constant tensile load test results
- Delivery, storage and handling instructions
- Installation instructions
- Sample warranty

E. Extrudate beads or rod:

- Statement of production dates
- Certification that material meets these Specifications
- Test reports from manufacturer
- Certification that it is of same resin as geomembrane

F. Schedule:

- Submit installation schedule two weeks prior to installation.

G. Panel layout:

- Submit drawings showing panel layout and details not conforming to the construction drawings.

H. Resumes:

- Field personnel, seamers, and supervisors.

2.2 WARRANTY

A. The Manufacturer shall submit a material warranty covering the HDPE geomembrane against manufacturer's defects and effects of weathering on a pro-rata basis for a period of twenty (20) years from date of completion of installation.

B. The installation Contractor shall submit a workmanship warranty covering seaming and installation of the material for a period of not less than one year after completion of installation.

2.3 GEOMEMBRANE

A. The geomembrane shall be a 60-mil HDPE geomembrane, textured on one side. Geomembrane shall meet the properties as specified in attached Table 2500.1. The geomembrane shall be manufactured of new, first quality products designed and manufactured for the purpose of liquid containment in hydraulic structures.

B. The geomembrane shall be produced free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter. The minimum roll width shall be 22 feet and the desired length of each roll shall be 400 feet minimum. Each roll shall be labeled indicating roll number, lot number, date of production, length, width, thickness and plant location. There shall not be more than a combined 1 percent by weight of additives other than carbon black.

Table 2500.1 Minimum values for 60-mil textured one-side HDPE geomembranes

Property	Test Method	Requirements
Minimum Thickness (mil)	ASTM D751, D1593 or D5199	54
Density (g/cm^3)	ASTM D792(B) or D1505	0.94
Carbon Black Content (%)	ASTM D1603, modified	2.0
Carbon Black Dispersion	ASTM D3015	A2
Tensile Properties (each direction)	ASTM D638 Type IV, 2ipm	
Strength at Yield (lb/in)	NSF 54 modified	130
Strength at Break (lb/in)		90
Elongation at Yield (%)	(1.3" gauge length)	13
Elongation at Break (%)	(2.5" gauge length)	150
Tear Resistance (lb)	ASTM D1004	45
Puncture Resistance (lb)	FTMS 101, Method 2065	108
Environmental Stress Crack Resistance (hours)	ASTM D1693	1500
Dimensional Stability (% change)	ASTM D1204 (1 hour at 100°C)	±2

2.4 RESIN

Resin shall be new, first quality, compounded and manufactured specifically for producing geomembrane. Resin types shall not be intermixed. Resin shall meet the requirements as specified in Table 2500.2.

Table 2500.2 Minimum values for HDPE resin

Property	Test Method	Requirements
Density (g/cm^3)	ASTM D792 or D1505	0.932-0.940
Oxygen Induction Time (minutes)	ASTM D3895 (1 atm, 200°C)	>100
Melt Index	ASTM D1238, Cond. E per 10 minutes	0.05-0.30 g.

2.5 EXTRUDATE ROD OR BEADS

All extrudate rod or beads shall be made from same resin as the geomembrane. Additives shall be thoroughly dispersed and shall be free of moisture or foreign matter.

2.6 CONFORMANCE TESTING (Performed by CQA Laboratory)

The CQA Monitor shall select samples of the geomembrane shipped to the jobsite at a rate of one per 100,000 square feet. The Installation Contractor shall assist the CQA Monitor in obtaining samples. The samples shall be sent to an independent testing laboratory for the following tests:

- Density - ASTM D1505
- Thickness - ASTM D751
- Tensile Properties - ASTM D638
- Carbon Black Content - ASTM D1603
- Carbon Black Dispersion - ASTM D3015

Installation of the geomembrane shall not proceed until the above testing is completed and the results have been approved by the Engineer.

PART III INSTALLATION

3.1 EQUIPMENT

Extrusion welders or wedge welders shall have temperature gauges installed. In addition, an adequate number of welding machines shall be available to avoid delaying work. The power source for the welders shall be adequate to provide a constant voltage under combined loading of all equipment.

3.2 DEPLOYMENT

A. Each panel shall be assigned an identifying number in sequence of deployment. In addition, each panel shall be visually inspected and faulty areas clearly marked. Geomembrane shall be unrolled using methods that do not damage material and protects underlying surface from damage. Material shall be unrolled using a spreader bar or low-ground pressure equipment.

B. Sandbags shall be placed to prevent wind uplifting.

C. Personnel walking or working on geomembrane shall wear soft-soled shoes. In areas of heavy traffic, geomembrane shall be protected by placing a protective cover over the geomembrane.

D. Sufficient material (slack) shall be provided to allow for thermal expansion and contraction.

3.3 FIELD SEAMING

A. To the extent possible, seams shall be oriented parallel to line of slope; down slope and not across slope. Slope seams shall extend a minimum of five feet beyond toe of slope. The number of seams shall be minimized in corners or odd shaped geometric locations.

B. Contractor shall provide at least one master welder who shall provide direct supervision over other welders as necessary.

C. Seaming shall not proceed when ambient air temperature or adverse weather conditions jeopardize the integrity of the liner installation. Installer shall demonstrate that acceptable seaming can be performed by completing acceptable trial welds.

D. Contractor shall examine all seams and non-seam areas of the geomembrane for defects, holes, blister, undispersed raw materials, and any sign of contamination by foreign matter.

E. Contractor shall repair and non-destructively test each suspect location in both seam and non-seam areas. Geomembrane locations that have been repaired shall not be covered until test with passing values is completed.

3.4 EXTRUSION WELDING

Adjacent pieces shall be hot-air bonded using procedures that do not damage geomembrane. Adjacent panels shall be overlapped 3-inches minimum. Welding equipment shall be purged of heat-degraded extrudate before welding. Geomembrane surfaces shall be cleaned by disc grinder no more than 30 minutes prior to welding. All extrusion welds shall be made to the dimensions shown on the Plans and Details.

3.5 WEDGE WELDING

A. Welding apparatus shall be a self-propelled device equipped with an electronic controller that displays applicable temperatures and speeds.

B. Area between sheets shall be protected against moisture build-up. Seam area shall be cleaned of dust, mud, moisture or debris immediately ahead of the hot wedge welder. All wedge welds shall be made to the dimensions shown on the Plans and Details.

3.6 TRIAL WELDS

A. Trials welds shall be performed on geomembrane samples to verify welding equipment is operating properly. No welding equipment or welder shall be

allowed to perform production welds until equipment and welders have successfully completed trial welds.

B. There shall be a minimum of two trial welds per day, per welding apparatus, one made prior to starting work and one completed at mid shift. Trial welds shall be made under the same conditions and with the same materials as production welds.

C. Four test strips, one inch wide shall be cut from trial welds. Welds shall be tested for peel adhesion and shear strength. The trial welds pass when results for peel and shear meet or exceed the values shown in Table 2500.3. The break must be a film-tearing bond (FTB) that occurs in the material itself and not as a peel at the interface. Breaks must also be ductile.

Table 2500.3 Minimum Weld Values for 60-mil HDPE Geomembranes

Property	Test Method	Value
Peel Strength (fusion & ext.), (lb/in)	ASTM D4437	98
Shear Strength (fusion & ext.), (lb/in)	ASTM D4437	121

3.7 FIELD QUALITY ASSURANCE

The Manufacturer, Fabricator and Installer shall participate in and conform to all terms and requirements of the Owner's quality assurance program. The Installation Contractor shall be responsible for assuring this participation. Quality assurance requirements are as specified in this Section.

3.8 FIELD TESTING

All field seams shall be non-destructively tested over their full length using a vacuum test unit, air pressure (for double fusion seams only), or other approved method. Non-destructive testing may be carried out as the seaming progresses or at completion of all field seaming. In either case, it must be completed before the geomembrane is covered.

3.9 VACUUM TESTING

A. Vacuum testing equipment shall consist of the following:

- A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft gasket attached to the bottom, valve assembly and a vacuum gauge.
- A vacuum pump assembly or other means of creating a vacuum
- A soapy solution

B. Vacuum testing procedures shall be performed as follows:

- Apply soapy solution to the seam area to be tested.
- Place vacuum box over wetted seam areas.
- Insure a tight seal is created.
- Apply a vacuum of at least 5 psi.
- Examine the geomembrane through the window for ten seconds and check for the presence of soap bubbles.
- Mark all areas where soap bubbles appear for repair.

3.10 AIR PRESSURE TESTING (for double seam air channel)

A. Air pressure testing equipment shall consist of the following:

- An air pump equipped with pressure gauge capable of generating and sustaining pressure over 40 psi.
- A sharp, hollow needle equipped with a pressure gauge.
- A hot air gun or torch to seal ends of air channel (clamps can be used).

B. Air pressure testing procedures shall be performed as follows:

- Seal both ends of seam to be tested, insert air needle into air channel and pressurize to at least 30 psi.
- If pressure loss exceeds 4 psi or does not stabilize after 5 minutes, locate faulty area and repair.
- Puncture opposite end of seam to release air. If blockage exists, locate and test seam on both sides of blockage.
- Remove needle and seal holes with extrusion welder.

3.11 DESTRUCTIVE TESTING (performed by CQA Monitor)

A. Test samples shall be collected at a frequency of one per every 500 lineal feet of seam. Test locations shall be determined by the CQA Monitor. Installation Contractor shall cut samples at locations designated by the CQA Monitor. CQA Monitor shall number each sample and give to Installer for pre-testing.

B. Installer will run pre-test and repair areas where samples were taken. If sample passes pre-test, the CQA Monitor will send sample via overnight service to an independent laboratory for peel and shear testing. Five specimens will be tested for both peel and shear out of each sample. Sufficient sample will be cut to allow for laboratory testing, retains by Installation Contractor and archive sample. A sample size of 40 inches long is suggested.

C. If a sample fails, the following procedure shall be followed. The Installer will cut another sample 10 feet on either side of the failed sample and re-test. If these

tests pass, then cap-strip the area in between passing results. If these samples fail, continue this procedure until the problem area is identified. If these failures are excessive, then the seaming unit and personnel will be required to run another test weld. Acceptable seams shall be bounded by two locations from which samples have passed destructive tests.

3.12 REPAIR PROCEDURES

A. Damaged membrane shall be removed and replaced with acceptable geomembrane materials if damage cannot be satisfactorily repaired. Installation Contractor shall be responsible for repair of damaged or defective areas. Agreement upon the appropriate repair method shall be decided between the CQA Monitor and the Installation Contractor. Available repair procedures include:

- Patching – used to repair large holes or tears
- Abrading and re-welding – used to repair small seam sections
- Beads – used to repair pin holes or minor cuts and scratches
- Capping – used to repair long lengths of seams
- Flap-welding – used to extrusion weld the flap of a fusion weld in lieu of a full cap

B. Surfaces of the membrane to be repaired shall be lightly abraded to assure cleanliness. All surfaces shall be clean and dry prior to execution of repair. Extend patches at least 6-inches for extrusion welds and 4-inches for wedge welds beyond the edge of the defect. Corners of all patch material shall be rounded. Installation Contractor shall log all patches and repairs on an as-built set of drawings. Installation Contractor shall non-destructively test all repairs.

3.13 GEOTEXTILE UNDERLAYMENT

Geosynthetic underlayment shall be placed between the geomembrane and the earthen subgrade on the sides and bottom of the reservoir. Underlayment shall be composed of a non-woven geotextile fabric with an average weight of 10 ounces per square yard (Mirafi 1100N or equal). Geotextile fabric shall be installed per fabric and liner Manufacturer's specifications.

3.14 SUBGRADE PREPARATION

The liner subgrade shall be prepared as specified in Section 2200, "Earthwork." Prior to installation of the geomembrane, the manufacturer of the synthetic liner or Installation Contractor shall certify in writing that the subgrade is acceptable. Originals of this certification are to be supplied to the Owner and to the Engineer.

3.15 SAFETY FEATURES

In addition to using textured liner material, Contractor shall be responsible for installing the following safety measures.

Rope tethers shall be installed at each corner of the pond. Tethers shall be constructed of 5/8" marine grade nylon rope with knots tied every 3-feet. Tethers shall extend from the top of dike to the bottom of the reservoir and shall be located at each interior corner of the pond. Tethers shall be secured to 4" x 4" posts anchored 2-feet minimum in concrete at the top of bank outside of the liner trench.

In addition, HDPE ladders shall be secured to the interior liner by welding according to these specifications. Rungs of HDPE ladders shall be 3-inch minimum in depth, 3-feet minimum in width, and ladders shall extend from top of dike to pond bottom at locations shown on Plan. Rungs shall be a maximum of 3-feet on center.

Upon completion of construction, Owner shall be responsible for installing a 6-foot tall minimum security fence, locked gates, and appropriate bilingual signage stating "DANGER – KEEP OUT".

3.16 LINER CONNECTIONS TO STRUCTURES

Watertight seals shall be formed between geomembrane and concrete structures or pipe penetrations. Connections shall be constructed as shown in the Details. Wedge anchors in concrete structures shall be spaced as shown on the Details.

2600 FILL PIPE

PART I GENERAL

1.1 DESCRIPTION

A pipeline shall be installed through the synthetic liner and into the reservoir for the purpose of filling the reservoir with water. The work in this Section includes all labor, materials and incidentals to install this pipeline.

PART II MATERIALS

2.1 PIPE & FITTINGS

A. Pipes shall be gasketed purple C900 (DR18), 8" diameter IPS as shown on the Plans and Details.

B. Pipe fittings shall be restrained cast iron mechanical joint (MJ) fittings, Mega-Lug or equivalent.

2.2 CONCRETE

A. Concrete for the apron shall be Portland Cement Concrete, 3000 psi minimum compressive strength.

B. Concrete for the pipeline encasement shall be Portland Cement Concrete, 2000 psi minimum compressive strength. Encasement concrete shall have a 6" slump and shall be adequately moist to flow easily around the fill pipe and adhere to trench walls.

C. Reinforcement steel shall conform to ASTM A615 and shall be clean of oil and rust prior to placement.

2.3 PAINT / COATINGS

Pipe that is exposed to sunlight shall be lightly sanded, primed and painted with purple exterior rated enamel paint.

PART III EXECUTION

3.1 TRENCHING

A. Prior to installation of the fill pipe, embankment shall be constructed to finish grade elevation. Trench for fill pipe shall be cut into compacted fill.

B. Trench shall be clean and free of debris or loose dirt and clods. Trench shall be made available to the Project Engineer for observation prior to placement of pipe or concrete encasement.

3.2 PIPE PLACEMENT

Pipe shall be placed in trench such that a minimum of 6" of concrete encasement can be poured on each side and below the pipeline. Pipe shall be supported on concrete blocks or other measures as approved by the Project Engineer.

3.3 CONCRETE PLACEMENT

A. Prior to placement of encasement concrete, pipeline shall be anchored in place in order to prevent the pipeline from moving or floating during placement of concrete. During placement of concrete, concrete shall be vibrated in place in order to ensure that concrete flows around pipeline. Concrete shall not be excessively vibrated such that concrete components begin to separate. Care shall be taken during placement of concrete to prevent debris from falling into the trench or concrete.

B. If multiple trucks will be required in order to deliver the necessary concrete, trucks shall be scheduled adequately such that successive pours are not allowed to begin to cure. Cold joints within the encasement will not be allowed. If Contractor chooses to pour the apron as a separate pour, dowels shall be installed in the concrete encasement to tie the apron to the encasement. Dowels shall be made of #4 steel rebar placed 8" on center around the perimeter of the riser pipeline.

C. The upper surface of concrete encasement shall be roughened with a shovel or other means such that the first lift of earthen backfill adheres to the concrete encasement. Concrete encasement shall not be smoothed with a trowel or any other means prior to curing.

D. Concrete shall be allowed to cure for seven days prior to any equipment activity being allowed over the top of the pipeline. Contractor may, upon Project Engineer's approval, utilize admixtures in order to reduce required curing time. Contractor shall provide necessary submittals at least 3 days prior to pouring concrete in order to obtain approval.

E. The concrete apron shall be reinforced with steel rebar as specified on the Details. Rebar shall be uniformly supported with concrete or metal supports such that the curtain is located at the middle of the slab. Splices of horizontal bars shall be staggered and shall overlap a minimum of 30 bar diameters.

3.4 TRENCH BACKFILL

Trench shall be backfilled and compacted according to embankment earthwork specifications.

3.5 LINER CONNECTION TO APRON & PIPE

Synthetic liner shall be connected to the concrete apron and pipe as shown on the details and as specified in Section 2500, “Synthetic Liner.”

3.6 WEAR STRIP

A wear strip shall be installed starting at the fill pipe invert elevation and shall extend down the slope to the bottom of the pond. The wear strip shall be centered on the fill pipe and width shall be as specified in the Plans and Details.

3.7 DISCHARGE ELBOW INSTALLATION

Upon completion of the synthetic liner, a 90 degree elbow shall be installed face up on the end of the fill pipe with a short section of pipe installed into the elbow. The section of pipe shall be cut as shown on the detail to provide a 12” airgap to prevent backflushing of water into the recycled water pipeline. The water shall discharge onto the synthetic liner wear strip. Fill pipe shall extend a sufficient distance from the apron to allow installation of the elbow.

2700 PIPE LEVEL SPREADER

PART I GENERAL

1.1 DESCRIPTION

A pipe level spreader will be installed in the location shown on the Plans and in accordance with Detail 2 on Sheet 4. The level spreader will be installed on the contour along the base of the reservoir embankment. The length of the spreader shall be as shown on the Plans and as staked in the field by the Engineer. The work in this Section includes all labor, materials and incidentals to install this pipe.

PART II MATERIALS

2.1 PIPE & FITTINGS

A. Dual-wall corrugated polyethylene pipe (DWCPP) will be used for the spreader. The ends of the pipe will be capped with fittings from the same manufacturer as the pipe.

B. 2" diameter steel pipes will be used to anchor/secure the spreader to the ground. Pipes shall be capped with chain link fence post caps or equivalent.

PART III EXECUTION

3.1 TRENCHING

A. A shallow trench will be excavated along the base of the reservoir, approximately 6 inches deep. A 2-inch layer of 3/4-inch-diameter crushed rock will be spread in the trench to aid in the leveling process and to secure the pipe.

B. End caps will be fastened to the ends of the pipe and secured with sheet metal screws and a 2-inch diameter steel pipe as shown on the detail.

C. 4-inch wide by 18-inch long windows shall be cut into the top of the pipe. The notches will be cut such that they are level and at the same elevation to assure water flows out of the pipe uniformly. Two rows of ±3/16-inch wide by 2-inch long slots shall be cut along the front of the spreader at 4-inch intervals.

D. 2-inch diameter steel pipes shall be installed every 30 inches on center. The pipes shall extend a minimum of 36 inches into the ground and extend 12 inches minimum above ground. The pipes shall be capped with chain link fence post caps or equivalent.

2800 OVERFLOW STRUCTURE

PART I GENERAL

1.1 DESCRIPTION

An overflow structure shall be installed in the location shown on the Plans and in accordance with Detail 4 on Sheet 4. The size and rim elevation of the overflow shall be as shown on the Plans and as staked in the field by the Engineer. The work in this Section includes all labor, materials and incidentals to install this pipe.

PART II MATERIALS

2.1 PIPE & FITTINGS

A. Dual-wall corrugated polyethylene pipe (DWCPP) will be used for the overflow. The ends of the pipe will be capped with fittings from the same manufacturer as the pipe.

B. Grates shall be fabricated of welded 5/8" diameter steel rebar, 4" on center both ways.

C. Concrete for the bottom of the overflow structure shall be Portland cement concrete, 2000-psi minimum compressive strength.

D. Envelope material shall be the same as specified in Section 2400, Subsection 2.2.

PART III EXECUTION

3.1 INSTALLATION

A. The overflow structure shall be set plumb and to the dimensions and elevations shown on the plans and detail sheets.

B. The bottom of the overflow structure shall be made by pouring concrete in the bottom 4" of the pipe. A series of 3/8" holes shall be drilled in the bottom 1' of the riser. This area shall be backfilled with gravel envelope material prior to backfilling with native material as shown in the detail.

C. A grate shall be installed over the top of the overflow structure and shall be bolted or locked to the riser. The riser shall be set 0.1' above ground elevation.

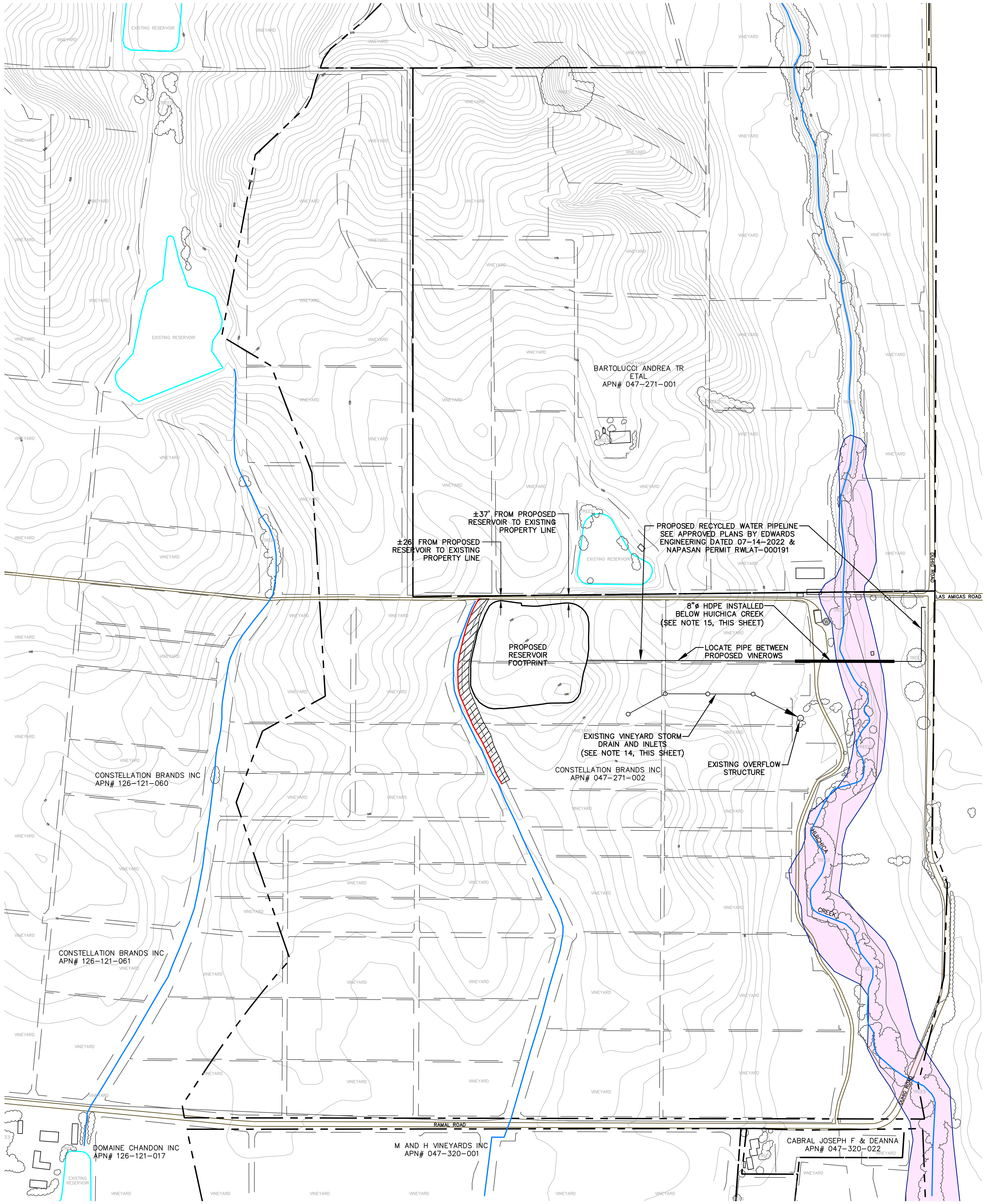
D. 4" to 6" diameter rock shall be placed around the overflow structure as shown in the detail.

APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

Photo 1 12/21/2022

Photo 2 12/21/2022



TOPOGRAPHIC MAPPING SOURCE: NAPA COUNTY LIDAR-GENERATED CONTOURS, 5' CONTOUR INTERVAL, MAY 2003.

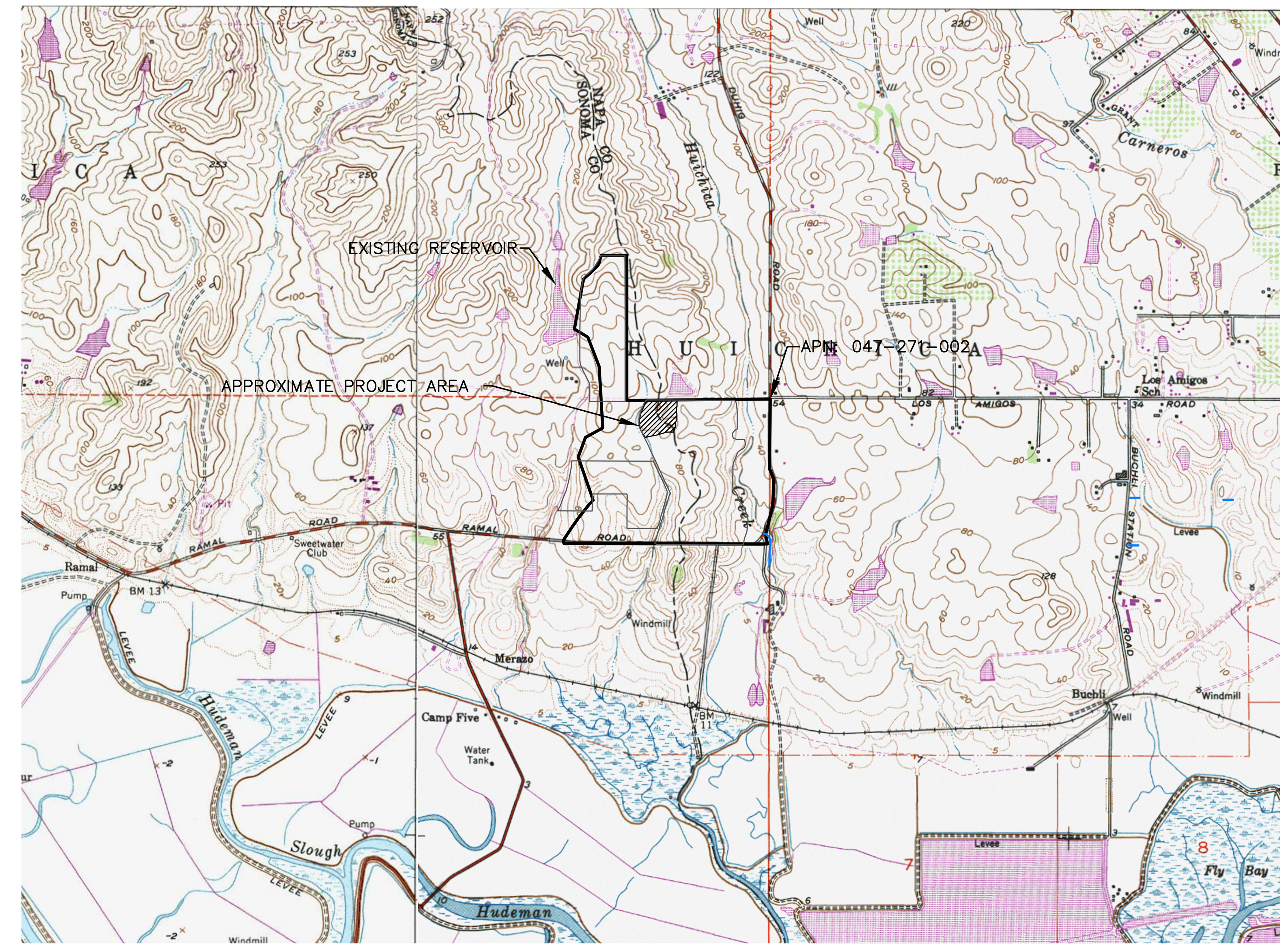
GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

LEGEND

APPROXIMATE PROPERTY LINE LOCATION
U.S.G.S. BLUE LINE STREAM
TOP OF BANK, APPROXIMATE
NAPA COUNTY STREAM SETBACK
EXISTING VINEYARD AREA
EXISTING ROAD
EXISTING BUILDING
FEMA FLOOD HAZARD ZONE (A)
EXISTING WELL, APPROXIMATE LOCATION



VICINITY MAP

USGS CUTTINGS WHARF QUADRANGLE
TOWNSHIP 4 & 5 N., RANGE 5 W.
SCALE: 1" = ±2000'

SCOPE OF WORK

THE PROPOSED SCOPE OF WORK IS FOR A NEW ±75 ACRE-FT AGRICULTURAL WATER STORAGE RESERVOIR. THE NEW RESERVOIR WILL BE CONSTRUCTED WITHIN EXISTING VINEYARD AREA THAT IS CURRENTLY FALLOW. THE VINEYARD WAS REMOVED UNDER ECP#P20-00169. THE NEW RESERVOIR WILL BE FILLED USING RECYCLED WATER FROM THE NAPA SANITATION DISTRICT. A WATER PURCHASE AGREEMENT WITH NAPA SANITATION HAS BEEN OBTAINED AS WELL AS ALL PERMITS REQUIRED FOR CONNECTION FROM EXISTING WATER MAIN LOCATION AND INSTALLATION OF PROPOSED DISTRIBUTION LINES. THE WATER IN THE PROPOSED RESERVOIR WILL BE USED FOR VINEYARD IRRIGATION.

GENERAL NOTES:

1. SITE ADDRESS: 2155 RAMAL ROAD, NAPA, CA 94558
2. APN: 047-271-002
3. RESERVOIR CAPACITY: ±75 ACRE-FEET
4. CONSTRUCTION STORMWATER GENERAL PERMIT INFORMATION:
   WDID: 2 49C400270
   APPLICATION: 559410
   SUBMISSION DATE: 03/16/2023
   STATUS: ACTIVE
5. UPON COMPLETION OF CONSTRUCTION, OWNER SHALL BE RESPONSIBLE FOR INSTALLING A 6 FOOT HIGH FENCE AROUND THE RESERVOIR. FENCE SHALL REMAIN LOCKED AT ALL TIMES IN ORDER TO PREVENT UNAUTHORIZED ACCESS.
6. UPON COMPLETION OF CONSTRUCTION, OWNER SHALL BE RESPONSIBLE FOR INSTALLING SIGNS ON CHAIN LINK FENCE EVERY 200-FEET STATING "DANGER – KEEP OUT" IN ENGLISH AND SPANISH.
7. THE SPECIFICATIONS DATED JANUARY 2023 ARE PART OF DESIGN PACKAGE FOR THE PROPOSED RESERVOIR. CONSTRUCTION OF PROPOSED RESERVOIR SHALL BE CONSISTENT WITH ALL PARTS OF THESE PLANS AND SPECIFICATIONS.
8. AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION, CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT (U.S.A.) AT 1-800-642-2444 IN ORDER TO LOCATE ANY EXISTING UTILITIES WITHIN OR ADJACENT TO PROJECT SITE. UTILITIES ARE KNOWN TO EXIST WITHIN THE PROJECT SITE AND CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR PROTECTION DURING CONSTRUCTION.
9. ARCHEOLOGICAL MITIGATION: IF ARCHEOLOGICAL MATERIALS ARE DISCOVERED DURING FUTURE DEVELOPMENT, ALL ACTIVITY SHALL BE TEMPORARILY HALTED IN THE VICINITY OF THE FIND SO A QUALIFIED ARCHEOLOGIST SHALL BE RETAINED TO EVALUATE THE FIND(S) AND TO RECOMMEND MITIGATION PROCEDURES, IF NECESSARY. PREHISTORIC ARCHEOLOGICAL MATERIALS INCLUDE, BUT ARE NOT LIMITED TO, OBSIDIAN, CHERT, AND BASALT FLAKES AND ARTIFACTS, GROUNDSTONE (SUCH AS MORTARS AND PESTLES), AND HUMAN GRAVES. HISTORIC ARCHEOLOGICAL MATERIALS INCLUDE, BUT ARE NOT LIMITED TO, GLASS BOTTLES, PRIVYS, AND CERAMICS.

   IF HUMAN REMAINS ARE ENCOUNTERED DURING PROJECT DEVELOPMENT, EXCAVATION OR DISTURBANCE OF THE LOCATION MUST BE HALTED IN THE VICINITY OF THE FIND, AND THE COUNTY CORONER SHALL BE CONTACTED. IF THE CORONER DETERMINES THE REMAINS ARE NATIVE AMERICAN, THE CORONER WILL CONTACT THE NATIVE AMERICAN HERITAGE COMMISSION. THE NATIVE AMERICAN HERTIAGE COMMISSION WILL IDENTIFY THE PERSON OR PERSONS BELIEVED TO BE MOST LIKELY DESCENDED FROM THE DECEASED NATIVE AMERICAN. THE MOST LIKELY DESCENDENT MAKES RECOMMENDATIONS REGARDING THE TREATMENT OF THE REMAINS WITH APPROPRIATE DIGNITY.
10. EARTHWORK QUANTITIES*:
    CUT VOLUME: ±65,000 CUBIC YARDS
    FILL VOLUME: ±65,000 CUBIC YARDS (±55,000 CY STRUCTURAL FILL, ±10,000 CY SHRINKAGE)

    *CONTRACTOR IS RESPONSIBLE FOR CALCULATING EARTHWORK QUANTITIES FOR BIDDING PURPOSES. STRIPPINGS AND ANY EXCESS MATERIAL NOT SUITABLE FOR USE AS STRUCTURAL FILL SHALL BE SPREAD IN ADJACENT VINEYARD AREAS. NO FILL SHALL BE PLACED WITHIN STREAM SETBACKS.
11. DISTURBED SOIL AREA
    THE TOTAL DISTURBED SOIL AREA IS ±6.5 ACRES.
12. FEMA FLOOD HAZARD ZONES
    THE PROJECT AREA IS NOT WITHIN A FEMA FLOOD ZONE. NO ADVERSE EFFECTS RELATED TO FLOODING ARE EXPECTED AS A RESULT OF THIS PROJECT.
13. THE RESERVOIR PUMP STATION WILL BE DESIGNED AND INSTALLED BY OTHERS. ANY NECESSARY PERMITS SHALL BE OBTAINED PRIOR TO CONSTRUCTION OF THE PUMP STATION. THE PUMP STATION WILL CONNECT TO A PIPELINE THAT WILL BE ATTACHED TO THE EXTERIOR OF RESERVOIR EMBANKMENT AND CONNECT TO A FLOATING INTAKE. THE PUMP STATION WILL CONVEY WATER FROM THE RESERVOIR TO EXISTING IRRIGATION PIPELINES WITHIN THE VINEYARD.
14. THE EXISTING VINEYARD STORM DRAIN WILL BE UTILIZED TO CONVEY SUBSURFACE WATER GENERATED BY THE PROPOSED RESERVOIR TOE DRAINS AND UNDERDRAINS. PRIOR TO CONNECTION, THE EXISTING PIPELINE SHALL BE INSPECTED AND REPAIRED AS REQUIRED BY APPROVED TRACK II ECP #P20-00169.
15. THE 8"ø HDPE RECYCLED WATER PIPELINE SHALL BE INSTALLED BELOW HUICHICA CREEK VIA DIRECTIONAL DRILLING. AS STATED IN THE ABOVE SCOPE OF WORK, ALL REQUIRED PERMITS HAVE BEEN OBTAINED FOR INSTALLATION OF THE PIPELINE. THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE WAS NOTIFIED OF THE PROJECT AND DID NOT REQUIRE A LAKE AND STREAMBED ALTERATION AGREEMENT PER THE LETTER TITLED, "NOTIFICATION OF LAKE OR STREAMBED ALTERATION, EPIMS NOTIFICATION NO. NAP-31500 R3, CARNEROS VISTA RANCH DIRECTIONAL BORING PIPELINE" DATED OCTOBER 11, 2022.

EROSION CONTROL NOTES:

1. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL BE RESPONSIBLE FOR SEEDING AND STRAW MULCHING ALL DISTURBED SOILS. SEED AND MULCH ON SLOPES GREATER THAN 25%, INCLUDING EMBANKMENTS, SHALL BE JUTE NETTED BEGINNING OCTOBER 15 OF THE YEAR OF CONSTRUCTION. SEED SHALL BE DWARF BARLEY AND SHALL BE BROADCAST AT A RATE OF 150 POUNDS PER ACRE. STRAW MULCH SHALL BE APPLIED AT A RATE OF 4,000 POUNDS PER ACRE. WHERE STRAW MULCH AND JUTE NETTING ARE REQUIRED, STRAW SHALL BE APPLIED AFTER SEEDING IS COMPLETED. JUTE NETTING SHALL BE APPLIED OVER THE STRAW MULCH WITH SEAMS RUNNING PERPENDICULAR TO THE SLOPE AND SHALL BE STAPLED IN PLACE ACCORDING TO THE STAPLING SCHEDULE SUPPLIED WITH THE JUTE NETTING.
2. STRAW WATTLES SHALL BE INSTALLED THE YEAR OF CONSTRUCTION IN THE LOCATIONS SHOWN ON THE PLANS AND AS SHOWN ON THE DETAIL. WATTLES SHALL BE STOCKPILED ON-SITE PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES AND SHALL BE INSTALLED IMMEDIATELY IN THE EVENT RAINSTORM ACTIVITY HAS BEEN FORECAST DURING THE CONSTRUCTION SEASON.
3. IF CONSTRUCTION IS NOT COMPLETED BY OCTOBER 15 OF THE YEAR OF CONSTRUCTION, ADDITIONAL TEMPORARY EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED UNTIL GRADING IS COMPLETED AND PERMANENT EROSION CONTROL MEASURES INSTALLED. TEMPORARY MEASURES SHALL BE AS DIRECTED BY ENGINEER IN FIELD.
4. THE SITE ENTRANCE SHALL BE STABILIZED WITH 3-4" CRUSHED ROCK TO PREVENT TRACKING OF SOIL OFFSITE.

PROJECT TEAM:

1. OWNER:
   CONSTELLATION BRANDS INC.
   PO BOX 106
   OAKVILLE, CA 94562
   ATTN: HARINDER DHALIWAL
2. CIVIL ENGINEER:
   PPI ENGINEERING
   2800 JEFFERSON STREET
   NAPA, CA 94558
   ATTN: MATT BUENO (707) 253-1806
3. GEOTECHNICAL ENGINEER:
   PJC & ASSOCIATES
   P.O. BOX 469
   SONOMA, CA 95476
   (707) 935-3747

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. BUENO
No. 84114
EXPIRES: 9-30-23
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	MADE UPDATES AS REQUESTED BY NAPA COUNTY. ADDED DIMENSION LINES FROM PROPERTY LINE TO RESERVOIR. UPDATED GENERAL NOTE 4.	JCJ	4-10-23

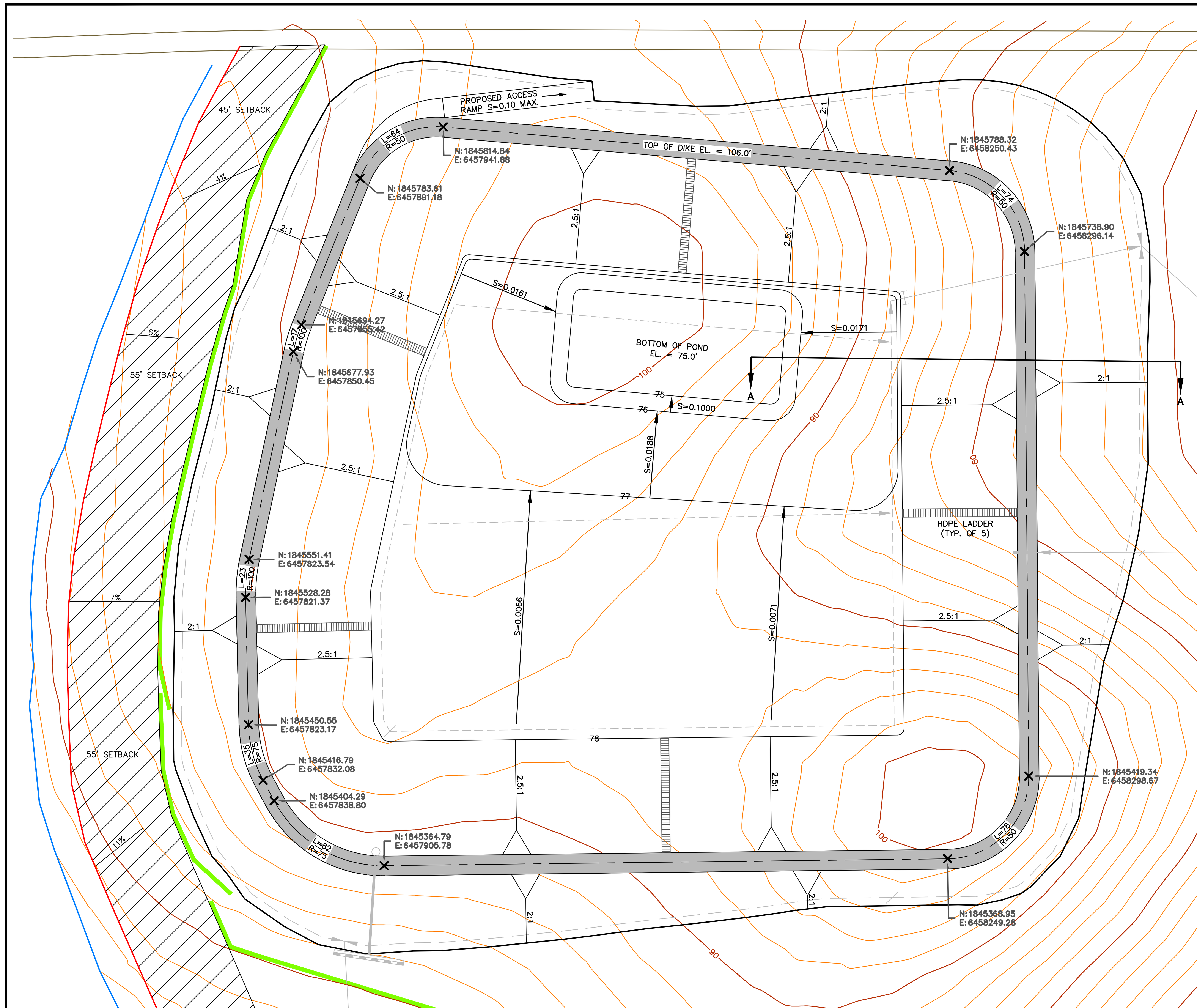
PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 12240011
DWG. NO: 12240011B

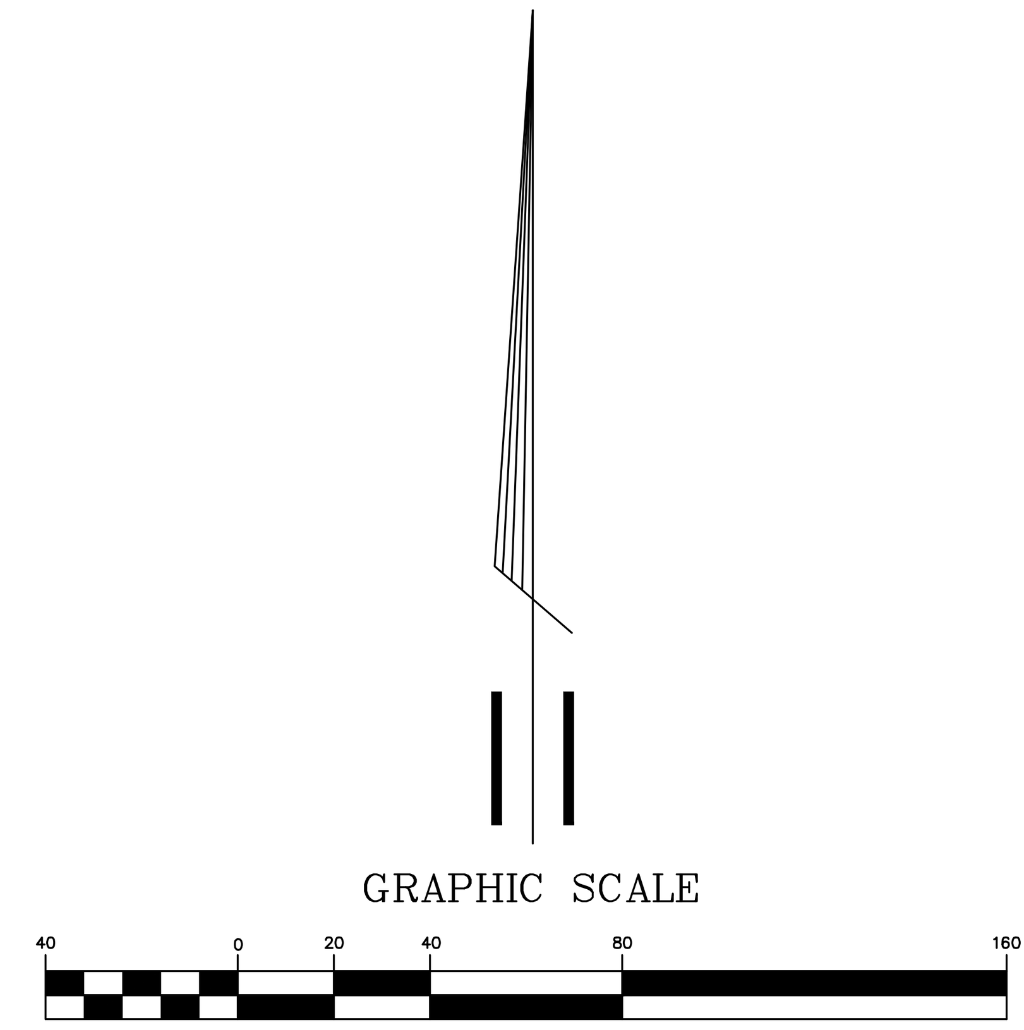
CONSTELLATION BRANDS INC
2155 RAMAL ROAD
WATER STORAGE RESERVOIR
SITE PLAN

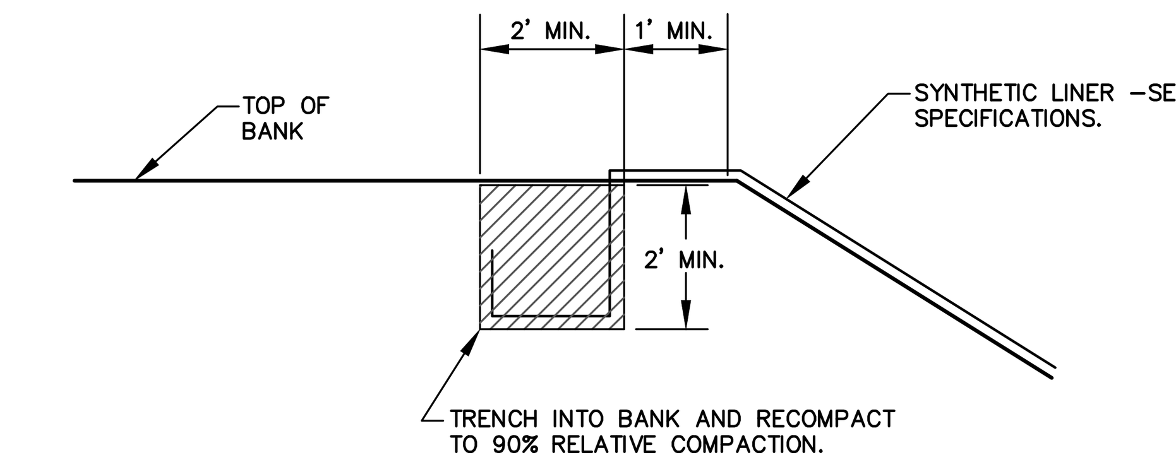
DESIGN ENGINEER: M. BUENO, J. BUSHEY

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	MB	04-10-23	1 OF: 4

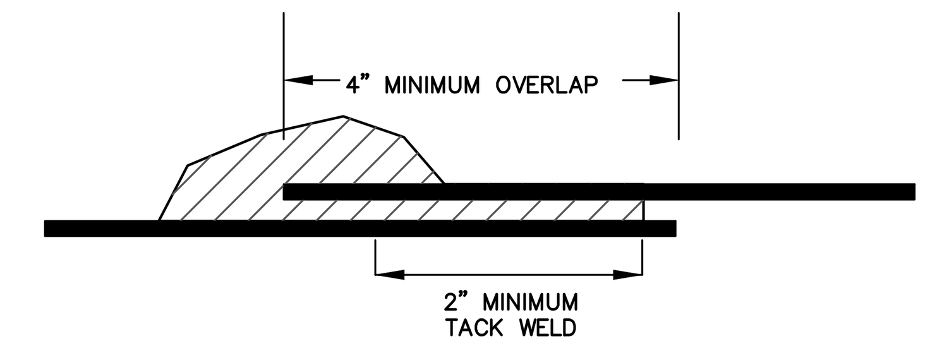


TOPOGRAPHIC MAPPING SOURCE: PPI ENGINEERING, 2' CONTOUR INTERVAL, 2022.





1/2 TYPICAL LINER ANCHOR TRENCH
N.T.S.



2/2 EXTRUSION WELD
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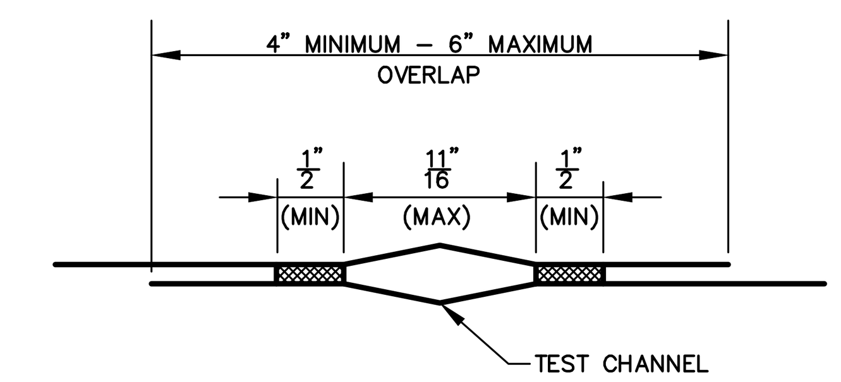

3/2 DOUBLE FUSION WELD
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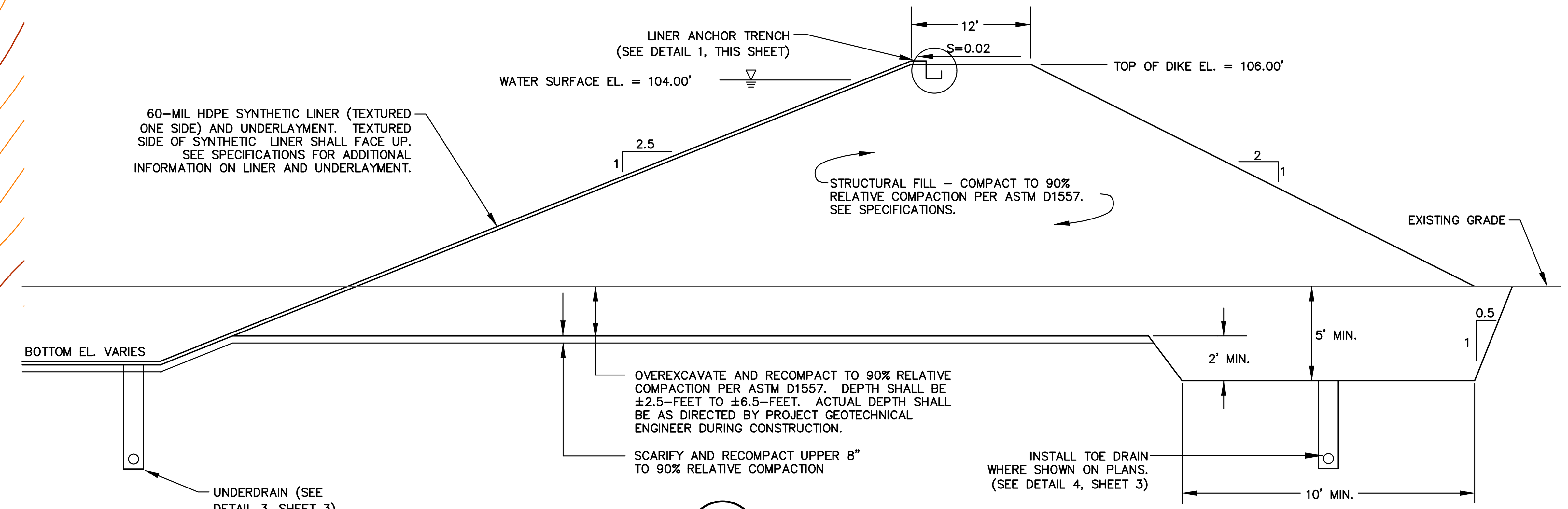


4/2 SECTION A–A
N.T.S.

LEGEND

Symbol	Description	Symbol	Description
(red line)	PPI ENGINEERING 10' INDEX CONTOUR (E)	(dashed arrow line)	PROPOSED PERFORATED UNDERDRAIN (SEE DETAIL 3, SHEET 3)
(orange line)	PPI ENGINEERING 2' INTERMEDIATE CONTOUR (E)	(dashed arrow line)	PROPOSED PERFORATED TOE DRAIN (SEE DETAIL 4, SHEET 3)
(blue line)	U.S.G.S. BLUE LINE STREAM	(arrow line)	PROPOSED SOLID SUBSURFACE DRAINLINE (SEE DETAIL 1, SHEET 3)
(red line)	TOP OF BANK, APPROXIMATE	I	PROPOSED CUTOFF COLLAR (SEE DETAIL 2, SHEET 3)
(hatch)	NAPA COUNTY STREAM SETBACK	o—	PROPOSED OVERFLOW PIPE (SEE DETAIL 1, SHEET 4)
(double line)	EXISTING ROAD	(hatched band)	PROPOSED LEVEL SPREADER (SEE DETAIL 2, SHEET 4)
— – —	PROPOSED CENTER LINE OF DIKE	(arrow line)	PROPOSED 8"ø PURPLE C900 (DR18)
(green line)	PROPOSED STRAW WATTLE (SEE DETAIL 5, SHEET 4)	(thick line)	PROPOSED FILL PIPE (SEE DETAIL 3, SHEET 4)
EL.	ELEVATION	MAX.	MAXIMUM
S	SLOPE	MIN.	MINIMUM
TYP.	TYPICAL	(E)	EXISTING

REGISTERED PROFESSIONAL ENGINEER MATHEW S. BUENO No. 84114 EXPIRES: 9-30-23 Civil STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	MADE UPDATES AS REQUESTED BY NAPA COUNTY. NO CHANGES MADE TO THIS SHEET.	JCJ	4–10–23

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253–1806 FAX 707/253–1604

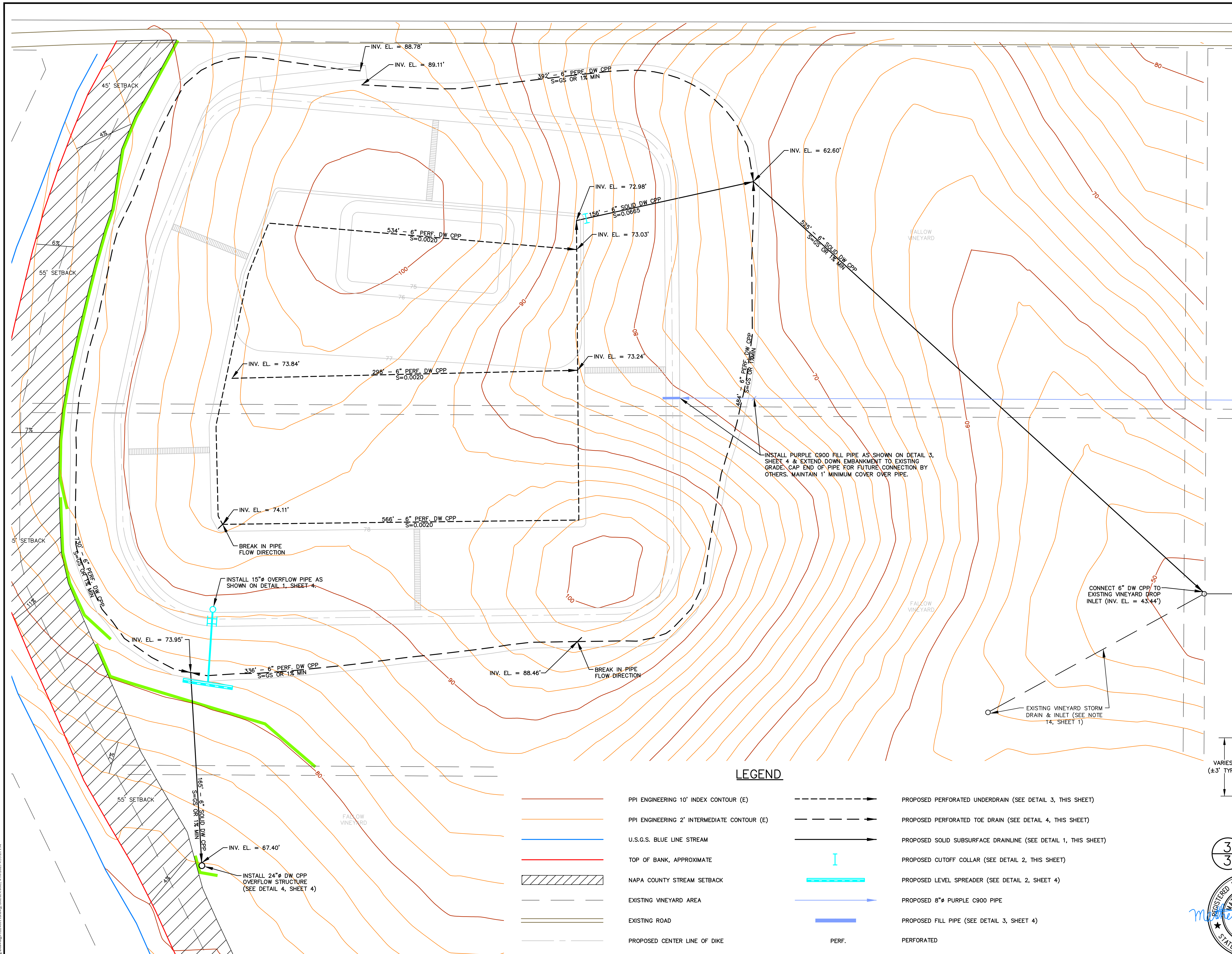
JOB NO: 12240011
DWG. NO: 12240011B

CONSTELLATION BRANDS INC
2155 RAMAL ROAD

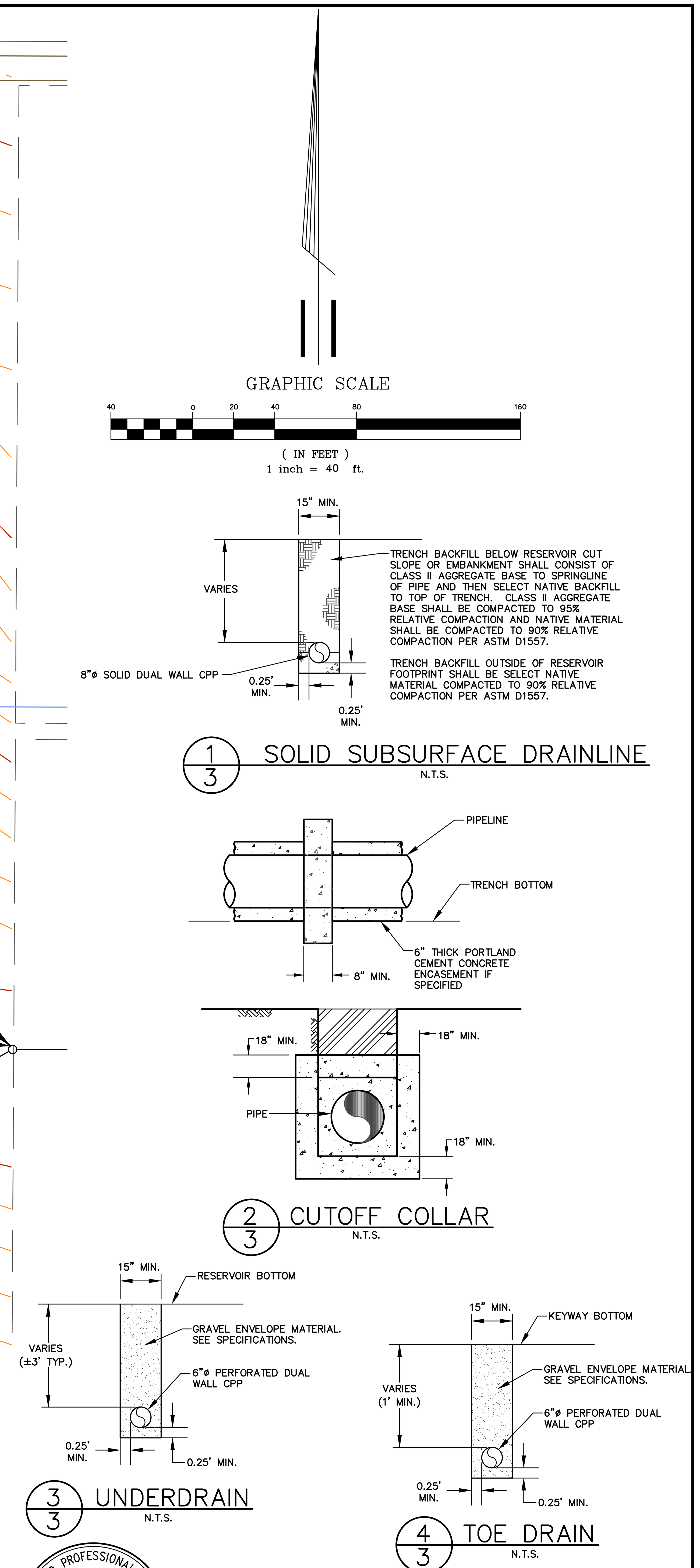
WATER STORAGE RESERVOIR
GRADING PLAN

DESIGN ENGINEER: M. BUENO, J. BUSHEY

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	MB	04–10–23	2 OF: 4



TOPOGRAPHIC MAPPING SOURCE: PPI ENGINEERING, 2' CONTOUR INTERVAL, 2022.



LEGEND

	PPI ENGINEERING 10' INDEX CONTOUR (E)		PROPOSED PERFORATED UNDERDRAIN (SEE DETAIL 3, THIS SHEET)
	PPI ENGINEERING 2' INTERMEDIATE CONTOUR (E)		PROPOSED PERFORATED TOE DRAIN (SEE DETAIL 4, THIS SHEET)
	U.S.G.S. BLUE LINE STREAM		PROPOSED SOLID SUBSURFACE DRAINLINE (SEE DETAIL 1, THIS SHEET)
	TOP OF BANK, APPROXIMATE		PROPOSED CUTOFF COLLAR (SEE DETAIL 2, THIS SHEET)
	NAPA COUNTY STREAM SETBACK		PROPOSED LEVEL SPREADER (SEE DETAIL 2, SHEET 4)
	EXISTING VINEYARD AREA		PROPOSED 8"ø PURPLE C900 PIPE
	EXISTING ROAD		PROPOSED FILL PIPE (SEE DETAIL 3, SHEET 4)
	PROPOSED CENTER LINE OF DIKE	PERF.	PERFORATED
	HDPE LADDER	DW	DUAL WALL
EL.	ELEVATION	CPP	CORRUGATED POLYETHYLENE PIPE
S	SLOPE	HDPE	HIGH DENSITY POLYETHYLENE
MIN.	MINIMUM	(E)	EXISTING
TYP.	TYPICAL	GS	GROUND SLOPE

REV. NO.	DESCRIPTION	BY	DATE
1	MADE UPDATES AS REQUESTED BY NAPA COUNTY. NO CHANGES MADE TO THIS SHEET.	JCJ	4-10-23

REGISTERED PROFESSIONAL ENGINEER
MATTHEW S. BUENO
No. 84114
EXPIRES: 9-30-23
Civil
STATE OF CALIFORNIA

PPI ENGINEERING
2800 JEFFERSON STREET
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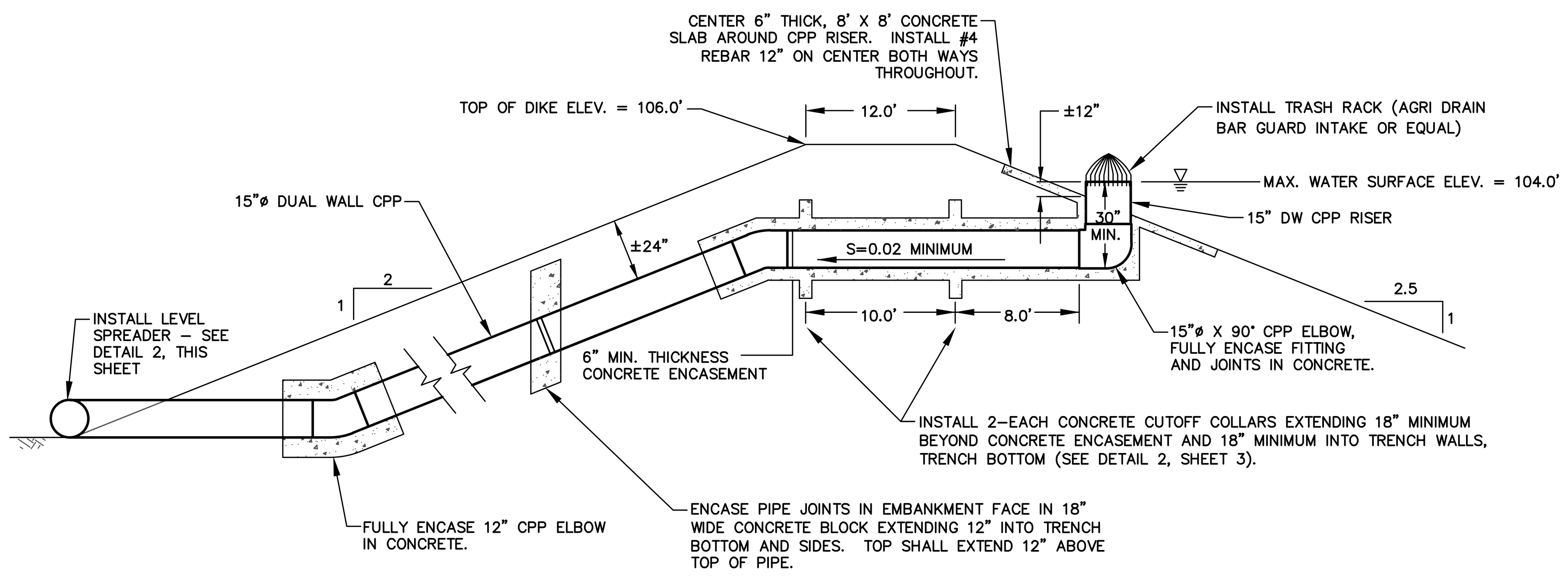
707/253-1806 FAX 707/253-1604

JOB NO: 12240011
DWG. NO: 12240011B

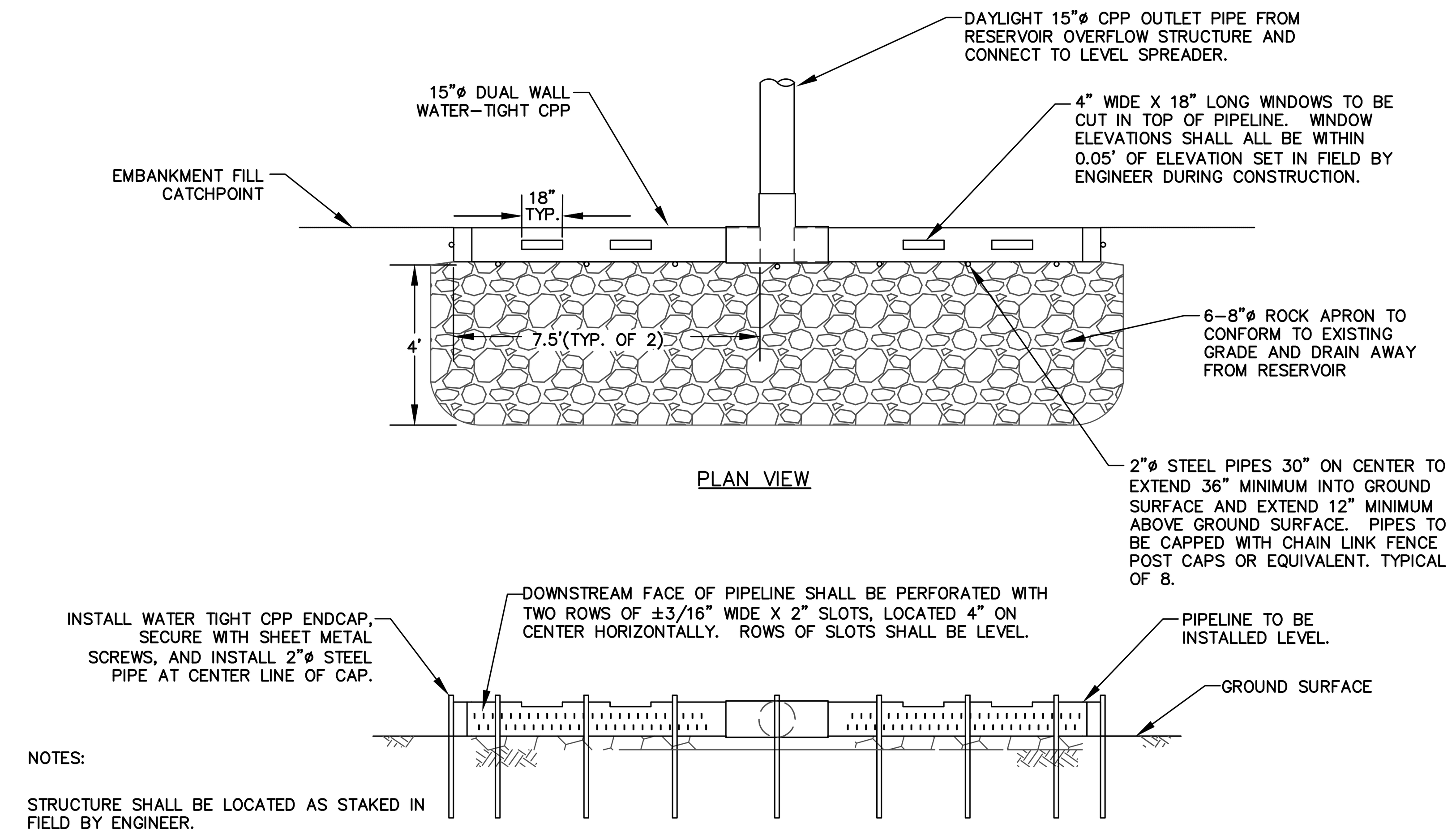
CONSTELLATION BRANDS INC
2155 RAMAL ROAD
WATER STORAGE RESERVOIR
DRAINAGE PLAN

DESIGN ENGINEER: M. BUENO, J. BUSHEY

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	MB	04-10-23	3 OF: 4



1/4 OVERFLOW PIPE
N.T.S.

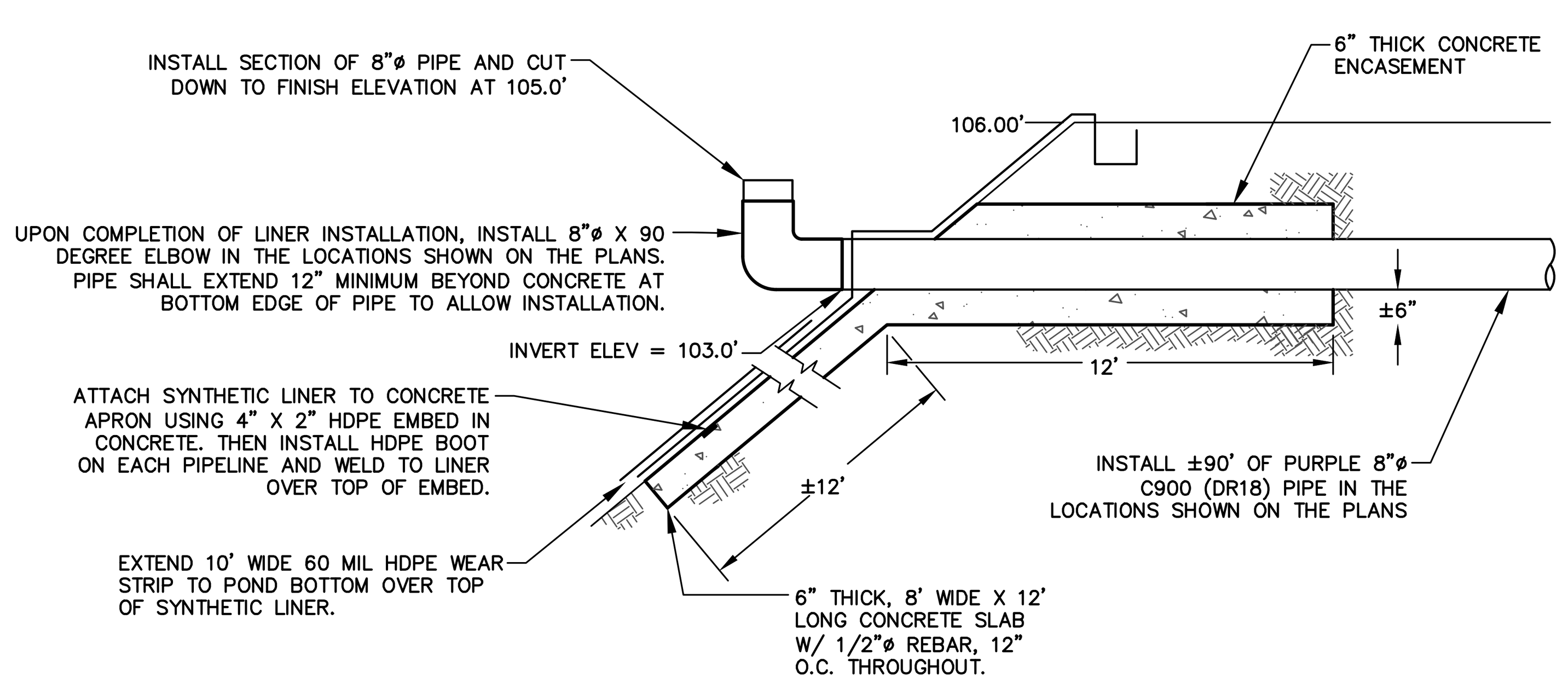


NOTES:

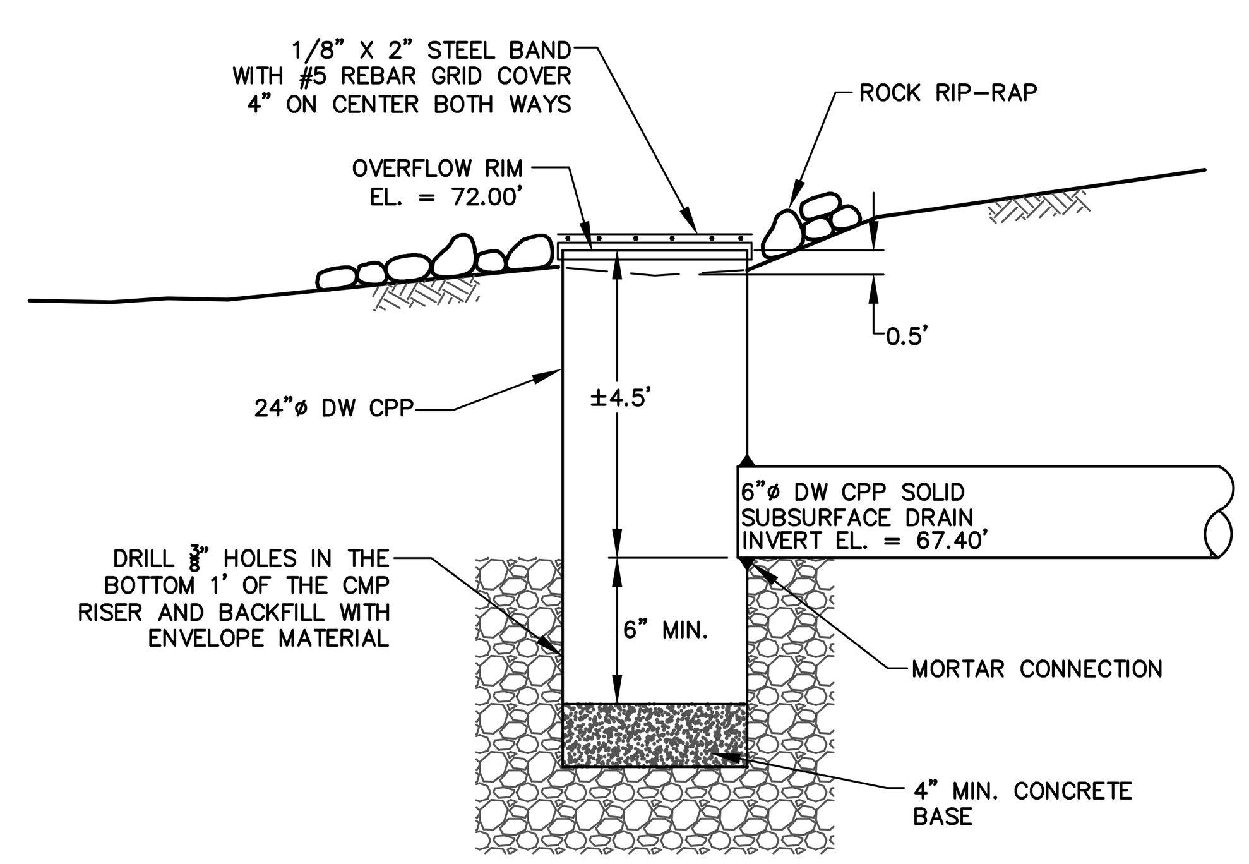
STRUCTURE SHALL BE LOCATED AS STAKED IN FIELD BY ENGINEER.

SUBGRADE SHALL BE STRIPPED OF VEGETATION, SCARIFIED AND COMPACTED PER SPECIFICATIONS. SUBGRADE SHALL BE LEVEL PRIOR TO PLACEMENT OF PIPELINE.

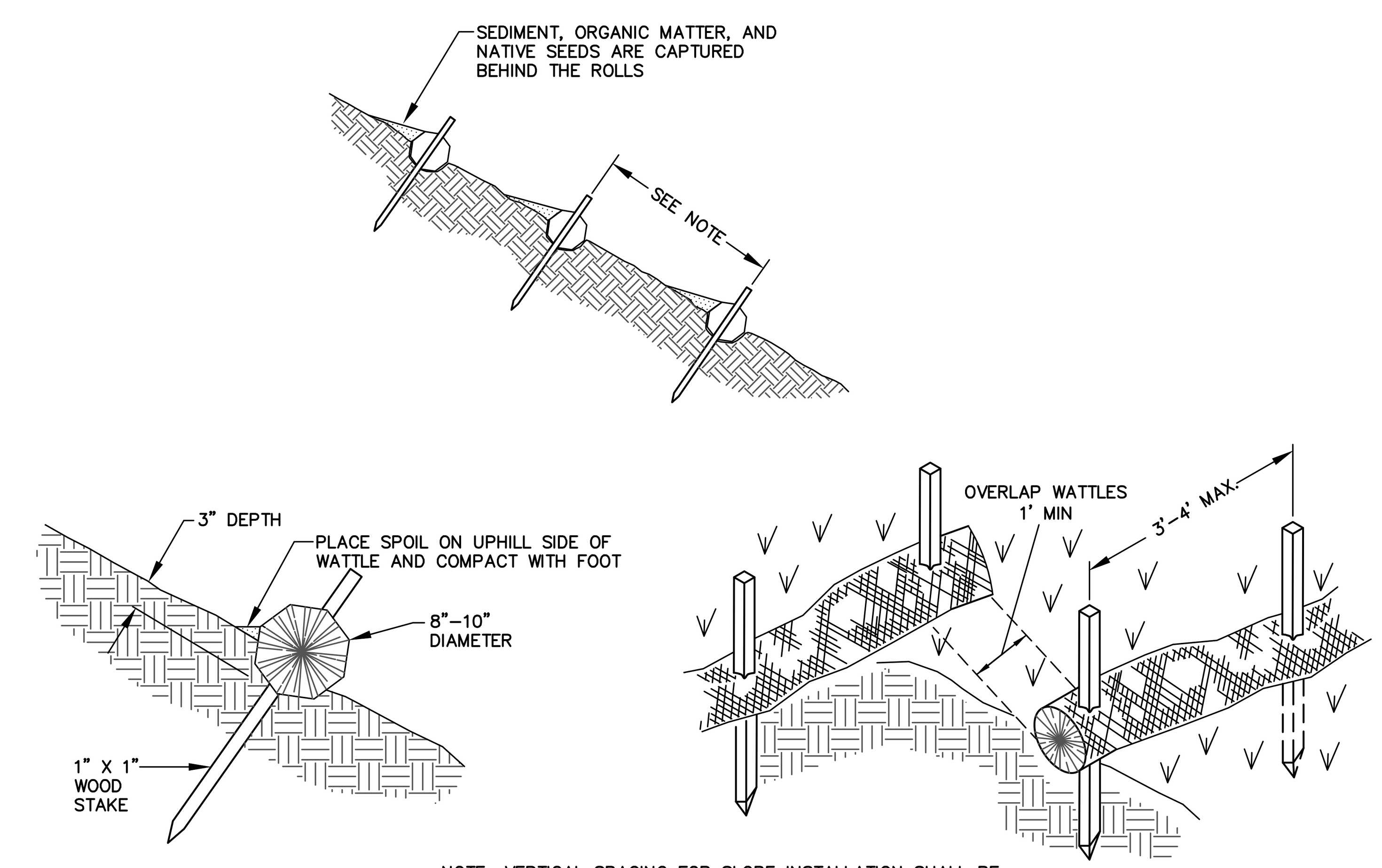
2/4 PIPE LEVEL SPREADER
N.T.S.



3/4 FILL PIPE
N.T.S.



4/4 OVERFLOW STRUCTURE
N.T.S.



NOTE: VERTICAL SPACING FOR SLOPE INSTALLATION SHALL BE DETERMINED BY SITE CONDITIONS. WATTLE SPACING AND LOCATIONS SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.

5/4 STRAW WATTLE INSTALLATION
N.T.S.

REV. NO.	DESCRIPTION	BY	DATE
1	MADE UPDATES AS REQUESTED BY NAPA COUNTY. NO CHANGES MADE TO THIS SHEET.	JCJ	4-10-23

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 12240011
DWG. NO: 12240011B

CONSTELLATION BRANDS INC
2155 RAMAL ROAD

WATER STORAGE RESERVOIR
DETAILS

DESIGN ENGINEER: M. BUENO, J. BUSHEY

SCALE:	DRAWN BY:	DATE:	SHEET: 4
AS SHOWN	MB	04-10-23	OF: 4