SAN MATEO
RESOURCE
CONSERVATION
DISTRICT

Regular Meeting of the Board of Directors
Thursday July 20, 2023
4:00 – 6:00 pm
Location: 80 Stone Pine Road, Suite 100, Half Moon Bay, CA 94019
and via Zoom at: https://us02web.zoom.us/j/89675733636

If you are using a computer or other device to join the meeting, you may click here. A computer video camera is not required to participate. If you do not have access to a computer or internet during this meeting, or if your computer does not have audio, you can call in by phone: (669) 900-6833 and enter the meeting ID: 896 7573 3636 when prompted.

1. Call to Order

2. Approval of Agenda

3. Introduction of Guests and Staff

4. Public Comment- The Board will hear comments on items that are not on the agenda. The Board cannot act on an item unless it is an emergency as defined under Government Code §54954.2.

5. Consent Agenda

The Board of Directors approves:

5.1. June 22, 2023 Draft Regular Minutes

5.2. Selection of Bay Circle Construction as contractor to construct the Mindego Creek Fish Passage Project.

The Board of Directors receives into record:

5.3. June 11, 2023 Half Moon Bay Review & Pacifica Tribune article, "Local agency envisions hub to help area farmers"

5.4. June 24, 2023 The San Mateo Daily Journal article, "Forest health project begins at Butano State Park"

5.5. July 5, 2023 Half Moon Bay Review article, "Butano State Park slated for forest recovery work"

6. Regular Agenda

6.1. Board will consider Certification of Exemption from Grading Permit for reservoir rehabilitation and maintenance at Pescadero Creek Vineyards.

6.2. Board will consider approval of revised mileage policy.

6.3. USDA NRCS (Natural Resources Conservation Service) report

6.4. Executive Director's report

6.5. Directors' connection and reports

7. Adjourn Meeting

The next Regular Meeting of the Board of Directors will be August 17, 2023

Public records that relate to any item on the open session agenda for a regular board meeting are available for public inspection. Those records that are distributed less than 72 hours prior to the meeting are available for public inspection at the same time as they are distributed to all members, or a majority of the members of the Board.

SAN MATEO RESOURCE CONSERVATION DISTRICT

PHONE: 650.712.7765

80 STONE PINE ROAD, SUITE 100
HALF MOON BAY, CA 94019

SANMATEORCD.ORG

Minutes of the Regular Meeting of the Board of Directors
Thursday, July 20, 2023
4:00 – 6:00 pm
Location: 80 Stone Pine Road, Suite 100, Half Moon Bay, CA 94019
and via Zoom at: https://us02web.zoom.us/j/89675733636

Directors: Adrienne Etherton (chairing), Michelle Weil, Steve Stielstra, Barbara Kossy (remote)
Associate Directors: none present
RCD staff: Kellyx Nelson, Lau Hodges, Jarrad Fisher, David Cowman, Joe Issel, Timothy Federal, Stephanie MacDonald
NRCS staff: Jim Howard
Guests: Cassandra Matter (Aide to Supervisor Ray Mueller), Zahra Kassam (The Mushroom Farm), Cert Munselle, Cameron Dale, Ron Sturgeon, Robert Schultz

1. Call to Order

Etherton called the meeting to order at 4:02 p.m.

2. Approval of Agenda

- Nelson requested item 6.1 be moved until 5:30p.
- **ACTION:** Stielstra moved to approve the agenda as amended, Weil seconded. Motion passed unanimously.

3. Introductions of Guests and Staff

All in attendance introduced themselves.

4. Public Comment

There was no public comment.

5. Consent Agenda

ACTION: Weil moved to approve the consent agenda, Stielstra seconded. Motion passed unanimously.

6. Regular Agenda

6.2 Board will consider approval of revised mileage policy.

- Nelson noted the current policy was approved in 2015 and needed updating to improve clarity and consistency in how it is interpreted. This need has come into particular focus with the increase in working remotely.
- Stielstra asked why the RCD uses the Internal Revenue Services (IRS) mileage reimbursement rate versus the General Services Administration's rate. Nelson explained that funders typically expect or require the IRS rate.
- Kossy asked if there were any liabilities from the previous version of the policy? Or if the past policy was a liability? Nelson did not believe there were any liabilities but if there were the new policy provides clarity.
- Stielstra asked if the new policy had been run past counsel or the RCD's accountant. Nelson explained it had not and that there was no intended

change in the terms of the policy. The update endeavors to clarify the policy already in place, including providing a number of examples.

- **ACTION:** Stielstra moved to approve the revised mileage policy, Weil seconded. Motion passed unanimously.

6.3 USDA NRCS (Natural Resources Conservation Service) report

- NRCS is approaching the sunset of the 2023 program year and is busy obligating money through the Farm Bill and trying to get everything buttoned up before the end the fiscal year.
- The Inflation Reduction Act is expected to increase NRCS funding; the agency is planning to staff up.
- NRCS had 27 interns in California for the summer; Thomas Duffy was Howard's forestry intern for the summer. Howard thanked the RCD staff for helping provide a meaningful and educational experience. Howard noted the intern program was one of the ways NRCS fast tracks employees into the work force.
- Howard is excited to be working with the RCD on a regenerative grazing program.
- Noah Katz, RCD Water Quality Program Manager, is working with NRCS on the National Water Quality Initiative Program to finish a Pescadero/Butano watershed assessment. The hope is to convert that assessment into a program and fund some RCD sediment and stream health programs.

6.4 Executive Director's report

- Project and Program Snapshots
  - Mindego Creek Fish Passage Project- going to construction in August, completed October. Will open 5 miles of habitat.
  - Quiroste Valley vegetation management- continues in September. Working with contractor rather than the Native Stewards while they are rebuilding. Still using tribal-led designs.
  - Pescadero Creek County Park Habitat Enhancement- instream habitat restoration in September
  - Pescadero Creek County Park Forest Health Project- We are entering a design phase for a project to focus on treating areas along the road and trail infrastructure throughout the park.
  - Butano Ridge Shaded Fuel Break - We have begun outreach to plan a shaded fuel break along a road system that spans nearly two dozen landowners along roughly 7 miles of road in the Pescadero area.
  - Jones Gulch Forest Health - We're planning to work with YMCA Camp Jones Gulch and Sempervirens fund to develop a forest health project for the property, deriving from their recently completed stewardship plan and conservation easement on the property.
  - Butano State Park water conservation project is nearly complete. All water lines, fixtures and the new 100k water tank have been installed! The only

remaining pieces are painting the tank and testing the tank. this will be completed in September of this year.
    - Neighborhood Chipper Program- has served over 400 homes so far this year. Some events still set to occur on bayside, La Honda, South Skyline area.
    - Quarry Park Shaded Fuel Break- Final phase of fuel break work set to begin August 1st. Working with Co Parks to line up additional fuel reduction work in Quarry Park along western boundary.
    - La Honda Shaded Fuel Break- Creating a 19-mile fuel break around the community of La Honda to improve community protection from wildfire. CEQA process on track to be completed by end of 2023, with implementation set to begin in Spring 2024. Continuing to meet with landowners, and will be scheduling a meeting with the greater La Honda community this fall at the fire house
    - Butano State Park Forest Health- Approx 60 acres of forest health treatments completed so far. Work is set to continue through the fall as long as weather permits.
    - Backfield Floodplain Project- Construction is well underway. The contractor is on schedule to complete the project in September of this year. Phase 2 of the project (pond) will start next summer.
    - Sam McDonald County Park water conservation- helping the park improve their water distribution system.
- DWR approved 5.45 million dollars in funding to:
    - design, plan, and secure permits for carbon farm plans
    - repair and enhance a pond at Johnston Ranch at the south end of Half Moon Bay
    - improve a pond, improve habitat, and improve soil health at Potrero Nuevo Farm on Tunitas Creek Road south of Half Moon Bay
    - improve water distribution at San Mateo County Memorial Park
- Loma Mar Pipeline Replacement Project- has stalled again due to unreliable contractor who keeps missing deadlines and not prioritizing this project. If they push it too far back they may risk additional delays due to weather and ultimately risk not completing the work before the funding agreement runs out. We have had multiple concerns about this contractor over more than one project. Steve Stielstra asked if this called for a Special Meeting. Nelson thought the issue did not yet meet the requirements for a special meeting, but that the issue might be agendized for the next Regular Meeting.
- Cutting Green Tape
    - Working on a summit that will be held at Asilomar convening all of the regions in the state from CDFW and Regional Water Quality Control boards to help advance efficient permitting of environmentally beneficial restoration projects.
- Events

    - Tour with Senator Becker (Aug 7) coordinated by California Climate and Ag Network.
    - Pescadero Arts and Fun Festival (August 19-20): Nelson asked directors to volunteer for RCD table. We will hand out impact reports, have watershed model, and hand out drinking water testing kits with instructions in English and Spanish.
    - Donor tour (August 27)
    - Happy Hour at Hop Dogma on August 23rd, 24th, or 30th. Directors indicated they could come on the 30th.
    - Community Forum about creek management in Pescadero at Harley Farms- October 3 or 4
    - Harley Farms Celebration- potentially October 13 or 14
    - RCD Conservation Planner training at TomKat Ranch (October 16-19)
    - Roundup on Roundup: Take 2 (November or December)
    - 15 Year Impact Report Release and meetings (August through December)
    - Director Day in the District was considered for August 17 but now looking to spring
- Administration
    - $200K County operating support was not included in the County budget. Directors expressed concern. Stielstra asked about a feedback loop on this. Nelson said she would let them know.
    - Recently we have updated our personnel manual, procurement policy, and now mileage policy and have been developing or updating a number of internal SOPs. We are now turning our attention to developing a salary schedule to improve transparency about salaries for different positions on staff and how those decisions are made. We've been doing homework to benchmark comparable positions and incorporate equity practices into our thinking. We had one meeting with Adrienne Etherton as the board's personnel committee, are doing more homework and will be coming back to meet with her again.
    - Working with staff to develop program strategies and communications documents.
    - Developing our advancement program. This is new to us.
    - 15 Year Impact Report in final stages, then annual reports.
    - Our strategic plan goes through 2024. Will need to update it in the upcoming calendar year.
    - Will be hiring administrative assistant who reports to Lau and increases our administrative capacity.
    - Still need to write up the narrative for the approved budget.
- Board matters
    - Adria and Nelson met with each member of the board except John Keener and John Wade (*request for John and John to please reply to Adria*)

- Nelson reported the following highlights:
    - This is a learning board- people who really like the opportunity to learn.
    - You like being part of an organization that is doing something, really getting it done.
    - There is more comfort with the idea of participating in fundraising than we expected, you just need tools and support.
    - We learned a lot about your networks and are beginning to think about how to connect the RCD to those networks.
    - There is a lot of interest in getting into the field and seeing projects (have been challenges with scheduling that but let's figure out how to do this).
    - The board has a great appreciation for staff and the team.
    - You all derive a lot of purpose and value from serving the community.
- Putting together communications packet/ talking points to help share the 15 year impact report.
- Board vacancy- Nelson will be meeting with Supervisors Pine and Mueller to kick off the process.

- Funding updates
    - Awarded Coastal Conservancy Regional Forest and Fire Capacity Program grant in partnership with RCD Santa Cruz County ($1.2mil between both RCDs)
    - Secured funding for workforce development focused on Registered Professional Forester certification and prescribed fire and forest related technical assistance through CARCD grant w/ CAL FIRE
    - Secured funding to support forest and fire related technical assistance through CARCD agreement with NRCS.
    - DWR funding approved - $5.16 million for coastal resilience/watershed restoration.

6.5 Directors' connections and reports

- Stielstra reported:
    - He had been thinking about the work the RCD did with the logjams in Pescadero after the 2023 storms and floods and he was interested to see how that work had progressed.
    - He had met with the Wildlands Conservancy's management team. They had just acquired their first properties in Utah and Oregon and were actively looking to acquire more.
- Weil reported:
    - She was looking forward to getting out in the field more; her family was headed on a two week road trip to Washington and back.
    - Her work with NatureEye was getting ready to launch drone tours all over the world with half of the revenue going to local partners.

- Kossy was on Salt Spring Island in Canada and was looking forward to getting home and attending the RCD's fall events. She introduced Zahra Kassam, whom she had invited to the meeting. Kassam said she was "blown away by the RCD's expertise and care."
- Etherton reported:
  - Brisbane hosted a habitat restoration event with Nature Watch.
  - She was excited about an upcoming family road trip ti Santa Fe via several national parks.

6.1 Board will consider Certification of Exemption from Grading Permit for reservoir rehabilitation and maintenance at Pescadero Creek Vineyards.

- Nelson provided background about the RCD's role in certifying exemptions to grading permits. Historically NRCS would supply the engineer with technical assistance and sign off on the permit; now the applicant must demonstrate the project meets NRCS standards with their own engineer or experts. She explained that staff were not making a recommendation but the applicants engineer is; bringing it before the board gives it a public platform.
- Fisher explained this exemption was for an agricultural reservoir and he had been working with the applicant on the designs.
- Issel stated the proposed approach was consistent with how the RCD would build a pond.
- Weil asked if the 4.17 acres were part of the pond. Fisher responded that it was for the pond footprint as well as the land to place the spoils and staging.
- Stielstra asked if there was a restoration, monitoring or compliance component. Fisher responded that RCD staff would have regular communications with the contractor and there was a closeout process with both RCD and NRCS staff.
- Etherton noted it was a robust process and asked what the incentives were for the exemption. Nelson explained that exemptions cost less. Schultz stated this was the quicker option and they wanted to get the pond online before the rains return.
- Weil asked how the RCD would be compensated. Nelson explained there was a fee structure, but it should be revised and updated.
- Etherton asked if San Mateo County had the authority to reject an exemption; Nelson noted it was not clearly spelled out. San Mateo County has asked clarifying questions but never overturned one.
- Weil asked if other counties do this; Nelson was not sure.
- **ACTION:** Weil moved to certify the grading exemption, Kossy seconded. Motion passed unanimously.

7. Adjourn Meeting

Etherton adjourned the meeting at 5:45 p.m.

SAN MATEO RESOURCE CONSERVATION DISTRICT

PHONE: 650.712.7765

80 STONE PINE ROAD, SUITE 100
HALF MOON BAY, CA 94019

SANMATEORCD.ORG

Memorandum

Date: July 20, 2023

To: Board of Directors

From: Kellyx Nelson

Re: Recommendation to contract with Bay Circle Construction as contractor to construct the Mindego Creek Fish Passage Project

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RCD staff recommends the board of directors approve contracting with Bay Circle Construction to construct the Mindego Creek Fish Passage Project for an amount not to exceed $535,396.

The project will remove a barrier to migration for steelhead trout and coho salmon (respectively identified as threatened and endangered under the Endangered Species Act), restoring access to 5 miles of habitat on Mindego Creek in the San Gregorio Watershed. The barrier consists of a 6-foot-high concrete dam, fish ladder, and water diversion infrastructure. The existing fish ladder is prone to clogging, which means it frequently cannot be used by fish. The project will remove the dam and fish ladder, reconstruct approximately 300 feet of channel, incorporate elements like large wood to enhance creek complexity and create fish habitat features, and maintain a water diversion for the landowner that is safe for fish.

A Request for Bids for project construction was released on May 2, 2022. It was distributed to 28 qualified firms, five trade journals, posted on the RCD's website, and published in the Half Moon Bay Review. Ten firms attended a mandatory pre-bid site tour on May 11, 2022. Three firms submitted bids, which were opened during a public bid opening on June 7, 2022. All three were deemed complete and submitted by the deadline. L.D. Giacomini Enterprises, Inc. (Giacomini) was the lowest responsible bidder. The RCD Board of Directors approved contracting with Giacomini on June 16, 2022. However, earlier this month, Giacomini informed the RCD that they would not be providing their services to complete the project this year due to scheduling conflicts. The RCD reached out to the second-lowest bidder, Bay Circle Construction, to request their services. Bay Circle provided an updated bid on July 12, 2023 which was reviewed by RCD staff. Bay Circle has experience working on projects involving creeks and restoration. Additionally, the RCD worked with the firm to successfully complete the Memorial Park Fish Passage Project. Bay Circle is the lowest responsible bidder available and able to perform construction services.

Local agency envisions hub to help area farmers

By Peter Tokofsky
Jul 11, 2023

As the warm summer months unfold, farmers markets across the Bay Area are flourishing. On almost any day — including Wednesdays in Pacifica, Thursdays in Pescadero and Saturdays in Half Moon Bay — shoppers have opportunities to take home a variety of locally grown produce and meats while soaking up the sights and aromas of the bounty from San Mateo County and beyond.

Although the markets provide a valued opportunity for small farmers and ranchers to avoid middlemen and meet face-to-face with their customers, participating in the markets comes at substantial cost and effort that can strain smaller operations. “It’s expensive to go to a farmers market,” said Adria Arko, director of advancement for the San Mateo Resource Conservation District.

Bringing produce to markets involves expenses such as operating a truck and maintaining supplies for setting up stands. Labor is required to prepare the produce for delivery, selling at the markets and packing back up at the end of the day.

In part to address the challenges faced by farmers who maintain direct sales operations, the local resource conservation district convened a meeting for the agricultural community last year to discuss ways small farms in the county could share efforts and resources. RCD is but one organization in a collaboration of partners that includes TomKat Ranch, Kitchen Table Advisors and Brisa Ranch as well as the county Farm Bureau and The Mixing Bowl.

Participants agreed on the need and opportunity for working collectively.

“We can see the potential very clearly,” said Verónica Mazariegos-Anastassiou, co-owner of Brisa Ranch, who participated in the meeting. But she acknowledged that some in the group expressed skepticism because they have seen ideas come and go over the years without any real results.

The initial meeting led to the formation of an Agricultural Markets Working Group. Those discussions continued through the fall and winter. The working group included farmers and ranchers from different parts of the county who operate various types of farms. They identified shared challenges and proposed some possible solutions.

They acknowledged, for example, that two farms driving half-full trucks to the same farmers market could explore ways to partner. The group also discussed how collaboration could help farmers meet requirements for supplying restaurants and stores when they cannot reach these customers alone.

The idea of developing “food hubs” that allow small farmers to share resources has been getting increasing attention in recent years. The U.S. Department of Agriculture estimated that the number of food hubs in the U.S. grew by 288 percent between 2007 and 2014. The agency defines a food hub as “a centrally located facility with a business management structure facilitating the aggregation, storage, processing, distribution, and/or marketing of locally/regionally produced food products.”

Arko said the next step for creating a food hub serving San Mateo County is to develop a business plan to work through the details and study how to make aggregation financially feasible. The plan should offer flexibility, she emphasized, because “not every farm is going to utilize every feature.” The group is waiting on the outcome of a grant proposal to the USDA to support this effort.

Arko believes that shared marketing that promotes the diversity of crops, sustainable farming practices and the beauty of San Mateo County could also become the task of a shared agricultural agreement.

Founded in 1939, the San Mateo RCD was the first conservation district in California. Originally formed to combat soil erosion after the era of the Dust Bowl, the agency and 94 others throughout the state now support resource conservation and agriculture in various ways.

Mazariegos-Anastassiou believes that there is a lot of interest in the area for buying local produce and the farm hub discussion is “a very exciting development.” She said people also recognize the role producers play as employers and stewards of the land, but there are currently limitations that can make it difficult for buyers to work with small local farms.

Peter Tokofsky

https://www.pacificatribune.com/news/local-agency-envisions-hub-to-help-area-farmers/article_10a2768c-203f-11ee-b654-2f99fb1380f0.html

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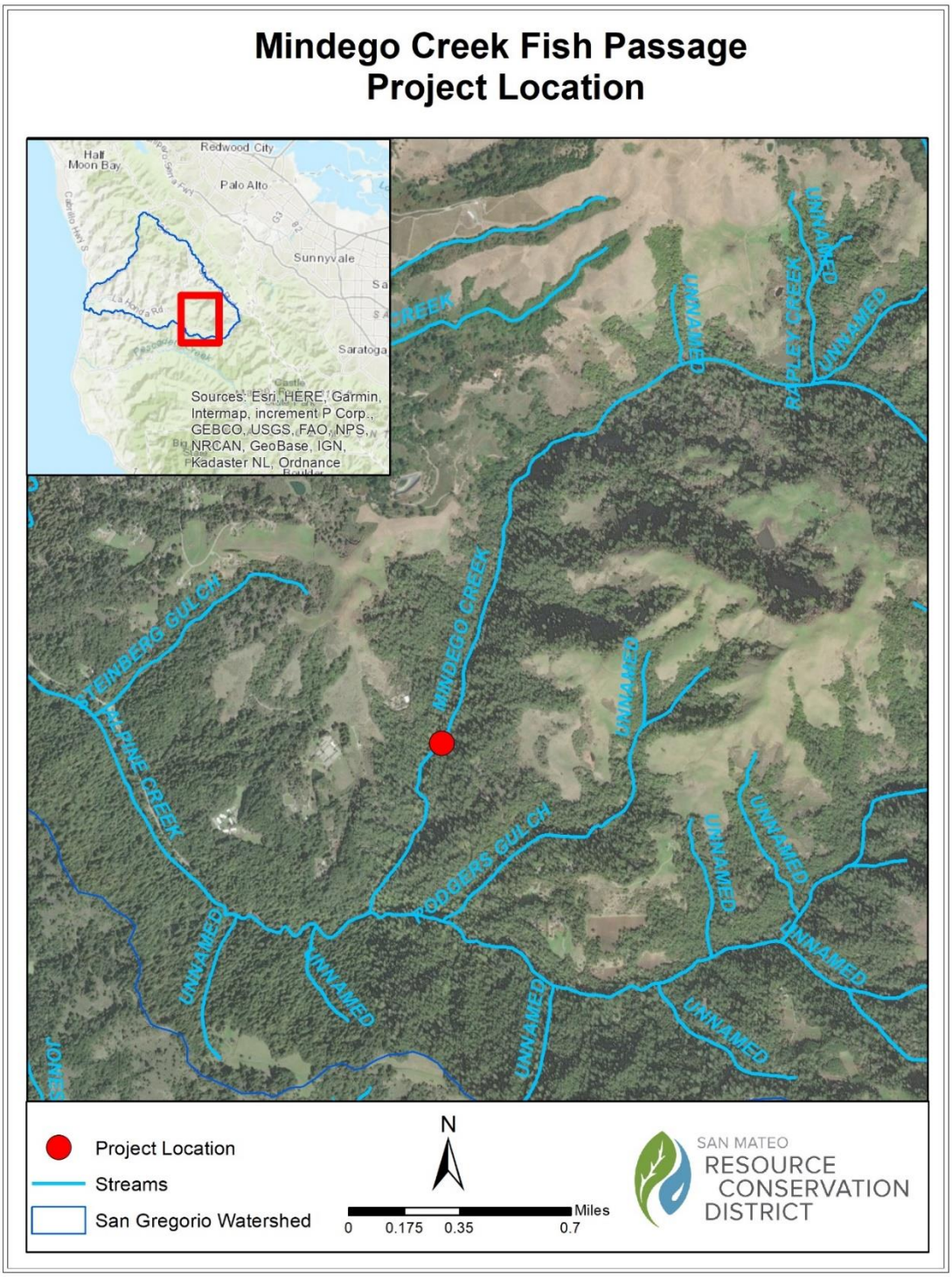
Peter Tokofsky

Figure 1. Project Location Map



https://www.smdailyjournal.com/arts_and_entertainment/forest-health-project-begins-at-butano-state-park/article_feca7eb6-1240-11ee-b372-274fa1f9d572.html

FEATURED

From the Daily Journal archives

Forest health project begins at Butano State Park

Project aims to improve biodiversity, reduce fire risk

By Rachel McCrea Daily Journal correspondent
Jun 24, 2023

Work has begun on the Butano State Park Forest Health Project, a collaborative effort to reduce fuels and improve the park's health and biodiversity.

California State Parks, the San Mateo Resource Conservation District, and Cal Fire are working together with private contractors to manage overgrown vegetation and to eventually reintroduce low-level fire in 420 acres of Butano State Park. The first stage of the project began May 1, when crews began using heavy machinery to turn understory trees and brush into mulch. Once enough vegetation is cleared out, the long-term goal is to use prescribed burns in the area.

The process of mowing and mulching is called “mechanical mastication” and is a more careful, site-specific process than clear-cutting, said Kellyx Nelson, the executive director of the San Mateo RCD. Both mechanical mastication and prescribed burns are examples of “low-level disturbance,” which is crucial to forest health.

“These ecosystems evolved with disturbance, including fire,” Nelson said.

When disturbances like fire are suppressed, she said, overgrown forests are more vulnerable to extreme wildfires and store less carbon. The Forest Health Project is like a “reboot” that mimics natural disturbances to improve the biodiversity and resilience of the park.

Though the project is imitating natural disturbances, human-caused disturbance has long been part of local ecosystems. Cultural burning practices used to be part of indigenous land management in the region, said David Cowman, a forest ecologist at the San Mateo RCD. According to California State Parks, Butano State Park lies on land once managed by the Quiroste tribe.

For around the past 14,000 years, fire has been the most prevalent form of disturbance in California, said Tim Hyland, the natural resource manager for the Santa Cruz district of California State Parks.

“Fire is the most powerful land management tool that humans have ever used,” he said.

However, when local lands started to be protected from mining, logging and grazing, they were also protected from natural “disturbance regimes” like fires, landslides and floods.

The loss of these disturbance regimes can cause biodiversity loss, but also has dire implications for wildfires. If fire policy is "put out every fire you can put out," as Hyland described it, the only fires become the uncontrollable, destructive ones that have become the norm during fire season.

After years of fire suppression, prescribed burns will have to wait until heavy machinery has cleared out dense vegetation.

"The fuels are too dense, the road infrastructure isn't, kind of, beefy enough to do prescribed fire currently," Cowman said. "It would burn too hot, it wouldn't be at the settings that we would want to burn the park at."

The Forest Health Project was still in its planning stage when the CZU Complex fire burned through the park in 2020. The fire damaged the park and caused closures, but it also gave the project leaders a chance to reevaluate their strategy and add more acres to the project.

"The fire kind of provided us with an unprecedented opportunity to reintroduce this disturbance," Cowman said. "It kind of wiped the slate clean."

Now that work on the project has started, Cowman's focus is on developing "treatment prescriptions" for the mechanical mastication stage. This process involves sending biologists, foresters and archaeologists through a section of forest to decide how to tackle it. They mark important plants, such as trees with nesting birds, and develop a site-specific plan for mowing and mulching.

The project is expected to cost $1.8 million, said Cowman, and is funded by California Climate Investments and California State Parks. It will cause short-term closures of specific roads and trails, and is estimated to be completed by late 2024.

The Forest Health Project is intended to make the park less susceptible to wildfires like the CZU Complex fire, but there's more to it than just mowing overgrown fuels.

“Yes, we’re reducing fuels, but our goal in [State] Parks is to preserve that biological diversity,” Hyland said. “That is done by allowing these natural processes to happen, or assisting them to happen.”

https://www.hmbreview.com/news/butano-state-park-slated-for-forest-recovery-work/article_9492174a-1b53-11ee-8eaa-e3921ec80306.html

Butano State Park slated for forest recovery work

RCD, Cal Fire and State Parks seek plan

By August Howell
Jul 5, 2023

With wildfire season on the horizon in California, a county conservation organization and two state agencies have partnered on a long-term project to bolster forest ecology and reduce fire risk at Butano State Park.

The San Mateo Resource Conservation District has partnered with the California Department of Parks and Recreation and Cal Fire to work on more than 400 acres of Butano State Park three years after the devastating CZU Lightning Complex fires swept through the area in August 2020.

RCD Executive Director Kellyx Nelson said the mechanical work within the next year will help set up Butano for long-term fuel reduction methods like prescribed burning. She noted that with State Parks working on forest restoration from the CZU damage in Santa Cruz County and Big Basin State Park, RCD is stepping in to expand the capacity for Butano. The resource conservation district's plan to prevent wildfires is to use a holistic approach by minimizing tree density and diversifying tree species.

"This is very much a project that's improving and restoring forest ecology," Nelson said. "It's a habitat restoration project that improves the biodiversity and resilience of the forest."

While RCD is managing the project, Mountain F. Enterprises will provide the boots on the ground thinning overgrown vegetation, removing dead or dying trees, and reducing ladder fuels. According to RCD's bid package, the Butano State Park Forest Health project "encompasses 391.6 acres of mechanical mastication, 16 acres of understory hand thinning, and 52.9 acres of various overlapping treatments aimed at thinning moderate range diameter trees to reduce competition and fuel load." The project is funded by $560,000 from State Parks and $2.8 million from Cal Fire's Forest Health Program.

"We are excited to be partnering with the RCD and Cal Fire on this important project," Chris Spohrer, the superintendent of State Parks' Santa Cruz district, said in a statement. "By working together, we can achieve our shared goals of promoting forest health, reducing the risk of wildfire and protecting the natural resources of San Mateo County and the state of California."

RCD Forest Ecologist David Cowman said the restoration should be finished by fall 2024.

In the last two years, RCD has completed just over 500 acres of forest management and fuel load reduction work in San Mateo County, meaning this singular Buntano project would represent a huge portion of work the conservation district has already done.

Cowman noted that most of the Santa Cruz Mountains are overdue for this type of work. With no low-intensity fires to clear out fuels for the last 200 years, there's a lot of work needed just to set up prescribed burns in the future.

"The long-term goal is to go in with this mechanical work, reset the system and set the park up for prescribed burning," he said.

"There are some types of fire that can be beneficial, and there are some types of fire that can be destructive," added Nelson. "There's no one size that fits all for fire."

August Howell

Geo Blue Consulting

23 June 2023

San Mateo Resource Conservation District
Attn.: Jarrad Fisher
80 Stone Pine Road, Suite 100
Half Moon Bay, California 94019

Sent Via E-Mail: jarrad@sanmateorcd.org

Re.: **GRX Proposal Package**
Reservoir Maintenance and Rehabilitation
Pescadero Creek Vineyards
6500 Pescadero Creek Road
Pescadero, San Mateo County, California

Dear Mr. Fisher:

On behalf of Pescadero Creek Vineyards (PCV), Geo Blue Consulting, Inc. (Geo Blue) is submitting this Grading Permit Exemption (GRX) proposal package to the San Mateo Resource Conservation District (RCD). PCV plans to rehabilitate its reservoir, with construction beginning in September 2023. The project goals and objectives are to restore the water storage capacity of the reservoir, remove invasive non-native species, and protect the adjoining meadow.

APPLICATION FORM AND FEES

Our completed GRX application form is included as Attachment A. Fees ($1,000) are being mailed separately to the RCD.

RESERVOIR MAINTENANCE GRADING AND DRAINAGE PLANS

Revised grading and drainage plans are included as Attachment B to this letter. PCV submitted preliminary plans to the RCD on 26 May 2023; the attached plans address RCD comments to the preliminary plans and further detail the project. The project described in the attached drawings consists of:

1. Capacity restoration. Approximately 3,626 cubic yards of sediment will be removed from the eastern shore and base of the reservoir.

2. Onsite reuse of excavated sediments. Vegetation and topsoil will be removed from the meadow and stockpiled. Spreading is planned in the meadow below the reservoir with

SAN MATEO RESOURCE CONSERVATION DISTRICT

PHONE: 650.712.7765

80 STONE PINE ROAD, SUITE 100
HALF MOON BAY, CA 94019

SANMATEORCD.ORG

Memorandum

Date: July 18, 2023

To: Board of Directors

From: Kellyx Nelson

Re: Recommendation to Adopt Revised Policy for Mileage Reimbursement

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Recommendation

I recommend that the board of directors adopt the following proposed policy for mileage reimbursement:

> In the course of their duties, employees may participate in meetings, field visits, conferences, and other work that requires travel. Employees may be reimbursed for their mileage when the travel is approved by their supervisor and not reasonably considered to be part of an employee's commute. When such travel commences or terminates at an employee's home, the distance traveled shall be computed from either the office or their home, whichever shall result in the lesser distance. Regardless of flexibility offered by the RCD, no employee's home is considered their permanent workstation. Employees will not be reimbursed for travel to locations that are on the way to the office or a shorter distance than driving to the office, or for travel that is not approved by their supervisor. The mileage reimbursement rate is determined by the current Internal Revenue Service rate. Employees are not reimbursed for mileage when driving a vehicle provided by the RCD or NRCS.
>
> The following scenarios are offered to help interpret this policy:
>
> - I live in San Francisco. I go through Pacifica to get to the RCD's office in Half Moon Bay. I will not be reimbursed for mileage to go from home to a site visit in Pacifica, as that will be considered my commute. However, if I have further work in Pacifica that day which requires additional driving, such as a series of site visits, I may be reimbursed for driving that is required as part of my work.
> - I live in Santa Cruz. I have a site visit in Pescadero at a distance shorter than my commute to the office would be. Once I reach the property, I will be driving on ranch roads as part of my work. I will not be reimbursed for travel

to the property. However, driving within the property is driving required for my work that is beyond a basic commute and I may be reimbursed for that.

- I live in the East Bay. I have a meeting in Montara at the beginning of my workday. I will not be reimbursed for my mileage to Half Moon Bay, but may be reimbursed for the additional mileage to Montara.
- I have a midday meeting. I leave from and return to the office. I may be reimbursed for all of my mileage to and from that meeting.
- I live in Pescadero. On my way home from the office I visit a site in San Gregorio. The total driving distance on the detour adds about 15 miles to my commute. I may be reimbursed for the 15 miles.
- I live in San Francisco. I drive from home to a site visit in Pescadero. I may be reimbursed for mileage from the office in Half Moon Bay to the site in Pescadero and all work-required mileage until I return to the office.
- I am attending a conference in Sacramento. I live in Redwood City. I may be reimbursed for all mileage to and from the conference as well as driving while at the conference for meals, networking, field trips, and work-related travel.

Background

Since our current mileage reimbursement policy was adopted in 2015, the RCD's staff size has increased as well as the amount that people work remotely. This has resulted in questions how to interpret the policy as well as some different interpretations. The current policy, adopted in 2015, says:

> The mileage reimbursement rate for employees travelling for RCD business is determined by the current year's Internal Revenue Service rate. Program mileage reimbursement may be determined by the current program contract. If this is not the case, the rate will be determined by the Internal Revenue Service rate for that year. Mileage reimbursement arising from travel between home and the district is not allowed. When a trip is commenced or terminated at an employee's home, the distance traveled shall be computed from either his/her headquarters or home, whichever shall result in the lesser distance. Any employee or contractor driving on RCD business must maintain a current California Driver's License, and active automobile insurance which complies with current California law. Each employee must annually provide to RCD a copy of that employee's Driver's License and a copy of evidence of possessing the minimum amounts of insurance specified by California law. These documents will be kept in each employee's personnel file.

The proposed changes are intended to:

1. Offer one consistent reimbursement rate. The current policy allows for reimbursement rates to vary based on the funding agreement for a specific contract, defaulting to the IRS rate if the rate is not determined by the funder. In practice, RCD staff includes IRS rates when applying for grants. It is also easier to administer, more equitable, and more certain to have one consistent rate.

2. Eliminate extraneous items and redundancy with other policies. The current policy includes license and insurance requirements that are unrelated to mileage reimbursement. Also, the personnel manual already requires staff to adhere to standards and laws pertaining to safety and prohibits illegal conduct while at work.

3. Clarify aspects of the policy that are inconsistently interpreted. Under the current policy, questions have arisen regarding billing for mileage if someone is driving to field work from their home when the distance is less than the distance would have been if they had driven to the field from the RCD office. One might interpret the current policy to mean that they could charge for mileage for driving what another might interpret as a regular commute.

4. Ensure that policies are consistent and that policy is consistent with practice. Supervisors must approve employee expense reimbursements. In practice this includes approving mileage, but that is not explicit in the current policy.

The need to revise the policy was brought to me by supervisors on staff who felt uncertain how to approve expenses and how to interpret the policy to staff that report to them. In response, I worked with the RCD's administrative officer, stewardship director, two program managers, and our engagement office (who takes lead on equity-related concerns) to develop a draft revised policy. That draft was discussed at a staff meeting and then posted on Teams (a communications platform that is used by all staff) for feedback. The only recommendation that was offered was to include specific examples I had sent to staff earlier this year regarding when to bill for their time in travel. Those examples were incorporated into the proposed policy for board consideration.

A remaining issue to be resolved is whether employees can be reimbursed for mileage if a "company" vehicle is provided by the NRCS or RCD. Use of the NRCS vehicle can be both limited and onerous, so it has not been required of staff. If the RCD acquires a vehicle as planned, the policy may be amended further to limit reimbursements when staff chooses to use their own vehicle, with potential exceptions. I will bring this issue forward at a later date.

an approximate thickness of 6 to 12 inches. Topsoil and vegetation will be returned to the meadow and evenly spread across the filled areas.

3. Install an underdrain system to protect the pond and liner. Water collection pipes beneath the pond liner will connect to a sump. The sump is intended to be used to pump groundwater into the reservoir. Overflow from the sump, if any, will gravity drain to the meadow.

4. Replace reservoir liner. The proposed liner will be synthetic. Upper portions of the liner will be covered with soil, which will be retained in place using a honeycomb-structured erosion control fabric.

5. Utility and access way relocation. Restoration work will require temporary removal of electrical and water lines. Plumbing and electrical permits will be obtained separately from the San Mateo County Building Department.

Contingency elements of the project are:

A. If necessary, excavated sediments may be exported offsite. This would require identification of a suitable fill site within the site vicinity, profiling, traffic and access plans, temporary storage during drying/drainage of sediments, loading and trucking.

Project activities and sequencing and project equipment are referenced on Sheet C1 of the attached Reservoir Grading and Drainage Plan.

SPECIFIC GOALS AND OBJECTIVES

The existing reservoir captures winter rainy season sheet flow from surrounding hillslopes and stores the water for dry season use. The capacity of the reservoir has decreased due to sedimentation, and the liner has degraded and needs to be replaced. By performing the regular maintenance activities described in Attachment B, the reservoir will be rehabilitated and habitat around the margins of the reservoir will be restored. Specifically, reduced leakage by replacement of the liner, and groundwater collection from the added underdrain system will reduce dry season lowering of reservoir levels.

IMPLEMENTATION SCHEDULE

Reservoir rehabilitation needs to be completed in Summer and Fall 2023 to capture rainfall runoff from during the 2023-2024 rainy season.

- September 1: Clearing, grubbing and site prep

- September 15: Grading Improvements
- October 1: Improvements completed and winterized
- October 15: Fill sites complete and covered with top soil and vegetation

IMPACT AVOIDANCE PLANS

Munselle Civil Engineering is experienced with Natural Resources Conservation Service (NRCS) practice standards. To ensure the project is consistent with NRCS standards, Munselle has incorporated impact avoidance measures into the Reservoir Grading and Drainage Plans (Attachment B). Munselle will monitor construction and verify compliance with Reservoir Grading and Drainage Plans. Best Management Practices (BMPs) will be in accordance with NRCS standards.

In addition, the following impact avoidance plans are included as attachments:

- Erosion control Plan, including avoidance measures and silt fencing locations (Attachment B, Sheet C5).
- Grassland protection and post-construction meadow restoration plan (Attachment C).
- Non-native American Bullfrog Eradication and Management Plan (Attachment D).
- Reservoir drawdown plan prior to construction (Attachment E).
- Vegetation maintenance plan for operation of the reservoir (Attachment F).

An endangered species assessment is planned for 15 August 2023. If necessary following the initial survey by a qualified biologist, exclusion fencing locations will be planned and a copy the plan will be submitted to RCD. If indicated by the report from the surveying biologist, biological monitors may be onsite during construction.

CLOSING

We look forward to working with RCD on this important project. Please contact me or Sean Callari if you have any questions or require additional information.

Sincerely,
Geo Blue Consulting, Inc.

Robert W. Schultz, CHG
Principal
rschultz@geoblueconsulting.com

Cc: Sean Callari, Pescadero Creek Vineyard, seancallari@hotmail.com
Cort Munselle, Munselle Civil Engineering, cort@munsellecivil.com
Joe Issel, RCD

Attachments:

Attachment A –	GRX Application Form
Attachment B -	Reservoir Grading and Drainage Plan
Attachment C -	Grassland Protection and Post-construction Meadow Restoration Plan
Attachment D -	Non-native American Bullfrog Eradication and Management Plan
Attachment E -	Reservoir Drawdown Plan Prior to Construction
Attachment F -	Vegetation Maintenance Plan for Operation of the Reservoir

ATTACHMENT A

SAN MATEO
RESOURCE CONSERVATION DISTRICT

PHONE: 650.712.7765
80 Stone Pine Rd, Ste.100
Half Moon Bay, CA 94019

Application for Certificate of Exemption from Grading Permit

INSTRUCTIONS

Please read the Grading Permit Exemption Application Process document prior to submitting your proposal for a Grading Permit Exemption from the RCD. The RCD will only review applications from applicants who have discussed their project with the San Mateo County Planning and Building Division. Approval of a Grading Permit Exemption does not exclude the applicant from other necessary permits. Please submit your fee with your application. Fee schedule is on the second sheet.

PROJECT INFORMATION

Project Name: 6500 Pescadero Creek Road

APN/s: 088090240

Site Address/Location: 6500 Pescadero Creek Road

Pescadero, California 94060

Cubic Yards to be Moved: 3,626 cubic yards of pond sediment

Area to be Cleared: 4.17 acres during construction

Conservation Purpose: Rehabilitation of agricultural reservoir to restore storage capacity of the reservoir, and remove invasive non-native species.

Please check allowable GRX circumstance:

☐ Land to be cleared is for natural resource management
☐ Agricultural use of land that is operated in accordance with a conservation plan
☐ Soil conservation
☐ Agricultural water impoundments not exceeding the minimum limitations of the State Dams and Reservoir Act of 1967
☐ Repair storm damage consisting of slide repair or debris removal
☒ Water impoundment replacement on agricultural lands

AGENCY INFORMATION AND CERTIFICATION

Applicant Name: _____

Agency Name (if applicable): _____

Phone Number: _____

Email: _____

Mailing Address: _____

_____

_____

Did you seek advice from San Mateo County Planning and Building Division? Yes ☒ No ☐

I hereby certify that the statements furnished in this form and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. If any of the facts represented here change, it is my responsibility to inform the RCD.

Signature: _____

Date: _____

Name: _____

Title: _____

RCD USE

RCD Board Approval

Signature: _____

Name: _____

Date: _____

Paid in Full: ____ Check Number: _____ Amount: _____

Date Submitted to SMC: _____

County GRX Number: _____

ATTACHMENT B

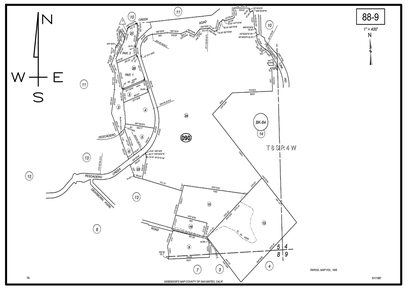
EROSION PREVENTION AND SEDIMENT CONTROL NOTES

1. PERFORM EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) IN ACCORDANCE WITH SAN MATEO COUNTY CODE.
2. THE APPROVED PLANS SHALL CONFORM TO NRCS SPECIFICATIONS FOR EPSC BEST MANAGEMENT PRACTICES (BMPS).
3. THE PROPERTY OWNER IS RESPONSIBLE FOR PREVENTING STORM WATER POLLUTION GENERATED FROM THE CONSTRUCTION SITE YEAR ROUND. WORK SITES WITH INADEQUATE EROSION PREVENTION AND/OR SEDIMENT CONTROL MAY BE SUBJECT TO A STOP WORK ORDER AND/OR ADDITIONAL INSPECTION FEES TO VERIFY COMPLIANCE.
4. IF DISCREPANCIES OCCUR BETWEEN THESE NOTES, MATERIAL REFERENCED ON THE APPROVED PLANS OR MANUFACTURER'S RECOMMENDATIONS, THEN THE MOST PROTECTIVE SHALL APPLY.
5. AT ALL TIMES THE PROPERTY OWNER IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH THE STATE OF CALIFORNIA NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBING ACTIVITIES SUCH AS CLEARING, GRADING, EXCAVATION, STOCKPILING, AND RECONSTRUCTION OF EXISTING FACILITIES INVOLVING REMOVAL AND REPLACEMENT.
6. THE PROPERTY OWNER MUST IMPLEMENT AN EFFECTIVE COMBINATION OF EPSC ON ALL DISTURBED AREAS DURING THE RAINY SEASON (APPROXIMATELY OCTOBER 1 - APRIL 30). GRADING AND DRAINAGE IMPROVEMENT SHALL BE PERMITTED DURING THE RAINY SEASON ONLY WHEN ON-SITE SOIL CONDITIONS PERMIT THE WORK TO BE PERFORMED IN COMPLIANCE WITH THE EPSC.
7. DURING THE RAINY SEASON, STORM WATER BMP'S SHALL BE IMPLEMENTED AND FUNCTIONAL ON THE SITE AT ALL TIMES AND THE AREA OF ERODIBLE LAND EXPOSED AT ANY ONE TIME DURING THE WORK SHALL NOT EXCEED ONE ACRE OR 20 PERCENT OF THE PERMITTED WORK AREA, WHICHEVER IS GREATER, AND THE TIME OF EXPOSURE SHALL BE MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE.
8. DURING THE NON-RAINY SEASON, ON ANY DAY WHEN THE NATIONAL WEATHER SERVICE FORECAST IS A CHANCE OF RAIN OF 30 PERCENT OR GREATER WITHIN THE NEXT 24 HOURS, STORM WATER BMP'S REFERENCED OR DETAILED SHALL BE IMPLEMENTED AND FUNCTIONAL ON THE SITE TO PREVENT SOIL AND OTHER POLLUTANT DISCHARGES. AT ALL OTHER TIMES, BMP'S SHOULD BE STORED ON SITE IN PREPARATION FOR INSTALLATION PRIOR TO RAIN EVENTS.
9. EPSC BMP'S SHALL BE INSPECTED BY THE PROPERTY OWNER BEFORE FORECASTED STORM EVENTS AND AFTER STORM EVENTS TO ENSURE BMP'S ARE FUNCTIONING PROPERLY. EPSC BMP'S THAT HAVE FAILED OR ARE NO LONGER EFFECTIVE SHALL BE PROMPTLY REPLACED. EPSC BMP'S SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED.
10. THE LIMITS OF GRADING SHALL BE DEFINED AND MARKED ON SITE TO PREVENT DAMAGE TO SURROUNDING TREES AND OTHER VEGETATION. PRESERVATION OF EXISTING VEGETATION SHALL OCCUR TO THE MAXIMUM EXTENT PRACTICABLE. ANY EXISTING VEGETATION WITHIN THE LIMITS OF GRADING THAT IS TO REMAIN UNDISTURBED BY THE WORK SHALL BE IDENTIFIED AND PROTECTED FROM DAMAGE BY MARKING, FENCING, OR OTHER MEASURES.
11. CHANGES TO THE EPSC PLAN MAY BE MADE TO RESPOND TO FIELD CONDITIONS IF THE ALTERNATIVE BMP'S ARE EQUIVALENT OR MORE PROTECTIVE THAN THE BMP'S SHOWN ON THE APPROVED PLANS. ALTERNATIVE BMP'S ARE SUBJECT TO REVIEW AND APPROVAL BY THE CIVIL ENGINEER.
12. DISCHARGES OF POTENTIAL POLLUTANTS FROM CONSTRUCTION SITES SHALL BE PREVENTED USING SOURCE CONTROLS TO THE MAXIMUM EXTENT PRACTICABLE. POTENTIAL POLLUTANTS INCLUDE BUT ARE NOT LIMITED TO SEDIMENT, TRASH, NUTRIENTS, PATHOGENS, PETROLEUM HYDROCARBONS, METALS, CONCRETE, CEMENT, ASPHALT, LIME, PAINT, STAINS, GLUES, WOOD PRODUCTS, PESTICIDES, HERBICIDES, CHEMICALS, HAZARDOUS WASTE, SANITARY WASTE, VEHICLE OR EQUIPMENT WASH WATER, AND CHLORINATED WATER.
13. ENTRANCE(S) TO THE CONSTRUCTION SITE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF POTENTIAL POLLUTANTS OFFSITE. POTENTIAL POLLUTANTS DEPOSITED ON PAVED AREAS WITHIN THE COUNTY RIGHT-OF- WAY, SUCH AS ROADWAYS AND SIDEWALKS, SHALL BE PROPERLY DISPOSED OF AT THE END OF EACH WORKING DAY OR MORE FREQUENTLY AS NECESSARY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING CONSTRUCTION VEHICLES LEAVING THE SITE ON A DAILY BASIS TO PREVENT DUST, SILT, AND DIRT FROM BEING RELEASED OR TRACKED OFFSITE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AT THE END OF EACH WORKING DAY OR MORE OFTEN, AS NECESSARY.
14. ALL DISTURBED AREAS SHALL BE PROTECTED BY USING EROSION PREVENTION BMP'S TO THE MAXIMUM EXTENT PRACTICABLE, SUCH AS ESTABLISHING VEGETATION COVERAGE, HYDROSEEDING, STRAW MULCH, GEOTEXTILES, PLASTIC COVERS, BLANKETS, OR MATS. TEMPORARY REVEGETATION SHALL BE INSTALLED AS SOON AS PRACTICAL AFTER VEGETATION REMOVAL, BUT IN ALL CASES PRIOR TO OCTOBER 1. PERMANENT REVEGATATION OR LANDSCAPING SHALL BE INSTALLED PRIOR TO FINAL INSPECTION.
15. WHENEVER IT IS NOT POSSIBLE TO USE EROSION PREVENTION BMP'S ON EXPOSED SLOPES, SEDIMENT CONTROL BMP'S SUCH AS FIBER ROLLS AND SILT FENCES SHALL BE INSTALLED TO PREVENT SEDIMENT MIGRATION. FIBER ROLLS AND SILT FENCES SHALL BE TRENCHED AND KEYED INTO THE SOIL AND INSTALLED ON CONTOUR. SILT FENCES SHALL BE INSTALLED APPROXIMATELY 2 TO 5 FEET FROM TOE OF SLOPE.
16. HYDROSEEDING SHALL BE CONDUCTED ACCORDING TO THE GRASSLAND PROTECTION AND POST-CONSTRUCTION MEADOW RESTORATION PLAN.
17. DUST CONTROL SHALL BE PROVIDED BY CONTRACTOR DURING ALL PHASES OF CONSTRUCTION.
18. STORM DRAIN INLETS SHALL BE PROTECTED FROM POTENTIAL POLLUTANTS UNTIL DRAINAGE CONVEYANCE SYSTEMS ARE FUNCTIONAL AND CONSTRUCTION IS COMPLETE.
19. ENERGY DISSIPATERS SHALL BE INSTALLED AT STORM DRAIN OUTLETS WHICH MAY CONVEY ERODSIVE STORM WATER FLOW.
20. SOIL, MATERIAL STOCKPILES, AND FERTILIZING MATERIAL SHALL BE PROPERLY PROTECTED WITH PLASTIC COVERS OR EQUIVALENT BMP'S TO MINIMIZE SEDIMENT AND POLLUTANT TRANSPORT FROM THE CONSTRUCTION SITE.
21. SOLID WASTE, SUCH AS TRASH, DISCARDED BUILDING MATERIALS AND DEBRIS, SHALL BE PLACED IN DESIGNATED COLLECTION AREAS OR CONTAINERS. THE CONSTRUCTION SITE SHALL BE CLEARED OF SOLID WASTE DAILY OR AS NECESSARY. REGULAR REMOVAL AND PROPER DISPOSAL SHALL BE COORDINATED BY THE CONTRACTOR.
22. A CONCRETE WASHOUT AREA SHALL BE DESIGNATED TO CLEAN CONCRETE TRUCKS AND TOOLS. AT NO TIME SHALL CONCRETE PRODUCTS AND WASTE BE ALLOWED TO ENTER COUNTY WATERWAYS SUCH AS CREEKS OR STORM DRAINS. NO WASHOUT OF CONCRETE, MORTAR MIXERS, OR TRUCKS SHALL BE ALLOWED ON SOIL. CONCRETE WASTE SHALL BE PROPERLY DISPOSED.
23. PROPER APPLICATION, CLEANING, AND STORAGE OF POTENTIALLY HAZARDOUS MATERIALS, SUCH AS PAINTS AND CHEMICALS, SHALL BE CONDUCTED TO PREVENT THE DISCHARGE OF POLLUTANTS.
24. TEMPORARY RESTROOMS AND SANITARY FACILITIES SHALL BE LOCATED AND MAINTAINED DURING CONSTRUCTION ACTIVITIES TO PREVENT THE DISCHARGE OF POLLUTANTS.
25. APPROPRIATE VEHICLE STORAGE, FUELING, MAINTENANCE, AND CLEANING AREAS SHALL BE DESIGNATED AND MAINTAINED TO PREVENT DISCHARGE OF POLLUTANTS.

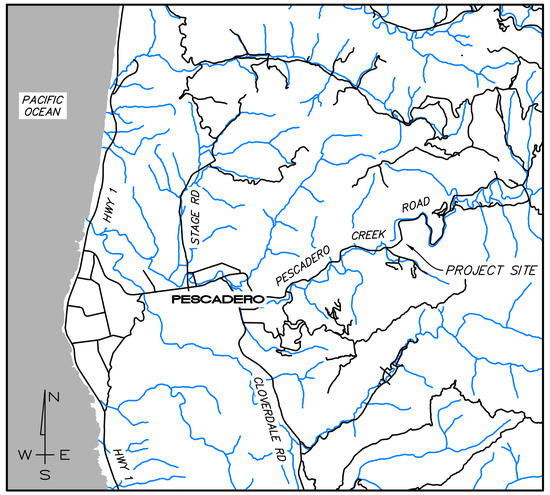
GRADING AND DRAINAGE NOTES

1. PERFORM GRADING AND DRAINAGE IMPROVEMENTS IN ACCORDANCE WITH THE SAN MATEO COUNTY CODE, APPLICABLE SAN MATEO COUNTY REGULATIONS, THE SAN MATEO COUNTY RESOURCE CONSERVATION DISTRICT (RCD), NRCS SPECIFICATIONS, AND, IF APPLICABLE, TO THE RECOMMENDATIONS OF THE SOILS REPORT PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC., AND DATED JULY 12, 2023.
2. ALL WORK SHALL BE DONE IN COMPLIANCE WITH THE APPROVED PLANS AND SPECIFICATIONS. THE APPROVED PLANS AND SPECIFICATIONS SHALL NOT BE CHANGED WITHOUT THE WRITTEN APPROVAL OF THE SAN MATED COUNTY COMMUNITY DEVELOPMENT DEPARTMENT AND THE RCD. PROPOSED MODIFICATIONS TO THE APPROVED PLANS AND SPECIFICATIONS SHALL BE SUBMITTED TO RCD IN WRITING, TOGETHER WITH ALL NECESSARY TECHNICAL INFORMATION AND DESIGN DETAILS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROPERTY OWNER AND ENGINEER OF RECORD, IF APPLICABLE, UPON DISCOVERING DISCREPANCIES, ERRORS, OR OMISSIONS IN THE APPROVED PLANS. PRIOR TO PROCEEDING, THE PROPERTY OWNER SHALL HAVE THE APPROVED PLANS REVISED TO CLARIFY IDENTIFIED DISCREPANCIES, ERRORS, OR OMISSIONS. RCD MAY REQUIRE UNAUTHORIZED WORK TO BE REDONE OR REMOVED TO VERIFY COMPLIANCE.
3. THE GRADING PERMIT EXEMPTION (GRX) AND A COPY OF THE APPROVED PLANS SHALL BE MAINTAINED ON THE PROJECT SITE THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES.
4. ISSUANCE OF A GRADING PERMIT EXEMPTION (GRX) BY RCD DOES NOT ELIMINATE THE RESPONSIBILITY OF THE PROPERTY OWNER TO SECURE PERMITS FROM OTHER AGENCIES WITH REGULATORY RESPONSIBILITIES FOR THE USES AND CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE WORK SHOWN ON THE APPROVED PLANS. FAILURE TO OBTAIN ALL REQUIRED PERMITS MAY RESULT IN FINES FROM OTHER AGENCIES.
5. EXISTING DRAINAGE COURSES RECEIVING WATERS FROM THE PROJECT SITE AND LOCATED THROUGHOUT THE PROJECT SITE SHALL REMAIN OPEN AND CLEAR OF DEBRIS TO PROPERLY CONVEY STORM WATER. IF EXISTING DRAINAGE COURSES RECEIVING WATERS FROM THE PROJECT SITE ARE LOCATED IN THE COUNTY RIGHT-OF- WAY AND NEED MAINTENANCE, CONTACT THE DEPARTMENT OF PUBLIC WORKS AT (650) 363-4100 FOR FURTHER ASSISTANCE. IN ANY EVENT, THE PROPERTY OWNER AND/OR CONTRACTOR SHALL BE HELD LIABLE FOR ANY DAMAGE DUE TO OBSTRUCTING NATURAL DRAINAGE PATTERNS.
6. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND SERVICE ALERT (USA), AT 811, AT LEAST TWO WORKING DAYS, BUT NOT MORE THAN 14 CALENDAR DAYS, PRIOR TO EXCAVATION. THE CONTRACTOR SHALL UNCOVER RELEVANT UTILITIES TO VERIFY THEIR LOCATION AND ELEVATION. IF UNEXPECTED OR CONFLICTING UTILITIES ARE ENCOUNTERED DURING EXCAVATION, NOTIFY USA, THE UTILITY OWNER, AND/OR THE ENGINEER OF RECORD, IF APPLICABLE, IMMEDIATELY. UTILITIES INCLUDE BUT ARE NOT LIMITED TO WATER, SEWER, ELECTRICAL, GAS, TELEPHONE, AND CABLE/TV. THE EXCAVATOR SHALL DELINEATE WITH PAINT OR OTHER SUITABLE MARKINGS THE AREA TO BE EXCAVATED.
7. IN THE EVENT CULTURAL RESOURCES (SUCH AS HISTORICAL, ARCHAEOLOGICAL, AND PALEONTOLOGICAL RESOURCES, AND HUMAN REMAINS) ARE DISCOVERED DURING GRADING OR OTHER CONSTRUCTION ACTIVITIES, WORK SHALL IMMEDIATELY BE HALTED WITHIN THE VICINITY OF THE FIND. THE NORTHWEST INFORMATION CENTER SHALL BE NOTIFIED AT (707) 588-8455. A QUALIFIED ARCHEOLOGIST SHALL BE CONSULTED FOR AN ON-SITE EVALUATION. ADDITIONAL MITIGATION MAY BE REQUIRED BY THE COUNTY PER THE ARCHEOLOGIST'S RECOMMENDATIONS. IF HUMAN BURIALS OR HUMAN REMAINS ARE ENCOUNTERED, THE CONTRACTOR SHALL ALSO NOTIFY THE COUNTY CORONER.
8. SHOULD GRADING OPERATIONS ENCOUNTER HAZARDOUS MATERIALS, OR WHAT APPEAR TO BE HAZARDOUS MATERIALS, STOP WORK IMMEDIATELY IN THE CONTAMINATED AREA AND CONTACT 911 OR THE APPROPRIATE AGENCY FOR FURTHER INSTRUCTION.
9. RETAINING WALLS, UNLESS EXEMPTED, ARE NOT APPROVED UNDER A GRADING PERMIT. A SEPARATE BUILDING PERMIT IS REQUIRED.
10. EQUIPMENT SHALL NOT CROSS OR DISTURB CHANNELS OF ACTIVELY FLOWING STREAMS WITHOUT AN APPROVED PERMIT AND BEST MANAGEMENT PRACTICES.
11. EXCESS SOIL SHALL BE REMOVED FROM THE PROJECT SITE UNLESS DEPICTED TO REMAIN ON SITE PER THE APPROVED PLAN. THE SITE RECEIVING SOIL MAY REQUIRE A GRADING PERMIT UNLESS EXEMPTED.
12. CONTOURS, ELEVATIONS, AND SHAPES OF FINISHED SURFACES SHALL BE BLENDED WITH ADJACENT NATURAL TERRAIN TO ACHIEVE A CONSISTENT GRADE AND NATURAL APPEARANCE. BORDERS OF CUT SLOPES AND FILLS SHALL BE ROUNDED OFF TO A MINIMUM RADIUS OF FIVE FEET TO BLEND WITH THE NATURAL TERRAIN.
13. FILL MATERIAL SHALL NOT INCLUDE ORGANIC, FROZEN, OR OTHER DELETERIOUS MATERIALS. NO ROCK OR SIMILAR IRREDUCIBLE MATERIAL GREATER THAN SIX INCHES IN ANY DIMENSION SHALL BE INCLUDED IN FILLS EXCEPT WHERE APPROVED BY THE SOILS ENGINEER. FILLS SHALL BE CONSTRUCTED IN LIFTS NOT EXCEEDING EIGHT INCHES IN DEPTH. COMPLETED FILLS SHALL BE STABLE, WELL-INTEGRATED, AND BONDED TO ADJACENT MATERIALS AND THE MATERIALS ON WHICH THEY REST. FILLS SHALL BE COMPETENT TO SUPPORT ANTICIPATED LOADS AND BE STABLE AT THE DESIGN SLOPES SHOWN ON THE APPROVED PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE SOILS ENGINEER.
14. GROUND SURFACES SHALL BE PREPARED TO RECEIVE FILL BY REMOVING VEGETATION, TOPSOIL, AND OTHER UNSUITABLE MATERIALS, AND SCARIFYING THE GROUND TO PROVIDE A BOND WITH THE FILL MATERIAL.
15. FILL SHALL NOT BE PLACED ON NATURAL SLOPES STEEPER THAN 2H:1V (50 PERCENT), UNLESS DIRECTED BY THE PROJECT GEOTECHNICAL ENGINEER.
16. FILLS INTENDED TO SUPPORT STRUCTURES OR SURCHARGES SHALL BE COMPACTED TO A MINIMUM OF 90 PERCENT OF MAXIMUM DRY DENSITY, AS DETERMINED BY ASTM D 1557, MODIFIED PROCTOR. A HIGHER COMPACTION PERCENTAGE MAY BE REQUIRED BY THE SOILS ENGINEER.
17. FILLS NOT INTENDED TO SUPPORT STRUCTURES OR SURCHARGES SHALL BE COMPACTED AS FOLLOWS:
    (1.) FILL GREATER THAN THREE FEET IN DEPTH SHALL BE COMPACTED TO THE DENSITY SPECIFIED BY THE SOILS ENGINEER.
    (2.) FILLS NO GREATER THAN THREE FEET IN DEPTH SHALL BE COMPACTED TO THE DENSITY NECESSARY FOR THE INTENDED USE OR AS DIRECTED BY THE SOILS ENGINEER.

GRADING AND DRAINAGE PLAN
FOR
PESCADERO RESERVOIR
APN 088-090-240
6500 PESCADERO CREEK RD
PESCADERO, CA



AP MAP



LOCATION MAP
NO SCALE

SOILS ANALYSIS

THE USDA-SCS SAN MATEO COUNTY SOIL SURVEY MAPS THE PROJECT SITE AS:

BdB	BOTELLA LOAM, GENTLY SLOPING, IMPERFECTLY DRAINED
CsB	CORRALITOS SANDY LOAM, GENTLY SLOPING
TxC2	TUNITAS LOAM, SLOPING, ERODED

CONSTRUCTION SCHEDULE

SEPTEMBER 2023	CLEARING, GRUBBING AND SITE PREP.
SEPTEMBER 2023	START WORK ON GRADING IMPROVEMENTS.
NOVEMBER 2023	IMPROVEMENTS COMPLETED AND WINTERIZED.

EARTHWORK VOLUMES

POND SITE GRADING	DISPOSAL AREAS (FILL ONLY)
CUT = 3,626 CY	SITE A = 2,275 CY (FILL)
FILL = 979 CY	SITE B = 372 CY (FILL)
NET = 2,647 CY (CUT)	NET = 2,647 CY (FILL)

NET PROJECT TOTAL = 0 CY CUT/FILL

NOTES:

1. THE QUANTITIES LISTED ARE THE ENGINEER'S ESTIMATE OF SURFACE GRADING ONLY. ADDITIONAL SUBSURFACE GRADING WILL BE REQUIRED FOR UTILITY TRENCHES, BENCHING, KEYWAYS, OVER EXCAVATION, IMPORT FILL, ETC AND/OR OTHER MEASURES DEEMED NECESSARY BY THE GEOTECHNICAL ENGINEER DURING PROJECT CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR HIS OWN EARTHWORK QUANTITIES.
3. NO EXPANSION/CONTRACTION FACTORS HAVE BEEN APPLIED. EXPANSION AND/OR CONTRACTION MAY BE EXPERIENCED DUE TO ACTUAL FIELD CONDITIONS.

OWNER

TONI CUPAL
PESCADERO CREEK VINEYARDS
6500 PESCADERO CREEK ROAD
PESCADERO, CA 94060

CONTACT

CORT MUNSELLE
MUNSELLE ENGINEERING
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0968

PROJECT DESCRIPTION

GRADING AND DRAINAGE IMPROVEMENTS TO REPAIR THE LINER AND RE-GRADE AN EXISTING AGRICULTURAL IRRIGATION POND WITH ASSOCIATED DRAINAGE IMPROVEMENTS.

GENERAL UNDERGROUND NOTES

1. NO GUARANTEE IS INTENDED THAT UNDERGROUND OBSTRUCTIONS, NOT SHOWN ON THESE PLANS, WILL NOT BE ENCOUNTERED. THOSE SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE AND THE CONTRACTOR IS CAUTIONED THAT THE OWNER, THE ENGINEER, AND THE COUNTY OF SAN MATEO ASSUME NO RESPONSIBILITY FOR ANY OBSTRUCTIONS EITHER SHOWN OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL COOPERATE WITH ALL UTILITY COMPANIES WORKING WITHIN THE LIMITS OF THIS PROJECT.
2. CONTRACTOR SHALL NOT BEGIN EXCAVATION UNTIL ALL EXISTING UTILITIES HAVE BEEN MARKED IN THE FIELD BY THE APPLICABLE ENTITY RESPONSIBLE FOR THAT PARTICULAR UTILITY. THE CONTRACTOR SHALL NOTIFY EACH APPLICABLE ENTITY AT LEAST 24 HOURS BEFORE STARTING WORK. HAND DIGGING IS REQUIRED IF TRENCH IS WITHIN 12" OF ANY EXISTING UTILITY.
3. UNDERGROUND SERVICE ALERT: CALL TOLL FREE (800) 642-2444 AT LEAST 48 HOURS PRIOR TO EXCAVATION.
4. THE CONTRACTOR SHALL OBTAIN A TRENCH PERMIT FROM THE CALIFORNIA DIVISION OF INDUSTRIAL SAFETY BEFORE EXCAVATION OF TRENCHES. A COPY OF THE PERMIT MUST BE ON FILE WITH THE CITY BEFORE TRENCH EXCAVATION MAY BEGIN.
5. CONTRACTOR SHALL UNCOVER EXISTING BURIED UTILITIES WITH UTILITY OWNER TO VERIFY LOCATIONS AND ELEVATIONS OF UTILITIES. BURIED UTILITIES INCLUDE BUT ARE NOT LIMITED TO WATER MAINS AND LATERALS, SEWER MAINS AND LATERALS, STORM DRAINS, GAS MAINS AND LATERALS, ELECTRICAL DISTRIBUTION LINES, CABLE TELEVISION LINES, AND TELEPHONE LINES. ALL UTILITIES CONFLICTING WITH THE PROPOSED CONSTRUCTION SHALL BE RELOCATED BEFORE THE START OF CONSTRUCTION.
6. THE CONTRACTOR SHALL VERIFY EXISTING INVERTS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION. THE PROJECT AND/OR DESIGN ENGINEER MAY ADJUST THE GRADE OF NEW SEWER AND STORM DRAIN CONSTRUCTION ACCORDINGLY WITH CONCURRENCE FROM THE COUNTY ENGINEER.
7. DISTANCES AND INVERTS ARE TO AND AT THE CENTER OF THE MANHOLES, CLEANOUTS, DROP INLETS, CATCH BASINS, AND YARD DRAINS OR AS MARKED ON THE DRAWINGS.
8. ALL UNDERGROUND IMPROVEMENTS SHALL BE INSTALLED AND APPROVED PRIOR TO PAVING.

INDEX OF DRAWINGS

SURVEY NOTES

1. TOPOGRAPHIC INFORMATION SHOWN HERE IS BASED UPON A FIELD SURVEY PREPARED BY BGT LAND SURVEYING, DATED DECEMBER 8, 2022.
2. THE LOCATION OF UNDERGROUND STRUCTURES AND UTILITIES SHOWN HEREON HAS BEEN DETERMINED FROM SURFACE EVIDENCE OF THEIR EXISTENCE AND/OR FROM INFORMATION OBTAINED FROM PUBLIC AND/OR UTILITY AGENCIES. THE SURVEYOR ACCEPTS NO LIABILITY FOR THE LOCATION, EXISTENCE OR NON-EXISTENCE OF THESE UNDERGROUND STRUCTURES, UTILITY LINES AND RELATED APPURTENANCES, ANY INDIVIDUAL, COMPANY OR AGENCY USING THIS MAP MUST CONFIRM THE LOCATION OF ALL UNDERGROUND LINES OR STRUCTURES PRIOR TO COMMENCING ANY EXCAVATION.
3. THE CONTENT OF THIS MAP WAS DEFINED BY CONTRACT AT THE SPECIFIC REQUEST OF THE CLIENT(S) AND/OR THEIR CONSULTANT(S). THE SURVEYOR ACCEPTS NO LIABILITY FOR USE OF THIS MAP BY ANY ONE OTHER THAN THE CLIENT(S) AND/OR CONSULTANTS FOR WHOM IT WAS PREPARED.
4. APPROXIMATE ASSESSOR'S PARCEL LINES SHOWN HEREON ARE BASED ON BEST FIT TO EVIDENCE COLLECTED IN THE FIELD AND DO NOT CONSTITUTE A BOUNDARY SURVEY. THE PERFORMANCE OF A BOUNDARY SURVEY AND THE ANALYSIS OF LEGAL DESCRIPTIONS PERTAINING TO THE LANDS DEPICTED HEREON WOULD BE REQUIRED IF PRECISE PROPERTY LOCATION AND BOUNDARY LIMITS ARE NEEDED OR DESIRED. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE PROPERTY DATA DELINEATED HEREON.
5. DESCRIPTION OF BENCHMARK:
   SURVEY CONTROL POINT "BGT CONTROL"
   ELEVATION = 100.00' (ASSUMED DATUM)
   CONTOUR INTERVAL = 2 FOOT

ABBREVIATIONS/LEGEND

AB	AGGREGATE BASE	HDPE	HIGH DENSITY POLYETHYLENE
AC	ASPHALT CONCRETE	HP	HIGH POINT
ARCH	ARCHITECTURAL	INV	INVERT ELEVATION
BC	BEGIN CURVE	LP	LOW POINT
BSW	BACK OF SIDEWALK	(N)	NEW/PROPOSED
BTM	BOTTOM	O.C.	ON CENTER
BVCE	BEGIN VERTICAL CURVE ELEVATION	PC	POINT OF CURVATURE
BVCS	BEGIN VERTICAL CURVE STATION	PCC	PORTLAND CEMENT CONCRETE
BW	BOTTOM OF WALL	PRC	POINT OF REVERSE CURVE
CB	CATCH BASIN	PVC	POLYVINYLCHLORIDE PIPE
CL	CENTERLINE	R=	RADIUS
CONC	CONCRETE	R.C.	RELATIVE COMPACTION
CPP	CORRUGATED PLASTIC PIPE	RCP	REINFORCED CONCRETE PIPE
DI	DROP INLET	R/W	RIGHT OF WAY
DIP	DUCTILE IRON PIPE	S=	SLOPE
DIA	DIAMETER	SD	STORM DRAIN
DWY	DRIVEWAY	SDDI	STORM DRAIN DROP INLET
EC	END CURVE	SDMH	STORM DRAIN MANHOLE
EG	EXISTING GROUND	SS	SANITARY SEWER
ELEV	ELEVATION	SSMH	SANITARY SEWER MANHOLE
EP	EDGE OF PAVEMENT	SSCO	SANITARY SEWER CLEANOUT
ESMT	EASEMENT	STA	STATION
(EX)	EXISTING	STD	STANDARD
FF	FINISH FLOOR	TC	TOP OF CURB
FG	FINISH GRADE	TG	TOP OF GRATE
FS	FINISH SURFACE	TW	TOP OF WALL
FL	FLOWLINE	TYP	TYPICAL
GB	GRADE BREAK	UNO	UNLESS NOTED OTHERWISE
GR	GRATE ELEVATION	W	WATER
H=	HEIGHT	WM	WATER METER

STORM DRAIN
PERFORATED SUBDRAIN
DIRT/VEGETATED POND ACCESS ROAD
EXISTING POND SPILLWAY CHANNEL
EXISTING TREE, TO BE SAVED, SEE TREE PROTECTION DETAIL SHEET C4 (6"TREE)

REVISION	DESCRIPTION	BY	DATE

MUNSELLE CIVIL ENGINEERING
CIVIL ENGINEERING • SURVEYING
PLANNING • CONST. MANAGEMENT
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0968

PROFESSIONAL ENGINEER — CORT L. MUNSELLE — No. 69941 — REGISTERED CIVIL ENGINEER — STATE OF CALIFORNIA

CORT L. MUNSELLE
RCE 69941
DATE: JUL 17, 2023

PESCADERO RESERVOIR
COVER SHEET AND NOTES
APN 088-090-240
6500 PESCADERO CREEK RD
PESCADERO, CA

JOB NO. 96-23

SHEET NO. C1 OF 5 SHEETS

P:\MCE JOBS\2023\96-23 PESCADERO RESERVOIR\DWGS\96-23 POND IP_FOR RCD SUBDWG 7/17/2023 2:12 PM CA

GRADING AND DRAINAGE NOTES

1. CONSULT WITH GEOTECH FOR LOCATION:
   (1) GEOTECH RECOMMENDATIONS FOR FILL PLACEMENT ON EXISTING SLOPES IN EXCESS OF 20%.
   (2) BACKDRAINS AND SUBDRAINS PER GEOTECH REPORT.
2. INSTALL FOUNDATION SUBDRAINS AND KEYWAY SUBDRAINS AS REQUIRED BY THE GEOTECHNICAL ENGINEER.
3. ALL FINISHED SURFACES SHALL BE POSITIVELY DRAINED.
4. ALL WORK SHALL COMPLY WITH BEST MANAGEMENT PRACTICES TO PREVENT STORM WATER CONTAMINATION.
5. FILL SHOULD BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING TWELVE INCHES IN LOOSE THICKNESS. CLAYEY SOIL SHOULD BE MOISTURE-CONDITIONED BETWEEN 3 TO 5 PERCENT ABOVE THE OPTIMUM MOISTURE CONTENT, AND COMPACTED TO BETWEEN 88 TO 92 PERCENT RELATIVE COMPACTION.GRANULAR SOIL SHOULD BE MOISTURE CONDITIONED WITHIN 2 PERCENT OF OPTIMUM MOISTURE CONTENT AND COMPACTED TO AT LEAST 90 PERCENT RELATIVE COMPACTION.
6. PRIOR TO CONSTRUCTION, CONSULT WITH OWNERS REPRESENTATIVE TO IDENTIFY ANY NATIVE OR SENSITIVE PLANT SPECIES IN THE PROJECT AREA. PLANTS DETERMINED BY THE OWNERS REPRESENTATIVE AS VALUABLE TO THE SITE ARE TO BE PROTECTED AS IS OR RELOCATED, PRIOR TO CONSTRUCTION.
7. EXCESS FILL SHALL BE PLACED IN DISPOSAL AREAS AS SHOWN, OR OFFHAULED TO AN APPROPRIATE DISPOSAL SITE, AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
   - THE FILL/DISPOSAL SITES SHALL BE PREPPED FOR GRADING BY REMOVING VEGETATION AND TOPSOIL. THIS MATERIAL SHOULD BE STOCKPILED ON-SITE.
   - PLACE FILL FROM POND GRADING IN DISPOSAL AREAS UP TO SUBGRADE ELEVATION
   - REPLACE TOP SOIL AND VEGETATED SOIL LAYER TO ACHIEVE FINISH GRADE PER PLANS

POND LINER NOTES

1. THE INTERIOR SURFACE OF THE POND SHALL BE LINED WITH A GEOMEMBRANE/SYNTHETIC LINER. THE LINER SHALL:
   - HAVE A 20 YEAR DESIGN LIFE.
   - BE BTL AQUA ARMOR RPEL-30, OR SIMILAR
   - INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
   - LINER SHALL BE ANCHORED INTO TRENCH AT THE TOP OF SLOPE. SEE BURIED LINER ANCHOR TRENCH DETAIL SHEET C4.
   - MINIMUM OF ONE SAFETY LADDER SHALL BE WELDED TO THE LINER.
2. ALL PENETRATIONS IN LINER SHALL BE SEALED WATER-TIGHT TO PIPE AND LINING SYSTEM PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
3. ABOVE ELEV 105', AN 8" GEOWEB MAT (PRESTO GEOWEB OR SIMILAR) SHALL BE PLACED OVER THE TOP OF THE GEOMEMBRANCE LINER, EXTENDING UP AND OVER THE TOP EMBANKMENT. PLACEMENT AND INSTALLATION OF THE GEOWEB MAT SHALL BE AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER AND MANUFACTURERS RECOMMENDATIONS.
   - NOTE THAT NO ANCHORS OR PENETRATIONS FROM THE GEOWEB SHALL PIERCE THE BELOW GEOMEMBRANE LINER.
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LINER QUANTITIES:

GEOMEMBRANE LINER	GEOWEB MAT
LINER 2D AREA = 31,586 SF	2D AREA = 23,998 SF
LINER 3D AREA = 33,251 SF	3D AREA = 24,907 SF

DRAINAGE BLANKET (MIRADRAIN)
2D AREA = 10,759 SF
3D AREA = 11,299 SF

RESERVOIR STORAGE NOTES

STORAGE CAPACITY =	5.17 ACRE-FEET
MAX WATER SURFACE AREA =	0.58 ACRES
MAX WATER SURFACE ELEV =	113.00 FT
OVERFLOW CREST ELEV =	113.00 FT (EXISTING)
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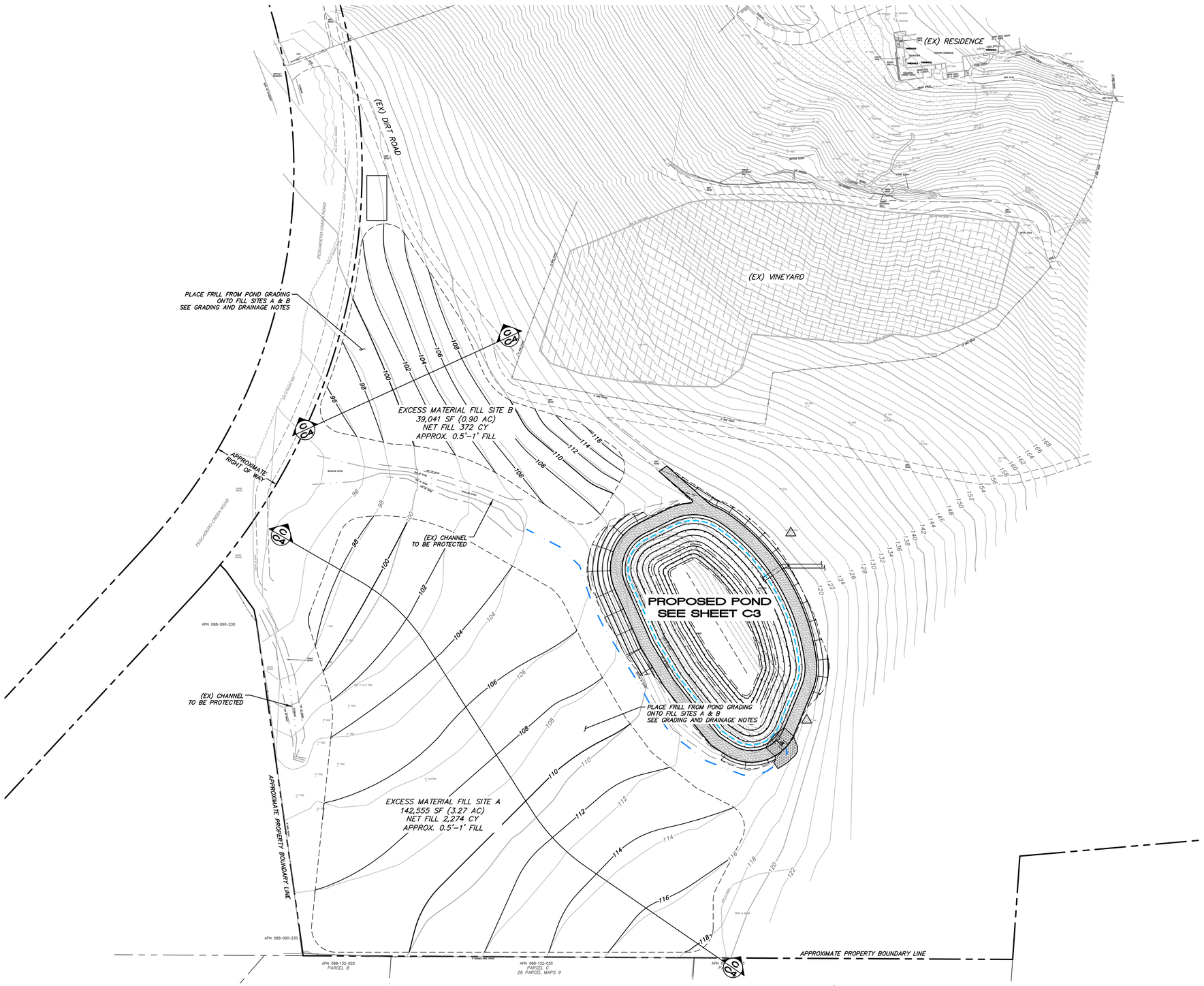

SITE GRADING PLAN

SCALE: 1" = 50'

0 50 100 150

(GRAPHIC SCALE IN FEET)

REVISION	DESCRIPTION	BY	DATE
	RCD SUBMITTAL	CD	JUL. 17, 2023

MUNSELLE CIVIL ENGINEERING
CIVIL ENGINEERING ◆ SURVEYING ◆
PLANNING ◆ CONST. MANAGEMENT
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0368

PROFESSIONAL ENGINEER ★ REGISTERED ★ CIVIL ★ STATE OF CALIFORNIA ★ CORT L. MUNSELLE No. 69941

CORT L. MUNSELLE
RCE 69941
DATE

PESCADERO RESERVOIR
SITE GRADING PLAN
APN 088-090-240
6500 PESCADERO CREEK RD
PESCADERO, CA

JUL 17, 2023

JOB NO.
96-23

SHEET NO.
C2
OF 5 SHEETS

P:\MCE JOBS\2023\96-23 PESCADERO RESERVOIR\DWGS\96-23 POND IP_FOR RCD SUB.DWG 7/17/2023 2:12 PM CA

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FREEBOARD =	2.0 FT

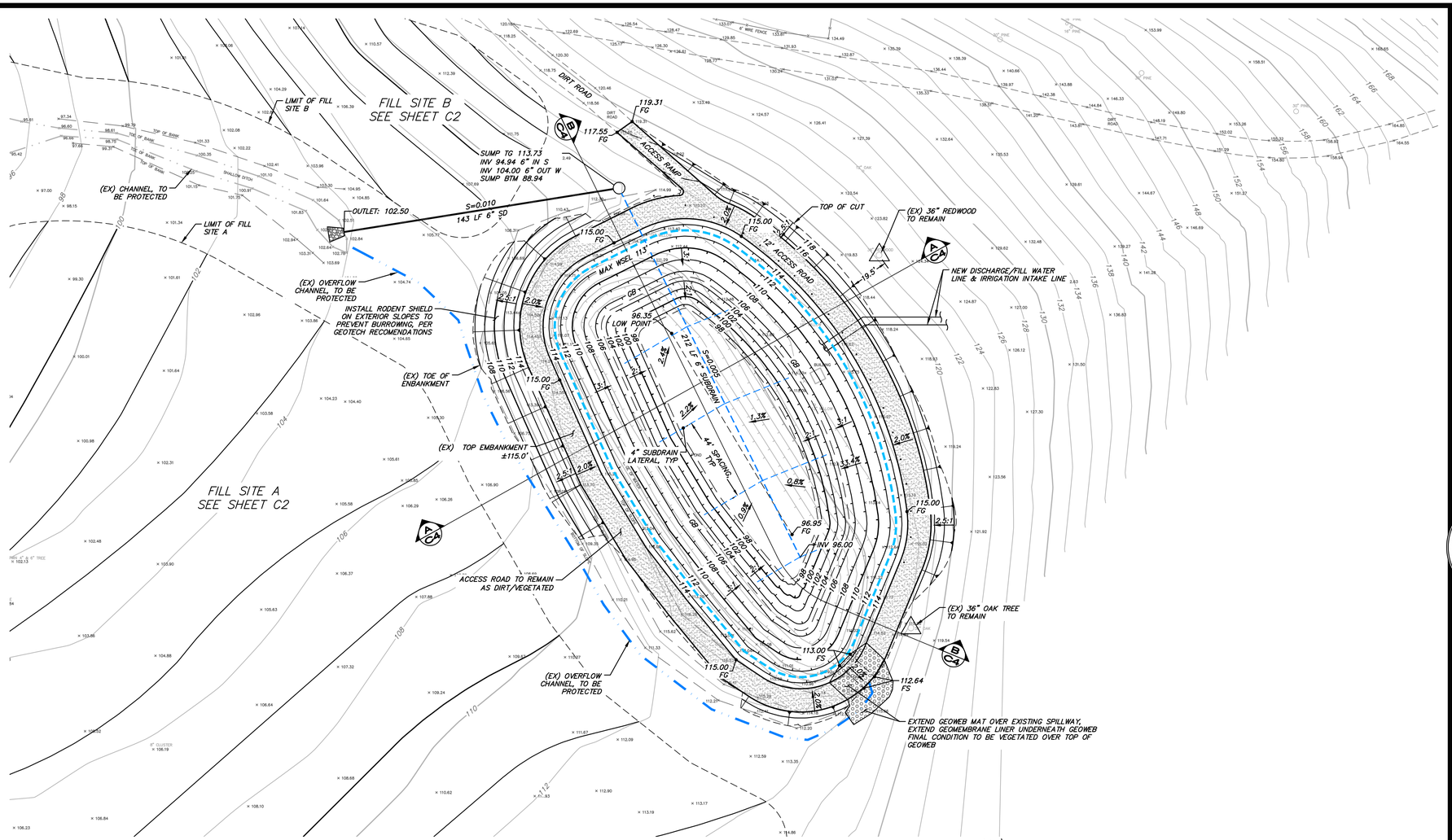
DRAINAGE SCHEDULE

STORM DRAIN, SIZE PER PLAN
SLOPE PER PLAN, SDR 35 PVC, UNO

SUBDRAIN, SIZE PER PLAN
PERFORATED SDR 35 PVC, UNO

ALL GRAVITY DRAIN PIPE, INCLUDING SUBDRAINS SHALL SLOPE TO DRAIN AT S=0.005 MIN.

PRESSURE PIPE TO BE PVC SCH. 40, SIZE BY OTHERS



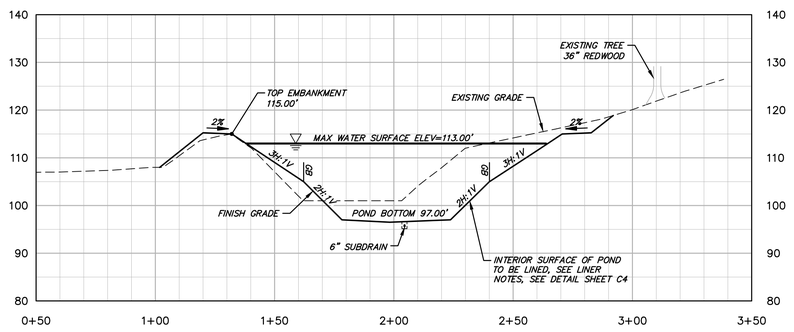
RESERVOIR GRADING PLAN

SCALE: 1" = 30'

0 30 60 90

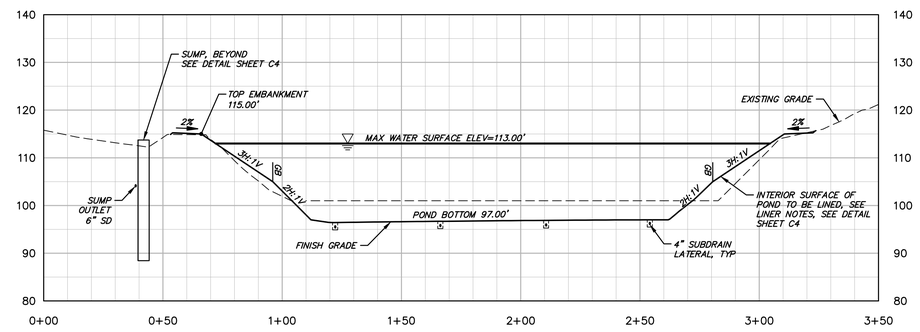
(GRAPHIC SCALE IN FEET)

N W E S



SECTION A

SCALE: HOR. 1"=30'
VERT. 1"=15'



SECTION B

SCALE: HOR. 1"=30'
VERT. 1"=15'

REVISION	DESCRIPTION	BY	DATE
	RCD SUBMITTAL	CD	JUL. 17, 2023

MUNSELLE CIVIL ENGINEERING
CIVIL ENGINEERING ❖ SURVEYING ❖
PLANNING ❖ CONST. MANAGEMENT
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0368

REGISTERED PROFESSIONAL ENGINEER ★ MUNSELLE ★ No. 69941 ★ CIVIL ★ STATE OF CALIFORNIA

CORT L. MUNSELLE
RCE 69941

DATE

PESCADERO RESERVOIR
RESERVOIR GRADING PLAN

APN 088-090-240
6500 PESCADERO CREEK RD
PESCADERO, CA

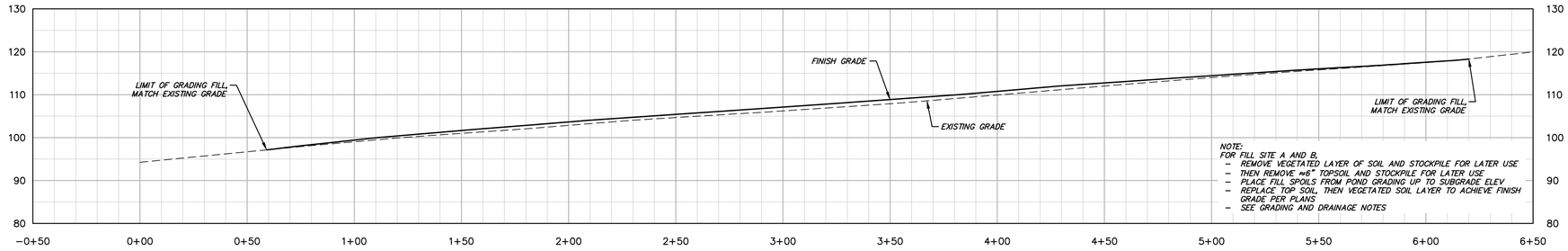
JUL 17, 2023

JOB NO. 96-23

SHEET NO. C3

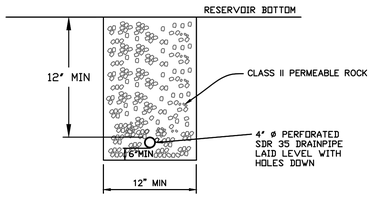
OF 5 SHEETS

P:\MCE JOBS\2023\96-23 PESCADERO RESERVOIR\DWGS\96-23 POND IP_FOR RCD SUB.DWG 7/17/2023 2:12 PM CA



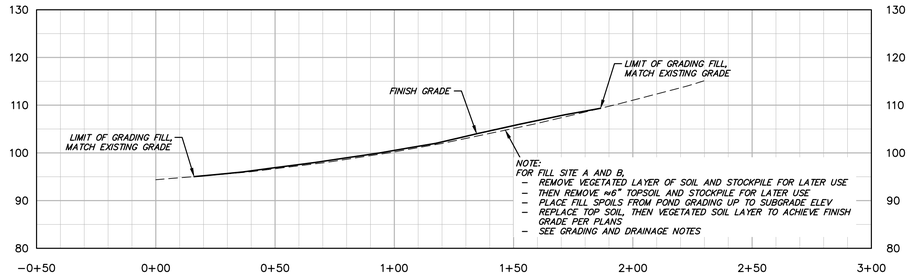
SECTION C

SCALE: HOR. 1"=30'
VERT. 1"=15'



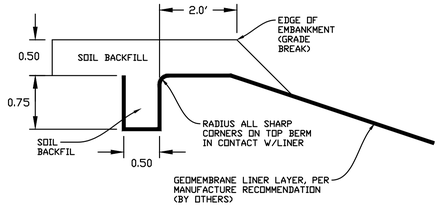
SUBDRAIN TRENCH BENEATH RESERVOIR

NOT TO SCALE



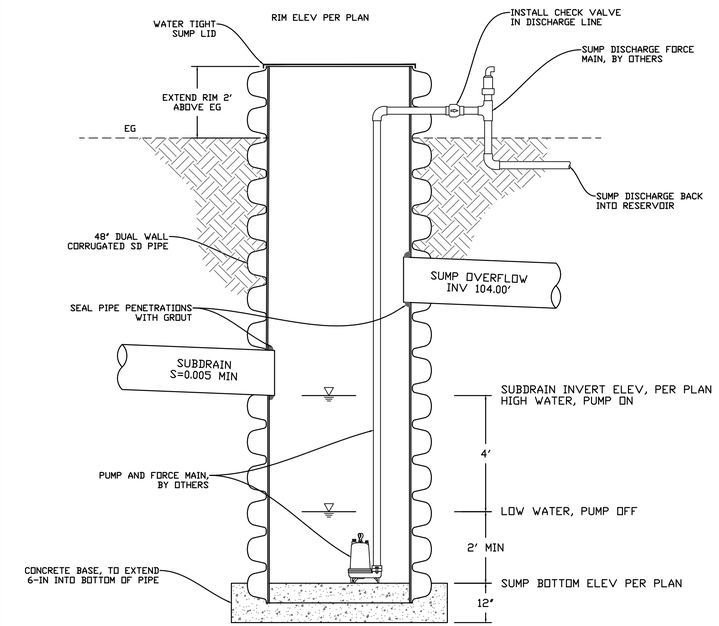
SECTION D

SCALE: HOR. 1"=30'
VERT. 1"=15'



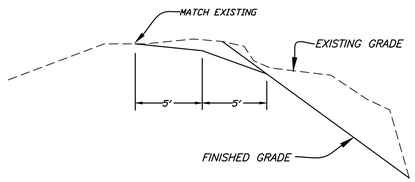
BURIED LINER ANCHOR TRENCH DETAIL

NO SCALE



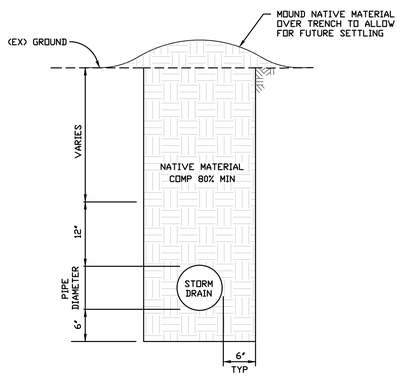
DRAINAGE SUMP DETAIL

NOT TO SCALE



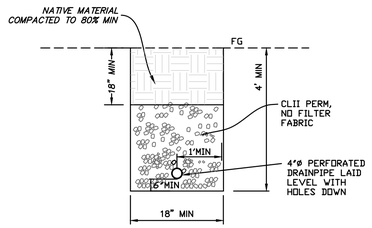
SLOPE ROUNDING DETAIL

NO SCALE



STORM DRAIN TRENCH DETAIL

NOT TO SCALE



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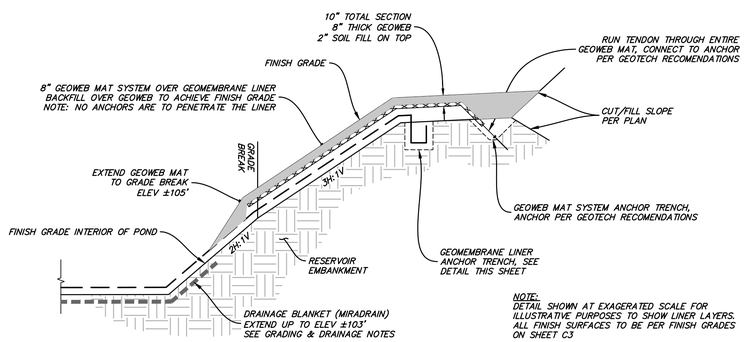

GEOWEB MAT DETAIL

NOT TO SCALE

REVISION	DESCRIPTION	BY	DATE
	RCD SUBMITTAL	CD	JUL 17, 2023

MUNSELLE CIVIL ENGINEERING
◆ CIVIL ENGINEERING ◆ SURVEYING ◆
◆ PLANNING ◆ CONST. MANAGEMENT ◆
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0368

PROFESSIONAL ENGINEER ★ CIVIL ★ REGISTERED ★ STATE OF CALIFORNIA ★ CORT L. MUNSELLE ★ No. 69941

CORT L. MUNSELLE
RCE 69941
DATE

PESCADERO RESERVOIR SECTIONS AND DETAILS

APN 088-090-240
6500 PESCADERO CREEK RD
PESCADERO, CA

JUL 17, 2023

JOB NO. 96-23

SHEET NO. C4

OF 5 SHEETS

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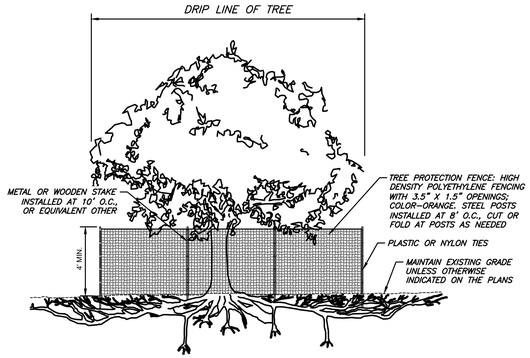

TREE PROTECTION FENCE DETAIL

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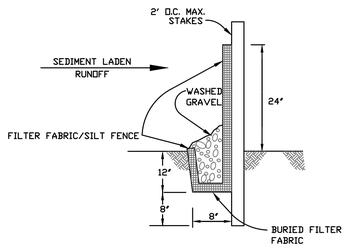

PROFILE

SILT FENCE DETAIL

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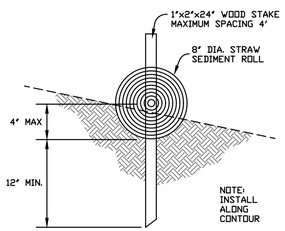
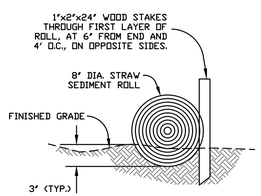


SLOPED AREA



FLAT AREA

STRAW WATTLE DETAIL

NOT TO SCALE

EROSION CONTROL PLAN

SCALE: 1" = 50'

0 50 100 150

(GRAPHIC SCALE IN FEET)

REVISION	DESCRIPTION	BY	DATE

MUNSELLE CIVIL ENGINEERING
❖ CIVIL ENGINEERING ❖ SURVEYING ❖
❖ PLANNING ❖ CONST. MANAGEMENT ❖
513 CENTER STREET
HEALDSBURG, CA 95448
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REGISTERED PROFESSIONAL ENGINEER ★ CORT L. MUNSELLE ★ No. 69941 ★ CIVIL ★ STATE OF CALIFORNIA

CORT L. MUNSELLE
RCE 69941
DATE

PESCADERO RESERVOIR
EROSION CONTROL PLAN

APN 088-090-240
6500 PESCADERO CREEK RD
PESCADERO, CA

JUL 17, 2023

JOB NO. 96-23

SHEET NO. C5 OF 5 SHEETS

P:\MCE JOBS\2023\96-23 PESCADERO RESERVOIR\DWGS\96-23 POND IP_FOR ROD SUB.DWG 7/17/2023 2:13 PM CA

Attachment C

Grassland Protection and Post-Construction Meadow Restoration Plan

Pescadero Reservoir Rehabilitation Project
6500 Pescadero Creek Road, Pescadero, California

Excess fill material generated during reservoir rehabilitation will be placed in designated onsite fill areas, including meadow grassland areas. Vegetation and topsoil in affected meadow areas will be conserved and replaced following the procedure described below.

GRASS AND TOPSOIL CONSERVATION

- Vegetation will be removed from meadow fill laydown areas by scraping the vegetated ground surface with a bulldozer or similar equipment. Disturbance or removal of vegetation will not exceed the minimum necessary to complete project implementation. Removed vegetation will temporarily be stored onsite in dedicated stockpiles.

- Following removal of vegetation, topsoil will be removed from fill laydown areas by scraping the vegetated ground surface with a bulldozer or similar equipment. Removed topsoil will temporarily be stored onsite in dedicated stockpiles.

- Stockpiled materials will be stored in designated areas to prevent runoff from entering waterways. Straw wattles will surround stockpile areas.

REUSE OF EXCAVATED SEDIMENTS

- The geotechnical engineer will inspect and verify topsoil removal, prior to emplacement of excavated sediments.

- Excavated sediments will be spread across fill areas with approximate thickness of 6 to 12 inches.

GRASS AND TOPSOIL REPLACEMENT

- Following placement of fill material in fill areas, stockpiled topsoil will be replaced on top of the fill layer.

- Stockpiled vegetation will be replaced on top of the topsoil layer.

- Restored meadow areas will be monitored and maintained to maximize reestablishment of native vegetation species.

Attachment D

Non-Native American Bullfrog Eradication and Management Plan

Pescadero Reservoir Rehabilitation Project
6500 Pescadero Creek Road, Pescadero, California

As is true for many frogs, the American bullfrog lives primarily in larger, permanent bodies of water, including swamps, ponds, and lakes. American bullfrog requires oxygen, and tends to live along the water's edge, not in or under water. American bullfrogs are prolific and can be found in great numbers where they occur. Breeding generally occurs in late spring and early summer with females laying up to 20,000 - 25,000 eggs which hatch in 3-5 days. While the number is vast, the majority will not survive due to predation.

The surviving American bullfrog tadpoles will experience metamorphosis in as little as 3-4 months in warmer climates, however, this transformation generally takes 1-2 years in coastal San Mateo County. The normal lifespan of the American bullfrog is approximately 4-5 years. American bullfrogs are a nighttime predator and eat small rodents, small turtles, snakes, other frogs, birds, and even bats.

Eradication methods for American bullfrog can be direct or indirect. Direct methods may include handheld dip net, hook and line, lights, spears, gigs, or fish tackle under a CDFW fishing license. Direct methods also include use of a Pellet Rifle (non-lead pellets) if a proper Scientific Collection Permit is obtained from CDFW for conducting a pilot project. An indirect method would involve seasonally timed complete dewatering and a drying period of the reservoir. The landowner will coordinate with CDFW on best removal practices.

The project site is within the historic range of the California red-legged frog (CRF) (Rana draytonii). The landowner will be responsible for American bullfrog removal efforts and shall notify the RCD and CDFW immediately if any CRF are observed during direct removal. If CRF are encountered in proximity to American bullfrog, the landowner will take reasonable precautions provided by CDFW to ensure no take of CRF occurs and submit an annual report to CDFW and SWRCB.

California red-legged frog

American Bullfrog

Species Identification

Non-native species can be identified using binoculars or by walking the perimeter of the reservoir listening for audible calls as bullfrogs enter the water. American bullfrog activity is at its greatest during the summer and the active breeding season occurs from April to July.

Presence surveys shall be conducted on warm days with winds less than 5-miles per hour. The surveys will be conducted annually during the months of May to July, for a minimum of at least once during the day and once at night. Surveyors will walk the entire perimeter of the reservoir to spot eggs/tadpoles and adults, respectively, while shining flashlights to detect movement and eye shine. If bullfrogs are detected during a survey or any other time, a count/tally will be recorded and no additional survey effort for the year would be needed. If no detections are made, the survey will be done two more times with at least one night survey during the breeding season or until/if presence is confirmed. Successive surveys will be conducted at least three weeks apart. Observed occurrences of CRF or any other listed species, including San Francisco garter snake, shall be reported to the RCD and CDFW immediately and to the California Natural Diversity Database within two weeks of observation.

Eradication Methods

It is important to note that American bullfrogs that reside in reservoirs close to the coast (within San Mateo County) are not known to persist in large populations due to cool temperatures and the persistence of coastal fog (based in field observations taken from Biologist Jim Robins of Alnus Ecological and RCD staff). Due to this fact, eradication efforts will focus on monitoring overall population growth and persistence.

If American bullfrogs are detected during the presence surveys the RCD will direct the landowner to conduct removal efforts within the reservoir. Capture and disposal shall be done

in compliance with CDFW codes and regulations using appropriate gear. To ensure that populations are kept in check, the reservoir will be drained once every five years after the irrigation season has ended and in the fall. The reservoir will be kept dry for a minimum of two weeks to kill any tadpoles that might otherwise hold up in any residual pool. If, however, American bullfrog populations grow rapidly before the 5-year period has ended the reservoir will be drained sooner to ensure that bullfrogs cannot persist. The RCD will confer with the landowner to decide if appropriate/necessary to drain the reservoir before the 5-year period has ended. If a significant drought year is occurring, or there is any risk of fire in the area, at a time when reservoir draining is required (either because bullfrogs were found on-site or because the five-year period has elapsed), the landowner may, with the approval of CDFW, delay draining of the reservoir for up to one year.

The permittee's American bullfrog management efforts shall target all bullfrog life history stages, and target both the aquatic/tadpole phase (draining or indirect) and the adult and subadult/amphibious (direct). Methods for removal will include the following; 1) egg mass removal, 2) larval removal, and 3) adult and juvenile American bullfrog removal.

Photos of removal efforts will be taken and submitted with reports.

Effectiveness and Success

Each year a report will be filed with SWRCB and CDFW with the following information:

- Number of American bullfrogs observed during presence surveys including age class and egg mass.
- Results of direct removal efforts. Number of individuals, age class, egg mass if encountered.
- Photos of removal efforts will be included when available.

The effectiveness and success of the eradication efforts will be measured by the following performance objectives. Each eradication/control effort will include a count of the number of American bullfrogs, larvae or egg masses removed and/or observed. If the eradication/control methods are working, each year should show a decrease in the take count. If methods do not appear to be effective, the landowner will consult with CDFW to find better methods for eradication. Control efforts shall continue every year that bullfrogs are observed.

Timeline (all information below will be included in the annual report)

- Survey for the presence of Bull Frogs annually, if documented (May-July)
- Direct removal efforts (April-August)
- Report summarizing eradication activities annually (December 31)
- Population Survey report annually (December 31)

Attachment E

Reservoir Drawdown Plan Prior to Construction

Pescadero Reservoir Rehabilitation Project
6500 Pescadero Creek Road, Pescadero, California

Annual drawdown of the existing reservoir started immediately after late season rainfall in May 2023.

RESERVOIR DRAWDOWN PROCEDURES

- Water from the reservoir is currently being used to irrigate the vineyard, orchards and berry fields.
- Irrigation rates have been increased to complete reservoir drawdown by August 31.
- Excess irrigation capture systems (e.g., tile drains) have been temporarily valved off to discontinue capture into the reservoir.
- Water from the reservoir is being used onsite.
- The vineyards, orchards, and berry fields are being monitored to ensure excess irrigation remains onsite.

Attachment F

Reservoir Vegetation Management Plan

Pescadero Reservoir Rehabilitation Project
6500 Pescadero Creek Road, Pescadero, California

During operation of the reservoir, vegetation will be managed to prevent invasive species, maintain water quality, and prevent vectors.

VEGETATION MANAGEMENT PROCEDURES

- Monthly water quality assessment and maintenance (i.e., oxygenation system).
- Algae management is not anticipated with proper water quality; however, algae may be manually removed if necessary to maintain water quality and habitat.
- Bullfrog eradication will be conducted as described in a separate Bullfrog Management Plan.
- Annual vegetation cleanup to remove non-native plants.
- Annual removal of vegetation that could jeopardize integrity of reservoir berm or liner.
- On-property composting of removed vegetation.
- A rodent barrier is included in the Reservoir Plans and will help maintain water quality and the integrity of the reservoir berm.

GEOTECHNICAL INVESTIGATION

RESERVOIR REHABILITATION PROJECT
6500 Pescadero Creek Road
Pescadero, California

Prepared For:
Ms. Toni Cupal
6500 Pescadero Creek Road
Pescadero, California 94060

Prepared By:
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Senior Staff Engineer

Scott Walker, GE
Principal/Vice President

12 July 2023
750681701

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GEOTECHNICAL INVESTIGATION
RESERVOIR REHABILITATION PROJECT
6500 Pescadero Creek Road
Pescadero, California

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed rehabilitation and expansion of an existing agricultural water storage reservoir located at 6500 Pescadero Creek Road in Pescadero, California. The site is about 1,000 feet west of the intersection of Pescadero Creek Road and Dearborn Park Road. The reservoir is located in the southwest portion of the property, south of the existing hillside vineyard. The reservoir is about 500 feet southeast of Pescadero Creek Road. The approximate location of the site and existing reservoir are shown on Figure 1, Site Location Map.

The existing elliptical-shaped reservoir is approximately 240 feet long and 80 feet wide and was constructed by partially cutting into the southwest-dipping hillside. The Site Plan is shown on Figure 2. On the downslope side of the reservoir, the impounded water is retained by an earthen embankment. According to the reservoir grading and drainage plans by Munselle Civil Engineering, the project civil engineer, the embankment crest elevation is approximately 115 feet[1]. The existing reservoir bottom elevation is at approximately Elevation 101 feet. The total height of the embankment is about 8 feet above the downslope grades and 14 feet above the existing pond bottom.

1.1 Proposed Development

Our understanding of the project is based on discussions with Mr. Sean Callari, the property owner representative, and Mr. Robert Schultz of Geo Blue Consulting, Inc., the project hydrology consultant, as well review of the aforementioned civil drawings. We understand plans for the

[1] Grading and Drainage Plan for Pescadero Reservoir, APN 088-090-241,6500 Pescadero Creek Road, Pescadero, CA prepared by Munselle Civil Engineering and dated 14 June 2023. Elevations reference herein are based on these plans, site-specific project datum.

proposed reservoir rehabilitation consist of expansion of the reservoir to the northeast, as well as deepening, in order to increase storage capacity to approximately 5.17 acre-feet. The horizontal position and crest elevation of the embankment on the west side of reservoir will remain largely unchanged. The new bottom elevation of the reservoir will be Elevation 97 feet. Cuts as deep as 10 feet are planned in the northeast expansion area.

Based on the reservoir grading plans, the reservoir expansion will have a maximum water surface elevation of 113 feet and a bottom elevation of 97 feet. The new reservoir will include a concrete overflow spillway at the south edge with an invert elevation of 113 feet. From the spillway, discharge water is directed south to the embankment toe, then west and north towards the existing natural drainage channel northeast of the reservoir.

The reservoir will be fully lined, as recommended herein. To provide protection and visual screening of the portion of the reservoir liner that may become exposed when water levels are low, a soil cover will be applied over the liner from the top of the embankment down to approximately Elevation 105 feet.

2.0 SCOPE OF SERVICES

Our services were performed in accordance with our proposal dated 27 March 2022. The scope of our services consisted of reviewing available geotechnical and geological publications and reports for the site and its vicinity, and subsurface exploration at the site, performing engineering analyses, and developing geotechnical design criteria for the proposed construction. Data acquired during our subsurface exploration, laboratory testing results, and engineering analyses were used to develop geotechnical conclusions and parameters regarding:

- soil and bedrock conditions at the site
- site seismicity and potential for seismic hazards, including liquefaction, lateral spreading, and fault rupture, as appropriate
- anticipated maximum height and slope configurations for stable embankment slopes; including seismic stability and anticipate earthquake-induced deformations

- site preparation, grading, excavation, and keying for embankment slopes, including criteria for fill quality and compaction
- potential re-use of existing embankment soils for use as engineered fill for the new embankment
- performance criteria for the anticipated reservoir liner and underdrain systems
- recommendations for erosion control measures to be implemented along embankment slopes
- construction considerations.

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

As part of our field investigation, we drilled three borings (designated LB-1 to LB-3) and installed one vibrating wire piezometer. Groundwater conditions were monitored in May 2023 (at time of installation), using a vibrating wire piezometer installed at LB-2. The approximate locations of the borings are shown on Figure 2, Site Plan.

Prior to performing our field investigation, we:

- obtained a soil boring permit from the San Mateo County Environmental HealthServices (SMCEHS); and
- notified Underground Service Alert (USA)

Details of the field investigation activities and laboratory testing are described in the remainder of this section.

3.1 Borings

On 9 May 2023, Pitcher Services, LLC of East Palo Alto, drilled three borings at the site to depths of 16.5 feet to 30.3 feet below the existing ground surface (bgs), using track-mounted, rotary wash drilling equipment. Our field engineer logged the borings and obtained representative samples of the soil and rock encountered for further classification and laboratory testing. The boring logs are presented in Appendix A. The soil and rock encountered were classified in

accordance with the soil and rock classification systems described on Figures A-4 and A-5, respectively.

Soil and rock samples were obtained using two different types of driven split-barrel samplers. The sampler types are as follows:

- Sprague & Henwood (S&H) split-barrel sampler with a 3.0-inch outside diameter and 2.5-inch inside diameter, lined with steel tubes with an inside diameter of 2.43 inches
- Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and 1.5-inch inside diameter, without liners.

The sampler types were chosen on the basis of soil type being sampled. In general, the S&H sampler was used to obtain samples in medium stiff to very stiff cohesive soil and the SPT sampler was used to evaluate the relative density of bedrock.

The SPT and S&H samplers were driven with a 140-pound, above-ground, automatic safety hammer falling 30 inches. The samplers were driven up to 18 inches and the hammer blows required to drive the samplers every six inches of penetration were recorded and are presented on the boring logs. A "blow count" is defined as the number of hammer blows per six inches of penetration or 50 blows for six inches or less of penetration. The driving of samplers was discontinued if the observed (recorded) blow count was 50 for six inches or less of penetration. The blow counts required to drive the S&H and SPT samplers were converted to approximate SPT N-values using factors of 0.9 and 1.4, respectively, to account for sampler type and hammer energy and are shown on the boring logs. The blow counts used for this conversion were: 1) the last two blow counts if the sampler was driven more than 12 inches and 2) the only blow count if the sampler was driven six inches or less.

Upon completion of drilling, the boreholes were backfilled with cement grout in accordance with the requirements of the SMCEHS. Within the cement grout backfill at boring LB-2, vibrating wire piezometers were installed at a depth of 19 feet and grouted in place. The soil and rock cuttings generated from drilling were spread around the immediate vicinity of each boring location.

3.2 Laboratory Testing

The soil and bedrock samples recovered from the field exploration program were re-examined in the office for soil and rock classifications, and representative samples were selected for laboratory testing. The laboratory testing program was designed to correlate and evaluate engineering properties of the soil at the site. Samples were tested to measure moisture content, dry density, plasticity (Atterberg limits), fines content (percent passing the No. 200 sieve), shear strength, permeability, and shrink/swell potential. Results of the laboratory tests are included on the boring logs and in Appendix C.

4.0 SITE CONDITIONS AND GEOLOGY

4.1 Surface Conditions

The existing elliptical-shaped reservoir is approximately 240 feet long and 80 feet wide and was constructed by partially cutting into the southwest-dipping hillside. On the downslope side of the reservoir, the impounded water is retained by an earthen embankment with an embankment crest at approximately Elevation 115 feet. The total height of the embankment is approximately 8 feet above the downslope grades and 14 feet above the existing pond bottom. The existing reservoir bottom elevation is unknown but estimated at approximately Elevation 101 feet. The existing reservoir is currently surrounded by trees and low grass vegetation.

An excavated soil spillway is located at the south edge of the existing reservoir. An existing drainage channel is located northwest of the existing reservoir.

To the north and east of the existing reservoir, the ground surface slopes up towards the east at a slope of about 4.5:1 to 5.5:1 (horizontal to vertical). To the south and west of the existing reservoir, the ground surface slopes down at a slope of about 30:1 toward Pescadero Creek Road.

4.2 Subsurface Conditions

Where explored, the subsurface materials generally consist of native colluvium overlying bedrock. Fill associated with the existing reservoir embankment construction is also present at

the site. The colluvium generally consists of stiff to hard clay with varying amounts of sand. A localized, approximately two-foot- thick layer of very stiff silt was encountered at the ground surface at boring LB-1. Based on laboratory test results on the clayey portions of the colluvium, the plasticity index (PI) ranges between 35 and 43, indicating high to very high expansion potential[2]. Where tested, the undrained shear strength of the colluvium was about 1,500 pounds per square feet (psf).

The colluvium extends to the maximum depths explored in LB-1 and LB-3 (16.5 feet bgs). In boring LB-2, deeply weathered claystone bedrock was encountered below the colluvium at a depth of approximately 19.5 feet bgs, corresponding to approximately Elevation 110.5 feet.

4.3 Groundwater

Groundwater was encountered during drilling. The groundwater measurements during drilling are summarized in Table 1.

TABLE 1
Groundwater Summary during Exploration

Boring Location	Measurement Date	Groundwater Depth (feet)	Groundwater Elevation (feet)
LB-1	5/10/2023	2	108.0
LB-2	5/10/2023	2	118.0
LB-3	5/10/2023	1.5	108.5

The groundwater levels were measured at the time of drilling and likely do not represent the stabilized groundwater level.

Measurements from the vibrating wire piezometers in LB-2 indicate that groundwater was between 0.1 and 0.6 feet bgs (corresponding to Elevation 117.9 feet and 117.5 feet) at LB-2

[2] Highly expansive soil undergoes large volume changes with changes in moisture content.

during May of 2023. The groundwater levels are influenced by rainfall; therefore, variations in groundwater elevations should be expected.

5.0 REGIONAL GEOLOGY AND SEISMICITY

5.1 Regional Geology

The site is located within the hills approximately five miles north of Chalk Mountain, part of a sub-mountain range along the California coast. Based on regional geologic maps, the existing reservoir is located within older alluvial fan and stream terrace deposits (Qof, Pleistocene). However, these may only be present in the near surface, and are underlain by the colluvium deposits (Qcl, Holocene), which are also mapped to the east, as shown on Figure 3.

5.2 Regional Seismicity

The project site is in a seismically active region. Numerous earthquakes have been recorded in the region in the past, and moderate to large earthquakes should be anticipated during the service life of the proposed development. The San Andreas, Hayward, Calaveras, and San Gregorio faults are the major faults closest to the site. These and other faults of the region are shown on Figure 4. For each of these faults, as well as other active faults within about 50 kilometers (km) of the site, the distance from the site and estimated mean Moment magnitude[3] [2014 Working Group on California Earthquake Probabilities (WGCEP) (2015) and Uniform California Earthquake Rupture Forecast Version 3 (UCERF3) as detailed in the United States Geological Survey Open File Report 2013-1165] are summarized in Table 2. The mean Moment magnitude presented on Table 2 was computed assuming full rupture of the segment using Hanks and Bakun (2008) relationship.

[3] Moment magnitude is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

TABLE 2
Regional Faults and Seismicity

Fault Segment	Approx. Distance from Fault (km)	Direction from Site	Mean Moment Magnitude
Butano	2.2	Northeast	6.7
Total San Gregorio	4.6	West	7.6
Pilarcitos	13	Northeast	6.7
San Andreas 1906 event	14	Northeast	8.1
Monte Vista – Shannon	19	Northeast	7.0
Sargent	36	East	6.8
Monterey Bay-Tularcitos	42	Southeast	7.2
Total Hayward-Rodgers Creek Healdsburg	43	Northeast	7.6
Mission (connected)	47	Northeast	6.1
Total Calaveras	49	East	7.5

Note: The table above is a summary and does not include all the fault segmentation, alternate traces and low activity faults included in the UCERF3 model.

Figure 4 also shows the earthquake epicenters for events with magnitude greater than 5.0 from January 1800 through August 2014. Since 1800, four major earthquakes have been recorded on the San Andreas fault. In 1836 an earthquake with an estimated maximum intensity of VII on the Modified Mercalli (MM) scale (Figure 5) occurred east of Monterey Bay on the San Andreas fault (Toppozada and Borchardt 1998). The estimated Moment magnitude, $M_{w,}$ for this earthquake is about 6.25. In 1838, an earthquake occurred with an estimated intensity of about VIII-IX (MM), corresponding to an M_w of about 7.5. The San Francisco Earthquake of 1906 caused the most significant damage in the history of the Bay Area in terms of loss of lives and property damage. This earthquake created a surface rupture along the San Andreas fault from Shelter Cove to San Juan Bautista approximately 470 kilometers in length. It had a maximum intensity of XI (MM), an M_w of about 7.9, and was felt 560 kilometers away in Oregon, Nevada, and Los Angeles. The Loma Prieta Earthquake occurred on 17 October 1989 in the Santa Cruz Mountains with an M_w of 6.9, the epicenter of which is approximately 46 km from the site.

In 1868 an earthquake with an estimated maximum intensity of X on the MM scale occurred on the southern segment (between San Leandro and Fremont) of the Hayward fault. The estimated

M_w for the earthquake is 7.0. In 1861, an earthquake of unknown magnitude (probably an M_w of about 6.5) was reported on the Calaveras fault. The most recent significant earthquake on this fault was the 1984 Morgan Hill earthquake (M_w = 6.2).

The 2016 U.S. Geologic Survey (USGS) predicted a 72 percent chance of a magnitude 6.7 or greater earthquake occurring in the San Francisco Bay Area in 30 years (Aagaard et al. 2016). More specific estimates of the probabilities for different faults in the Bay Area are presented in Table 3.

TABLE 3

Estimates of 30-Year Probability (2014 to 2043) of a Magnitude 6.7 or Greater Earthquake

Fault	Probability (percent)
Hayward-Rodgers Creek	33
Calaveras	26
N. San Andreas	22
San Gregorio	6

6.0 DISCUSSION AND CONCLUSIONS

Based on our investigation and evaluations, we conclude the primary geotechnical and geological issues of concern that should be addressed during the design of the reservoir expansion include:

- properly constructing reservoir cut slopes and embankments that will have adequate static and dynamic factors of safety and perform well during a seismic event
- providing sufficient surface and subsurface drainage

These geotechnical and geological concerns and their potential impacts on the project are discussed in the remainder of this report.

6.1 Seismic Hazards

The site is located in a seismically active region of California near major faults and may experience strong to very strong ground shaking during the design life of the proposed improvements. The intensity of earthquake ground shaking at the site will depend on the characteristics of the generating fault, the distance to the earthquake fault, and the magnitude and duration of the earthquake. Strong shaking during an earthquake can sometimes result in ground failure such as that associated with soil liquefaction[4], lateral spreading[5], and seismic densification[6]. We used the results of our field and laboratory investigation along with available subsurface information for the site to evaluate the potential for these phenomena to occur. Further discussion is provided below.

6.1.1 Liquefaction

If a soil liquefies during an earthquake, it experiences a significant temporary loss of strength. Flow failure, lateral spreading, differential settlement, loss of bearing, ground fissures, and sand boils are evidence of excess pore pressure generation and liquefaction. The reservoir expansion is located within a zone mapped as having moderate susceptibility to liquefaction as designated by the Association of Bay Area Governments' Resilience Program (ABAGRP), as shown in Figure 6. However, all of the soil encountered during our exploration has sufficient strength and/or plasticity to resist liquefaction. We therefore conclude the potential for significant or widespread liquefaction at the site is very low.

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4 Liquefaction is a transformation of soil from a solid to a liquefied state during which saturated soil temporarily loses strength resulting from the buildup of excess pore water pressure, especially during earthquake-induced cyclic loading. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits.

5 Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.

6 Seismic densification (also referred to as differential compaction) is a phenomenon in which non-saturated, cohesionless soil is densified by earthquake vibrations, causing ground-surface settlement.

6.1.2 Lateral Spreading

Lateral spreading is generally the most pervasive and damaging type of liquefaction-induced ground failure generated by earthquakes. During lateral spreading, surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. The surficial soil is transported downslope or in the direction of a free face by earthquake and gravitational forces. Because the potential for widespread liquefaction to occur at the site is very low, we conclude the potential for lateral spreading is nil.

6.1.3 Seismic Densification

Seismically-induced densification can occur during strong ground shaking in loose, clean granular deposits above the groundwater level, resulting in ground surface settlement. The near surface clay and silt above the groundwater table is not susceptible to seismically-induced densification during earthquake shaking.

6.2 Expansive Soil Considerations

The existing near-surface colluvium has high to very high expansion potential. Moisture fluctuations in near-surface expansive soil could cause the soil to expand or contract, resulting in movement and potential damage to improvements that overlie them. Potential causes of moisture fluctuations include drying during construction, subsequent wetting from rain, capillary rise, landscape irrigation, and type of plant selection.

Shrinking and cracking of the near-surface expansive soil can occur when the soil is exposed during dry weather. These effects can be mitigated by moisture conditioning the expansive soil.

If earthwork is performed in wet weather conditions, it may be difficult to compact the soil; it may need to be either aerated during dry weather. Light grading equipment may be needed to avoid damaging the subgrade.

6.3 Landsliding

Landslides can be a result(s) of a variety of geologic, morphological, physical, and/or human causes. Weak, weathered, fractured, permeable, and/or adversely oriented geologic conditions are common causes of slope instabilities. Erosion, deposition, fluvial, tectonic uplift, and volcanic

activities are common morphological causes. Common physical causes of slope instabilities are generally prolonged and/or intense precipitation, seismic events, and shrink-swell processes. Common manmade causes are excavation at toes of slopes, loading of a slope crest, deforestation, irrigation, mining, leaking utilities, and drawdown of reservoirs.

Our review of landslide susceptibility data (ABAGRP) indicates the reservoir expansion is not located within a zone of landslide susceptibility, as shown in Figure 7. Figure 7 does indicate that a zone of "Few Landslides" is adjacent to the pond location, however the details on this map indicate areas of "Few Landslides" are those within the hillside terrain that contained no mapped landslides.

No evidence of landsliding has been observed at the site (with the exception of shrink-swell processes that resulted in the colluvium deposition). Therefore, we conclude that historic significant landsliding or seismically-induced slope instability has likely not impacted the site previously.

6.4 Slope Stability Evaluation

Although the site has likely not been impacted by landsliding in the past, evaluation of the proposed reservoir slopes and the impact of their construction on slope stability at the site is warranted. We conducted slope stability analyses using the results of our field exploration, laboratory testing, groundwater monitoring, geologic interpretation, engineering judgment, and the topographic survey and proposed grading information in the project grading and drainage plans. Using the computer program GeoStudio SLOPE/W 2020 we performed 2-dimensional slope stability analyses. We used Spencer's Method to search for the most critical surfaces and to calculate the factor of safety against slope failure, which is defined as the ratio of the slide mass resisting forces/moments to driving forces/moments. The higher the factor of safety, the more resistant the slope is to failure.

Additionally, we evaluate seismic slope stability using a pseudo-static approach which employed the Lowe-Karafiath method. In this method of analysis, an earthquake is represented by an equivalent horizontal static force. The seismic force is modeled by applying a horizontal ground

acceleration (a horizontal seismic coefficient) to the potential slide mass. By iterating the horizontal seismic coefficient, we obtained the magnitude of the horizontal seismic coefficient that results in slope failure (i.e. corresponds to a factor of safety equal to 1.0). The corresponding horizontal seismic coefficient is referred to as the "yield acceleration" for that slope configuration. The amount of potential permanent deformation for each potential slip surface case was estimated using procedures developed by Bray & Macedo (2019) for the Design Earthquake (DE)[7] and Maximum Considered Earthquake (MCE) levels of shaking.

6.4.1 Idealized Slope Stability Subsurface Profiles

We developed two Idealized subsurface profiles (Sections 1-1′ and 2-2′ as shown on Figure 2) to represent critical slope configurations in the vicinity of the proposed reservoir expansion. Section 1-1′ is oriented to include the tallest portion of the proposed embankment, located near the northwest corner. Section 2-2′ is oriented to include the steepest portion of the slope above the reservoir to the east. Each profile includes a bend near the center of the reservoir in order to analyze the critical 2-dimensional section on each side of the reservoir. This bend-point is identified by a zero value on the horizontal scales on the figures in Appendix C.

For each of the two idealized profiles we evaluated stability of various failure scenarios including slopes above the reservoir (both large failure surfaces and localized failures within the reservoir slope) and west embankment slope failures (both into the reservoir and on the downstream face).

6.4.2 Groundwater and Reservoir Water Levels

No groundwater data was available for the incline slopes north and east of the reservoir at the time of this report. Based on the groundwater measured at LB-2 in May 2023, the groundwater table at the location of the reservoir appears to be seasonally very shallow (within about one foot from the ground surface). Consequently, for our slope stability analyses, we assumed that the groundwater table could be as high as one foot bgs in the inclined slopes north and east of the reservoir.

[7] Design Earthquake and Maximum Considered Earthquake as developed in accordance with the 2022 California Building Code/ASCE 7-16.

For the slope stability analyses, we assumed the following:

- The reservoir will be lined, which will locally isolate the reservoir water from the groundwater table;
- The groundwater table in the vicinity of the pond will be lowered locally based on the recommendations for a pond underdrain system (recommended in Section 7 of this report).
- The groundwater is estimated to be at the level of the gravity outlet of the pond underdrain system (about Elevation 104 feet), representing a condition where the sump pump system may be inoperable.

As part of our slope stability analyses, we modeled three water level scenarios within the new reservoir, including:

- Design reservoir water level (operating low water level): top of water at approximately Elevation 105 feet;
- Full reservoir utilizing spillway (operating high water level): top of water at approximately Elevation 113 feet; and
- Empty reservoir (to check for a fully drained condition)

6.4.3 Geotechnical Parameters for Soil and Bedrock Units

Geotechnical engineering parameters of the reservoir expansion and embankment engineered fill, colluvium, and claystone layers used in our slope stability analyses were based on the results of our field exploration, laboratory testing, and engineering judgment. These values are presented in Table 4.

TABLE 4

Geotechnical Properties of Soil used in Slope Stability Studies

Material Description	Total Unit Weight (pcf)	Effective Stress Strength Parameters		Total Stress Strength Parameters	
		Effective Cohesion, c′ (psf)	Effective Internal Friction Angle, ϕ′ (degrees)	Cohesion, c (psf)	Internal Friction Angle, ϕ (degrees)
Berm Fill (Earthen Embankment)	115	380	23	1,500	0
Upper Clay	115	380	23	1,500	0

Based on the drilling data of the claystone encountered at boring LB-2 and the overall slopes encountered at the site, we modeled the claystone layer as an impenetrable bedrock material.

Effective strength parameters were used for drained condition analyses with long-term loading conditions. The total strength parameters were used for undrained condition analyses for rapid loading conditions.

Additionally, a near-surface bulk sample was collected at boring LB-1 to be remolded for laboratory analysis to provide parameters for engineered fill for the earthen embankment. The remolded silt sample was determined to be a localized material and not representative of the near surface clay located at the rest of the site. We understand that the existing embankment was previously constructed using excavated material for the existing reservoir. Therefore, for the slope stability analysis, we assumed similar properties for both the upper clay and earthen embankment.

6.4.4 Slope Stability Analysis Results

The slope stability analyses are separated into two phases, including (1) an evaluation of the static slope stability conditions of the slopes around and within the proposed reservoir, and (2) a check of the proposed slopes under earthquake loading.

6.4.4.1 Static Stability Evaluation

For the first stage of our analyses we evaluated the stability of the proposed reservoir slopes under static conditions. We considered the various combinations of profile location, failure surface location, reservoir level, and loading rate described above. In total, more than 30 static analyses were performed. The results of the 14 critical runs are presented in Table 5 below and in Table C-1 in Appendix C. Details of the analyses, including slope stability cross sections, are provided in Figures C-1 to C-14 in Appendix C.

TABLE 5
Static Slope Stability Analysis Results

Section	Reservoir Condition	Failure Surface Location	Loading Condition	Drainage Condition	Factor of Safety
1	Operating Low Water	Uphill - Localized	Static	Drained	2.78
1	Operating Low Water	Uphill - Large Surface	Static	Drained	2.32
1	Operating Low Water	Embankment - Upslope Face	Static	Drained	3.01
1	Operating High Water	Embankment - Downslope Face	Static	Drained	3.83
1	Empty	Uphill - Localized	Static	Drained	2.43
1	Empty	Uphill - Large Surface	Static	Drained	2.30
1	Empty	Embankment - Upslope Face	Static	Drained	2.49
2	Operating Low Water	Uphill - Localized	Static	Drained	2.85
2	Operating Low Water	Uphill - Large Surface	Static	Drained	2.34
2	Operating Low Water	Embankment - Upslope Face	Static	Drained	2.84
2	Operating High Water	Embankment - Downslope Face	Static	Drained	6.89
2	Empty	Uphill - Localized	Static	Drained	2.45
2	Empty	Uphill - Large Surface	Static	Drained	2.26
2	Empty	Embankment - Upslope Face	Static	Drained	2.45

As shown in Table 5, the critical static factors of safety range are all above 2.3. The geotechnical standard of practice for statically safe slopes are those with a factor of safety of at least 1.5; therefore, these slopes are considered acceptable under static conditions.

6.4.4.2 Pseudo-Static Evaluation

We evaluated the seismic stability of the proposed slopes and embankments during a major earthquake. Because earthquake loads are short-term, we used total stress (undrained) strength parameters in our analyses (see Table 4). Furthermore, because the likelihood for an earthquake to occur simultaneously with a rapid drawdown event (empty reservoir condition) is very low, we did not evaluate this extreme condition.

The results of our analyses indicate the slopes for the proposed reservoir condition could exhibit permanent displacements during an earthquake generating horizontal ground surface accelerations greater than or equal to the yield acceleration, as shown in Table 6.

TABLE 6
Seismic Slope Stability Analysis Results

Profile No.	Reservoir Level	Yield Acceleration (*g*)	Estimated Slope Displacement (inches)					
			Design Earthquake			Maximum Considered Earthquake		
			16th Percentile	50th Percentile	84th Percentile	16th Percentile	50th Percentile	84th Percentile
1	Operating Low Water	0.77	<0.2	<0.2	1	<0.2	1.8	4.1
1	Operating Low Water	0.96	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
1	Operating High Water	1.45	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2	Operating Low Water	0.65	<0.2	0.7	2	1.3	3.1	6.5
2	Operating Low Water	1.21	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
2	Operating High Water	3.50	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.

Note: N.C. = not calculated

As can be seen, for the critical uphill and downstream embankment scenarios, the anticipated slope displacements range are small (less than 2 inches) for the Design Earthquake (DE) level of shaking and less than 6.5 inches for the Maximum Considered Earthquake (MCE) level of shaking, even when looking at the 84th Percentile prediction value. Based on our experience with similar

projects, this magnitude of displacement is acceptable/tolerable for reservoirs of this type. In addition, the reservoir has been designed for at least one foot of freeboard (top of embankment ranges from Elevation 114 to 115) and the spillway is at Elevation 113 feet. With permanent deformations less than 6½ inches, the likelihood of embankment overtopping, and subsequent erosion is low. We therefore conclude these estimated seismically-induced permanent deformations are acceptable for the project.

6.4.5 Slope Stability Conclusions

Based on the results of our engineering evaluation, we conclude the proposed reservoir expansion can be constructed as generally planned. The proposed slopes exhibit adequate factors of safety under static conditions. During a major earthquake some permanent ground deformations may occur at the site, but the magnitude of the movement does not create a significant hazard for the project. The slope deformations following a major earthquake should be planned for in the design of the reservoir, drainage facilities, and pond liner system; damage to the pond liner and/or drainage systems should be expected and would likely require repair prior to the continued operation of the reservoir.

7.0 RECOMMENDATIONS

From a geotechnical and geological standpoint, we conclude the site can be redeveloped as currently planned provided the recommendations presented in this report are incorporated into the project plans and specifications and implemented during construction. As discussed in Section 6.3.6, we judge a properly constructed embankments will have adequate static factors of safety and should perform adequately during a moderate to large seismic event, provided there is an understanding that some damage and subsequent and repair may be needed following a significant earthquake.

The project will involve clearing and grubbing vegetation, over-excavating colluvium and possibly bedrock to grade and construct the new reservoir, installation of an underdrain system that extends across the floor of the reservoir, installation of a trench drain along the east perimeter of the reservoir, installation of a drainage sump, and overexcavation and recompaction of the

existing embankment slope. Our recommendations regarding the geotechnical aspects of these project elements are discussed in the remainder of this section.

7.1 Embankment and Reservoir Design

Documentation of the condition and installation methods for the fill installed to create the current embankment forming the west side of the reservoir were not available at the time of this report. As such, the expected future performance of the existing embankment is not known. Therefore, to create a uniform containment structure, we recommend the upper portion of the existing west embankment be overexcavated to approximately Elevation 110 feet and rebuilt using engineered fill in accordance with the recommendations in Section 7.2. The overexcavation should extend laterally around the perimeter of the reservoir until it keys in to at least 5 feet of native material (measured horizontally at Elevation 110 feet).

Additional recommendations related to the design of the reservoir include:

- The new reservoir should be lined with a mechanical liner system. This can consist of a heavy-duty textured HDPE liner such as BTL Liners, Aqua Armor RPEL-30, or equivalent
    - *per the BTL Liners specifications, the anchor trenches for the HDPE liner should be at least one foot in width and one foot in depth and located at least one foot from the edge of the embankment;*
- The liner system should include an underdrain to control groundwater and reduce upward pressures on the reservoir base. Underdrain may also serve as additional groundwater recapture and can be pumped into the reservoir for additional water storage. Recommendations for the underdrain are provided in Section 7.5.
- a gravity-fed erosion resistant spillway should be installed at the operational high water level (Elevation 113 feet)
- a typical embankment crest height to provide a minimum freeboard of one foot above the spillway elevation
- Cut slopes in native material exposed to the elements should be cut no steeper than 2.5:1 (horizontal to vertical).

- The downslope side of the new embankment fill should roughly match the existing grades and be no steeper 2.5:1 (horizontal to vertical).

- We understand the reservoir has a Typical Low Operating Level at Elevation 105 feet. Below Elevation 105 feet, the reservoir surface can be sloped at 2:1 (horizontal to vertical). Above Elevation 105 feet we understand a soil cover will be used for aesthetics; this section should be sloped no steeper than 3:1 (horizontal to vertical) and include additional surface stabilization measures.

If cover above the pond liner system is required for long-term UV or aesthetic purposes, the reservoir liner can be covered with reinforced soil. We recommend using a cellular webbing system such as Presto GeoWeb or similar above the liner system to mitigate erosion of the cover soil. A typical anchor trench for the GeoWeb system should be provided at the top of slope per the manufacturer's recommendations. Anchors for the GeoWeb system should not penetrate the reservoir liner.

As the reservoir design is finalized, we should review the plans and specifications to check that the design is in conformance with our recommendations. The details of the pond liner and GeoWeb systems, including the recommended material type, strength, thickness, and associated anchoring details should be designed and installed in accordance with manufacturer recommendations.

7.2 Site Preparation and Grading

Prior to grading operations, the site should be cleared and grubbed of all vegetation (with the exception of large trees to remain, as indicated on the project plans) and stripped of organic topsoil.

The onsite native soil can be used as engineered fill when excavated from the site during grading operations. The native soil should be free of organic matter and contain no rocks or lumps larger than four inches in greatest dimension. Other materials should be approved by the geotechnical engineer prior to their use.

Fill should be placed in horizontal layers not exceeding twelve inches in loose thickness. Clayey soil should be moisture-conditioned between 3 to 5 percent above the optimum moisture content, and compacted to between 88 to 92 percent relative compaction[8]. Granular soil should be moisture conditioned within 2 percent of optimum moisture content and compacted to at least 90 percent relative compaction. The compaction equipment should consist of a large vibratory sheeps-foot type roller or a heavy sheeps-foot static roller, such as a Cat 825; a smooth-drum roller should not be used.

Temporary cut slopes may be inclined at 1:1 (horizontal to vertical) provided they are less than five feet high and are not surcharged by construction equipment. Temporary slopes higher than five feet should be no steeper than 1.5:1. The recommended permanent embankment slopes are provided in Section 7.1.

To reduce the potential for burrowing animals to damage the embankment, we recommend installing a rodent proofing system on the downstream slope faces below the reservoir. This system could consist of polymer-coated wire steel mesh installed just below the finished surface.

7.3 Benching

Fill placed on slopes steeper than 5:1 should be benched into the existing slope. The benches will provide horizontal surfaces for the placement and compaction of the embankment fill, and help prevent the downward creep of the soil. Benches should be a maximum of five feet high and a minimum of six feet wide. Temporary cuts for benches may be made vertical, provided they are less than five feet high and they are not surcharged by construction equipment. Soft or unsuitable material encountered in bench excavations should be removed and replaced with engineered fill.

[8] Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the ASTM D1557-91 laboratory compaction procedure.

7.4 Surface Drainage Control

Surface drainage features should be provided to collect surface runoff, prevent erosion, contain slough, and prevent saturation of the engineered fill.

To protect the embankment from possible overtopping (and associated erosion), the existing spillway location at the south edge of the reservoir can remain as planned. The spillway should be protected from erosion with a concrete apron and rip rap below the spillway. In lieu of a concrete apron, geoweb (minimum of 8 inches deep) filled with crushed rock can be used for erosion control, which can then be covered with vegetation for aesthetics.

7.5 Pond Liner and Subsurface Drainage

To retain water within the reservoir and mitigate the potential for internal erosion within the embankment, a geomembrane (BTL Liners, Aqua Armor RPEL-30 or equivalent) should be placed at the base of the reservoir. The Aqua Armor RPEL-30 includes a HDPE woven reinforcement layer as well as an engineered polymer coating for additional exposure resistance.

The liner should be designed with an anchor trench to limit the liner from translating down the inboard slope and the liner should be designed with slack or overlap to accommodate at least 5 feet of displacement during a major earthquake. *Per the BTL Liners specifications, the anchor trenches for the HDPE liner should be at least one foot in width and one foot in depth and located at least one foot from the edge of the embankment.*

Below the liner, an underdrain system consisting of a drainage blanket and perforated PVC pipes should be installed at the base of the reservoir. The base of the reservoir should be covered with a drainage blanket consisting of continuous, prefabricated drainage panels (such as MiraDRAIN 6000 or equivalent). The drainage panels should extend across the floor of the reservoir and up the sides to at least Elevation 103 feet, and up the entire slope to within 18 inches of the ground surface on the upslope (eastern) side.

Alternatively to running the drainage panel up the eastern face of the reservoir, a trench drain, running along the east edge of the reservoir can be constructed. The trench drain should extend

from just below the ground surface down to Elevation 97 feet. The trench drain should consist of at least a 4-inch-diameter perforated pipe (near the base of the trench) surrounded by Caltrans Class 2 specification permeable rock. The trench drain should be covered with at least 18 inches of native low-permeability material to reduce the capture of surface water into the subdrain system. The underdrain system should drain by gravity to the planned sump system.

The underdrain collection system can consist of 4-inch diameter perforated PVC pipes laid out in a grid with spacing no more than 45 feet apart, on-center. The pipes should be placed in gravel trenches at least one foot deep and surrounded with Caltrans Class 2 permeable material. The pipes should be sloped to drain at a ½ percent slope or steeper.

The underdrain (and trench drain if utilized) should drain by gravity to a sump pit location. The sump location should be established a bottom elevation to allow for efficient pumping below the pipe inlet levels. In addition, the sump system should include a gravity outlet that is no higher than Elevation 104 feet to allow for gravity drainage from the subdrain systems in the case of a pump failure. If the reservoir is to be completely emptied, the sump system should be fully operational and dewatered prior to emptying. The purpose of this recommendation is to reduce the potential for uplift pressure to damage the liner system.

7.6 2022 California Building Code (CBC) Mapped Values

As applicable, improvements can be designed in accordance with applicable seismic codes. On the basis of the results of our field exploration, we conclude the site is classified as a "soft rock" site. For seismic design in accordance with the provisions of the 2022 CBC, we recommend the following:

- Risk-Targeted Maximum Considered Earthquake (MCE_R) ground motion parameter spectral response acceleration (5% critical damping) for 0.2 seconds (S_s) and 1 second (S_1) of 1.977g and 0.717g, respectively
- Site Class C
- Site Coefficients F_a and F_v of 1.2 and 1.4 , respectively

- MCE_R spectral response acceleration parameters at 0.2 seconds (S_{MS}) and at 1 second (S_{M1}) of 2.373g and 1.004g, respectively.

- Design Earthquake (DE) spectral response acceleration parameters at 0.2 seconds (S_{DS}) and at 1 second (S_{D1}) of 1.582g and 0.669g, respectively.

8.0 ADDITIONAL GEOTECHNICAL SERVICES

During final design we should be retained to consult with the design team as geotechnical questions arise. Technical specifications and design drawings should incorporate Langan's recommendations. When authorized, Langan will assist the design team in preparing specification sections related to geotechnical issues such as earthwork and backfill and excavation support. Langan should also, when authorized, review the project plans, as well as Contractor submittals relating to materials and construction procedures for geotechnical work, to confirm the designs incorporate the intent of our recommendations.

Langan has investigated and interpreted the site subsurface conditions and developed the geotechnical reservoir design recommendations contained herein, and is therefore best suited to perform quality assurance observation and testing of geotechnical-related work during construction. The work requiring quality assurance confirmation and/or special inspections per the Building Code includes, but is not limited to, earthwork, backfill, ground improvement, shallow and deep foundations, and excavation support.

Recognizing that construction observation is the final stage of geotechnical design, quality assurance observation during construction by Langan is necessary to confirm the design assumptions and design elements, to maintain our continuity of responsibility on this project, and allow us to make changes to our recommendations, as necessary. The general geotechnical construction methods recommended herein are predicated upon Langan assisting with the final design and providing construction observation services for the Owner. Should Langan not be retained for these services, we cannot assume the role of geotechnical engineer of record, and the entity providing the final design and construction observation services must serve as the engineer of record.

9.0 LIMITATIONS

The conclusions and recommendations provided in this report result from our interpretation of the geotechnical conditions existing at the site inferred from a limited number of borings, as well as architectural information provided by Munselle Civil Engineering and Geo Blue Consulting, Inc. Actual subsurface conditions may vary. Recommendations provided are dependent upon one another and no recommendation should be followed independent of the others.

Any proposed changes in structures or their locations should be brought to Langan's attention as soon as possible so that we can determine whether such changes affect our recommendations. Information on subsurface strata and groundwater levels shown on the logs represent conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to Langan's attention for evaluation, as they may affect our recommendations.

This report has been prepared to assist the Owner and civil engineer in the design process and is only applicable to the design of the specific project identified. The information in this report cannot be utilized or depended on by engineers or contractors who are involved in evaluations or designs of facilities on adjacent properties which are beyond the limits of that which is the specific subject of this report.

Environmental issues (such as permitting or potentially contaminated soil and groundwater) are outside the scope of this study and should be addressed in a separate evaluation.

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FIGURES

Legend

- Approximate Location of Reservoir
- Approximate Property Boundary

Notes:
1. Site located in the La Honda USGS Quadrangle.
2. Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
3. All features shown are approximate.

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Project	6500 PESCADERO CREEK ROAD SAN MATEO COUNTY CALIFORNIA
Figure Title	SITE LOCATION MAP
Project No.	750681701
Date	7/12/2023
Scale	1" = 2,000'
Drawn By	OG
Figure	1

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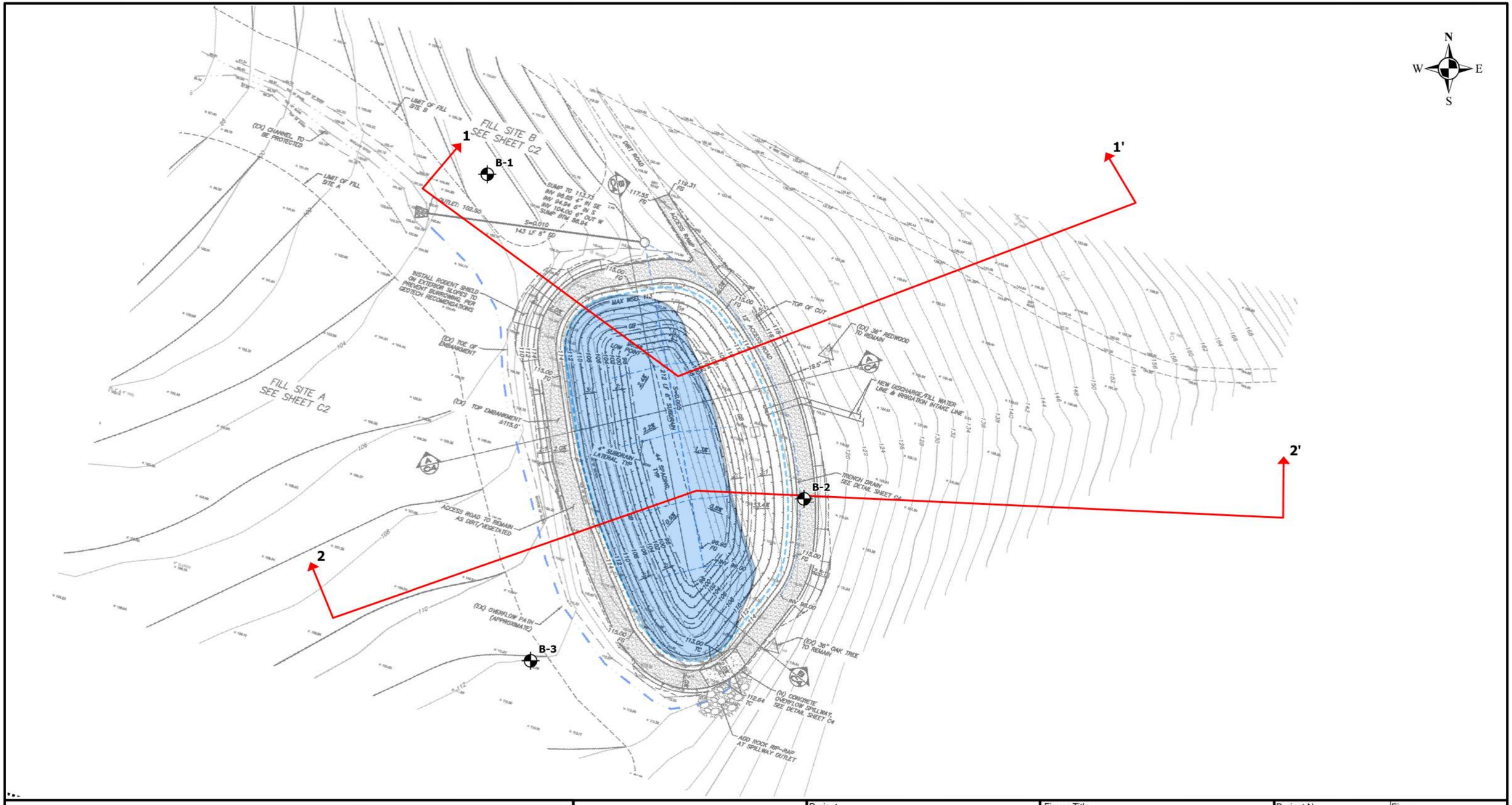

Legend

- Approximate Location of Boring by Langan, May 2023
- Slope Stability Analysis Section
- Approximate Location of Existing Reservoir

Notes:
1. Basemap based on Sheet C3 of "Pescadero Reservoir, Reservoir Grading Plan, APN 088-090-240, 6500 Pescadero Creek Rd., Pescadero, CA" by Munselle Civil Engineering, dated 14 June 2023.
2. "Pescadero Reservoir Preliminary Reservoir Plan" provided by Munselle Civil Engineering, dated 5/15/2023.
3. All features shown are approximate.

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Project
6500 PESCADERO CREEK ROAD
SAN MATEO COUNTY CALIFORNIA

Figure Title
SITE PLAN

Project No.	Figure
750681701	2
Date: 7/12/2023	
Scale: 1" = 60'	
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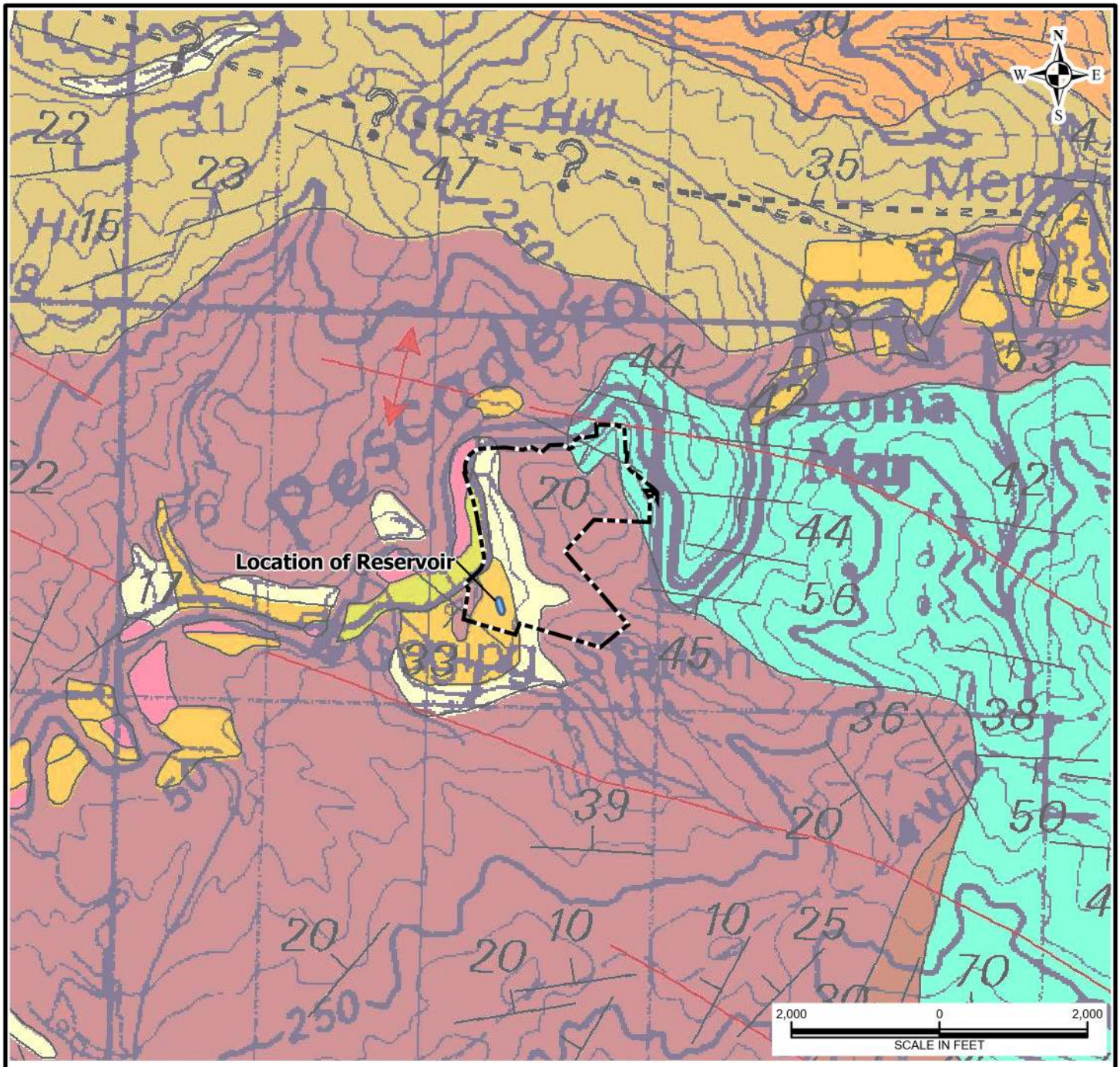

Legend

- Approximate Property Boundary
- Fault | Small dashes where inferred
- Anticline
- Strike and dip of bedding
- Qyfo | Younger (outer) alluvial fan deposits (Holocene)
- Qcl | Colluvium (Holocene)
- Qof | Coarse-grained older alluvial fan and stream terrace deposits (Pleistocene)
- Tpp | Pomponio Mudstone Member (Pliocene)
- Tpt | Tahana Member (Pliocene and upper Miocene)
- Tsc | Santa Cruz Mudstone (upper Miocene)
- Tb | Butano Sandstone (middle and lower Eocene)

Notes:
1. "Geologic Map and Map Database of the Palo Alto 30' x 60' Quadrangle, California," by E.E. Brabb, R.W. Graymer, and D.L. Jones, dated 2000.
2. All features shown are approximate.

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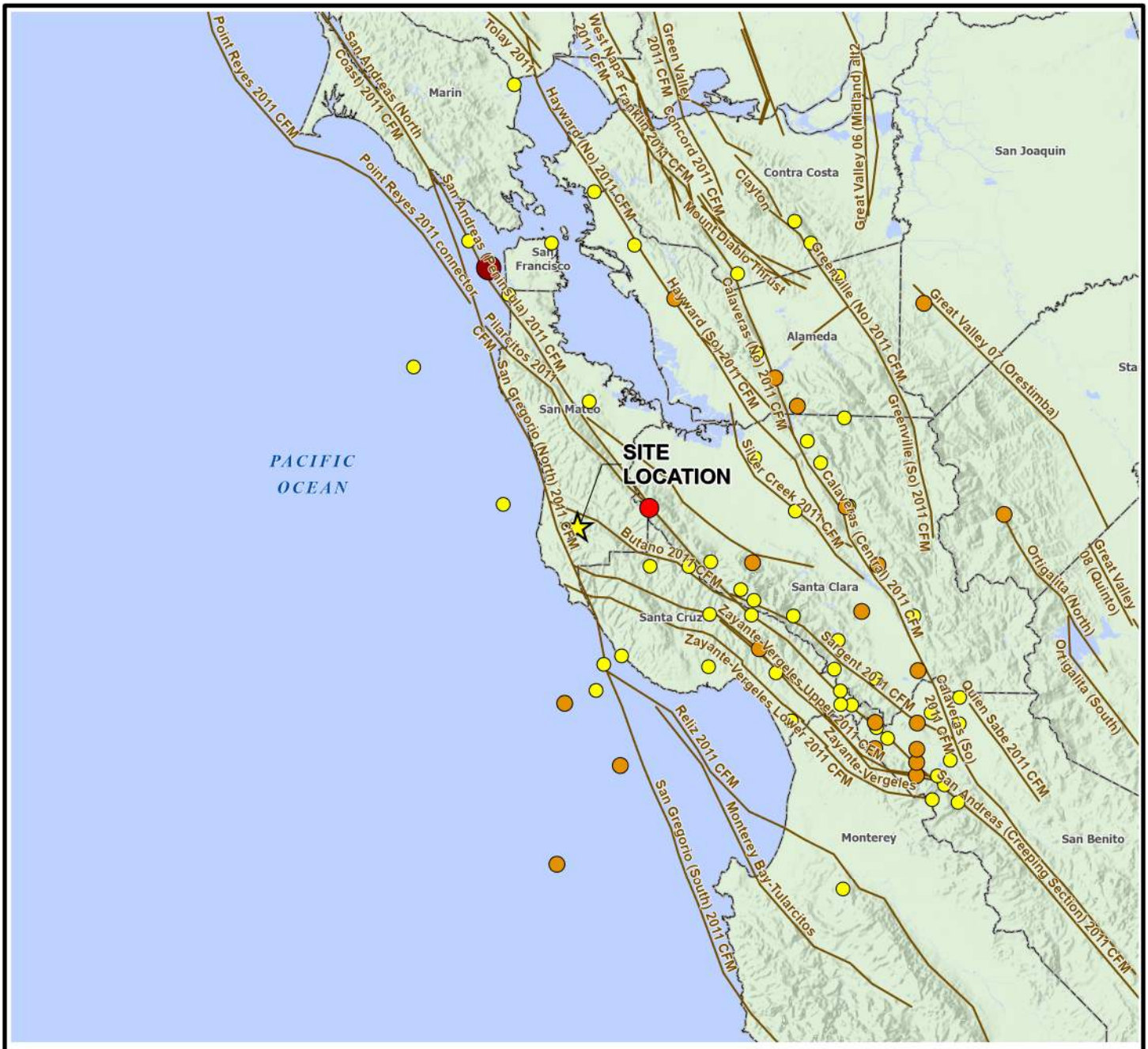
Project
6500 PESCADERO CREEK ROAD
SAN MATEO COUNTY CALIFORNIA

Figure Title
REGIONAL GEOLOGIC MAP

Project No.	750681701
Date	7/12/2023
Scale	1" = 2,000'
Drawn By	OG
Figure	3

Path: \\langan.com\data\OAK\data7\750681701\Project Data\ArcGIS\APRX\Reservoir Rehabilitation Project_750681701_rev.aprx



Legend

- County Boundary
- Fault

Earthquake Epicenter Magnitude

- Magnitude 5 to 5.9
- Magnitude 6 to 6.9
- Magnitude 7 to 7.4
- Magnitude 7.5 to 8

0 10 20
Miles

N
W E
S

Notes:
1. Quaternary fault data displayed are provided by the CGS Map Sheet 48: Fault based seismic sources used in the Uniform California Earthquake Rupture Forecast, Version (UCERF3).
2. Earthquakes queried within 100 km of site location with a magnitude of 5+ from 01/01/1800 to present, from the ANSS Comprehensive Earthquake Catalog (ComCat), downloaded 05/22/2023.
3. Basemap hillshade and County bondaries provided by USGS and California Department of Transportation.
4. Map displayed in California State Coordinate System, California (Teale) Albers, North American Datum of 1983 (NAD83), Meters.

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Figure Title
MAP OF MAJOR FAULTS AND EARTHQUAKE EPICENTERS

Project No.	750681701
Date	7/12/2023
Scale	1 inch = 20 miles
Drawn By	GS
Figure	4

\\langan.com\data\SFO\data2\731758201\Project Data\ArcGIS\MXD\Geotech_Figures

I **Not felt by people, except under especially favorable circumstances. However, dizziness or nausea may be experienced.**
Sometimes birds and animals are uneasy or disturbed. Trees, structures, liquids, bodies of water may sway gently, and doors may swing very slowly.

II **Felt indoors by a few people, especially on upper floors of multi-story buildings, and by sensitive or nervous persons.**
As in Grade I, birds and animals are disturbed, and trees, structures, liquids and bodies of water may sway. Hanging objects swing, especially if they are delicately suspended.

III **Felt indoors by several people, usually as a rapid vibration that may not be recognized as an earthquake at first. Vibration is similar to that of a light, or lightly loaded trucks, or heavy trucks some distance away. Duration may be estimated in some cases.**
Movements may be appreciable on upper levels of tall structures. Standing motor cars may rock slightly.

IV **Felt indoors by many, outdoors by a few. Awakens a few individuals, particularly light sleepers, but frightens no one except those apprehensive from previous experience. Vibration like that due to passing of heavy, or heavily loaded trucks. Sensation like a heavy body striking building, or the falling of heavy objects inside.**
Dishes, windows and doors rattle; glassware and crockery clink and clash. Walls and house frames creak, especially if intensity is in the upper range of this grade. Hanging objects often swing. Liquids in open vessels are disturbed slightly. Stationary automobiles rock noticeably.

V **Felt indoors by practically everyone, outdoors by most people. Direction can often be estimated by those outdoors. Awakens many, or most sleepers. Frightens a few people, with slight excitement; some persons run outdoors.**
Buildings tremble throughout. Dishes and glassware break to some extent. Windows crack in some cases, but not generally. Vases and small or unstable objects overturn in many instances, and a few fall. Hanging objects and doors swing generally or considerably. Pictures knock against walls, or swing out of place. Doors and shutters open or close abruptly. Pendulum clocks stop, or run fast or slow. Small objects move, and furnishings may shift to a slight extent. Small amounts of liquids spill from well-filled open containers. Trees and bushes shake slightly.

VI **Felt by everyone, indoors and outdoors. Awakens all sleepers. Frightens many people; general excitement, and some persons run outdoors.**
Persons move unsteadily. Trees and bushes shake slightly to moderately. Liquids are set in strong motion. Small bells in churches and schools ring. Poorly built buildings may be damaged. Plaster falls in small amounts. Other plaster cracks somewhat. Many dishes and glasses, and a few windows break. Knickknacks, books and pictures fall. Furniture overturns in many instances. Heavy furnishings move.

VII **Frightens everyone. General alarm, and everyone runs outdoors.**
People find it difficult to stand. Persons driving cars notice shaking. Trees and bushes shake moderately to strongly. Waves form on ponds, lakes and streams. Water is muddied. Gravel or sand stream banks cave in. Large church bells ring. Suspended objects quiver. Damage is negligible in buildings of good design and construction; slight to moderate in well-built ordinary buildings; considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Plaster and some stucco fall. Many windows and some furniture break. Loosened brickwork and tiles shake down. Weak chimneys break at the roofline. Cornices fall from towers and high buildings. Bricks and stones are dislodged. Heavy furniture overturns. Concrete irrigation ditches are considerably damaged.

VIII **General fright, and alarm approaches panic.**
Persons driving cars are disturbed. Trees shake strongly, and branches and trunks break off (especially palm trees). Sand and mud erupts in small amounts. Flow of springs and wells is temporarily and sometimes permanently changed. Dry wells renew flow. Temperatures of spring and well waters varies. Damage slight in brick structures built especially to withstand earthquakes; considerable in ordinary substantial buildings, with some partial collapse; heavy in some wooden houses, with some tumbling down. Panel walls break away in frame structures. Decayed pilings break off. Walls fall. Solid stone walls crack and break seriously. Wet grounds and steep slopes crack to some extent. Chimneys, columns, monuments and factory stacks and towers twist and fall. Very heavy furniture moves conspicuously or overturns.

IX **Panic is general.**
Ground cracks conspicuously. Damage is considerable in masonry structures built especially to withstand earthquakes; great in other masonry buildings - some collapse in large part. Some wood frame houses built especially to withstand earthquakes are thrown out of plumb, others are shifted wholly off foundations. Reservoirs are seriously damaged and underground pipes sometimes break.

X **Panic is general.**
Ground, especially when loose and wet, cracks up to widths of several inches; fissures up to a yard in width run parallel to canal and stream banks. Landsliding is considerable from river banks and steep coasts. Sand and mud shifts horizontally on beaches and flat land. Water level changes in wells. Water is thrown on banks of canals, lakes, rivers, etc. Dams, dikes, embankments are seriously damaged. Well-built wooden structures and bridges are severely damaged, and some collapse. Dangerous cracks develop in excellent brick walls. Most masonry and frame structures, and their foundations are destroyed. Railroad rails bend slightly. Pipe lines buried in earth tear apart or are crushed endwise. Open cracks and broad wavy folds open in cement pavements and asphalt road surfaces.

XI **Panic is general.**
Disturbances in ground are many and widespread, varying with the ground material. Broad fissures, earth slumps, and land slips develop in soft, wet ground. Water charged with sand and mud is ejected in large amounts. Sea waves of significant magnitude may develop. Damage is severe to wood frame structures, especially near shock centers, great to dams, dikes and embankments, even at long distances. Few if any masonry structures remain standing. Supporting piers or pillars of large, well-built bridges are wrecked. Wooden bridges that "give" are less affected. Railroad rails bend greatly and some thrust endwise. Pipe lines buried in earth are put completely out of service.

XII **Panic is general.**
Damage is total, and practically all works of construction are damaged greatly or destroyed. Disturbances in the ground are great and varied, and numerous shearing cracks develop. Landslides, rock falls, and slumps in river banks are numerous and extensive. Large rock masses are wrenched loose and torn off. Fault slips develop in firm rock, and horizontal and vertical offset displacements are notable. Water channels, both surface and underground, are disturbed and modified greatly. Lakes are dammed, new waterfalls are produced, rivers are deflected, etc. Surface waves are seen on ground surfaces. Lines of sight and level are distorted. Objects are thrown upward into the air.

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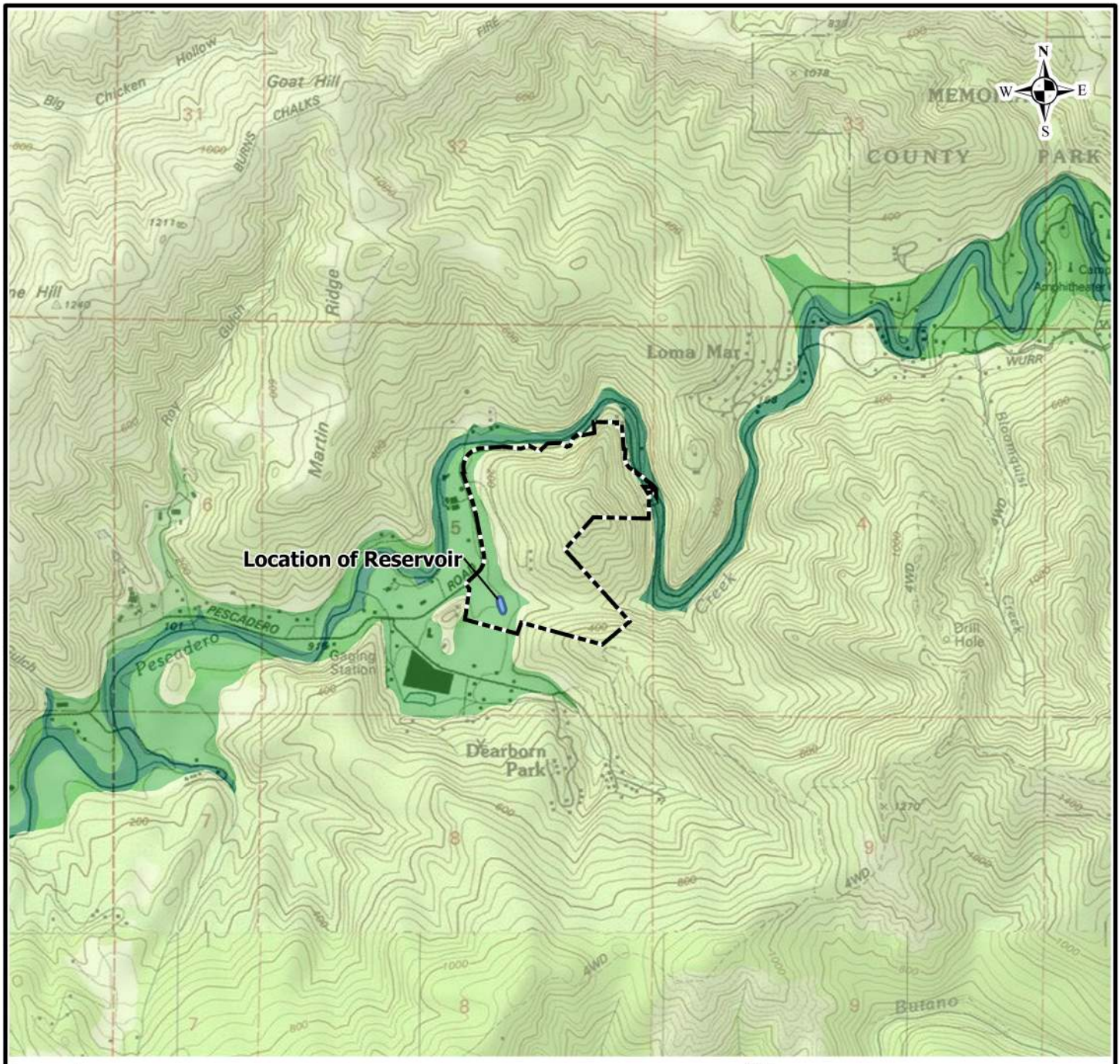
Figure Title
MODIFIED MERCALLI INTENSITY SCALE

Project No. 750681701
Date 7/12/2023
Figure 5



Legend

- Approximate Site Boundary
- Approximate Location of Reservoir

Liquefaction Susceptibility

- Very high
- High
- Moderate
- Low
- Very low

Notes:
1. Site is located in the La Honda USGS Quadrangle.
2. Seamless Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
3. Liquefaction Susceptibility dataset provided in GIS format by the Association of Bay Area Governments' Resilience Program. This data is preliminary and has not been reviewed for conformity with United States Geological Survey (USGS) editorial standards or with the North American Stratigraphic Code.

2,000 0 2,000
SCALE IN FEET

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Figure Title
LIQUEFACTION SUSCEPTIBILITY MAP

Project No.	750681701
Date	7/12/2023
Scale	1" =2,000'
Drawn By	OG
Figure	6

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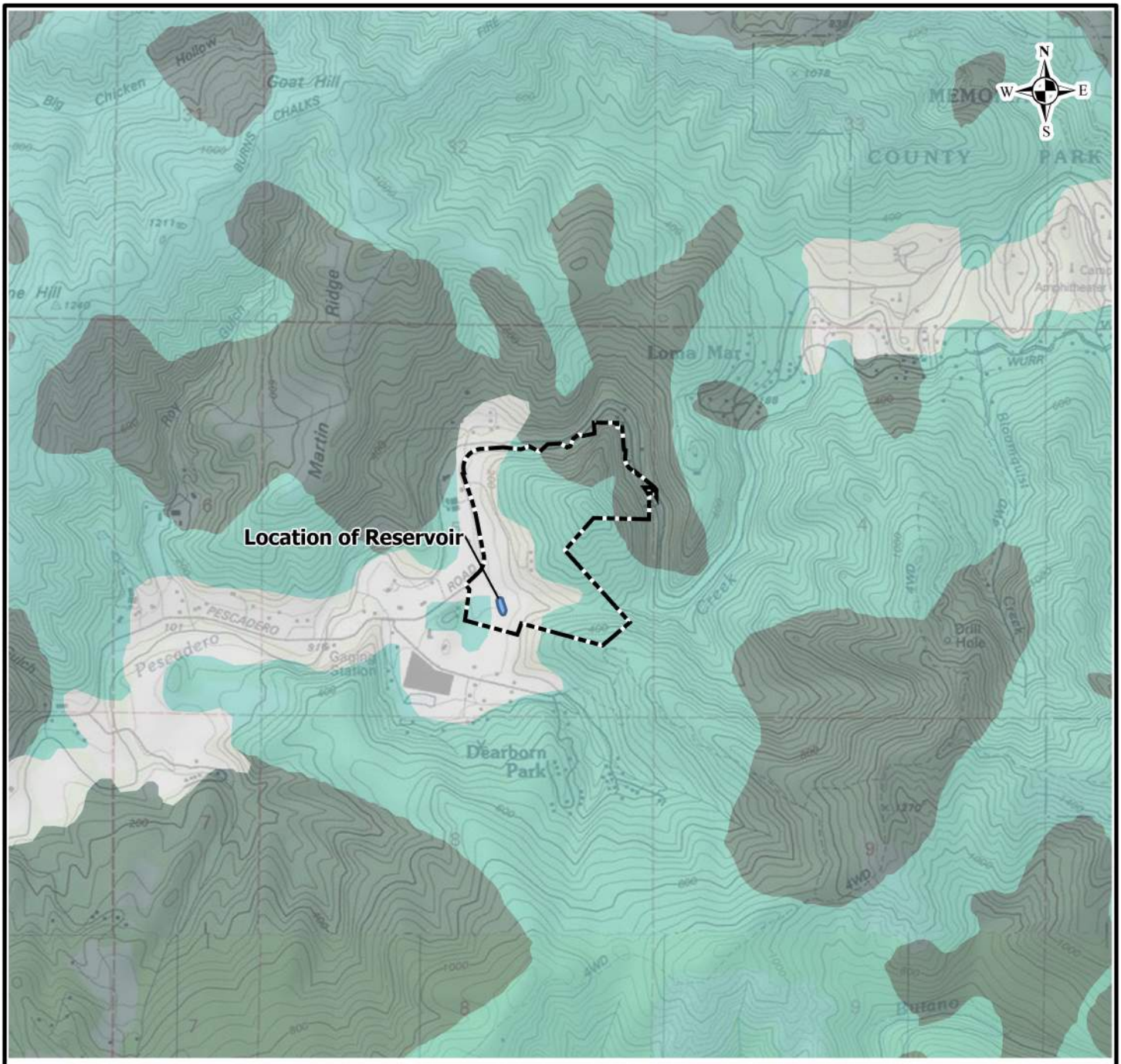

Legend

- Approximate Site Boundary
- Approximate Location of Reservoir

Landslide Areas

- Mostly Landslides
- Few Landslides
- Flat Land

Notes:
1. Site is located in the La Honda USGS Quadrangle.
2. Seamless Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
3. Landslide areas dataset provided in GIS format by the Association of Bay Area Governments' Resilience Program. This data is preliminary and has not been reviewed for conformity with United States Geological Survey (USGS) editorial standards or with the North American Stratigraphic Code.

2,000 0 2,000
SCALE IN FEET

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Figure Title
LANDSLIDE AREAS MAP

Project No.	750681701
Date	7/12/2023
Scale	1" =2,000'
Drawn By	OG

Figure 7

Path: \\langan.com\data\OAK\data7\750681701\Project Data\ArcGIS\APRX\Reservoir Rehabilitation Project_750681701_rev.aprx

APPENDIX A

BORING LOGS

LANGAN

Log of Boring **LB-1** Sheet 1 of 1

Project: 6500 Pescadero Creek Road			Project No.: 750681701		
Location: North of Reservoir, Lat/Long: 37.262675, -122.321028			Elevation and Datum: Approx. el. 107 (feet, project datum)		
Drilling Company: Pitcher Services, LLC			Date Started: 5/10/2023	Date Finished: 5/10/2023	
Drilling Equipment: Track Rig (PD81)			Completion Depth: 16.5 ft	Rock Depth: N/E	
Drilling Method: Rotary Wash			Number of Samples: Disturbed 4	Undisturbed 0	Core 0
Hammer Type: Automatic	Weight (lbs): 140	Drop (in): 30	Water Level (ft.): First ▽ 2.0	Completion ▼ N/A	24 HR. ▽ N/A
Sampler: Sprague & Henwood			Drilling Foreman: Will	Field Engineer: Kristen Pettey	

DEPTH (feet)	SAMPLES: Sampler Type	Sample	Push Pressure (psi)	Blows/6"	Corrected N-Value [1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure (psf)	Shear Strength (psf)	Fines %	Natural Moisture Content (%)	Dry Density (pcf)
1						ML	SILT (ML) dark brown, very stiff, moist, trace fine sand and organics Triaxial Test, see Figure B-1						
2							Permeability Test, see Figure B-5	PP		2,750			
3	S&H			5 8 11	17		Shrink Swell Test, see Figure B-6 Compaction Test, see Figure B-7 LL = 42, PI = 14, see FIgure B-8					28.2	88.0
4							CLAY (CH) dark brown to gray-brown with orange mottling, very stiff, wet	PP		3,500			
5													
6	S&H			5 9 12	19		gray-brown with orange mottling, stiff LL = 72, PI = 43, see Figure B-8	PP		3,000			
7													
8													
9						CH							
10													
11	S&H			5 8 11	17		gray-brown with orange and gray mottling, trace fine sand	PP		4,000			
12													
13													
14													
15											91.3	31.0	
16	S&H			6 10 14	22		gray-brown with yellow-brown mottling, very stiff to hard, trace fine to medium sand LL = 63, PI = 35, see Figure B-8	PP		4,500			
17													
18													
19													
20													
21													
22													
23													
24													
25													

Backfilled with cement grout.

Water Level:
At 2.0ft. measured on 5/10/2023 1:28:00 PM

[1] S&H and SPT blowcounts for the last two increments were converted to SPT N-Values using factors of 0.9 and 1.4, respectively to account for hammer energy and sampler type.

[2] Elevations reference project datum provided in grading and drainage plan by Munselle Civil Engineering titled "Grading and Drainage Plan for Pescadero Reservoir, APN 088-090-240, 6500 Pescader Creed Rd, Pescadera, CA," dated 14 June 2023.

Figure: A-1

Template: Document; Strip: BH-GEO-CAL;
Printed on 07/13/2023

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Log of Boring **LB-2** Sheet 1 of 2

Project: 6500 Pescadero Creek Road				Project No.: 750681701			
Location: East of Reservoir, Lat/Long: 37.262101, -122.320366				Elevation and Datum: Approx. el. 120 (feet, project datum)			
Drilling Company: Pitcher Services. LLC				Date Started: 5/10/2023		Date Finished: 5/10/2023	
Drilling Equipment: Track Rig (PD81)				Completion Depth: 30.3 ft		Rock Depth: 19.5 ft	
Drilling Method: Rotary Wash				Number of Samples	Disturbed: 7	Undisturbed: 0	Core: 0
Hammer Type: Automatic	Weight (lbs): 140	Drop (in): 30		Water Level (ft.)	First ▽: 2.0	Completion ▼: N/A	24 HR. ▽▼: N/A
Sampler: Sprague & Henwood, Standard Penetration Test				Drilling Foreman: Will		Field Engineer: Kristen Pettey	

DEPTH (feet)	Sampler Type	Sample	Push Pressure (psi)	Blows/6"	Corrected N-Value [1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure (psf)	Shear Strength (psf)	Fines %	Natural Moisture Content (%)	Dry Density (pcf)
1							CLAY (CH) dark brown, stiff to very stiff, moist						
2							▽	PP		2,000			
3	S&H			7 8 9	15		wet, trace fine sand					32.6	81.0
4													
5				2			medium stiff to stiff					35.8	86.0
6	S&H			5 6	10		LL = 72, PI = 42, see Figure B-8	TV		1,000			
7													
8													
9						CH							
10				3			gray-brown with yellow-brown mottling, stiff, trace fine sand						
11	S&H			5 5	9		Triaxial Test, see Figure B-2	TV		1,100			
12													
13													
14													
15				3			trace fine to coarse sand				93.9	34.7	
16	S&H			5 7	11			PP		2,000			
17													
18							sand and gravel lens						
19													
20				15			CLAYSTONE dark brown, intensely fractured, low hardness, weak, deeply weathered						
21	S&H			28 46	67								
22													
23													
24													
25													

Backfilled with cement grout.

Water Level:
At 2.0ft. measured on 5/10/2023 7:40:00 AM

[1] S&H and SPT blowcounts for the last two increments were converted to SPT N-Values using factors of 0.9 and 1.4, respectively to account for hammer energy and sampler type.

[2] Elevations reference project datum provided in grading and drainage plan by Munselle Civil Engineering titled "Grading and Drainage Plan for Pescadero Reservoir, APN 088-090-240, 6500 Pescader Creed Rd, Pescadera, CA," dated 14 June 2023.

Figure: A-2a

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Printed on 07/13/2023

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Log of Boring **LB-2** Sheet 2 of 2

Project	Project No.
6500 Pescadero Creek Road	750681701
Location	**Elevation and Datum**
East of Reservoir, Lat/Long: 37.262101, -122.320366	Approx. el. 120.0 (feet)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Push Pressure (psi)	SAMPLES: Blows/6"	SAMPLES: Corrected N-Value [1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure (psf)	Shear Strength (psf)	Fines %	Natural Moisture Content (%)	Dry Density (pcf)
26	SPT			50	70/6"	Weathered Rock	CLAYSTONE dark brown, intensely fractured, low hardness, weak, deeply weathered dark brown to brown, closely fractured, friable						
30	S&H			50/4"	70/4"								

Backfilled with cement grout.

Water Level:
At 2.0ft. measured on 5/10/2023 7:40:00 AM

[1] S&H and SPT blowcounts for the last two increments were converted to SPT N-Values using factors of 0.9 and 1.4, respectively to account for hammer energy and sampler type.

[2] Elevations reference project datum provided in grading and drainage plan by Munselle Civil Engineering titled "Grading and Drainage Plan for Pescadero Reservoir, APN 088-090-240, 6500 Pescader Creed Rd, Pescadera, CA," dated 14 June 2023.

Figure: A-2b

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Printed on 07/13/2023

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Log of Boring **LB-3** Sheet 1 of 1

Project: 6500 Pescadero Creek Road		Project No.: 750681701	
Location: Southwest of reservoir, Lat/Long: 37.261729, -122.320942		Elevation and Datum: Approx. el. 110 (feet, project datum)	
Drilling Company: Pitcher Services, LLC		Date Started: 5/10/2023	Date Finished: 5/10/2023
Drilling Equipment: Track Rig (PD81)		Completion Depth: 16.5 ft	Rock Depth: N/E
Drilling Method: Rotary Wash		Number of Samples: Disturbed 4	Undisturbed 0 / Core 0
Hammer Type: Automatic	Weight (lbs): 140 / Drop (in): 30	Water Level (ft.): First ▽ 1.5	Completion ▼ N/A / 24 HR. ▽ N/A
Sampler: Sprague & Henwood		Drilling Foreman: Will	Field Engineer: Kristen Pettey

DEPTH (feet)	Sampler Type	Sample	Push Pressure (psi)	Blows/6"	Corrected N-Value [1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure (psf)	Shear Strength (psf)	Fines %	Natural Moisture Content (%)	Dry Density (pcf)
1							CLAY (CH) dark brown, stiff, moist						
2							▽	PP		1,500			
3	S&H			3 6 8	13		brown with orange mottling, stiff, wet, trace fine sand, trace organics					40.9	75.0
4													
5													
6	S&H			4 6 9	14		brown with gray-brown mottling, trace subrounded fine gravel Triaxial Test, see Figure B-3	TxUU	400	1,490		34.6	85.0
7													
8						CH							
9													
10													
11	S&H			3 4 6	910		gray to gray-brown with orange mottling	PP		1,750			
12													
13													
14													
15													
16	S&H			3 5 6	10		gray-brown with yellow-brown and gray mottling, very stiff Triaxial Test, see Figure B-4	TxUU	1,100	1,540		40.5	81.0
17													
18													
19													
20													
21													
22													
23													
24													
25													

Backfilled with cement grout.

Water Level:
At 1.5ft. measured on 5/10/2023 11:23:00 AM

[1] S&H and SPT blowcounts for the last two increments were converted to SPT N-Values using factors of 0.9 and 1.4, respectively to account for hammer energy and sampler type.

[2] Elevations reference project datum provided in grading and drainage plan by Munselle Civil Engineering titled "Grading and Drainage Plan for Pescadero Reservoir, APN 088-090-240, 6500 Pescader Creed Rd, Pescadera, CA," dated 14 June 2023.

Figure: A-3

Template: Document; Strip: BH-GEO-CAL;
Printed on 07/13/2023

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Symbols	Typical Names
Coarse-Grained Soils (more than half of soil > no. 200 sieve size	**Gravels** (More than half of coarse fraction > no. 4 sieve size)	**GW**	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)	**SW**	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine -Grained Soils (more than half of soil < no. 200 sieve size)	**Silts and Clays** LL = < 50	**ML**	Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL = > 50	**MH**	Inorganic silts of high plasticity
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic silts and clays of high plasticity
Highly Organic Soils		**PT**	Peat and other highly organic soils

GRAIN SIZE CHART

Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size in Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.075
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.075
Silt and Clay	Below No. 200	Below 0.075

Unstabilized groundwater level

Stabilized groundwater level

PP = Pocket Penetrometer

TV = Torvane

SAMPLE DESIGNATIONS/SYMBOLS

Sample taken with Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter. Darkened area indicates soil recovered

Classification sample taken with Standard Penetration Test sampler

Undisturbed sample taken with thin-walled tube

Disturbed sample

Sampling attempted with no recovery

Core sample

Analytical laboratory sample

Sample taken with Direct Push or Drive sampler

Sonic

SAMPLER TYPE

C Core barrel

CA California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter

D&M Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube

O Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube

PT Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube

S&H Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter

SPT Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.38- or 1.5-inch inside diameter - see report text

ST Shelby Tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure

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Project: 6500 PESCADERO CREEK ROAD
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SAN MATEO COUNTY CALIFORNIA

Figure Title: SOIL CLASSIFICATION CHART

Project No. 750681701
Date 6/27/2023
Drawn By JPC
Checked By HS

Figure A-4

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/27/2023 Time: 13:57 User: jcarabelas Style Table: Langan.stb Layout: SOIL CHART

I FRACTURING

Intensity	Size of Pieces in Feet
Very little fractured	Greater than 4.0
Occasionally fractured	1.0 to 4.0
Moderately fractured	0.5 to 1.0
Closely fractured	0.1 to 0.5
Intensely fractured	0.05 to 0.1
Crushed	Less than 0.05

II HARDNESS

1. **Soft** - reserved for plastic material alone.
2. **Low hardness** - can be gouged deeply or carved easily with a knife blade.
3. **Moderately hard** - can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away.
4. **Hard** - can be scratched with difficulty; scratch produced a little powder and is often faintly visible.
5. **Very hard** - cannot be scratched with knife blade; leaves a metallic streak.

III STRENGTH

1. **Plastic** or very low strength.
2. **Friable** - crumbles easily by rubbing with fingers.
3. **Weak** - an unfractured specimen of such material will crumble under light hammer blows.
4. **Moderately strong** - specimen will withstand a few heavy hammer blows before breaking.
5. **Strong** - specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
6. **Very strong** - specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

IV WEATHERING - The physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing.

D. Deep - moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.

M. Moderate - slight change or partial decomposition of minerals; little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.

L. Little - no megascopic decomposition of minerals; little of no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.

F. Fresh - unaffected by weathering agents. No disintegration of discoloration. Fractures usually less numerous than joints.

ADDITIONAL COMMENTS:

V CONSOLIDATION OF SEDIMENTARY ROCKS: usually determined from unweathered samples. Largely dependent on cementation.

U = unconsolidated
P = poorly consolidated
M = moderately consolidated
W = well consolidated

VI BEDDING OF SEDIMENTARY ROCKS

Splitting Property	Thickness	Stratification
Massive	Greater than 4.0 ft.	very thick-bedded
Blocky	2.0 to 4.0 ft.	thick bedded
Slabby	0.2 to 2.0 ft.	thin bedded
Flaggy	0.05 to 0.2 ft.	very thin-bedded
Shaly or platy	0.01 to 0.05 ft.	laminated
Papery	less than 0.01	thinly laminated

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Project
6500 PESCADERO CREEK ROAD
SAN MATEO COUNTY
SAN MATEO COUNTY CALIFORNIA

Figure Title
PHYSICAL PROPERTIES CRITERIA FOR ROCK DESCRIPTIONS

Project No. 750681701
Date 6/27/2023
Drawn By JPC
Checked By HS

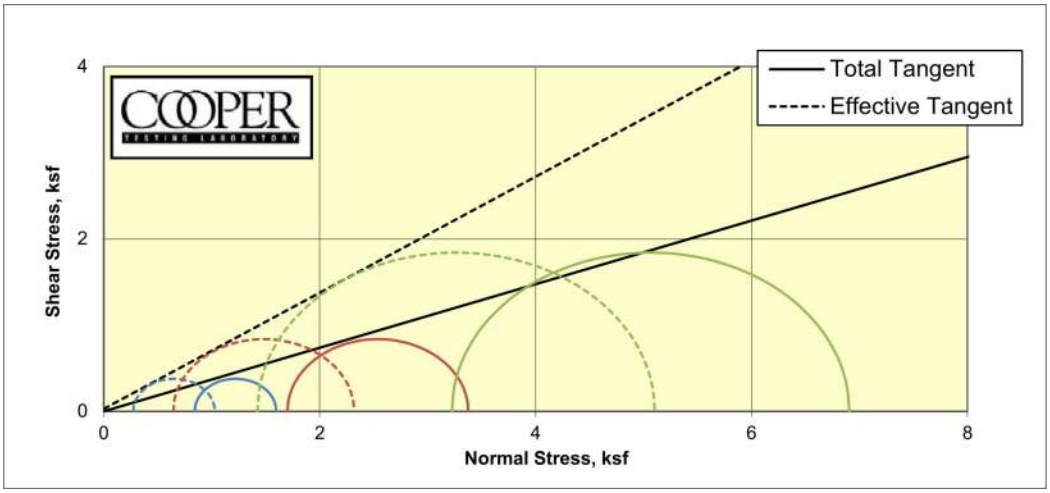
Figure
A-5

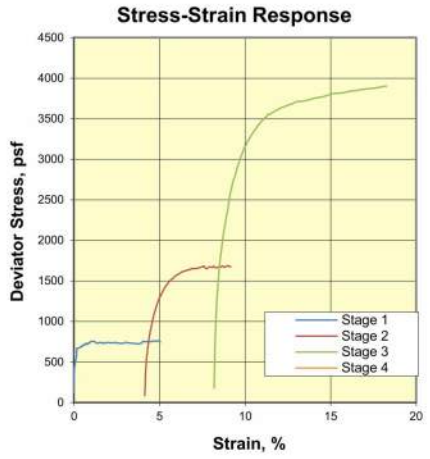
Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/27/2023 Time: 13:56 User: jcarabelas Style Table: Langan.stb Layout: ROCK CHART

APPENDIX B

LABORATORY TEST RESULTS

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m





CTL Number:	010-1172
Client Name:	Langan Engineering
Project Name:	6500 Pescadero Creek Road
Project Number:	750681701-700-001.0
Date:	6/16/2023 By: MD/DC
Total C	0.000 ksf
Total phi	20.2 degrees
Eff. C	0.030 ksf
Eff. Phi	33.9 degrees ©

Remarks: Remolded to 88% of 96.2pcf at 22% (Opt. +2%)

Stage	1	2	3	4
Boring	B-1			
Sample				
Depth	2			
Visual Description	SILT (ML), brown			
MC (%)	21.9			
Dry Density (pcf)	84.5			
Saturation (%)	58.5			
Void Ratio	1.031			
Diameter (in)	2.38			
Height (in)	5.00			
	Final			
MC (%)	37.0	33.8	31.2	
Dry Density (pcf)	85.1	89.0	92.4	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	1.018	0.928	0.858	
Diameter (in)	2.39	2.38	2.39	
Height (in)	4.92	4.71	4.51	
Cell Pressure (psi)	125.3	131.4	142.2	
Back Pressure (psi)	119.5	119.6	119.8	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	0.755	1.675	3.683	
Excess PP (psi)	4.0	7.3	12.5	
Sigma 1 (ksf)	1.029	2.320	5.105	
Sigma 3 (ksf)	0.274	0.645	1.422	
P (ksf)	0.651	1.482	3.264	
Q (ksf)	0.377	0.837	1.841	
Stress Ratio	3.759	3.596	3.589	
Rate (in/min)	0.0005	0.0005	0.0005	

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Project: 6500 PESCADERO CREEK ROAD
SAN MATEO COUNTY CALIFORNIA

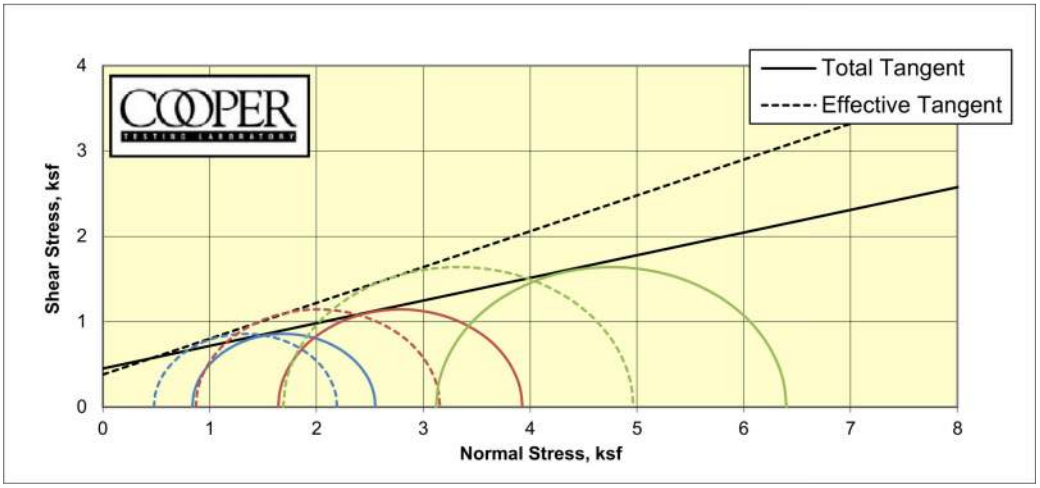
Figure Title: STAGED CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION WITH PORE PRESSURE ASTM D4767m

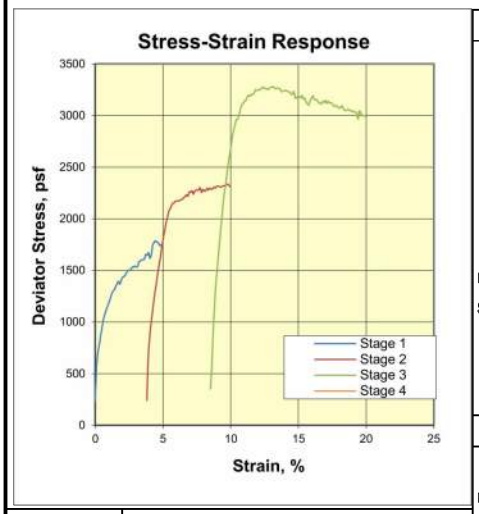
Project No. 750681701
Date 06/22/2023
Drawn By AG
Checked By HS

Figure B-1

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 10:07 User: agekas Style Table: Langan.stb Layout: Fig B-1

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m





CTL Number:	010-1172
Client Name:	Langan
Project Name:	6500 Pescadero Creek Road
Project Number:	750681701-700-001.0
Date:	5/24/2023 By: MD/DC
Total C	0.450 ksf
Total phi	14.9 degrees
Eff. C	0.380 ksf
Eff. Phi	22.8 degrees ©

Stage	1	2	3	4
Boring	B-2			
Sample	3			
Depth	11			
Visual Description	CLAY (CH), gray-brown with yellow-brown mottling			
MC (%)	41.9			
Dry Density (pcf)	78.2			
Saturation (%)	94.9			
Void Ratio	1.235			
Diameter (in)	2.41			
Height (in)	5.03			
	Final			
MC (%)	43.9	42.5	40.5	
Dry Density (pcf)	78.4	79.8	81.9	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	1.228	1.189	1.134	
Diameter (in)	2.41	2.43	2.46	
Height (in)	5.02	4.83	4.59	
Cell Pressure (psi)	54.6	60.1	71.2	
Back Pressure (psi)	48.8	48.7	49.5	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	1.714	2.287	3.278	
Excess PP (psi)	2.5	5.4	9.9	
Sigma 1 (ksf)	2.193	3.157	4.966	
Sigma 3 (ksf)	0.478	0.870	1.689	
P (ksf)	1.336	2.014	3.328	
Q (ksf)	0.857	1.143	1.639	
Stress Ratio	4.584	3.628	2.941	
Rate (in/min)	0.0005	0.0005	0.0005	

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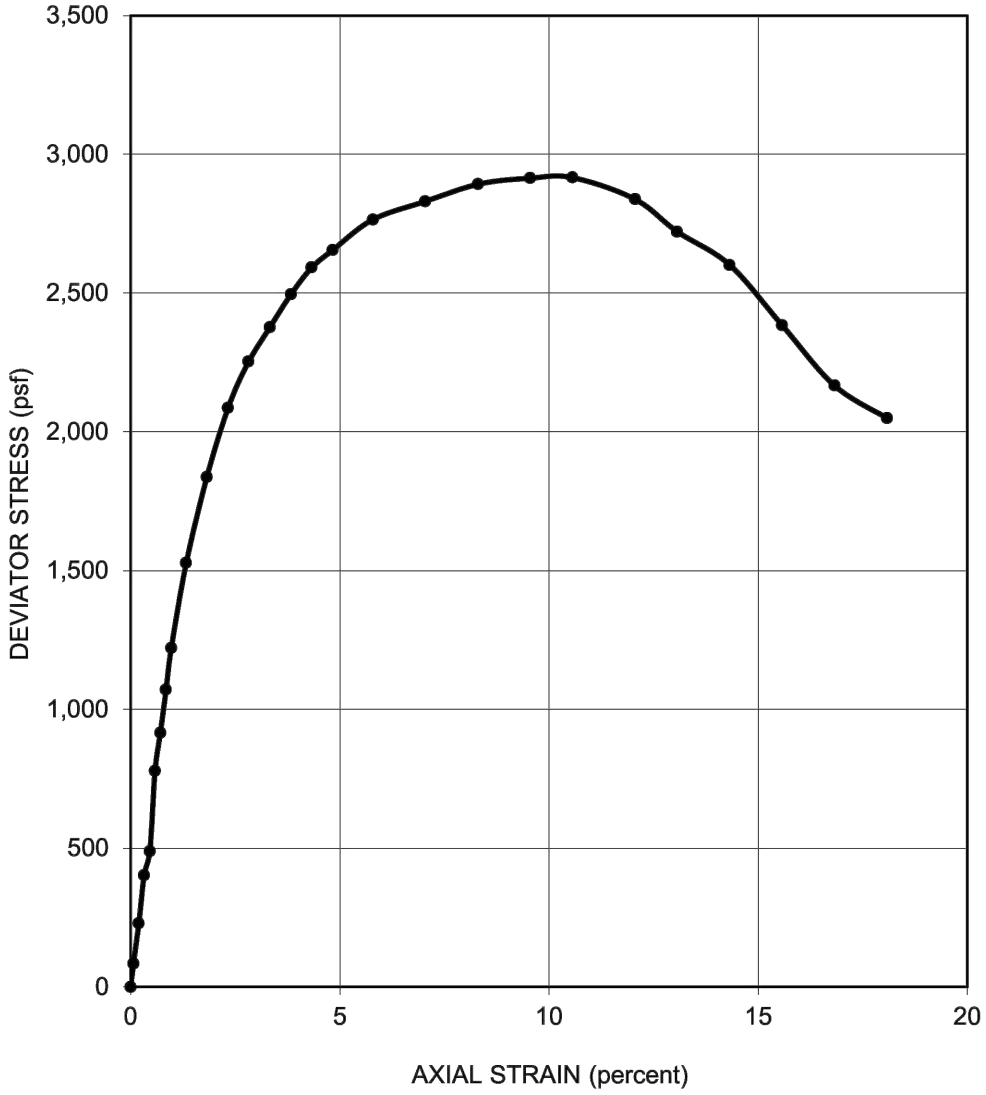
Project: 6500 PESCADERO CREEK ROAD
SAN MATEO COUNTY CALIFORNIA

Figure Title: STAGED CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION WITH PORE PRESSURE ASTM D4767m

Project No. 750681701
Date 06/22/2023
Drawn By AG
Checked By HS

Figure B-2

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 10:11 User: agekas Style Table: Langan.stb Layout: Fig B-2



SAMPLER TYPE: Sprague & Henwood			SHEAR STRENGTH:	1,460	psf
DIAMETER (in.): 2.38	HEIGHT (in.): 4.78		STRAIN AT FAILURE:	10.6	%
MOISTURE CONTENT:	34.6	%	CONFINING PRESSURE:	400	psf
DRY DENSITY:	85	pcf	STRAIN RATE:	1.00	% / min
DESCRIPTION: CLAY (CH), brown with gray-brown mottling			SOURCE: B-3 at 5 feet		

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Project
6500 PESCADERO CREEK ROAD
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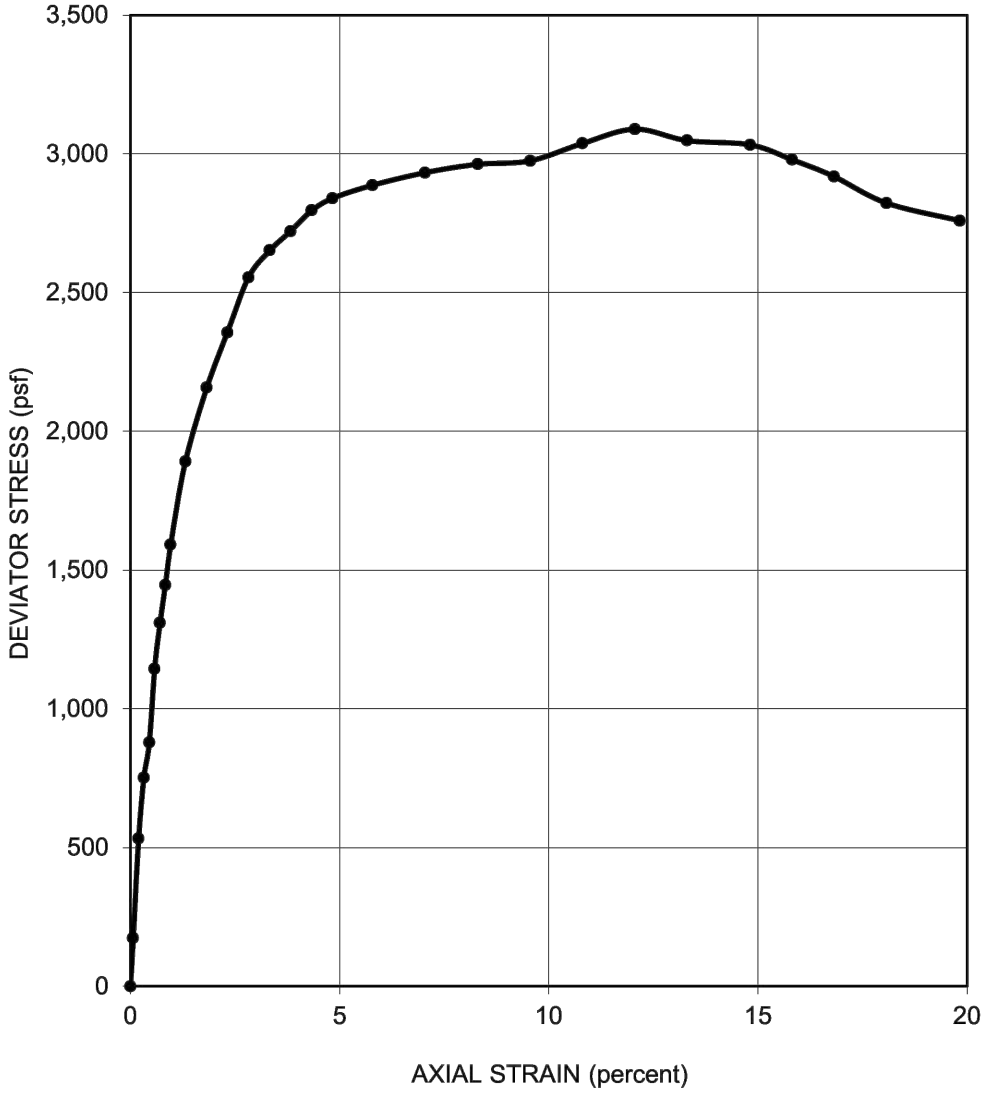
Figure Title
UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Project No. 750681701
Date 06/22/2023
Drawn By AG
Checked By HS

Figure
B-3

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 14:22 User: agekas Style Table: Langan.stb Layout: Fig B-3_TXUU



SAMPLER TYPE: Sprague & Henwood			SHEAR STRENGTH:	1,540	psf
DIAMETER (in.): 2.38	HEIGHT (in.): 5.51		STRAIN AT FAILURE:	12.1	%
MOISTURE CONTENT:	40.5	%	CONFINING PRESSURE:	1,100	psf
DRY DENSITY:	81	pcf	STRAIN RATE:	1.00	% / min
DESCRIPTION: CLAY (CH), gray-brown with yellow-brown and gray mottling			SOURCE: B-3 at 16 feet		

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Project: 6500 PESCADERO CREEK ROAD
SAN MATEO COUNTY CALIFORNIA

Figure Title: UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST

Project No. 750681701
Date 06/22/2023
Drawn By AG
Checked By HS

Figure B-4

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 10:24 User: agekas Style Table: Langan.stb Layout: Fig B-4_TXUU

COOPER TESTING LABORATORY

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	010-1172	**Boring:**	B-1	**Date:**	05/31/23
Client:	Langan	**Sample:**		**By:**	MD/PJ
Project:	750681701-700-001.0	**Depth, ft.:**	2	**Remolded:**	88% of 96.2pcf at 22% (Opt. +2%).

Visual Classification: SILT (ML), brown

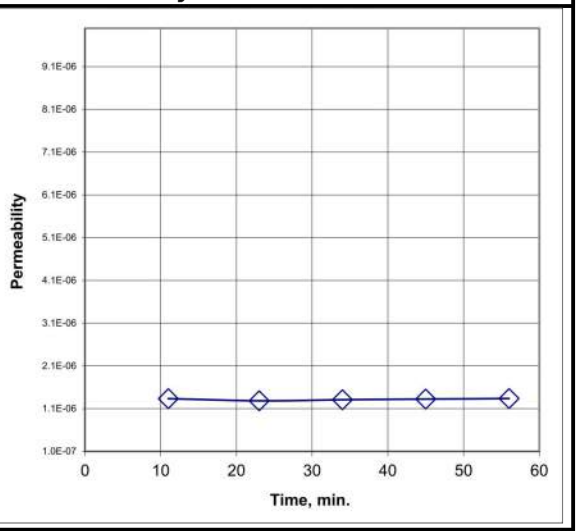
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
64	59.5	58.5	5

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 14

Date	Minutes	Head, (in)	K,cm/sec
5/30/2023	0.00	41.79	Start of Test
5/30/2023	11.00	41.39	1.3E-06
5/30/2023	23.00	40.99	1.3E-06
5/30/2023	34.00	40.59	1.3E-06
5/30/2023	45.00	40.19	1.3E-06
5/30/2023	56.00	39.79	1.3E-06



Average Hydraulic Conductivity: 1.E-06 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	3.00		2.97
Diameter, in	2.38		2.36
Area, in2	4.43		4.37
Volume in3	13.29		12.99
Total Volume, cc	217.8		212.9
Volume Solids, cc	107.4		107.4
Volume Voids, cc	110.4		105.5
Void Ratio	1.0		1.0
Total Porosity, %	50.7		49.6
Air-Filled Porosity (θa),%	21.3		1.9
Water-Filled Porosity (θw),%	29.4		47.7
Saturation, %	58.1		96.2
Specific Gravity	2.75	Assumed	2.75
Wet Weight, gm	359.4		396.8
Dry Weight, gm	295.3		295.3
Tare, gm	0.00		0.00
Moisture, %	21.7		34.4
Wet Bulk Density, pcf	103.0		116.3
Dry Bulk Density, pcf	84.6		86.6
Wet Bulk Dens.ρb, (g/cm^3)	1.65		1.86
Dry Bulk Dens.ρb, (g/cm^3)	1.36		1.39

Remarks:

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Project: 6500 PESCADERO CREEK ROAD
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Figure Title: HYDRAULIC CONDUCTIVITY ASTM D 5084

Project No. 750681701
Date 06/22/2023
Drawn By AG
Checked By HS

Figure B-5

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 10:38 User: agekas Style Table: Langan.stb Layout: Fig B-5 ASTM

COOPER TESTING LABORATORY

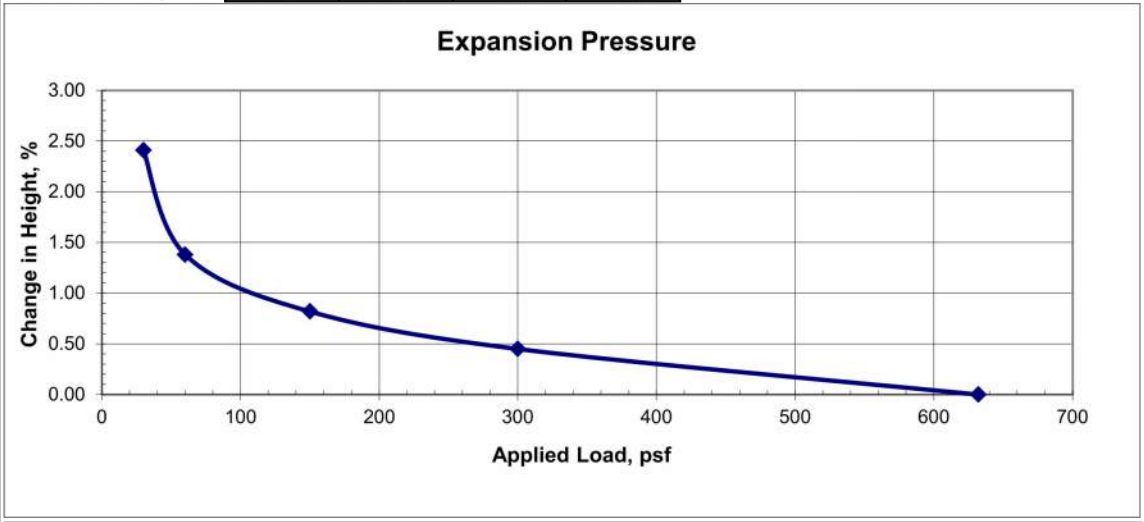
Shrink-Swell / Expansion Pressure
ASTM D 3877m

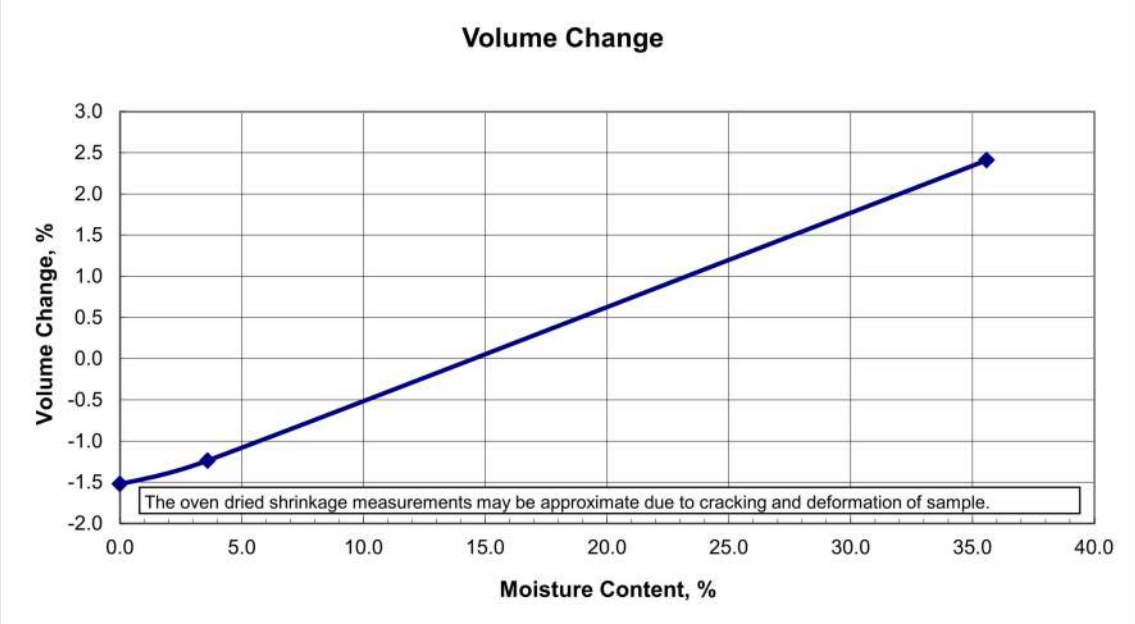
Job No.:	011-1172		**LL**	42	**Date:**	6/13/2023	
Client:	Langan		**PL**	28	**By:**	MD	
Project:	750681701-700-001.0		**PI**	14	**Checked By:**	DC	Assumed / Determined
Boring:	B-1	**Sample:**	**Depth,ft:**	2	**Specific Gravity:**	2.75	
Soil Desc.	SILT (ML), brown						

Load, psf:	632	300	150	60	30
Exp., %	0.00	0.45	0.82	1.38	2.41

	Field	**Saturated**	**Air-Dry**	**Oven-Dry**
Moisture %:	21.8	35.6	3.6	0.0
Dry Density, pcf	84.5	82.5	85.5	85.8
Saturation, %	58.0	90.3	9.8	0.0
Void Ratio	1.034	1.083	1.009	1.003
Volume Change, %	0.0	2.4	-1.2	-1.5

Remarks:
Remolded to 88% of 96.2pcf at 22% (Opt. +2%)





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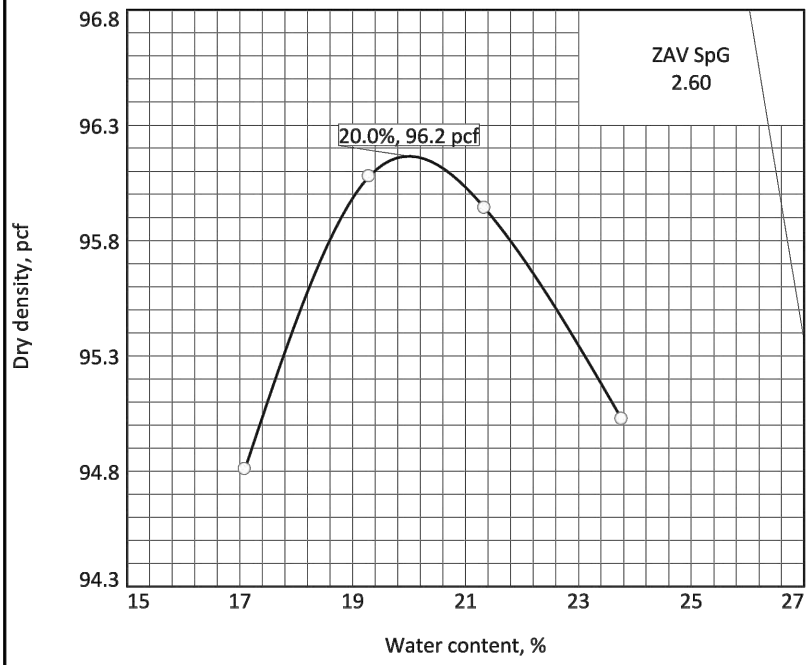
Project	Figure Title	Project No.	Figure
6500 PESCADERO CREEK ROAD SAN MATEO COUNTY CALIFORNIA	SHRINK-SWELL/ EXPANSION PRESSURE ASTM D 3877m	750681701 Date 06/22/2023 Drawn By AG Checked By HS	B-6

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 10:44 User: agekas Style Table: Langan.stb Layout: Fig B-6 Shrink-Swell

COMPACTION TEST REPORT



Curve No.

Test Specification:
ASTM D 1557-00 Method B Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: 0.03333 cu. ft.

Test Performed on Material Passing 3/8 in. **Sieve**

Soil Data

NM _____ **Sp.G.** 2.7
LL 42 **PI** 14
%>3/8 in. _____ **%<#200** _____
USCS _____ **AASHTO** _____

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.40	8.18	8.30	8.36		
WM	4.48	4.48	4.48	4.48		
WW + T #1	982.7	1175.9	1269.2	1079.2		
WD + T #1	850.4	1050.3	1116.2	941.4		
TARE #1	293.6	315.5	323.2	295.5		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	23.8	17.1	19.3	21.3		
DRY DENSITY	95.0	94.8	96.1	95.9		

TEST RESULTS

Maximum dry density = 96.2 pcf

Optimum moisture = 20.0 %

Material Description

Brown SILT w/ Sand & organics

Project No. 010-1172 **Client:** Langan
Project: 6500 Pescadero Creek Road - 750681701-700-001.0

○ **Source of Sample:** B-1 **Depth:** 2 feet

Remarks:

COOPER TESTING LABORATORY

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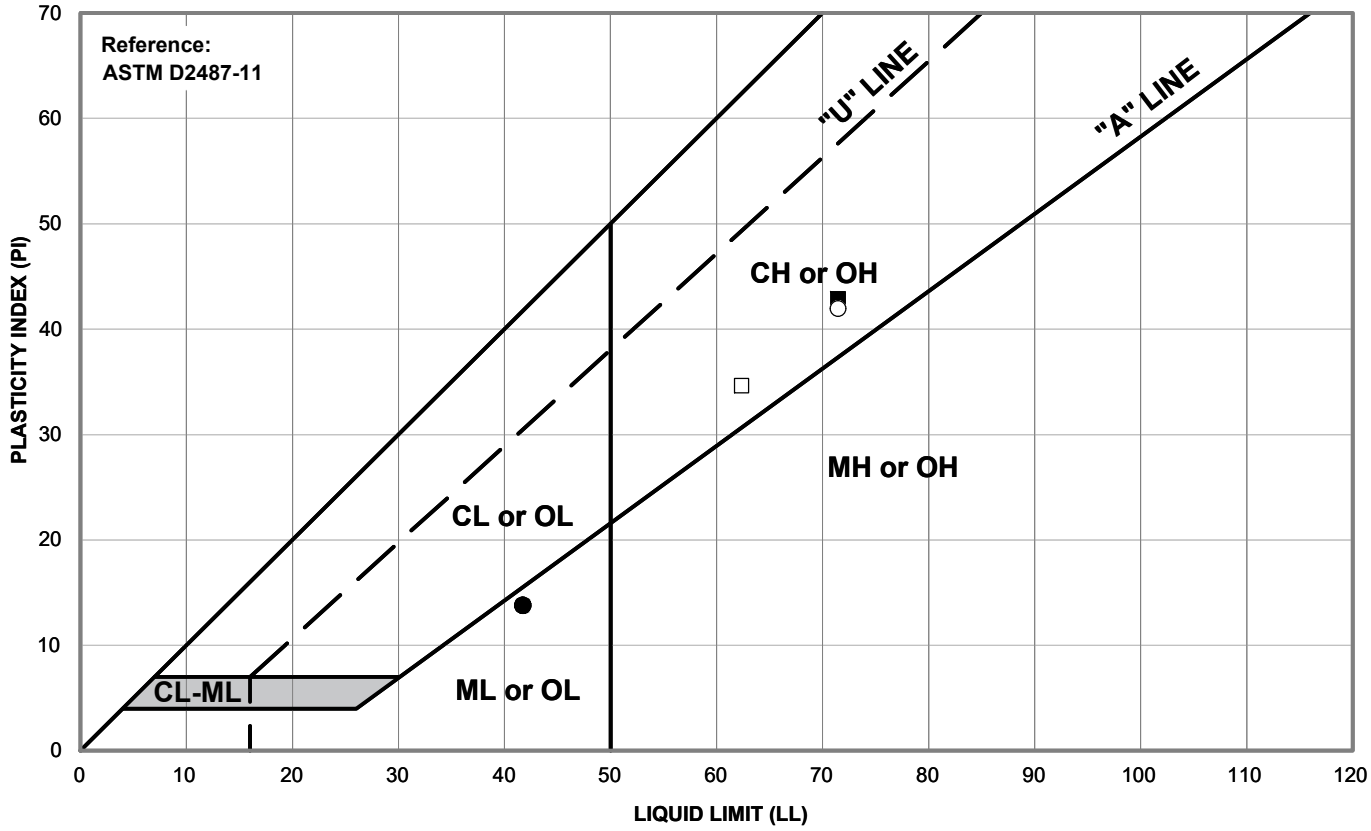
Project	Figure Title	Project No.	Figure
6500 PESCADERO CREEK ROAD SAN MATEO COUNTY CALIFORNIA	COMPACTION TEST REPORT ASTM D1557	750681701 Date 06/22/2023 Drawn By AG Checked By HS	B-7

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 14:17 User: agekas Style Table: Langan.stb Layout: Fig B-7 Proctor

PLASTICITY CHART



Symbol	Source	Description and Classification	Natural M.C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
●	B-1 at 2 feet	SILT (ML), dark brown	--	42	14	--
■	B-1 at 6 feet	CLAY (CH), gray-brown with orange mottling	--	72	43	--
□	B-1 at 16 feet	CLAY (CH), gray-brown with yellow-brown mottling	--	63	35	--
○	B-2 at 6 feet	CLAY (CH), dark brown	--	72	42	--

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Project: 6500 PESCADERO CREEK ROAD
SAN MATEO COUNTY CALIFORNIA

Figure Title: PLASTICITY CHART

Project No. 750681701
Date 06/22/2023
Drawn By AG
Checked By HS

Figure B-8

Filename: C:\bms\langan-pw-01\d0355566\FG01-750681701-B-GI0101.dwg Date: 6/23/2023 Time: 10:06 User: agekas Style Table: Langan.stb Layout: Fig B-8_PI

APPENDIX C

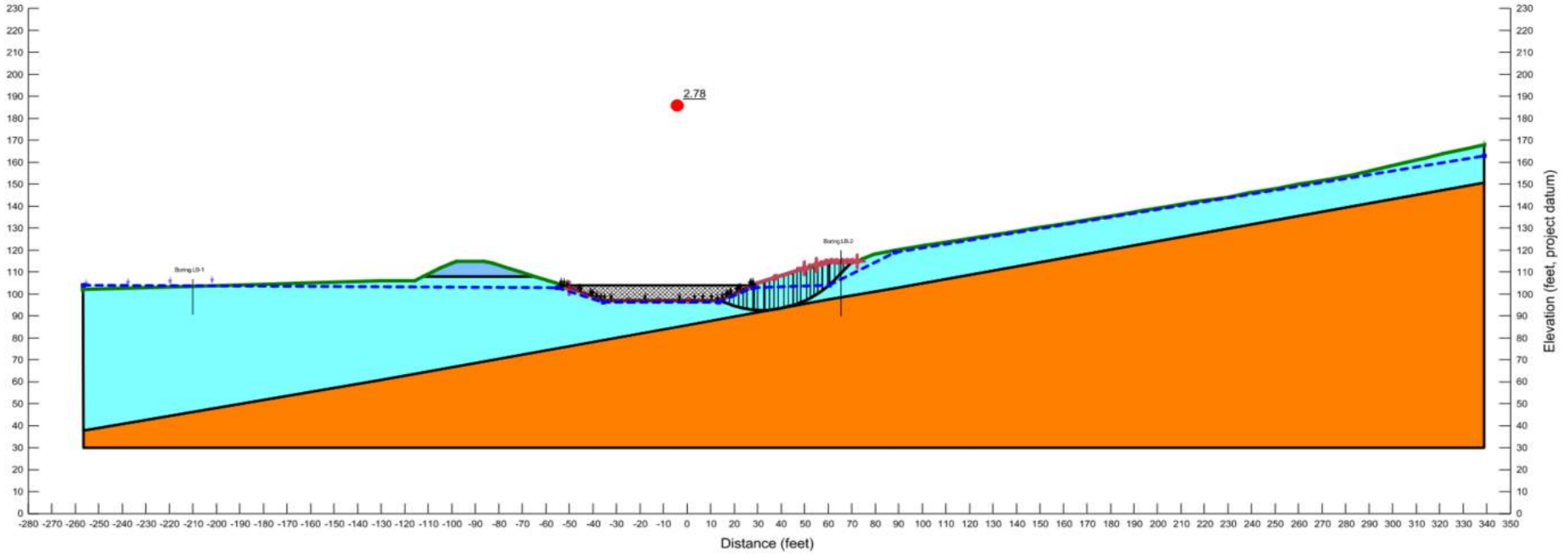
SLOPE STABILITY ANALYSES

Table C-1 - Slope Stability Analyses Summary

Section	Reservoir Condition	Failure Surface Location	Slip Direction	Loading Condition	Analysis Method	Drainage Condition	Search Method	FOS	Yield Acceleration (g)
1	Operating Low Water	Uphill	Right to Left	Pseudo	Lowe-Karafiath	Undrained	Approximate Surface from Comparable Static Undrained Analysis	n/a	0.77
1	Operating Low Water	Uphill - Localized	Right to Left	Static	Spencer	Drained	Entry Exit	2.78	n/a
1	Operating Low Water	Uphill - Large Surface	Right to Left	Static	Spencer	Drained	Entry Exit	2.32	n/a
1	Operating Low Water	Embankment - Upslope Face	Left to Right	Pseudo	Lowe-Karafiath	Undrained	Approximate Surface from Comparable Static Undrained Analysis	n/a	0.96
1	Operating Low Water	Embankment - Upslope Face	Left to Right	Static	Spencer	Drained	Entry Exit	3.01	n/a
1	Operating High Water	Embankment - Downslope Face	Right to Left	Pseudo	Lowe-Karafiath	Undrained	Approximate Surface from Comparable Static Undrained Analysis	n/a	1.45
1	Operating High Water	Embankment - Downslope Face	Right to Left	Static	Spencer	Drained	Entry Exit	3.83	n/a
1	Empty	Uphill - Localized	Right to Left	Static	Spencer	Drained	Entry Exit	2.43	n/a
1	Empty	Uphill - Large Surface	Right to Left	Static	Spencer	Drained	Entry Exit	2.30	n/a
1	Empty	Embankment - Upslope Face	Left to Right	Static	Spencer	Drained	Entry Exit	2.49	n/a
2	Operating Low Water	Uphill	Right to Left	Pseudo	Lowe-Karafiath	Undrained	Approximate Surface from Comparable Static Undrained Analysis	n/a	0.65
2	Operating Low Water	Uphill - Localized	Right to Left	Static	Spencer	Drained	Entry Exit	2.85	n/a
2	Operating Low Water	Uphill - Large Surface	Right to Left	Static	Spencer	Drained	Entry Exit	2.34	n/a
2	Operating Low Water	Embankment - Upslope Face	Left to Right	Pseudo	Lowe-Karafiath	Undrained	Approximate Surface from Comparable Static Undrained Analysis	n/a	1.21
2	Operating Low Water	Embankment - Upslope Face	Left to Right	Static	Spencer	Drained	Entry Exit	2.84	n/a
2	Operating High Water	Embankment - Downslope Face	Right to Left	Pseudo	Lowe-Karafiath	Undrained	Approximate Surface from Comparable Static Undrained Analysis	n/a	3.50
2	Operating High Water	Embankment - Downslope Face	Right to Left	Static	Spencer	Drained	Entry Exit	6.89	n/a
2	Empty	Uphill - Localized	Right to Left	Static	Spencer	Drained	Entry Exit	2.45	n/a
2	Empty	Uphill - Large Surface	Right to Left	Static	Spencer	Drained	Entry Exit	2.26	n/a
2	Empty	Embankment - Upslope Face	Left to Right	Static	Spencer	Drained	Entry Exit	2.45	n/a

Name: 750681701 - Figure C-1 - Section 1 - Uphill - Localized - Operating Low Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1



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Project	Figure Title	Project No.	Figure No.
6500 PESCADERO CREEK ROAD SAN MATEO COUNTY CALIFORNIA	**Slope Stability Analysis - Section 1 - Uphill - Localized - Operating Low Water Static - Drained Condition**	750681701 Date: July 2023 Scale: AS SHOWN Prepared By: HS	**C-1**

Name: 750681701 - Figure C-2 - Section 1 - Uphill - Large Surface - Operating Low Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

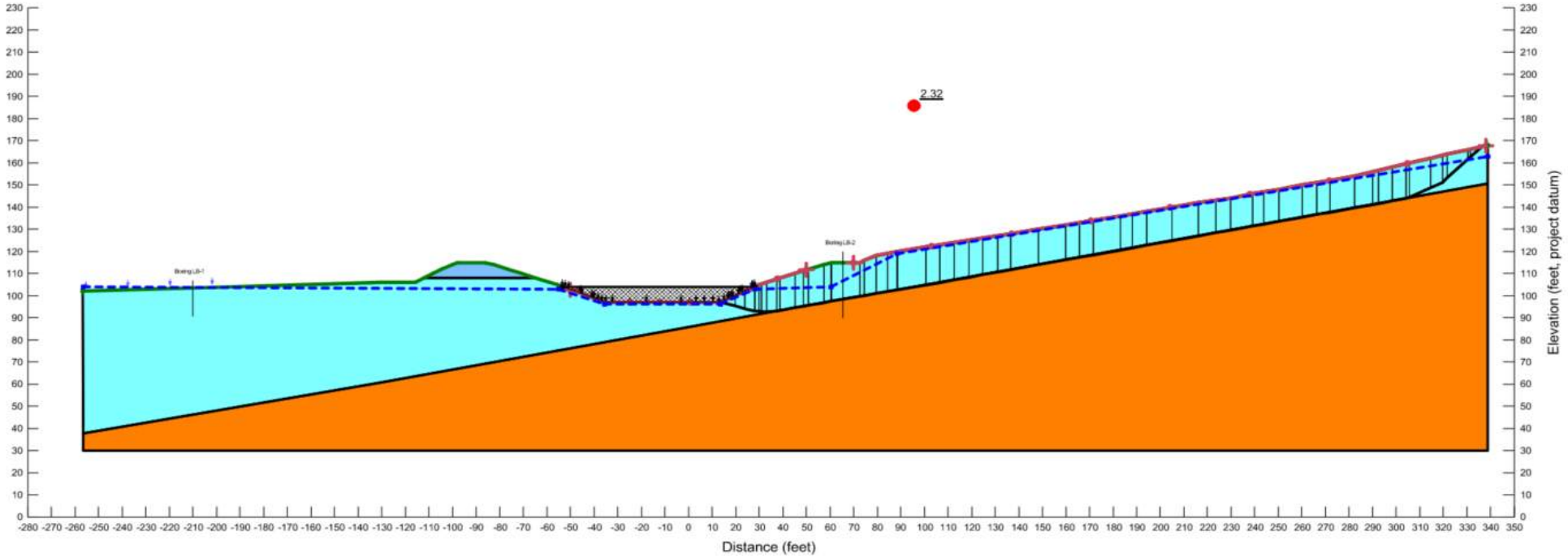

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Figure Title	**Slope Stability Analysis - Section 1 - Uphill - Large Surface - Operating Low Water - Static - Drained Condition**
Project No.	750681701
Date	July 2023
Scale	AS SHOWN
Prepared By:	HS
Figure No.	**C-2**

Name: 750681701 - Figure C-3 - Section 1 - Embankment - Operating Low Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Left to Right
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

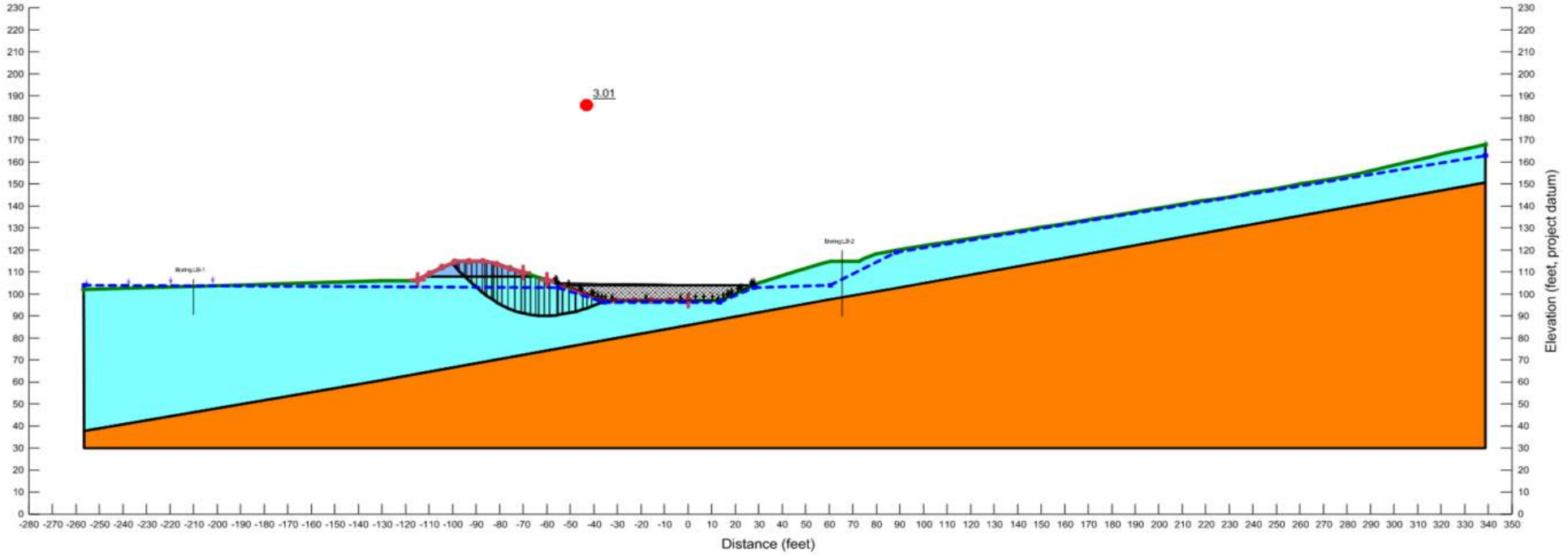

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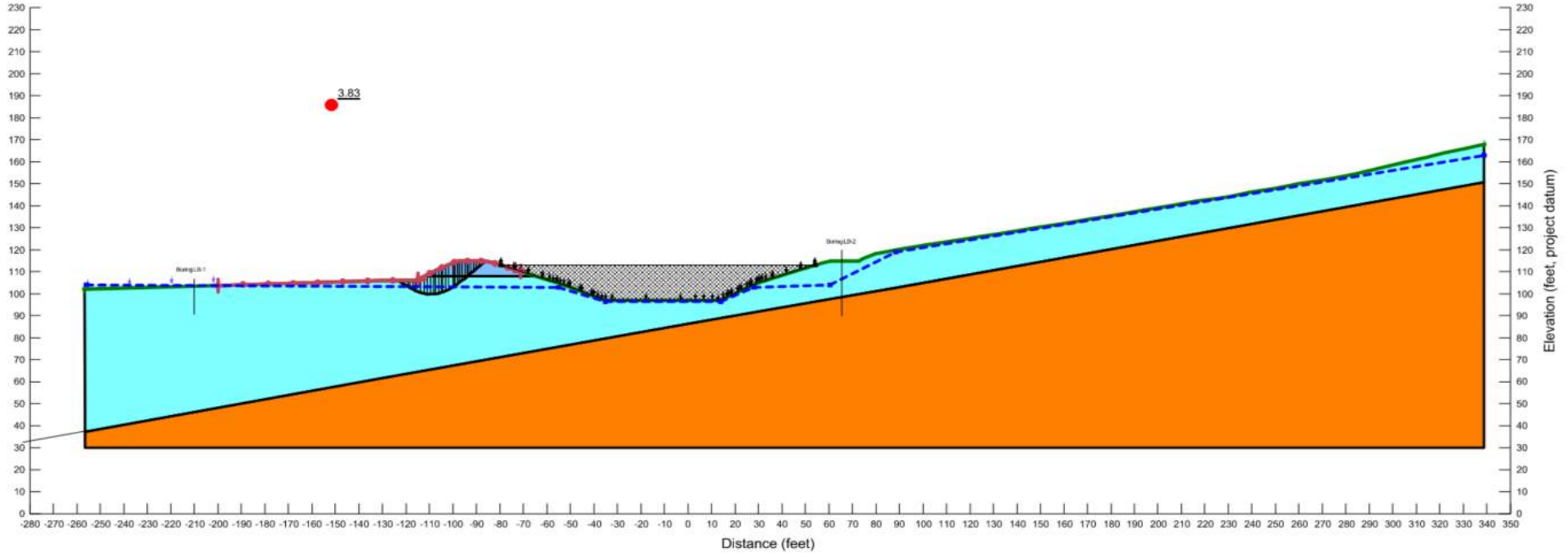
Figure Title	**Slope Stability Analysis - Section 1 - Embankment - Operating Low Water - Static - Drained Condition**
Project No.	750681701
Date	July 2023
Scale	AS SHOWN
Prepared By:	HS
Figure No.	**C-3**

Name: 750681701 - Figure C-4 - Section 1 - Embankment - Operating High Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1



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Project	Figure Title	Project No.	Figure No.
6500 PESCADERO CREEK ROAD SAN MATEO COUNTY CALIFORNIA	**Slope Stability Analysis - Section 1 - Embankment - Operating High Water - Static - Drained Condition**	750681701 Date: July 2023 Scale: AS SHOWN Prepared By: HS	**C-4**

Name: 750681701 - Figure C-5 - Section 1 - Uphill - Localized - Empty - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

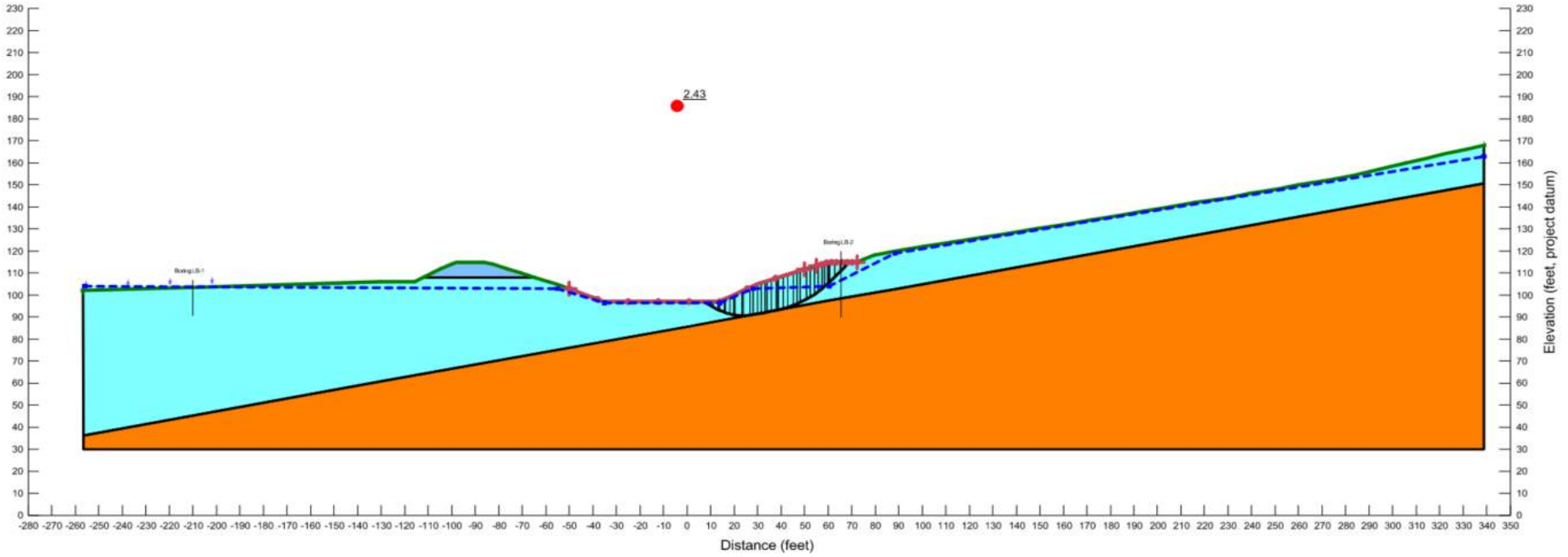

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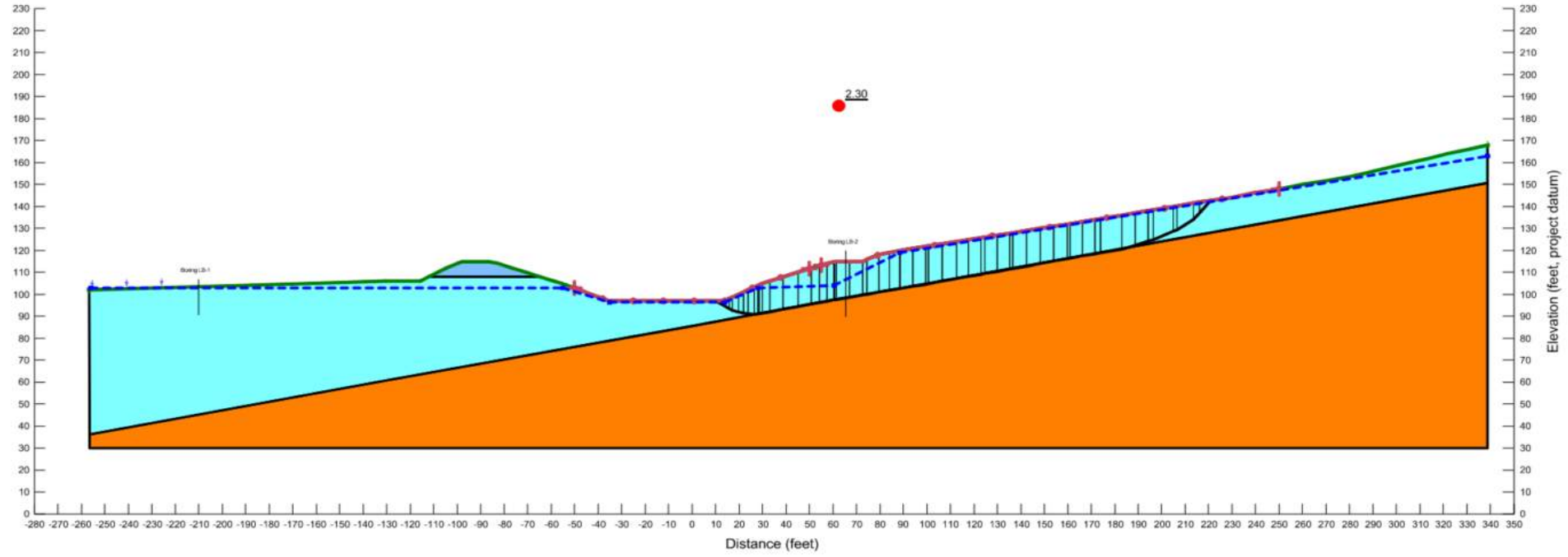
Figure Title	**Slope Stability Analysis - Section 1 - Uphill - Localized - Empty - Static - Drained Condition**
Project No.	750681701
Date	July 2023
Scale	AS SHOWN
Prepared By:	HS
Figure No.	**C-5**

Name: 750681701 - Figure C-6 - Section 1 - Uphill - Large Surface - Empty - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1



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6500 PESCADERO CREEK ROAD

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Figure Title

Slope Stability Analysis - Section 1 - Uphill - Large Surface - Empty - Static - Drained Condition

Project No. 750681701

Date July 2023

Scale AS SHOWN

Prepared By: HS

Figure No. **C-6**

Name: 750681701 - Figure C-7 - Section 1 - Embankment - Empty - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Left to Right

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

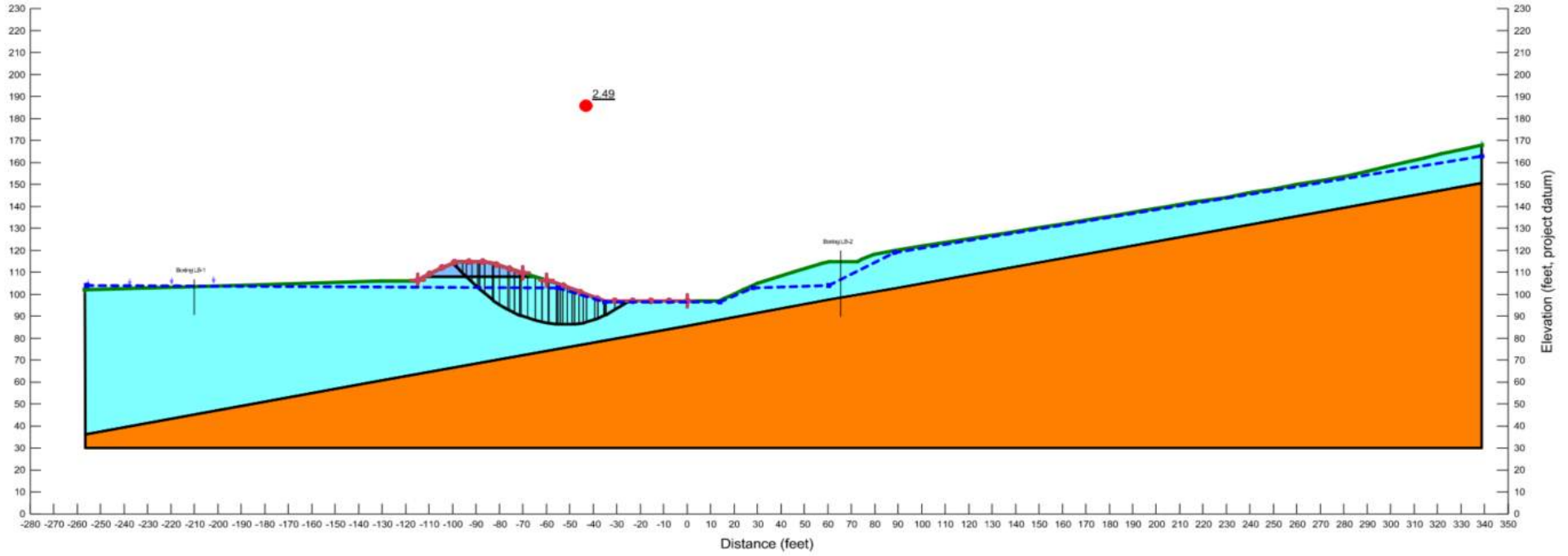

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Figure Title	**Slope Stability Analysis - Section 1 - Embankment - Empty - Static - Drained Condition**
Project No.	750681701
Date	July 2023
Scale	AS SHOWN
Prepared By:	HS
Figure No.	**C-7**

Name: 750681701 - Figure C-8 - Section 2 - Uphill - Localized - Operating Low Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

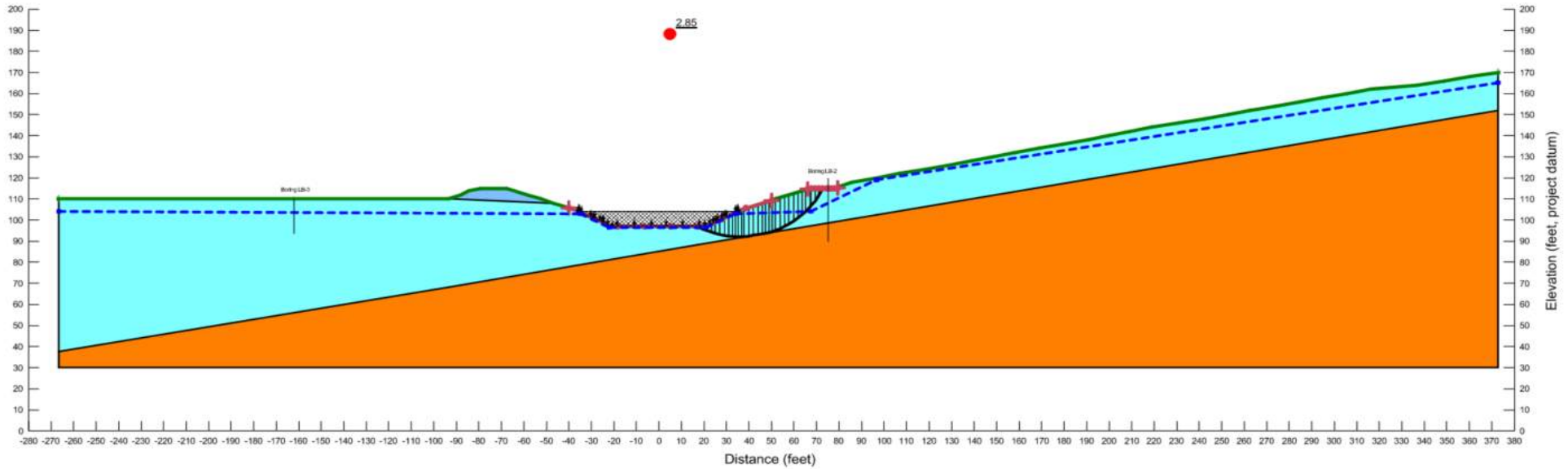

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Figure Title	**Slope Stability Analysis - Section 2 - Uphill - Localized - Operating Low Water - Static - Drained Condition**
Project No.	750681701
Date	July 2023
Scale	AS SHOWN
Prepared By:	HS
Figure No.	**C-8**

Name: 750681701 - Figure C-9 - Section 2 - Uphill - Large Surface - Operating Low Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

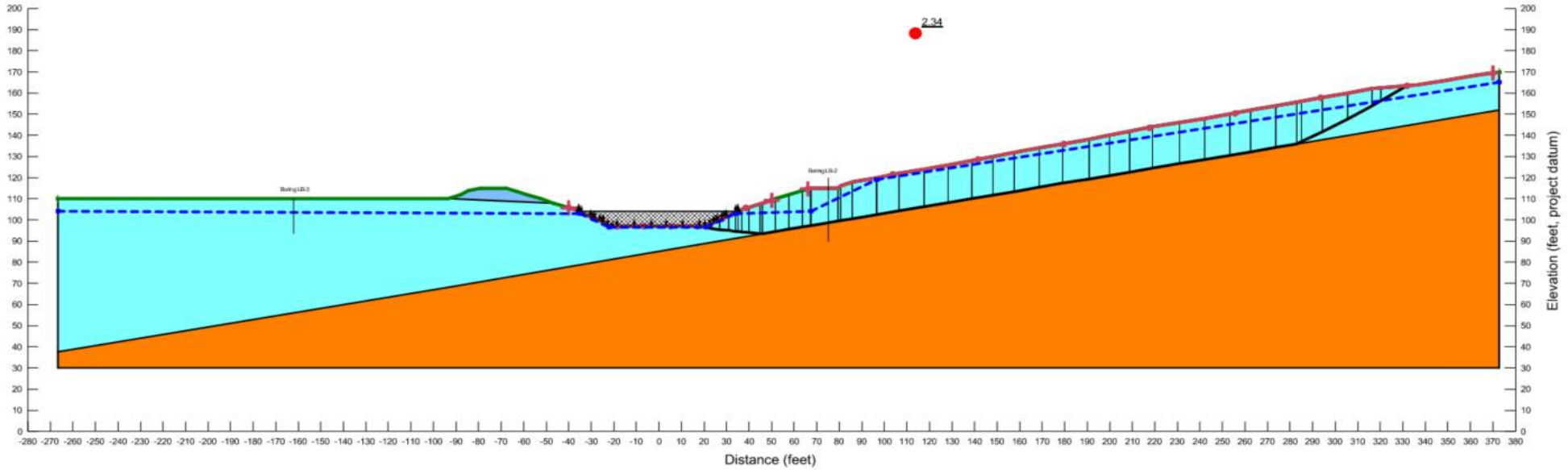

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Figure Title

Slope Stability Analysis - Section 2 - Uphill - Large Surface - Operating Low Water - Static - Drained Condition

Project No. 750681701

Date July 2023

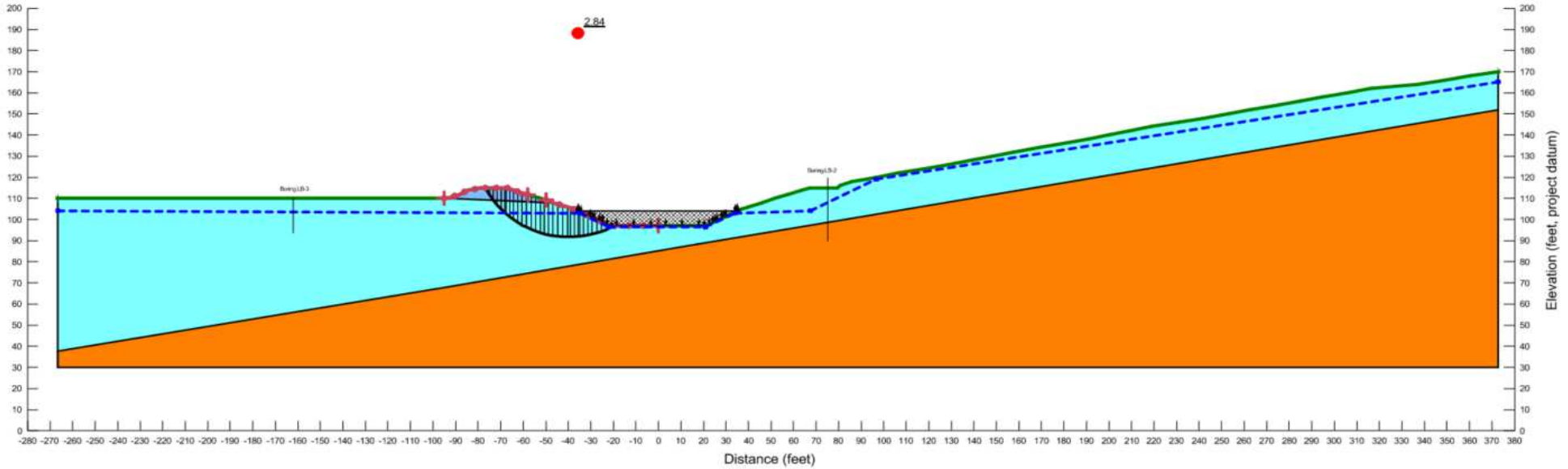
Scale AS SHOWN

Prepared By: HS

Figure No. **C-9**

Name: 750681701 - Figure C-10 - Section 2 - Embankment - Operating Low Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Left to Right
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1



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Project	Figure Title	Project No.	Figure No.
6500 PESCADERO CREEK ROAD SAN MATEO COUNTY CALIFORNIA	**Slope Stability Analysis - Section 2 - Embankment - Operating Low Water - Static - Drained Condition**	750681701 Date: July 2023 Scale: AS SHOWN Prepared By: HS	**C-10**

Name: 750681701 - Figure C-11 - Section 2 - Embankment - Operating High Water - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left
Surcharge (Unit Weight): 62.4 pcf

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

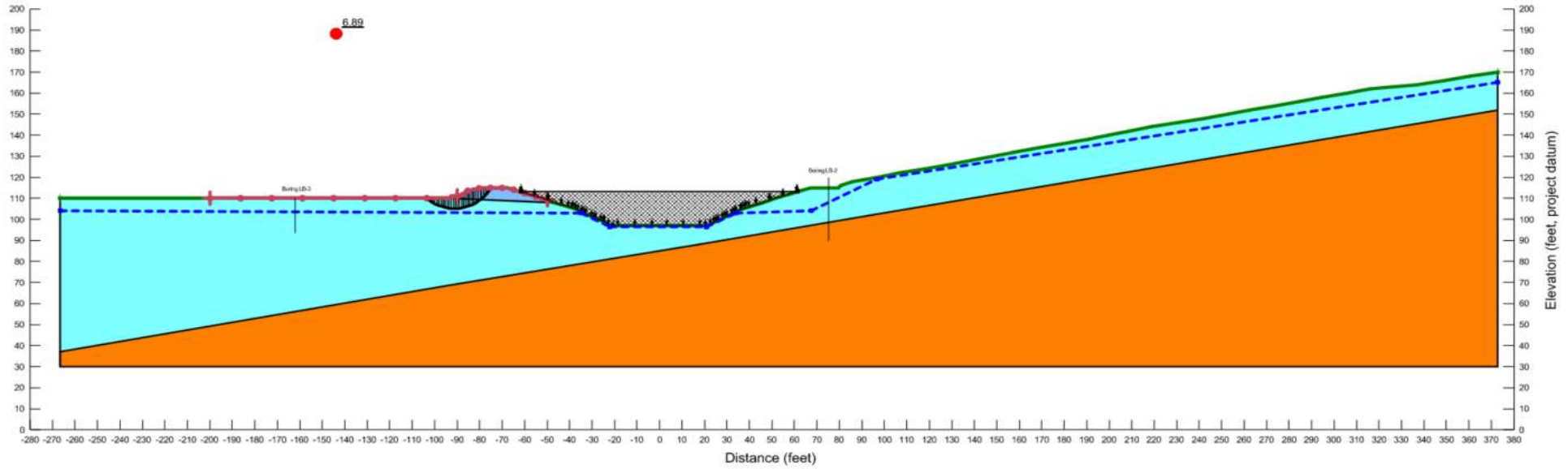

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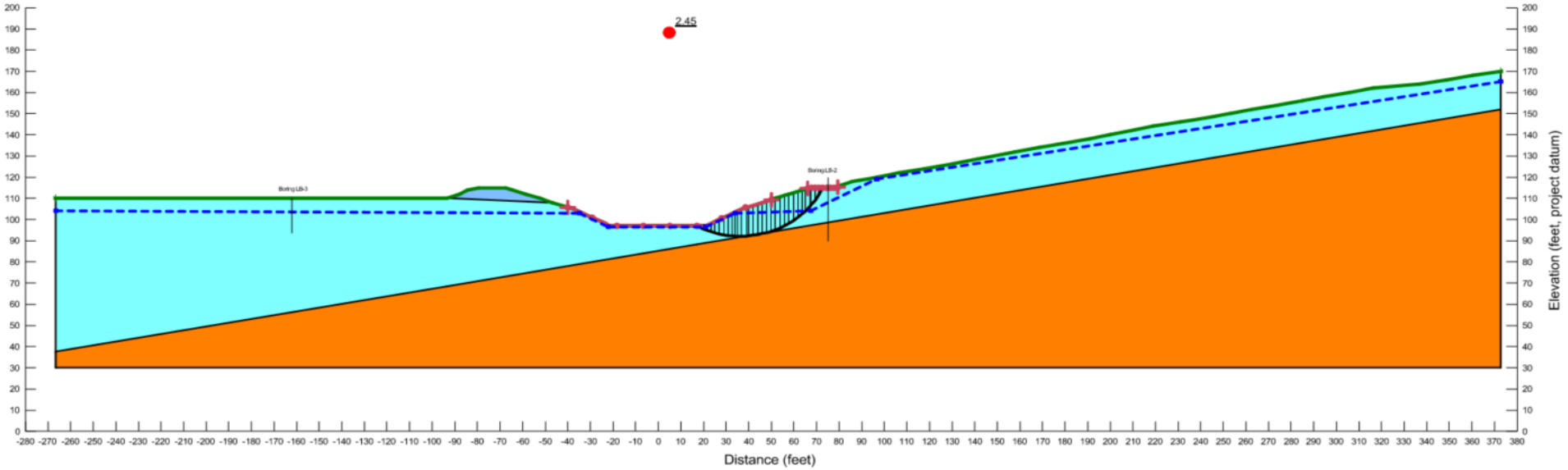
Figure Title	**Slope Stability Analysis - Section 2 - Embankment - Operating High Water - Static - Drained Condition**
Project No.	750681701
Date	July 2023
Scale	AS SHOWN
Prepared By:	HS
Figure No.	**C-11**

Name: 750681701 - Figure C-12 - Section 2 - Uphill - Localized - Empty - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1



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SAN MATEO COUNTY CALIFORNIA

Figure Title

Slope Stability Analysis - Section 2 - Uphill - Localized - Empty - Static - Drained Condition

Project No. 750681701

Date July 2023

Scale AS SHOWN

Prepared By: HS

Figure No. **C-12**

Name: 750681701 - Figure C-13 - Section 2 - Uphill - Large Surface - Empty - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Right to Left

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1

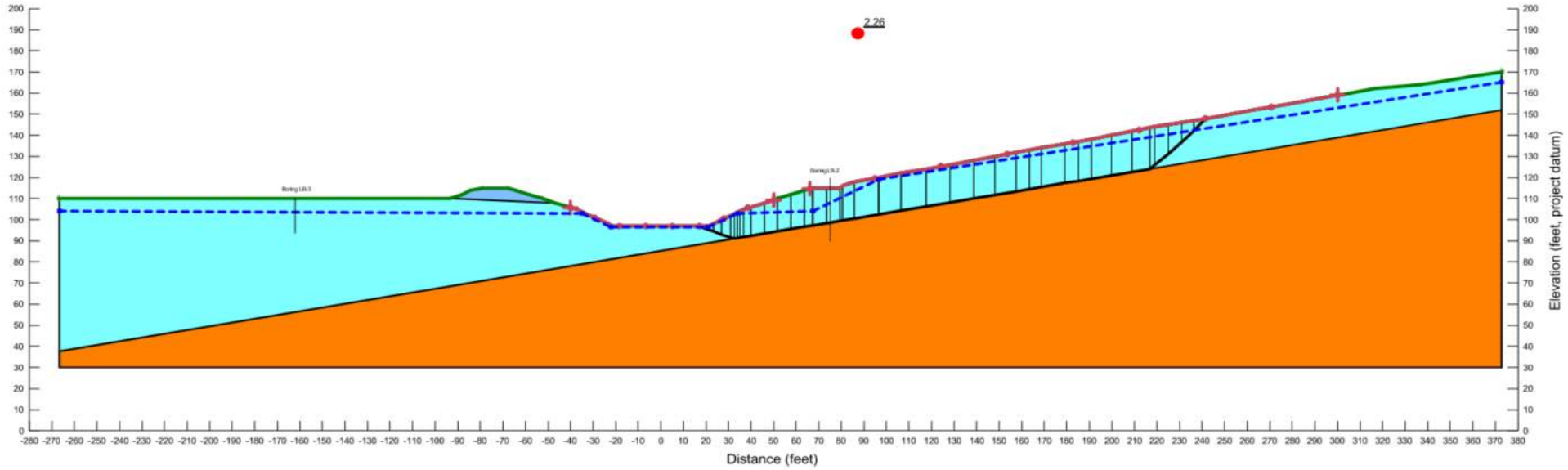

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Figure Title

Slope Stability Analysis - Section 2 - Uphill - Large Surface - Empty - Static - Drained Condition

Project No.
750681701

Date
July 2023

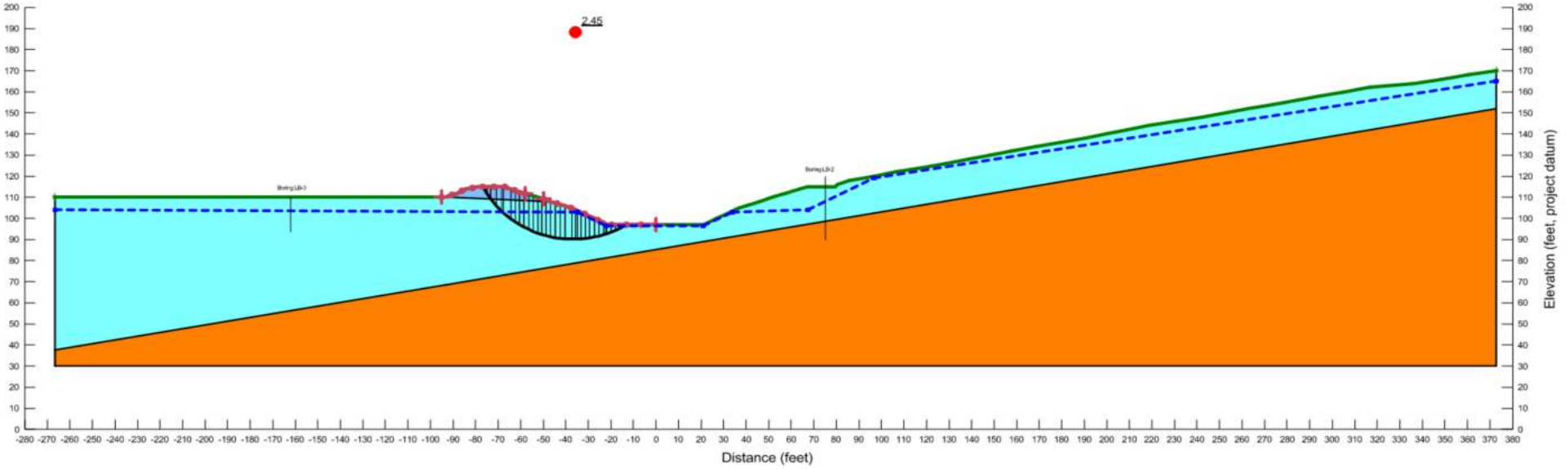
Scale
AS SHOWN

Prepared By:
HS

Figure No.
C-13

Name: 750681701 - Figure C-14 - Section 2 - Embankment - Empty - Static - Drained Condition
Method: Spencer
Slip Surface Option: Entry and Exit
Direction of movement: Left to Right

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Phi-B (°)	Piezometric Line
	Berm Fill - drained	Mohr-Coulomb	115	380	23	0	1
	Claystone	Bedrock (Impenetrable)					1
	Upper Clay - drained	Mohr-Coulomb	115	380	23	0	1



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Project	Figure Title	Project No.	Figure No.
6500 PESCADERO CREEK ROAD SAN MATEO COUNTY CALIFORNIA	**Slope Stability Analysis - Section 2 - Embankment - Empty - Static - Drained Condition**	750681701 Date: July 2023 Scale: AS SHOWN Prepared By: HS	**C-14**

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