CITY OF MORGAN HILL

PLANNING DIVISION

17575 Peak Avenue Morgan Hill CA 95037 (408) 778-6480 Fax (408) 779-7236
Website Address: www.morgan-hill.ca.gov

MITIGATED NEGATIVE DECLARATION

I. DESCRIPTION OF PROJECT:

Date: March 14, 2024

APNs: 729-09-001 and 728-1-003

Project Title: East Dunne Hillside Water Reservoir Project

Project Location: 3000 East Dunne Avenue, 220 feet northeast of Flaming Oak Lane Intersection
2375 East Dunne Avenue
Morgan Hill, CA 95037

Project Proponent: City of Morgan Hill Public Works Department
17575 Peak Avenue
Morgan Hill, CA 95037

Project Description: The proposed project consists of the construction of an 850,000-gallon above-ground welded steel water supply reservoir and a future pump station, as well as a 15-foot-wide perimeter access strip encircling the water reservoir, an underground biofiltration vault with rock-armored outfall, and landscaping to filter views of the reservoir. In addition, the project would include the replacement of two existing pumps currently in use at the East Dunne Booster Station at 2375 East Dunne Avenue with larger electric pumps.

II. DETERMINATION

In accordance with the City of Morgan Hill procedures for compliance with the California Environmental Quality Act (CEQA), the City has completed an Initial Study to determine whether the proposed project may have a significant adverse effect on the environment. On the basis of that study, the City makes the following determination:

- Although the project, as proposed, could have had a significant effect on the environment, there will not be a significant effect in this case because mitigation measures will be included in the project, and, therefore, this **MITIGATED NEGATIVE DECLARATION** has been prepared.

III. MITIGATION AND AVOIDANCE MEASURES

A. Biological Resources

MM-BIO-1: ***Special-Status and Migratory Bird Species***

The following avoidance measures shall be required to avoid the project's potential effects on Swainson's hawk, grasshopper sparrow, golden eagle, white- tailed kite, or any other special-status or migratory bird species.

a. *If land clearing and grading are to be conducted outside of the breeding season (i.e., September 1 through January 31), a preconstruction survey for nesting migratory birds is not warranted.*
b. *If land clearing and grading are to be conducted during the breeding season (i.e., February 1 through August 31), a preconstruction nesting bird survey shall be conducted. The survey shall be performed by a qualified biologist no more than seven days prior to the initiation of work. If no nesting or breeding activity is observed, work may proceed without restrictions. To the extent allowed by access, all active nests identified within 76 m (250 ft) for raptors and 15 m (50 ft) for passerines shall be mapped.*
c. *For any active nests found near the construction limits (76 m [250 ft] for raptors and 15 m [50 ft] for passerines) the Project Biologist shall make a determination as to whether or not construction activities are likely to disrupt reproductive behavior. If it is determined that construction is unlikely to disrupt breeding behavior, construction may proceed. If it is determined that construction may disrupt breeding, the no-construction buffer zone shall be expanded; avoidance is the only mitigation available. The ultimate size of the no-construction buffer zone may be adjusted by the Project Biologist based on the species involved, topography, lines of site between the work area and the nest, physical barriers, and the ambient level of human activity.*
d. *If it is determined that construction activities are likely to disrupt raptor breeding, construction activities within the no-construction buffer zone may not proceed until the project biologist determines that the nest is long longer occupied.*
e. *If maintenance of a no-construction buffer zone is not feasible, the Project Biologist shall monitor the nest(s) to document breeding and rearing behavior of the adult birds. If it is determined that construction-related activities are likely to cause nest abandonment, work shall cease immediately and the CDFW shall be contacted for guidance. Work may not resume until an agreement has been reached with the authorities specifying the conditions under which work may proceed.*

B. Geology and Soils

MM-GEO-1: ***Erosion and Landslide Hazards***

Prior to grading permit issuance, the applicant shall submit a final design-level geotechnical report of the project site that provides final design recommendations for tank foundation and surface drainage controls to ensure slope stability hazards are minimized. The geotechnical report shall be reviewed and approved by the City Engineer, Chief Building Official, and a qualified Geotechnical Engineer to ensure that all geotechnical recommendations specified in the geotechnical report are properly incorporated and utilized in the project design in order to adhere to all geotechnical requirements contained in the California Building Code.

III. FINDING

The City of Morgan Hill hereby finds that the proposed project could have a significant effect on the environment; however, there would not be a significant effect in this case because mitigation measures summarized above and described in the initial study will reduce the impacts to a less-than-significant level.

David Gittleson, Associate Engineer

Date

DRAFT
INITIAL STUDY

CITY OF MORGAN HILL
EAST DUNNE HILLSIDE
WATER RESERVOIR PROJECT
MORGAN HILL, CALIFORNIA

PREPARED FOR
CITY OF MORGAN HILL
PUBLIC WORKS DEPARTMENT
17575 PEAK AVENUE
MORGAN HILL, CA 95037

MARCH 2024

PREPARED BY

RANEY PLANNING & MANAGEMENT, INC. 25 years

1501 Sports Drive, Suite A, Sacramento, CA 95834

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CITY OF MORGAN HILL
COMMUNITY DEVELOPMENT DEPARTMENT
ENVIRONMENTAL CHECKLIST FORM

PROJECT INFORMATION

PROJECT TITLE:
East Dunne Hillside Water Reservoir

PROJECT LOCATION:
3000 East Dunne Avenue (water reservoir site), 220 feet northeast of Flaming Oak Lane Intersection;
2375 East Dunne Avenue (pump station site)

LEAD AGENCY NAME AND ADDRESS:
City of Morgan Hill
Public Works
Department 17575 Peak Avenue Morgan Hill,
CA 95037

CONTACT PERSON AND PHONE NUMBER:
David Gittleson, P.E.
Engineering & Utilities, 408/310-4642
(email: david.gittleson@morganhill.ca.gov)

PROPERTY OWNER:
City of Morgan Hill
17575 Peak Avenue
Morgan Hill, CA 95037

PROJECT SPONSOR:
City of Morgan Hill
17575 Peak Avenue
Morgan Hill, CA 95037

GENERAL PLAN DESIGNATION:
Open Space

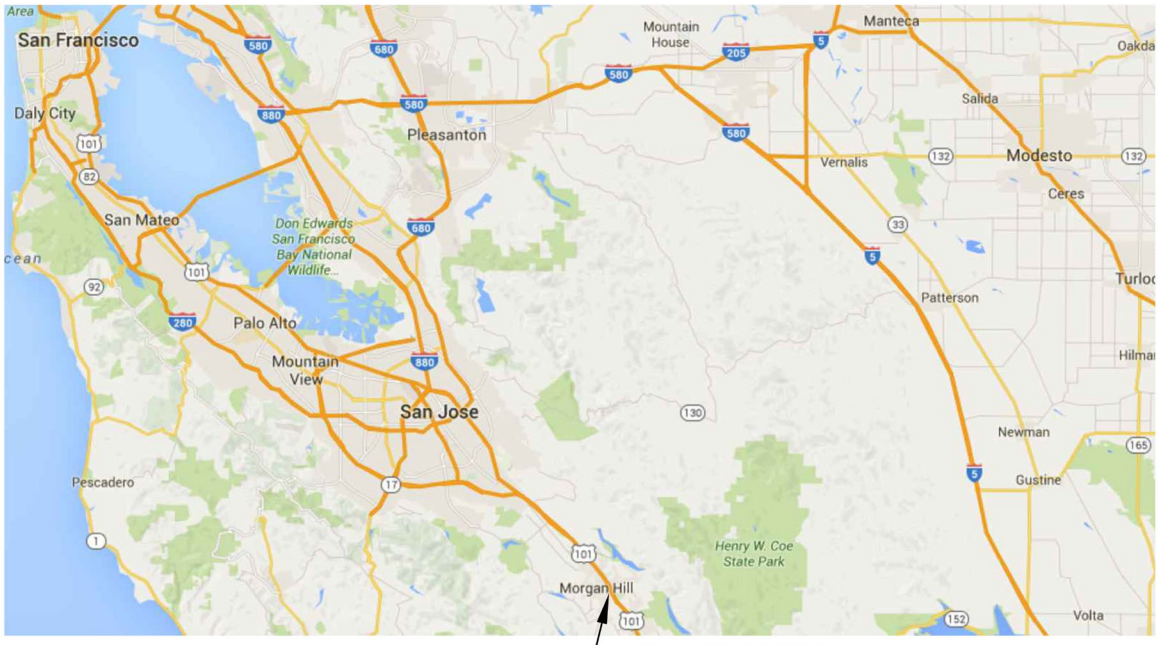
ZONING:
Open Space

PROJECT DESCRIPTION

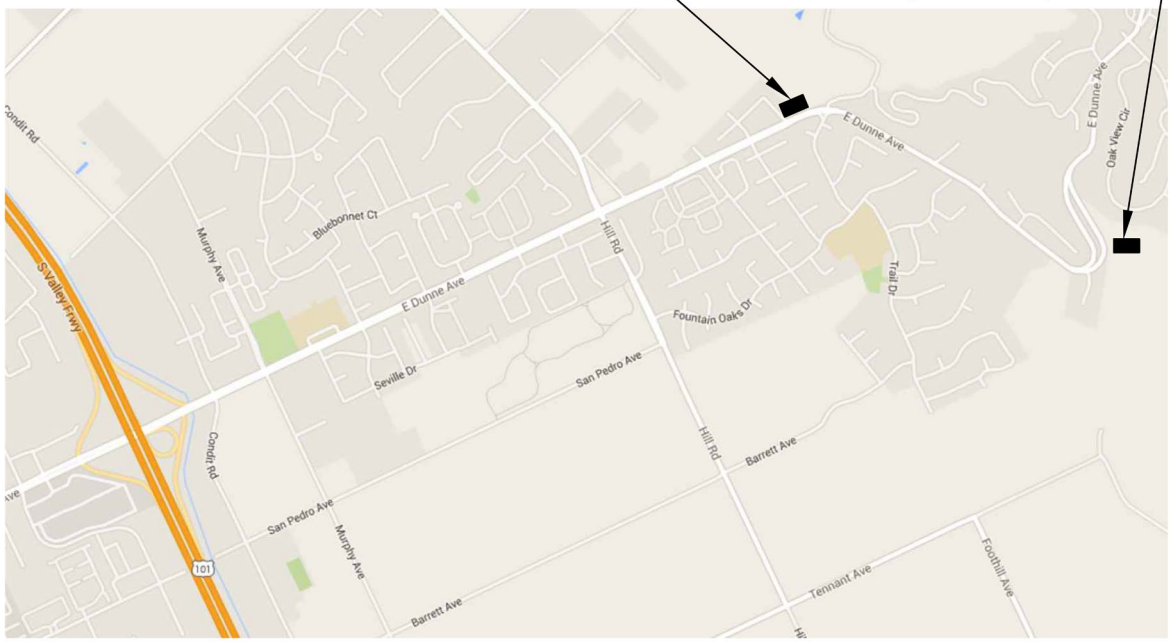
Existing Setting. The project site consists of a water reservoir site and pump station site, both of which are located on East Dunne Avenue in the City of Morgan Hill, California. The 4.36-acre water reservoir site is located at 3000 East Dunne Avenue and is approximately 220 feet northeast of the intersection of East Dunne Avenue and Flaming Oak Lane, in the eastern hillsides of Morgan Hill; the 0.2-acre pump station site is located at 2375 East Dunne Avenue in the eastern hillsides of Morgan Hill. **Figure 1** shows the location of the project site. The proposed water reservoir site consists of one parcel (Assessor's Parcel Number [APN] 729-09-001) that has been historically used as open space and the approximately 0.2-acre pump station site consists of one parcel (APN 728-1-003) that is developed with an existing pump station.

The proposed water reservoir site is currently an undeveloped, generally open, grass-covered hill slope with scattered oak trees. The hilly terrain encompassing the site is located on the western flank of the Diablo Range, one of the component ranges of the Coast Ranges geomorphic province of California. The slopes of the reservoir site descend westward to the floor of Coyote Valley, within which the City of Morgan Hill is centered.

FIGURE 1
PROJECT LOCATION



VICINITY MAP
NO SCALE



LOCATION MAP
NO SCALE

The reservoir site is located on a southwest-facing slope with overall gradients ranging from approximately 16 to 19 degrees in the upper portion of the site and reservoir vicinity, to 22 - 28 degrees in the lowermost portion of the site, downslope and southeast of the proposed access road. An unnamed drainage course defined by the topographic swale drops from northeast to southwest, passing downslope of the reservoir and access road. Slope gradients within approximately 150 feet of this swale are steeper than the overall slopes farther uphill. Elevations across the property range from approximately 675 feet above mean sea level (AMSL) in the unnamed topographic swale near the downslope property boundary, to approximately 870 feet AMSL near the existing residences upslope of the upper property boundary. The water reservoir pad would be constructed at an elevation of 780 feet AMSL.

The project site is designated Open Space on the Morgan Hill 2035 General Plan Land Use Map. Zoning for the project site is also Open Space. **Figure 2** indicates the General Plan land use designation for the project site, and **Figure 3** shows the zoning for the site and vicinity.

Regional access to the project site is available from U.S. 101, located approximately 2.2 miles west of the project site, and its East Dunne Avenue interchange. East Dunne Avenue adjoins the project site and provides local access to the property.

Water Reservoir Development at 3000 East Dunne Avenue

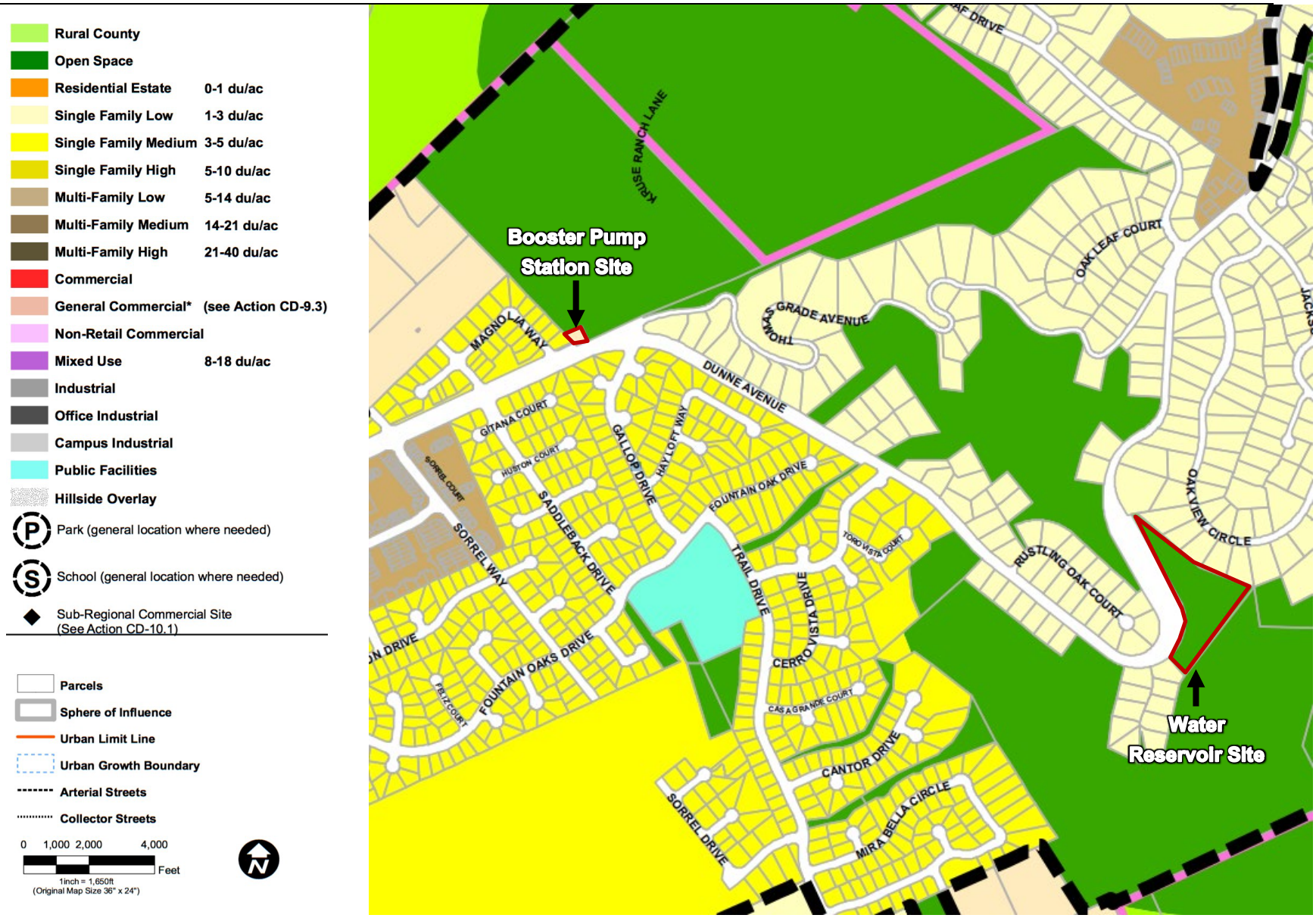
Phase 1- The City is proposing the following water system improvements on the 4.36-acre project site:

- an approximately 850,000-gallon steel water supply reservoir approximately 80 feet in diameter;
- a 15-foot-wide perimeter access strip immediately encircling the reservoir;
- tiered retaining walls along the northern side of approximately half of the reservoir pad;
- a reservoir access road stemming northeastward from the northeast-bound lane of East Dunne Avenue;
- retaining walls along portions of the access road;
- connective water piping between the reservoir/future pump station and East Dunne Avenue;
- installation of an underground biofiltration vault with rock-armored outfall, inclusive of energy dissipation headwall and rip rap apron on the south side of the access road, near its intersection with East Dunne Avenue; and
- landscaping to screen and filter views of the water reservoir.

Phase 2- A future pump station and slab-on-grade pad along the downslope side of the reservoir pad plus piping to the Holiday Lakes Reservoirs. The proposed access driveway would be gated and used for maintenance and operation of the water reservoir facility. There would be no public access available for vehicles.

The East Dunne Avenue Water Reservoir project would construct an 850,000-gallon above-ground welded steel water supply reservoir. Several potential locations were evaluated for siting the proposed reservoir and the proposed location adjoining East Dunne Avenue was considered the best fit for the criteria under consideration by the City. These criteria included the use of City-owned land, meeting the critical hydraulic elevation of 780 feet AMSL, location in the necessary piping alignment to improve water flows to the existing Holiday Lake Estates distribution system, minimize grading while accounting for area of landscape tree planting, and to provide for the required site maintenance access.

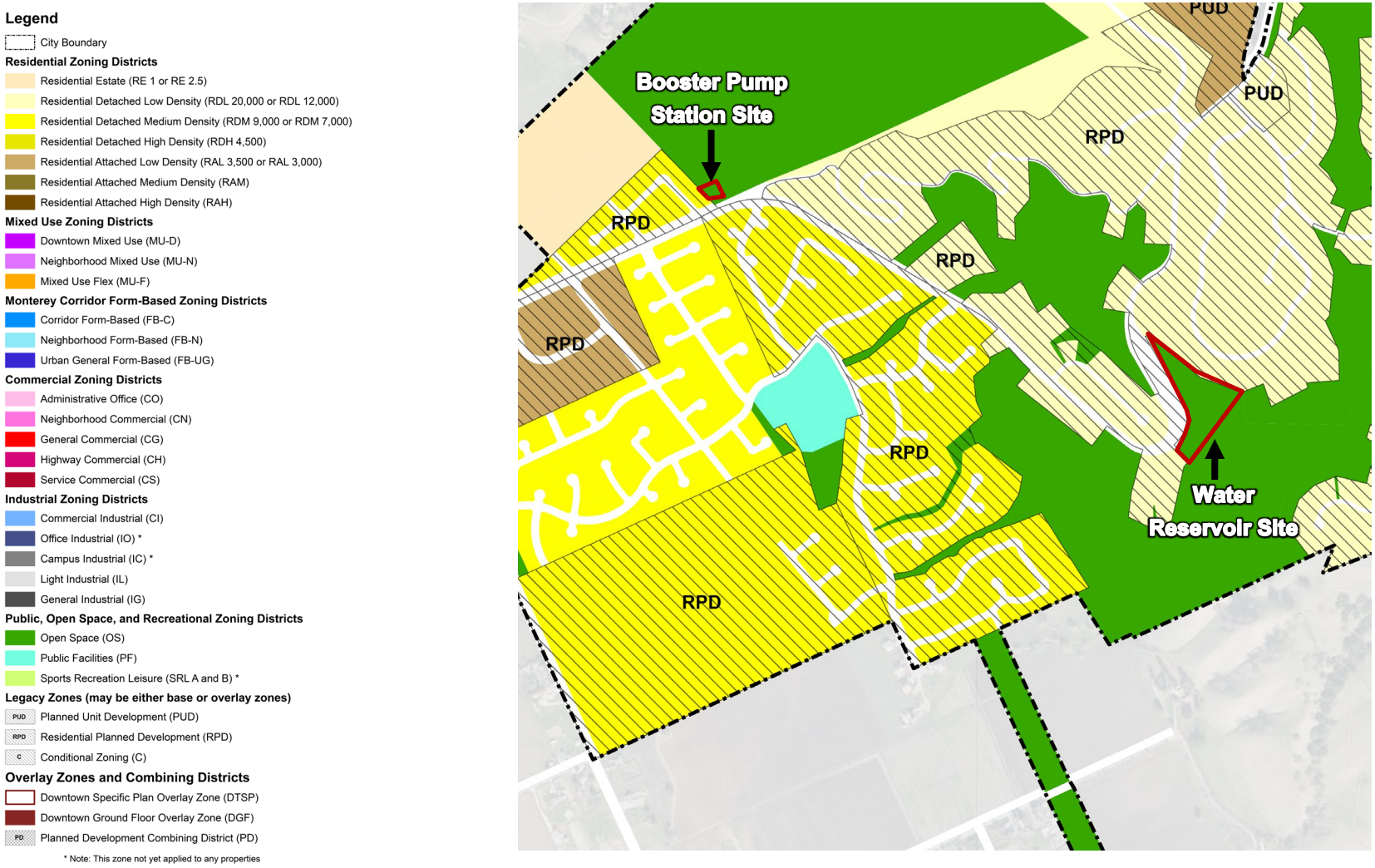
FIGURE 2
GENERAL PLAN LAND USE DESIGNATIONS



EAST DUNNE HILLSIDE WATER RESERVOIR

Source: City of Morgan Hill, *General Plan Land Use Diagram*, Adopted June 2023.

FIGURE 3
ZONING DESIGNATIONS



EAST DUNNE HILLSIDE WATER RESERVOIR

Source: City of Morgan Hill, *Zoning*. September 29, 2023.

The proposed project is one of several east hillside projects that would improve fire protection for nearby neighborhoods, enhance the City's capacity to respond to major earthquakes and other major devastating emergencies, and provide critical redundancies and system reliability. The proposed project would also improve reliability for required fire flows to be delivered to water system facilities serving Jackson Academy of Math & Music Elementary School.

Figure 4 presents the site plan for the proposed Phase 1 project. As shown therein, the proposed project would construct an 850,000-gallon, approximately 34-foot-tall above-ground welded steel water supply reservoir. As shown in **Figure 5**, the proposed water reservoir site drainage system would consist of a series of open v-ditches, underground storm drain pipes, storm water energy dissipation structures, and an underground biofiltration vault. A series of two-foot-wide v-ditches lining the outside of the reservoir center and the reservoir access road, as well as a storm drain manhole adjacent to the proposed reservoir center, would capture stormwater flows. The proposed access road would be graded such that stormwater runoff would be directed into the v-ditches. Stormwater would be directed into a series of 16-inch storm drain pipelines which would lead to the proposed underground biofiltration vault located in the southern portion of the project site, near the access road's intersection with East Dunne Avenue. Following treatment in the underground biofiltration vault, stormwater flows would be discharged onto the downslope hillside through a rip rap apron, which would slow flows and protect the hillside from erosion.

Hillside grading would be required for the access road reservoir pad area (see **Figure 6**). On the upslope portion of the reservoir pad, tiered retaining walls would be installed, as shown in **Figure 7**. As shown therein, the proposed water reservoir would be graded into the hillside such that the reservoir would be less visually prominent, as the highest point of the reservoir would be below the top of the slope. Cut soils from the water reservoir site would also be utilized to raise and construct a uniform grade for the access road. Excess soil will be hauled off site.

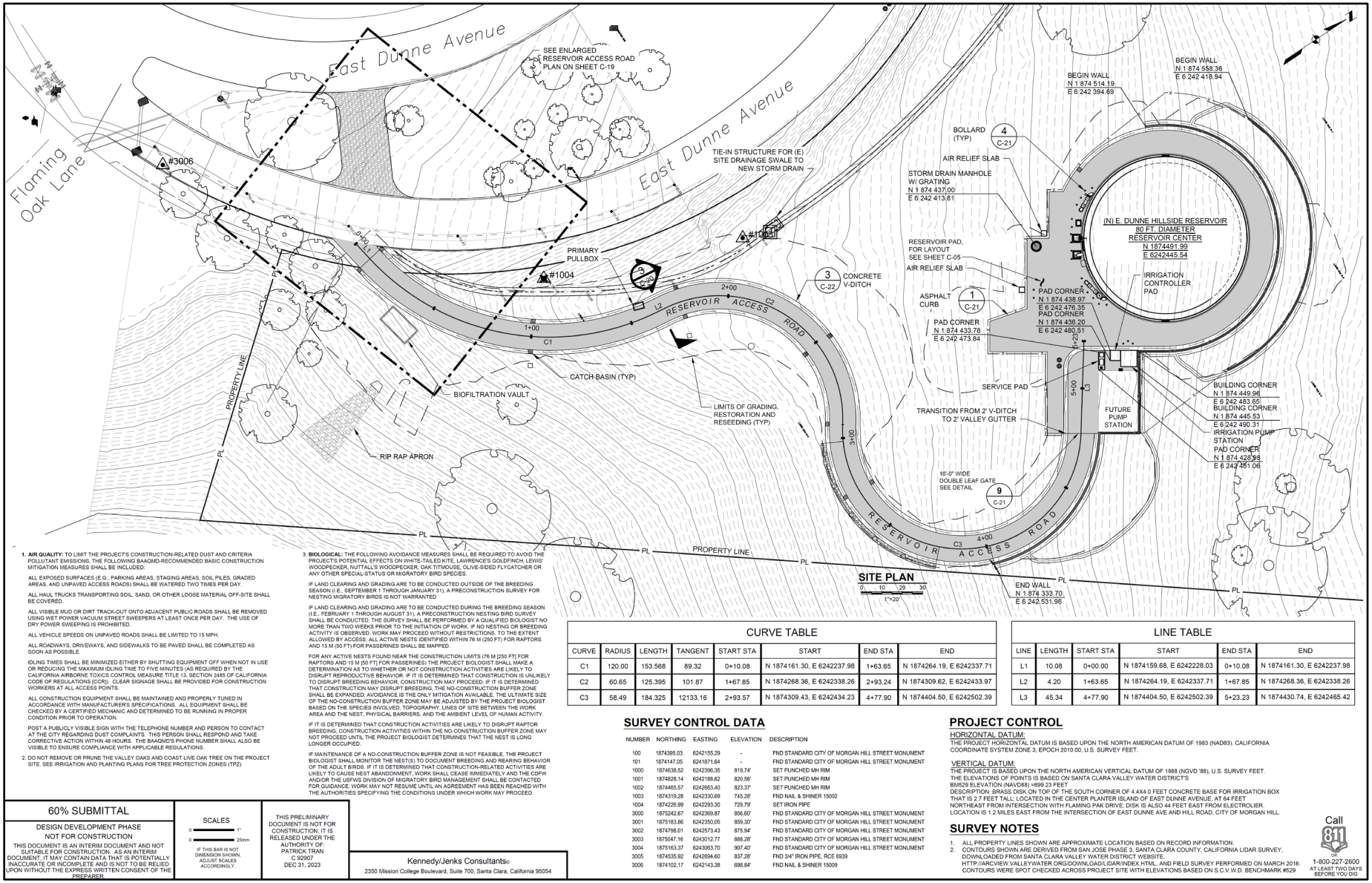
The proposed water reservoir design would include landscaping to help screen the hillside reservoir structure from public views and visibility from surrounding residential properties. Native tree, shrub, and grass species would be planted to replace non-native vegetation removed during site preparation and restore hillside cut slopes.

As shown in **Figure 5**, Phase 2 of the proposed project would include a future pump station located east of the reservoir at the intersection with the access road and the reservoir perimeter road and the installation of new piping to transfer water to the existing Holiday lakes Reservoirs. The proposed project would distribute potable water to the nearby community from the proposed reservoir through a newly installed 16-inch water pipeline, which was previously installed within the downslope portion of the hill and the lower portion of the access road to connect to an existing outlet within East Dunne Avenue. Potable water would be pumped into the water reservoir from an existing water inlet within East Dunne Avenue through a new 16-inch water inlet pipeline. In general, potable water in the reservoir would be drawn down and distributed to customers on a daily basis via the new 16-inch water pipe and refilled each evening via the new 16-inch water line to the reservoir. The water reservoir could also be used for fire suppression purposes and thus is intended to improve wildfire safety in the surrounding community.

Proposed Upgrades to Existing Booster Pump Station at 2375 East Dunne Avenue

The proposed project would also entail the replacement of two existing pumps currently in use at the East Dunne Booster Station at 2375 East Dunne Avenue with larger electric pumps. Inside the masonry block building, the existing generator will remain for emergency back-up power. The booster station serves three water mains that supply water for domestic and fire protection services including Holiday Lake Estates, Jackson Oaks, and Morgan Hill's hillside areas as well as the residential development in the area immediately surrounding the booster station.

FIGURE 4
SITE PLAN



CURVE TABLE							
CURVE	RADIUS	LENGTH	TANGENT	START STA	START	END STA	END
C1	120.00	153.568	89.32	0+10.08	N 1874161.30, E 6242237.98	1+63.65	N 1874264.19, E 6242337.71
C2	60.65	125.395	101.87	1+67.85	N 1874268.36, E 6242338.26	2+93.24	N 1874309.62, E 6242433.97
C3	58.49	184.325	12133.16	2+93.57	N 1874309.43, E 6242434.23	4+77.90	N 1874404.50, E 6242502.39

LINE TABLE					
LINE	LENGTH	START STA	START	END STA	END
L1	10.08	0+00.00	N 1874159.68, E 6242228.03	0+10.08	N 1874161.30, E 6242237.98
L2	4.20	1+63.65	N 1874264.19, E 6242337.71	1+67.85	N 1874268.36, E 6242338.26
L3	45.34	4+77.90	N 1874404.50, E 6242502.39	5+23.23	N 1874430.74, E 6242465.42

SURVEY CONTROL DATA

NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	1874395.03	6242155.29	-	FND STANDARD CITY OF MORGAN HILL STREET MONUMENT
101	1874147.05	6241871.64	-	FND STANDARD CITY OF MORGAN HILL STREET MONUMENT
1000	1874638.52	6242396.35	819.74'	SET PUNCHED MH RIM
1001	1874828.14	6242188.62	820.56'	SET PUNCHED MH RIM
1002	1874465.57	6242663.40	823.37'	SET PUNCHED MH RIM
1003	1874319.28	6242330.69	745.28'	FND NAIL & SHINER 15002
1004	1874226.99	6242293.30	729.79'	SET IRON PIPE
3000	1875242.67	6242369.87	856.60'	FND STANDARD CITY OF MORGAN HILL STREET MONUMENT
3001	1875183.86	6242350.05	859.30'	FND STANDARD CITY OF MORGAN HILL STREET MONUMENT
3002	1874798.01	6242573.43	875.94'	FND STANDARD CITY OF MORGAN HILL STREET MONUMENT
3003	1875047.16	6243012.77	888.28'	FND STANDARD CITY OF MORGAN HILL STREET MONUMENT
3004	1875163.37	6243063.70	907.40'	FND STANDARD CITY OF MORGAN HILL STREET MONUMENT
3005	1874535.92	6242694.60	837.28'	FND 3/4" IRON PIPE, RCE 6939
3006	1874102.17	6242143.38	698.84'	FND NAIL & SHINER 15009

PROJECT CONTROL

HORIZONTAL DATUM:
THE PROJECT HORIZONTAL DATUM IS BASED UPON THE NORTH AMERICAN DATUM OF 1983 (NAD83). CALIFORNIA COORDINATE SYSTEM ZONE 3, EPOCH 2010.00, U.S. SURVEY FEET.

VERTICAL DATUM:
THE PROJECT IS BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NGVD '88), U.S. SURVEY FEET. THE ELEVATIONS OF POINTS IS BASED ON SANTA CLARA VALLEY WATER DISTRICT'S BM529 ELEVATION (NAVD88) =699.23 FEET
DESCRIPTION: BRASS DISK ON TOP OF THE SOUTH CORNER OF 4.4X4.0 FEET CONCRETE BASE FOR IRRIGATION BOX THAT IS 2.7 FEET TALL; LOCATED IN THE CENTER PLANTER ISLAND OF EAST DUNNE AVENUE, AT 64 FEET NORTHEAST FROM INTERSECTION WITH FLAMING PAK DRIVE; DISK IS ALSO 44 FEET EAST FROM ELECTROLIER.
LOCATION IS 1.2 MILES EAST FROM THE INTERSECTION OF EAST DUNNE AVE AND HILL ROAD, CITY OF MORGAN HILL.

SURVEY NOTES

1. ALL PROPERTY LINES SHOWN ARE APPROXIMATE LOCATION BASED ON RECORD INFORMATION.
2. CONTOURS SHOWN ARE DERIVED FROM SAN JOSE PHASE 3, SANTA CLARA COUNTY, CALIFORNIA LIDAR SURVEY, DOWNLOADED FROM SANTA CLARA VALLEY WATER DISTRICT WEBSITE, HTTP://ARCVIEW.VALLEYWATER.ORG/DOWNLOAD/LIDAR/INDEX.HTML, AND FIELD SURVEY PERFORMED ON MARCH 2016. CONTOURS WERE SPOT CHECKED ACROSS PROJECT SITE WITH ELEVATIONS BASED ON S.C.V.W.D. BENCHMARK #529

1. **AIR QUALITY:** TO LIMIT THE PROJECT'S CONSTRUCTION-RELATED DUST AND CRITERIA POLLUTANT EMISSIONS, THE FOLLOWING BAAQMD-RECOMMENDED BASIC CONSTRUCTION MITIGATION MEASURES SHALL BE INCLUDED:

ALL EXPOSED SURFACES (E.G., PARKING AREAS, STAGING AREAS, SOIL PILES, GRADED AREAS, AND UNPAVED ACCESS ROADS) SHALL BE WATERED TWO TIMES PER DAY.

ALL HAUL TRUCKS TRANSPORTING SOIL, SAND, OR OTHER LOOSE MATERIAL OFF-SITE SHALL BE COVERED.

ALL VISIBLE MUD OR DIRT TRACK-OUT ONTO ADJACENT PUBLIC ROADS SHALL BE REMOVED USING WET POWER VACUUM STREET SWEEPERS AT LEAST ONCE PER DAY. THE USE OF DRY POWER SWEEPING IS PROHIBITED.

ALL VEHICLE SPEEDS ON UNPAVED ROADS SHALL BE LIMITED TO 15 MPH.

ALL ROADWAYS, DRIVEWAYS, AND SIDEWALKS TO BE PAVED SHALL BE COMPLETED AS SOON AS POSSIBLE.

IDLING TIMES SHALL BE MINIMIZED EITHER BY SHUTTING EQUIPMENT OFF WHEN NOT IN USE OR REDUCING THE MAXIMUM IDLING TIME TO FIVE MINUTES (AS REQUIRED BY THE CALIFORNIA AIRBORNE TOXICS CONTROL MEASURE TITLE 13, SECTION 2485 OF CALIFORNIA CODE OF REGULATIONS [CCR]). CLEAR SIGNAGE SHALL BE PROVIDED FOR CONSTRUCTION WORKERS AT ALL ACCESS POINTS.

ALL CONSTRUCTION EQUIPMENT SHALL BE MAINTAINED AND PROPERLY TUNED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. ALL EQUIPMENT SHALL BE CHECKED BY A CERTIFIED MECHANIC AND DETERMINED TO BE RUNNING IN PROPER CONDITION PRIOR TO OPERATION.

POST A PUBLICLY VISIBLE SIGN WITH THE TELEPHONE NUMBER AND PERSON TO CONTACT AT THE CITY REGARDING DUST COMPLAINTS. THIS PERSON SHALL RESPOND AND TAKE CORRECTIVE ACTION WITHIN 48 HOURS. THE BAAQMD'S PHONE NUMBER SHALL ALSO BE VISIBLE TO ENSURE COMPLIANCE WITH APPLICABLE REGULATIONS.

2. DO NOT REMOVE OR PRUNE THE VALLEY OAKS AND COAST LIVE OAK TREE ON THE PROJECT SITE. SEE IRRIGATION AND PLANTING PLANS FOR TREE PROTECTION ZONES (TPZ)

3. **BIOLOGICAL:** THE FOLLOWING AVOIDANCE MEASURES SHALL BE REQUIRED TO AVOID THE PROJECT'S POTENTIAL EFFECTS ON WHITE-TAILED KITE, LAWRENCE'S GOLDFINCH, LEWIS' WOODPECKER, NUTTALL'S WOODPECKER, OAK TITMOUSE, OLIVE-SIDED FLYCATCHER OR ANY OTHER SPECIAL-STATUS OR MIGRATORY BIRD SPECIES.

IF LAND CLEARING AND GRADING ARE TO BE CONDUCTED OUTSIDE OF THE BREEDING SEASON (I.E., SEPTEMBER 1 THROUGH JANUARY 31), A PRECONSTRUCTION SURVEY FOR NESTING MIGRATORY BIRDS IS NOT WARRANTED.

IF LAND CLEARING AND GRADING ARE TO BE CONDUCTED DURING THE BREEDING SEASON (I.E., FEBRUARY 1 THROUGH AUGUST 31), A PRECONSTRUCTION NESTING BIRD SURVEY SHALL BE CONDUCTED. THE SURVEY SHALL BE PERFORMED BY A QUALIFIED BIOLOGIST NO MORE THAN TWO WEEKS PRIOR TO THE INITIATION OF WORK. IF NO NESTING OR BREEDING ACTIVITY IS OBSERVED, WORK MAY PROCEED WITHOUT RESTRICTIONS. TO THE EXTENT ALLOWED BY ACCESS, ALL ACTIVE NESTS IDENTIFIED WITHIN 76 M (250 FT) FOR RAPTORS AND 15 M (50 FT) FOR PASSERINES SHALL BE MAPPED.

FOR ANY ACTIVE NESTS FOUND NEAR THE CONSTRUCTION LIMITS (76 M [250 FT] FOR RAPTORS AND 15 M [50 FT] FOR PASSERINES) THE PROJECT BIOLOGIST SHALL MAKE A DETERMINATION AS TO WHETHER OR NOT CONSTRUCTION ACTIVITIES ARE LIKELY TO DISRUPT REPRODUCTIVE BEHAVIOR. IF IT IS DETERMINED THAT CONSTRUCTION IS UNLIKELY TO DISRUPT BREEDING BEHAVIOR, CONSTRUCTION MAY PROCEED. IF IT IS DETERMINED THAT CONSTRUCTION MAY DISRUPT BREEDING, THE NO-CONSTRUCTION BUFFER ZONE SHALL BE EXPANDED; AVOIDANCE IS THE ONLY MITIGATION AVAILABLE. THE ULTIMATE SIZE OF THE NO-CONSTRUCTION BUFFER ZONE MAY BE ADJUSTED BY THE PROJECT BIOLOGIST BASED ON THE SPECIES INVOLVED, TOPOGRAPHY, LINES OF SITE BETWEEN THE WORK AREA AND THE NEST, PHYSICAL BARRIERS, AND THE AMBIENT LEVEL OF HUMAN ACTIVITY.

IF IT IS DETERMINED THAT CONSTRUCTION ACTIVITIES ARE LIKELY TO DISRUPT RAPTOR BREEDING, CONSTRUCTION ACTIVITIES WITHIN THE NO-CONSTRUCTION BUFFER ZONE MAY NOT PROCEED UNTIL THE PROJECT BIOLOGIST DETERMINES THAT THE NEST IS LONG LONGER OCCUPIED.

IF MAINTENANCE OF A NO-CONSTRUCTION BUFFER ZONE IS NOT FEASIBLE, THE PROJECT BIOLOGIST SHALL MONITOR THE NEST(S) TO DOCUMENT BREEDING AND REARING BEHAVIOR OF THE ADULT BIRDS. IF IT IS DETERMINED THAT CONSTRUCTION-RELATED ACTIVITIES ARE LIKELY TO CAUSE NEST ABANDONMENT, WORK SHALL CEASE IMMEDIATELY AND THE CDFW AND/OR THE USFWS DIVISION OF MIGRATORY BIRD MANAGEMENT SHALL BE CONTACTED FOR GUIDANCE. WORK MAY NOT RESUME UNTIL AN AGREEMENT HAS BEEN REACHED WITH THE AUTHORITIES SPECIFYING THE CONDITIONS UNDER WHICH WORK MAY PROCEED.

60% SUBMITTAL

DESIGN DEVELOPMENT PHASE
NOT FOR CONSTRUCTION

THIS DOCUMENT IS AN INTERIM DOCUMENT AND NOT SUITABLE FOR CONSTRUCTION. AS AN INTERIM DOCUMENT, IT MAY CONTAIN DATA THAT IS POTENTIALLY INACCURATE OR INCOMPLETE AND IS NOT TO BE RELIED UPON WITHOUT THE EXPRESS WRITTEN CONSENT OF THE PREPARER.

SCALES
0 1"
0 25mm
IF THIS BAR IS NOT DIMENSION SHOWN, ADJUST SCALES ACCORDINGLY.

THIS PRELIMINARY DOCUMENT IS NOT FOR CONSTRUCTION. IT IS RELEASED UNDER THE AUTHORITY OF:
PATRICK TRAN
C 92907
DEC 31, 2023

Kennedy/Jenks Consultants©
2350 Mission College Boulevard, Suite 700, Santa Clara, California 95054

Call 811 OR 1-800-227-2600
AT LEAST TWO DAYS BEFORE YOU DIG

FIGURE 5
SITE PIPING PLAN

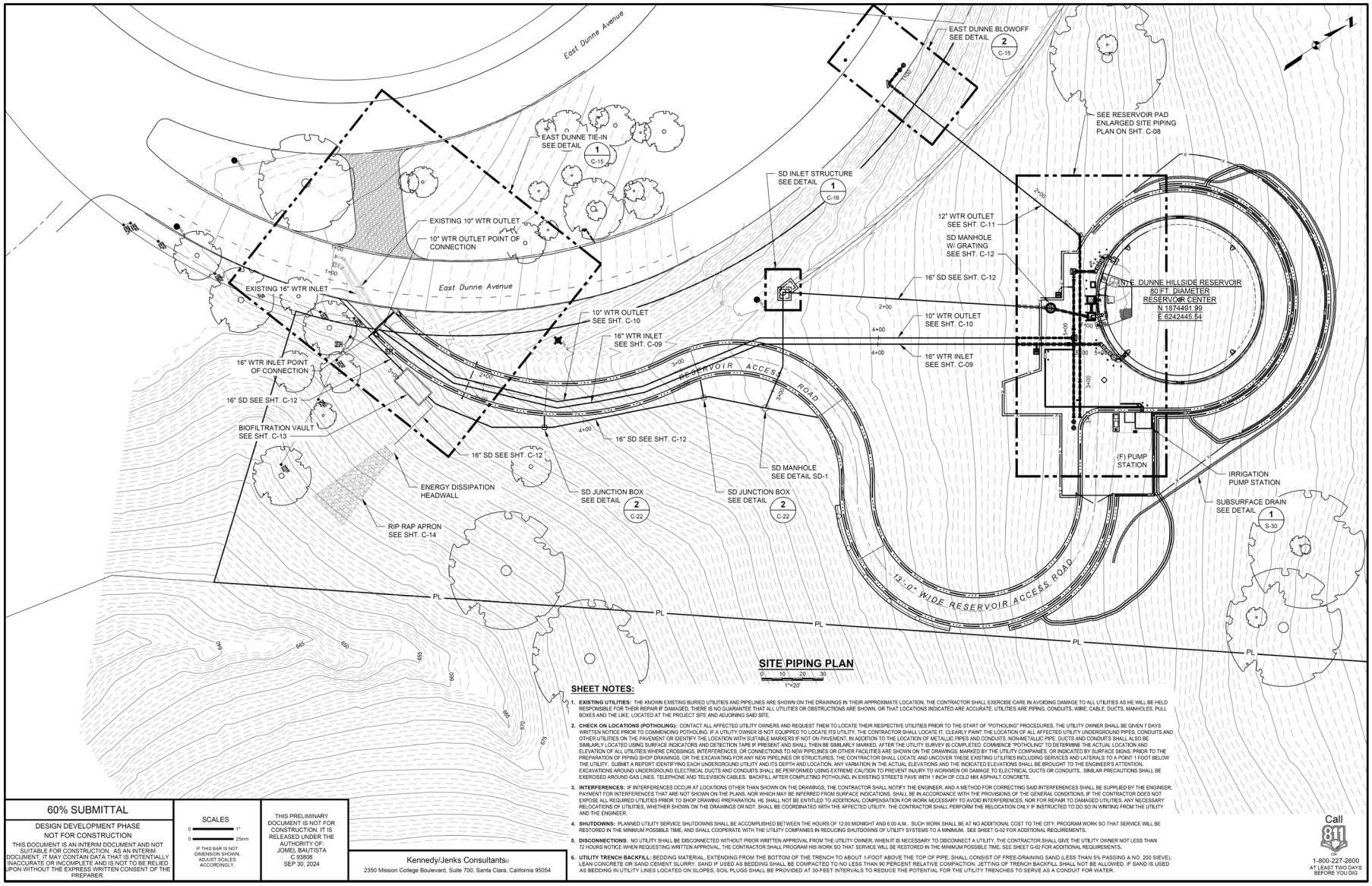


FIGURE 6
RESERVOIR SITE AND ACCESS ROAD GRADING PLAN

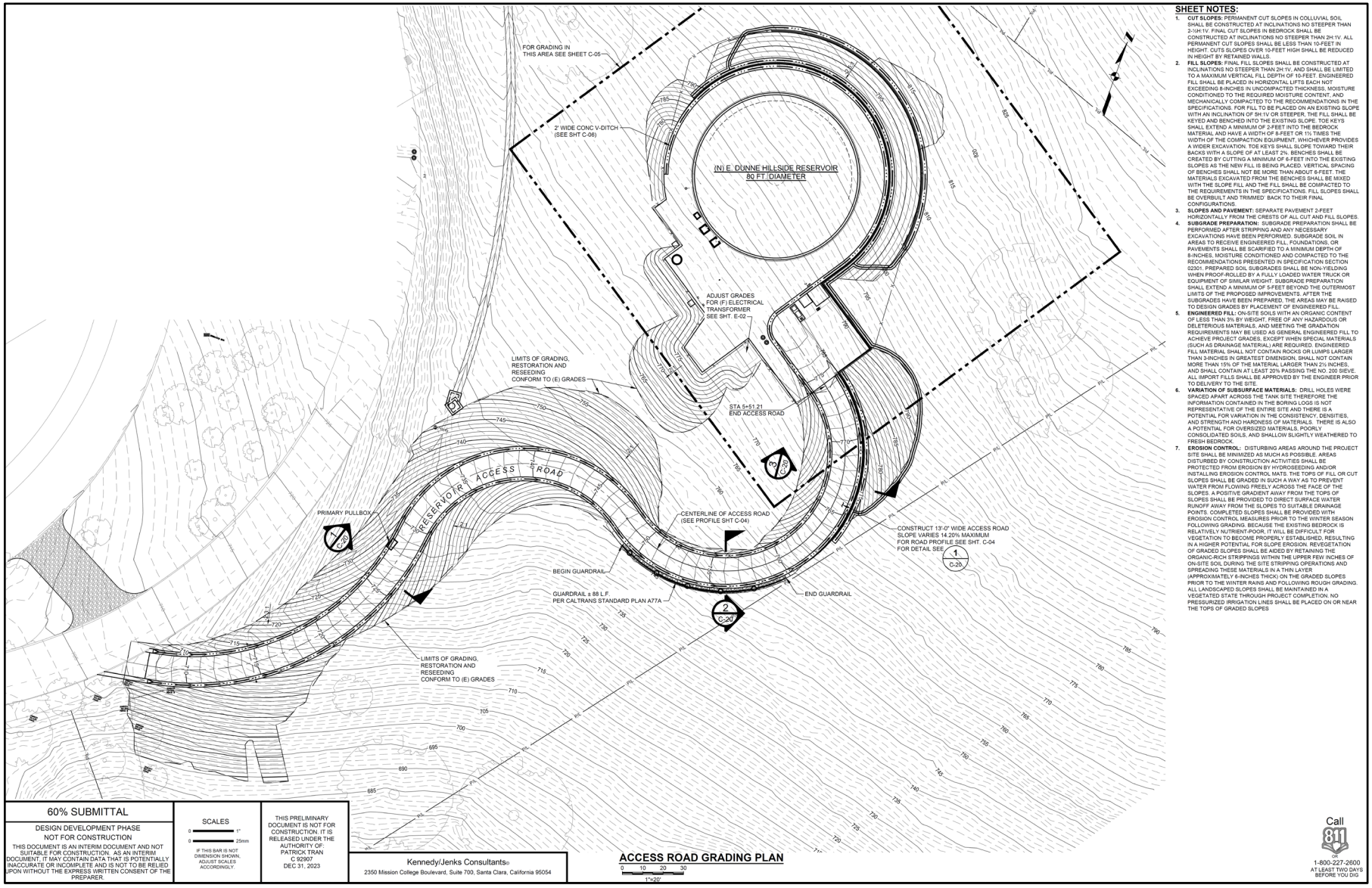
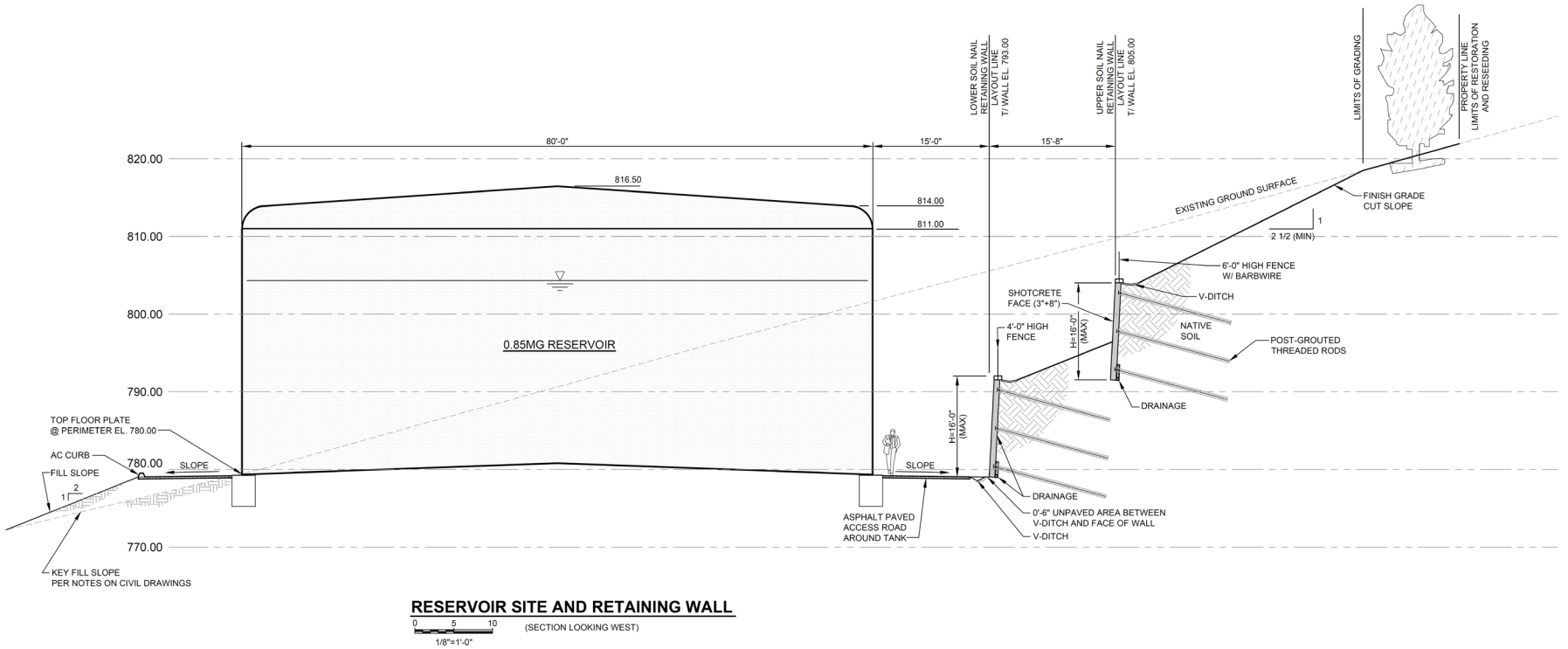


FIGURE 7
RESERVOIR SITE AND RETAINING WALL



SURROUNDING LAND USES

The proposed water reservoir project would be developed on a 4.36-acre parcel that is located in the eastern hillside area of Morgan Hill and is surrounded by residential development and hillside open space. Surrounding residential development is served by East Dunne Avenue and situated on Oak View Circle, Oakwood Court, Flaming Oak Lane, and Rustling Oak Court. While residential development adjoins the project site immediately to the north and south, East Dunne Avenue is located adjacent to the project site's western perimeter, and open space areas bound the site to the east and south. Other land uses in the vicinity of the project site include Jackson Academy of Math & Music Elementary School and Jackson Park, both approximately 0.5-mile to the west of the proposed water reservoir site.

The proposed project would also include improvements to the existing East Dunne Booster Station located at 2375 East Dunne Avenue. The East Dunne Booster Station is surrounded by existing residential development immediately west of the site, as well as to the south, across East Dunne Avenue. Undeveloped land borders the East Dunne Booster Station to the north and east.

OTHER AGENCIES WHOSE APPROVAL IS REQUIRED

In addition to the City of Morgan Hill, lead agency for the proposed project, responsible agencies having discretionary approval or jurisdiction by law over natural resources affected by the project are listed as follows: None.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages:

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☒ Biological Resources	☐ Cultural Resources	☐ Energy
☒ Geology and Soils	☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☐ Hydrology and Water Quality	☐ Land Use and Planning	☐ Mineral Resources
☐ Noise	☐ Population and Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities and Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

David Gittleson _____ Date

EVALUATION OF ENVIRONMENTAL IMPACTS

Issues:

1. AESTHETICS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?	☐	☐	✖	☐
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	☐	☐	☐	✖
c. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	✖	☐
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	✖	☐

1a. Scenic Vistas

The 4.36-acre reservoir project site is located in the eastern hillsides area of Morgan Hill and has been historically used for open space purposes. Elevations across the property range from approximately 675 feet AMSL in the unnamed topographic swale near the downslope property boundary, to approximately 870 feet AMSL near the existing residences upslope of the northern property boundary. The project site and the residential properties to the north have commanding views of Morgan Hill and the valley below, and of the Santa Cruz Mountains to the west. Views of and from the project site are similar to those of adjoining properties and are shown in **Figure 8** and **Figure 9**, respectively. **Figure 10** presents a view shed section elevation of the proposed water reservoir relative to surrounding residences.

Potentially viewable scenic vistas in the vicinity of the project site are available to the travelling public on westbound East Dunne Avenue. One such vista view is available to westbound drivers and bicyclists on a grade-separated section of that road that is immediately west of and downslope of the project site. Because the proposed water reservoir would be located east of and approximately 55 feet above the roadway, public scenic views to the west of East Dunne Avenue at this location would not be affected by the proposed project. Eastbound and westbound lanes below the site are separated by a median landscaped with mature oak trees, screening views of the project site from this location.

CEQA (Public Resources Code [PRC] Section 21000 et seq.) case law has established that only public views, not private views, are protected under CEQA. For example, in *Association for Protection etc. Values v. City of Ukiah* (1991) 2 Cal.App.4th 720 [3 Cal. Rptr.2d 488] the court determined that "we must differentiate between adverse impacts upon particular persons and adverse impacts upon the environment of persons in general. As recognized by the court in *Topanga Beach Renters Assn. v. Department of General Services* (1976) 58 Cal.App.3d 188 [129 Cal.Rptr. 739]: '[A]ll government activity has some direct or indirect adverse effect on some persons. The issue is not whether [the project] will adversely affect particular persons but whether [the project] will adversely affect the environment of persons in general.'" Such a conclusion is consistent with the thresholds of significance established in Appendix G of the CEQA Guidelines. Although the following discussion of private views is not required pursuant to CEQA Guidelines, it is provided for disclosure purposes.

Scenic views from surrounding residential neighborhoods are dependent upon the relative locations and lot orientations of individual homes.

FIGURE 8 VIEWS OF THE WATER RESERVOIR SITE

VIEW OF SITE FROM EAST DUNNE AVENUE AT PROPOSED ACCESS DRIVE INTERSECTION

VIEW OF PROPOSED RESERVOIR SITE FROM PLANNED ACCESS DRIVE

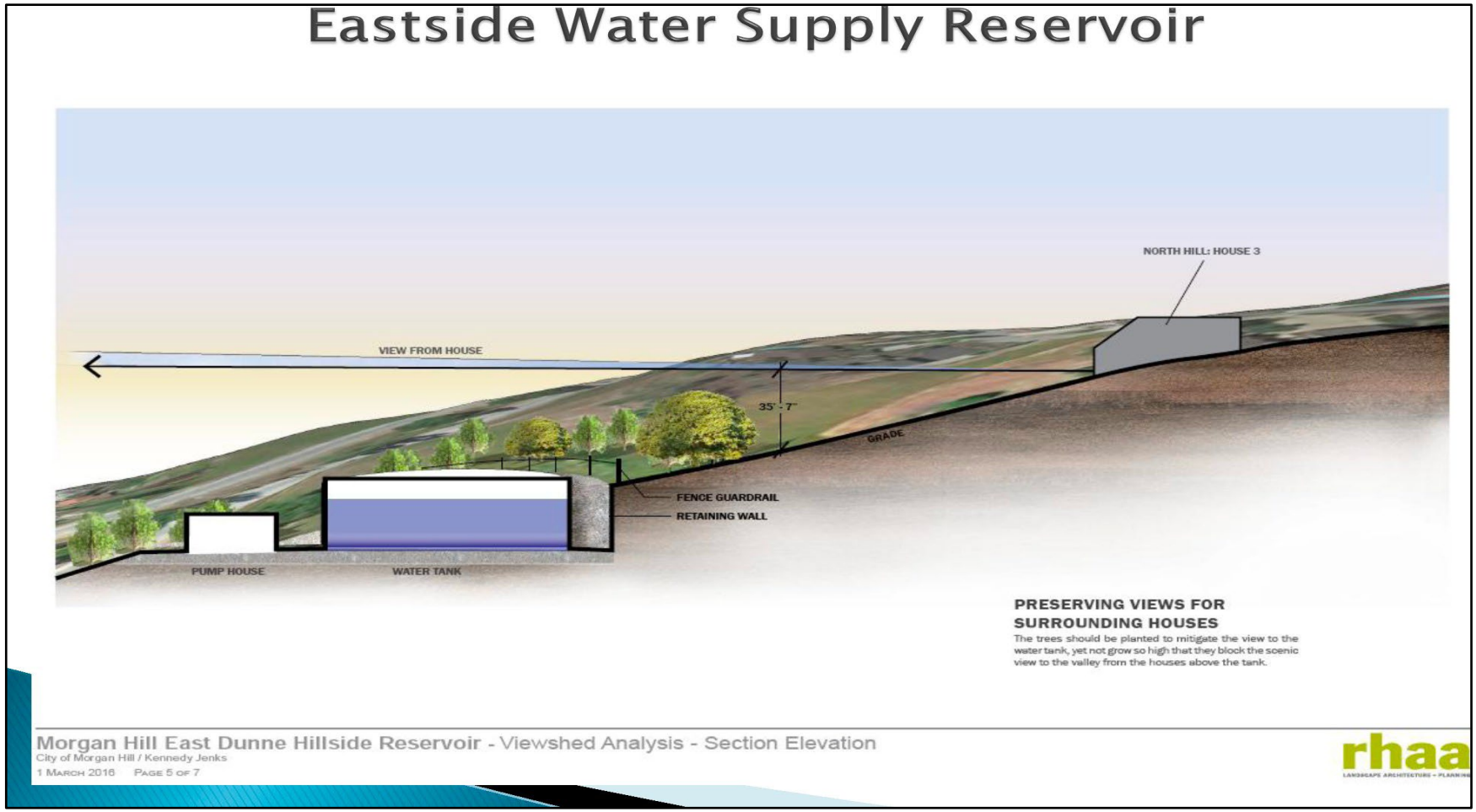
DUNNE HILLSIDE WATER RESERVOIR

FIGURE 9 VIEWS FROM THE WATER RESERVOIR SITE

VIEW FROM THE WATER RESERVOIR SITE TO THE WEST

VIEW FROM THE WATER RESERVOIR SITE TO THE SOUTH

FIGURE 10 VIEWSHED SECTION ELEVATION OF WATER RESERVOIR SITE



EAST DUNNE HILLSIDE WATER RESERVOIR Source: City of Morgan Hill Public Works Department (2015)

As part of the background analysis of visual resources in the project area, a view shed study was prepared for the City by landscape architectural firm Royston Hanamoto Alley & Abey (RHAA) in 2015. The study identified nearby residences with views that could be affected by the proposed water reservoir development. The study addressed potential visual impacts to homes on Oak View Circle, Oakwood Court, Flaming Oak Lane, and Rustling Oak Court. Visual simulations of the proposed water reservoir presented in the study are included as Attachment 1. In brief, while the proposed water reservoir would be visible from some of the foregoing properties, proposed landscape trees and associated plantings would filter and partially screen views of the reservoir. Due to local topography, the proposed elevation of the water reservoir pad would not obstruct scenic views from residences on Oak View Circle or Oakwood Court, as shown in the visual simulation presented in Attachment 1.

Views of the project site from residences on Flaming Oak Lane and Rustling Oak Court would be restricted by mature landscape trees on private property and median street trees.

The proposed upgrades to the existing booster pump station at 2375 East Dunne Avenue would not alter on- or off-site views, and, thus, would not result in any adverse impacts to scenic resources.

Based on the above, scenic resources would not be impacted by the proposed project, and a **less-than-significant** impact would occur.

1b. Scenic Resources Within a State Scenic Highway

State-designated scenic highways do not exist in the project vicinity.[1] Therefore, the project would not affect scenic resources within a state scenic highway, and **no impact** would occur.

1c. Visual Character

The visual quality and character of the project site is defined by the current use for open space purposes, while the visual character of the project area setting is formed by surrounding open space areas and residential uses surrounding the project site. The extensive hillside open space to the west, south, and east of the project area contributes to the semi-rural character of the project vicinity. Private views of the project site that define its visual character are primarily available from side and rear yards of residences on surrounding streets adjoining the site. Public views of the project site are available to travelers on East Dunne Avenue.

The development of the project site with a water reservoir and access road would have a minor effect on the visual character of the project site. Residential development adjoins the project site to the north and south, and residential neighborhoods are located to the east and west of the water reservoir property. The project plans specify the preservation of existing oak trees on the site, the planting of landscape trees around the water reservoir, and planting of appropriate groundcover on cut slopes to minimize the visual impacts of site development. The visual analysis prepared by RHAA and presented in Attachment 1 shows the water reservoir in white for purposes of identifying the structures (reservoir and pump house) on the project site. However, the City will paint the reservoir to blend in with surrounding trees and proposed landscaping, further minimizing potential visual effects of the proposed reservoir.

In addition, as discussed above, because the proposed upgrades to the existing booster pump station at 2375 East Dunne Avenue would occur within the existing pump station building, the proposed project would not alter the visual character of the site or the surroundings.

Consequently, the proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings, and a **less-than-significant** impact would occur.

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[1] California Department of Transportation. *California State Scenic Highway System Map.* Available at: https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa. Accessed January 2024.

1d. Light or Glare

The project site is currently not lit and does not produce lighting impacts that would affect surrounding neighborhoods. Project plans do not include extensive lighting for the water reservoir site; however, lighting fixtures would be installed for emergency lighting purposes. Exterior lighting that may be required for access improvements would be required to comply with all applicable regulations set forth in the Morgan Hill Municipal Code, which would ensure that project lighting would not adversely affect adjacent properties. As a result, the project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Therefore, a **less-than-significant** impact would occur.

2. AGRICULTURE AND FOREST RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	✖
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	✖
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	✖
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	✖
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	✖

2a, 2b, 2c, 2d, 2e. Farmland, Agricultural, and Forestry Uses

The existing booster pump station site is already fully developed, and thus, the proposed improvements would not result in the loss or conversion of Farmland or forest land. As such, the following analysis focuses on potential impacts related to the proposed water reservoir.

The City of Morgan Hill General Plan currently designates the reservoir site as Open Space and the site is zoned as Open Space. The 4.36-acre reservoir site presently encompasses open hillside area covered with non-native grasses and several large oak trees. The property's grassy slopes are seasonally disced for fire prevention. The project site is surrounded by hillside residential properties, constraining agricultural use of the site. Given the small size of the project site, current zoning, and the urban development surrounding the proposed site, project development would have a less-than-significant effect on the conversion of the site to a non-agricultural use. Similarly, the project site is not zoned as timberland or forest land, and does not contain enough trees to be considered as forest land. Therefore, the proposed improvements would not result in the conversion of agricultural land to non-agricultural use or result in the loss or conversion of forest land, and **no impact** would occur.

3. AIR QUALITY. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	✖	☐
b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	✖	☐
c. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	✖	☐
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	✖	☐

3a, 3b. Air Quality Planning and Criteria Pollutants

The City of Morgan Hill is located in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The SFBAAB area is currently designated as a nonattainment area for State and federal ozone, State and federal fine particulate matter 2.5 microns in diameter ($PM_{2.5}$), and State respirable particulate matter 10 microns in diameter (PM_{10}) ambient air quality standards (AAQS). The SFBAAB is designated attainment or unclassified for all other AAQS. It should be noted that on January 9, 2013, the U.S. Environmental Protection Agency (USEPA) issued a final rule to determine that the Bay Area has attained the 24-hour $PM_{2.5}$ federal AAQS. Nonetheless, the Bay Area must continue to be designated as nonattainment for the federal $PM_{2.5}$ AAQS until such time as the BAAQMD submits a redesignation request and a maintenance plan to the USEPA, and the USEPA approves the proposed redesignation. The USEPA has not yet approved a request for redesignation of the SFBAAB; therefore, the SFBAAB remains in nonattainment for 24-hour $PM_{2.5}$.

In compliance with regulations, due to the nonattainment designations of the area, the BAAQMD periodically prepares and updates air quality plans that provide emission reduction strategies to achieve attainment of the AAQS, including control strategies to reduce air pollutant emissions through regulations, incentive programs, public education, and partnerships with other agencies. The current air quality plans are prepared in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

The most recent federal ozone plan is the 2001 Ozone Attainment Plan, which was adopted on October 24, 2001 and approved by the California Air Resources Board (CARB) on November 1, 2001. The plan was submitted to the USEPA on November 30, 2001 for review and approval. The most recent State ozone plan is the 2017 Clean Air Plan, adopted on April 19, 2017. The 2017 Clean Air Plan was developed as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, toxic air contaminants (TACs), and greenhouse gases (GHGs). Although a plan for achieving the State PM_{10} standard is not required, the BAAQMD has prioritized measures to reduce PM in developing the control strategy for the 2017 Clean Air Plan. The control strategy serves as the backbone of the BAAQMD's current PM control program.

The aforementioned air quality plans contain mobile source controls, stationary source controls, and transportation control measures to be implemented in the region to attain the State and federal AAQS within the SFBAAB. Adopted BAAQMD rules and regulations, as well as thresholds of significance, have been developed with the intent to ensure continued attainment of AAQS, or to work towards attainment of AAQS for which the area is currently designated nonattainment, consistent with applicable air quality plans. For development projects, BAAQMD establishes significance thresholds for emissions of the ozone precursors reactive organic gases (ROG) and oxides of nitrogen (NO_X), as well as for PM_{10}, and $PM_{2.5}$, expressed in pounds per day (lbs/day) and tons per year (tons/yr). The thresholds are listed in Table 1. Thus, by exceeding the BAAQMD's mass emission thresholds for operational emissions of ROG, NO_X, or PM_{10}, a project would be considered to conflict with or obstruct implementation of the BAAQMD's air quality planning efforts.

Table 1
BAAQMD Thresholds of Significance

Pollutant	Construction	Operational	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_X	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
Source: BAAQMD, CEQA Guidelines, April 2023.			

Emissions of particulate matter can be split into two categories: fugitive emissions and exhaust emissions. The BAAQMD thresholds of significance for exhaust PM emissions are presented in Table 1. The BAAQMD does not maintain quantitative thresholds for fugitive emissions of PM_{10} or $PM_{2.5}$; rather, BAAQMD requires all projects within the district's jurisdiction to implement Basic Construction Mitigation Measures (BCMMs) related to dust suppression.

Construction and operational emissions of both phases of the proposed project were quantified using the California Emissions Estimator Model (CalEEMod) web-based software version 2022 – a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions, including GHG emissions, from land use projects. The model applies inherent default values for various land uses, including construction data, trip generation rates, vehicle mix, trip length, average speed, etc. Where project-specific information is available, such information should be applied in the model.

The proposed project's modeling assumed the following:

- Construction would commence in June 2024 and take place over approximately one year;
- 12,800 cubic yards of soil would be off-hauled a haul distance of 30 miles during grading; and
- Trip generation rates were updated to be consistent with the project-specific information.

The proposed project's estimated emissions associated with construction and operations are provided below. All CalEEMod results are included as Attachment 2 to this Initial Study. It is noted that due to the nature of the proposed improvements to the existing booster pump station, construction and operational emissions would be below the emissions discussed below.

Construction Emissions. According to the CalEEMod results, the proposed project would result in maximum unmitigated construction criteria air pollutant emissions as shown in Table 2. As shown in the table, the proposed project's maximum unmitigated construction emissions would be below the applicable thresholds of significance.

Table 2
Maximum Unmitigated Construction Emissions (lbs/day)

Pollutant	Proposed Project Emissions	Threshold of Significance	Exceeds Threshold?
ROG	1.83	54	**NO**
NO_X	19.1	54	**NO**
PM_{10} (exhaust)	0.81	82	**NO**
$PM_{2.5}$ (exhaust)	0.73	54	**NO**
Source: CalEEMod, February 2024 (see Attachment 2).			

All projects within the jurisdiction of the BAAQMD are required to implement all of the BAAQMD's BCMMs, which would be included in the project approval as Conditions of Approval:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
7. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
8. Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a six- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.
9. Publicly visible signs shall be posted with the telephone number and name of the person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's General Air Pollution Complaints number shall also be visible to ensure compliance with applicable regulations.

The proposed project's required implementation of the BAAQMD's BCMMs listed above for the project's construction activities would help to minimize construction-related fugitive dust emissions to a less-than-significant level. Because the proposed project would be below the applicable thresholds of significance for construction emissions, project construction would not result in a significant air quality impact.

Operational Emissions. Considering the nature of the proposed project, new substantial criteria pollutant emissions would not be generated during project operations. The only vehicle trips generated by the proposed project would be two maintenance visits to the site per week. Thus, operational emissions of NO_X, ROG, PM_{10}, and $PM_{2.5}$ would be well below the BAAQMD's applicable thresholds of significance.

Conclusion. As stated previously, the applicable regional air quality plans include the 2001 Ozone Attainment Plan and the 2017 Clean Air Plan. According to BAAQMD, if a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation, the project may be considered consistent with the air quality plans. Because both components of the proposed project would result in emissions below the applicable thresholds of significance, the proposed project would not be considered to conflict with or obstruct implementation of regional air quality plans. In addition, the project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or State AAQS. Thus, a **less-than-significant** impact would occur.

3c. Exposure of Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others, due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and/or duration of exposure to air pollutants. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, childcare centers, playgrounds, retirement homes, convalescent homes, hospitals, and medical clinics. Adjacent residences are considered to be the closest sensitive receptors to project construction.

The major pollutant concentrations of concern are localized carbon monoxide (CO) emissions and TAC emissions, which are addressed in further detail below.

Localized CO Emissions. Localized concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. High levels of localized CO concentrations are only expected where background levels are high, and traffic volumes and congestion levels are high. Emissions of CO are of potential concern, as the pollutant is a toxic gas that results from the incomplete combustion of carbon-containing fuels such as gasoline or wood. CO emissions are particularly related to traffic levels.

In order to provide a conservative indication of whether a project would result in localized CO emissions that would exceed the applicable threshold of significance, the BAAQMD has established screening criteria for localized CO emissions. According to BAAQMD, a proposed project would result in a less-than-significant impact related to localized CO emission concentrations if all of the following conditions are true for the project:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans;
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, underpass, etc.).

Given that the proposed project is consistent with the site's current land use and zoning designations, the proposed project would not conflict with the Santa Clara Valley Transportation Authority (VTA) Congestion Management Program (CMP).[2] As discussed above, the proposed project would generate approximately two vehicle trips per week, and, thus, would not increase traffic volumes at any intersection to more than 44,000 vehicles per hour. Furthermore, areas where vertical and/or horizontal mixing is limited due to tunnels, underpasses, or similar features do not exist in the project area. Therefore, based on the BAAQMD's screening criteria for localized CO emissions, the proposed project would not be expected to result in substantial levels of localized CO at surrounding intersections or generate localized concentrations of CO that would exceed standards or cause health hazards.

TAC Emissions. Another category of environmental concern is TACs. The CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (Handbook) provides recommended setback distances for sensitive land uses from major sources of TACs, including, but not limited to, freeways and high traffic roads, distribution centers, gas dispensing facilities, and rail yards. The CARB has identified diesel particulate matter (DPM) from diesel-fueled engines as a TAC; thus, high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Health risks associated with TACs are a function of both the concentration of emissions and the duration of exposure, where the higher the concentration and/or the longer the period of time that a sensitive receptor is exposed to pollutant concentrations would correlate to a higher health risk. As noted above, the nearest existing sensitive receptors to the project site are the adjacent single-family residences.

The proposed project does not include any operations that would be considered a substantial source of TACs. Accordingly, operations of the proposed project would not expose sensitive receptors to excess concentrations of TACs.

Short-term, construction-related activities would result in the generation of TACs, specifically DPM, from on-road haul trucks and off-road equipment exhaust emissions. Construction is temporary and occurs over a relatively short duration in comparison to the operational lifetime of the proposed project. Health risks are typically associated with exposure to high concentrations of TACs over extended periods of time (e.g., 30 years or greater), whereas the construction period associated with the proposed project is estimated to be approximately one year.

All construction equipment and operation thereof would be regulated pursuant to the In-Use Off-Road Diesel Vehicle Regulation, which is intended to help reduce emissions associated with off-road diesel vehicles and

[2] Santa Clara Valley Transportation Authority. *2015 Congestion Management Plan.* October 2015.

equipment, including DPM. Project construction would also be required to comply with all applicable BAAQMD rules and regulations, particularly associated with permitting of air pollutant sources. In addition, only portions of the site would be disturbed at a time throughout the construction period, with operation of construction equipment occurring intermittently throughout the course of a day rather than continuously at any one location on the project site. Operation of construction equipment within portions of the development area would allow for the dispersal of emissions, and would ensure that construction-activity is not continuously occurring in the portions of the project site closest to existing receptors. Because construction equipment on-site would not operate for long periods of time and would be used at varying locations within the site, associated emissions of DPM would not occur at the same location (or be evenly spread throughout the entire project site) for long periods of time. Due to the temporary nature of construction and the relatively short duration of potential exposure to associated emissions, the potential for any one sensitive receptor in the area to be exposed to concentrations of pollutants for a substantially extended period of time would be low.

Furthermore, the City would prepare, and include on all site development and grading plans, a management plan detailing strategies for control of noise, dust and vibration, and storage of hazardous materials during construction of the project. Pursuant to Section 18.76.040 (Air Contaminants) of the City's Municipal Code, the management plan must include all applicable BAAQMD rules and regulations, as well as the City's standard conditions for construction activity. The City of Morgan Hill Development Services Department would ensure that the BAAQMD's BCMMs, listed under section "a,b" above, would be noted on project construction drawings prior to issuance of a building permit or approval of improvement plans.

Conclusion. Based on the above discussion, neither component of the proposed project would expose any sensitive receptors to substantial concentrations of localized CO or TACs from construction or operation. Therefore, the proposed project would result in a **less-than-significant** impact related to the exposure of sensitive receptors to substantial pollutant concentrations.

3d. Odors

According to the BAAQMD CEQA Guidelines, land uses associated with odor complaints typically include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. The project would not include any uses identified by BAAQMD as being associated with odors. New or unusual sources of nuisance odors would be associated with the proposed water reservoir or booster pump station improvements. Therefore, the project's potential for nuisance odor problems would be less than significant.

During project construction, however, nuisance diesel odors associated with operation of diesel construction equipment on-site (primarily during initial grading phases), but this effect would be localized, sporadic, and short-term in nature. Therefore, temporary impacts from nuisance diesel odors on adjacent residential receptors would be **less than significant**.

4. BIOLOGICAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	✖	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☐	✖	☐
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	✖	☐
d. Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☐	☐	✖	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	✖	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	✖	☐

The following evaluation of biological resources on the project site derives from a biological survey conducted by Wood Biological Consulting, Inc. in July 2016. In addition to the assessment of the biological resources on the project site, this report includes recommendations for the preservation and conservation of biological resources through project site design. It is noted that because the improvements to the existing booster pump station site would be limited to the existing masonry enclosure and, thus, would not disturb any previously undisturbed land, impacts related to such are dismissed from the following analysis.

The biological study area (BSA) consists of the boundaries of the subject parcel (729-09-001) in which the project site is located **(Figure 11)**. In addition, in order to obtain background information regarding the recorded distribution of special- status species in the BSA, a new query was conducted in March 2024 for published records of special-status plant and wildlife species within the project vicinity using the California Natural Diversity Database (CNDDB) Rarefind 5 application, which includes information from databases maintained by the U.S. Fish and Wildlife Service (USFWS) and the California Native Plant Society (CNPS). The CNDDB query encompassed a search area of the U.S. Geological Survey (USGS) quadrangle in which the project site is located (Mount Sizer), as well as the eight contiguous quadrangles surrounding Mount Sizer. It should be noted that focused wildlife or botanical surveys were not conducted as part of the Wood Biological Consulting, Inc. biological survey; such surveys were not warranted for the purposes of this analysis.

The subject parcel, located at 3000 East Dunne Avenue, is owned by the City of Morgan Hill. Covering a total of 4.36 acres of unimproved land, the reservoir site is situated in a formerly rural area that has been developed with numerous small residential neighborhoods clustered on a narrow ridge separating Tennant Creek and Anderson Lake from the bottom lands of Santa Clara Valley. The region was under relatively intensive cultivation as early as the 1870s. By the late Nineteenth Century, most of the Catherine Dunne Ranch property had been subdivided into ranchettes, coinciding with the founding of the community of Morgan Hill (Archives and Architecture LLC, 2012).

Base map source: Santa Clara Valley Habitat Agency, Geobrowser

DUNNE HILLSIDE WATER RESERVOIR Source: Wood Biological Consulting, Inc. (2016)

The BSA is located on a southwest-facing slope at elevations from 710 to 840 feet AMSL. The project site appears as a remainder parcel isolated by East Dunne Avenue to the west and residential neighborhoods to the north, east and south. Extensive open grasslands are contiguous with the subject parcel, extending eastward. Eastward, beyond Anderson Lake, are vast open lands of the Mt. Hamilton Range, reaching all the way to the San Joaquin Valley.

Vegetative and Wildlife Habitats in the Project Area. The BSA is dominated by non-native annual grassland habitat with scattered oak trees. A narrow ravine runs past the southern boundary of the property, supporting coast live oak woodland. A portion of such habitat extends into the BSA. Wetlands, surface tributaries, and open channels do not occur within the BSA. **Figure 11** presents the distribution of habitats on the project site.

Non-native Annual Grassland. Non-native annual grassland covers a majority of the BSA. Based on the predominance of non-native grasses, the site has evidently been subjected to a long history of grazing. The site is dominated by wild oats (*Avena fatua*) and co-dominated by false brome (*Brachypodium distachyon*), Italian ryegrass (*Festuca perennis*), summer mustard (*Hirschfeldia incana*), bristly ox-tongue (*Helminthotheca echioides*), yellow starthistle (*Centaurea solstitialis*), and spring vetch (*Vicia sativa*).

Other common, non-native forbs and grasses characteristic of the on-site plant community include Italian thistle (*Carduus pycnocephalus*), prickly lettuce (*Lactuca serriola*), soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), and bur-clover (*Medicago polymorpha*). Additional scattered native species were recorded, including California poppy (*Eschscholzia californica*), soap plant (*Chlorogalum pomeridianum*), annual willowherb (*Epilobium brachycarpum*), and coyotebrush (*Baccharis pilularis*). Three mature valley oaks (*Quercus lobata*) occur in the grassland.

As a common, widespread, and non-natural plant association, non-native annual grassland does not have a global or State rarity ranking. Unless found to harbor special-status species, impacts to non-native annual grassland would not typically meet the significance criteria pursuant to CEQA guidelines.

Grasslands may support a variety of reptiles and amphibians including alligator lizard (*Elgaria* spp.), common kingsnake (*Lampropeltis getula*), gopher snake (*Pituophis catenifer*), northern Pacific rattlesnake (*Crotalus oreganus*), ring-necked snake (*Diadophis punctatus*), and western fence lizard (*Sceloporus occidentalis*), among others. Such habitat also attracts avian seed-eating and insect-eating species of birds and mammals. California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), and western meadowlark (*Sturnella neglecta*) are a few seed-eaters that nest and forage in grasslands. Insect-eaters such as barn swallow (*Hirundo rustica*), western bluebird (*Sialia mexicana*), and western scrub-jay (*Aphelocoma californica*) commonly forage in grasslands. In the project region, burrowing owl (*Athene cunicularia*) may nest and forage in grasslands where the vegetation is kept low by grazing or regular mowing.

Grasslands are important foraging grounds for aerial and ground foraging insect-eating bat species in the genus *Myotis*. A large number of other mammal species such as black-tailed jackrabbit (*Lepus californicus*), Botta's pocket gopher (*Thomomys bottae*), brush rabbit (*Sylvilagus bachmani*), California ground squirrel (*Spermophilus beecheyi*), California vole (*Microtus californicus*), and deer mouse (*Peromyscus maniculatus*) also reside or forage within grasslands. Small rodents attract raptors (birds of prey) such as barn owls (*Tyto alba*) and great horned owls (*Bubo virginianus*) that hunt at night, as well as day-hunting raptors such as golden eagle (*Aquila chrysaetos*) and red-tailed hawk (*Buteo jamaicensis*). Mule deer (*Odoicoileus hemionus*) use grassland for grazing and, if the grass is tall enough, for bedding down at night. American badger (*Taxidea taxus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), and red fox (*Vulpes vulpes*) dig dens in grasslands for the rearing of young and daytime refuge, and, along with bobcats (*Lynx rufus*) will hunt in grasslands.

Animal species or their sign[3] detected within the on-site habitat during the biological survey include the

[3] Animal signs include tracks, vocalization, scat, white-wash, feathers, fur, shed skin, nests, burrows, prey remains, and dead individuals.

following relatively common species: American crow (*Corvus brachyrhynchos*), brush rabbit, California ground squirrel, mourning dove, mule deer, raccoon (*Procyon lotor*), red-tailed hawk, tree swallow (*Tachycineta bicolor*), turkey vulture (*Cathartes aura*), and western scrub-jay.

Coast Live Oak Woodland. Coast live oak woodland is typically found on north-facing slopes and shaded ravines in the southern and inland portions of the State and on more exposed, mesic sites in the north. Such communities are dominated by coast live oak (*Quercus agrifolia*), a drought-resistant evergreen tree that grows up to 80 feet tall and produces both deep taproots and extensive surface roots. The species frequently occurs in pure, dense stands with a closed canopy. Coast live oak woodlands can be found on alluvial terraces, canyon bottoms, stream banks, slopes, and flats, growing on deep, sandy or loamy soils with high organic matter content (Sawyer et al., 2009).

The BSA contains coast live oak woodland comprised of a mixed stand of trees confined to the lower slopes of a narrow ravine. In addition to coast live oak, valley oak makes up a substantial portion of the canopy. Scattered trees of California sycamore are rooted in the channel bottom. On the slopes, the understory consists primarily of the same herbaceous plant species described for non-native annual grassland, above, along with such characteristic understory species as poison oak (*Toxicodendron diversilobum*), blue wildrye (*Elymus glaucus*), rigid hedge nettle (*Stachys rigida*), California coffeeberry (*Frangula californica*), common snowberry (*Symphoricarpos albus* var. *laevigatus*), and California brome (*Bromus carinatus*).

Coast live oak woodland provides foraging, nesting, cover, and movement habitat for a variety of animal species. California newt (*Taricha torosa*) and California slender salamander (*Batrachoseps attenuatus*) can be found underneath surface litter, such as downed wood, leaf litter and bark. Pacific treefrog (*Pseudacris regilla*) and western toad (*Bufo boreas*) could also occur in oak woodland if suitable spawning pools are nearby. Reptiles often found in oak woodland include alligator lizard, common kingsnake, gopher snake, terrestrial garter snake (*Thamnophis elegans*), western fence lizard, and western skink (*Eumeces skiltonianus*).

Avian insect eaters, such as bushtit (*Psaltriparus minimus*), chestnut-backed chickadee (*Poecile rufescens*), dark-eyed junco (*Junco hyemalis*), and oak titmouse (*Baeopholus inornatus*) feed off of the foliage of oaks. Bark gleaner species, such as acorn woodpecker (*Melanerpes formicivorus*), Steller's jay (*Cyanocitta stelleri*), and western scrub-jay feed on insects as well as acorns. California quail and California towhee (*Melozone crissalis*) are ground foliage gleaners. Great horned owl, red-shouldered hawk (*Buteo lineatus*), and red-tailed hawk may forage on small mammals in adjacent grasslands from the protection of the canopy of oak woodlands while Cooper's hawk (*Accipiter cooperi*) and sharp-shinned hawk (*Accipiter striatus*) may hunt small birds among the tree canopy.

Mammals associated with coast live oak woodland include the native western gray squirrel (*Sciurus griseus*) and the ubiquitous non-native eastern fox squirrel (*Sciurus niger*), which forage and nest in the canopy. The long-tailed weasel (*Mustela frenata*) hunts for shrews and California vole on the ground. Bobcat, dusky-footed woodrat (*Neotoma fuscipes*), gray fox, mountain lion (*Felis concolor*), mule deer, raccoon (*Procyon lotor*), and Virginia opossum (*Didelphis virginiana*) are also likely to utilize the understory of coast live oak woodland, consisting of poison oak, blackberry bushes, etc., for shelter, hunting, and for browse. Mature oaks and snags also provide nesting and roosting areas for a variety of special-status species of bats that occur in the region, including long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), pallid bat (*Antrozous pallidus*), and Yuma myotis (*Myotis yumanensis*).

Animal species or their sign detected within the BSA during the biological survey include tree swallow and western scrub-jay.

4a. Special-Status or Sensitive Species

Special-status Plant Species. According to the results of the CNDDB search, a total of 33 special-status plant species have been recorded within the nine-quadrangle search area. Based on site conditions, existing on-site habitats, and the geographic location of the project site, all 33 recorded special-status plants can be assumed to be absent from the BSA due to a lack of suitable habitat or substrate, geographic isolation from known

populations, or the fact that they would have been detectable during the site reconnaissance. Therefore, the proposed project would not result in any impacts to special-status plant species.

Special-status Animal Species. A total of 28 special-status animal species have been recorded within the nine-quadrangle search area. Based on the habitats and geographic location of the project site, 17 of the identified special-status animals can be determined to be absent from the BSA due to a lack of suitable habitat or substrate, geographic isolation from known populations, or the fact that they would have been detectable during the site reconnaissance. Another five target species are unlikely to occur on-site due to the disturbed context of the site, the presence of only marginally suitable habitat, and/or geographic isolation from known populations.

Suitable or marginally suitable habitat is considered to be present on-site for four of the identified special-status animal species, including four bird species. As such, the following species are considered to have the potential to occur within the BSA.

The potential exists for four special-status bird species to occur on site. These include the State-listed fully protected Swainson's hawk (*Buteo swainsoni*), as well as grasshopper sparrow (*Ammodramus savannarum*), golden eagle (*Aquila chrysaetos*), and white-tailed kite (*Elanus leucurus*). Of the foregoing species, only golden eagle has been reported from within a three-mile radius of the project site. Nonetheless, suitable nesting habitat is present on-site and in the immediate vicinity. In addition, suitable nesting habitat for numerous species of migratory birds is also present on-site and in the immediate vicinity. If occupied nests of any of these species are present on-site or the project vicinity at the time of construction, project implementation could result in potentially significant impacts to special-status bird species. However, incorporation of the mitigation measures outlined below would reduce such impacts to a less-than-significant level.

Although unlikely to occur on-site, due to the species' local significance, it is noted that multiple occurrences of California tiger salamander (*Ambystoma californiense*) have been recorded within a three-mile radius of the project site. However, suitable aquatic habitat for the species is not present within the BSA or in the project vicinity. Due to a lack of nearby breeding habitat, California tiger salamander is not expected to occur on-site, and thus, impacts to such species would not occur.

Based on the above, the proposed project would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS, and, with incorporation of mitigation, a **less-than-significant** impact would occur.

4b. Special-status Natural Communities

Special-status natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection under the Clean Water Act (CWA), Lake and Streambed Alteration Program (LSAP), and/or the Porter-Cologne Water Quality Control Act (Porter-Cologne). A number of communities have been designated as rare and are given the highest inventory priority (CNDDB, 2016; CDFG, 2010). Vegetation alliances given a rarity ranking of G1/S1, G2/S2, or G3/S3 are considered to be of high inventory priority by the CNDDB; impacts would be considered significant pursuant to CEQA. Alliances ranked as G4/S4 or G5/S5 are generally considered common enough to not be of concern; impacts would not normally be considered as significant pursuant to CEQA.

A total of two special-status natural community species have been recorded within the nine 7.5-minute USGS quadrangles including and surrounding the project site (CNDDB; 2016), including serpentine bunchgrass grassland and sycamore alluvial woodland. However, special-status natural communities do not occur within the BSA. As such, the proposed project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS, and a **less-than-significant** impact would occur.

4c. Protected Wetlands

Waters of the U.S. or wetlands are not present within the BSA. Therefore, the proposed project would not have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means, and a **less-than-significant** impact would occur.

4d. Fish and Wildlife Movement

Under CEQA, impacts to wildlife movement are considered significant if a project would interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Although lands to the south and east are open, undeveloped, and support extensive native habitats, the project site is not situated along a natural movement corridor and does not provide connectivity between two segregated areas of high value or unique habitats. The subject parcel is bordered by residential neighborhoods and is located adjacent to a busy surface street. The site does not support good cover habitat, topographic protection, or attractive features such as water sources. The subject property is not considered to serve as a significant wildlife migratory corridor. Therefore, the proposed project would not interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites, and a **less-than-significant** impact would occur.

4e. Local Policies and Ordinances

One adopted local ordinance is applicable to the proposed project. Pursuant to Chapter 12.32, Restrictions on Removal of Significant Trees, of the City of Morgan Hill's Municipal Code, it is unlawful to remove any significant tree or community of trees without a permit. Significant trees on residential properties include all indigenous species having a circumference of 18 inches (8.5 inches in diameter) or more measured at 4.5 feet vertically above the ground or immediately below the lowest branch, whichever is lower.

A total of four significant trees are present within the BSA, including three valley oak trees and one coast live oak tree. Project implementation would not require the removal of any of these identified significant trees. Project implementation would result in no impacts to significant trees. As such, the proposed project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, and a **less-than-significant** impact would occur.

4f. Habitat Conservation Plans

The proposed project constitutes a covered activity under the Santa Clara Valley Habitat Plan (SCVHP) (Plan; ICF International, 2012). The project proponent will be applying for coverage under the SCVHP. According to the SCVHP Geobrowser program, the project site is not located within a designated Plant or Wildlife Survey Area for any covered species.[4] In addition, the SCVHP Geobrowser program indicates that the project site is located outside of the SCVHP Burrowing Owl Fee Area, and is not identified in the SCVHP as Occupied Nesting Burrowing Owl Habitat, Potential Burrowing Owl Nesting/Overwintering Habitat Depending on Site Conditions, or Overwintering Only Habitat. Furthermore, the SCVHP designates the site as California Annual Grassland; as such, development of the project would require the payment of a Fee Zone A (Ranchlands and Natural Lands) Land Cover Fee. Given compliance with SCVHP requirements and payment of the applicable Land Cover Fee, the proposed action would be consistent with an approved local, regional, or state habitat conservation plan, and the impact would be **less than significant**.

Mitigation Measures (MM) – Biological Resources (BIO)

The measure outlined below shall be implemented to avoid, minimize, or mitigate impacts to biological resources that would result from project implementation. With the incorporation of the following measure,

[4] Santa Clara Valley Habitat Agency. *Geobrowser.* Available at: http://www.hcpmaps.com/habitat/. Accessed March 2024.

significant impacts to special-status wildlife species would be reduced to a less-than-significant level.

MM-BIO-1: Special-Status and Migratory Bird Species.

The following avoidance measures shall be required to avoid the project's potential effects on Swainson's hawk, grasshopper sparrow, golden eagle, white- tailed kite, or any other special-status or migratory bird species.

a. *If land clearing and grading are to be conducted outside of the breeding season (i.e., September 1 through January 31), a preconstruction survey for nesting migratory birds is not warranted.*

b. *If land clearing and grading are to be conducted during the breeding season (i.e., February 1 through August 31), a preconstruction nesting bird survey shall be conducted. The survey shall be performed by a qualified biologist no more than seven days prior to the initiation of work. If no nesting or breeding activity is observed, work may proceed without restrictions. To the extent allowed by access, all active nests identified within 76 m (250 ft) for raptors and 15 m (50 ft) for passerines shall be mapped.*

c. *For any active nests found near the construction limits (76 m [250 ft] for raptors and 15 m [50 ft] for passerines) the Project Biologist shall make a determination as to whether or not construction activities are likely to disrupt reproductive behavior. If it is determined that construction is unlikely to disrupt breeding behavior, construction may proceed. If it is determined that construction may disrupt breeding, the no-construction buffer zone shall be expanded; avoidance is the only mitigation available. The ultimate size of the no-construction buffer zone may be adjusted by the Project Biologist based on the species involved, topography, lines of site between the work area and the nest, physical barriers, and the ambient level of human activity.*

d. *If it is determined that construction activities are likely to disrupt raptor breeding, construction activities within the no-construction buffer zone may not proceed until the project biologist determines that the nest is long longer occupied.*

e. *If maintenance of a no-construction buffer zone is not feasible, the Project Biologist shall monitor the nest(s) to document breeding and rearing behavior of the adult birds. If it is determined that construction-related activities are likely to cause nest abandonment, work shall cease immediately and the CDFW shall be contacted for guidance. Work may not resume until an agreement has been reached with the authorities specifying the conditions under which work may proceed.*

With the incorporation of the foregoing mitigation measure, any potential impacts to special-status or other migratory birds would be reduced to a less-than-significant level.

5. CULTURAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☐	☐	✖
b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?	☐	☐	✖	☐
c. Disturb any human remains, including those interred outside of dedicated cemeteries.	☐	☐	✖	☐

The evaluation of historic resources on the project site is based upon field reconnaissance of the project area conducted on July 6, 2016, a review of the listed historic properties presented in the Draft EIR (DEIR) for the City of Morgan Hill 2035 General Plan, and the City's Historical Resources Code (Chapter 18.75 Morgan Hill Municipal Code). In addition, a records search of the California Historical Resources Information System (CHRIS) was performed by the North Central Information Center (NWIC) for cultural resource site records and survey reports within the proposed project area, as well as a records search of the Native American Heritage Commission (NAHC) Sacred Lands File.[5,6] It is noted that because the improvements to the existing booster pump station site would be limited to the existing masonry enclosure, and, thus, would not disturb any previously undisturbed land, impacts related to such are dismissed from the following analysis.

5a. Historical Resources

The proposed water reservoir site consists of one parcel (APN 729-09-001) comprising approximately 4.36 acres that have been historically used as open space. The project site is not included on the City's list of historic properties and does not contain any structures. In addition, based on the results of the CHRIS search, the State Office of Historic Preservation Directory (which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places) indicates recorded buildings or structures are not located in or adjacent to the project site. Therefore, the proposed project would not result in direct or indirect effects on historic resources, and **no impact** would occur.

5b, 5c. Archaeological Resources and Human Remains

Archaeological surveys conducted in Morgan Hill have identified numerous precontact sites with shell midden components, including human burials, indicating the potential for additional undiscovered archeological resources to be discovered in the City. The records search of the NAHC Sacred Lands File conducted for the proposed project returned negative results, indicating that known cultural resources are not present on the project site. However, previously unrecorded archaeological deposits that meet the definition of unique archaeological resources under CEQA could be damaged or destroyed by ground disturbing activities associated with the proposed project. Should such resources occur on-site, the ability of the deposits to convey their significance, either as containing information important in prehistory or history, or as possessing traditional or cultural significance to Native American or other descendant communities, would be materially impaired. According to the Morgan Hill General Plan EIR, Native American archaeological sites in the Morgan Hill area are primarily situated on the Santa Clara Valley floor near former and existing sources of fresh water. Based on this criterion, the potential for archaeological resources to occur on the project site is considered to be low.

For projects permitted under the 2035 General Plan that are not located within an archaeological sensitivity area and/or contain known archaeological resource, the following City standard conditions of approval related to the protection of historical and archaeological resources would be implemented, consistent with Section 18.60.090

[5] California Historical Resources Information System. *Record search results for the proposed East Dunne Hillside Water Reservoir Project.* June 30, 2023.

[6] Native American Heritage Commission. *East Dunne Hillside Water Reservoir Project, Santa Clara County.* July 7, 2023.

of the City's Municipal Code:

A. The developer shall enter into written contracts with an archaeologist and the Tamien Nation Tribe, and pay all fees associated with the activities required by this condition. The following policies and procedures for treatment and disposition of inadvertently discovered human remains or archaeological materials shall apply:

    1. Prior to start of grading or earthmoving activity (includes demolition and moving of heavy equipment on site) on the "first day of construction", the archaeologist and Tamien Nation Tribal Monitor shall hold a preconstruction meeting for the purposes of "cultural sensitivity training" with the general contractor and subcontractors.

    2. An archaeologist and a Tamien Nation Tribal Monitor shall be present on-site to monitor all ground disturbing activities and an archaeologist shall be on-call. Where historical or archaeological artifacts are found, work in areas where remains or artifacts are found will be restricted or stopped until proper protocols are met, as described below:

        a) Work at the location of the find will halt immediately within fifty feet of the find. If an archaeologist is not present at the time of the discovery, the applicant shall contact an archaeologist for evaluation of the find to determine whether it qualifies as a unique archaeological resource as defined by this chapter.

        b) If the find is determined not to be a Unique Archaeological Resource, construction can continue. The archaeologist will prepare a brief informal memo/letter in collaboration with a tribal representative that describes and assesses the significance of the resource, including a discussion of the methods used to determine significance for the find;

        c) If the find appears significant and to qualify as a unique archaeological resource, the archaeologist will determine if the resource can be avoided and will detail avoidance procedures in a formal memo/letter; and

        d) If the resource cannot be avoided, the archaeologist in collaboration with a tribal representative shall develop within forty-eight hours an action plan to avoid or minimize impacts. The field crew shall not proceed until the action plan is approved by the Development Services Director. The action plan shall be in conformance with California Public Resources Code 21083.2.

    3. The following policies and procedures for treatment and disposition of inadvertently discovered human remains or archaeological materials shall apply. If human remains are discovered, it is probable they are the remains of Native Americans,

        a) If human remains are encountered, they shall be treated with dignity and respect as due to them. Discovery of Native American remains is a very sensitive issue and serious concern. Information about such a discovery shall be held in confidence by all project personnel on a need-to-know basis. The rights of Native Americans to practice ceremonial observances on sites, in labs and around artifacts shall be upheld.

        b) Remains should not be held by human hands. Surgical gloves should be worn if remains need to be handled.

        c) Surgical mask should also be worn to prevent exposure to pathogens that may be associated with the remains.

    4. In the event that known or suspected Native American remains are encountered, or significant historic or archaeological materials are discovered, ground-disturbing activities shall be immediately stopped. Examples of significant historic or archaeological materials include, but are not limited to, concentrations of historic artifacts (e.g., bottles, ceramics) or prehistoric artifacts (chipped chert or obsidian, arrow points, ground stone mortars and pestles), culturally altered ash stained midden soils

associated with pre-contact Native American habitation sites, concentrations of fire-altered rock and/or burned or charred organic materials and historic structure remains such as stone lined building foundations, wells or privy pits. Ground-disturbing project activities may continue in other areas that are outside the exclusion zone as defined below.

5. An "exclusion zone" where unauthorized equipment and personnel are not permitted shall be established (e.g., taped off) around the discovery area plus a reasonable buffer zone by the contractor foreman or authorized representative, or party who made the discovery and initiated these protocols, or if on-site at the time or discovery, by the monitoring archaeologist and tribal representative (typically twenty-five to fifty feet for single burial or archaeological find).
6. The discovery locale shall be secured (e.g., 24-hour surveillance) as directed by the City or County if considered prudent to avoid further disturbances.
7. The Contractor Foreman or authorized representative, or party who made the discovery and initiated these protocols shall be responsible for immediately contacting by telephone the parties listed below to report the find and initiate the consultation process for treatment and disposition:
    - The City of Morgan Hill Development Services Director (408) 779-7247
    - The Contractor's Point(s) of Contact
    - The Coroner of the County of Santa Clara (if human remains found) (408) 793-1900
    - The Native American Heritage Commission (NAHC) in Sacramento (916) 653-4082
    - The Amah Mutsun Tribal Band (916) 481-5785 (H) or (916) 743-5833 (C)
    - The Tamien Nation (707) 295-4011 (office) and (925) 336-5359 (THPO)
8. The Coroner has two working days to examine the remains after being notified of the discovery. If the remains are Native American the Coroner has 24 hours to notify the NAHC.
9. The NAHC is responsible for identifying and immediately notifying the Most Likely Descendant (MLD). (Note: NAHC policy holds that the Native American Monitor will not be designated the MLD.)
10. Within 24 hours of their notification by the NAHC, the MLD will be granted permission to inspect the discovery site if they so choose.
11. Within 24 hours of their notification by the NAHC, the MLD may recommend to the City's Development Services Director the recommended means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The recommendation may include the scientific removal and non-destructive or destructive analysis of human remains and items associated with Native American burials. Only those osteological analyses or DNA analyses recommended by the appropriate tribe may be considered and carried out.
12. If the MLD recommendation is rejected by the City of Morgan Hill the parties will attempt to mediate the disagreement with the NAHC. If mediation fails then the remains and all associated grave offerings shall be reburied with appropriate dignity on the property in a location not subject to further subsurface disturbance.

Compliance with the foregoing Condition of Approval would reduce potentially significant impacts on archaeological resources to a **less-than-significant** level.

6. ENERGY. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☐	✖
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	✖

The main forms of available energy supply are electricity, natural gas, and oil. A description of the 2022 California Green Building Standards Code (CALGreen Code) and the Building Energy Efficiency Standards, with which the proposed project would be required to comply, as well as discussions regarding the proposed project's potential effects related to energy demand during construction and operations are provided below.

California Green Building Standards Code. The 2022 California Green Building Standards Code, otherwise known as the CALGreen Code (CCR Title 24, Part 11) is a portion of the California Building Standards Code (CBSC), which became effective on January 1, 2023.[7] The purpose of the CALGreen Code is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices. The CALGreen standards regulate the method of use, properties, performance, types of materials used in construction, alteration repair, improvement and rehabilitation of a structure or improvement to property. The provisions of the code apply to the planning, design, operation, construction, use, and occupancy of every newly constructed building or structure throughout California. Requirements of the CALGreen Code include, but are not limited to, the following measures:

- Compliance with relevant regulations related to future installation of EV charging infrastructure in residential and non-residential structures;
- Indoor water use consumption is reduced through the establishment of maximum fixture water use rates;
- Outdoor landscaping must comply with the California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), or a local ordinance, whichever is more stringent, to reduce outdoor water use;
- Diversion of 65 percent of construction and demolition waste from landfills; and
- Mandatory use of low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particle board.

Building Energy Efficiency Standards. The 2022 Building Energy Efficiency Standards are a portion of the CBSC that expand upon energy efficiency measures from the 2019 Building Energy Efficiency Standards resulting in a reduction in energy consumption from the 2019 standards. Energy reductions relative to previous Building Energy Efficiency Standards would be achieved through various regulations including requirements for the use of high efficacy lighting, improved water heating system efficiency, and high-performance attics and walls.

6a, 6b. Energy Impacts

Construction and energy use associated with the proposed project are discussed below.

Construction Energy Use. Due to the nature of the proposed upgrades to the existing booster pump station, the following analysis focuses on construction energy impacts related to the proposed water reservoir.

Construction of the proposed reservoir would involve on-site energy demand and consumption related to use of oil in the form of gasoline and diesel fuel for construction worker vehicle trips, hauling and materials delivery truck trips, and operation of off-road construction equipment. In addition, diesel-fueled portable generators may be

[7] California Building Standards Commission. *California Green Building Standards Code*. 2022.

necessary to provide additional electricity demands for temporary on-site lighting, welding, and for supplying energy to areas of the site where energy supply cannot be met via a hookup to the existing electricity grid. Project construction would not involve the use of natural gas appliances or equipment.

Even during the most intense period of construction, due to the different types of construction activities (e.g., site preparation, grading, reservoir installation), only portions of the project site would be disturbed at a time, with operation of construction equipment occurring at different locations on the project site, rather than a single location. In addition, all construction equipment and operation thereof would be regulated pursuant to the CARB In-Use Off-Road Diesel Vehicle Regulation. The In-Use Off-Road Diesel Vehicle Regulation is intended to reduce emissions from off-road, heavy-duty diesel vehicles in California by imposing limits on idling, requiring all vehicles to be reported to CARB, restricting the addition of older vehicles into fleets, and requiring fleets to reduce emissions by retiring, replacing, or repowering older engines, or installing exhaust retrofits. In addition, as a means of reducing emissions, construction vehicles are required to become cleaner through the use of renewable energy resources. The In-Use Off-Road Diesel Vehicle Regulation would therefore help to improve fuel efficiency for equipment used in construction of the proposed project. Technological innovations and more stringent standards are being researched, such as multi-function equipment, hybrid equipment, or other design changes, which could help to further reduce demand on oil and limit emissions associated with construction.

Based on the above, the temporary increase in energy use occurring during construction of the proposed project would not result in a significant increase in peak or base demands or require additional capacity from local or regional energy supplies. In addition, the proposed project would be required to comply with all applicable regulations related to energy conservation and fuel efficiency, which would help to reduce the temporary increase in demand.

Operational Energy Use. In response to the growing climate crisis, the City has determined that natural gas use in local buildings, which accounts for approximately one-third of the community's carbon footprint, represents the City's greatest opportunity to reduce future GHG emissions. Requiring all new buildings to be constructed without natural gas will dramatically reduce future emission growth as electricity procured by Silicon Valley Clean Energy is 100 percent carbon free. The City Council adopted Ordinance No. 2306 on November 6, 2019, which prohibits natural gas infrastructure in new buildings. According to the project designs, the proposed project would not be designed to include natural gas.

Energy use associated with operation of the proposed water reservoir would be typical of water utility uses, requiring electricity for exterior lighting, electronic equipment, machinery, security systems, and more. Maintenance activities during operations, such as landscape maintenance, would involve the use of electric or gas-powered equipment. In addition to on-site energy use, the proposed project would result in transportation energy use associated with vehicle trips generated by the proposed development (i.e., trips for maintenance).

With regard to transportation energy use, the proposed project would comply with all applicable regulations associated with vehicle efficiency and fuel economy. In addition, as discussed in Section 17, Transportation, of this Initial Study, the proposed project meets the Governor's Office of Planning and Research (OPR) screening thresholds. As such, the proposed project would not result in a significant impact related to vehicle miles traveled (VMT), or, by extension, fuel consumption. Therefore, the proposed project would not result in an adverse impact related to transportation energy use.

As previously discussed, the proposed project would include the replacement of two existing pumps at the existing booster pump station with larger pumps. Although the new pumps would be larger than the existing pumps in the station, the new pumps would still be electric. In addition, the new electric pumps would comply with all current design specifications for energy efficiency. Thus, operational energy use associated with the upgrades to the existing booster pump station would be similar to current energy demand.

Conclusion. Based on the context above, construction and operation of the proposed project would not result in wasteful, inefficient, or unnecessary consumption of energy resources or conflict with or obstruct a State or local plan for renewable energy or energy efficiency. Thus, **no impact** would occur.

7. GEOLOGY AND SOILS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	✖	☐
ii. Strong seismic ground shaking?	☐	☐	✖	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	✖	☐
iv. Landslides?	☐	☐	✖	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	✖	☐	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	✖	☐
d. Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	✖	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	✖
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	✖	☐

The evaluation of site geological and soils conditions and the effects of these conditions on the proposed project, as well as the impacts of local geological and soils conditions on project facilities, is based upon a Geotechnical Investigation for the project site prepared by Cal Engineering & Geology (CE&G) in June 2016 (see Attachment 3).[8] Because the proposed improvements to the existing booster pump station would consist of the replacement of two existing pumps and would not involve ground-disturbing activities, the following analysis is focused on the proposed water reservoir.

Existing Conditions. The hilly terrain encompassing the site is located on the western flank of the Diablo Range, one of the component ranges of the Coast Ranges geomorphic province of California. This province is characterized by northwest-southeast trending mountain ranges and intervening valleys such as those occupied by the San Francisco Bay and the Santa Clara Valley. The slopes of the reservoir site descend westward to the floor of Coyote Valley, within which the City of Morgan Hill is centered.

Regional geologic mapping by Wentworth and others (1999) shows the upslope (eastern) part of the site as being underlain by the Pliocene-age Basalt of Anderson and Coyote Reservoirs. The western part of the site vicinity is mapped as being underlain by the Silver Creek Gravels of similar age. Slightly younger deposits known as the Packwood Gravels lie just upslope and east of the site. The Silver Creek Gravels are described as consisting of interbedded conglomerate, sandstone, siltstone, tuffaceous sediment, tuff, and basalt. The Basalt of Anderson and Coyote Reservoirs is described as pyroclastic andesite and basalt flows. The Packwood Gravels consist typically of gravel, cobbles, sandy conglomerate, silty sandstone, sandy siltstone and minor claystone. Regionally, all of these units overlie ophiolitic (ocean floor) and Franciscan Complex metamorphic rocks; the nearest exposures of these rocks is to the north, along the spine of the ridge crest west of Anderson Lake.

[8] Cal Engineering & Geology, Inc. *Geotechnical Investigation Report: East Dunne Hillside Water Reservoir Project, Morgan Hill, California*. August 11, 2016.

Detailed geologic mapping performed for the City of Morgan Hill (PGE, 1991) shows similar rock types, although the names and ages assigned to the map units differs from those used by Wentworth and others. As shown on PGE (1991), the site is underlain by rocks of the Santa Clara Formation. In general, this formation consists of "poorly to well consolidated" non-marine sediments largely reflective of an alluvial fan setting. Within this formation are intervals of basalt lava flows and flow breccia (map unit QTsb); at least two of these intervals are shown on the City Geologic Map, although this mapping is somewhat interpretive. Geologic interpretation and analysis performed for the Anderson Dam Seismic Retrofit Project highlighted extensive folding and possible broken folds within the Santa Clara Formation; the implication of this for the reservoir site is that belts of rock shown as continuous on maps such as PGE (1991) may in fact not be nearly as continuous.

7a. Seismic Hazards

The proposed project includes:

- an approximately 850,000-gallon steel water supply reservoir approximately 80 feet in diameter;
- a 15-foot-wide perimeter access strip immediately encircling the reservoir;
- tiered retaining walls along the northern side of approximately half of the reservoir pad;
- a reservoir access road stemming northeastward from the northeast-bound lane of East Dunne Avenue;
- retaining walls along portions of the access road;
- connective water piping between the reservoir/future pump station and East Dunne Avenue;
- installation of an underground biofiltration vault with rock-armored outfall, inclusive of energy dissipation headwall and rip rap apron on the south side of the access road, near its intersection with East Dunne Avenue; and
- landscaping to screen and filter views of the water reservoir.

In addition, the proposed project would include a future pump station and slab-on-grade pad.

The project site is shown on the City of Morgan Hill Ground Movement Potential Map (PGE, 1991) as lying within map unit "Ps," which is defined as "relatively unstable surficial deposits or bedrock materials including landside debris, colluvium, and weak bedrock, commonly less than about 10 feet thick on moderate to steep slopes. Subject to shallow, slow-moving landsliding and soil creep."

The site is not located within a California Geological Survey (CGS) Seismic Hazard Zone (CGS, 2006). These zones were established to trigger further evaluation (for certain projects) of the potential for seismically induced landsliding in hillside areas, and liquefaction potential in valley floor areas.

Fault Rupture. Active faults are not mapped as passing through the site in the general project vicinity. Several fault strands are mapped west of the Calaveras fault and east of the toe of the Diablo Range. Collectively, these faults are referred to as the Coyote Creek-Range Front fault zone, which consists of an anastomosing zone of variable width that juxtaposes different rock types. The closest mapped fault strand is shown by PGE (1991) as passing near the valley floor/toe-of-slope hinge, approximately 1,400 feet west of the site. This fault, the Range Front Fault of PGE (1991), was evaluated together with the Coyote Creek fault in depth as part of investigations for the Anderson Dam Seismic Retrofit Project (HDR, 2013). In summary, work by several investigators concluded that the fault is not seismically capable if it is even present as mapped.

The site is not mapped within a CGS Earthquake Fault Rupture Hazard Zone (Bryant and Hart, 2007). The site is not located within a fault rupture hazard zone established by the local jurisdiction (Morgan Hill General Plan 2035 Update, Draft Housing and Safety Element, accessed February 2024).

Ground Shaking. The East Dunne reservoir site is located within the greater San Francisco Bay Area, which is recognized as one of the more seismically active regions of California. Because the East Dunne reservoir site is in the seismically active San Francisco Bay Area, the site is likely to experience significant ground shaking (moment magnitude greater than 7.0) from one or more of the nearby active faults during the design lifetime of the project. Two seismogenic (capable of generating significant earthquakes) earthquake faults near the site are the Calaveras fault (approximately 1.2 miles east of the site, essentially coincident with the axis of Anderson Lake); and the San Andreas fault (approximately 12.2 miles) west of the site.

ABAG has estimated the degree of ground shaking that could occur in the San Francisco Bay area on a regional basis and estimates that the project area could experience strong ground shaking in the event of an earthquake on one of the regional faults.[9]

As part of its review, the City of Morgan Hill Community Development Agency Building Division would review the planned design to ensure compliance with the California Building Code (CBC), as relevant. As a result, potential impacts related to ground shaking would be less than significant.

Liquefaction. Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary, but essentially total, loss of shear strength because of pore pressure build-up under the reversing cyclic shear stresses associated with earthquakes. Soils most susceptible to liquefaction are saturated, clean, loose, fine-grained sands and silts. The primary factors affecting soil liquefaction include:

1) intensity and duration of seismic shaking; 2) soil type and relative density; 3) overburden pressure; and

4) depth to ground water.

The soil and groundwater conditions needed for soil liquefaction do not appear to be present in the site vicinity, and none of the on-site earth materials are considered susceptible to liquefaction. The soils encountered at the site are relatively thin (combined thickness of colluvium and uppermost severely weathered rock on the order of up to 10 feet in thickness), contain significant proportions of clay and silt, and are relatively stiff in consistency. Additionally, shallow (within 50 ft below ground surface) groundwater conditions are not present in the site soils. Based on subsurface information collected during the Geotechnical Investigation, because the groundwater level is generally low, the granular soils locally present at the site are generally too dense to liquefy, and because the clayey soils locally present at the site are sufficiently plastic and stiff to preclude liquefaction, the potential for liquefaction at the project site is very low.

Conclusion. Based on the above, the proposed project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving fault rupture, ground shaking, or liquefaction, and a **less-than-significant** impact would occur.

7b. Erosion Hazards

The potential for severe erosion is considered to be low to moderate in the colluvium and in sedimentary intervals of the Santa Clara Formation bedrock, and low in the flow/breccia intervals of the Santa Clara Formation. However, because the existing bedrock is relatively nutrient-poor, it will be difficult for vegetation to become properly established, resulting in a higher potential for slope erosion.

The Geotechnical Investigation provides the following recommendations to control potential erosion hazards on the project site.

- Disturbing areas around the project site should be minimized as much as possible. Areas disturbed by construction activities should be protected from erosion by hydroseeding and/or installing erosion control mats.
- The tops of fill or cut slopes should be graded in such a way as to prevent water from flowing freely

[9] Association of Bay Area Governments. *Resilience*. Available at: http://quake.abag.ca.gov/earthquakes/santaclara/. Accessed February 2024.

across the face of the slopes. A positive gradient away from the tops of slopes should be provided to direct surface water runoff away from the slopes to suitable drainage points.

- Completed slopes should be provided with erosion control measures prior to the winter season following grading.
- Revegetation of graded slopes can be aided by retaining the organic-rich strippings within the upper few inches of on-site soil during the site stripping operations and spreading these materials in a thin layer (approximately 6 inches thick) on the graded slopes prior to the winter rains and following rough grading. When utilizing this method, it may be possible to reduce the amount of hydroseeding. All landscaped slopes should be maintained in a vegetated state after project completion. The use of native drought-tolerant vegetation is recommended. No pressurized irrigation lines should be placed on or near the tops of graded slopes.
- Collected surface water within the swales crossed by the access road should be conveyed by a pipe to a discharge point below any active sliding or gullying, and appropriate energy dissipaters should be constructed at the outlet points to reduce the potential for future slope instability or erosion/gullying.

Without implementation of these recommendations, geologic impacts related to erosion during construction could be significant. However, incorporation of the mitigation measure outlined below would reduce such impacts to **less than significant**.

7c, 7d. Geologic Stability and Soil Engineering Constraints

Unstable Geologic Units or Soil. The site is shown on the City of Morgan Hill Ground Movement Potential Map (PGE, 1991) as lying within map unit "Ps," which is defined as "relatively unstable surficial deposits or bedrock materials including landside debris, colluvium, and weak bedrock, commonly less than about 10 feet thick on moderate to steep slopes. Subject to shallow, slow-moving landsliding and soil creep."

Landslides. Regional landslide mapping (Nilsen, 1975; excerpt provided in CE&G, 2015) does not show any landslides at the site, although earthflow-style landslide deposits are shown in the general vicinity of the site. As shown on the City of Morgan Hill Geologic Map, colluvium occupies the topographic swale areas. Relatively restricted shallow sloughing (landsliding) has affected the colluvium in portions of the slopes south (downslope) of the site. Such shallow instability appears to have been associated with concentration of surface runoff in topographic swales. The nearest mapped landslide has an overall direction of movement that is westward, away from the slopes encompassing the site. A substantial spur ridge divides the portion of the regional slope affected by landsliding from the portion of the slope encompassing the site.

The Geotechnical Investigation indicates that the potential for deep-seated landsliding (involving bedrock) to adversely affect the site improvements is low under both static and seismic conditions, provided site improvements are appropriately designed and constructed and surface runoff is appropriately managed. This is based on several lines of evidence, including: the presence of interlayered basaltic rocks in an overall favorable orientation within the rock sequence observed; the lack of evidence for previous deep-seated landsliding with areas of interlayered basaltic rocks in the general region; and the site's location outside of a topographic swale, with minimal contributing watershed upslope.

There is a moderate potential for the previously mapped shallow landsliding on the steeper slopes below (south of) the access road to reactivate under current site conditions. However, due to the proposed drainage system that would be developed on-site, including energy dissipaters to reduce the potential for future slope instability, surface drainage in the project vicinity would be appropriately controlled, and the area would not receive the concentrated runoff that is judged to be a primary factor in the formation of landsliding, thereby lessening the potential for reactivation.

In addition, the Geotechnical Investigation provides recommendations for the proposed water reservoir tank foundations to be supported by a reinforced concrete ring foundation bearing in competent bedrock. By embedding the ring footings at least 24 inches below pad grade or lowest adjacent grade, whichever provides a deeper

embedment, the Geotechnical Investigation states that post-construction settlement of the reservoir foundations would be less than one inch.

Conclusion. The Geotechnical Investigation for the project site provides site-specific analysis that addresses potentially unstable geologic units and soils. Please see Section 7b above. Based on the above, a **less-than-significant** impact would occur.

7e. Alternative Wastewater Disposal Systems

Soils Incapable of Supporting Septic Tanks or Alternative Wastewater Disposal Systems. The project site is located within the Morgan Hill city limits and the area is served by the community's sewer system. Septic tanks or wastewater disposal systems would not be required for the project. As such, **no impact** would occur.

Mitigation Measures (MM) – Geology and Soils (GEO)

The measure outlined below shall be implemented to avoid, minimize, or mitigation impacts related to erosion and landslide hazards that would result from project implementation. With the incorporation of the following measure, significant impacts related to erosion would be reduced to a less-than-significant level.

MM-GEO-1: Erosion and Landslide Hazards.

Prior to grading permit issuance, the applicant shall submit a final design-level geotechnical report of the project site that provides final design recommendations for tank foundation and surface drainage controls to ensure slope stability hazards are minimized. The geotechnical report shall be reviewed and approved by the City Engineer, Chief Building Official, and a qualified Geotechnical Engineer to ensure that all geotechnical recommendations specified in the geotechnical report are properly incorporated and utilized in the project design in order to adhere to all geotechnical requirements contained in the California Building Code.

8. GREENHOUSE GAS EMISSIONS. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	✖	☐
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gasses?	☐	☐	✖	☐

8a, 8b. Greenhouse Gas Emissions

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. Therefore, the cumulative global emissions of GHGs contributing to global climate change can be attributed to every nation, region, and city, and virtually every individual on Earth. An individual project's GHG emissions are at a micro-scale level relative to global emissions and effects to global climate change; however, an individual project could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact. As such, impacts related to emissions of GHG are inherently considered cumulative impacts.

Construction of the proposed project would cumulatively contribute to increases of GHG emissions. Estimated GHG emissions attributable to future development would be primarily associated with increases of carbon dioxide (CO_2) and, to a lesser extent, other GHG pollutants, such as methane (CH_4) and nitrous oxide (N_2O) associated with area sources, mobile sources or vehicles, utilities (electricity and natural gas), water usage, wastewater generation, and the generation of solid waste. The primary source of GHG emissions for the project would be mobile source emissions. The common unit of measurement for GHG is expressed in terms of annual metric tons of CO_2 equivalents ($MTCO_2e$/yr).

The proposed project is located within the jurisdictional boundaries of BAAQMD. The most recent BAAQMD Air Quality Guidelines were released in April 2023.[10] The updated GHG thresholds address more recent climate change legislation, including Senate Bill (SB) 32, and provide qualitative thresholds related to Buildings and Transportation.

Construction GHG emissions are a one-time release and are, therefore, not typically expected to generate a significant contribution to global climate change. Neither the City nor BAAQMD has an adopted threshold of significance for construction-related GHG emissions and does not require quantification. Nonetheless, the proposed project's construction GHG emissions, have been estimated using CalEEMod and the same assumptions discussed in Section 3, Air Quality, of this Initial Study (see Attachment 2). Based on the modeling results, construction of the proposed project would result in total GHG emissions of 185 $MTCO_2e$ over the entire construction period.

Potential impacts related to GHG emissions resulting from implementation of the proposed project are considered in comparison with BAAQMD's adopted thresholds of significance below.

BAAQMD Thresholds of Significance. The BAAQMD's adopted thresholds of significance for GHG emissions are qualitative, and address recent climate change legislation, including SB 32. According to the new thresholds of significance, a project must either include specific project design elements (e.g., exclude use of natural gas, achieve a specific reduction in project-generated VMT below the regional average) or be consistent with a local GHG reduction strategy that meets the criteria under State CEQA Guidelines Section 15183.5(b).[11]

Considering the nature of the proposed project, new substantial GHG emissions would not be generated during project operations. Operation of the proposed project would not increase GHG emissions, as the operational phase

[10] Bay Area Air Quality Management District. *2022 California Environmental Quality Act Guidelines*. April 2023.
[11] Bay Area Air Quality Management District. *CEQA Thresholds for Evaluating the Significance of Climate Impacts From Land Use Projects and Plans*. April 2022.

would only generate two new vehicle trips per week within the project area. Furthermore, the proposed project would not include the construction of any development that would require the use of natural gas. Therefore, the proposed project would not conflict with the BAAQMD's adopted thresholds of significance.

Conclusion. Based on the above, the proposed project would not be considered to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Thus, a **less-than-significant** impact would occur.

9. HAZARDS AND HAZARDOUS MATERIALS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	✖	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☐	☐	✖	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	✖
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	✖	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	✖
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	✖	☐
g. Expose people or structures, either directly or indirectly, to the risk of loss, injury or death involving wildland fires?	☐	☐	✖	☐

9a. Routine Transport, Use, or Disposal of Hazardous Materials

Development of a new water reservoir and associated distribution facilities at the project site, as well as the proposed improvements to the existing booster pump station, would not involve the routine transport, use, or disposal of hazardous materials. Therefore, operation of the proposed project would not create a significant hazard to the public, and a **less-than-significant** impact would occur.

9b, 9d. Release of or Exposure to Hazardous Materials

Because the proposed upgrades to the existing booster station would not include the disturbance of land that has not already been subject to significant disturbance, the following analysis is primarily focused on impacts related to the proposed water reservoir.

Naturally Occurring Asbestos. Naturally occurring asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. However, the project site is not located in an area where naturally occurring asbestos is likely to be present, and therefore, impacts associated with exposure to naturally occurring asbestos would not occur.[12]

Site History and Description. The proposed reservoir site consists of one parcel (APN 729-09-001) located immediately north of the intersection of Flaming Oak Lane and East Dunne Avenue. Historical aerial photographs taken between 1956 and 2012 indicate that the project site remained undeveloped throughout the entire period available. As such, the project site has not been subject to a past use that involved the storage or use of hazardous materials. East Dunne Avenue was extended into the eastern hillsides of Morgan Hill around

[12] Department of Conservation Division of Mines and Geology. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos Report, August 2000*. Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5126473.pdf. Accessed February 2024.

1980 and the surrounding hillside areas were subsequently developed with residential neighborhoods.

A review of the EnviroStor database maintained by the State Department of Toxic Substance Control (DTSC) for the local area shows that occurrences of leaking underground storage tanks (LUST) are not present within a 1.25-mile radius of the site.[13] Similarly, according to the State Water Resources Control Board (SWRCB) GeoTracker, although one leaking underground storage tank (LUST), located at 2055 East Dunne Avenue, is within a 1.25-mile radius of the site, cleanup of the site has been completed, and the case has been closed.[14]

Based upon agency records and historic aerial photo information, the proposed project would not have the potential to result in a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials. Therefore, the impact would be **less than significant**.

9c. Hazardous Emissions or Use of Acutely Hazardous Materials

Hazardous emissions are TACs identified by the CARB and the BAAQMD. Extremely hazardous materials are defined by the State of California in Section 25532 (2)(g) of the Health and Safety Code. During project construction, only common hazardous materials such as paints, solvents, cements, adhesives, and petroleum products (such as asphalt, oil, and fuel) would be used, none of which are considered extremely hazardous materials. As discussed in Section 3, Air Quality, the only TAC that would be emitted during construction is DPM.

The closest school to the project site is Jackson Academy of Math & Music Elementary School, located at 2700 Fountain Oaks Drive, approximately 0.5 mile west of the site. As discussed in Section 3d, Exposure of Sensitive Receptors, operation of project-related diesel construction equipment would result in less-than-significant cancer and non-cancer risks on nearby sensitive receptors.

Operation of the proposed reservoir would not include the use of extremely hazardous materials or emissions of TACs. Therefore, **no impact** would occur related to emitting hazardous emissions or handling hazardous materials within 0.25-mile of a school.

9e. Airports/Airstrips

The nearest airport to the proposed project is the San Martin Airport, located approximately 3.5 miles southwest of the project site. Therefore, **no impact** would occur associated with safety hazards due to location of the project within two miles of a public airport or in the vicinity of a private airstrip.

9f. Emergency Plans

The project would not impair or physically interfere with an adopted emergency response or emergency evacuation plan. Therefore, the project's impact on emergency response would be **less than significant**.

9g. Wildland Fire Hazards

The California Department of Forestry and Fire Protection (CAL FIRE) describes "wildland/urban interface" as the condition where highly flammable native vegetation, such as trees and grasses, meets high-value structures, such as homes. Historically, homes in these wildland/urban intermix boundary areas were particularly vulnerable to wildfires because they were built with a reliance on fire department response for protection rather than fire resistance, survivability, and self-protection. However, in the recent past, a number of serious wildfires have highlighted the need for regulating development in these hazardous areas. The severity of the wildfire hazard is based on fuel classification, topography (steepness of slope), and critical fire weather frequency. CAL FIRE defines Fire Hazard Severity Zones for areas within the state; a fire hazard is defined as a "measure of the likelihood of an area burning and how it burns."

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[13] Department of Toxic Substances Control. *EnviroStor*. Available at: https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=3000+east+dunne+avenue. Accessed February 2024.

[14] State Water Resources Control Board. *GeoTracker*. Available at: https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=3000+east+dunne+avenue#. Accessed February 2024.

CAL FIRE Fire Hazard Severity Zone (FHSZ) maps indicate areas for which the Board of Forestry has determined that the State of California has fiscal responsibility for wildland fire protection services as the State Responsibility Area (SRA), and areas for which local jurisdictions have fiscal responsibility as the Local Responsibility Area (LRA). SRAs include areas covered by forest or trees capable of producing forest products, and lands used for range or forage purposes. SRAs do not include lands owned by the federal government or lands within City boundaries. Thus, in Morgan Hill, the areas within the City limits primarily fall into the LRA category.

According to the City's Wildland Urban Interface Map, the project site is located in a High FHSZ.[15] Currently, the project area is disced to control growth of non-native grasses and prevent fire hazards in the project vicinity. Development of the proposed project would decrease the amount of vegetation on-site, thus removing potential sources of wildfire fuel. The proposed project would include the construction of an access drive to the water reservoir, which would facilitate access for continued vegetation control that would be included in the maintenance of the project site. In addition, the proposed project would improve reliability for required fire flows to be delivered to water system facilities serving Jackson Academy of Math & Music Elementary School. Therefore, the project would be beneficial to the region through improved wildfire suppression. With implementation of enhanced vegetation control, the potential impact of wildland fire hazards at the project site would be **less than significant**.

[15] City of Morgan Hill. *City of Morgan Hill Wildland Urban Interface*. Available at: https://www.morganhill.ca.gov/DocumentCenter/View/3037/Fire-Hazard-Severity-Zones-Adopted3-18-09?bidId=. Accessed February 2024.

10. HYDROLOGY AND WATER QUALITY. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	✖	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	✖
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i. Result in substantial erosion or siltation on- or off-site;	☐	☐	✖	☐
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	✖	☐
iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	✖	☐
iv. Impede or redirect flood flows?	☐	☐	☐	✖
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	✖
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	✖	☐

Because the proposed upgrades to the existing booster station would not include the disturbance of land that has not already been subject to significant disturbance, the following analysis is primarily focused on impacts related to the proposed water reservoir.

A Drainage Technical Memorandum consisting of an evaluation of drainage and runoff treatment requirements for the proposed project was prepared by Kennedy/Jenks Consultants (K/J).[16] The Drainage Technical Memorandum describes site drainage conditions, identifies relevant regulatory agency requirements, and specifies design and construction guidelines to ensure compliance with these guidelines. The following discussion summarizes the information presented in the Drainage Technical Memorandum; the complete memorandum is included as Attachment 4.

The site is located in the Pajaro River Watershed, which drains to Monterey Bay. Drainage from the site flows south and southwest to Tennant Creek, located approximately 0.25-mile south of the site. Water in Tennant Creek drains into East Little Llagas Creek, which flows into Llagas Creek, discharging to the Pajaro River. Precipitation in the Morgan Hill area is approximately 21.7 inches per year.

The majority of the project site consists of an open, grass-covered hillslope with sparse oak trees. The approximate slope of the site is 17 percent. A 440-foot-long concrete v-ditch runs along the southwestern side of the site, parallel to East Dunne Avenue. The drainage ditch conveys runoff flows to the southern end of the project site at the roadway where untreated runoff discharges to the street, flowing to a municipal storm drain on East Dunne Avenue near Flaming Oak Lane.

[16] Kennedy/Jenks Consultants. *Design Alternative Evaluation No. 3 – Site Drain Alternatives, E. Dunne Hillside Water Reservoir Project*. March 24, 2016.

10a, 10e. Water Quality

Regulatory Review. The following regulatory entities were referenced for guidance in determining the applicable regulatory issues associated with drainage and stormwater for the project.

- *City of Gilroy, City of Morgan Hill and County of Santa Clara:* Stormwater Management Guidance Manual for Low Impact Development & Post-Construction Requirements, June (Morgan Hill, 2015 or Guidance Manual)
- *Santa Clara County:* Drainage Manual, 14 August (SCCDM, 2007 or Drainage Manual)
- *Santa Clara Valley Water District:* applicable construction permitting requirements
- *State of California:* Phase II Small MS4 General Permit; Regional Water Quality Control Board Region 3's Post-Construction Requirements (Order No. 2013-0001-DWQ, 1 July 2013).

In addition, if applicable, construction activities would be required to meet the provisions of State of California Construction General Permits (CGP) requirements [Order 2012-0006-DWQ (amends 2009- 0009-DWQ as amended by 2010-0014-DWQ), July 2012].

Post-Construction. The proposed project includes removal of groundcover, consisting of non-native grasses and other vegetation, on a portion of the 4.36-acre hillside site. The project is estimated to create between 15,000 square feet (sf) and 22,499 sf of impervious surface. The construction of a new reservoir, booster station pad, and roadway at the top of the hill, as well as the future development of a pump station, would create additional runoff that would need to be managed to avoid erosion as it flows down the hill and to minimize the potential for impact to the existing stormwater drainage system.

Based upon the City's Stormwater Management Guidance Manual, Tier 3 Performance Requirements (PR-3) would be required to manage surface water flows from the pervious and impervious surfaces of the project.[17] Regulated projects subject to PR-3 must also meet the requirements of the first two tiers and include the submitted certifications (Morgan Hill, 2015). The requirements of the three tiers include:

- PR-1 - Site Design and Runoff Reduction
  - Limit disturbance of natural drainage features
  - Limit clearing, grading and soil compaction
  - Minimize impervious surfaces
  - Minimize runoff by dispersing runoff to landscape or using permeable pavements
- PR-2 - Water Quality Treatment
  - Treat runoff with an approved and appropriately sized low impact development (LID) treatment system prior to discharge from the site
- PR-3 - Runoff Retention
  - Required to retain stormwater runoff on the site
  - Prevent offsite discharge from events up to the 95th percentile rainfall event using Source Control Measures (SCMs) (site's requirement is 85th percentile)

A Stormwater Control Plan (SWCP) for PR-1, PR-2, and PR-3 projects must include specific information required by the City of Morgan Hill Public Works Department, such as Best Management Practices (BMP) to be considered and included in the project Stormwater Control Plan.

Gilroy, Morgan Hill and the portion of Santa Clara County that drains to the Pajaro River watershed (this

[17] City of Morgan Hill. *Stormwater Management Guidance Manual for Low Impact Development & Post-Construction Requirements*. June 2015.

portion referred to as "South Santa Clara County") are traditional Permittees under the State's Phase II Small MS4 General Permit (Phase II Permit) (SWRCB, 2013). Because Gilroy, Morgan Hill and South Santa Clara County are located in Regional Water Quality Control Board Region 3 (Central Coast Region), they are subject to the Central Coast Post-Construction Requirements.

The types of post-construction controls include Low Impact Development (LID) site design, pollutant source control, stormwater treatment, and hydromodification management measures. The LID approach reduces stormwater runoff impacts by minimizing disturbed areas and impervious surfaces, maximizing opportunities for infiltration and evapotranspiration, and using stormwater as a resource (e.g. rainwater harvesting for non-potable uses). Compliance with the Guidance Manual (Morgan Hill, 2015) and associated performance requirements described under Guidance Manual addresses these Phase II Small MS4 requirements.

Based on the information provided in the Drainage Technical Memorandum, drainage design options for the proposed project are available to accommodate the runoff from non-rooftop surfaces on-site to meet the water quality requirements (i.e. 85th percentile) from the impervious surfaces of the reservoir and booster station pads, and the driveway. Additional measures such as tree planting and porous pavement were considered but deemed unnecessary for water quality control purposes. Because drainage areas would be less than 5,000 sf and continuous drainage runs would be less than 75 feet, the drainage system design options would be sufficient.

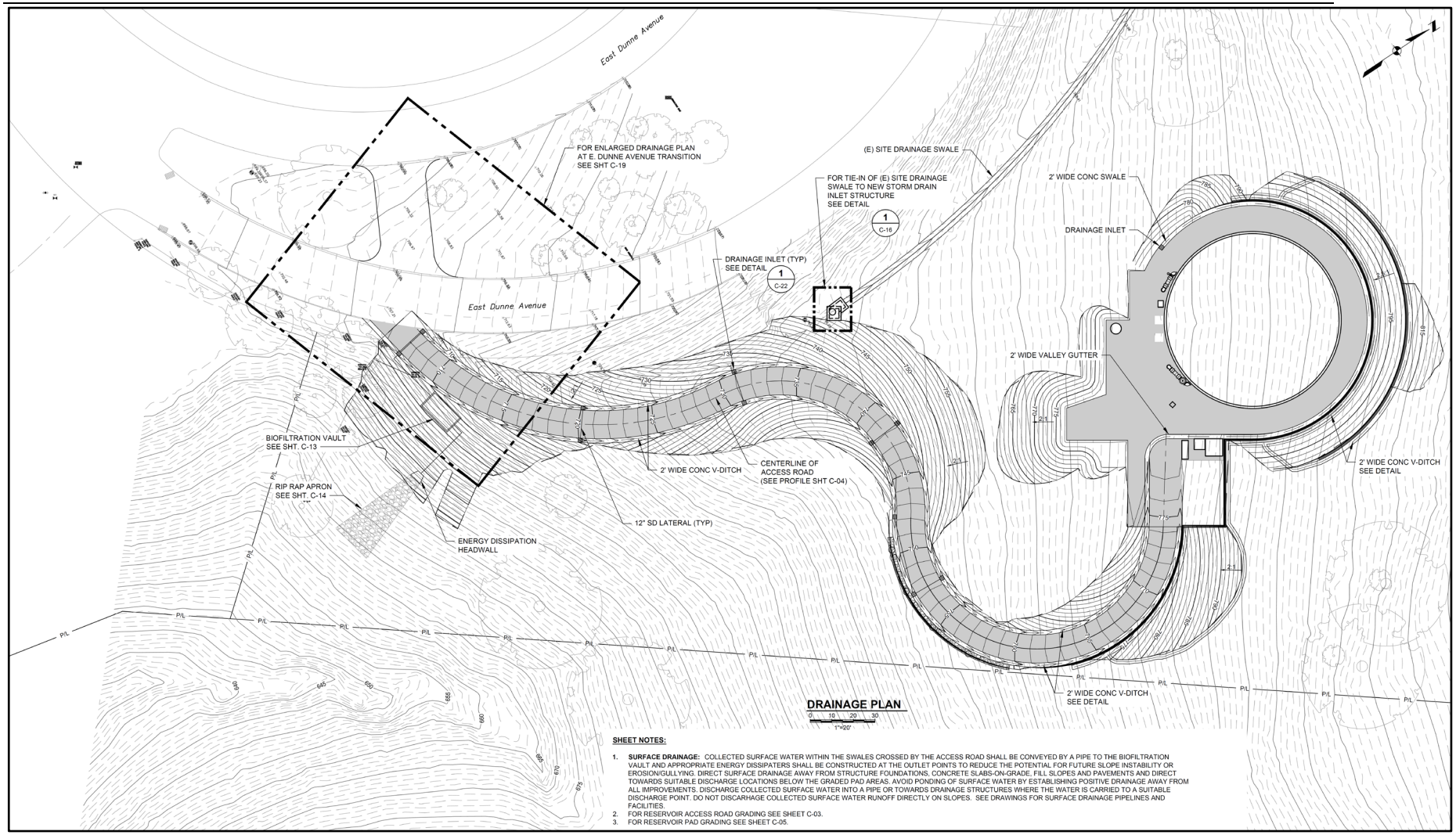
Pursuant to the *City of Gilroy, City of Morgan Hill and County of Santa Clara:* Stormwater Management Guidance Manual for Low Impact Development & Post-Construction Requirements, June, Tier 3 Performance Requirements (PR-3) would be required to manage surface water flows from the pervious and impervious surfaces of the project. Upon review of the above-mentioned regulations, the project would be required to adhere to the PR-3 requirements in the Guidance Manual for low flow and water quality considerations. For high flow and storm water runoff management considerations, guidance provided in the Drainage Manual shall be used. The proposed water reservoir site drainage system would consist of a series of open v-ditches, underground storm drain pipes, storm water energy dissipation structures, and an underground biofiltration vault. A series of two-foot-wide v-ditches lining the outside of the reservoir center and the reservoir access road, as well as a storm drain manhole adjacent to the proposed reservoir center, would capture stormwater flows. The proposed access road would be graded such that stormwater runoff would be directed into the v-ditches. Stormwater would be directed into a series of 16-inch storm drain pipelines which would lead to the proposed underground biofiltration vault located in the southern portion of the project site, near the access road's intersection with East Dunne Avenue. Following treatment in the underground biofiltration vault, stormwater flows would be discharged onto the downslope hillside through a rip rap apron, which would slow flows and protect the hillside from erosion. The Drainage Plan for the proposed project is shown in Figure 12.

Construction. Without proper precautions, construction-related excavation and associated stockpiling of soil and placement of imported fills could induce erosion, and related sedimentation, resulting in degradation of water quality in the storm runoff from the site. Road construction activities would also require the use of hazardous materials that could degrade water quality without proper controls.

The construction work, including construction staging and soil storage, proposed for the water reservoir project is planned to occur on approximately one acre of the 4.36-acre project site.

For the disturbance of areas one acre or more, Chapter 13.30 of the City of Morgan Hill Municipal Code (Urban Storm Water Quality Management and Discharge Control), requires projects to comply with the requirements of the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ (Construction General Stormwater Permit) to control erosion during construction. The Construction General Stormwater Permit applies to projects that disturb one or more acres of soil, or disturb less than one acre but are part of a larger common plan of development that disturbs one or more acres.

FIGURE 12 DRAINAGE PLAN



Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. In accordance with this permit, the project sponsor would be required to submit a Notice of Intent and implement a Storm Water Pollution Prevention Plan (SWPPP).

The SWPPP prepared in accordance with this permit would include at least the minimum BMPs related to housekeeping (storage of construction materials [including hazardous materials], waste management, vehicle storage and maintenance, landscape materials, pollutant control); non-stormwater management; erosion control; sediment control; run-on and run-off control. Additional BMPs would be specified as needed to protect water quality from construction-related stormwater and non-stormwater discharges. As part of the SWPPP, the City would implement a construction site monitoring program to demonstrate compliance with the discharge prohibitions of the General Permit; demonstrate whether non- visible pollutants are present and could contribute to an exceedance of water quality objectives; identify the need for correction actions, additional BMPs, or SWPPP revisions; and evaluate the effectiveness of the existing BMPs. The SWPPP must also be submitted to the City of Morgan Hill Engineering Division for review and approval. Chapter 13.30 of the City's Municipal Code also specifies requirements for implementation of erosion and sedimentation controls.

With implementation of the requirements of the Construction General Stormwater Permit and specific erosion and sedimentation requirements of Chapter 13.30 of the City of Morgan Hill Municipal Code, water quality impacts related to erosion and a release of hazardous materials during construction would be **less than significant**.

10b. Groundwater Resources

The proposed project is located in the Llagas Subbasin of the Gilroy-Hollister Groundwater Basin, which has an area of 87 square miles and is used by the City of Morgan Hill as a water supply.[18] The Geotechnical Investigation prepared for the proposed project included borings to gather geologic and soils data for evaluation of site characteristics.[19]

Seven geotechnical borings and an additional probe were completed for the investigation of the project site to characterize the soil/bedrock conditions in the area of the reservoir and to evaluate anticipated excavation conditions near the upslope limit of the reservoir footprint. Groundwater was not found in any of the borings. Soil and bedrock colors observed in samples indicate consistently oxidized conditions, which suggests that the water table does not tend to fluctuate through the intervals drilled. Conversely, a fluctuating water table is likely to result in mottled coloration, and presence of green, gray, and blue hues that indicate reducing conditions.

The proposed water reservoir would be filled on a regular basis, drawing from groundwater supplies. As such, the proposed project would be considered to consume the City's groundwater supply. However, according to the General Plan EIR, the Llagas Subbasin is not in a condition of overdraft, and groundwater levels are not expected to drop.[20] Further, storm runoff from low flow events from the project's impervious surfaces would be discharged for infiltration on the project site, ensuring that existing levels of water percolation on the property continue after the completion of the water facilities construction.

Based on these site characteristics and proposed project plans, **no impact** would occur related to depletion of groundwater resources and interference with groundwater recharge.

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18 California Department of Water Resources. *California's Groundwater Bulletin 118, Central Coast Hydrologic Region, Gilroy-Hollister Groundwater Basin, Llagas Subbasin*. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/3_003_01_Llagas-Subbasin.pdf. Accessed February 2024.

19 Cal Engineering & Geology, Inc. *Geotechnical Investigation Report: East Dunne Hillside Water Reservoir Project, Morgan Hill, California*. August 11, 2016.

20 City of Morgan Hill. *Morgan Hill 2035 Final Environmental Impact Report* [pg. 4.9-18]. Adopted July 2016.

10ci, 10cii, 10ciii. Drainage

As previously discussed, the proposed water reservoir site drainage system would consist of a series of open v-ditches, underground storm drain pipes, storm water energy dissipation structures, and an underground biofiltration vault. A series of two-foot-wide v-ditches lining the outside of the reservoir center and the reservoir access road, as well as a storm drain manhole adjacent to the proposed reservoir center, would capture stormwater flows. The proposed access road would be graded such that stormwater runoff would be directed into the v-ditches. Stormwater would be directed into a series of 16-inch storm drain pipelines which would lead to the proposed underground biofiltration vault located in the southern portion of the project site, near the access road's intersection with East Dunne Avenue. Following treatment in the underground biofiltration vault, stormwater flows would be discharged onto the downslope hillside through a rip rap apron, which would slow flows and protect the hillside from erosion. The proposed drainage system would also manage runoff such that flooding would not occur on- or off-site. In addition, because stormwater flows would be treated and then discharged onto the hillside, flows would infiltrate into the permeable surfaces, and would not exceed the capacity of the City's stormwater drainage systems. Therefore, the project would have a **less-than-significant** impact related to substantially altering the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion, siltation, or flooding on- or off-site, create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.

10civ, 10d. Flood Hazards

The proposed project site is located on the eastern hillsides of Morgan Hill. Elevations across the property range from approximately 675 feet AMSL in the unnamed topographic swale near the downslope property boundary, to approximately 870 feet AMSL near the existing residences upslope of the upper property boundary. Streams do not flow through the project site, and storm drainage from the site and residential uses above the site are collected in a concrete-lined ditch on the western perimeter of the site and directed to drainage facilities in East Dunne Avenue below the project site.

100-Year Flood. According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 06085C0463H, effective July 18, 2009, the project site is located within Zone X, which is not considered a Special Flood Hazard Area.[21] Therefore, the proposed project would not impede or redirect flood flows, and no impact would occur.

Inundation by Dam Failure. Dams located near Morgan Hill include Anderson Dam and Chesbro Dam. The project site is located approximately one mile south of the Anderson Reservoir. According to the City's General Plan EIR, a review of potential inundation hazards from dam failure at the reservoir indicates that the project site is not located in the dam failure inundation area of Anderson Dam. Consequently, no impact would occur related to flooding as a result of failure of a levee or dam.

Inundation by Seiche, Tsunami, or Mudflow. The project site is located at an elevation of approximately 675 to 870 feet AMSL, more than 17 miles inland from the Pacific Ocean coastline, and is separated from the coast by mountainous terrain. Therefore, the project site would not be subject to risk associated with tsunamis, which are large sea waves. Seiches are standing waves caused by large-scale, short-duration phenomena (e.g. wind or atmospheric variations or seismic activity) that result from the oscillation of confined bodies of water (such as reservoirs and lakes) that may damage low-lying adjacent areas as a result of changes in the surface water elevation. Bodies of water such as bays, harbors, reservoirs, ponds, and swimming ponds can experience seiche waves up to several feet in height during a strong earthquake.

There are two large bodies of water adjacent to or partially within the City or its Sphere of Influence. One of these, Anderson Reservoir, is located approximately one mile north of the project site. A seiche could

[21] Federal Emergency Management Agency. *National Flood Hazard Layer FIRMette No. 06085C0463H.* Available at: https://msc.fema.gov/portal/search?AddressQuery=Morgan%20Hill%20CA. Accessed February 2024.

theoretically occur in these reservoirs as the result of an earthquake or other disturbance, but the flooding impact would be less than that for the dam inundation zones.

Based on the above, **no impact** would occur related to exposure of people or structures to significant risk of loss, injury, or death involving seiche, or tsunami or landslide-induced mudflows.

11. LAND USE AND PLANNING. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☐	✖
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	✖

11a. Divide an Established Community

The subject property consists of one parcel that has been historically used for open space purposes. In brief, the project site has a 2035 General Plan land use designation (2035 General Plan Land Use Map, 2016) as Open Space. Zoning for the project site is Open Space District, similar to open space zoning on lands adjoining the site to the east and south.

The proposed water reservoir project includes construction and operation of a water reservoir, pump station, and access driveway on the hillside project site. The proposed water reservoir use would supplement existing water system facilities and improve emergency water services for the community. Consequently, the proposed project would not divide an established community, but rather complement and enhance water service infrastructure in the surrounding established neighborhoods, a beneficial impact of the project. Therefore, **no impact** would occur.

11b. Project Consistency with Land Use Plans and Policies

2035 General Plan. The proposed project would need to be consistent with pertinent goals and policies of the General Plan. The EIR for the 2035 General Plan identifies the following Natural Resources and Environment Element goal and actions that relate to the proposed project:

> *Goal NRE-7 Conservation of water resources.*
>
> Action NRE-7.A Infrastructure Maintenance. Correct known deficiencies in the City's sewer, storm drain, and water systems and work toward environmentally sustainable systems. Maintain the City's infrastructure to ensure that facilities are up to date and incorporate efficiency and conservation mechanisms.
>
> Policy SSI-13.2 System Assessment. Evaluate the capacity and condition of water, wastewater, and stormwater facilities on a regular basis to assess each system's ability to withstand increased wet and dry weather events, meet changes in demand, and determine system deficiencies.

The proposed project would be consistent with the goals, policies, and required actions specified above through the implementation of the water reservoir project. The planned construction of the water reservoir and associated distribution facilities would provide facilities that correct existing deficiencies in water service facilities in three water service zones, and supplement existing water facilities by providing for emergency water service facilities to ensure appropriate water supplies to the community in the event of earthquakes, wildland fires, and similar catastrophes.

In addition, the 2035 General Plan Safety, Services, and Infrastructure Element (SSI) includes Policies SSI-2.4 through 2.11, providing guidance for the development of future infrastructure improvements in a manner that ensures appropriate caution is applied in the design and construction of critical structures. In particular, Policy SSI-2.9 specifies the preparation of geologic studies to direct "development in potentially hazardous areas, such as hillside areas." The geologic studies shall address issues that include landslides, slope stability, runoff, and erosion.

The planning for the proposed project has included several background studies that respond to the policy requirements presented in the General Plan. These analyses include preliminary geologic feasibility evaluation and report, geotechnical studies that include field testing of geologic and soils conditions on the subject property, and drainage studies. The results and recommendations of these studies are included in the Geology and Soils, and Hydrology sections of this Initial Study. Consequently, the proposed project is consistent with the land use plans and policies of the 2035 General Plan, and **no impact** would occur.

12. MINERAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	✖
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	✖

12a, 12b. Mineral Resources

The Morgan Hill General Plan does not identify any regionally or locally important mineral resources within the City of Morgan Hill. Therefore, **no impact** would occur.

13. NOISE. *Would the project result in:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	✖	☐
b. Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	✖	☐
c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	✖

A detailed Noise Assessment Study was completed as part of this Initial Study by Edward L. Pack Associates, Inc. (ELPA) in August 2016 and it is included as Attachment 5 of this Initial Study and summarized below.[22] It is noted that although the proposed upgrades to the existing booster pump station would include the replacement of the existing pumps with larger ones, both the existing and proposed pumps are electric and within a masonry enclosure. As such, the noise generated by the upgrades to the booster pump station would be similar to existing noise levels. Thus, the following discussion is focused on potential impacts related to the proposed water reservoir.

Existing Noise Environment

Noise-Sensitive Receptors. Certain land uses are particularly sensitive to noise, including residences, schools, hospitals, rest homes, long-term medical and mental care facilities, places of worship, and passive open space/recreational areas. Residential areas are also considered noise sensitive during the night-time hours. Existing sensitive receptors located adjacent to the site include single-family residences located adjacent to the site's southwestern and northern boundaries. Residences to the north are located along Oak View Circle while those to the southwest are located on Rustling Oak Court, across East Dunne Avenue.

Existing and Future Noise Levels. The primary source of noise at the project site is traffic on East Dunne Avenue, which is located along the site's southwestern boundary. In order to determine the existing noise environment at the site, on August 2 and 3, 2016, ELPA conducted continuous recordings of sound levels at the northern project boundary, which borders the property boundary of residences on Oak View Circle. Noise measurements indicate that noise levels are currently 53 A-weighted decibels (dBA) averaged over a 24-hour period (L_{dn}) with daytime levels ranging from 42 to 51 dBA averaged over the given time period (L_{eq}) and nighttime levels ranging from 41 to 52 dBA (L_{eq}). Future noise contours presented in the Morgan Hill 2035 General Plan's Safety, Services, and Infrastructure Element (Figure SSI-7) indicate that noise levels at the project site and its vicinity will continue to be less than 60 dBA (L_{dn}) in 2035.

Applicable Noise Standards and Significance Criteria

Zoning Ordinance. Section 18.48.075 – Noise specifies the following:

> "At the lot line of all uses specified in Section 18.48.010, the maximum sound generated by any use shall not exceed seventy to seventy-five db(A) when adjacent uses are industrial or wholesale uses.
>
> When adjacent to offices, retail or sensitive industries, the sound level shall be limited to sixty-five to seventy db(A). When uses are adjacent or contiguous to residential, park or institutional uses, the maximum sound level shall not exceed sixty db(A).

[22] Edward L. Pack Associates, Inc. *Noise Assessment Study for the City of Morgan Hill East Dunne Hillside Water Reservoir Project*. August 2016.

> Excluded from these standards are occasional sounds generated by the movement of railroad equipment, temporary construction activities, or warning devices." (Ord. 1804 N.S. §1 (Exh. A) (part), 2006)

Section 8.28.040(D)(1)(d) of the Morgan Hill Noise Ordinance states that public works projects are exempt from construction hours specified in this section of the ordinance, which are as follows: construction activities are prohibited between 8:00 p.m. and 7:00 a.m., Monday through Friday, and between 6:00 p.m. and 9:00 a.m. on Saturdays. Construction is prohibited on Sundays or federal holidays.

Morgan Hill General Plan Noise Element. Table SSI-1 of the Morgan Hill 2035 General Plan's Safety, Services, and Infrastructure Element presents acceptable exterior noise level standards, utilizing the Day-Night Level (L_{dn} or DNL) 24-hour descriptor to define acceptable noise exposures for various land uses. These noise standards indicate that exterior noise levels up to 60 dB (DNL) are considered "normally acceptable" for single-family residential uses. Between 55 and 70 dB (DNL), the noise environment is considered "conditionally acceptable." Above 70 dB (DNL), noise levels are considered unacceptable for residential uses and these uses are discouraged.

California Environmental Quality Act (CEQA). For this analysis, 60 dB (DNL) is defined in the Noise Element as an acceptable noise level for residential uses and it is applied at the closest receptors as a significance threshold to indicate noise compatibility with adjacent land uses. The above 60-dBA noise limit specified in the Zoning Ordinance is applied to operational noise levels generated by the proposed pump station and this threshold is applied at the closest residential property boundaries. As indicated above, the CEQA checklist question #13a uses the term "substantial" permanent and temporary noise increases, but it is up to local jurisdictions to define what is considered a "substantial" noise increase. Typically, allowable noise increases before a significant impact occurs are:

- A 5 dB increase in the ambient noise exposure if the ambient + project remains within the Noise Element standards for the receptor land use; and
- A 3 dB increase in the ambient noise exposure if the ambient + project will exceed the limits of the Noise Element standards for the receptor land use.

The existing ambient noise exposures at the residential receptor locations are below the 60 dB DNL limit for residential land use. Thus, a 5 dB increase in the ambient noise environment at the Oak View Circle residences could occur before a significant noise impact would result, while a 3 dB increase in the ambient noise environment at the residences that back to East Dunne Avenue could occur before a significant noise impact would result.

13a. Temporary or Permanent Noise Increases

Short-Term Noise Increases. Section 8.28.40 of the Morgan Hill Municipal Code prohibits construction activities (including operation of any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist or other appliance) between 8:00 p.m. and 7:00 a.m., Monday through Friday, and between 6:00 p.m. and 9 a.m. on Saturdays. Construction activities may not occur on Sundays or federal holidays. The Morgan Hill Municipal Code does not specify any short-term noise level limits.

Project construction would result in temporary short-term noise increases due to the operation of heavy equipment. Project construction would involve limited use of heavy construction equipment such as a grader, loader, or backhoe and this type of equipment would generate noise levels in the range of 78 to 85 dBA (L_{eq}) at 50 feet from the source.[23] The potential for construction-related noise increases to adversely affect nearby residential receptors would depend on the location and proximity of construction activities to these receptors.

[23] U.S. Department of Transportation, Federal Highway Administration, *Construction Noise Handbook, Table 9.1, RCNM Default Noise Emission Reference Levels and Usage Factors.* Available at http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Accessed February 2024.

Temporary disturbance (e.g., speech interference) can occur if the noise level in the interior of a building exceeds 45 to 60 dBA. To maintain such interior noise levels, exterior noise levels at the closest residences (with windows closed) should not exceed 80 dBA. This exterior noise level is used as a significance threshold. An existing residential receptor is located approximately 120 feet to the northeast, 170 feet to the northwest, and 230 feet to the southwest of the area where most construction activity would occur (in the water reservoir vicinity). At 120 feet, construction noise from such heavy equipment would range from 70 to 77 dBA, and such noise increases would not exceed the 80-dBA threshold, indicating that these temporary noise increases, while intermittent and only occurring when heavy equipment is being operated in the closest locations to any given receptor, would be less than significant. While such noise levels would be noticeable, through adherence to construction time limits specified in Section 8.28.040(d)(1) of the City's Municipal Code, as presented below, short-term noise increases generated by the proposed project would be less than significant:

Construction activities are prohibited other than between the hours of seven a.m. and eight p.m., Monday through Friday, and between the hours of nine a.m. to six p.m. on Saturday. Construction activities may not occur on Sundays or federal holidays.

Long-term Noise Increases. As part of the Noise Assessment Study, noise measurements were collected at an existing pump station (White Oak Court facility) that is similar to the project in order to estimate project-generated noise levels. Noise measurements indicate that the maximum exterior noise levels outside the pump station building is 60 dBA at seven feet from the ventilation louver. When this noise level is applied at the proposed pump station location, this noise level would attenuate to 34 dBA at the northwest property boundary (170 feet away) and 20 dBA at the southwest property boundary (230 feet away), the two closest property boundaries. Because such noise levels would be well below the 60-dBA ordinance noise limit, a less-than-significant impact would occur.

An emergency generator is also proposed to be located in the pump station and it would operate for one hour each month for testing. Based on noise measurements collected at the existing White Oak Court pump station, operation of the generator with the pumps would generate a maximum exterior noise level of 86 dBA at 7 feet from the ventilation louver, attenuating to 59 dBA at the northwest property boundary (170 feet away) and 45 dBA at the southwest property boundary (230 feet away), the two closest property boundaries. Therefore, during the one hour per month when the generator is tested, maximum operating noise levels would not exceed the 60-dBA limit at the closest property boundaries even if pump were operating at the same time, a **less-than-significant** impact would occur.

13b. Groundborne Noise and Vibration

Project construction would involve use of heavy construction equipment such as graders, loaders, or backhoes, and there would be minimal vibration generated by such equipment at adjacent structures, which would operate at least 110 feet or more from the nearest residential structures. Pile driving is not proposed as part of project construction. At 110 feet, vibration levels generated by such construction activities would not exceed the 0.5 peak particle velocities (PPV) in inches per second (in/sec) threshold level for cosmetic damage to structures. Therefore, vibration levels associated with operation of any heavy construction equipment would be less than significant.

Groundborne noise refers to a condition where noise is experienced inside a building or structure as a result of vibrations produced outside of the building and transmitted as ground vibration between the source and receiver. Groundborne noise can be problematic in situations where the primary airborne noise path is blocked, such as in the case of a subway tunnel passing in close proximity to homes or other noise-sensitive structures. However, proposed noise and vibration-generating construction activities associated with the proposed project would involve techniques that primarily generate airborne noise and surface vibration. Any potential groundborne noise from construction activities would be imperceptible, and therefore, would have **no impact**.

13c. Airport-Related Issues

The project site is not located within an airport land use plan. A public airport, public use airport, or private airstrip is not located within two miles of the project site. The proposed project would not expose people residing or working in the area to excessive noise levels. Therefore, **no impact** would occur.

14. POPULATION AND HOUSING. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure)?	☐	☐	☐	✖
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	✖

14a, 14b. Growth-Inducement Impacts and Displacement of Housing or Residents

The proposed water reservoir site development would encompass the construction of a water reservoir, pump station, and access road. The project facilities would provide supplemental water storage capacity and distribution for three elevation zones to ensure adequate fire flow pressures and emergency water supplies in the event of earthquake damage, wildland fires, or similar emergencies. The proposed water system improvements would alleviate recurring waterline issues such as pipe damage and inadequate water pressure to residential neighborhoods below the project site.

The new water facilities would not be available for the provision of additional water services to new housing developments, precluding the inducement of new housing or business development and associated population growth. The project site is owned by the City of Morgan Hill and designated by the 2035 General Plan and Zoning Map as Open Space. As a result, the site would not be developed with new housing and the project would not cause the construction of replacement housing elsewhere.

The proposed project would also include the construction of a dedicated driveway to access the water reservoir site. The new driveway would not connect to any roadways other than East Dunne Avenue. The project would connect to the existing water system and not extend water infrastructure to other parts of the community. Consequently, the proposed water reservoir project would have **no impact** on population or housing growth.

15. PUBLIC SERVICES. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Fire protection?	☐	☐	☐	✖
b. Police protection?	☐	☐	☐	✖
c. Schools?	☐	☐	☐	✖
d. Parks?	☐	☐	☐	✖
e. Other Public Facilities?	☐	☐	☐	✖

15a-e. Public Services

The project would incrementally increase demand for fire and police protection services. The City of Morgan Hill contracts with CAL FIRE (State Department of Forestry and Fire Protection) for fire protection services. There are three fire stations located within the city boundaries: El Toro Station, located at 18300 Monterey Road; Dunne-Hill Station, located at 2100 East Dunne Avenue; and the CAL FIRE station at 15670 Monterey Road. The project site is located approximately one mile east of the Dunne-Hill Station and approximately three miles east of the CAL FIRE station. Due to the nature of the proposed project, and the site's proximity to existing fire stations, the proposed project would not substantially increase demand for fire services, and existing fire facilities would be adequate to serve the needs of the project. As such, new or expanded fire facilities would not be required from buildout of the proposed project.

The Morgan Hill Police Department provides police protection services to incorporated areas in the project vicinity. The project site is located in the eastern hillsides of Morgan Hill, surrounded by residential development, and served by the Department's normal patrol routes. The introduction of water storage and distribution facilities to the site would not be expected to cause an increase in the need for police oversight. The water storage facilities would be fenced for protection, and the access driveway would be gated to prevent unauthorized vehicle access.

The proposed water reservoir project would not generate new students, nor result in the need for additional expanded or new recreational or other governmental facilities. Therefore, **no impact** would occur.

16. RECREATION. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	✖
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	✖

16a, 16b. Demand for Recreational Facilities

The proposed project would include the development of a water reservoir and minor upgrades to an existing booster pump station. The proposed project would not result in population growth that could result in increased use of existing recreational facilities, nor would the proposed project include or require construction or expansion of recreational facilities. Thus, **no impact** would occur related to recreational resources.

17. TRANSPORTATION. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	✖	☐
b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	✖	☐
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	✖
d. Result in inadequate emergency access?	☐	☐	☐	✖

17a. Impacts on the Circulation System

Due to the non-residential nature of the proposed project, use of existing transit, bicycle, and pedestrian facilities is unlikely to increase as a result of project buildout. In addition, the proposed project would not result in alterations to any existing or planned transit, bicycle, or pedestrian facilities. Therefore, the proposed project would not conflict with any program, plan, ordinance, or policy related to such.

The proposed project would involve construction of a water reservoir, pumping facilities, ancillary facilities, and an access road at the project site, as well as installation of two new pumps in the existing booster pump station. During construction of the proposed water reservoir, approximately up to 2,133 haul trips (up to 1,067 truckloads)[24] could be generated during the project's two-month grading phase, resulting in an average of approximately two truckloads (or four truck trips) per hour during the grading phase. Project construction would also generate worker trips and materials delivery truck trips during the project's nine-month construction duration. After construction is completed, project-related maintenance activities would generate an average of one to two vehicles per week.

The project's construction-related and operational vehicles would access the site via East Dunne Avenue. The street provides regional access to the U.S. 101 freeway, as well as local access to the project's access road. Access to and from the project site during grading and excavation would be controlled by flagmen. A temporary haul road across the East Dunne Avenue median would preclude the need for haul trucks to travel eastward on East Dunne Avenue and turn around (U-turn) in the residential neighborhood north of the project site. The temporary haul road could also provide off-road refuge for haul trucks and allow safe access to westbound East Dunne Avenue, further maintaining safe traffic flows on East Dunne Avenue.

The project's estimated average increase of approximately four to five haul truck trips per hour temporarily during construction and one to two weekly trips during operation are expected to have a minimal impact on roadway and intersection operations in the project vicinity. Therefore, the proposed project would not conflict with any program, plan, ordinance, or policy addressing the circulation system, and a **less-than-significant** impact would occur.

17b. VMT Impacts

Section 15064.3 of the CEQA Guidelines provides specific considerations for evaluating a project's transportation impacts. Pursuant to Section 15064.3, analysis of VMT attributable to a project is the most appropriate measure of transportation impacts. Other relevant considerations may include the effects of the project on transit and non-motorized travel. Determination of impacts based on VMT have been required by law Statewide since July 1, 2020.

Pursuant to Section 15064.3(b)(3), a lead agency may analyze a project's VMT qualitatively based on the availability of transit, proximity to destinations, etc. The City of Morgan Hill is undertaking a process of updating

[24] Based on an estimated 12,800 cubic yards of material to be hauled off-site with trucks carrying an average of 12 cubic yards.

its General Plan policies to incorporate VMT methodologies and significance thresholds to be consistent with SB 743 but has not yet released draft thresholds. In the absence of an adopted or draft City policy with numeric thresholds, the VMT assessment relies on *The Technical Advisory on Evaluating Transportation Impacts in CEQA* published by the Governor's OPR.[25] The OPR recommendations include the screening thresholds criteria listed below:

- Projects (including office, residential, retail, and mixed-use developments) proposed within half a mile of an existing major transit stop or within a quarter of an existing stop along a high-quality transit corridor may be presumed to have a less-than-significant impact;
- 100 percent affordable residential development in infill locations may be presumed to have a less-than-significant impact on VMT;
- Projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant impact; and
- Local-serving retail developments (considered to be less than 50,000 sf in size) may be assumed to cause a less-than-significant impact on VMT.

As discussed above, operation of the proposed project is anticipated to generate one to two vehicle trips per week. Because the proposed project would generate or attract fewer than 110 trips per day, pursuant to OPR guidance, the proposed project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b), and a **less-than-significant** impact would occur.

17c, 17d. Increase Hazards and Emergency Access

Project implementation would create a new access driveway on East Dunne Avenue. The access would be located on the outside of a curve on the divided section of East Dunne Avenue (eastbound direction only). Addition of this access is not expected to pose any new traffic hazards because sufficient sight distance onto eastbound East Dunne Avenue is provided from the project access road and vice-versa. In addition, construction-related and operational traffic volumes turning to and from East Dunne Avenue at this access would be low because the access road would be restricted to construction and service vehicles only.

The project site has frontage on East Dunne Avenue and emergency personnel could access the project site from this street as well as the proposed access road, which would extend from East Dunne Avenue to the proposed water reservoir. Project implementation is not expected to impede or alter emergency access to surrounding areas, and therefore, would have **no impact** on emergency access.

[25] Governor's Office of Planning and Research. *Technical Advisory on Evaluation Transportation Impacts in CEQA*. December 2018.

18. TRIBAL CULTURAL RESOURCES. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k).	☐	☐	☐	✖
b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	✖

18a, 18b. Tribal Cultural Resources

As discussed in Section 5, Cultural Resources, of this Initial Study, the records search of the NAHC Sacred Lands File conducted for the proposed project returned negative results, indicating that known cultural resources are not present on the project site. However, compliance with Section 18.60.090 of the City's Municipal Code would ensure that the proper measures are taken should tribal cultural resources be discovered within the project site.

Given compliance with the City's standard conditions of approval related to cultural resource discovery, **no impact** to tribal cultural resources would occur.

19. UTILITIES AND SERVICE SYSTEMS. *Would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	✖	☐
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☐	✖
c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	✖	☐
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	✖
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	✖

The proposed water reservoir would have a limited need for utility and service systems. The principal effects of the project would entail the installation of appropriate storm drainage facilities to ensure the collection and disposition of storm drainage from new impervious surfaces (e.g., access drive, reservoir cover, etc.) on the project site. In addition, although the proposed improvements to the existing booster pump station may consume a larger amount of electricity, demand for other utilities services would not increase. As such, the following discussion is focused on potential impacts of the proposed water reservoir.

19a, 19c. Construction or Relocation of Utilities Facilities

The proposed project consists of the installation of a water reservoir, and, thus, constitutes the construction of new water infrastructure. Evaluation of potential environmental effects of such is addressed throughout this Initial Study. In addition, issues related to stormwater infrastructure are addressed in Section 10, Hydrology and Water Quality, of this Initial Study. The proposed project would not require wastewater collection and treatment services; thus, the project would not result in a determination by the wastewater treatment provider that adequate capacity is not available to serve the project. Furthermore, the proposed project would not require the construction or relocation of electric, natural gas, or telecommunications infrastructure. Therefore, a **less-than-significant** impact would occur.

19b. Water Supplies

Morgan Hill provides potable water service to its residential, commercial, industrial, and institutional customers within the City limits. The City's municipal water system extracts water from the underground aquifers via a series of groundwater wells distributed along the valley floor and supplies thirteen pressure zones. Water is then pumped up to service the five higher-pressure zones on both east and west sides of the valley via booster stations.

The City's water system facilities include 17 groundwater wells, 13 potable water storage tanks, 10 booster stations, and over 160 miles of pressured piping ranging from 2 to 14 inches in diameter. Gate valves and pressure-reducing valves are used to isolate or regulate flow between pressure zones.

Currently, the City has an operational storage capacity equivalent to approximately 1.25 days of average

water use.

Section 4.15.1.3 of the DEIR for the 2035 General Plan indicates that there are sufficient water supplies that would be available to serve the future needs of the community through the 2035 planning horizon from existing entitlements and resources and that new or expanded entitlements would not be required. Although the proposed water reservoir would draw from the City's water supply, the function of the proposed project is to redistribute that water. As such, the proposed project would not, in of itself, consume water supplies. Consequently, **no impact** would occur related to the City's water entitlements resulting from the proposed project.

19d, 19e. Solid Waste

Recology South Valley provides solid waste and recycling services to the businesses and residents of the cities of Morgan Hill and Gilroy. Recology South Valley has contracted with the Monterey Regional Waste Management District to provide solid waste disposal services at the Monterey Peninsula Landfill and Materials Recovery Facility for the waste collected by Recology.[26] Pursuant to the Landfill's current Solid Waste Facility Permit, the Landfill has a maximum permitted tonnage limit of 3,500 tons per day and a design capacity of 49,700,000 cubic yards, with remaining capacity of 48,560,000 cubic yards.[27]

The proposed water reservoir operation would not increase demands on collection, recycling, and disposal services for recycled materials and solid waste.

For demolition and construction waste disposal, the California Green Building Standards Code (Cal-Green) came into effect for all projects beginning after January 1, 2011. Cal-Green Section 4.408, Construction Waste Reduction Disposal and Recycling, mandates that, in the absence of a more stringent local ordinance, a minimum of 50 percent of non-hazardous construction and demolition debris must be recycled or salvaged. Cal-Green requires that all project sponsors have a waste management plan for on-site sorting of construction debris. The waste management plan shall do the following:

- Identify the materials to be diverted from disposal by recycling, reuse on the project, or salvage for future use or sale;
- Specify if materials will be sorted on-site or mixed for transportation to a diversion facility;
- Identify the diversion facility where the material collected will be taken;
- Identify construction methods employed to reduce the amount of waste generated; and
- Specify that the amount of materials diverted shall be calculated by weight or volume, but not by both.

The City would conform to the Cal-Green requirements for re-use and disposal of construction waste generated by project site preparation and planned construction. Therefore, **no impact** would occur.

[26] Andi Borowski, Environmental Services Assistant, Morgan Hill Environmental Services Department. Personal communication [email] with Jesse Fahrney, Associate, Raney Planning and Management, Inc. July 26, 2022.

[27] California Department of Resources Recycling and Recovery (CalRecycle). *Facility/Site Summary Details: Monterey Peninsula Landfill (27-AA-0010)*. Available at: https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/2642?siteID=1976. Accessed February 2024.

20. WILDFIRE. *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:*	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	✖	☐
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	✖	☐
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	✖	☐
d. Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	✖	☐

20a, 20b, 20c, 20d. Wildfire Impacts

The City's Wildland Urban Interface map indicates that the project site is located in a High FHSZ.[28] However, the proposed project would be required to comply with all applicable requirements of the California Fire Code (CFC), as adopted by Chapter 15.44 of the City's Municipal Code, as well as all applicable CBSC requirements. Compliance with such would help to reduce the spread of fire.

As noted in Section 9, Hazards and Hazardous Materials, implementation of the proposed project would not interfere with potential evacuation or response routes used by emergency response teams. The project would not conflict with the City's Emergency Operations Plan.[29] In addition, because the proposed project is not residential in nature, project occupants would not be exposed to pollutants due to wildfire. Furthermore, as discussed previously, the proposed project would include the construction of an access drive to the water reservoir, which would facilitate access for continued vegetation control that would be included in the maintenance of the project site. Finally, although the project site is located on a slope, as indicated in the project plans, the proposed water reservoir would be underlain by compacted aggregate base and reinforced with concrete piers installed at each end of the reservoir, as well as in the center. In addition, retaining walls would be installed along the slope of the project site. As such, the proposed project would not expose downslope people or structures to significant risks as a result of post-fire slope instability. Therefore, a **less-than-significant** impact would occur.

[28] City of Morgan Hill. *City of Morgan Hill Wildland Urban Interface*. Available at: https://www.morganhill.ca.gov/DocumentCenter/View/3037/Fire-Hazard-Severity-Zones-Adopted3-18-09?bidId=. Accessed February 2024.

[29] City of Morgan Hill. *Emergency Operations Plan.* January 11, 2018.

21. MANDATORY FINDINGS OF SIGNIFICANCE.	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	✖
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	✖
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	✖

21a, 21c. Significant Impacts on the Natural and Man-Made Environments

With mitigation measures specified above in Sections 4 and 7, the proposed project would not degrade the quality of the environment. As indicated in the above discussion, the project also would not substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. Therefore, **no impact** would occur.

21b. Cumulative Impacts

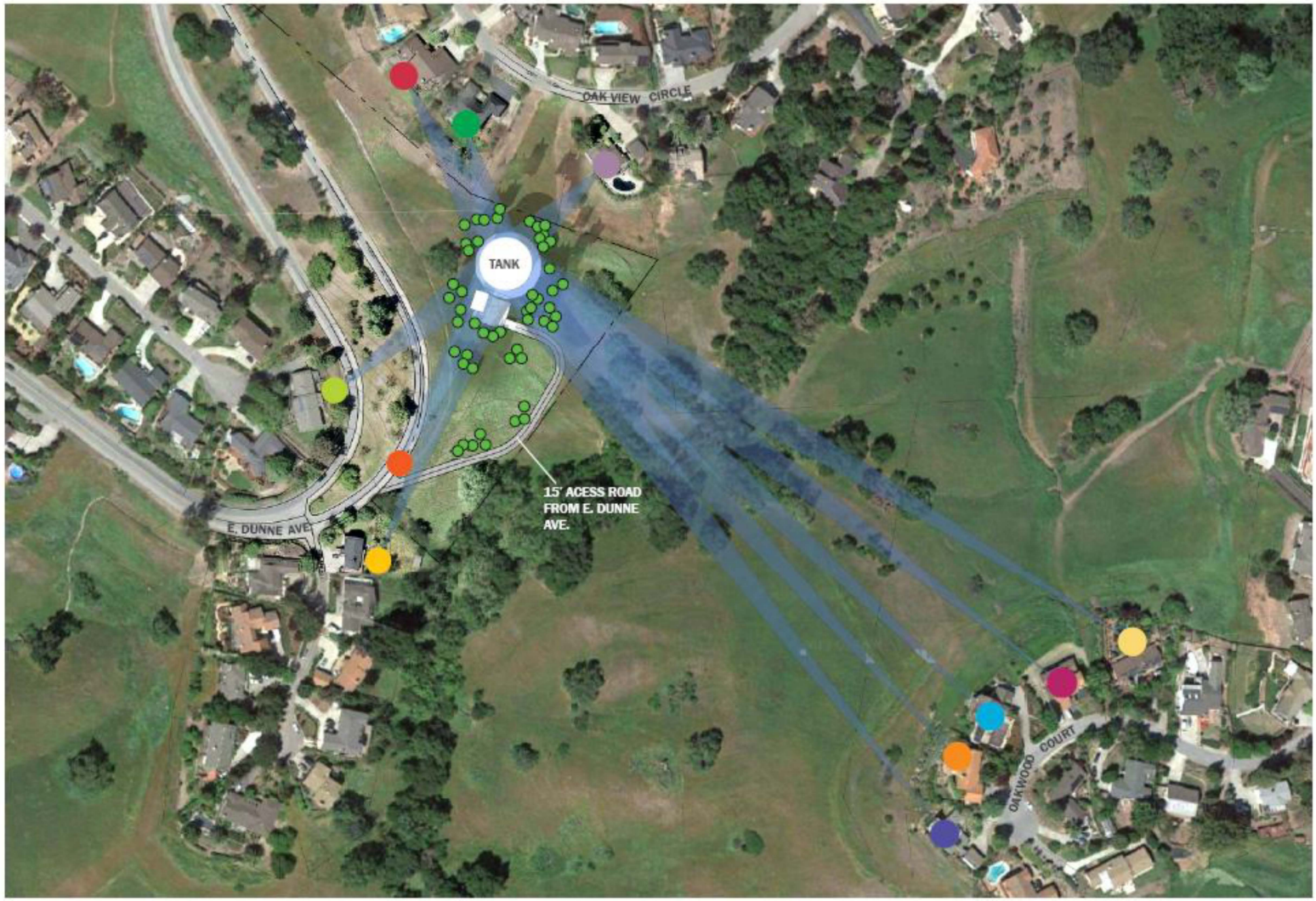
The proposed construction of new water system facilities on the 4.36-acre project parcel and replacement of equipment at the East Dunne Booster Station may cause environmental effects that are individually less than significant but, when considered in conjunction with the environmental effects of other projects in the area, could result in cumulatively significant impacts on the environment. In addition to the East Dunne Hillside Reservoir improvements, the City proposes to implement other infrastructure improvements in the eastern part of Morgan Hill; these include: 1) the Jackson Oaks Well Rehabilitation; 2) the Oak Canyon Booster Station Rebuild; and 3) Transmission Main to Holiday Lake Reservoirs 1 and 2. A review of the locations for these projects indicates that none are in the immediate vicinity of the proposed project.

Potential cumulative impacts that could arise from the construction of more than one of the projects at the same time would be minimized through the City's scheduling of construction for both projects to ensure no new significant effects would result and that the potentially significant effects of the project are reduced through the implementation of specified mitigation measures. Consequently, the proposed project would not cause environmental impacts that would be cumulatively considerable when evaluated in conjunction with other current or planned projects. Therefore, **no impact** would occur.

Attachment 1

RHAA View Shed Analysis

Eastside Water Supply Reservoir – View Shed Study



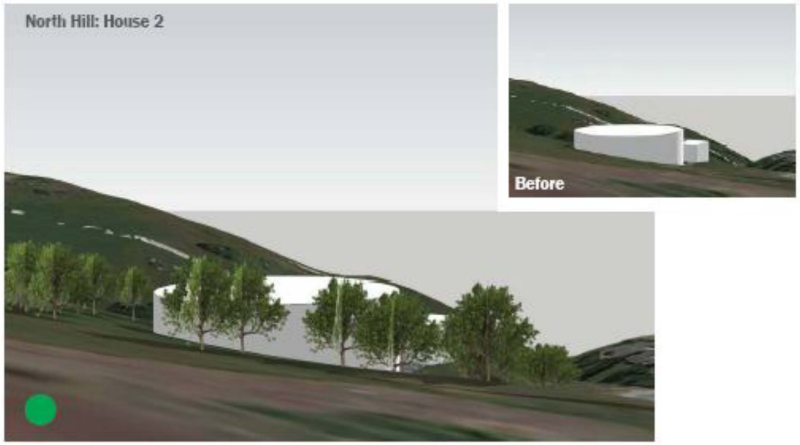
rhaa
LANDSCAPE ARCHITECTURE + PLANNING

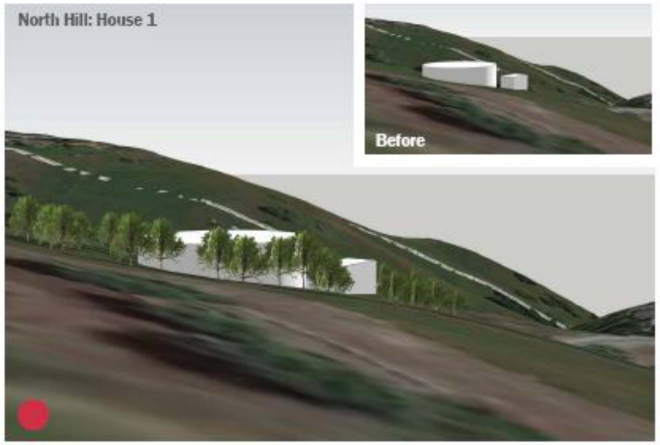
Eastside Water Supply Reservoir – View Shed Study

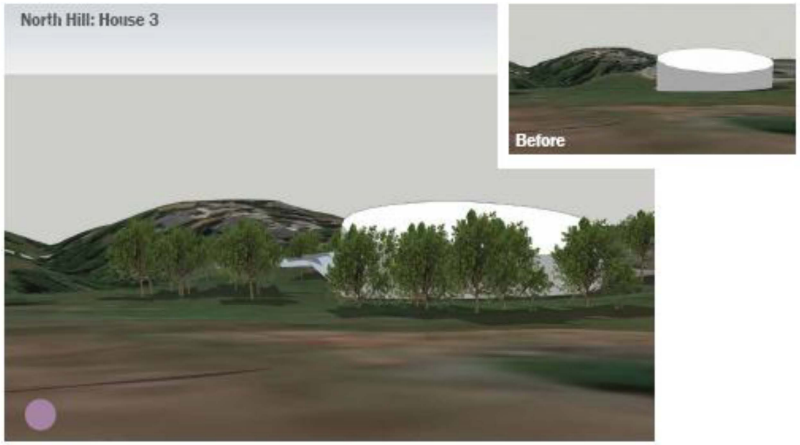
Viewshed - East Hill

Eastside Water Supply Reservoir – View Shed Study

Viewshed - North Hill Above Tank

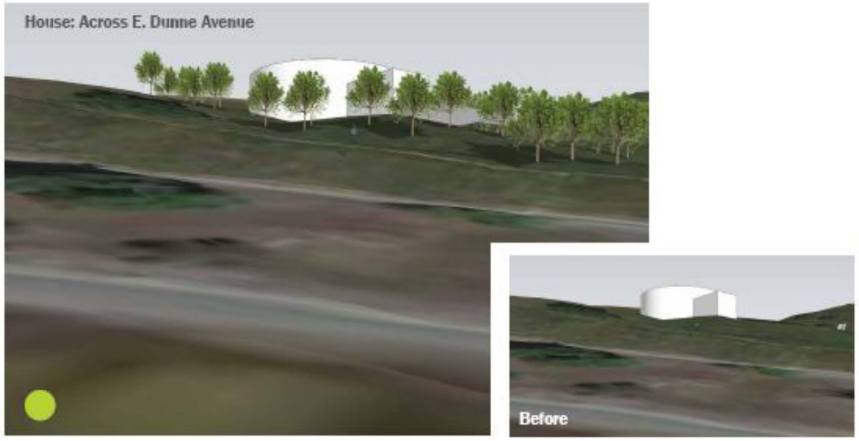






Eastside Water Supply Reservoir – View Shed Study

Viewshed - South Along the Road



Attachment 2

Air Quality CalEEMod Modeling Results

East Dunne Hillside Reservoir Custom Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	East Dunne Hillside Reservoir
Construction Start Date	6/3/2024
Operational Year	2025
Lead Agency	City of Morgan Hill
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	1.80
Precipitation (days)	32.2
Location	37.13781535879457, -121.59567084638373
County	Santa Clara
City	Morgan Hill
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1936
EDFZ	1
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.21

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Other Asphalt Surfaces	21.8	1000sqft	0.50	0.00	0.00	—	—	—
Other Non-Asphalt Surfaces	24.3	1000sqft	0.56	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.32	1.83	19.1	18.1	0.04	0.81	7.69	8.49	0.73	3.59	4.32	—	4,636	4,636	0.26	0.34	4.67	4,748
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.84	1.36	5.85	8.15	0.01	0.26	0.10	0.37	0.24	0.02	0.27	—	1,227	1,227	0.05	0.01	0.01	1,232
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.62	0.54	4.92	5.11	0.01	0.22	1.63	1.84	0.20	0.76	0.96	—	1,099	1,099	0.06	0.06	0.38	1,118
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.11	0.10	0.90	0.93	< 0.005	0.04	0.30	0.34	0.04	0.14	0.17	—	182	182	0.01	0.01	0.06	185

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	2.32	1.83	19.1	18.1	0.04	0.81	7.69	8.49	0.73	3.59	4.32	—	4,636	4,636	0.26	0.34	4.67	4,748
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.84	1.36	5.85	8.15	0.01	0.26	0.10	0.37	0.24	0.02	0.27	—	1,227	1,227	0.05	0.01	0.01	1,232
2025	0.63	0.55	4.67	6.94	0.01	0.20	0.10	0.31	0.19	0.02	0.21	—	1,091	1,091	0.04	0.01	0.01	1,096
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.62	0.54	4.92	5.11	0.01	0.22	1.63	1.84	0.20	0.76	0.96	—	1,099	1,099	0.06	0.06	0.38	1,118
2025	0.01	0.01	0.09	0.14	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	21.4	21.4	< 0.005	< 0.005	< 0.005	21.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.11	0.10	0.90	0.93	< 0.005	0.04	0.30	0.34	0.04	0.14	0.17	—	182	182	0.01	0.01	0.06	185
2025	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.54	3.54	< 0.005	< 0.005	< 0.005	3.55

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.01	0.01	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	3.99	3.99	< 0.005	< 0.005	0.01	4.04
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.01	0.01	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	3.85	3.85	< 0.005	< 0.005	< 0.005	3.90

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	< 0.005	0.01	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	2.95	2.95	< 0.005	< 0.005	< 0.005	2.98
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.49	0.49	< 0.005	< 0.005	< 0.005	0.49

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.30	2.30	< 0.005	< 0.005	0.01	2.34
Area	0.00	0.01	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Stationary	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	1.69	1.69	< 0.005	< 0.005	0.00	1.69
Total	0.01	0.01	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	3.99	3.99	< 0.005	< 0.005	0.01	4.04
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.17	2.17	< 0.005	< 0.005	< 0.005	2.20
Area	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Stationar	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	1.69	1.69	< 0.005	< 0.005	0.00	1.69
Total	0.01	0.01	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	3.85	3.85	< 0.005	< 0.005	< 0.005	3.90
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.56	1.56	< 0.005	< 0.005	< 0.005	1.59
Area	0.00	0.01	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Stationary	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	1.39	1.39	< 0.005	< 0.005	0.00	1.39
Total	< 0.005	0.01	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	2.95	2.95	< 0.005	< 0.005	< 0.005	2.98
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.26	0.26	< 0.005	< 0.005	< 0.005	0.26
Area	0.00	< 0.005	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Stationary	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	0.23	0.23	< 0.005	< 0.005	0.00	0.23
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.49	0.49	< 0.005	< 0.005	< 0.005	0.49

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.70	1.43	13.7	12.9	0.02	0.65	—	0.65	0.59	—	0.59	—	2,064	2,064	0.08	0.02	—	2,071
Dust From Material Movement	—	—	—	—	—	—	6.26	6.26	—	3.00	3.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.75	0.71	< 0.005	0.04	—	0.04	0.03	—	0.03	—	113	113	< 0.005	< 0.005	—	113
Dust From Material Movement	—	—	—	—	—	—	0.34	0.34	—	0.16	0.16	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.14	0.13	< 0.005	0.01	—	0.01	0.01	—	0.01	—	18.7	18.7	< 0.005	< 0.005	—	18.8
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.33	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	65.6	65.6	< 0.005	< 0.005	0.28	66.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.36	3.36	< 0.005	< 0.005	0.01	3.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.56	0.56	< 0.005	< 0.005	< 0.005	0.57
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.08	1.75	16.7	16.4	0.02	0.77	—	0.77	0.71	—	0.71	—	2,595	2,595	0.11	0.02	—	2,604

Dust From Material Movement	—	—	—	—	—	—	7.09	7.09	—	3.43	3.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.34	0.29	2.75	2.70	< 0.005	0.13	—	0.13	0.12	—	0.12	—	427	427	0.02	< 0.005	—	428
Dust From Material Movement	—	—	—	—	—	—	1.17	1.17	—	0.56	0.56	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.50	0.49	< 0.005	0.02	—	0.02	0.02	—	0.02	—	70.6	70.6	< 0.005	< 0.005	—	70.9
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.10	0.10	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.03	0.55	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	109	109	< 0.005	< 0.005	0.47	111
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.19	0.03	2.35	1.10	0.01	0.04	0.49	0.53	0.02	0.14	0.16	—	1,932	1,932	0.15	0.31	4.20	2,032

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	16.8	16.8	< 0.005	< 0.005	0.03	17.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.40	0.18	< 0.005	0.01	0.08	0.09	< 0.005	0.02	0.03	—	318	318	0.03	0.05	0.30	334
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.78	2.78	< 0.005	< 0.005	0.01	2.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.07	0.03	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	< 0.005	—	52.6	52.6	< 0.005	0.01	0.05	55.2

3.5. Paving (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.63	0.53	4.90	6.53	0.01	0.23	—	0.23	0.21	—	0.21	—	992	992	0.04	0.01	—	995
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.63	0.53	4.90	6.53	0.01	0.23	—	0.23	0.21	—	0.21	—	992	992	0.04	0.01	—	995
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.96	1.28	< 0.005	0.05	—	0.05	0.04	—	0.04	—	194	194	0.01	< 0.005	—	195
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.17	0.23	< 0.005	0.01	—	0.01	0.01	—	0.01	—	32.1	32.1	< 0.005	< 0.005	—	32.2
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.03	0.55	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	109	109	< 0.005	< 0.005	0.47	111
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	101	101	< 0.005	< 0.005	0.01	103
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	20.0	20.0	< 0.005	< 0.005	0.04	20.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.32	3.32	< 0.005	< 0.005	0.01	3.37
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.59	0.49	4.63	6.50	0.01	0.20	—	0.20	0.19	—	0.19	—	992	992	0.04	0.01	—	995
Paving	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.09	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	19.4	19.4	< 0.005	< 0.005	—	19.5
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.21	3.21	< 0.005	< 0.005	—	3.22

Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.44	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	99.2	99.2	< 0.005	< 0.005	0.01	101
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.96	1.96	< 0.005	< 0.005	< 0.005	1.99
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.33	0.33	< 0.005	< 0.005	< 0.005	0.33
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Architectural Coating (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	0.14	0.91	1.15	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	0.64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.32	7.32	< 0.005	< 0.005	—	7.34
Architectural Coatings	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.21	1.21	< 0.005	< 0.005	—	1.22
Architectural Coatings	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.30	2.30	< 0.005	< 0.005	0.01	2.34
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.30	2.30	< 0.005	< 0.005	0.01	2.34

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.17	2.17	< 0.005	< 0.005	< 0.005	2.20
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.17	2.17	< 0.005	< 0.005	< 0.005	2.20
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.26	0.26	< 0.005	< 0.005	< 0.005	0.26
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.26	0.26	< 0.005	< 0.005	< 0.005	0.26

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landsca Equipment	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.01	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consum er Products	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architect ural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consum er Products	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architect ural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landsca pe Equipme nt	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	< 0.005	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	1.69	1.69	< 0.005	< 0.005	0.00	1.69
Total	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	1.69	1.69	< 0.005	< 0.005	0.00	1.69
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	1.69	1.69	< 0.005	< 0.005	0.00	1.69
Total	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	1.69	1.69	< 0.005	< 0.005	0.00	1.69
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	0.23	0.23	< 0.005	< 0.005	0.00	0.23
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	0.23	0.23	< 0.005	< 0.005	0.00	0.23

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	6/3/2024	6/28/2024	5.00	20.0	—
Grading	Grading	7/1/2024	9/20/2024	5.00	60.0	—

Paving	Paving	9/23/2024	1/10/2025	5.00	80.0	—
Architectural Coating	Architectural Coating	10/7/2024	11/1/2024	5.00	20.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Rubber Tired Dozers	Diesel	Average	1.00	7.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	7.00	84.0	0.37
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	1.00	6.00	10.0	0.56
Paving	Pavers	Diesel	Average	1.00	6.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	1.00	7.00	36.0	0.38
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix

Site Preparation	—	—	—	—
Site Preparation	Worker	7.50	11.7	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	12.5	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	17.8	30.0	HHDT
Grading	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	12.5	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	0.00	11.7	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.40	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	0.00	0.00	2,766

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	—	—	18.8	0.00	—
Grading	—	12,800	60.0	0.00	—
Paving	0.00	0.00	0.00	0.00	1.06

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Other Asphalt Surfaces	0.50	100%
Other Non-Asphalt Surfaces	0.56	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	204	0.03	< 0.005
2025	0.00	204	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Other Asphalt Surfaces	0.44	0.00	0.00	114	2.95	0.00	0.00	769
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	0.00	0.00	2,766

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)

Other Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Other Asphalt Surfaces	0.00	—
Other Non-Asphalt Surfaces	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor
Emergency Generator	Diesel	1.00	0.01	3.00	201	0.73

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Demolition not required. In addition, the project would not include any structures. Therefore, building construction is also not required. Remaining phase timing is based on project-specific information provided by the project applicant.
Construction: Off-Road Equipment	Additional construction equipment added based on project-specific information.
Construction: Trips and VMT	Hauling trips and distance during grading phase updated based on project-specific information.
Operations: Vehicle Data	Weekday trip rate updated based on the assumption of two maintenance vehicles visiting the site per week.

Attachment 3

Geotechnical Investigation

CE&G
CAL ENGINEERING & GEOLOGY

6455 Almaden Expwy.
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San Jose
California 95120

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August 11, 2016

Don Barraza, P.E.
Principal Engineer
Kennedy/Jenks Consultants
303 Second Street, Suite 300 South
San Francisco, CA, 94107

Subject: **Geotechnical Investigation Report**
East Dunne Hillside Water Reservoir Project
Morgan Hill, California

Dear Mr. Barraza:

Cal Engineering & Geology, Inc. (CE&G) is pleased to submit this geotechnical investigation report to support the design for the East Dunne Hillside Water Reservoir Project in Morgan Hill, California. Our investigation included compiling and reviewing existing data; performing a field exploration program, geotechnical laboratory testing, engineering evaluations and analyses; and preparing this report.

CE&G appreciates the opportunity to submit this geotechnical investigation report. If there are questions concerning the information provided herein, please do not hesitate to contact us.

Sincerely,

CAL ENGINEERING & GEOLOGY

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1. Introduction

1.1 General

Design of the City of Morgan Hill's (City) East Dunne Hillside Water Reservoir Project is led by Kennedy/Jenks Consultants. Cal Engineering & Geology, Inc. (CE&G) has provided geotechnical engineering services for the Project, which is located in the Jackson Oaks area of eastern Morgan Hill, California. In support of the Kennedy/Jenks, Cal Engineering & Geology's work included compiling and reviewing available pertinent geotechnical and geologic data; performing field reconnaissance, a field exploration and laboratory testing program, and geotechnical engineering analyses; developing geotechnical design recommendations for the proposed improvements; and preparing this report. The work has been completed to collect geotechnical data and provide engineering analyses and geotechnical design recommendations for the design team to design a water tank, pump station pad, access road, and associated retaining walls to be constructed at the site. The location of the Project is shown in Figure 1, Site Location Map.

1.2 Project Description

As currently conceived, the project includes: an approximately 850,000-gallon steel water tank approximately 80 feet in diameter; a 15-foot-wide perimeter access strip immediately encircling the tank; tiered retaining walls along the upslope approximately half of the tank pad; a pump station and slab-on-grade pad along the downslope side of the tank pad; an access road stemming northeastward from the NE-bound lane of East Dunne Avenue; retaining walls along portions of the access road; and connective piping between the tank/pump station and East Dunne Avenue.

1.3 Purpose and Scope of Services

The investigation completed by CE&G was undertaken to assess the existing surface and subsurface conditions in the immediate vicinity of the proposed project, and to develop geotechnical design recommendations for the proposed improvements.

The scope of work completed for the geotechnical investigation and report included:

1. Meetings with the City and Kennedy/Jenks and management of geotechnical explorations.

2. Completion of an office study to identify and evaluate relevant geologic and geotechnical information available for the site, including published geologic maps, and previously prepared reports regarding the site and vicinity.

3. Geologic reconnaissance to observe current site conditions.

4. A subsurface exploration and laboratory testing program to develop information needed to complete geotechnical analyses and prepare this geotechnical report.

5. Completion of engineering analyses to develop geotechnical parameters for the design of the water tank foundations, retaining walls, access road, and pump station pad.

6. Preparation of a draft and final geotechnical investigation report.

1.4 Information Provided and Previous Site Investigations

CE&G previously evaluated the preliminary engineering geologic suitability of the site, and prepared a report entitled *Preliminary Engineering Geologic Feasibility Evaluation, Proposed East Dunne Tank Site, Morgan Hill, California*, dated 27 July 27, 2015. Information from this previous study was used in developing the scope for the geotechnical investigation and for refining the siting of the water reservoir. Pertinent background information is carried forward in this report.

The following information was provided by the Kennedy/Jenks and/or Mark Thomas & Co., the project surveyors:

- A composite topographic and orthophoto base map of the project area, and stationing data for the access road alignment in the form of electronic AutoCAD files.

- Preliminary access road alignment and profiles.

- Technical Memorandum #1, Design Alternative Evaluation No. 1 - Retaining Wall Alternatives

2. Site Conditions

2.1 Site Description

The proposed tank site is currently an undeveloped, generally open, grass-covered hillslope with sparse oak trees. To the west and downslope lies a sweeping switchback turn in East Dunne Avenue, with a cut slope bordering the roadway on the west side of the site. To the north and upslope are residential properties. Downslope (to the south) of the site, the grassy slopes yield to scattered oak trees clustered along the axis of a northeast-southwest-trending topographic swale. Land use in the vicinity is residential. Based on available information, the site has not been previously developed.

The hilly terrain encompassing the site is located on the western flank of the Diablo Range, one of the component ranges of the Coast Ranges geomorphic province of California. The slopes of the tank site descend westward to the floor of Coyote Valley, within which the City of Morgan Hill is centered.

The tank site is located on a southwest-facing slope with overall gradients ranging from approximately 16 – 19 degrees in the upper portion of the site and tank vicinity, to 22 - 28 degrees in the lowermost portion of the site, downslope and southwest of the proposed access road. An unnamed drainage course defined by the topographic swale drops from northeast to southwest, passing downslope of the tank and access road. Slope gradients within approximately 150 feet of this swale are steeper than the overall slopes farther uphill.

The overall surface water flow pattern in the site vicinity is westward toward East Dunne Avenue, and southwestward toward the unnamed topographic swale that ultimately drains into Upper Llagas Creek.

Elevations across the property range from approximately 675 feet above mean sea level (msl) in the unnamed topographic swale near the downslope property boundary, to approximately 870 feet msl near the existing residences upslope of the upper property boundary. The tank pad would be constructed at elevation 780 ft msl.

2.2 Topographic and Survey Information

Topography of the site was provided by Kennedy/Jenks. The topographic data are in LiDAR (Light Detection and Ranging) format derived from the San Jose Phase 3 LIDAR project. Latitude and longitude coordinates are based on the California Coordinate System Zone 3 and the 1983 North American Datum (NAD83). Elevation references are based on 1988 North American Vertical Datum (NAVD88).

3. Geology

The regional geologic setting and observations regarding surface outcrops and site geomorphology are contained in our preliminary engineering geologic feasibility report (CE&G, 2015), and are not reproduced fully herein. The reader is referred to that report for additional detail pertaining to the site geology.

3.1 Geologic Setting

The East Dunne tank site lies within the Coast Ranges geomorphic province of California. This province is characterized by northwest-southeast trending mountain ranges and intervening valleys such as that occupied by San Francisco Bay and the Santa Clara Valley. The geologic setting is shown on our Regional Geologic and Index Map (Figure 2).

3.1.1 Bedrock Geology

Regional geologic mapping by Wentworth and others (1999), shows the upslope (eastern) part of the site as being underlain by the Pliocene-age Basalt of Anderson and Coyote Reservoirs. The western part of the site vicinity is mapped as being underlain by the Silver Creek Gravels of similar age. Slightly younger deposits known as the Packwood Gravels lie just upslope and east of the site. The Silver Creek Gravels are described as consisting of interbedded conglomerate, sandstone, siltstone, tuffaceous sediment, tuff, and basalt. The Basalt of Anderson and Coyote Reservoirs is described as pyroclastic andesite and basalt flows. The Packwood Gravels consist typically of gravel, cobbles, sandy conglomerate, silty sandstone, sandy siltstone and minor claystone. Regionally, all of these units overlie ophiolitic (ocean floor) and Franciscan Complex metamorphic rocks; the nearest exposures of these rocks is to the north, along the spine of the ridge crest west of Anderson Lake. Wentworth's mapping considered and incorporated earlier more detailed mapping by PGE (1991) described below.

Detailed geologic mapping performed for the City of Morgan Hill (PGE, 1991) shows similar rock types, although the names and ages assigned to the map units differs from those used by Wentworth and others. As shown on PGE (1991), the site is underlain by rocks of the Santa Clara Formation (map unit QTs on Plate 1 below). In general, this formation consists of "poorly to well-consolidated" non-marine sediments largely reflective of an alluvial fan setting. Within this formation are intervals of basalt lava flows and flow breccia (map unit QTsb); at least two of these intervals are shown on the City Geologic Map, although this mapping is somewhat interpretive.

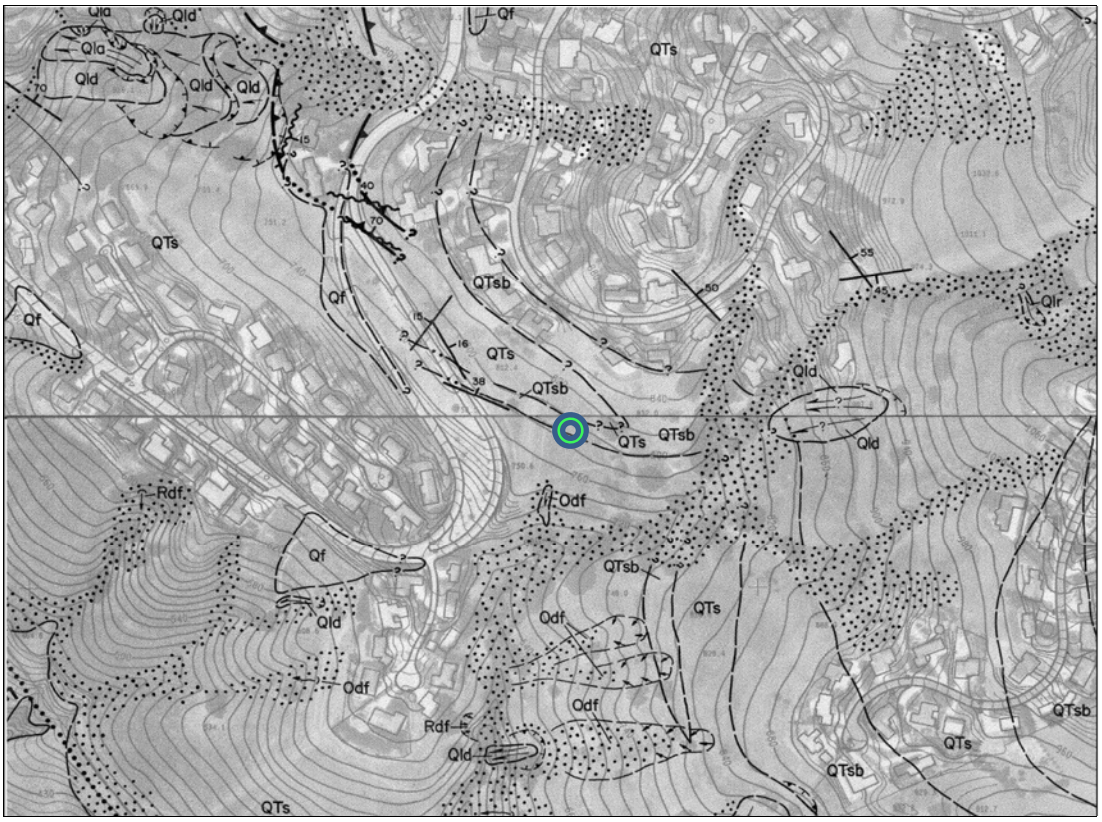

Plate 1 - Excerpt of PGE (1991), with site location at green circle.

Geologic interpretation and analysis performed for the Anderson Dam Seismic Retrofit Project highlighted extensive folding and possible broken folds within the Santa Clara Formation; the implication of this for the tank site is that belts of rock shown as continuous on maps such as PGE (1991) may in fact not be nearly as continuous.

3.1.2 Landslide Geology

Regional landslide mapping (Nilsen, 1975; excerpt provided in CE&G, 2015) does not show any landslides at the site, although earthflow-style landslide deposits are shown in the general vicinity of the site.

The mapping of PGE (1991) found the extent of landslide deposits to be considerably less than was interpreted by Nilsen (1975). As shown on the City of Morgan Hill Geologic Map (see excerpt above), colluvium occupies the topographic swale areas. Localized landslide deposits are mapped within the general vicinity (within hundreds of feet), and are generally shown as confined to topographic swale areas.

A regional landslide inventory map by Delattre and others (2006; excerpt provided in CE&G, 2015) largely supports the mapping of PGE (1991) insofar as is pertinent to the site vicinity. The nearest mapped landslide has an overall direction of movement that is westward, away from the slopes encompassing the site. A substantial spur ridge divides the portion of the regional slope affected by landsliding from the portion of the slope encompassing the site.

3.2 Faulting

No active faults are mapped as passing through the site in the general project vicinity. Several fault strands are mapped west of the Calaveras fault and east of the toe of the Diablo Range. Collectively, these faults are referred to as the Coyote Creek-Range Front fault zone, which consists of an anastomosing zone of variable width that juxtaposes different rock types. The closest mapped fault strand is shown by PGE (1991) as passing near the valley floor/toe-of-slope hinge, approximately 1,400 feet west of the site (see the dotted line at the extreme lower left corner of the excerpt from PGE (1991) shown above). This fault – the Range Front Fault of PGE (1991) -- was evaluated together with the Coyote Creek fault in depth as part of investigations for the Anderson Dam Seismic Retrofit Project (HDR, 2013). Summarizing, work by several investigators concluded that the fault is not seismically capable if it is even present as mapped. Seismicity is discussed further, below. Figure 3, Regional Fault Map, shows known active faults in the region.

3.3 Geohazard Mapping

The site is not mapped within a California Geological Survey (CGS) Earthquake Fault Rupture Hazard Zone (Bryant and Hart, 2007).

The site is not located within a fault rupture hazard zone established by the local jurisdiction (Morgan Hill General Plan 2035 Update, Draft Housing and Safety Element, accessed May 2016).

The site is shown on the City of Morgan Hill Ground Movement Potential Map (PGE, 1991) as lying within map unit "Ps," which is defined as "relatively unstable surficial deposits or bedrock materials including landside debris, colluvium, and weak bedrock, commonly less than about 10 feet thick on moderate to steep slopes. Subject to shallow, slow-moving landsliding and soil creep."

The site is not located within a California Geological Survey (CGS) Seismic Hazard Zone (CGS, 2006). These zones were established to trigger further evaluation (for certain projects) of the potential for seismically induced landsliding in hillside areas, and liquefaction potential in valley floor areas.

The site is mapped within a County of Santa Clara Landslide Hazard Zone; these zones are established in most hillside areas in order to help confirm that slope stability considerations are addressed in certain project classes (Santa Clara County Planning Dept. online GIS database at https://sccplanning.maps.arcgis.com, accessed May 2016).

The site is not mapped within a County of Santa Clara Fault Rupture Hazard Zone, Liquefaction Hazard Zone, Collapsible Soil or Dam Inundation hazard zone (see link above).

3.4 Regional Groundwater

Groundwater within the hillslope areas encompassing the site is commonly at tens of feet in depth below ground surface, though variable. We are not aware of regional groundwater contouring of sufficient detail to apply to this project. Widely scattered springs and seeps in the general vicinity are interpreted to represent the intersection of the local water table with the ground surface.

3.5 Seismicity

3.5.1 Active Faults

The East Dunne tank site is located within the greater San Francisco Bay Area, which is recognized as one of the more seismically active regions of California. The right-lateral strike-slip San Andreas fault system controls the northwest-southeast structural grain of the Coast Ranges and the Bay Area. The fault system marks the major boundary between two of earth's tectonic plates, the Pacific Plate on the west and the North American Plate on the east. The Pacific Plate is moving north relative to the North American plate at approximately 40 mm/yr in the Bay Area (WGCEP, 2003).

The transform boundary between these two plates has resulted in a broad zone of multiple, subparallel faults within the North American Plate, along which right-lateral strike-slip faulting predominates. In this broad transform boundary, the San Andreas Fault accommodates less than half of the average total relative plate motion. Much of the remainder in the greater South Bay Area is distributed across faults such as the San Gregorio-Hosgri, Monte Vista-Shannon, Sargent, Berrocal, Hayward (southern segment), Calaveras, Zayante-Vergeles, and Greenville fault zones.

Since the East Dunne tank site is in the seismically active San Francisco Bay Area, it will likely experience significant ground shaking (moment magnitude greater than 7.0) from one or more of the nearby active faults during the design lifetime of the project. Major seismic sources in the San Francisco Bay area include those summarized in Table 1. For major active faults within 50 km of the site, the distance from the site and the estimated maximum moment magnitude are listed.

Distances are estimated with respect to an approximate project center at latitude 37.13774°, longitude -121.59512°.

Two seismogenic (capable of generating significant earthquakes) earthquake faults near the site are the Calaveras fault (approximately 1.9 km [1.2 mi] east of the site, essentially coincident with the axis of Anderson Lake); and the San Andreas fault (approximately 19.6 km [12.2 mi] west of the site).

Table 1 - Distances to Selected Major Active Faults

Fault Name	Distance and Direction From Site to Fault
Calaveras (central segment)	1.9 km northeast
San Andreas	19.6 km southwest
Berrocal	15.4 km southwest
Sargent	16.5 km southeast
Zayante-Vergeles	25.0 km southeast
Monte Vista-Shannon	30.6 km northwest
Ortigalita	31.0 km northeast
Greenville	32.2 km northeast
Hayward (southern segment)	42.0 km northwest
San Gregorio	57.9 km southwest

3.5.2 Liquefaction and Seismic Densification

Soil liquefaction is a phenomenon in which saturated, cohesionless soils (generally sands) lose their strength due to the build-up of excess pore water pressure during cyclic loading, such as that induced by earthquakes. Soils most susceptible to liquefaction are saturated, clean, loose, fine-grained sands and silts. The primary factors affecting soil liquefaction include: 1) intensity and duration of seismic shaking; 2) soil type and relative density; 3) overburden pressure; and 4) depth to ground water.

The soil and groundwater conditions needed for soil liquefaction do not appear to be present in the site vicinity, and none of the onsite earth materials are considered susceptible to liquefaction. The soils encountered at the site are relatively thin (combined thickness of colluvium and uppermost severely weathered rock on the order of up to 10 feet in thickness), contain significant proportions of clay and silt and are relatively stiff in consistency. Additionally, shallow (within 50 ft bgs) groundwater conditions are not present in the site soils. Based on subsurface information collected during this investigation, we judge the potential for liquefaction at this site to be very low because the groundwater level is generally low, the granular soils locally present at the site are generally

too dense to liquefy, and the clayey soils locally present at the site are sufficiently plastic and stiff to preclude liquefaction.

Seismic densification is the densification of unsaturated, loose to medium dense granular soils due to strong vibration such as that resulting from earthquake shaking. Materials considered susceptible to seismic densification were not encountered in our borings.

4. Site Investigation

4.1 Previous Investigations

As noted above, CE&G previously prepared a Preliminary Engineering Geologic Feasibility Evaluation report (CE&G, 2015). Geologic mapping included in that report was largely carried forward for this report, and refined on the basis of findings gathered during this investigation. Additional information regarding surface exposures is presented in CE&G (2015).

CE&G (2015) described degraded surface exposures of generally pebbly sandstone with variable fines content; and intervals of common cobble- to boulder-size rubble composed of basalt. The best exposures in the vicinity are provided by the road cut along East Dunne Avenue. Areas where basaltic cobbles and boulders were concentrated in the surficial colluvium were inferred to approximately mark the location of discontinuous basalt flows and/or breccia in the subsurface. These observations are consistent with regional exposures in the area.

4.2 Site Reconnaissance

CE&G performed field reconnaissance of the site on several dates, in coordination with representatives of the City of Morgan Hill, Kennedy/Jenks, and Mark Thomas & Co. No evidence of significant settlement, structural distress, erosion, stability problems, or maintenance problems were observed.

4.3 Subsurface Exploration

4.3.1 Scope of Explorations

CE&G prepared a preliminary subsurface exploration plan that showed planned boring locations. The preliminary plan was submitted to the City for review prior to execution of subsurface exploration.

Seven geotechnical borings and an additional probe were completed for the investigation of East Dunne Tank site to characterize the soil/bedrock conditions in the area of the tank and to evaluate anticipated excavation conditions near the upslope limit of the tank footprint. All borings were drilled using a track-mounted drilling rig. The locations of the borings were selected based on review of published geologic mapping; our own site geologic reconnaissance mapping (performed for CE&G [2015] and this investigation); evaluation of the locations of existing improvements (sanitary sewer) and the proposed improvements; access; environmental constraints; and public/pedestrian safety.

Prior to drilling, CE&G coordinated with the City regarding selection of the final locations of the borings. CE&G marked, and coordinated a USA (Underground Service Alert); obtained an encroachment permit through the City of Morgan Hill; obtained an exploratory boring permit from the Santa Clara Valley Water District; and obtained a hydrant water meter (through City of Morgan Hill DPW). The locations of the completed borings were marked in the field and recorded by measuring with a tape from established points of reference and by using a handheld GPS device. Following drilling, the completed borings were surveyed by the Mark Thomas & Co. surveying team, for plotting as shown on Figure 4, Vicinity Geologic Map.

The geotechnical borings were drilled by Britton Exploration on April 11-13, 2016, utilizing a track-mounted CME-55 drill rig. Surface conditions at all of the borings were similar, consisting of grassy hillslope terrain with surface gradients on the order of 17 to 20 degrees. The drill rig utilized a 6-inch solid stem auger, with tooling on hand to permit switchover to hollow stem or rotary wash tri-cone bit drilling depending on conditions encountered. The borings were drilled to depths ranging between approximately 20 and 52 feet below existing grade (B-1: 51.5 feet; B-2: 50.0 feet; B-3: 51.5 feet; B-4: 20.0 feet; B-5: 25.0 feet; B-6: 25.0 feet; B-7: 25.0 feet), with the additional probe (P-1) drilled to 40.0 feet below existing grade. Sampling protocol and boring depths were determined based upon geologic conditions; expected elevation of the tank and pump station pad; configuration of the planned retaining walls; and by materials encountered during the drilling operation.

Upon completion, the borings were backfilled with neat cement grout in accordance with the Santa Clara Valley Water District's permit criteria. Drilling spoils were distributed unobtrusively on site.

4.3.2 Logging and Sampling

The materials encountered in the borings were logged in the field by a CE&G geologist. The soils were visually classified in the field, office, and laboratory according to the Unified Soil Classification System (USCS) in general accordance with ASTM D2487 and D2488.

During the drilling operations, soil samples were obtained using one of the following sampling methods:

- California Modified (CM) Sampler; 3.0 inch outer diameter (O.D.), 2.5 inch inner diameter (I.D.) (ASTM D1586)

- Standard Penetration Test (SPT) Split Spoon Sampler; 2.0 inch O.D., 1.375 inch I.D. (ASTM D1586)

The samplers were driven 18 inches (unless otherwise noted on the boring logs) with a 140-pound automatic trip-hammer dropping 30 inches in general conformance with ASTM D6066 procedures. The number of blows required to drive the SPT or CM sampler 6 inches was recorded for each sample. The results are included on the boring logs in Appendix A. The blow counts included on the boring logs are uncorrected and represent the field values.

Soil samples obtained from the borings were packaged and sealed in the field to reduce the potential for moisture loss and disturbance. The samples were taken to CE&G's Oakland office for laboratory testing and storage.

4.3.3 Soil Conditions Encountered

Relatively uniform soil conditions were encountered in the borings. Subsurface soil conditions encountered in our borings were generally consistent with geologic mapping performed for CE&G (2015), except that the extent of hard basaltic flow and/or flow breccia encountered was less than anticipated within the area of improvements based on surface exposures.

None of the borings encountered existing fill on the undeveloped site, although previous disking for fire prevention, and faint remnant ranch/fire roads suggest that the upper approximately 1 foot of soil has locally been disturbed.

Colluvium – All the borings encountered colluvium. Texturally, the colluvium was field classified as generally lean clay to sandy lean clay (CL), with sandy fat clay (CH) described in B-4 and B-6. These deposits are firm and moist. The colluvium is inferred to be derived from the underlying Santa Clara Formation bedrock, and the transition between colluvium and the underlying severely weathered rock is gradual.

Santa Clara Formation bedrock – All of the borings bottomed in Santa Clara Formation bedrock. The dominant rock types encountered are sandstone, clayey sandstone, claystone, and sandy claystone. Scattered concentrations of gravel were noted either through behavior of the drill rig or visible in the samples. Boring B-1 encountered near refusal at a depth of approximately 41 feet. A switchover in drilling technique allowed the boring to penetrate to a depth of 51.5 feet at a very slow rate. The refusal was at first suspected to be due to a basaltic interval, however the few fragments retrieved indicated that hard, cemented sandstone had been encountered. Clayey sandstone with gravel was also encountered in B-5 and B-6. B-6 encountered an apparent interval of basalt within a thicker interval of sandstone with gravel that presented hard drilling.

B-1 was the only boring that encountered near-refusal. None of the borings (except B-6) recovered any basalt flow and/or breccia. Surface exposures indicate a greater proportion of basalt and breccia than was encountered by our borings. The geotechnical probe boring (P-1) location was

selected to investigate whether the hard material encountered in B-1 extended into the proposed tank backcut. That material was not encountered in P-1.

Based on the relative lack of basaltic material suggested by B-1, B-2, and B-3 in contrast to surface concentrations of cobbles and boulders, we have adjusted the inferred limits of basaltic intervals on our Vicinity Geologic Map.

Slope gradients are distinctly steeper downslope of a topographic bench at approximately the location of B-6. We infer that the clayey sandstone with gravel encountered in B-6 corresponds to a slightly harder, stronger interval that "daylights" in the slope at approximately that elevation. Observed landsliding appears to be limited to the steeper slopes below this location.

For a more detailed description of the soils encountered in the borings, the logs of the borings and laboratory test results are included in Appendices A and B.

4.3.4 Groundwater Conditions Encountered

Groundwater was not found in any of the borings. Soil and bedrock colors observed in samples indicate consistently oxidized conditions, which suggests that the water table does not tend to fluctuate through the intervals drilled. Conversely, a fluctuating water table is likely to result in mottled coloration, and presence of green, gray, and blue hues that indicate reducing conditions.

4.4 Geotechnical Laboratory Testing

Laboratory testing was performed to obtain information regarding the physical and index properties of selected samples recovered from the exploratory borings. Tests performed included natural moisture content, dry unit weight, Atterberg Limits, grain size distribution, Caltrans corrosion testing, and triaxial unconsolidated undrained testing. Tests were completed in general conformance with applicable ASTM standards. The laboratory testing indicates that the Plasticity Index of the clay soil layers ranges between 11 and 41 percent for the samples tested. The results of the laboratory tests are summarized on the boring logs in Appendix A and in Appendix B.

4.5 Slope Stability Assessment

CE&G performed global stability analyses to develop an opinion regarding the stability of proposed bedrock cuts upslope of the proposed water tank and to develop recommendations for earth retention structures.

CE&G used stability software GSLOPE with search routines to evaluate the stability of the proposed cuts. CE&G then varied the depth of the failure surfaces to get insight into the stability of the proposed cut. Our evaluation indicates that shallow failure surfaces do not have adequate

factor of safety. As a result engineered earth retention is required. Our analyses suggest that removal and reconstruction of the slope with geogrid reinforcement would increase the grading by 50 to 100% over that required to construct the tank pad. In addition, our analysis indicates that cantilever retaining walls do not provide an adequate factor of safety against global slope failures.

Based on our experience, the most economical solutions for large bedrock cuts like that proposed are tieback retaining walls or soil nail retaining walls. These wall types are generally used since the construction sequence results in a continuously stabilized excavation. Support of the slope is provided in a top-down manner as the excavation is being made so that when the pad elevation is reached, the walls are already installed. This expedites the construction schedule. Additionally, the construction sequence and methods are conducive to variable height permanent walls. In general, soil nail walls are more economical than tieback retaining walls.

The stability analyses are included in Appendix D.

5. Conclusions and Discussion

5.1 General Summary

Based on the results of our investigation, it is our opinion the site is geologically and geotechnically suitable for the proposed improvements shown on our Vicinity Geologic Map (Figure 4), provided the recommendations presented in this report are followed.

A review of our conclusions with respect to various geologic and geotechnical issues is presented below, beginning with landsliding/slope stability, since this is arguably the most important geologic hazard with respect to site suitability. Geotechnical recommendations for design and construction of the proposed improvements are presented in the "Recommendations" section of this report.

5.2 Landsliding

As described above, no evidence of deep-seated landsliding was detected at the site. Relatively restricted shallow sloughing (landsliding) has affected the colluvium in portions of the slopes south (downslope) of the site. Such shallow instability appears to have been associated with concentration of surface runoff in topographic swales.

In our judgment, the potential for deep-seated landsliding (involving bedrock) to adversely affect the site improvements is low under both static and seismic conditions. We base this on several lines of evidence, including: the presence of interlayered basaltic rocks in an overall favorable orientation within the rock sequence observed; the lack of evidence for previous deep-seated landsliding with areas of interlayered basaltic rocks in the general region; and the site's location outside of a topographic swale, with minimal contributing watershed upslope.

We also judge the potential for shallow-seated landsliding (under static and seismic conditions) to adversely affect the site improvements to be low, provided site improvements are appropriately designed and constructed and surface runoff is appropriately managed. There is a moderate potential for the mapped past shallow landsliding on the steeper slopes below (south of) the access road to reactivate under current site conditions. However, if surface drainage in this vicinity is appropriately controlled, the area will not receive the concentrated runoff that we judge to be a primary factor in the formation of this landsliding, which will lessen the potential for reactivation. Additionally, the proposed access road we understand will be supported along this interval with an outboard retaining wall deriving support from the relatively strong bedrock beneath the slide.

5.3 Seismic Hazards

Large magnitude earthquakes and strong ground shaking are likely to affect the project area within the design lifetime of the proposed improvements. Peak ground shaking parameters are presented below in Section 6.2 and should be considered in the design of the proposed improvements. Local ground-modifying effects of high intensity ground shaking are considered secondary seismic effects. Our review of these processes is presented below.

- We confirm our judgment that the potential for fault ground rupture or coseismic faulting to significantly affect the proposed improvements is low.

- We confirm our judgment that the potential for ridgetop fissuring, ridgetop shattering, ridgetop spreading or other seismically induced ground deformation to significantly affect the proposed improvements is low.

- We confirm our judgment that the potential for soil liquefaction to significantly affect the proposed project is low.

5.4 Soil Permeability

We understand the design team requires an estimate of the on-site soil permeability that will be used in the site drainage assessment. The permeability of the on-site soil was not tested. However, based on the type and consistency of the soils encountered at the site during the subsurface exploration, the following permeability estimates are provided for use in estimating the amount of rainfall that will infiltrate into the site soils.

The types of soils encountered at the site in the upper colluvial soil included primarily Sandy Lean Clay (CL) and Sandy Fat Clay (CH), for which a typical permeability value of 7 x 10-5 in/hr is representative. Below the colluvium, some of the weathered bedrock that consists of sandstone has a higher permeability. The sandstone typically has been weathered to the consistency of Silty Sand (SM) and Clayey Sand (SC), for which a value of between 0.04 and 4 x 10-4 in/hr may be used. Where the bedrock consists of claystone, weathered to Sandy Clay (CL), the value above for the colluvial soil may be used.

5.5 Geotechnical Considerations

Significant geotechnical issues that will affect the design and construction of the proposed water tank, retaining walls, and access road are as follows:

- **Water Tank Foundation** – In order to reduce the potential for differential settlement of water tank foundations, we recommend that tank foundations be extended into bedrock materials. This is conceptually shown in Figure 5, Geologic Cross-Section A-A' and detailed recommendations are provided in Section 6.3.

- **Retaining Walls** –We recommend that the proposed retaining walls around the uphill side of the tank pad be designed as tieback or soil nail retaining walls. As an alternative, cantilever retaining walls utilizing spread footings that bear in competent bedrock materials may be considered. Detailed recommendations are provided in Section 6.6, Retaining Wall Design.

- **Surface Water Drainage** – Localized shallow landsliding, gullying and erosion have occurred within the central parts of the swale areas immediately south of the tank access road. Surface drainage improvements should be designed to adequately collect and accommodate the volumes of water that reach these drainages.

- **Rippability** – Subsurface exploration was completed using primarily hollow stem augers and only encountered drilling refusal in Boring B-1 below a depth of 40 feet, which is below the planned tank excavation. Based on the subsurface exploration, the majority of soil and bedrock underlying the project site is anticipated to be excavated with conventional heavy earthwork and excavation equipment. The need for jack hammers, hoe rams or blasting is not currently anticipated for the majority of the planned excavations. However, such equipment may be necessary in isolated locations.

6. Recommendations

6.1 Earthwork

6.1.1 Clearing and Stripping

Prior to grading, areas that will support foundations, concrete slabs-on-grade, pavements or engineered fill should be cleared of all deleterious material that may be present at the site. The root systems of trees designated for removal should be completely grubbed and removed. All deleterious material generated during the clearing operation should be removed from the construction areas.

After clearing, soil surfaces should be stripped of all vegetation and organic material. Organic laden soils are defined as soils with more than 3 percent by weight of organic content. The required stripping depth should be determined in the field by the geotechnical engineer at the time of construction. For planning purposes, an average stripping depth of 3 inches may be assumed. Organic laden topsoil can be stockpiled for reuse in the upper 12 inches of landscape areas or removed from the construction areas.

6.1.2 Excavations

Excavations for this site will include cuts for the water tank pad, cuts along the access road alignment, excavation of water tank and retaining wall foundations; excavations for keying and benching of fills; and trenching for and utility lines. The excavation for the water tank pad is expected to be up to approximately 34 feet below the existing grade. The tank pad retaining walls will likely be required prior to the construction of the tank foundation. Excavation for the access road is anticipated to be up to 12 feet below the existing grade.

The stability of temporary excavations, braced or unbraced, is the responsibility of the contractor. All excavations and shoring systems should meet the minimum requirements given in the State of California Occupational Safety and Health Standards, latest edition.

6.1.3 Cut and Fill Slopes

Permanent cut slopes in colluvial soil should be constructed at inclinations no steeper than 2-½:1 (horizontal:vertical). Final cut slopes in bedrock should be constructed at inclinations no steeper than 2:1 (horizontal:vertical). All permanent cut slopes should be less than 10 feet in height. Cuts slopes over 10 feet high should be reduced in height by designing retained walls. Final fill slopes should be constructed at inclinations no steeper than 2:1 (horizontal:vertical) and

should be limited to a maximum vertical fill depth of 10 feet. Fill slopes should be overbuilt and trimmed` back to their final configurations.

Pavements should be separated at least 2 feet horizontally from the crests of all cut slopes and fill slopes.

6.1.4 Dewatering

Perched and shallow ground water will not likely be encountered in the excavations. Therefore, the need for temporary dewatering systems, such as sloping excavations to a sump pump location, trenching from the base of excavations to discharge water by gravity flow, or other means are not currently anticipated. If the need arises, design of construction dewatering should be determined by the contractor in consultation with our field representative at the time of construction.

6.1.5 Subgrade Preparation

Subgrade preparation should be performed after stripping and any necessary excavations have been performed. Subgrade soil in areas to receive engineered fill, foundations, or pavements should be scarified to a minimum depth of 8 inches, moisture conditioned and compacted to the recommendations presented in Section 6.1.7. Prepared soil subgrades should be non-yielding when proof-rolled by a fully loaded water truck or equipment of similar weight.

Subgrade preparation should extend a minimum of 5 feet beyond the outermost limits of the proposed improvements. After the subgrades have been prepared, the areas may be raised to design grades by placement of engineered fill.

If unstable, wet or soft soil is encountered, the soil will require processing before compaction can be achieved. When construction schedule does not allow for air-drying, other means such as lime treatment, over-excavation and replacement, geotextile fabrics, etc. may be considered to help stabilize the subgrade. The method to be used should be determined at the time of construction based on the actual site conditions. We recommend obtaining unit prices for subgrade stabilization during the construction bid process.

6.1.6 Material for Engineered Fill

On-site soils with an organic content of less than 3 percent by weight, free of any hazardous or deleterious materials, and meeting the gradation requirements below may be used as general engineered fill to achieve project grades, except when special materials (such as drainage material) are required.

Engineered fill material should not contain rocks or lumps larger than 6 inches in greatest dimension, should not contain more than 15 percent of the material larger than 2½ inches, and should contain at least 20 percent passing the No. 200 sieve.

All import fills should be approved by the project geotechnical engineer prior to delivery to the site. At least five (5) working days prior to importing to the site, a representative sample of the proposed import fill should be delivered to our laboratory for evaluation.

Possible sources for import fill include the Aromas Quarry located south of Gilroy, California and Stevens Creek Quarry located near Cupertino, California.

6.1.7 Engineered Fill Placement and Compaction

Engineered fill should be placed in horizontal lifts each not exceeding 8 inches in uncompacted thickness, moisture conditioned to the required moisture content, and mechanically compacted to the recommendations below. Relative compaction or compaction is defined as the in-place dry density of the compacted soil divided by the laboratory maximum dry density as determined by ASTM Test Method D1557, latest edition, expressed as a percentage. Moisture conditioning of soils should consist of adding water to the soils if they are too dry and allowing the soils to dry if they are too wet.

Engineered fills consisting of on-site soils or imported soils of low expansion potential should be compacted to no less than 90 percent relative compaction with moisture content between about 1 and 3 percent above the laboratory optimum value. In pavement areas, the upper 6 inches of subgrade soil should be compacted to no less than 95 percent relative compaction with moisture content between 1 and 3 percent above the optimum value. Aggregate base in vehicle pavement areas should be compacted at slightly above the optimum moisture content to no less than 95 percent relative compaction.

For fill to be placed on an existing slope with an inclination of 5:1 (horizontal:vertical) or steeper, the fill should be keyed and benched into the existing slope. Toe keys should extend a minimum of 2 feet into the bedrock material and have a width of 8 feet or 1½ times the width of the compaction equipment, whichever provides a wider excavation. Toe keys should slope toward their backs with a slope of at least 2 percent. Benches should be created by cutting a minimum of 6 feet into the existing slopes as the new fill is being placed. Vertical spacing of benches should not be more than about 6 feet. The materials excavated from the benches can be mixed with the slope fill and the fill should be compacted to the requirements in this section.

6.1.8 Utility Trench Excavation and Backfill

Utility trenches will likely extend through recompacted engineered fill in some cases, or native soil or bedrock. Utility trenches in bedrock material should be able to stand near vertical with minimal bracing.

Excavations should be constructed in accordance with the current CAL-OSHA safety standards and local jurisdiction. The stability and safety of excavations, braced or unbraced, is the responsibility of the contractor.

Bedding material, extending from the bottom of the trench to about 1 foot above the top of pipe, may consist of free-draining sand (less than 5% passing a No. 200 sieve), lean concrete or sand cement slurry. Sand if used as bedding should be compacted to no less than 90 percent relative compaction. Jetting of trench backfill shall not be allowed. If sand is used as bedding in utility lines located on slopes, soil plugs should be provided at about 30 feet intervals to reduce the potential for the utility trenches to serve as a conduit for water.

6.1.9 Wet Weather Construction

We recommend that earthwork not be performed during wet weather seasons. If site grading and construction is to be performed during the rainy periods, the owner and contractors should be fully aware of the potential impact of wet weather. Rainstorms could cause unstable excavations, delay to construction and damage to previously completed work by saturating compacted pads or subgrades, or flooding excavations.

Earthwork during rainy months will require extra effort and caution by the contractors. The grading contractor should be responsible to protect his work to avoid damage by rainwater. Standing pools of water should be pumped out immediately. Construction during wet weather conditions should be addressed in the project construction bid documents and/or specifications. We recommend the grading contractor submit a wet weather construction plan outlining procedures they will employ to protect their work and to minimize damage to their work by rainstorms.

6.1.10 Erosion Control

Disturbing areas around the project site should be minimized as much as possible. Areas disturbed by construction activities should be protected from erosion by hydroseeding and/or installing erosion control mats.

The tops of fill or cut slopes should be graded in such a way as to prevent water from flowing freely across the face of the slopes. A positive gradient away from the tops of slopes should be

provided to direct surface water runoff away from the slopes to suitable drainage points. Completed slopes should be provided with erosion control measures prior to the winter season following grading.

Because the existing bedrock is relatively nutrient-poor, it will be difficult for vegetation to become properly established, resulting in a higher potential for slope erosion. Revegetation of graded slopes can be aided by retaining the organic-rich strippings within the upper few inches of on-site soil during the site stripping operations and spreading these materials in a thin layer (approximately 6 inches thick) on the graded slopes prior to the winter rains and following rough grading. When utilizing this method, it may be possible to reduce the amount of hydroseeding. All landscaped slopes should be maintained in a vegetated state after project completion. The use of native drought-tolerant vegetation is recommended. No pressurized irrigation lines should be placed on or near the tops of graded slopes.

6.2 Seismic Design Parameters

Because of the uncertainty of when and where earthquakes will occur, the extent of potential seismic damage to the water tank facility over their expected design life is difficult to predict. Seismic design parameters were determined based on soil type, design earthquake magnitude, and peak ground acceleration. The soil type was determined using an interactive map on the United States Geologic Survey (USGS) Earthquake Hazards Program website (USGS, 2015). The use of the National Earthquake Hazards Reduction Program (NEHRP) deaggregation, provided by the USGS, determined that a design earthquake with magnitude 6.5 and peak ground acceleration (PGA) of 0.73g should be used for seismic design. This value of PGA is based on a 475-year return period. The following seismic design parameters are from Chapter 16 of the 2013 California Building Code for Site Class C type soils (California Building Code, 2013).

Table 2 - Seismic Design Parameters

Item	Factor or Coefficient	Value	CBC 2013* Table/Figure
Site Class Definition	Site Class	C	Table 1613.5.2
0.2 Second Spectral Response Acceleration	S_S	2.165g	Figure 1613.5(3)
1.0 Second Spectral Response Acceleration	S_1	0.827g	Figure 1613.5(4)
Values of Site Coefficient	F_a	1.0	Table 1613.5.3(1)
Value of Site Coefficient	F_v	1.3	Table 1613.5.3(2)
Designed Spectral Response Acceleration for Short Periods	S_{DS}	1.443	Equation 16-38 (S_{DS}=2/3(Fa S_S)

Item	Factor or Coefficient	Value	CBC 2013* Table/Figure
Designed Spectral Response Acceleration for 1-Second Periods	S_{D1}	0.717g	Equation 16-40 (SDS=2/3(Fv S1)

6.3 Water Tank Foundation

We recommend the proposed tank be supported by a reinforced concrete ring foundation bearing in competent bedrock. The ring foundation may be designed to impose an allowable soil bearing pressure of 6,000 pounds per square foot. The ring footings should be embedded at least 24 inches below pad grade or lowest adjacent grade, whichever provides a deeper embedment. Where the ring is less than 5 feet horizontally from a slope it should be deepened to extend at least 24 inches into competent bedrock, as verified in the field by an engineer or geologist from our office (See Figure 5).

Ring walls should be reinforced to resist hoop stresses within the foundations. Hoop stresses may be calculated by assuming an outward lateral pressure equal to one-half the vertical pressure acting on the adjacent subgrade inside the ring wall.

Concrete should be placed only in excavations that are clean and free of loose soil and debris. All foundation excavations should be observed by a member of our staff to verify that adequate foundation bearing soils have been reached.

Soil resistance to lateral loads for the foundation will be provided by a combination of frictional resistance between the bottom of the footing and underlying soils and by passive pressures acting against the embedded sides of the footing. For frictional resistance, an ultimate coefficient of friction of 0.44 may be used for design. In addition, an ultimate passive lateral bearing pressure equal to an equivalent fluid pressure of 425 psf/ft may be used, provided the footings are poured tight against undisturbed competent bedrock. These values may be used in combination without reduction. The passive pressure can be assumed to act from the top of the lowest adjacent grade if the ring foundation is surrounded by pavements or concrete or at a depth of 1 foot below grade in unpaved areas. Total post-construction settlement of the tank foundation is expected to be less than 1 inch.

Ring foundations should be constructed and backfilled in consideration of the tank manufacturer's specifications. Our firm should be commissioned to review the foundation plans to determine if our recommendations are incorporated in the design. Our representative should observe the foundation excavations to determine if the excavations extend into suitable bearing material.

6.4 Pump Station Foundations

The proposed pump station structure is anticipated to be constructed over an engineered fill pad (see Figures 4 and 5) and may be supported on conventional shallow foundations founded on compacted engineered fill or undisturbed native soils. The footings should be embedded at least 18 inches below rough pad grade or lowest adjacent finish grade, whichever provides a deeper embedment. Footings may be designed using a net allowable soil bearing pressure of 2,500 pounds per square foot (psf) for dead plus live loads. This value may be increased by one-third when considering short-term loads such as wind and seismic forces. Reinforcement for the foundations should be determined by the project structural engineer.

Lateral loads may be resisted by a combination of friction between the bottom of foundations and the supporting subgrade in engineered fill, and by passive resistance acting against the vertical sides of the foundations. An ultimate friction coefficient of 0.35 may be used for friction between the foundations and supporting subgrade. Ultimate passive resistance equal to an equivalent fluid weight of 350 pounds per cubic foot (pcf) acting against the embedded sides of the foundations may be used for design purposes. The passive pressure can be assumed to act starting at the top of the lowest adjacent grade in paved areas. In unpaved areas, the passive pressure can be assumed to act starting at a depth of 1 foot below grade. It should be noted that the passive resistance value discussed above is only applicable where the concrete is placed directly against undisturbed soil or engineered fills. Voids created by the use of forms should be backfilled with soil compacted to the requirements given in this report or with concrete.

Total post-construction settlement of the structure is anticipated to be less than 1/2 inch.

To maintain foundation support, footings located near utility trenches oriented parallel to the structure should be deepened so that the bearing surfaces are below an imaginary plane having an inclination of 1½:1 (horizontal to vertical). This imaginary plane should be drawn extending upward from the bottom edge of the adjacent utility trench.

Our firm should be commissioned to review the foundation and utility plans to determine if our recommendations are incorporated in the design. Our representative should observe the foundation excavations to determine if the excavations extend into suitable bearing material.

6.5 Concrete Slabs-On-Grade

Concrete slabs-on-grade are anticipated for the interior floor within the pump station structure. Preparation of subgrade soil and placement and compaction of engineered fill should be as outlined in the "Earthwork" section of this report. Soil subgrade should be maintained in a moist condition prior to pouring the concrete slab.

Interior concrete slabs-on-grade where vapor transmission through the slabs is undesirable, should be underlain by at least 4 inches of capillary break material such as free draining, clean drain rock or 3/8 inch pea gravel. A visqueen should be placed over the capillary break material. The visqueen should be a high quality polymer at least 10 mils thick that is resistant to puncture during slab construction. Typically, the membrane and the slab are separated by 2 inches of sand. For interior or exterior slabs where moisture transmission through the slabs is not an issue, the above recommended capillary break section is optional.

A lower water-cement ratio (0.45 to 0.50) will also help reduce the permeability of the concrete slab.

For on-site exterior flatwork where moisture transmission through the slabs is not an issue, concrete slabs may be constructed directly on the compacted soil subgrade. If a concrete slab is used for the driveway, we recommend the slab be underlain by a minimum of 6 inches of Class 2 aggregate base compacted to no less than 95 percent relative compaction.

Exterior concrete slabs-on-grade should be cast free from adjacent footings or other non-heaving edge restraints. This may be accomplished by using a strip of 1/2-inch asphalt-impregnated felt divider material between the slab edges and the adjacent structure. Construction and/or control joints should be provided in concrete slabs. Continuous reinforcing or dowels at the construction and control joints will help reduce differential slab movements.

6.6 Retaining Wall Design

Retaining walls are currently proposed at the site and will include: a) retaining walls around the upslope side of the water tank pad; and b) retaining wall along the downslope edge of the access road.

Based on our topographic profiling and topography provided by Kennedy/Jenks, we understand that the upslope side of the water tank pad will be supported by tiered retaining walls between 12 and 15 feet tall. The height of the retaining walls will depend largely on the height of cuts in the slope above the upper wall and the gradient of the slope between the walls. We understand that the access road retaining walls will be less than about 6 feet tall. We request the opportunity to review the locations of proposed walls to verify that the following design parameters apply to the wall locations.

Retaining walls must be designed to resist static earth pressures due to the supported soil and bedrock, surcharge pressures induced by loads close to the walls, and seismic loads. For this project, we recommend the walls be designed using the lateral pressures presented below.

The effects of surcharge loads close to the walls should be included in the wall design. While the surcharge loads on the tank pad retaining walls will likely be minimal, the surcharge loads on the access road retaining wall will include heavy equipment used during construction and on occasion for repair or maintenance at the tank site. For uniform vertical surcharge loading behind the walls, the additional lateral surcharge pressure should be 1/3 of the vertical surcharge load. For other surcharge loads, please contact our office.

6.6.1 Active Soil Pressures

Active soil pressures may be used for the design of unrestrained walls where the top of the wall is allowed to deflect and minor settlement of wall backfill is tolerable. These may include the access road retaining walls and conventional cantilever retaining walls supporting the upslope side of the water tank pad. Unrestrained walls with drained backfill conditions may be designed using the following active soil pressures:

Table 3 – Active Equivalent Fluid Pressures

Backfill Slope	Equivalent Fluid Pressure for Soil	Equivalent Fluid Pressure for Weathered Bedrock
Horizontal	40 pcf	37 pcf
2:1 (hor:vert)	60 pcf	53 pcf

6.6.2 Seismic Design Increment

As a result of earthquake shaking, the soil or bedrock behind the retaining walls will exert an additional horizontal force on the walls. We recommend using an additional equivalent fluid pressure of 40 pcf to model the earthquake-induced force on the walls, applied at 1/3xH (H= design wall height) up from the base of the wall.

6.6.3 Soil Nail Retaining Wall

Soil nail retaining walls are to be used above the water tank pad. The following recommendations should be incorporated in the design. We understand the project structural engineer will design the soil nail retaining wall based on design values provided herein, which are intended for low-pressure grouted soil nails.

Table 4 – Soil Nail Design Recommendations

Soil Nail Reinforcement	
Minimum Reinforcement Bar Size	#8 for bar anchors
Minimum Grout Hole Diameter	6 inch
Corrosion Protection	Double corrosion protection
Soil Nails	
Minimum Length	30 feet beyond unbounded zone
Inclination	15 - 20 degrees
Unbonded Length	Determine graphically assuming a minimum unbounded zone taken as a 2H:1V from the base of the lowest retaining wall. This added unbonded length is intended to address global stability of the retaining walls.
Soil Nail Spacing	4 to 5 feet in both the vertical and horizontal directions

The following points should be incorporated into the design and construction of soil nail retaining walls:

- The design should be based upon the methods described in the latest Federal Highway Administration manual titled, Geotechnical Engineering Circular No. 7, Soil Nail Walls-Reference Manual" (FHWA-NHI-14-007).

- The design of the soil nails should use the computer program SNAP-2 referenced in the FHWA manual or using a comparable software program that can be shown to conform to the recommended design procedure.

- As noted in Chapter 5 of the FHWA manual, the design needs to address the failure modes shown on Figure 5.8 of the manual. The failure modes include: internal stability, global stability, the presence of weak layers, pullout, tensile overstress of the soil nails, and facing failures.

- The following soil and bedrock parameters should be used for design of the soil nail retaining wall(s).

- All aspect of design, construction, and testing and inspections shall be in general conformance with the FHWA manual.

Table 5 –Soil Nail Design Parameters

Ultimate Soil-Grout Bond Strength (Assuming augered soil nail installation)	15 psi
Minimum diameter	6 inches
Effective Cohesion Values (Colluvium – Sandy Clay)	1500 psf
Effective Friction Angles (Colluvium – Sandy Clay)	27 degrees
Effective Cohesion Value (Weathered Sandstone	300 psf
Effective Friction Angle (Weathered Sandstone Bedrock)	36 degrees
Wall / Soil Interface Friction Coefficient	0.50
Soil Nail Inclination	15 - 20 degrees

6.6.4 Soldier Pile Retaining Walls

If soldier cast-in-drilled-hole (CIDH) piles and lagging are to be used to retain slopes, the retaining walls may be supported by a drilled foundation system designed according to the criteria outlined below. The proposed retaining walls may be supported on a CIDH pile system that penetrates into bedrock.

CIDH piles should be designed to derive their vertical supporting capacity from skin friction between the pile shafts and the surrounding earth material. Piles should have a minimum diameter of 18 inches, and should extend to a minimum depth of 10 feet and a minimum of 6 feet into bedrock, whichever provides a deeper embedment. Center to center spacing of the piles should be a minimum of three pile diameters.

Piles should be reinforced throughout their entire length and designed by the structural engineer. As a minimum, we recommend four No. 5 reinforcing bars.

Resistance to lateral loads may be calculated based on passive soil pressure acting against the piles. For dead plus live loads, the ultimate passive soil resistance may be calculated using an equivalent fluid weight of 275 pounds per square foot acting over a width of 1-½ pile diameters on the portion of the piles in bedrock. This passive soil resistance assumes a 3:1 (horizontal:vertical) slope below

the wall. The top of the passive pressure zone should be assumed to begin at the top of the bedrock or at the bottom of the active pressure zone, whichever is deeper. The top of the bedrock is estimated to be 6 feet below the ground surface in the area of the access road.

Prior to the placement of steel and concrete, the bottom of pile excavations should be cleaned of loose soil. If groundwater is encountered during drilling, it should either be sumped from the holes or the concrete should be placed by the tremie method. Our field representative should be present during foundation drilling to verify that the piles extend sufficiently into the recommended earth materials.

We should be commissioned to review the retaining wall design plans to determine if our recommendations are incorporated in the design. We should observe the foundation excavations to determine if the excavations extend into suitable bearing material. This will involve intermittent to full time observation during pile drilling, and intermittent observation of the grade beam and footing excavations prior to placement of reinforcing steel and concrete.

We anticipate that wood lagging will be incorporated in the retaining wall design. The base of the lagging should extend at least 2 feet below the lowest adjacent final grade. If this is not attainable, a slurry trench should be constructed at the base of the lagging. At least 3 inches of the edge of the lagging should be in contact with the wide flange beam in the piles.

The top of the lagging should extend between 6 and 12 inches above the final grade above the retaining wall in order to prevent surface water runoff from discharging over the slope.

6.6.5 Cantilever Retaining Walls

In areas where shallow bedrock is present below the retaining wall, a conventional cantilever retaining wall may be used. For this case, an allowable bearing pressure of 3,500 psf DL + LL may be used. For resistance to lateral loads, an ultimate passive equivalent fluid pressure of 425 psf may be used. An ultimate friction value of 0.40 may also be used to resist lateral loads.

6.6.6 MSE Walls

We understand Mechanically Stabilized Earth (MSE) retaining walls are being considered for support along the access road. The following parameters are recommended for use in the design of MSE walls:

The following parameters can be used in the design of MSE walls.

- Effective friction angle, $\varphi' = 32$ degrees
- Effective Unit Weight, $\gamma' = 125$ pcf

- Effective cohesion, c' = 0 psf

We anticipate the MSE walls will be reinforced with geosynthetic reinforcement. The native soils may be used in the construction of the MSE walls.

If geosynthetic reinforcement is to be used, the backfill material should meet the following gradation requirements:

Table 6 – MSE Wall Backfill Gradation Requirements

Sieve Size	Percent Passing
6-inch	100%
3-inch	75% to 100%
No. 4	50% to 80%
No. 40	0% to 60%
No. 200	0% to 20%

6.6.7 Retaining Wall Drainage

A subdrain should be constructed on the backfill side of the retaining walls. The drain should consist of Class 2 Permeable drainage material complying with Section 68 Caltrans Standard Specification, latest edition. The permeable material should be at least 12 inches wide and should extend up the back of the wall to within 12 inches of the top of the wall. Native clayey soil or aggregate base and asphalt pavement should be used for the upper foot of wall backfill and should cap the drainage material. As an alternative to the Class 2 Permeable drainage material, a clean coarse gravel or drain rock may be used. If coarse gravel or drain rock is selected as a drainage material it should be separated from all adjacent soil by an engineering filter fabric such as Mirafi 140N, or a similar geotextile. Enough space should be provided between the laggings to allow seepage through the face of the wall.

In lieu of the above mentioned drain rock, a prefabricated drainage composite such as "CCW MiraDRAIN 6000XL" or equivalent may be used for drainage behind the retaining walls. This drainage composite should be installed on the back of the tieback wall at least 1 foot below the ground surface and should be wrapped around a drainage pipe at the base of the wall.

Backfill against retaining walls should be compacted as discussed in the "Earthwork" Section of this report. Over-compaction should be avoided because increased compaction effort can result in lateral pressures significantly higher than those recommended above. Backfill placed within 5 feet of the walls should be compacted with hand-operated equipment.

6.6.8 Construction Considerations

It is anticipated that difficult drilling conditions could be encountered during the tieback installation operation and the contractor should provide suitable equipment to install tiebacks to the depths indicated on the plans. It is recommended that considerations such as the use of additional specialized equipment be fully evaluated by the contractor during the bidding process.

Free groundwater was not encountered during the exploratory drilling at the site and based on our review of available groundwater data for the area, it is not anticipated to be encountered during construction.

For the soil nail wall construction, localized sloughing of the retaining wall cut slope may occur before the shotcrete has been applied to the slope. While there is a low likelihood for this to occur, the contract may consider using Stay Forms to provide a surface against which the shotcrete may be applied. Following the curing of the shotcrete, the void behind the form should be backfilled with low strength concrete flowable fill to within 12 inches below the final grade. The upper 12 inches should be backfilled with compacted native soil.

6.7 Surface Drainage

Engineering design of grading and drainage at the site is the responsibility of the project Civil Engineer. We recommend the following be considered by the project Civil Engineer and incorporated into the project plans where appropriate. Collected surface water within the swales crossed by the access road should be conveyed by a pipe to a discharge point below any active sliding or gullying, and appropriate energy dissipaters should be constructed at the outlet points to reduce the potential for future slope instability or erosion/gullying.

Generally, surface drainage should be directed away from structure foundations, concrete slabs-on-grade, fill slopes and pavements and directed towards suitable discharge locations below the graded pad areas. Ponding of surface water should be avoided by establishing positive drainage away from all improvements. Collected surface water should be discharged into a pipe or towards drainage structures and the water carried to a suitable discharge point. Collected surface water runoff should not be discharged directly on slopes.

6.8 Soil or Bedrock Corrosion Potential

Two samples from the borings were tested to provide general information regarding corrosion potential of site materials. Test results from Cooper Testing Lab are included in Appendix C of this report and summarized in Table 7 below. Project designers should review the report and

incorporate into the design as appropriate. Additional testing may be necessary to address specific project needs.

Table 7 – Corrosion Test Results

Chemical Analysis	Test Method	Sample Boring Number and Depth		Corrosion Classification
		B-1 15.5 & 20.5 feet	B-2 24 & 29 feet	
pH	Cal 643	8.3	8.3	not corrosive
Chloride (ppm)	Cal 422 Mod.	N.D.	N.D.	not corrosive
Sulfate (ppm)	Cal 417 Mod.	N.D.	N.D.	not corrosive
Minimum Resistivity (ohm-cm)	Cal 643	790	1,000	corrosive

According to Corrosion Guidelines Version 2.1, dated January 2015, prepared by Corrosion and Structural Concrete Field Investigation Branch, Materials Engineering and Testing Services, Division of Engineering Services, California Department of Transportation, a site is considered to be corrosive to structural elements if one or more of the following conditions exist for the representative soil samples taken at the site.

> *Chloride concentration is 500 ppm or greater, sulfate concentration is 2,000 ppm or greater, or the pH is 5.5 or less.*

Based on the above guidelines and laboratory test results, the samples tested are "not corrosive."

7. Limitations

The findings and conclusions of this report are based upon information provided to us regarding the existing improvements, our geologic reconnaissance, subsurface conditions described on the boring logs, the results of the laboratory testing program, interpretation and analysis of the collected data, and professional judgment.

It is the client's responsibility to ensure that recommendations contained in this report are carried out during the design and construction phases of the project.

Site conditions described in the text of this report are those existing at the time of our last field reconnaissance and are not necessarily representative of the site conditions at other times or locations.

The findings of this report should be considered valid for a period of five years unless the conditions of the site change. After a period of three years, CE&G should be contacted to review the site conditions and prepare a letter regarding the applicability of this report.

The evaluation or identification of the potential presence of hazardous materials at the site was not requested and was beyond the scope of this investigation and report.

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FIGURES

BASEMAP REFERENCE

1. ORTHOIMAGERY FROM ESRI.
2. STREET CENTERLINES FROM CALTRANS GIS DATA, 2016

0 0.25 0.5 1
MILES

N

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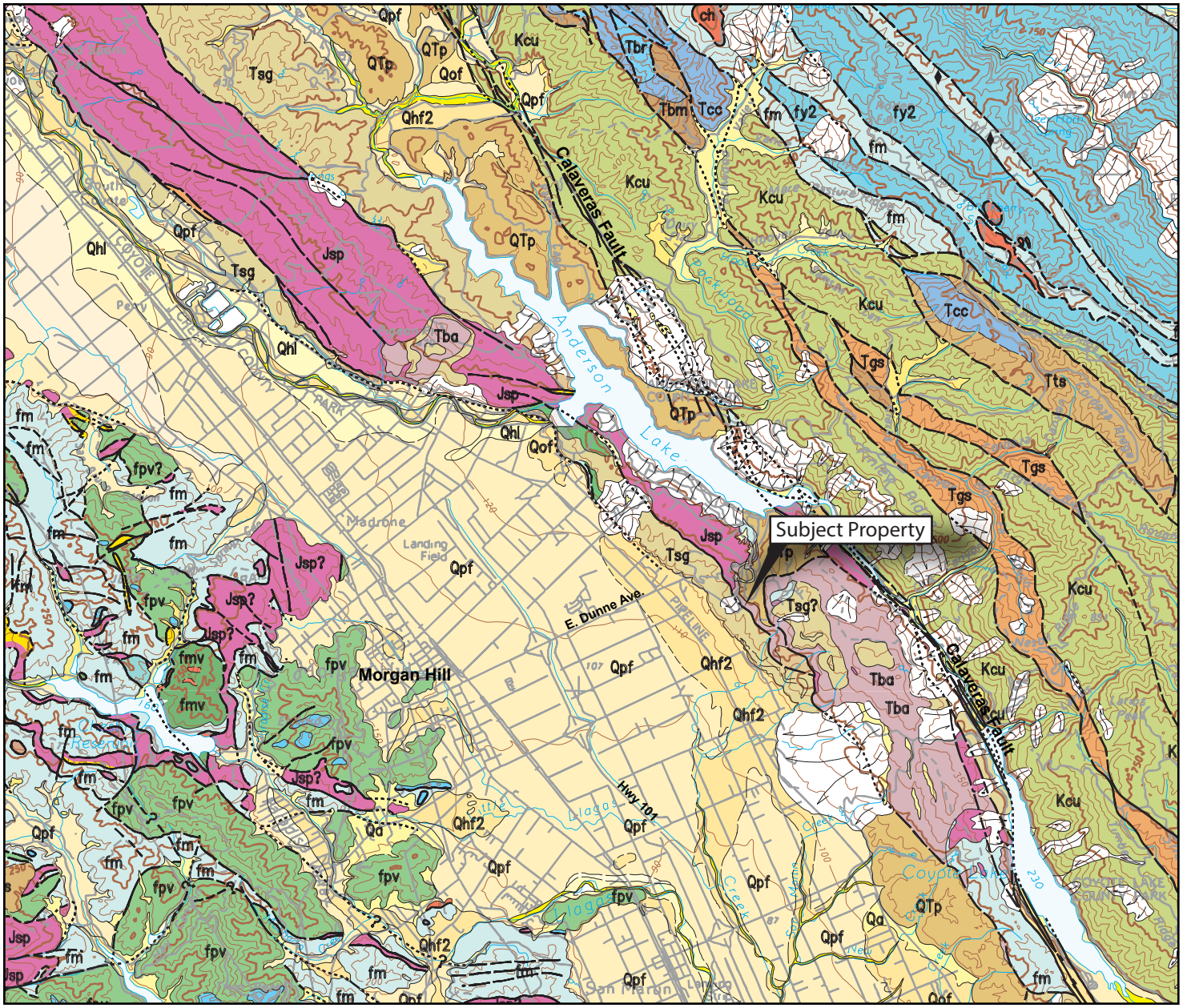
SITE LOCATION MAP

EAST DUNNE TANK SITE
MORGAN HILL

160200	AUGUST 2016	FIGURE 1

M:\2016\160200 Kennedy Jenks-East Dunne Tank\GIS\160200_Fig1_Site Location Map.mxd: 6/6/2016; kdrozynska



EXPLANATION

EARTH MATERIALS

- Landslide deposit
- Qhl — Levee deposit
- Qhf2 — Older alluvial fan
- Qpf — Alluvial fan deposit
- Qof — Older alluvial fan deposits
- QTp — Packwood Gravels
- Tsg — Silver Creek Gravels
- Tba — Basalt
- Tgs — Glauconitic sandstone and mudstone
- fm — Melange
- fpv — Basaltic volcanic rocks
- Kcu — Sandstone, mudstone, conglomerate
- Jsp — Serpentinized harzburgite and dunite

SYMBOLS

- Contact, dashed where approximately located, dotted where concealed
- Fault, dashed where approximately located, dotted where concealed

N

Base Map: Modified from Wentworth, et.al, 1999

0 2 4

Approximate Scale in Miles

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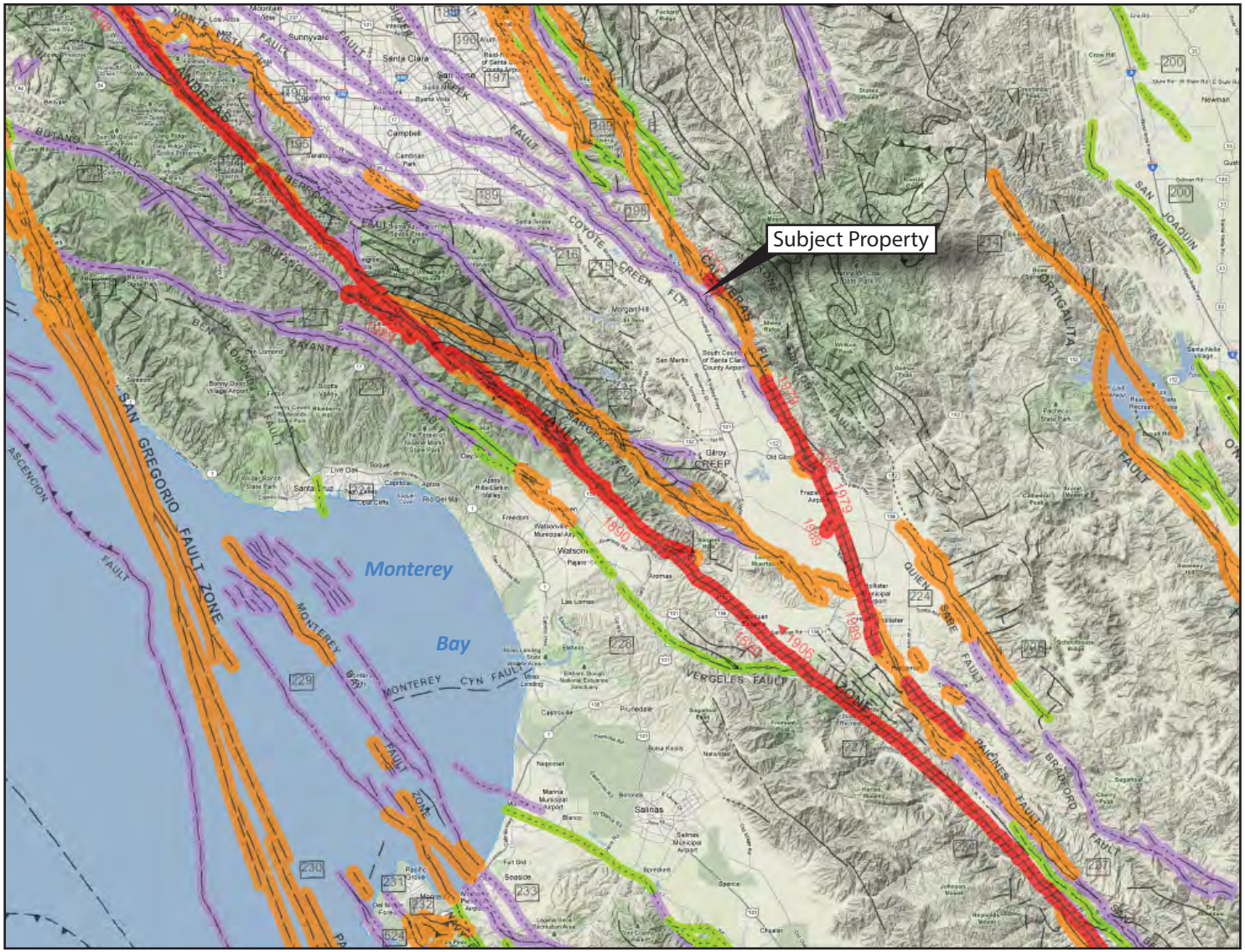
REGIONAL GEOLOGIC & INDEX MAP

EAST DUNNE TANK SITE
MORGAN HILL, CALIFORNIA

160200	AUGUST 2016	FIGURE 2



Base Map: Modified from Jennings and Bryant, 2010

EXPLANATION

- Historic Fault
- Holocene Fault
- Quaternary Fault
- Late Quaternary Fault
- Pre-Quaternary Fault

N

0 10 20

Approximate Scale in Miles

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REGIONAL FAULT MAP

EAST DUNNE TANK SITE
MORGAN HILL, CALIFORNIA

160200	AUGUST 2016	FIGURE 3

EXPLANATION

Ef	Existing fill
QTsb	Santa Clara Formation - Basaltic breccia and flows
QTs	Santa Clara Formation - Nonmarine sedimentary rock; variable from cobbly sandstone to sandy claystone
	Geologic contact; dashed where inferred, dotted where concealed, queried where uncertain
44	Slope aspect and gradient in degrees
Als?	Landslide; arrows indicate direction of movement. Hachures indicate scarp area. Dls - dormant landslide; Als - active or recently active landslide
B-7	Drill holes
P-1	Probe
	Area of pronounced soil creep
	Spring
	Cut slope
A A′	Line of geologic cross section

Topographic information derived from Santa Clara Valley Water District LiDAR dataset (flown 2006). Aerial image from Triathlon, dated April 28, 2006.

N

0 50 100

Scale in Feet

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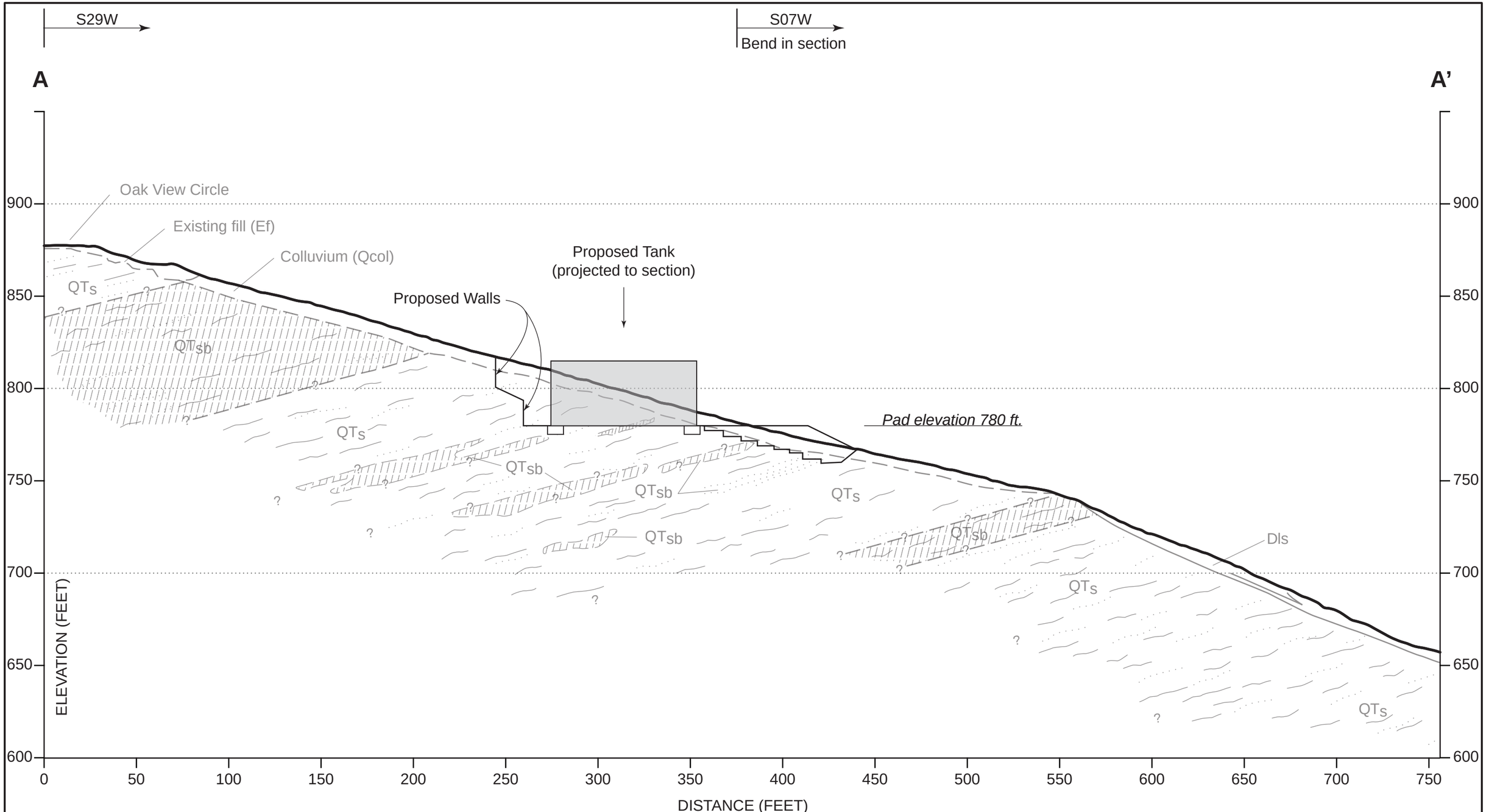
VICINITY GEOLOGIC MAP

EAST DUNNE TANK SITE
MORGAN HILL, CALIFORNIA

160200	AUGUST 2016	FIGURE 4



Notes:

1. Colluvium mantle not shown on Vicinity Geologic Map (Figure 4).
2. Subsurface extent and nature of QTsb is speculative.
3. See text for discussion of conceptual tank, wall and pad footprints shown.
4. Improvements shown schematically; location adjusted laterally to preserve elevation, and provide cut pad in rock.

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GEOLOGIC CROSS SECTION A - A'
EAST DUNNE TANK
MORGAN HILL, CALIFORNIA

PROJECT 160200	AUGUST 2016	FIGURE 5

APPENDIX A

- Boring Logs

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BORING NUMBER B-1

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/11/2016 **COMPLETED** 4/13/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.13802 **LONGITUDE** -121.59519
DRILLING RIG/METHOD 6-in. Solid Flight Auger, Rotary Wash
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Fisher **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		LEAN CLAY (CL), dark brown, moist, firm (COLLUVIUM)									
5		SANDSTONE, brown, weak to medium strength, massive, moist, severely weathered, trace 1/8 in. gravel, otherwise medium gravel (BEDROCK WEATHERED to SILTY SAND)	CM	9-13-16		96	18	39	28	11	27
10		dark yellow brown	CM	10-13-14		100	15				15
15		CLAYEY SANDSTONE with GRAVEL, olive brown, weak to medium strong, medium hardness, massive, severely weathered, estimated 30 % subrounded gravel up to 1/2 in., CaCO3 in matrix. (WEATHERED to CLAYEY SAND)	CM	10-14-17		111	16				16
20		SANDSTONE, pale olive, moist, medium to weak, massive, (WEATHERED to SANDY CLAY)	CM	11-25-40		85	35				54
25			SPT	9-14-24			33				
30		Clay content increasing CLAYSTONE, mottled olive brown and gray, weak, massive, moist, severely weathered	CM	19-17-30		102	22				
35											

(Continued Next Page)

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BORING NUMBER B-1

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		light yellowish brown to olive brown,weak to medium strength, massive, moist, severely weathered, sand is very fine to fine CLAYSTONE, mottled olive brown and gray, weak, massive, moist, severely weathered *(continued)*	CM	14-30-50/6"		97	21				
40		SANDSTONE, olive brown and gray, medium strength, medium hard, massive, dry, intensely fractured, caliche, severely weathered Very hard drilling, switched over to Rotary Wash	SPT	28-50/3"							
45			SPT	50/0"							
50		No recovery, sandstone in wash	SPT	50/0"							

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

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BORING NUMBER B-2

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/13/2016 **COMPLETED** 4/13/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.13799 **LONGITUDE** -121.59494
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Briseno **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SANDY LEAN CLAY (CL), olive brown, moist, firm (COLLUVIUM)									
10		SANDSTONE, olive brown, friable, loosely consolidated, moist, severely weathered, fine sand up to small subrounded gravel, weak (WEATHERED to WELL GRADED SAND with SILT)	CM	7-8-10		100	12				10
15		SILTY SANDSTONE, olive gray, weak, moist, severely weathered, some isolated 1 in. gravel, some iron staining along fractures, severe caliche at 15 ft. (WEATHERED to SILTY SAND)	CM	7-11-14		100	17				26
20		CLAYSTONE, gray, hard, moist, some iron stains sandy lens at 20 ft. very fine to fine sand	CM	15-35-50/4"		100	22				
25		SANDY CLAYSTONE, olive, weak, thumbnail can penetrate, moist, very fine sand, iron stained mottled with gray at 24.5 ft. sandy lens at 25 ft.	CM	9-20-50		104	22				
30		SANDSTONE, olive mottled with gray, friable, moist, severy weathered, few iron stains	CM	21-50/5"		104	19				
35			CM	27-50/3"		99	20				

(Continued Next Page)

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BORING NUMBER B-2

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		Increase in iron staining at 34.5 ft.									
40		SANDSTONE interbedded with CLAY STONE, olive and gray respectively, CACO3 vein between beds. beds are at least 1 ft. thick	SPT	17-28-50							
45		SANDSTONE, olive, hard, moist	SPT	18-30-39							
50		CLAYSTONE, dark gray, weak, thumbnail can penetrate, moist, caliche lens between yellowish brown SANDSTONE, mottle with gray, heavily iron stained. bedded	SPT	15-23-34							

Bottom of borehole at 50.0 ft. Borehole backfilled with grout.

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BORING NUMBER B-3

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/11/2013 **COMPLETED** 4/11/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.13781 **LONGITUDE** -121.59481
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Fisher **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SANDY LEAN CLAY (CL), light yellowish brown, moist, firm (COLLUVIUM)									
5		CLAYEY SANDSTONE, light olive brown, low hardness,weak, easily carved with knife, possible 1 in. clay interbeds, fracture indeterminate, moist, severely weathered, CACO3 distributed throughout rock mass (BEDROCK WEATHERED to SANDY CLAY)	CM	9-16-21		94	27				52
10		SANDSTONE, light yellowish brown, weak, low hardness, massive, fracture indeterminate, moist to dry, severely weathered, very fine sand to silt	CM	21-50		102	21				
15			CM	15-29-50/5"		95	24				
20		SANDSTONE interbedded with CLAYEY SANDSTONE, light yellowish brown to gray, weak to medium strength, low hardness, possible 3/4 in. beds, fracture indeterminate, dry, severely weathered, sand fine to medium									
25		SANDSTONE with pebbly interbeds, grayish brown, friable to weak, low hardness, 3 in. beds, fracture indeterminate, dry to slightly moist, severely weathered	SPT	7-8-11			11				24
30		CLAYEY SANDSTONE with GRAVEL, grayish brown, weak, medium hardness, 3 in. pebbly beds, fracture indeterminate,fracture indeterminate, dry to slightly moist, severely weathered with CACO3 in rock matrix, some angular gravel	CM	12-19-30		108	11				
35			CM	25-30-36		112	11				

(Continued Next Page)

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BORING NUMBER B-3

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35		CLAYEY SANDSTONE interbedded with SANDY CLAYSTONE, light yellowish brown, weak, low hardness, 4 in. beds at 50 degrees dip, fracture indeterminate, moist, severely weathered	SPT	11-13-23			22				
40		SANDY CLAYSTONE, yellowish brown, weak, low hardness, possibly massive, moist, severely weathered	CM	13-32-45		100	25				
45		mottled with olive brown and dark gray	CM	14-15-21		97	25				
50			CM	15-24-47		101	24				
		CLAYEY SANDSTONE interbedded with SANDY CLAYSTONE, dark yellowish brown, weak, low hardness, 2-6 in. beds, fracture indeterminate, moist, severely weathered									

Bottom of borehole at 51.5 ft. Borehole backfilled with grout.

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BORING NUMBER B-4

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/12/2016 **COMPLETED** 4/12/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.13762 **LONGITUDE** -121.59516
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Briseno **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SANDY FAT CLAY (CH), very dark gray brown, moist, firm, sparse rootlets (COLLUVIUM)	CM	4-5-7		95	24	66	25	41	64
5		SANDY CLAY (CL), brown, moist, firm, caliche, iron stains caliche increases at 5 ft. (HIGHLY WEATHERED BEDROCK)	CM	5-8-14		105	21				75
10		SILTY SANDSTONE, light yellowish brown, hard, dry to moist, very severely weathered, caliche in matrix (WEATHERED BEDROCK)	CM	11-13-31		92	18				
15		CLAYSTONE, gray, weak to medium strength, dry to moist, severely weathered, caliche in matrix, isolated fine gravel	CM	11-30-42		109	19				
20		mottled with brown, iron stains along fractures, sparse caliche, some very fine sand	CM	15-35-43		106	21				

Bottom of borehole at 20.0 ft. Borehole backfilled with grout.

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BORING NUMBER B-5

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/12/2016 **COMPLETED** 4/12/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.13733 **LONGITUDE** -121.59485
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Briseno **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		LEAN CLAY (CL), dark brown, moist, firm, rootlets (COLLUVIUM)	CM	4-8-9		77	32				
5		CLAYEY SANDSTONE with GRAVEL, gray, friable, loosely consolidated, dry to moist, very severely weathered, silt to fine sand, subangular gravel (HIGHLY WEATHERED BEDROCK) color change to light olive brown	CM	4-5-6		93	15				
10		CLAYSTONE, gray, hard, dry to moist, severely weathered, some very fine sand	CM	8-18-25		104	20				
15		isolated grains of coarse sand SANDSTONE, olive yellow, hard, dry, coarse grained, iron bands	CM	15-18-32		110	9				
20		color change to brown, fine sand CLAYSTONE interbedded with SANDSTONE, gray and brown respectively, hard, dry, severely weathered, caliche stains	CM	15-24-40		104	18				
25		greater than or equal to 6 in. interbeds	SPT	11-14-15			20				

Bottom of borehole at 25.0 ft. Borehole backfilled with grout.

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BORING NUMBER B-6

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/12/2016 **COMPLETED** 4/12/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.1372 **LONGITUDE** -121.59523
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Briseno **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		SANDY FAT CLAY (CH), dark gray brown, moist, firm (COLLUVIUM) rootlets at 1.5 ft.	CM	3-5-6		99	18	57	21	36	62
		caliche, iron staining and sparse isolated pebbles at 2.5 ft.									
5		SANDY CLAY (CL), very dark gray brown, moist, firm, caliche, iron staining (HIGHLY WEATHERED BEDROCK)	CM	3-5-9		93	26				79
10		CLAYEY SANDSTONE with GRAVEL, light yellowish brown, friable, dry, fine sand to coarse subrounded to rounded gravel, clay nodules	CM	20-23-30		106	14				
15		some chert observed	SPT	13-17-23			11				
20			CM	27-50			14				
25			SPT	15-30-31			10				

Bottom of borehole at 25.0 ft. Borehole backfilled with grout.

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BORING NUMBER B-7

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/12/2016 **COMPLETED** 4/12/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.13705 **LONGITUDE** -121.59554
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Briseno **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		LEAN CLAY (CL), dark brown, moist, firm									
		CLAYEY SANDSTONE with GRAVEL, light yellowish brown, dry, friable, fine sand to coarse subrounded gravel, chert	CM	11-17-18		99	10				
		clay nodules									
5			CM	19-21-25		111	12				
10		SANDSTONE interbedded with CLAYEY SANDSTONE, olive yellow and gray respectively, medium strength, dry, severely weathered	CM	23-34-47		104	19				
15		CLAYEY SANDSTONE with GRAVEL, light yellowish brown, dry, friable, fine sand to coarse subrounded gravel, chert, clay nodules, iron stained, caliche	CM	50							
20		SANDSTONE, light olive brown, friable, weak, dry	SPT	17-23-32			11				
25		CLAYEY SANDSTONE with GRAVEL, light yellowish brown, dry, friable, coarse sand to subangular gravel, chert, clay nodules, iron stained, caliche	SPT	14-19-35							

Bottom of borehole at 25.0 ft. Borehole backfilled with grout.

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BORING NUMBER Probe

CLIENT Kennedy-Jenks
PROJECT NAME E. Dunne Tank
PROJECT NUMBER 160200
PROJECT LOCATION Morgan Hill, California
DATE STARTED 4/13/2016 **COMPLETED** 4/13/2016
GROUND ELEVATION _____ **DATUM** Site Specific **HOLE SIZE** 6 in.
DRILLING CONTRACTOR Britton Exploration
COORDINATES: **LATITUDE** 37.13786 **LONGITUDE** -121.59513
DRILLING RIG/METHOD 6-in. Solid Flight Auger
GROUNDWATER AT TIME OF DRILLING --- N/A
LOGGED BY R. Briseno **CHECKED BY** _____
GROUNDWATER AT END OF DRILLING --- N/A
HAMMER TYPE 140 lb hammer with 30 in. autotrip
GROUNDWATER AFTER DRILLING --- N/A

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
0		LEAN CLAY (CL), dark brown, moist (COLLUVIUM)									
		CLAYEY SANDSTONE, olive. Driller indicates that drilling is very consistent all the way, no gravel, feels like claystone									
5											
10											
15											
20											
25											
30											
35											

(Continued Next Page)

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BORING NUMBER Probe

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (FIELD VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTIC LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	FINES CONTENT (%)
35											
		CLAYEY SANDSTONE, olive. Driller indicates that drilling is very consistent all the way, no gravel, feels like claystone *(continued)*									
40											

Bottom of borehole at 40.0 ft. Borehole backfilled with grout.

APPENDIX B

- Laboratory Test Results

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SUMMARY OF LABORATORY RESULTS

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California

Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	5.5	4/22/2016	39	28	11	19	27	SM	18.0	95.6		
B-1	11.0	4/22/2016				25	15		14.6	100.4		
B-1	16.0	4/22/2016				37.5	16		16.3	111.0		
B-1	21.0	4/22/2016				4.75	54		35.2	85.1		
B-1	25.0	4/20/2016							32.9			
B-1	31.0	4/20/2016							22.4	102.1		
B-1	35.5	4/20/2016							21.2	97.4		
B-2	9.5	4/22/2016				19	10		11.9	99.7		
B-2	14.5	4/22/2016				19	26		17.5	99.9		
B-2	19.5	4/20/2016							22.0	100.4		
B-2	24.5	4/21/2016							22.4	103.9		
B-2	28.5	4/21/2016							19.4	103.6		
B-2	33.5	4/21/2016							19.6	99.3		
B-3	6.0	4/25/2016				19	52		26.5	93.8		
B-3	10.5	4/22/2016							20.5	102.1		
B-3	15.5	4/22/2016							24.1	95.1		
B-3	20.0	4/22/2016				25	24		10.9			
B-3	26.0	4/22/2016							11.2	107.9		
B-3	31.0	4/22/2016							10.8	112.1		
B-3	35.0	4/20/2016							22.2			
B-3	40.5	4/22/2016							24.5	100.3		
B-3	46.0	4/22/2016							25.3	97.3		
B-3	51.0	4/22/2016							23.6	101.0		
B-4	2.0	4/22/2016	66	25	41	25	64	CH	24.4	94.6		
B-4	4.5	4/25/2016				19	75		20.8	105.4		
B-4	9.0	4/22/2016							17.7	92.3		
B-4	14.5	4/22/2016							19.4	109.1		
B-4	18.5	4/22/2016							20.8	106.1		

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SUMMARY OF LABORATORY RESULTS

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California

Borehole	Depth	Date Tested	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Screen Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-5	2.0	4/25/2016							32.3	77.0		
B-5	4.5	4/25/2016							14.6	93.2		
B-5	9.5	4/25/2016							19.6	104.1		
B-5	14.5	4/25/2016							8.8	110.0		
B-5	19.5	4/25/2016							18.4	104.0		
B-5	23.5	4/25/2016							20.3			
B-6	2.0	4/26/2016	57	21	36	37.5	62	CH	18.2	98.8		
B-6	4.5	4/27/2016				19	79		26.2	93.2		
B-6	9.5	4/25/2016							14.1	105.8		
B-6	13.5	4/25/2017							10.9			
B-6	19.0	4/25/2016							13.9			
B-6	23.5	4/25/2016							10.1			
B-7	2.0	4/25/2016							9.6	98.6		
B-7	4.5	4/25/2016							12.0	110.9		
B-7	9.5	4/25/2016							19.1	103.9		
B-7	18.5	4/20/2016							10.6			

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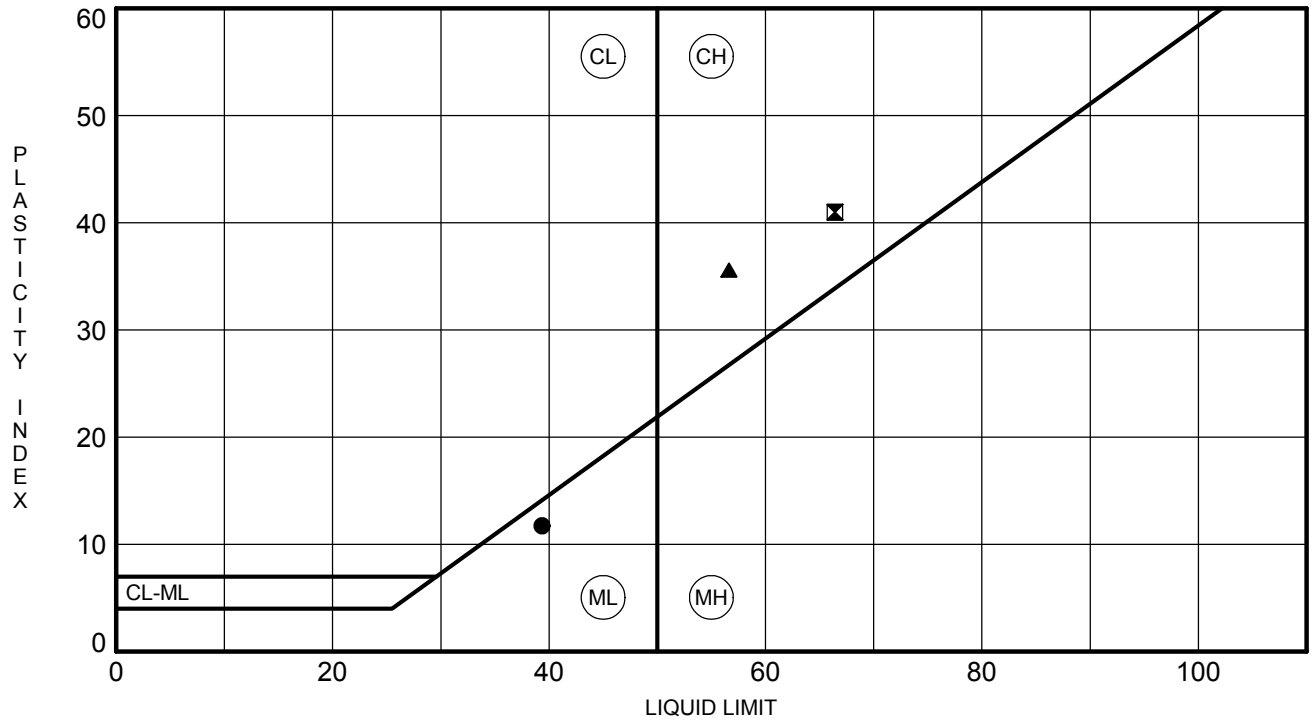
ATTERBERG LIMITS RESULTS

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification	Date Tested
●	**B-1**	**5.5**	**39**	**28**	**11**	**27**	**Brown Silty Sand**	**4/26/2016**
⊠	**B-4**	**2.0**	**66**	**25**	**41**	**64**	**Very Dark Gray Brown Sandy Fat Clay**	**4/26/2016**
▲	**B-6**	**2.0**	**57**	**21**	**36**	**62**	**Dark Gray Brown Sandy Fat Clay**	**4/26/2016**

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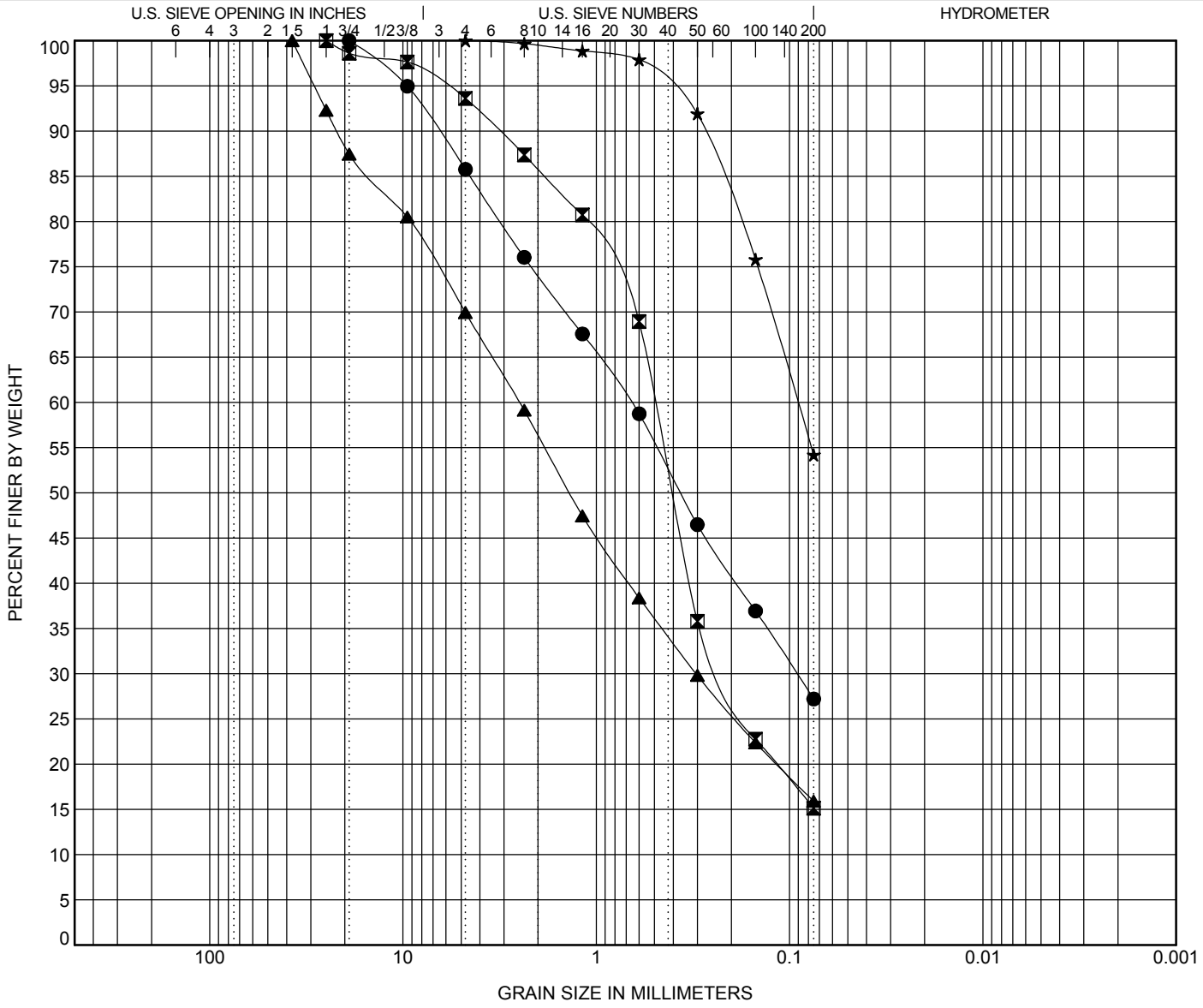
GRAIN SIZE DISTRIBUTION

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**B-1**	**5.5**	**4/22/2016**	**Brown Silty Sand**	**39**	**28**	**11**		
⊠	**B-1**	**11.0**	**4/22/2016**	**Dark Yellow Brown Silty Sand**					
▲	**B-1**	**16.0**	**4/22/2016**	**Olive Brown Clayey Sand**					
★	**B-1**	**21.0**	**4/22/2016**	**Pale Olive Sandy Clay**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**5.5**	**19**	**0.661**	**0.092**		**14.2**	**58.6**	**27.2**	
⊠	**B-1**	**11.0**	**25**	**0.498**	**0.221**		**6.4**	**78.5**	**15.1**	
▲	**B-1**	**16.0**	**37.5**	**2.497**	**0.305**		**30.1**	**54.0**	**15.9**	
★	**B-1**	**21.0**	**4.75**	**0.09**			**0.0**	**45.8**	**54.2**	

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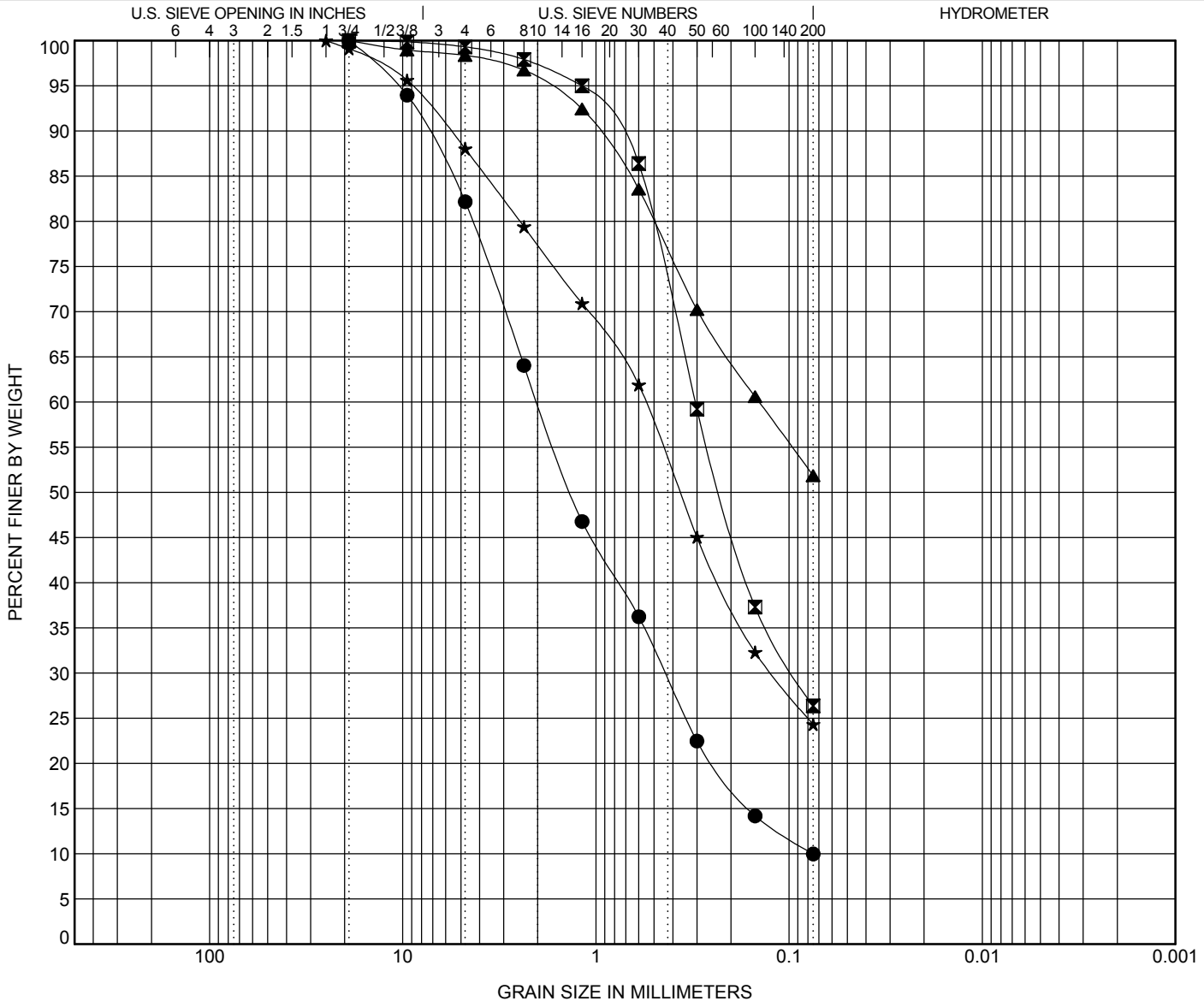
GRAIN SIZE DISTRIBUTION

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**B-2**	**9.5**	**4/22/2016**	**Olive Brown Well graded Sand with Silt**				**1.27**	**26.63**
⊠	**B-2**	**14.5**	**4/22/2016**	**Olive Gray Silty Sand**					
▲	**B-3**	**6.0**	**4/22/2016**	**Light Olive Brown Sandy Clay**					
★	**B-3**	**20.0**	**4/22/2016**	**Dark Olive Silty Sand**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-2**	**9.5**	**19**	**2.006**	**0.438**	**0.075**	**17.8**	**72.2**	**10.0**	
⊠	**B-2**	**14.5**	**19**	**0.306**	**0.094**		**0.7**	**73.0**	**26.4**	
▲	**B-3**	**6.0**	**19**	**0.143**			**1.6**	**46.5**	**51.9**	
★	**B-3**	**20.0**	**25**	**0.555**	**0.123**		**12.0**	**63.7**	**24.3**	

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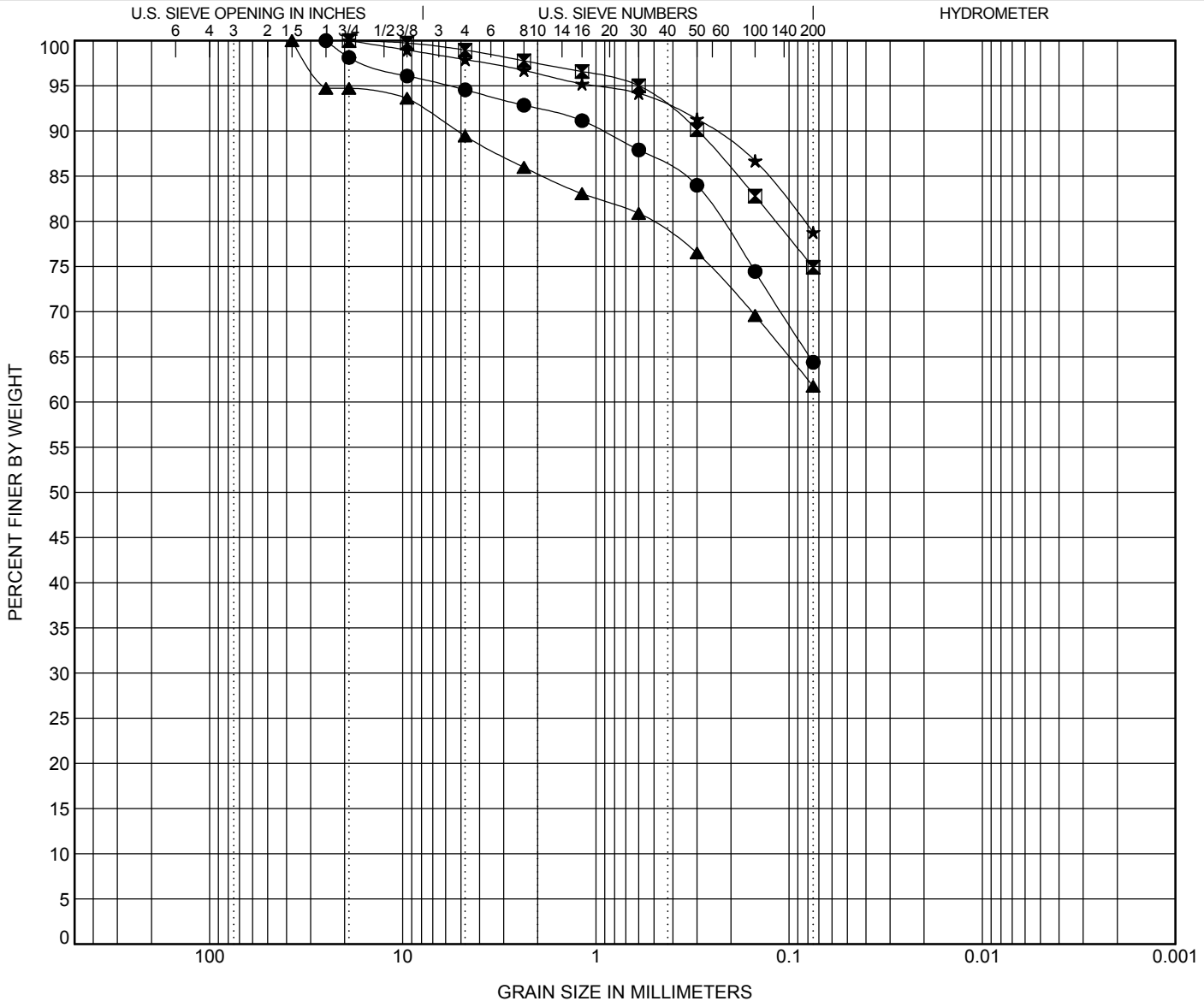
GRAIN SIZE DISTRIBUTION

CLIENT Kennedy-Jenks **PROJECT NAME** E. Dunne Tank

PROJECT NUMBER 160200 **PROJECT LOCATION** Morgan Hill, California



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	DATE TESTED	Classification	LL	PL	PI	Cc	Cu
●	**B-4**	**2.0**	**4/27/2016**	**Very Dark Gray Brown Sandy Fat Clay**	**66**	**25**	**41**		
⊠	**B-4**	**4.5**	**4/27/2016**	**Brown Sandy Clay**					
▲	**B-6**	**2.0**	**4/27/2016**	**Dark Gray Brown Sandy Fat Clay**	**57**	**21**	**36**		
★	**B-6**	**4.5**	**4/27/2016**	**Very Dark Gray Brown Sandy Clay**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-4**	**2.0**	**25**				**5.5**	**30.2**	**64.4**	
⊠	**B-4**	**4.5**	**19**				**1.1**	**24.0**	**74.9**	
▲	**B-6**	**2.0**	**37.5**				**10.6**	**27.7**	**61.7**	
★	**B-6**	**4.5**	**19**				**2.1**	**19.1**	**78.8**	

APPENDIX C

- Corrosion Test Results

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

20 May 2016

Job No. 1605100
Cust. No. 11770

Mr. Dan Peluso
Cal. Engineering & Geology
1870 Olympic Blvd. #100
Walnut Creek, CA 94596

Subject: Project No.: 160200
Project Name: East Dunne Tank
Corrosivity Analysis – CalTrans Test Methods with Brief Evaluation

Dear Mr.Peluso:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on May 12, 2016. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, both samples are classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations are none detected to 15 mg/kg

The sulfate ion concentrations are none detected to 15 mg/kg.

The pH of the soils are both 8.30 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Cal Engineering and Geology
Client's Project No.: 160200
Client's Project Name: East Dunne Tank
Date Sampled: Not Indicated
Date Received: 12-May-16
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 20-May-2016

Job/Sample No.	Sample I.D.	Moisture (%)	pH	Min.Resistivity (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1605100-001	B-1 @ 15.5' & 20.5'	-	8.30	790	-	N.D.	N.D.
1605100-002	B-2 @ 24' & 29'	-	8.30	1,000	-	N.D.	N.D.

Method:	CT 226 [a]	CT 643 [b]	CT 643 [b]	-	CT 422 [c]	CT 417 [c]
Reporting Limit:	-	-	-	50	15	15
Date Analyzed:	-	18-May-2016	18-May-2016	-	18-May-2016	18-May-2016

Cheryl McMillen
Laboratory Director

* Results Reported on an "As Received" Basis
N.D. - None Detected

[a] Rev. July 2010 [b] Rev. June 2007 [c] Rev. November 2006

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Chain of Custody

Page of

1100 Willow Pass Court
Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775
CERCO analytica

Job No.	CU#		Client Project I.D.
160510O	11770		160200

Schedule
Analyte

Date Sampled | Date Due

Full Name Dan Peluso w/ Cal Engineering + Geology
Fax
Phone 925-935-9771
Company
Cell ☒

Sample Source: East Dunne Tank

CalTrans w/Brief Evalation — ANALYSIS

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	pH	Sulfate	Chloride	Resistivity-Minimum	Brief Evaluation
	B-1 @ 15.5' + 20.5'								X	X	X	X	X
	B-2 @ 24' + 29'								X	X	X	X	X
	DPeluso@CalEng.com												

MATRIX: DW - Drinking Water; GW - Ground Water; SW - Surface Water; WW - Waste Water Water; SL - Sludge; S - Soil; Product

ABBREVIATIONS: HB - Hosebib; PV - Petcock Valve; PT - Pressure Tank; PH - Pump House; RR - Restroom; GL - Glass; PL - Plastic; ST - Sterile

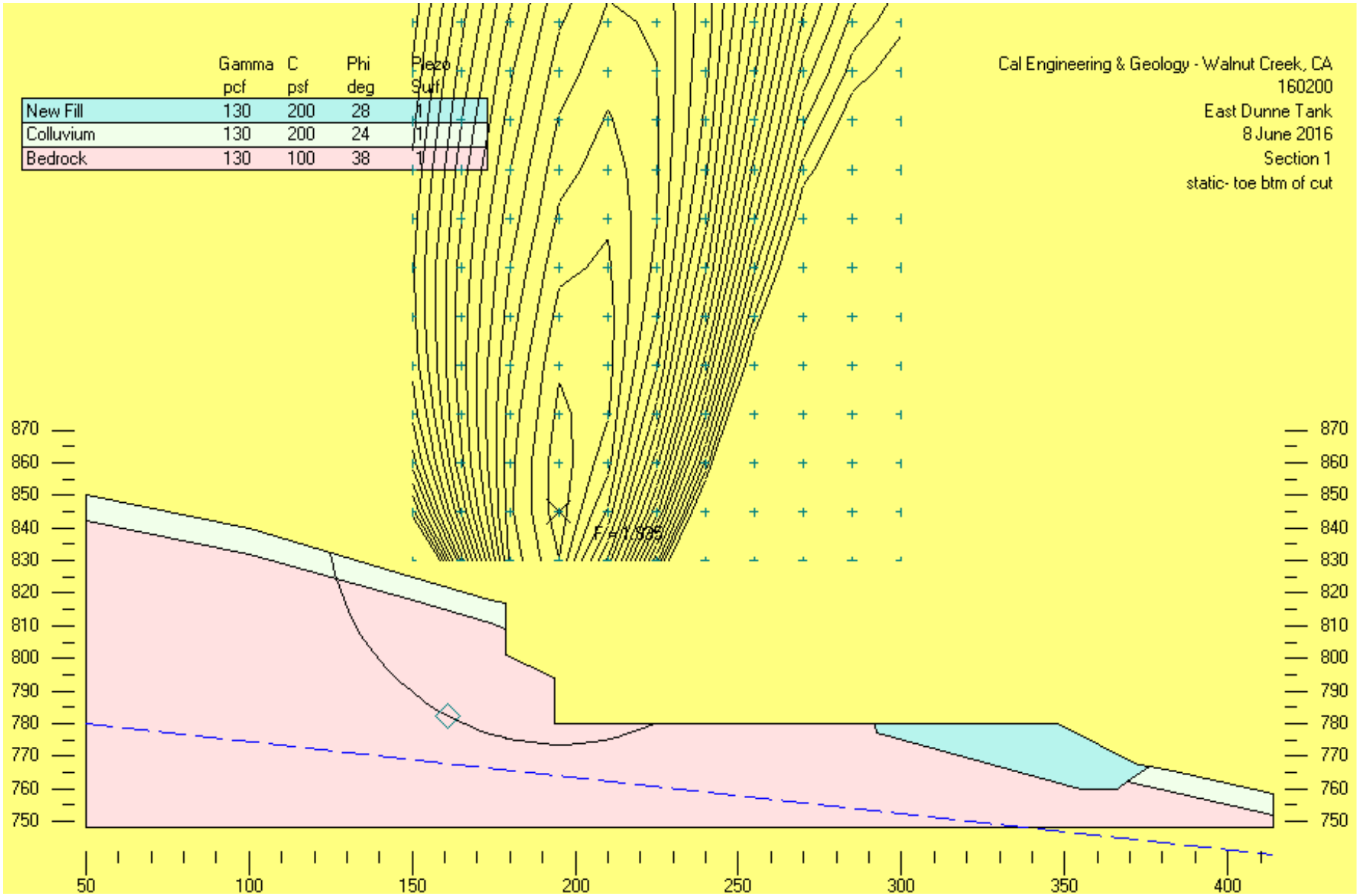
SAMPLE RECEIPT: Total No. of Containers; Rec'd Good Cond/Cold; Conforms to Record; Temp. a t Lab - °C; Sampler

Relinquished By: Date 5/12/16 Time 9:20 AM
Received By: Date 5/12/16 Time 9:20
Relinquished By: Date Time
Received By: Date Time
Relinquished By: Date Time
Received By: Date Time

Comments:
THERE IS AN ADDITIONAL CHARGE FOR METALS/POLY TUBES

APPENDIX D

- Slope Stability Analysis



GSLOPE Static Slope Stability Calculation Output

Attachment 4

Drainage Technical Memorandum

24 March 2016

Technical Memorandum No. 3

To: Kevin O'Connell, P.E., City of Morgan Hill

From: Donald Barraza, P.E., Kennedy/Jenks Consultants

By: Katie McCoy, P.E., Kennedy/Jenks Consultants

Subject: Design Alternative Evaluation No. 3 – Site Drainage Alternatives
E. Dunne Hillside Water Reservoir Project
Department of Public Works
City of Morgan Hill, CA
K/J 1672001*00, Phase 3, Task 3.1.3

Introduction

The City of Morgan Hill, CA intends to undertake the construction of the new E. Dunne Hillside Water Reservoir facilities. Key objectives for the project are: 1) completion of construction documents that have been reviewed and approved by all permitting agencies to allow the City to bid the project in May 2016 in order to have the new reservoir constructed and operational by 30 June 2017; 2) delivery of a project within the current FY 15/16 year Capital Improvement Program budget of $2,200,000; 3) construction and operation of the new reservoir, future pump station, and pipelines with the least adverse impact to adjacent homeowners; 4) design and construction of facilities that satisfy the requirements of the Department of Water Resources, Division of Drinking Water to provide a reliable potable water supply to City users; and 5) preparation of an Initial Study and related CEQA documentation to assess and minimize construction-related and long-term adverse environmental impacts associated with the project.

This Technical Memorandum (TM) No. 3 summarizes the design evaluation for site drainage alternatives for the E. Dunne Hillside Water Reservoir Project in the City of Morgan Hill, CA. Within TM No. 3 are presented goals and objectives, background information, site conditions and field observations, regulatory issues and review, description of the conceptual design, description(s) of design alternatives, advantages and disadvantages, engineer's opinion of probable construction cost, issues to be resolved during final design, and conclusions and recommendations.

Goals and Objectives

The goals and objectives of this design alternative evaluation are:

1. Evaluate alternatives for conveying surface water from improved areas of the reservoir pad and access road to offsite natural drainage features and storm drains.

2. Evaluate calculation of peak reservoir site runoff to determine impacts to offsite storm drainage facilities.

3. Evaluate site drainage improvements that do not enlarge unnamed topographic swales on the site and convey surface runoff from the site to Upper Llagas Creek without increasing the size of scarp areas or contributing to dormant or active landslides.

4. Evaluate ways to disperse versus concentrate runoff from the improved areas of the tank pad site and from the improved paved access roadway.

5. Evaluate the need for storm drain detention basin. Identify size, location, construction requirements. Evaluate if storm drain detention can be constructed below grade beneath the tank pad.

6. Identify approach for site storm drainage improvements including additional swales, inlets, drains, and retention basins.

7. Evaluate requirements for reservoir overflow containment, retention, energy dissipation and discharge.

Background Information

The site is located in the Pajaro River Watershed which drains to Monterey Bay. Drainage from the site makes its way south and southwest to Upper Llagas Creek located approximately ¼ mile south of the site. Water in Upper Llagas Creek drains into Little Llagas Creek which later drains into Llagas Creek and then the Chesbro Reservoir. The Chesbro Reservoir is located approximately 6 miles east of the site and discharges to the Pajaro River. Precipitation in the Morgan Hill area is approximately 21.7 inches per year.

The key elements of the project are summarized below:

1. **Reservoir:** A drinking water reservoir of 850,000 gallon capacity with 80'-0" nominal diameter and 25'-0" maximum water depth. The tank will be constructed of welded steel at ground level. Included would be all reservoir appurtenances, interior piping, inlet/outlet piping, foundations/anchoring, and corrosion protection elements including protective coatings and cathodic protection systems.

2. **Pipelines:** Approximately 700 lineal feet of inlet 16"-diameter and outlet 12"–diameter connecting pipelines to and from interconnections in the water distribution system on E. Dunne Avenue north of Flaming Oaks Court.

3. **Access Road:** Approximately 600 lineal feet of asphalt concrete paved access road from E. Dunne Avenue to the reservoir tank pad site including roadway retaining structures and drainage elements.

4. **Retaining Structures:** Two-tier earth retaining structures with combined total heights of 26'-0" for the reservoir tank pad site, and single tier heights up to 14'-0" for the access roadway.

5. **Pump Station:** Planning and layout of the reservoir site to accommodate a future approximately 20'-0" x 30'-0" (600 sq.ft.) pump station.

6. **Site Drainage:** Grading and drainage improvements for the reservoir pad, access roadway, and proposed retention/infiltration basin(s).

7. **Landscaping:** Landscaping and irrigation for screening the reservoir and permanently cut slopes, and reconstruction of construction-related disturbed areas.

Site Conditions and Field Observations

The majority of the site is an open, grass-covered hillslope with sparse oak trees. The approximate slope of the site is 17%. A 440-foot-long concrete v-ditch runs along the southwestern side of the site, parallel to E. Dunne Ave. It connects to the roadway at the bottom, travels northeast, and turns to the north before ending at approximately 45 feet east of the roadway. According to a *Preliminary Engineering Geologic Feasibility Evaluation* conducted for the project site, there are no landslides but there are earthflow-style landslide deposits in the general vicinity (along southeast edge of existing v-ditch). There are also no active seismic faults passing through project site (CE&G, 2015).

Field observations made during the geologic feasibility evaluation indicate that the majority of the site is cobbly sandstone to sandy claystone with a few areas toward the top of the hill having basalt and basalt flow breccia soil types. The geologic feasibility evaluation also indicated that Santa Clara Foundation bedrock underlies the site.

Regulatory Issues and Review

The following regulatory entities were referenced for guidance in determining the applicable regulatory issues associated with drainage and stormwater for the project. An evaluation of each entity's requirements follows.

A. *City of Gilroy, City of Morgan Hill and County of Santa Clara:* Stormwater Management Guidance Manual for Low Impact Development & Post-Construction Requirements, June (Morgan Hill, 2015 or Guidance Manual)

B. *Santa Clara County:* Drainage Manual, 14 August (SCCDM, 2007 or Drainage Manual)

C. *Santa Clara Valley Water District:* applicable construction permitting requirements

D. *State of California:* Phase II Small MS4 General Permit; Regional Water Quality Control Board Region 3's Post-Construction Requirements (Order No. 2013-0001-DWQ, 1 July 2913)

E. *State of California:* Construction General Permits (CGP) requirements [Order 2012-0006-DWQ (amends 2009-0009-DWQ as amended by 2010-0014-DWQ), 1 July 2012]

Stormwater Management Guidance Manual

The project is estimated to be less than 5 acres and to create between 15,000 square feet (sf) and 22,499 sf of impervious surface. Per the Guidance Manual, Tier 3 Performance Requirements (PR-3) will be required to manage surface water flows from the pervious and impervious surfaces of the project. Regulated projects subject to PR-3 must also meet the requirements of the first two tiers and include the submitted certifications (Morgan Hill, 2015). The requirements of the three tiers include:

- PR-1 - Site Design and Runoff Reduction
  - Limit disturbance of natural drainage features
  - Limit clearing, grading and soil compaction
  - Minimize impervious surfaces
  - Minimize runoff by dispersing runoff to landscape or using permeable pavements
- PR-2 - Water Quality Treatment
  - Treat runoff with an approved and appropriately sized low impact development (LID) treatment system prior to discharge from the site
- PR-3 - Runoff Retention
  - Required to retain stormwater runoff on the site.
  - Prevent offsite discharge from events up to the 95th percentile rainfall event using Source Control Measures (SCMs) (site's requirement is 85th percentile; refer to the Description of Conceptual Design section below)

Specific information must be included in the Stormwater Control Plan (SWCP) for PR-1, PR-2 and PR-3 projects. Copies of the checklists for these three tiers and the SWCP are found in Attachment A to this memo. The City of Morgan Hill Public Works Department also has a

specific construction Best Management Practices (BMP) sheet that must be considered and included in the project documents.

Santa Clara County Drainage Manual

According to the Drainage Manual, the project is located in a "Very Small Drainage Area" because it is less than 50 acres. Projects in Santa Clara County are to be designed using a 10-year, 24-hour design storm. For flooding considerations, a 100-year, 24-hour design storm is used.

Santa Clara Valley Water District

Drainage area is less than 320 acres, therefore no permit coverage required (SCCDM, 2007).

Phase II Small MS4 General Permit

Gilroy, Morgan Hill and the portion of Santa Clara County that drains to the Pajaro River watershed (this portion referred to as "South Santa Clara County") are traditional Permittees under the State's Phase II Small MS4 General Permit (Phase II Permit) (SWRCB, 2013). Since Gilroy, Morgan Hill and South Santa Clara County are located in Regional Water Quality Control Board Region 3 (Central Coast Region), they are subject to the Central Coast Post-Construction Requirements.

The types of post-construction controls include LID site design, pollutant source control, stormwater treatment, and hydromodification management measures. The LID approach reduces stormwater runoff impacts by minimizing disturbed areas and impervious surfaces, maximizing opportunities for infiltration and evapotranspiration, and using stormwater as a resource (e.g. rainwater harvesting for non-potable uses). Compliance with the Guidance Manual (Morgan Hill, 2015) and associated performance requirements described under Guidance Manual above addresses these Phase II Small MS4 requirements.

Statewide Construction General Permit

As long as the area of disturbance (including contractor staging area and earthen material storage) is not equal to or greater than an acre of land, permit coverage under the CGP is not required (CGP, 2012). This will need to be verified during final design.

Upon review of the above-mentioned regulatory entities, the project will need to adhere to the PR-3 requirements in the Guidance Manual for low flow and water quality considerations. For high flow and storm water runoff management considerations, guidance provided in the

Drainage Manual shall be used. Additionally, storm water management requirements from the post-construction requirements of the Phase II permit shall also be considered.

Design Storm Estimates

Design information provided in the Guidance Manual and the Drainage Manual was used to evaluate the runoff management requirements for surface water flow from the project site. Additionally, the Post-Construction Water Balance Calculator from Appendix 2 of the CGP (WBC) was used to estimate flow quantities and runoff management options.

Per the Guidance Manual, the site is located in the Santa Clara County Watershed Zone 5 (WZ-5). The PR-3 Runoff Retention requirements section in Appendix B of the Guidance Manual provides WZ-specific information for the Design Rainfall Events & Treatment Requirements. For WZ-5, runoff retention is to be made via optimized infiltration to prevent offsite discharge from events up to the 85th percentile, 24-hour storm event. After infiltration is optimized, storage, rainwater harvesting, and/or evapotranspiration may be used. For this project, the 85th percentile average 24-hour storm event was determined using the Post-Construction Water Balance Calculator in Appendix 2 of the CGP.

The Drainage Manual identified the 10-year, 24-hour duration for general designs and the 100-year, 24-hour duration for safe conveyance of flooding incidents. For this project, the intensity/duration/frequency data were gathered from the Point Precipitation Frequency Estimates table on the NOAA website for Morgan Hill, CA (NOAA, 2016). The table is found in Attachment B to this TM.

The amounts of rain from these three precipitation events relevant to design are:

- 85th percentile, 24-hour storm event: **0.84** inches (WBC)
- 10-year, 24-hour storm event: **4.27** inches (Attachment B)
- 100-year, 24-hour storm event: **7.01** inches (Attachment B)

Description of Conceptual Design

The construction activities associated with the project site will add impervious surfaces that will increase the amount of stormwater runoff generated during a storm event. The Conceptual Design for stormwater runoff management for the project site was considered with a Water Quality Design approach and a Water Quantity and Flooding Safety Design approach. The Water Quality Design approach used the 85th percentile average 24-hour storm event and the runoff credit criteria from the Water Balance Calculator. The 10-yr and 100-yr design storm information was used in consideration of the increase in the quantity of water and the potential

for flooding incidents. Although the Water Balance Calculator indicated that runoff credits could be used to manage the excess water for each of the three design storm scenarios, the project site's slope characteristics need to be taken into account for the larger two storm events. Water flowing down a hillside with a slope of 16-17% will take the path of least resistance and have the potential to grow in quantity and speed and cause erosion and/or other soil instability occurrences. Although an assumed infiltration rate was used in the concept design, a more accurate account of the soil's infiltrative capacity is necessary to better determine where/how the water will travel down the hillside from the project site. In some areas, additional facilities may be needed to redistribute flow to enable better sheet flow and increase the potential for infiltration. Retention/infiltration facilities may even be needed.

When considering how to manage the increase in runoff from the project site, two approaches were evaluated: 1) break up the discharge areas by disconnecting the impervious drainage surfaces to enable the existing pervious surfaces to infiltrate the runoff, or 2) prevent offsite discharge of the stormwater by providing retention.

The tank and booster station impervious area is approximately 12,500 sf. The two proposed road alignments (Options #1 and #2) are approximately 8,300 sf and 9,100 sf, respectively. They will produce differing effects on surface water flow from the project site. Thus, differing considerations were made for the quantity and management of surface water generated from these impervious areas.

For the purpose of this Conceptual Design, we have presumed a permeability value of 0.13 inches/hour. Pre-construction and post-construction runoff estimates in cubic feet (cf) from the impervious surface areas for the three design storm scenarios, as calculated by the Water Balance Calculator, are summarized in Table 1. The various design factors and related notes from which the design flows were calculated are displayed in the calculation sheet found in Attachment C to this TM.

Table 1: Pre-Project and Post-Project Related Runoff Estimates

	Pre-Construction Runoff, cf			Post- Construction Runoff, cf		
	85th Percentile	10-yr, 24-hr	100-yr, 24-hr	85th Percentile	10-yr, 24-hr	100-yr, 24-hr
Tank & booster station area	35	1,000	2,850	640	3,250	4,280
Roadway Option #1	20	660	1,870	420	2,130	2,800
Roadway Option #2	25	730	2,070	460	2,350	3,100

Runoff credits from the "impervious disconnect" option from non-rooftop surfaces provided in the Water Balance Calculator will be sufficient to mitigate the runoff generated from the 85th percentile average 24-hour storm event coming from the impervious surfaces of the tank and booster station pads, and from the roadway (whichever option is chosen). This credit option will be sufficient as long as the following criteria can be met:

1. Each discharge point drains a maximum of 5,000 sf
2. Continuous runs (i.e. roadway) must be less than 75 feet.

Additional credits such as tree planting and porous pavement were considered but deemed unnecessary. Further explanation is provided below to demonstrate how these criteria can be met for the two proposed road alignments.

Description of Design Alternative No. 1A

Design Alternative No. 1A pertains to Road Alignment Option No. 1 (RA #1). RA #1, approximately 555 feet long, begins at E Dunne Ave., approximately 40 feet south of where the concrete v-ditch meets the roadway and extends up the hill, ending in the lower southeast area of the proposed booster station pad. Surface water drainage in this Design Alternative is separated into three drainage management areas (DMAs) which are shown on the figure found in Attachment D to this TM.

- **DMA 1:** RA #1 is expected to act as a drainage break for water draining south from the northeast area of the project site. As water flows south and reaches RA #1, it is redirected east and south to continue infiltrating along the hillside.

  This area is anticipated to drain the impervious surface of the tank (~5,000 sf).

- **DMA 2:** Surface water flowing from the west side of the project site flows in the south-southwest direction toward the concrete v-ditch.

  This area is anticipated to drain the impervious surfaces of the driveway around the tank (~4,500 sf).

- **DMA 3:** From the south side of RA #1 where it ends at the booster station pad, water is anticipated to flow south and southeast along the path of least resistance with the contour lines.

This area is anticipated to drain the impervious surface of the booster station pad (~3,000 sf).

Drainage from the impervious surface of RA#1 can be mitigated with curb cuts every 75 feet along the alignment to allow water to infiltrate as it flows down the hillside. An alignment of 555 feet will require a minimum of six (6) curb cuts. Additional flow distribution, retention, infiltration and/or armoring may be required to minimize erosion associated with larger storm events as runoff flows down the steep hillside. As summarized in Table 1, approximate runoff volumes to the three DMAs from the tank and booster area would range from 780 cf to 1,300 cf for the 10-yr design storm and from 1,030 cf to 1,700 cf for the 100-yr design storm. Approximate runoff volumes to each of the curb cut areas from the roadway would be 355 cf for the 10-yr design storm and 470 cf for the 100-yr design storm.

Approximate locations of the curb cuts and the drainage arrows from the DMAs for the tank and booster station pads are provided on the figure in Attachment D.

Description of Design Alternative No. 1B

Design Alternative No. 1B pertains to Road Alignment Option No. 2 (RA #2). RA #2, approximately 608 feet long, begins at E Dunne Ave. where the concrete v-ditch meets the roadway, and extends up the hill resembling an S-curve shape, ending on the east side of the proposed tank and booster station pad at the junction where the booster station and tank pads meet.

Surface water drainage in this Design Alternative is separated into two DMAs:

- **DMA 1:** RA #2 is expected to act as a drainage break for water draining south from the northeast area of the project site. As water flows south and reaches RA #2, it is redirected east and south to continue infiltrating along the hillside.

  This area is anticipated to drain the impervious surface of the tank (~5,000 sf).

- **DMA 2:** Surface water flowing from the west side of the project site flows in the south-southwest direction toward the concrete v-ditch. Additionally, from the south side of RA #2 where it ends at the tank and booster station pads, water is expected to flow south and southeast along the path of least resistance with the contour lines.

  This area is anticipated to drain the impervious surfaces of the area surrounding the tank (~4,500 sf) to the southwest toward the v-ditch and the impervious surface of the booster station pad (~3,000 sf) to the south along the hillside. A culvert may be needed to convey water under the RA #2 near the 3+50 mark to allow the water to continue down

the hillside. Otherwise, there potentially could be excess runoff that will make its way to the v-ditch and join the potential excess runoff in the v-ditch from the area surrounding the tank.

Drainage from the impervious surface of RA#2 can be mitigated with curb cuts every 75 feet along the alignment to allow water to infiltrate as it flows down the hillside. An alignment of 608 feet will require a minimum of seven (7) curb cuts. Additional flow distribution retention, infiltration and/or armoring may be required to minimize erosion associated with larger storm events as runoff flows down the steep hillside. As summarized in Table 1, approximate runoff volumes to the two DMAs from the tank and booster area would range from 780 cf to 1,300 cf for the 10-yr design storm and from 1,030 cf to 1,700 cf for the 100-yr design storm. Approximate runoff volumes to each of the curb cut areas from the roadway would be 300 cf for the 10-yr design storm and 440 cf for the 100-yr design storm.

Approximate locations of the curb cuts and the drainage arrows from the tank and booster station pads are shown on the figure in Attachment D.

Assessment of Design Alternatives

Alternative No. 1A has an additional DMA for the excess runoff to be mitigated, allowing runoff to be distributed over a larger area, as opposed to Alternative No. 1B which only has two DMAs. In Alternative No. 1B, the water draining from the booster station pad could require the installation of a culvert with appropriate armoring/flow distribution at the discharge near the 3+50 mark to allow the water to continue draining down the hillside.

Flow volume from Alternative No. 1A is slightly less than Alternative No. 1B because the road alignment is shorter.

As mentioned above in the Site Conditions and Field Observations section, there are earthflow-style landslide deposits in the general vicinity (along southeast edge of existing v-ditch) suggesting the potential for excess water to increase the potential for soil instability in the area near the existing tree line at the south end of the project site. Although the potential is expected to be minimal, the road alignment for Alternative No. 1A brings the excess water closer to this earthflow deposit area than the Alternative No. 1B alignment.

Engineer's Opinion of Probable Construction Cost

It is anticipated that any additional cost for the needed stormwater drainage features will be minimal although potential retention/infiltration facilities may increase costs and will require careful design consideration given the steepness of the slope. The required features needed to provide the "impervious disconnect" criteria mentioned above to mitigate the post-construction

runoff related to the project are expected to be handled with standard drainage design construction measures (i.e. piping, storm drains in the tank and booster station pad areas, sloped pavement, outfalls to pervious surfaces, cuts in curbing along roadside, gravel strips alongside the roadway for additional infiltrating - as a conservative measure).

Issues to be Resolved during Final Design

A comprehensive geotechnical investigation is underway and field investigations are scheduled for the week of 11 April 2016. As part of this investigation, a sample will be collected for permeability information. Two to three infiltration tests per the Central Coast Region Post Construction infiltration testing methods using the shallow method should also be performed. For the purpose of this Conceptual Design, we have presumed a permeability value of 0.13 inches/hour. Should this value and/or any other information gathered from the investigation be considered more appropriate or otherwise useful, the mitigation options for the runoff from impervious surfaces shall be reassessed.

The area of disturbance (including contractor staging area and earthen material storage) will need to be verified during final design. Provided the total does not equal or add up to greater than an acre of land, permit coverage under the CGP will continue to not be required (CGP, 2012).

Regulated projects located in the Cities of Gilroy or Morgan Hill or in Santa Clara County need to comply with certain requirements in the Guidance Manual. The SWCP and PR-1, PR-2, PR-3 checklists need to be completed and submitted for approval. Additionally, the City of Morgan Hill Public Works Department also has a specific construction BMP sheet that must be considered and included in the project documents.

Conclusions and Recommendations

Currently, there are no impervious surfaces at the top of the hill where the project site is located. The construction of a new tank, booster station pad, and roadway at the top of the hill will create additional runoff that will need to be managed to avoid erosion as it flows down the hill and to minimize the potential for impact to the existing stormwater drainage system. Where the water will flow down the hill from the project site will depend on many factors. Some of these factors include: maximum slope of the current hillside; proposed slope of the new roadway; infiltrative capacity of the soil, and existing drainage patterns.

Based on the information provided in the Water Balance Calculator, runoff credits from the "impervious disconnect" option from non-rooftop surfaces will be sufficient to meet the water quality requirements (i.e. 85th percentile) from the impervious surfaces of the tank and booster station pads and the roadway, whichever option is chosen. Additional credits such as tree

planting and porous pavement were considered but deemed unnecessary. This credit option will be sufficient as long as drainage areas are less than 5,000 sf and continuous drainage runs are less than 75 feet.

Considering the project-related water quality impacts, runoff can be mitigated with the "impervious disconnect" credit. No offsite discharge is anticipated and thus the PR-3 criteria will be met. No retention and minimal impact to existing storm drainage or conveyance features are expected. Other post-construction requirements identified in the Phase II MS4 permit and the Guidance Manual shall be included in the construction documents.

Considering the water quantity and proper conveyance of potential flooding incidents, additional evaluation and design are needed. Based on the results of the geotechnical investigation and infiltration testing, further analysis will be conducted to evaluate the management of the runoff generated from 10-year and 100-year precipitation events for compliance with the requirements of the Drainage Manual.

References

(CE&G, 2015) *Preliminary Engineering Geologic Feasibility Evaluation*
(Morgan Hill, 2015) *Stormwater Management Guidance Manual for Low Impact Development & Post-Construction Requirements.* City of Gilroy, City of Morgan Hill and County of Santa Clara. July 27.

(CGP, 2012) *Statewide Construction General Permit*. Order 2012-0006-DWQ (amends 2009-0009-DWQ as amended by 2010-0014-DWQ). State of California. July 1.

(Morgan Hill, 2015) *Stormwater Management Guidance Manual for Low Impact Development & Post-Construction Requirements.* City of Gilroy, City of Morgan Hill and County of Santa Clara. June.

(NOAA, 2016) NOAA website: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html [37.1375, -121.595; Station: Morgan Hill 2 E (04-5844)]. March 14.

(SCCDM, 2007) *Santa Clara County, California, Drainage Manual.* Schaaf &Wheeler Consulting Civil Engineers, Santa Clara, CA. August 14.

(SWRCB, 2013) *State Phase II Small MS4 General Permit, Post-Construction Requirements, Order No. 2013-0001-DWQ. Regional* Water Quality Control Board Region 3. July 1.

Attachment(s) (4)

Technical Memorandum No. 3

A. PR-1 checklist
   PR-2 checklist
   PR-3 checklist
   SWCP checklist
B. Point Precipitation Frequency Estimates Table
C. Water Balance Calculator Calculations Sheet
D. Figure

cc: Douglas Henderson, P.E., Santa Clara

PERFORMANCE REQUIREMENT NO. 1
SITE DESIGN AND RUNOFF REDUCTION

CERTIFICATION

	DESIGN STRATEGY	INCORPORATED?
1.	Limit disturbance of creeks and natural drainage features.	
2.	Minimize compaction of highly permeable soils.	
3.	Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection.	
4.	Minimize impervious surfaces by concentrating improvements on the least sensitive areas of the site, while leaving the remaining land in a natural undisturbed state.	
5.	Minimize stormwater runoff by implementing one or more of the following design measures:	
	a) Direct roof runoff into cisterns or rain barrels for reuse.	
	b) Direct roof runoff onto vegetated areas safely away from building foundations and footings.	
	c) Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas safely away from building foundations and footings.	
	d) Direct runoff from driveways and/or uncovered parking lots onto vegetated areas safely away from building foundations and footings.	
	e) Construct bike lanes, driveways, uncovered parking lots, sidewalks, walkways, and patios with permeable surfaces.	

I, _____, acting as the Project Engineer for _____ project, located at _____, hereby state that the Site Design and Runoff Reduction design strategies indicated above have been incorporated into the design of the project.

_____ _____

Signature Date

SOURCE CONTROL CHECKLIST	
ON-SITE SOURCE CONTROL MEASURES	**INCORPORATED?**
Wash area/racks, drain to sanitary sewer[1]	☐
Covered dumpster area, drain to sanitary sewer[1]	☐
Sanitary sewer connection or accessible cleanout for swimming pool/spa/fountain[1]	☐
Parking garage floor drains plumbed to sanitary sewer[1]	☐
Fire sprinkler test water/condensate drain lines drain to landscape/sanitary sewer[1]	☐
Interior floor drains/boiler drain lines plumbed to sanitary sewer	☐
Beneficial landscaping/IPM (minimize irrigation, runoff, pesticides and fertilizers; promotes treatment)	☐
Outdoor material storage protection	☐
Covers, drains for loading docks, maintenance bays, fueling areas	☐
Maintenance (pavement sweeping, catch basin cleaning, good housekeeping)	☐
Storm drain labeling	☐
Other[2] _____	☐

Notes:

[1] Subject to sanitary sewer authority requirements.

[2] See CASQA Stormwater BMP Handbook for New Development and Redevelopment for additional BMPs for vehicle service repair facilities, fuel dispensing areas, industrial processes, rooftop equipment and other pollutant generating activities and sources: https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook

PERFORMANCE REQUIREMENT NO. 2: WATER QUALITY TREATMENT

CERTIFICATION

	ON-SITE WATER QUALITY TREATMENT MEASURES (IN ORDER OF PRIORITY)	INCORPORATED?
1.	Low Impact Development (LID) Treatment Systems designed to retain stormwater runoff generated by the 85th percentile 24-hour storm. Stormwater Control Measures implemented (circle all that apply, design documentation is required): • Harvesting and Use, • Infiltration, • Evapotranspiration	
2.	Biofiltration Treatment Systems – with the following design parameters: a) Maximum surface loading rate appropriate to prevent erosion, scour and channeling within the biofiltration treatment system itself and equal to 5 inches per hour, based on the flow of runoff produced from a rain event equal to or at least: i. 0.2 inches per hour intensity; or ii. Two times the 85th percentile hourly rainfall intensity for the applicable area, based on historical records of hourly rainfall depth b) Minimum surface reservoir volume equal to the biofiltration treatment system surface area times a depth of 6 inches c) Minimum planting medium depth of 24 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used. A Regulated Project may utilize an alternative planting medium if it demonstrates its planting medium is equal to or more effective at attenuating pollutants than the specified planting medium mixture. d) Proper plant selection[13] e) Subsurface drainage/storage (gravel) layer with an area equal to the biofiltration treatment system surface area and having a minimum depth of 12 inches f) Underdrain with discharge elevation at top of gravel layer g) No compaction of soils beneath the biofiltration facility (ripping/loosening of soils required if compacted) h) No liners or other barriers interfering with infiltration, except for situations where lateral infiltration is not technically feasible	

[13] Technical guidance for designing bioretention facilities is available from the Central Coast LID Initiative. The guidance includes design specifications and plant lists appropriate for the Central Coast climate: http://www.centralcoastlidi.org/Central_Coast_LIDI/LID_Structural_BMPs.html

3.	Non-Retention Based Treatment Systems – designed to meet at least one of the following hydraulic sizing criteria:	
	(a) Volume Hydraulic Design Basis – Treatment systems whose primary mode of action depends on volume capacity shall be designed to treat stormwater runoff equal to the volume of runoff generated by the 85th percentile 24-hour storm event, based on local rainfall data.	
	(b) Flow Hydraulic Design Basis – Treatment systems whose primary mode of action depends on flow capacity shall be sized to treat: (i) The flow of runoff produced by a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the applicable area, based on historical records of hourly rainfall depths; or (ii) The flow of runoff resulting from a rain event equal to at least 0.2 inches per hour intensity.	

I, _____, acting as the Project Engineer for _____ project, located at _____, hereby state that the On-Site Water Quality Treatment Measures indicated above have been incorporated into the design of the project.

_____ _____

Signature Date

PERFORMANCE REQUIREMENT NO. 3: RUNOFF RETENTION

Design Rainfall Events & Treatment Requirements for WMZs

WMZ[1]	Treatment Options & Design Rainfall	Check Applicable WMZs
WMZ 1	Via optimized infiltration[2], prevent offsite discharge from events up to the 95th percentile 24-hour rainfall event as determined from local rainfall data.	
WMZ 2	Via storage, rainwater harvesting, infiltration, and/or evapotranspiration, prevent offsite discharge from events up to the 95th percentile 24-hour rainfall event as determined from local rainfall data.	
WM 4 *	Via optimized infiltration[2], prevent offsite discharge from events up to the 95th percentile 24-hour rainfall event as determined from local rainfall data.	
WMZ 5	Via optimized infiltration[2] prevent offsite discharge from events up to the 85th percentile 24-hour rainfall event as determined from local rainfall data.	
WMZ 6	Via storage, rainwater harvesting, infiltration, and/or evapotranspiration, prevent offsite discharge from events up to the 85th percentile 24-hour rainfall event as determined from local rainfall data.	
WMZ 9	Via storage, rainwater harvesting, infiltration, and/or evapotranspiration, prevent offsite discharge from events up to the 85th percentile 24-hour rainfall event as determined from local rainfall data.	
WMZ 10 *	Via optimized infiltration[2], prevent offsite discharge from events up to the 95th percentile 24-hour rainfall event as determined from local rainfall data	

Notes:

* Applicable only to those areas that overlay designated Groundwater Basins

1. Includes only those WMZs contained in Santa Clara County.
2. Storage, rainwater harvesting, and/or evapotranspiration may be used when infiltration is optimized.

PERFORMANCE REQUIREMENT NO. 3: RUNOFF RETENTION

LID Site Assessment Checklist

ITEMS TO DOCUMENT:	INCLUDED?
1. Site topography	☐
2. Hydrologic features including contiguous natural areas, wetlands, watercourses, seeps, or springs	☐
3. Depth to seasonal high groundwater	☐
4. Locations of groundwater wells used for drinking water	☐
5. Depth to an impervious layer such as bedrock	☐
6. Presence of unique geology (e.g., karst)	☐
7. Geotechnical hazards	☐
8. Documented soil and/or groundwater contamination	☐
9. Soil types and hydrologic soil groups	☐
10. Vegetative cover/trees	☐
11. Run-on characteristics (source and estimated runoff from offsite which discharges to the project area)	☐
12. Existing drainage infrastructure for the site and nearby areas including the location of municipal storm drains	☐
13. Structures including retaining walls	☐
14. Utilities	☐
15. Easements	☐
16. Covenants	☐
17. Zoning/Land Use	☐
18. Setbacks	☐
19. Open space requirements	☐
20. Other pertinent overlay(s)	☐

PERFORMANCE REQUIREMENT NO. 3: RUNOFF RETENTION

LID Site Design Measures

	DESIGN MEASURE	INCORPORATED?
1.	Defining the development envelope, identifying the protected areas, and identifying areas that are most suitable for development and areas to be left undisturbed	
2.	Identifying conserved natural areas, including existing trees, other vegetation, and soils (shown on the plans)	
3.	Limit the overall impervious footprint of the project	
4.	Design of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided that public safety or mobility uses are not compromised	
5.	Set back development from creeks, wetlands, and riparian habitats	
6.	Design conforms the site layout along natural landforms	
7.	Design avoids excessive grading and disturbance of vegetation and soils	

I, _____, acting as the Project Engineer for _____ project, located at _____, hereby state that LID Site Design Measures indicated above have been incorporated into the design of the project.

_____ _____

Signature Date

PERFORMANCE REQUIREMENT NO. 3: RUNOFF RETENTION

Technical Infeasibility Checklist

	Site Conditions	Check If Applicable
1.	Depth to seasonal high groundwater limits infiltration and/or prevents construction of subgrade stormwater control measures[14]	☐
2.	Depth to an impervious layer such as bedrock limits infiltration	☐
3.	Sites where soil types significantly limit infiltration	☐
4.	Sites where pollutant mobilization in the soil or groundwater is a documented concern	☐
5.	Space constraints (e.g., infill projects, some redevelopment projects, high density development)	☐
6.	Geotechnical hazards	☐
7.	Stormwater Control Measures located within 100 feet of a groundwater well used for drinking water	☐
8.	Incompatibility with surrounding drainage system (e.g., project drains to an existing stormwater collection system whose elevation or location precludes connection to a properly functioning treatment or flow control facility)	☐

[14] See Santa Clara Valley Water District guidelines for minimum groundwater separation from stormwater infiltration devices (Section 7, Table 6, of this Manual).

APPENDIX B

Stormwater Control Plan Checklist

Stormwater Control Plan Required Contents	PR Level	Done?
1. Project Information	All	
• Project name		
• Application number		
• Address and assessor's parcel number		
• Name of Applicant		
• Project Phase number (if project is being constructed in phases)		
• Project Type (e.g., commercial, industrial, multi-unit residential, mixed-use, public), and description		
2. Project Areas	All	
• Total project site area		
• Total new impervious surface area		
• Total replaced impervious surface area		
• Total new pervious area		
• Calculation of Net Impervious Area		
3. Statement of Performance Requirements that apply to the project:	All	
• Performance Requirement No.1 – Site Design and Runoff Reduction		
• Performance Requirement No.2 – Water Quality Treatment		
• Performance Requirement No. 3 – Runoff Retention		
• Performance Requirement No. 4 – Peak Management		
4. Delineation of Drainage Management Areas (DMAs)	All	
5. Summary of Site Design and Runoff Reduction Performance Requirement measures selected for the project (see PR-1 checklist)	PR-1	
6. Description of Runoff Reduction Measures and Structural Stormwater Control Measures, by Drainage Management Area and for entire site	PR-2, 3, and 4	
7. Water quality treatment calculations used to comply with the Water Quality Treatment Performance Requirement and any analysis to support infeasibility determination	PR-2	
8. Documentation certifying that the selection, sizing, and design of the Stormwater Control Measures meet the full or partial Water Quality Treatment Performance Requirements (see PR-2 checklist)	PR-2	

ATTACHMENT B

NOAA Atlas 14, Volume 6, Version 2
Location name: Morgan Hill, California, US*
Latitude: 37.1375°, Longitude: -121.5950°
Elevation: 780 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.123 (0.108–0.141)	0.156 (0.137–0.179)	0.201 (0.176–0.232)	0.239 (0.207–0.279)	0.294 (0.243–0.359)	0.338 (0.272–0.425)	0.384 (0.299–0.499)	0.435 (0.326–0.586)	0.506 (0.359–0.721)	0.565 (0.383–0.842)
10-min	0.176 (0.155–0.202)	0.224 (0.197–0.257)	0.288 (0.252–0.332)	0.343 (0.297–0.400)	0.421 (0.348–0.514)	0.484 (0.389–0.609)	0.551 (0.429–0.716)	0.623 (0.467–0.840)	0.726 (0.514–1.03)	0.810 (0.549–1.21)
15-min	0.213 (0.188–0.245)	0.270 (0.238–0.311)	0.349 (0.305–0.402)	0.415 (0.359–0.484)	0.509 (0.421–0.622)	0.586 (0.471–0.736)	0.666 (0.518–0.866)	0.753 (0.564–1.02)	0.878 (0.622–1.25)	0.980 (0.664–1.46)
30-min	0.297 (0.262–0.341)	0.377 (0.331–0.433)	0.486 (0.425–0.560)	0.578 (0.501–0.675)	0.710 (0.587–0.867)	0.816 (0.656–1.03)	0.929 (0.722–1.21)	1.05 (0.787–1.42)	1.22 (0.867–1.74)	1.37 (0.925–2.04)
60-min	0.443 (0.390–0.507)	0.561 (0.493–0.645)	0.723 (0.634–0.834)	0.861 (0.746–1.01)	1.06 (0.875–1.29)	1.22 (0.977–1.53)	1.38 (1.08–1.80)	1.56 (1.17–2.11)	1.82 (1.29–2.60)	2.03 (1.38–3.03)
2-hr	0.678 (0.597–0.778)	0.861 (0.757–0.989)	1.11 (0.973–1.28)	1.32 (1.15–1.54)	1.63 (1.34–1.98)	1.87 (1.50–2.35)	2.13 (1.65–2.76)	2.40 (1.80–3.24)	2.80 (1.98–3.98)	3.12 (2.11–4.65)
3-hr	0.851 (0.750–0.976)	1.08 (0.950–1.24)	1.40 (1.22–1.61)	1.66 (1.44–1.94)	2.04 (1.69–2.50)	2.35 (1.89–2.95)	2.68 (2.08–3.48)	3.02 (2.27–4.08)	3.52 (2.50–5.02)	3.93 (2.66–5.85)
6-hr	1.21 (1.06–1.38)	1.54 (1.35–1.76)	1.99 (1.74–2.29)	2.37 (2.05–2.77)	2.92 (2.41–3.56)	3.36 (2.70–4.22)	3.83 (2.98–4.97)	4.33 (3.24–5.84)	5.05 (3.58–7.19)	5.63 (3.82–8.39)
12-hr	1.63 (1.43–1.87)	2.08 (1.83–2.39)	2.70 (2.37–3.12)	3.24 (2.80–3.77)	4.00 (3.31–4.89)	4.62 (3.72–5.81)	5.28 (4.11–6.86)	6.00 (4.49–8.09)	7.02 (4.97–10.0)	7.85 (5.32–11.7)
24-hr	2.12 (1.92–2.39)	2.72 (2.47–3.07)	3.56 (3.21–4.02)	4.27 (3.83–4.87)	5.30 (4.59–6.24)	6.13 (5.20–7.38)	7.01 (5.80–8.65)	7.96 (6.40–10.1)	9.33 (7.19–12.3)	10.4 (7.78–14.3)
2-day	2.73 (2.48–3.08)	3.54 (3.20–3.99)	4.63 (4.18–5.23)	5.55 (4.97–6.33)	6.85 (5.94–8.08)	7.89 (6.69–9.50)	8.99 (7.43–11.1)	10.1 (8.16–12.9)	11.8 (9.08–15.6)	13.1 (9.76–18.0)
3-day	3.06 (2.78–3.45)	3.98 (3.60–4.48)	5.21 (4.70–5.89)	6.24 (5.59–7.11)	7.68 (6.65–9.04)	8.81 (7.47–10.6)	9.99 (8.26–12.3)	11.2 (9.03–14.3)	13.0 (10.0–17.2)	14.4 (10.7–19.7)
4-day	3.36 (3.05–3.78)	4.38 (3.96–4.93)	5.73 (5.18–6.48)	6.86 (6.14–7.81)	8.41 (7.29–9.91)	9.63 (8.17–11.6)	10.9 (9.01–13.4)	12.2 (9.82–15.5)	14.0 (10.8–18.6)	15.5 (11.5–21.2)
7-day	4.12 (3.74–4.64)	5.37 (4.86–6.05)	7.00 (6.32–7.91)	8.34 (7.47–9.50)	10.2 (8.81–12.0)	11.6 (9.83–14.0)	13.0 (10.8–16.1)	14.6 (11.7–18.5)	16.6 (12.8–22.0)	18.2 (13.6–25.0)
10-day	4.59 (4.17–5.17)	5.98 (5.41–6.74)	7.78 (7.02–8.79)	9.24 (8.27–10.5)	11.2 (9.71–13.2)	12.7 (10.8–15.3)	14.3 (11.8–17.6)	15.8 (12.7–20.1)	18.0 (13.9–23.8)	19.6 (14.6–26.9)
20-day	5.85 (5.30–6.58)	7.64 (6.92–8.61)	9.90 (8.94–11.2)	11.7 (10.5–13.3)	14.0 (12.2–16.5)	15.8 (13.4–19.0)	17.5 (14.5–21.6)	19.2 (15.5–24.4)	21.5 (16.6–28.5)	23.2 (17.3–31.8)
30-day	7.09 (6.42–7.97)	9.25 (8.38–10.4)	11.9 (10.8–13.5)	14.0 (12.6–16.0)	16.7 (14.5–19.7)	18.7 (15.8–22.5)	20.6 (17.0–25.4)	22.5 (18.1–28.5)	24.9 (19.2–33.0)	26.7 (19.9–36.6)
45-day	8.80 (7.98–9.90)	11.4 (10.4–12.9)	14.7 (13.2–16.6)	17.1 (15.3–19.5)	20.2 (17.5–23.8)	22.4 (19.0–27.0)	24.5 (20.3–30.2)	26.5 (21.3–33.7)	29.1 (22.5–38.6)	31.0 (23.1–42.5)
60-day	10.3 (9.38–11.6)	13.4 (12.1–15.1)	17.0 (15.3–19.2)	19.7 (17.6–22.5)	23.1 (20.0–27.2)	25.5 (21.6–30.6)	27.7 (22.9–34.2)	29.8 (24.0–37.9)	32.5 (25.1–43.0)	34.4 (25.6–47.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

Attachment C: Calculation Sheet

Area of Impervious Surface	sq. feet	acres
- Tank & booster station area	12,500	0.29
- Roadway Option #1	8,327	0.19
- Roadway Option #2	9,114	0.21

Runoff Coefficient, C, for asphalt/concrete pavement: 0.95

A permeability value of 0.13 inches/hour has been presumed. More site-specific information will be gathered from an onsite geotechnical survey.

Using the Appendix 2 Post-Construction Water Balance Calculator (WBC) from the State CGP,
the 85th percentile design storm event value is 0.84 inches.

Based on the County of Santa Clara Design Manual,
the design storm for general designs is the 10-year, 24-hour storm event; value of 4.27 inches.
the safe release design storm for flood protection is the 100-year, 24-hour storm event (7.01 inches).

The WBC was used to determine the amount of pre-project runoff and project-related runoff for the three design storms:

	Pre-Project Runoff, cf			Project-related Runoff	
	85th Percentile	10-yr, 24-hr	100-yr, 24-hr	85th Percentile	10-yr, 24-hr
- Tank & booster station area	35	1,000	2,850	640	3,250
- Roadway Option #1	20	660	1,870	420	2,130
- Roadway Option #2	25	730	2,070	460	2,350

Considering the runoff credit options in the WBC, runoff from the 85th percentile design storm will be mitigated with the non-rooftop impervious surface disconnect option, provided the following conditions:

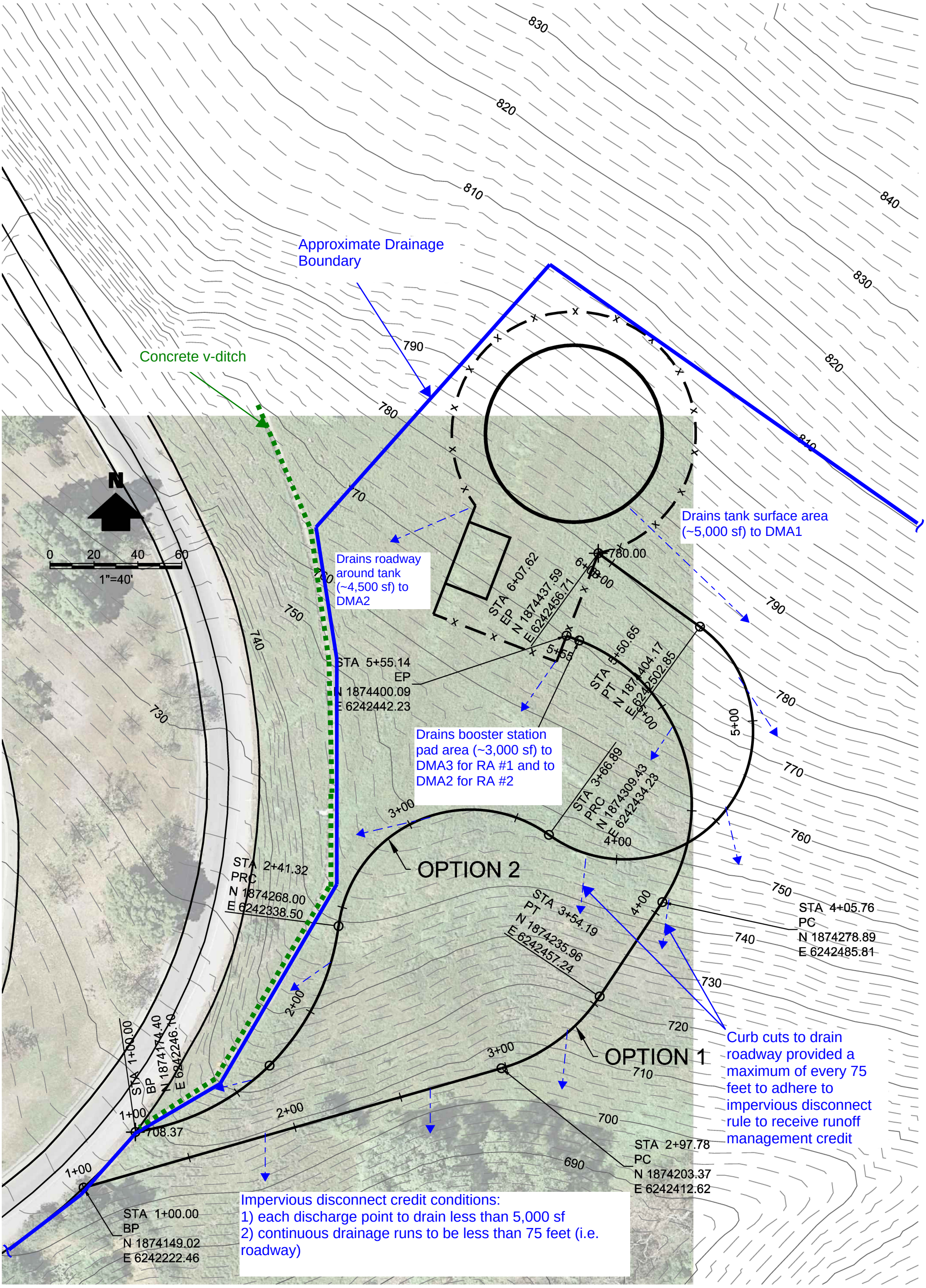
1) each discharge point needs to drain less than 5,000 sf
2) continuous runs (i.e. roadway) need to be less than 75 feet.

Tank and booster station area needs three discharge points as shown in Figure 1.
Each point would convey approx. 1/3 of total discharge volume.

Impervious disconnect for every 75 feet at a minimum for the two roadway options will result in:

- Option #1 - 6 curb cuts, minimum
- Option #2 - 7 curb cuts, minimum

ATTACHMENT D



Attachment 5

Noise Assessment Study

ATTACHMENT 5

NOISE ASSESSMENT STUDY

FOR THE

CITY OF MORGAN HILL

EAST DUNNE HILLSIDE WATER RESERVOIR PROJECT

EAST DUNNE AVENUE

MORGAN HILL

BY

EDWARD L. PACK ASSOCIATES, INC.

AUGUST 2016

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NOISE ASSESSMENT STUDY
FOR THE
EAST DUNNE HILLSIDE WATER RESERVOIR PROJECT
EAST DUNNE AVENUE
MORGAN HILL

Prepared by
Jeffrey K. Pack

August 29, 2016
Project No. 48-043

Executive Summary

The noise analysis presented herein assesses potential noise impacts from the proposed East Dunne Hillside Water Reservoir Project along East Dunne Avenue in Morgan Hill to adjacent and nearby residences.

The results of this study reveal that maximum noise levels from the project will be in compliance with the City of Morgan Hill Zoning Ordinance. The long-term noise exposures will be in compliance with the standards of the City of Morgan Hill General Plan Noise Element. Increases in the ambient noise environment due to the project will be less than significant and will be in compliance with the guidelines of the California Environmental Quality Act (CEQA).

Noise mitigation measures for the project will not be required.

I. Description of the Study Area

The proposed pump station site is a vacant parcel located upslope from East Dunne Avenue and downslope from Oak View Circle in the Jackson Oaks area of Morgan Hill. The site is bounded by single-family residences along Oak View Circle from northwest to northeast. East Dunne Avenue is the west and south. Single-family residences line the westerly side of East Dunne Avenue to the southwest of the site. Vacant land is to the east.

II. Ambient Noise Levels

To determine the existing noise levels at the receptor locations, noise level measurements were made at the property line of the residence along Oak View Circle, as shown on Figure 1 on page 3. The measurements were made for a continuous 24-hour period, on August 2-3, 2016 during representative hours of the DNL index. The noise level data were acquired using a Larson-Davis Model 812 Precision Integrating Sound Level Meter. The meter yields, by direct readout, a series of descriptors of the sound levels versus time. These descriptors are commonly used to describe community noise, as defined in Appendix B. The measured descriptors include the L_1, L_{10}, L_{50}, and L_{90}, i.e., those levels exceeded 1%, 10%, 50% and 90% of the time. Also measured were the maximum and minimum levels and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL's. The results of the measurements are shown in the data table in Appendix C.

The results of the field survey reveal that the L_{eq}'s at the measurement location ranged from 42.1 to 51.3 dBA during the daytime and from 41.2 to 51.7 dBA at night. Although distance traffic creates the background noise environment in the area, evening cricket noise generated the highest noise levels at the site.

Measurements of the exiting ambient conditions at the residences to the southwest could not be performed as there is no secure location along the property line at which to place a sound meter. However, due to the close proximity of this property line to East Dunne Avenue, it is evident that the ambient noise levels are higher than at the residential property lines of the Oak View Circle residences.

FIGURE 1 – Noise Measurement Location

III. Noise Standards

Zoning Ordinance

The maximum noise levels generated by operations of the pump station were evaluated against the standards of the City of Morgan Hill Zoning Ordinance, Ref. (a). *Section 18.45.075 – Noise* specifies the following:

At the lot line of all uses specified in Section 18.48.010, the maximum sound generated by any use shall not exceed seventy to seventy-five db(A) when adjacent uses are industrial or wholesale uses. When adjacent to offices, retail or sensitive industries, the sound level shall be limited to sixty-five to seventy db(A). When uses are adjacent or contiguous to residential, park or institutional uses, the maximum sound level shall not exceed sixty db(A).

Excluded from these standards are occasional sounds generated by the movement of railroad equipment, temporary construction activities, or warning devices.

(Ord. 1804 N.S. § 1 (Exh. A) (part), 2006)

The noise limit for the pump station operation is 60 dBA at the residential property boundaries.

Construction noise from Public Works projects is exempt from Zoning Ordinance noise limits.

General Plan Noise Element

The noise exposures generated by the project were evaluated against the standards of the City of Morgan Hill Noise Element of the General Plan, Ref. (b), which utilizes the Day-Night Level (DNL) 24-hour descriptor to define acceptable noise exposures for various land uses. The standards specify a limit of 60 decibels (dB) DNL for residential land use receptor locations.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act does not provide quantitative limits on noise levels or noise exposures. Rather, CEQA bases the significance of an impact on a series of questions, as shown below. The results of this study in relation to the CEQA criteria are included in the table.

Would the project:

	Potentially Significant Impact	*Less-than-Significant Impact with Mitigation Measures Incorporated*	*Less-Than-Significant Impact*	*No Impact*
a. Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or in applicable standards of other agencies?				X
b. Result in exposure of persons to or generation of excessive ground-borne vibration or ground borne noise levels?				X
c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X
d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
e. For a project located within an airport land-use plan or, where such a plan has not been adopted, within two miles of a public airport or public-use airport, expose people residing or working in the project area to excessive noise levels?				X
f. For a project located within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels?				X

The term "substantial" is left to the local jurisdiction to determine the level of allowable noise increase due to a project.

Typically, allowable noise increases before a significant impact occurs are:

A 5 dB increase in the ambient noise exposure if the ambient + project remains within the Noise Element standards for the receptor land use; and

A 3 dB increase in the ambient noise exposure if the ambient + project will exceed the limits of the Noise Element standards for the receptor land use.

The existing ambient noise exposures at the residential receptor locations are below the 60 dB DNL limit for residential land use. Thus, a 5 dB increase in the ambient noise environment at the Oak View Circle residences is allowed before a significant noise impact occurs and a 3 dB increase in the ambient noise environment at the residences that back to East Dunne Avenue is allowed before a significant noise impact occurs.

IV. Project Description

The pump station project includes the construction of an 850,000 gallon steel water reservoir approximately 80 ft. in diameter, as shown on the Reservoir Site Layout Plan Option 1, Ref. (c). A 20' x 30' pump station building will be located at the southwesterly corner of the water tank. The nearest residential property line is approximately 170 to the north of the northwesterly end of the pump station building.

The next nearest residential property line in the vicinity of the site is to the southwest across East Dunne Avenue. The southwestern property line is approximately 230 ft. from the southerly end of the pump station building

Based on the configuration and operations of the existing pump station at the White Oak Court facility, the proposed pump station is planned to house three 50 h.p. above grade water pumps and an emergency generator, similar to the White Oak Court pump station. The White Oak Court pump station pumps are Wehr 50 h.p., 600 GPM pumps. The generator is a Katolight model FC-12-6-2011UA mounted on vibration isolating springs.

The proposed pump station access roll-up door will be in the southeasterly façade. The access man door and ventilation louver will be in the northeasterly façade. The intake (radiator) louver for the generator will be in the southwesterly façade.

The water pumping operation will typically entail the operation of one or two pumps at any given time. All three pumps operating would only occur during a water main break or other unforeseen circumstance. The pumps run on an as needed basis, but could operate for 24 continuous hours. The generator operates for 1 hour per month during normal maintenance operations. Other operations occur during power outages. The latter of these scenarios is not included in this analysis as emergent situations are unknown and cannot be predicted. Thus, the normal maintenance operation is used herein to determine potential noise impacts.

The overall site plan is shown on Figure 2 on page 8.

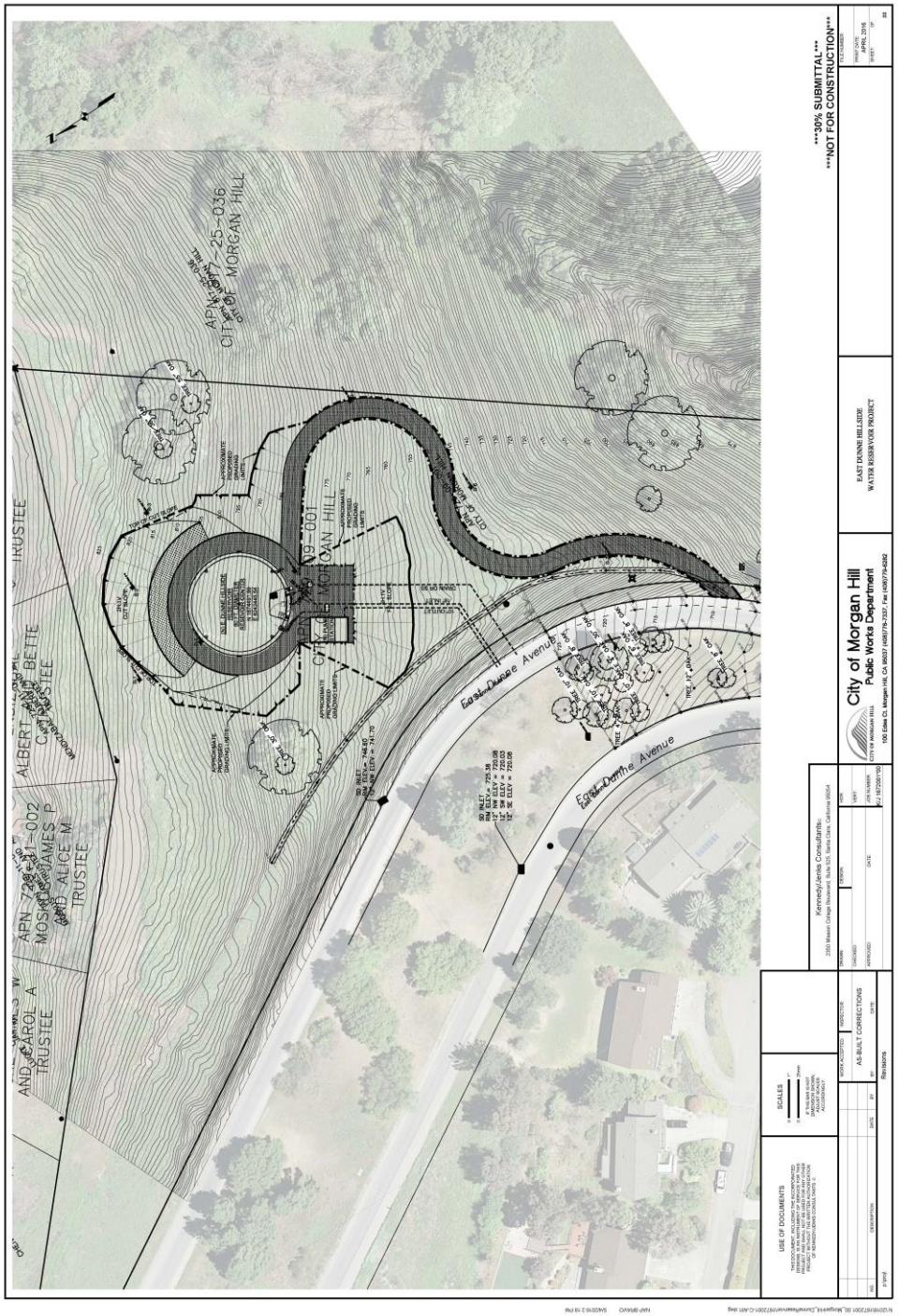

FIGURE 2 – SITE PLAN

III. Project-Generated Noise Levels

To determine the project-generated noise levels produced by the proposed pump station, noise level measurements were made at the White Oak Court facility, as this pump station is similar to the proposed East Dunne Avenue facility. Noise level measurements were conducted on August 17, 2016 using a Larson Davis 831 Precision Integrating Sound Level Meter.

Representatives from the City of Morgan Hill Public Works Department provided access to the pump station. Two pumps were turned on. Sound level measurements were made at three locations inside the building. Location 1 was at the roll-up door at the end of pump 2 (middle pump). Location 2 was at the ventilation louver adjacent to Pump 1. Location 3 was 5 ft. from the side of the generator. Sound measurements were then made outside the building. Location 4 was 10 ft. from the roll-up door. Location 5 was 7 ft. from the ventilation louver. Location 6 was 8 ft. from the rear (solid) wall of the building. Location 7 was 6 ft. from the intake (radiator) louver to the generator.

Subsequent to the pump sound measurements, the generator was started and run in the maintenance operating mode. The above described seven measurement locations were repeated in order (Locations 8-15). The final measurement location was outside the building at a distance of 40 ft. from the roll-up door.

The sound level data measured at the outside of the building were applied to the proposed project site and extrapolated to the residential receptor locations to the northwest and southwest. The ventilation louver will face north. Thus, the sound levels emanating from the ventilation louver were used to analyze the noise impact to the Oak View Circle residences.

The generator radiator louver will face south. Thus, the sound levels emanating from the radiator louver were used to analyze the noise impact to the residences to the southwest. From the data acquired at 10 ft. and at 40 ft. from the roll-up door, the sound attenuation rate used for this study is:

$19\log_{10}(r_1/r_2)$ where r = distance

The measured noise levels represent the highest or "maximum" noise levels for each of the sources. The noise exposures (24-hour average or DNL) were calculated for the scenarios of two pumps operating simultaneously and continually for 24-hours and the generator operating for one continuous hour during the daytime period.

Table I, below, provides the measured sound levels at the White Oak Court pump station and the sound levels calculated for the most residential property lines near the proposed project site, per the Zoning Ordinance. Also provided are the DNL noise exposures, per the General Plan standards.

TABLE I

East Dunne Avenue Hillside Reservoir Sound Levels

Equip/Operation	Measurement Location	Indoor/ Outdoor	Sound Level, dBA	Meas. Distance, ft.	Dist. To Prop. Line, ft.	Sound Level @ Prop. Line, dBA	DNL
Pumps	1	Indoor	76.6	--	--	--	--
Pumps	2	Indoor	76.0	--	--	--	--
Pumps	3	Indoor	75.4	--	--	--	--
Pumps	4	Outdoor	51.4	10	--	--	--
Pumps	5	Outdoor	60.4	7	170	34	40
Pumps	6	Outdoor	46.2	8	--	--	--
Pumps	7	Outdoor	50.2	6	230	20	26
Pumps & Generator	8	Indoor	101.0	--	--	--	--
Pumps & Generator	9	Indoor	100.9	--	--	--	--
Pumps & Generator	10	Indoor	103.0	--	--	--	--
Pumps & Generator	11	Outdoor	76.8	10	--	--	--
Pumps & Generator	12	Outdoor	85.8	7	170	59	45
Pumps & Generator	13	Outdoor	60.1	8	--	--	--
Pumps & Generator	14	Outdoor	75.4	6	230	45	31
Pumps & Generator	15	Outdoor	65.3	40	--	--	--

As shown in Table I, the indoor noise levels with just the pumps running were 75-77 dBA. With the generator running, the noise levels increased to 101-103 dBA. Just outside the building, the pump only noise levels reduced to 46 to 60 dBA, with the highest noise level near the ventilation louver. With the generator running, the outdoor noise levels were 60-86 dBA, with the highest noise level near the ventilation louver.

The operational maximum sound levels will range from 34-59 dBA at the most impacted residential property boundary to the northwest. The operational maximum sound levels will range from 20-45 dBA at the most impacted residential property boundary to the southwest. Thus, the noise levels will be within the 60 dBA limit of the City of Morgan Hill Zoning Ordinance standards.

To evaluate the project-generated noise exposures against the standards of the City of Morgan Hill General Plan Noise Element, the DNL's were calculated as a decibel average of the operational sound levels over the daytime and nighttime periods of the DNL index. For a source that operates for 24-hours and is relatively unchanging, the DNL is the operating sound level + 6 dB. Thus, the pump noise exposure at the residential property boundary to the northwest will be 40 dB. The pump noise exposure at the residential property boundary to the southwest will be 26 dB.

The generator (with pumps) noise exposure at the most impacted residential property boundary to the northwest will be 45 dB. The pump noise exposure at the residential property boundary to the southwest will be 31 dB.

The combined noise exposures were calculated to be 46 dB DNL at the residential property boundary to the northwest and 32 dB DNL at the residential property boundary to the southwest. Thus, the noise exposures will be within the 60 dB DNL limit of the City of Morgan Hill Noise Element standards.

For CEQA purposes, the ambient noise exposure of 53 dB DNL at the operational noise exposure of 46 dB DNL were combined to yield a noise exposure of 54 dB DNL, which equates to a 1 dB increase in the ambient noise exposure. **This is a less-than-significant impact.**

Ambient noise measurements could not be performed at the residential property boundary along East Dunne Avenue. Because of the closer proximity to the roadway, it is evident that the ambient noise exposure at this location is higher than that at the property boundary to the homes along Oak View Circle. Therefore, we are estimating that the ambient noise exposures along the property boundaries to the southwest are at least 53 dB DNL. Combining the project-generated noise exposure of 32 dB to the ambient yields a noise exposure of 53 dB DNL. The project does not add to the existing noise environment at this location. The project generates **no impact** to the residences to the southwest.

As the project noise levels, noise exposures and noise environment increases will be within the limits of the City of Morgan Hill Zoning Ordinance, the City of Morgan Hill Noise Element and CEQA, noise mitigation measures will not be required.

The above report presents a noise assessment study for the planned East Dunne Hillside Reservoir Project along East Dunne Avenue in Morgan Hill. The study findings are based on field measurements at similar facilities and other data and are correct to the best of our knowledge. However, significant deviations in the project operations or plans, equipment used on the site, noise regulations or other future changes beyond our control may produce long-range noise results different from our estimates. If you have any questions or would like an elaboration on this report, please contact me.

Report Prepared By:

EDWARD L. PACK ASSOC., INC.

Jeffrey K. Pack
President

Attachment: Appendices A, B and C

APPENDIX A

References:

(a) City of Morgan Hill Municipal Code, Title 18 –Zoning, Chapter 18.48, Section 18.48.075 – Noise, 2006

(b) City of Morgan Hill General Plan, Health and Safety Element, "Noise", July 2001

(c) Reservoir Site Layout Plan Option 1, E. Dunne Hillside Water Reservoir City of Morgan Hill, by Kennedy/Jenks Consultants, May, 2016

APPENDIX B

Noise Standards and Terminology

1. Noise Standards

A. City of Morgan Hill Noise Element Standards

The Public Health and Safety (Noise) Element of the City of Morgan Hill General Plan, adopted July, 2001, contains land use compatibility standards for various land uses. a section on noise. The Noise Element references the Land Use Compatibility chart from the State of California Guidelines for the Preparation of a Noise Element. The "Normally Acceptable" standards for the land use categories are as follows:

Residential (Single-Family)	60 dB DL
Residential (Multi-Family, Hotels, Motels)	65 dB DNL
Schools, Libraries, Churches, Hospitals	70 dB DNL
Auditoriums, Concert Halls, Amphitheaters	70 dB DNL (conditionally acceptable)
Sports Arenas, Outdoor Spectator Sports	75 dB DNL (conditionally acceptable)
Playgrounds, Neighborhood Parks	70 dB DNL
Golf Courses, Riding Stables, Water Recreation	75 dB DNL
Office Buildings, Business Commercial and Professional	70 dB DNL
Industrial	75 dB DNL
Interior Noise Exposure Limits:	
Residential	45 dB DNL
Offices	45 dBA L_{eq}

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the Sound Level Meters. Some of the statistical levels used to describe community noise are defined as follows:

L_1 - A noise level exceeded for 1% of the time.

L_{10} - A noise level exceeded for 10% of the time, considered to be an "intrusive" level.

L_{50} - The noise level exceeded 50% of the time representing the "mean" sound level.

L_{90} - The noise level exceeded 90 % of the time, designated as a "background" noise level.

L_{eq} - The continuous equivalent-energy level is that level of a steady-state noise having the same sound energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is used to calculate the DNL and CNEL.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dBA weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = \left[[(10\log_{10}(10^{\Sigma Leq(7\text{-}10)})) \times 15] + [((10\log_{10}(10^{\Sigma Leq(10\text{-}7))})+10) \times 9]\right]/24$$

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the precision acoustical instruments shown below. The acoustical instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters was provided by a microphone extended to a height of 5 ft. above the ground. The meter conforms to ANSI S1.4 for Type 1 instruments. The "A" weighting network and the "Fast" response setting of the meter were used in conformance with the applicable ISO and IEC standards. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter
Larson Davis 831 Precision Integrating Sound Level Meter
Larson Davis LDL 812 Precision Integrating Sound Level Meter
Larson Davis 2900 Real Time Analyzer

APPENDIX C

Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: GEIER & GEIER
FILE: 48-043
PROJECT: DUNNE AVENUE PUMP STATION
DATE: 8/2/-3/2016
SOURCE: AMBIENT

LOCATION 1	Residential PL Northwest			
TIME	Leq	10^Leq/10		
7:00 AM	42.1	16218.1		
8:00 AM	45.1	32359.4		
9:00 AM	47.3	53703.2		
10:00 AM	44.8	30199.5		
11:00 AM	43.0	19952.6		
12:00 PM	44.5	28183.8		
1:00 PM	43.3	21379.6		
2:00 PM	43.9	24547.1		
3:00 PM	42.6	18197.0		
4:00 PM	45.3	33884.4		
5:00 PM	45.0	31622.8		
6:00 PM	45.3	33884.4		
7:00 PM	46.2	41686.9		
8:00 PM	48.6	72945.8		
9:00 PM	51.3	134896.3	SUM=	593661
10:00 PM	51.7	147910.8	Ld=	46.0
11:00 PM	50.0	100000.0		
12:00 AM	48.6	72443.6		
1:00 AM	46.2	41686.9		
2:00 AM	42.9	19498.4		
3:00 AM	42.1	16218.1		
4:00 AM	42.7	18620.9		
5:00 AM	46.3	42658.0		
6:00 AM	41.2	13182.6	SUM=	472219
		1.0	Ln=	47.2
		1.0		
	Daytime Level=	57.8		
	Nighttime Level=	66.7		
	DNL=	**53**		
	24-Hour Leq=	46.5		