3.8 Biological Resources

This section describes the affected environment and regulatory setting for biological resources in the vicinity of the Project site. It also describes the impacts on biological resources that would result from implementation of the Project and the mitigation measures to reduce such impacts. The material in this section is based on biological resources field surveys (conducted June 20, 23, 24, 25, and 26; October 13 and 20, 2014; as well as March 20, April 21, May 12, and June 2, 25, and 26, 2015) and a review of lists of special-status plants and wildlife from the California Department of Fish and Wildlife (DFW) California Natural Diversity Database (CNDDB),[1] the U.S. Fish and Wildlife Service (FWS) online species list,[2] and the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants.[3] The purpose of the field surveys was to determine if the Project site contains any sensitive land cover types or special-status species. Field surveys included a combination of general reconnaissance-level surveys to characterize the resources on the Project site and specific surveys to determine if western burrowing owls (*Athene cunicularia*) were nesting on the site. The results of these surveys were considered in the evaluation that follows, along with existing data and information regarding the Project site and surrounding environments. In addition, a Tree Assessment was prepared for the Project Site by HortScience, as included in Appendix 3.8.

Four comment letters pertaining to biological resources were received in response to the Notice of Preparation (NOP) (Appendix 1). Those letters focused on three main issues: (1) assessment of and mitigation for burrowing owl impacts, consistent with the Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP); (2) assessment of and mitigation for nitrogen deposition impacts from new vehicle trips, consistent with the HCP/NCCP; and (3) assessment of and mitigation for impacts on birds resulting from bird strikes on tall buildings. As appropriate, these issues have been addressed in this section, and where necessary, mitigation has been prescribed.

Existing Conditions

Regulatory Setting

Federal

Clean Water Act (Sections 401 and 404)

The Clean Water Act (CWA) is the primary federal law for protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. As such, the CWA empowers the U.S. Environmental Protection Agency (EPA) to set national water quality standards and effluent limitations and establishes permit review mechanisms to enforce the standards and limitations. Most CWA provisions are at least indirectly relevant to the management and protection of biological

[1] California Department of Fish and Wildlife. 2014. *California Natural Diversity Database*. Available: <http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp>. Accessed: December 5, 2014.

[2] U.S. Fish and Wildlife Service. 2014. *Quad Finder*. Available: <http://www.fws.gov/sacramento/es_species/Lists/es_species-lists_quad-finder.htm>. Accessed: December 5, 2014.

[3] California Native Plant Society. 2014. *Online Inventory of Rare and Endangered Plants*. Available: <http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp>. Accessed: December 5, 2014.

resources because of the link between water quality and ecosystem health. The portions that are most directly relevant to biological resources management are contained in Section 404, which regulates the discharge of dredged and fill materials into waters of the United States, including wetlands and other waters of the United States.

Specifically, Section 404 regulates the following:

- All areas within the ordinary high-water mark of a stream, including nonperennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

Section 404 requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (USACE) for all discharges of dredged or fill material into waters of the United States, including streams, ponds, and wetlands, before proceeding with a proposed activity. CWA Section 401 requires applicants for a Section 404 permit to first obtain certification from the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) so that the proposed project will comply with State water quality standards.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act authorizes USACE to regulate the construction of any structure or work in, over, or under; excavation of material from; or deposition of material into navigable waters of the United States, including tidal waters. *Navigable waters of the United States* are defined as those waters subject to the ebb and flow of the tide shoreward to the mean high water mark or those that are currently used, have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. A letter of permission or permit from USACE is required prior to any work being completed within navigable waters.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires that the National Oceanic and Atmospheric Administration (NOAA) Fisheries and FWS be consulted when a proposed federal action may adversely affect *essential fish habitat* (EFH), which is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Migratory routes to and from anadromous[4] fish spawning grounds are also considered EFH.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 United States Code [USC] 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the former Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 United States Code [USC] 703, 50 Code of Federal Regulations [CFR] 21, 50 CFR 10). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of the MBTA. FWS is responsible for overseeing compliance with the MBTA, and the U.S. Department of Agriculture's Animal Damage Control Officer makes recommendations on related animal protection issues.

[4] *Anadromous* fish are species that migrate from the ocean to spawn in freshwater rivers or brackish upper reaches of estuaries.

Endangered Species Act

The Endangered Species Act (ESA), enacted in 1973, protects fish and wildlife species (and their habitats) that have been identified by FWS or NOAA Fisheries as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments in danger of extinction through all or a significant portion of their range; *threatened* refers to those that are likely to become endangered in the near future. FWS and NOAA Fisheries administer the ESA. In general, NOAA Fisheries is responsible for protection of ESA-listed marine species and anadromous fish species, while other listed species are under FWS jurisdiction.

The ESA Authorization Process for Federal Actions under Section 7 provides a means for authorizing take of threatened and endangered species by federal agencies. Under Section 7, the federal agency conducting, funding, or permitting an action (the lead agency) must consult with FWS or NOAA Fisheries, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. This Project may not require any federal action, funding, or approvals that would trigger this consultation requirement, but the process is described in the event consultation is required. If a proposed project "may affect" a listed species or designated critical habitat, the lead agency is required to submit a biological assessment (BA) that evaluates the nature and severity of the expected effect. In response, FWS or NOAA Fisheries issues a biological opinion (BO), with a determination that the proposed action may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding) or will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding). The BO issued by FWS or NOAA Fisheries may stipulate discretionary "reasonable and prudent" conservation measures. If the project will not jeopardize a listed species, FWS or NOAA Fisheries issues an incidental take statement to authorize the proposed activity.

State

California Fish and Game Code Section 1600

The California Fish and Game Code regulates activities that interfere with the natural flow or substantially alter the channel, bed, or bank of a lake, river, or stream. Lake and streambed alteration activities are covered under Section 1601 for public agencies and Section 1603 for private parties. Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements administered under Section 1600 *et seq.*

California Endangered Species Act

The California Endangered Species Act (CESA) protects wildlife and plants that have been listed as endangered or threatened under the act by the California Fish and Game Commission. DFW administers CESA, which prohibits all persons from taking species that are State listed as endangered or threatened, except under certain circumstances. The CESA definition of *take* is any action or attempt to "hunt, pursue, catch, capture, or kill." California Fish and Game Code Section 2081 provides a means by which agencies or individuals may obtain authorization for incidental take of State-listed species and species that have been designated as fully protected under the California Fish and Game Code Section 3511 (fully protected birds), Section 4700 (fully protected mammals), 5050 (fully protected reptiles and amphibians), and 5515 (fully protected fish). Take must be incidental to, not the purpose of, an otherwise lawful activity.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act provides a mechanism for protecting the quality of the State's waters through the State Water Resources Control Board (State Water Board) and nine regional water boards, which oversee implementation of the act. The State Water Board and the Regional Water Board have taken the position that the act and basin plans developed pursuant to the Act provide independent authority to regulate the discharge of fill material to wetlands outside the jurisdiction of USACE.

California Native Plant Protection Act

The California Native Plant Protection Act (CNPPA), enacted in 1977, prohibits the import of rare and endangered plants into California, the take of rare and endangered plants, and the sale of rare and endangered plants (the threatened category replaced the rare category when CESA was enacted in 1984). CESA defers to the CNPPA, which ensures that State-listed plant species are protected when State agencies are involved in projects subject to the California Environmental Quality Act (CEQA).

Regional

Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan

In 2013, the County of Santa Clara (County), Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, and the cities of Gilroy, Morgan Hill, and San José (collectively referred to as the Local Partners) finalized the HCP/NCCP. The HCP/NCCP encompasses all of the Llagas/Uvas/Pajaro watersheds within Santa Clara County; all of the Coyote Creek watershed, except for the Baylands; a large portion of the Guadalupe watershed; and small areas outside of these watersheds. The HCP/NCCP promotes the protection and recovery of covered species while accommodating planned public and private development, infrastructure, and maintenance activities in accordance with applicable laws. The HCP/NCCP was developed in association with FWS and DFW and in consultation with a stakeholder group and the general public. The HCP/NCCP's goal is to protect and enhance ecological diversity in more than 500,000 acres of Santa Clara County. To this end, the HCP/NCCP describes how to avoid, minimize, and mitigate impacts on endangered and threatened species, thereby addressing the permitting requirements relevant to these species for activities conducted in the HCP/NCCP area.

Although the Project site is not within the regulatory boundary of the HCP/NCCP,[5] it does lie just beyond its boundaries. The Project site is within the Expanded Study Area for Burrowing Owl Conservation, a large region referenced in the HCP/NCCP where burrowing owl conservation activities are expected to occur between 2013 and 2063. The City of Santa Clara is not a member jurisdiction of the HCP/NCCP and, therefore, is not subject to obligations imposed upon member agencies.

[5] Santa Clara Valley Habitat Agency. 2012. *Final Santa Clara Valley Habitat Plan*. August. Prepared for the City of San José, City of Morgan Hill, City of Gilroy, Santa Clara Valley Water District, Santa Clara County, and Santa Clara Valley Transportation Authority. Available: http://scv-habitatagency.org/178/Final-Habitat-Plan. Prepared by ICF International.

Local

City of Santa Clara General Plan. The *City of Santa Clara 2010–2035 General Plan* (General Plan) contains goals and policies related to biological resources in the City. General Plan goals and policies relevant to the Project are outlined below.

Goal 5.10.1-G1. The protection of fish, wildlife, and their habitats, including rare and endangered species.

Goal 5.10.1-G2. Conservation and restoration of riparian vegetation and habitat.

Policy 5.3.1-P10. Provide opportunities for increased landscaping and trees in the community, including requirements for new development to provide street trees and a minimum 2:1 on- or off-site replacement for trees removed as part of the proposal to help increase the urban forest and minimize the heat island effect.

Policy 5.3.4-P5. Encourage mixed-use development site planning and design to implement the elements illustrated in Figures 7.3-2 and 7.3-3, including street tree planting along all streets.

Policy 5.3.4-P12. Prioritize pedestrian-oriented streetscape and building design in mixed-use development, including features such as wider sidewalks, street furniture, specialty planters, signage, public art, street trees, special paving materials, decorative awnings, enhanced entrances, colors, variety of materials and textures, and distinctive building massing and articulation.

Policy 5.8.2-P1. Require that new and retrofitted roadways implement "Full-Service Streets" standards, including minimal vehicular travel lane widths, pedestrian amenities, adequate sidewalks, street trees, bicycle facilities, transit facilities, lighting, and signage, where feasible.

Policy 5.8.2-P3. Encourage undergrounding of utilities and utility equipment within the public right-of-way and site these facilities to provide opportunities for street trees and adequate sidewalks.

Policy 5.8.4-P5. Design streets to include detached sidewalks with planting strips or wider, attached sidewalks with tree-wells to encourage pedestrian use and safety, as well as to remove barriers and increase accessibility.

Policy 5.10.1-P1. Require environmental review prior to approval of any development with the potential to degrade the habitat of any threatened or endangered species.

Policy 5.10.1-P2. Work with Santa Clara Valley Water District and require that new development follow the "Guidelines and Standards for Lands Near Streams" to protect streams and riparian habitats.

Policy 5.10.1-P4. Protect all healthy cedars, redwoods, oaks, olives, bay laurel and pepper trees of any size, and all other trees over 36 inches in circumference measured from 48 inches above-grade on private and public property as well as in the public right-of-way.

Policy 5.10.1-P5. Encourage enhancement of land adjacent to creeks in order to foster the reinstatement of natural riparian corridors where possible.

Policy 5.10.1-P11. Require use of native plants and wildlife-compatible nonnative plants, when feasible, for landscaping on City property.

Policy 5.10.1-P12. Encourage property owners and landscapers to use native plants and wildlife-compatible nonnative plants, when feasible.

Policy 5.10.4-P7. Require installation of native and low-water-consumption plant species when landscaping new development and public spaces to reduce water usage.

Protected Trees

The City maintains a Heritage Tree Inventory (Appendix 8.10 of the General Plan) and protects trees, consistent with General Plan Policy 5.10.1-P4, above. None of the trees on the Project site are identified in the Heritage Tree Inventory.

Burrowing Owl Conservation in the Project Area. This section provides context about past conservation easements. A comment regarding that topic was raised during scoping for the Project. Appendix M to the HCP/NCCP (Western Burrowing Owl Conservation Strategy) states on page M-16 that the Habitat Agency should study the feasibility of population augmentation activities in the "existing burrowing owl mitigation area in the City of Santa Clara at the end of Great America Parkway." This references a parcel of land north of the Project site, not the Project site itself. No portion of the Project site has been set aside for burrowing owl mitigation, there are no recorded conservation easements or deed restrictions on the property related to burrowing owls, and City Council has not taken any actions to place any such limitations on the Project site.

On September 19, 1999, the City entered into a mitigation agreement with the California Department of Fish and Game related to build-out of the Bayshore North Redevelopment Plan (BNRP). Pursuant to the agreement, the City committed to mitigating the impacts of the BNRP by acquiring and preserving a total of 58.5 acres of existing burrowing owl foraging and breeding habitat lands in Byron, California.

In 2000, City Council considered taking additional steps related to burrowing owl conservation but never took any final actions. On May 2, 2000, the City Council gave the City Manager the direction to look into potentially developing and maintaining "44.5 acres of burrowing owl habitat in some combination on the following three sites: the closed Lafayette landfill adjacent to the Santa Clara P.A.L. Track, two of the four slopes of the relocated golf holes on the Project site, and at the San José/Santa Clara Water Pollution Control Plant." No subsequent report was ever made to City Council on the potential for creating such habitat, and City Council did not take up the issue again after 2000. As the agenda report at the May 2, 2000, meeting explained,[6] the Mitigation Agreement required the City to acquire the 58.5 acres in Byron, but designating an additional 44.5 acres was a voluntary step, which the City ultimately did not undertake.

Environmental Setting

The Project site is currently occupied by the Santa Clara Golf & Tennis Club, Santa Clara Fire Station 10 (Fire Station 10), a Bicycle-Motocross (BMX) track, the Ameresco Methane Plant, and the Eastside Storm Retention Basin (Retention Basin), and City vehicle washing station. The biological communities on the Project site, consisting of annual grassland, ruderal, developed/turf areas; vegetated depressions; and pond/creek/drainages, reflect the disturbed and developed nature of the site.

As discussed in Chapter 2, *Project Description*, the Project would include new off-site roadways and access points, including the Lick Mill Boulevard extension, the Santa Clara Gateway vehicular access variant, the Tasman Drive slip-ramp, and the San Tomas Aquino Creek overcrossing. The land that would be disturbed to accommodate the new roadways is fully developed and does not include any

[6] Santa Clara City Council Agenda Report, May 2, 2000, Council Meeting, Item 5.C ("The 58.5 acres [in Byron] were the only contractual habitat mitigation required for the development of the 103 acres of City-owned property addressed in the North Bayshore Environmental Impact Report (EIR). The Committee's efforts have focused on the remaining 44.5 acres needed to meet Council's goal of 103 acres of habitat area. These 44.5 acres are a voluntary commitment by the City, not a legal requirement.")

biological communities, except for the aquatic habitat that would be displaced because of new bridge abutments.

A brief description of each of the vegetation communities on the Project site is provided below. Figure 3.8-1 illustrates existing biological communities on the Project site.

Annual Grassland

There are approximately 50 acres of nonnative annual grassland habitat on the Project site, primarily on the steep slopes adjacent to the golf course greens. This habitat is regularly mowed and characterized by dense cover of nonnative grasses, including wild oats (*Avena* sp.), ripgut brome (*Bromus diandrus*), harding grass (*Phalaris aquatia*), and smilograss (*Piptatherum miliaceum*) in localized areas. Nonnative forbs, such as bristly oxtongue (*Helminthotheca* [*Picris*] *echioides*), black mustard (*Brassica nigra*), Italian thistle (*Carduus pycnocephalus*), Russian thistle (*Salsola tragus*), and stinkwort (*Dittrichia graveolens*), are the most common forbs in annual grassland on the Project site. Native species observed sporadically in annual grassland include horseweed (*Erigeron* [*Conyza*] *canadensis*), coyote brush (*Baccharis pilularis*), and fringed willowherb (*Epilobium ciliatum*). Native saltgrass (*Distichlis spicata*) was observed is small patches near sprinklers on the Project site.

Portions of this vegetation community support the Canada goose (*Branta canadensis*), western scrub jay (*Aphelocoma californica*), mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferous*), northern mockingbird (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), and California ground squirrel (*Otospermophilus beecheyi*).

Ruderal

Ruderal/disturbed habitat encompasses approximately 50 acres and exists in several locations on the Project site. The largest area of ruderal habitat occurs on the east side of Lafayette Street, around the Retention Basin, in Parcel 1 as well as surrounding the golf course in Parcel 3 (Figure 3.8-1). Ruderal habitat is typified by a dominance of nonnative forbs that thrive in disturbed conditions. Although vegetation in ruderal habitat includes grass species similar to that observed in annual grassland, nonnative weedy forbs are more dominant in ruderal habitat than in annual grassland. These weedy forbs are taller and denser than the vegetation in the annual grassland (which may be due in part to the absence of mowing). Heavy cover of weedy forbs, including bristly oxtongue, Italian thistle, black mustard, stinkwort, bur clover (*Medicago polymorpha*), pampas grass (*Coraderia selloana*), cheeseweed (*Malva parviflora*), and fennel (*Foeniculum vulgare*), was observed in ruderal habitat on the Project site.

Wildlife species occurring within disturbed/ruderal habitat are primarily commensal[7] species that thrive in developed habitats. Species observed are similar to those described under Annual Grassland, above.

Developed/Turf Areas

Developed/turf areas are the dominant biological community on the Project site and include golf course greens and adjacent disturbed areas (which are devoid of vegetation and often mulched), paved golf course paths, buildings and associated pavement, the BMX course and its associated footprint, the parking lots in Parcel 5, and the asphalt path and maintenance facility surrounding the retention basin. Approximately 140 acres of the Project area are classified as developed/turf areas. The developed portions of the Project site represent low-quality habitat and support only a small number of plant and

[7] *Commensal* species are species that benefit from association with humans.

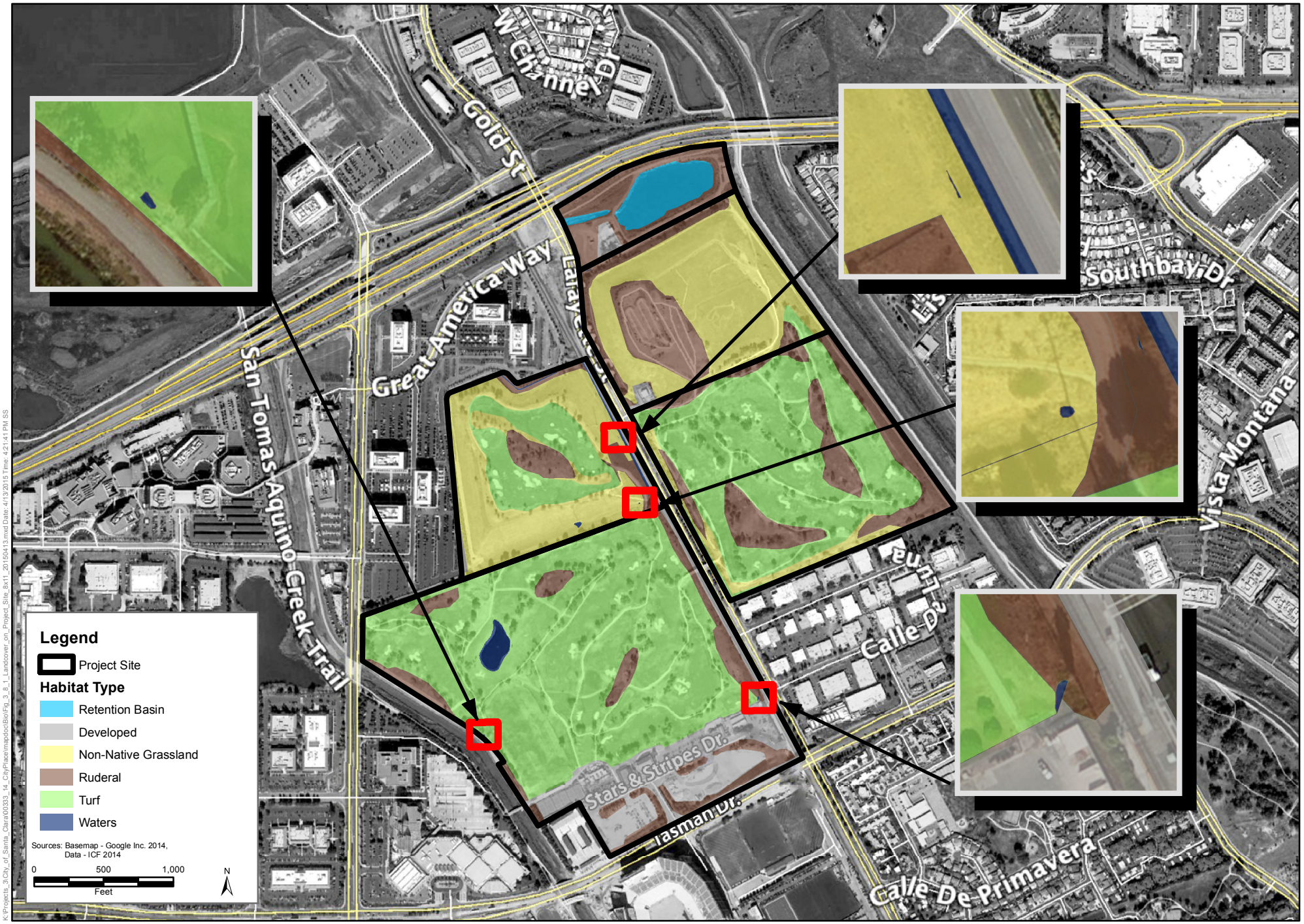

Figure 3.8-1
Land Cover Types on the Project Site
City Place Santa Clara

wildlife species. Vegetation in developed/turf areas is highly variable, ranging from nonexistent in paved areas to maintained greens and ornamental shade trees. The most common vegetation observed in developed/turf areas includes bermudagrass, river red gum (*Eucalyptus camaldulensis*), red iron bark (*Eucalyptus sideroxylon*) and Aleppo pine (*Pinus halepensis*).[8]

Wildlife species occurring within disturbed/turf areas are primarily commensal species that thrive in developed habitats. Species observed are similar to those described under Annual Grassland, above.

Vegetated Depressions

Vegetated depressions are very small areas dominated by emergent herbaceous wetland plants that are either intermittently flooded or contain perennially saturated soils. Four vegetated depressions, accounting for approximately 0.7 acre of land cover, were observed on the Project site, as shown on Figure 3.8-1. One of the vegetated depressions is located in the southeastern corner of Parcel 4; one is located on the western edge of Parcel 4 near San Tomas Aquino Creek; and the remaining two are located on the eastern edge of Parcel 3. These vegetated depressions are low quality because they are dominated by dense stands of nonnative vegetation, including cattail (*Typha* sp.), Bermudagrass, bristly oxtongue, bulrush (*Schoenoplectus* spp.), dallisgras (*Paspalum dilatatum*), velvet grass (*Holcus lanatus*), perennial pepperweed (*Lepidium latifolium*), and Italian rye grass (*Festuca perennis*).

Wildlife species observed within the vegetated depressions on the Project site include song sparrow (*Melospiza melodia*) and red-winged blackbird (*Agelaius phoeniceus*).

Pond/Creek/Drainages

Two human-made ponds are present on the Project site, encompassing approximately 6 acres: the 1-acre golf course pond on Parcel 4 and the 5-acre retention basin (Figure 3.8-1). Both ponds consist of open water edged by cattails on their margins as well as the majority of the vegetation described under the Vegetated Depressions section, above. Many species of waterfowl use the human-made ponds, including mallard (*Anas platyrhynochos*), American coot (*Fulicia americana*), and Canada goose. In addition, a small, unvegetated concrete drainage ditch runs east to west along the northern boundary of Parcel 4.

The Project footprint is bounded by San Tomas Aquino Creek to the west and the Guadalupe River to the east, both riparian channels in the vicinity of the Project site. San Tomas Aquino Creek comprises an open water channel approximately 60 feet wide lined with bulrush (*Bolboschoenus* spp.) and tall flatsedge (*Cyperus eragrostis*). Unlike San Tomas Aquino Creek, the reach of the Guadalupe River adjacent to the Project site is narrow, approximately 20 feet wide, and choked with dense emergent vegetation, such as cattails (*Typha* sp.) and bulrush (*Schoenoplectus* sp.). Both San Tomas Aquino Creek and the Guadalupe River are confined by levees that create an upland boundary between the top of bank and the golf course. In both cases, the banks of the levees are dominated by nonnative grasses, such as harding grass (*Phalaris aquatica*), oat grass (*Avena* spp.), and Italian rye grass (*Festuca perennis*). San Tomas Aquino Creek and the Guadalupe River both support western pond turtle (*Emys marmorata*), but this species has not been documented within a 2.5-mile radius of the Project area. Anadromous fish species have not been documented in San Tomas Aquino Creek; however, central California coast steelhead (*Oncorhynchus mykiss*) and central valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*) have been documented in the Guadalupe River. Critical habitat is also designated in the Guadalupe River, upstream from the San Francisco Bay to the City of San José, for central California coast steelhead (70 Federal Register [FR] 52570, September 2, 2005).

[8] HortScience. "Tree Assessment, City Center, Santa Clara." Memorandum. December 23, 2014.

The Eastside Retention Drainage Swale is located parallel to the west side of the Guadalupe River, outside the Project site boundary. The drainage swale begins at the Tasman Drive overcrossing of the Guadalupe River and extends approximately 3,780 feet before it empties into the Eastside Storm Retention Basin. While the Project may convey runoff in this swale, the Project would not otherwise modify this feature.

Serpentine Grassland

Serpentine grassland is a rare land cover type found in pockets throughout California. This land cover type is not found at the Project site but is described here because of its importance for special-status species and the potential for the Project to affect serpentine grassland elsewhere, as described below. The serpentine grasslands in the South Bay support the Bay checkerspot butterfly, a federally threatened species, along with several rare plant species. There is no serpentine grassland on the Project site. However, air quality modeling and habitat analysis have demonstrated that serpentine grasslands in the Santa Clara Valley are affected by atmospheric nitrogen sources throughout the South Bay, including vehicle trips.[9] Nitrogen becomes airborne and then eventually settles out on the landscape. When it settles out onto natural habitats it serves as an inadvertent fertilizer, adding nitrogen to the soil. Serpentine grasslands are naturally nutrient poor, which is what makes them unique. It is also what creates an environment where many rare plants occur. When those habitats are fertilized by atmospheric nitrogen, it enables nonnative plants to overrun the native plants and reduce habitat quality overall.

An adverse impact on off-site serpentine grasslands here could furthermore result in loss of habitat for the federally threatened Bay checkerspot butterfly, which relies on the native dotseed plantain (*Plantago erecta*).[10] The dotseed plantain grows only in serpentine grassland habitat. The added nitrogen allows nutrient nitrogen-poor serpentine soils to be invaded by nonnative annual grasses that displace the native forbs that provide caterpillar food and adult nectar for the butterfly. Native species cover and richness are reduced, and native plant species, including the dotseed plantain, become less prevalent. Loss of host plants and nectar sources due to nonnative grass invasions leads to rapid declines and eventual local extinction of Bay checkerspot butterfly populations.

Special-Status Species

For the purposes of this analysis, special-status species include those that fit into the following categories:

- Species that are listed, proposed, or candidates for listing as threatened or endangered by FWS pursuant to the ESA of 1969, as amended.
- Species that are listed as rare, threatened, or endangered by DFW pursuant to the CESA of 1970, as amended.
- Species that are designated as fully protected under Sections 3511 (birds), 4700 (mammals), and 5050 (reptiles and amphibians) of the California Fish and Game Code.

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[9] Santa Clara Valley Habitat Agency. 2012. Final Santa Clara Valley Habitat Plan. August. Prepared for the City of San José, City of Morgan Hill, City of Gilroy, Santa Clara Valley Water District, Santa Clara County, and Santa Clara Valley Transportation Authority. Prepared by ICF International. Available: http://scv-habitatagency.org/178/Final-Habitat-Plan.

[10] *Plantago erecta* is referred to by a number of common names; the Santa Clara Valley Habitat Plan refers to it as dwarf plantain.

- Species that are designated by DFW as California species of special concern.
- Species that are not currently protected by statute or regulation but are considered rare, threatened, or endangered under CEQA (Section 15380).

Special-status species documented in the CNDDB within 2.5 miles of the Project site are shown in Figures 3.8-2 and 3.8-3.

Special-Status Plant Species

A total of 13 special-status plant species were identified in the Project region from the CNDDB, FWS, and CNPS species lists for the Milpitas U.S. Geological Survey (USGS) 7.5-minute quadrangle (see Table 3.8-2 at the end of this section). Upon further review of the local habitat conditions and specifics of the documented CNDDB occurrence records, only Congdon's tarplant was deemed to have the potential to occur on the Project site. Surveys were conducted in October 2014, and no Congdon's tarplants were present on the Project site (see Impact BIO-1, below).

Special-Status Wildlife Species

A total of 29 special-status wildlife species were identified in the Project region from the CNDDB and FWS databases within the Milpitas USGS 7.5-minute quadrangle (see Table 3.8-3 at the end of this section) or have potential to occur in the Project region based on life history. Table 3.8-3 lists these species and their potential to occur on the Project site. Upon further review of the local habitat conditions and specifics of the documented CNDDB occurrence records, 22 of the original 29 special-status wildlife species were deemed to have no potential to occur on the Project site because of lack of suitable habitat. Special-status species with potential to occur on the Project site include the following:

- western pond turtle (*Emys marmorata*),
- Cooper's hawk (*Accipiter cooperii*),
- northern harrier (*Circus cyaneus*),
- white-tailed kite (*Elanus leucurus*),
- burrowing owl (*Athene cunicularia),*
- Central California coast steelhead (*Oncorhynchus mykiss*),
- Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*),
- longfin smelt (*Spirinchus thaleichthys*), and
- green sturgeon (*Acipenser medirostris*).

The retention pond, drainage swale, golf course ponds, Guadalupe River, and San Tomas Aquino Creek have the potential to support western pond turtle. However, the poor quality of the upland habitat and the degree of isolation of the aquatic features on-site results in low potential for the site to support a viable population of western pond turtle, although the adjacent creek and river do support this species. Foraging habitat for Cooper's hawk, northern harrier, and white-tailed kite is present within the ruderal and nonnative grassland areas on-site; however, no nesting habitat was identified during the 2014 surveys. No special-status fish have been identified in San Tomas Aquino Creek, but Central California coast steelhead and Central Valley fall-run Chinook salmon do occur in the Guadalupe River. Longfin smelt and green sturgeon occur nearby, but their use of the Guadalupe River in the Project reach is unknown at this time.

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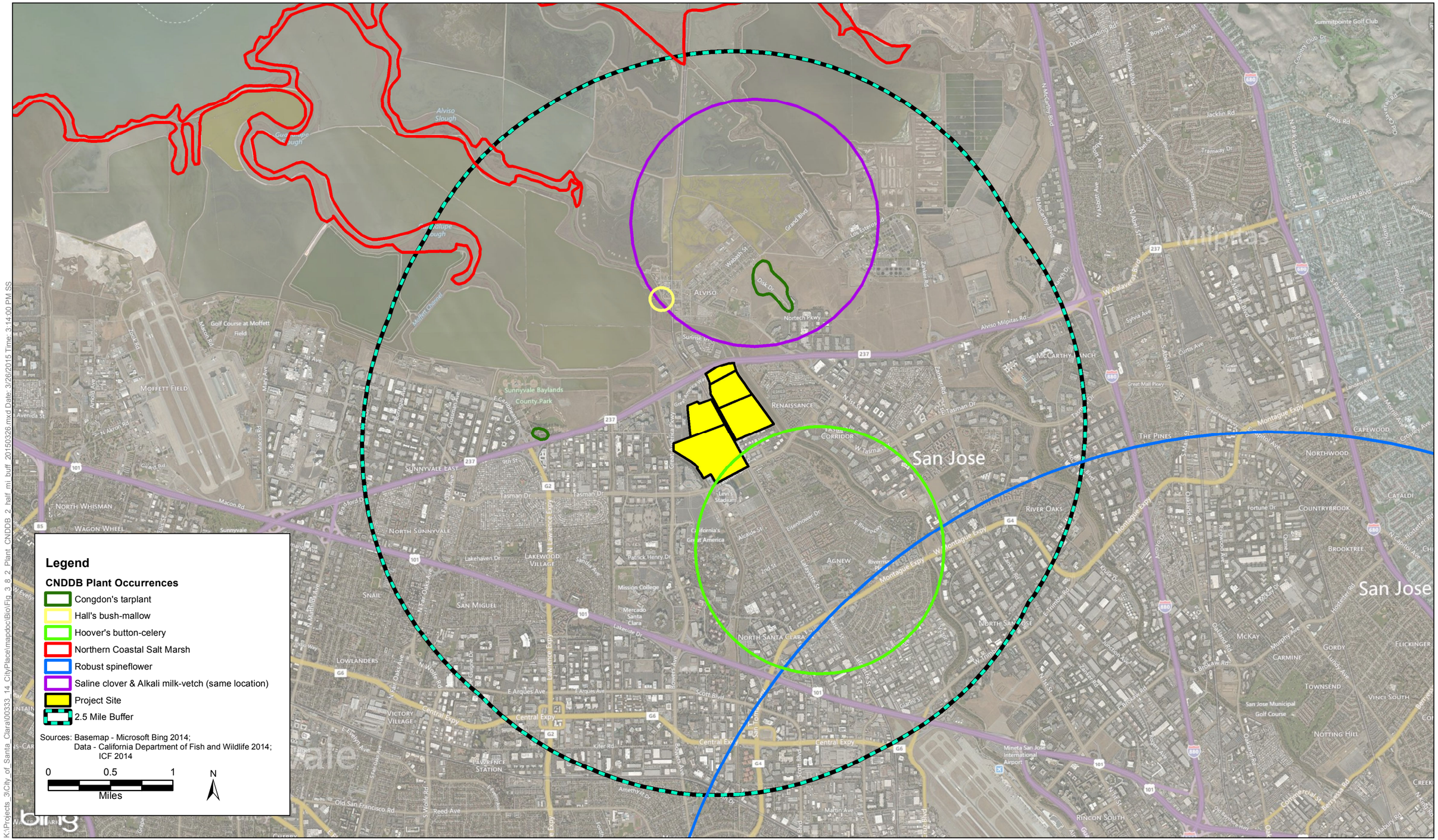

Figure 3.8-2
CNDDB Plant Occurrences Within 2.5 Miles of Project Site
City Place Santa Clara

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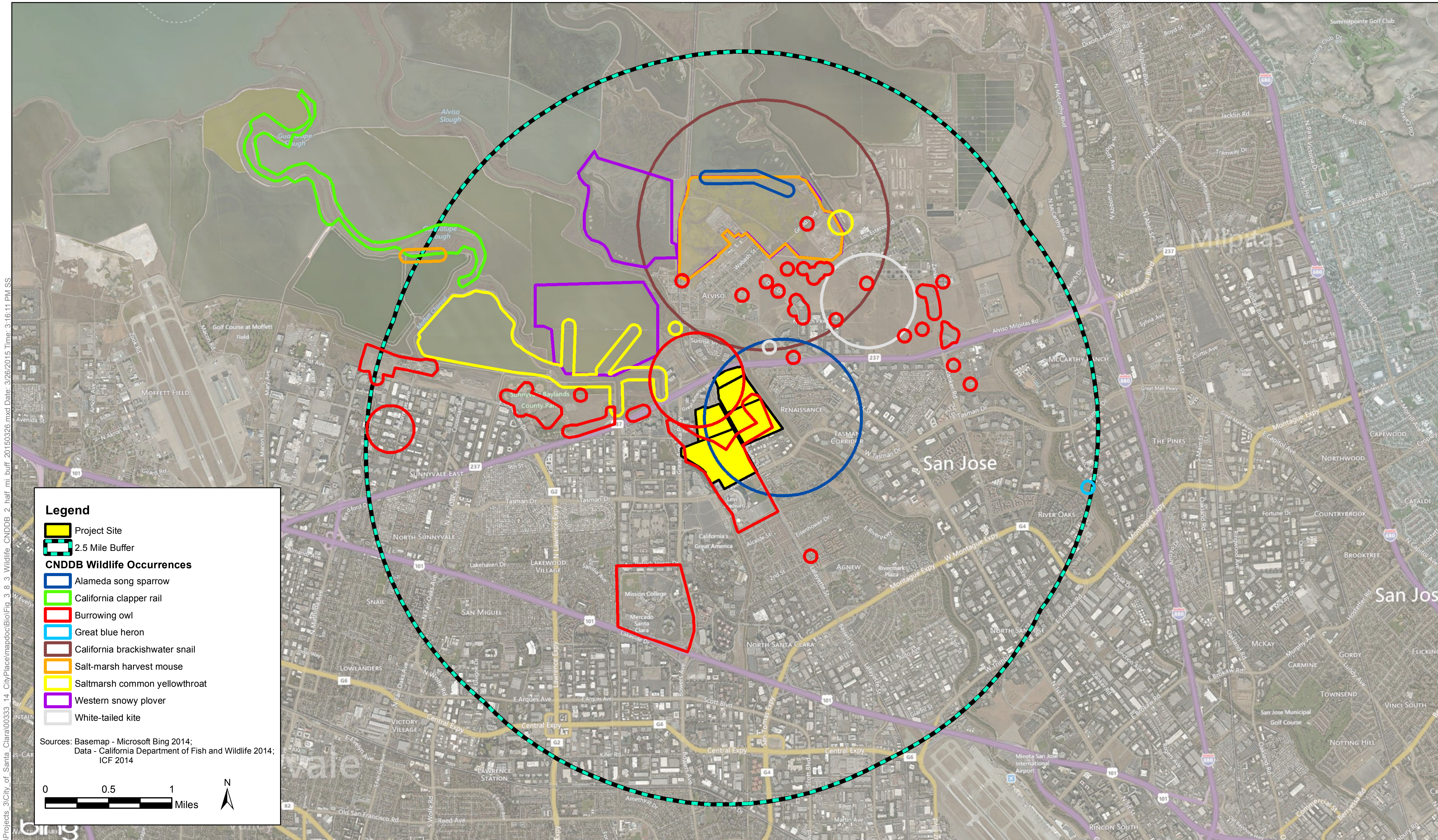

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Figure 3.8-3
CNDDB Wildlife Occurrences Within 2.5 Miles of Project Site
City Place Santa Clara

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Burrowing Owl

Burrowing owl surveys were performed during the breeding season on June 20, 23, 24, 25, and 26, 2014 (Parcels 1–4), in accordance with the *Burrowing Owl Survey Protocol and Mitigation Guidelines.*[11] Because of changes in Project schedule and design, burrowing owl surveys were repeated in 2015 on March 20 (Parcel 5) and April 21, May 12, and June 2, 25, and 26 (Parcels 1–5) in accordance with the *Staff Report on Burrowing Owl Mitigation.*[12] No burrowing owls were observed. However, numerous burrows and California ground squirrels were observed throughout the Project site, in annual grassland and ruderal habitats outside of the managed golf course turf and developed areas. At one location on Parcel 2, east of the BMX track, a number of owl pellets were observed in association with a perch post during the 2014 and 2015 surveys. Two of these pellets were of the right size and composition to indicate burrowing owl use, but were both very old and most likely from a previous season or a wintering, non-breeding owl. Historically, there have been burrowing owls within the Project site and on adjacent properties.[13,14]

The last records of burrowing owls on the Project site were from the statewide burrowing owl survey, coordinated by the Institute for Bird Populations in 2006 between May 15 and July 15.[15] During that survey, owls were located along the western edge of the Project site and adjacent to the Retention Basin. No records of nesting burrowing owls have been recorded on the Project site since 2006. The nearest burrowing owl nest locations in 2014 were recorded on City property south of Levi's Stadium, approximately 0.4 mile away, by City of Santa Clara Public Works.[16] Nesting burrowing owls have also been observed at the San José/Santa Clara Water Pollution Control Plant, which is located approximately 1 mile northeast of the Project site.

Central California Coast Steelhead

Central California coast steelhead use the Guadalupe River in the Project area as a migratory pathway to Guadalupe Creek, Alamitos Creek, and upper Los Gatos Creek where they could spawn. There is a small residual steelhead run in Alamitos and Guadalupe Creeks.[17] From December 2013 through March 2014, 74 juvenile steelhead from the lower Guadalupe River and Los Gatos Creek were tagged with Passive

[11] The California Burrowing Owl Consortium. 1999. Burrowing Owl Survey Protocol and Mitigation Guidelines. Available: http://www.water.ca.gov/floodmgmt/docs/bio/CDFW_1993_BUOW.pdf

[12] California Department of Fish and Game. 2012. *Staff Report on Burrowing Owl Mitigation*. State of California Natural Resources Agency. March 7. Available: http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html#Mammals.

[13] Wilkerson, R.L., and R.B. Siegel. 2010. Assessing Changes in the Distribution and Abundance of Burrowing Owls in California, 1993–2007. Bird Populations. Volume 10, pp. 1–36.

[14] California Department of Fish and Wildlife. 2014. California Natural Diversity Database. Available: <http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp>. Accessed: December 5, 2014.

[15] Wilkerson, R.L., and R.B. Siegel. 2010. Assessing Changes in the Distribution and Abundance of Burrowing Owls in California, 1993–2007. Bird Populations. Volume 10, pp. 1–36.

[16] G. Bolen (pers. comm.) – Ginger Bolen, H.T. Harvey. Email to Troy Rahmig, ICF, on August 18, 2014.

[17] Smith, Jerry J. 2013. Northern Santa Clara County Fish Resources. Available: http://www.permanentereimagined.org/attachments/article/3/Northern%20Santa%20Clara%20County%20Fish%20Resources%202013.pdf. Accessed: January 12, 2015.

Integrated Transponders (PIT).[18] Critical habitat[19] has also been designated in the Guadalupe River in the Project reach (70 FR 52570, September 2, 2005).

Central Valley Fall-Run Chinook Salmon

Chinook salmon enter and spawn in the Guadalupe River in the early fall (September or earlier). The Project reach is used as a migratory pathway to the upper areas where spawning could occur.

Environmental Impacts

This section describes the impact analysis related to effects from the Project on biological resources. It describes the methods used to determine the impacts of the Project and lists the thresholds used to measure whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- 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 DFW or FWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by DFW or FWS.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any 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.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

Methods for Analysis

The environmental setting of the Project was established by reviewing available information on special-status species known to occur in the Project vicinity, as described under the Special-Status Species

[18] Valoppi, L., J. Hobbs, Jo. Bourgeois, and E. Mruz. 2014. Successes and Challenges of Fisheries Resources in a Large Restoration Project. South Bay Restoration Project. Available: http://www.southbayrestoration.org/documents/Valoppi_CalNevaAFS_March_2014-1_Final.pdf. Accessed: January 12, 2015.

[19] *Critical habitat* is a specific geographic area that contains features essential for the conservation of a threatened or endangered species. Critical habitat is designated by the U.S. Fish and Wildlife Service (FWS), and consultation is required with the FWS to ensure activities do not adversely modify critical habitat to the point where it will no longer aid in the species' recovery.

section, above. This review was supplemented with field surveys conducted by ICF International on June 20, 23, 24, 25, and 26, 2014; October 13 and 20, 2014; and March 20, 2015, to determine which of these species actually occurs or whether potential habitat is present on the Project site. This species list was then reviewed in light of Project activities to identify any actions that could result in significant effects on biological resources, as defined by the CEQA thresholds.

Scheme Analysis

The biological resources analysis is not concerned with the range of densities under the Project schemes (Schemes A-1, A-2, and B). This analysis is focused on ground disturbance in general. The geographic area affected by the Project would not change between the schemes.

Impacts Not Evaluated in Detail

Loss or Damage to Special-Status Plants. No special-status plant species have been documented on the Project site; therefore, there would be no impact on special-status plant species resulting from implementation of the Project. Only one special-status plant species, Congdon's tarplant, has the potential to occur on the Project site. Surveys for this species were conducted on the Project site on October 13, 2014, by an ICF International botanist, during the plant's blooming period. Congdon's tarplant was not identified on the Project site, and ***no impact*** would occur.

Potential Interference with Migration Routes or Nursery Sites for Common Species. There are no established migration routes or nursery sites on the Project site, nor is the site an important link in a known movement route for any common wildlife species. The site is an established golf course in a built-out area surrounded by roadways. There would be *no impact* on migration routes or nursery sites for common wildlife species. Migration routes as they relate to special-status fish species in the Guadalupe River are addressed below in Impact BIO-5.

Conflict with a Habitat Conservation Plan or Natural Community Conservation Plan. The Project site is outside of the HCP/NCCP permit area and not a covered activity as defined by the plan. Burrowing owl is the only species covered by the HCP/NCCP that has the potential to occur on the Project site. The Project site is located in the South San José Region, which does not play a prominent role in the conservation strategy within the expanded study area for burrowing owls, as outlined in the HCP/NCCP. The existing urban nature of the South San José Region provides low-quality, isolated habitat patches and limited opportunities for burrowing owl colonization. Development of the Project site would not preclude successful implementation of the burrowing owl conservation strategy. Occupied burrowing owl habitat is not present at the Project site. Sites of importance (i.e., nesting colonies and potential expansion habitat) are located in the North San José/Baylands Region (Figure 5-10 of the HCP/NCCP). The Project would not conflict with the policies in the HCP/NCCP, and ***no impact*** would occur.

Impacts and Mitigation Measures

Impact BIO-1: Interference with Movement of Native Migratory Wildlife Species. The Project could result in harm to or mortality of migratory birds or their active nests. (SU for bird harm or mortality and LTS/M for active nests)

Currently, there are approximately 951 protected trees and approximately 454 non-protected trees at the Project site, a total of approximately 1,405 trees. For the purposes of this analysis, it is assumed that all existing trees at the Project site would be removed. However, 18 trees at Parcel 5 are not included in these totals because they are not expected to be removed as part of the Project (i.e., 16 Canary Island

date palms down the center median and on either side of Centennial Boulevard where it meets Tasman Drive and two California fan palms located in front of the existing parking structure west of the Project area).[20] In addition, up to 234 trees, of which 153 qualify as protected, could be removed at the Tasman East industrial/office development for the Lick Mill Boulevard extension, and up to 104 trees, of which 79 qualify as protected, could be removed at the Santa Clara Convention Center for construction of the roadway from Great America Parkway over San Tomas Aquino Creek and, potentially, Option 2 of the Fire Station 10 relocation.[21] No heritage trees are present at the Project site or in the two off-site areas that could be affected by the Project (Tasman East industrial/office development and the Santa Clara Convention Center). Trees are present in the area that would be affected by construction of the Tasman Drive slip-ramp, but it is unknown whether any are heritage trees.

Impacts on migratory birds, including burrowing owl, could involve removal of nest trees or shrubs, or other nesting substrate (e.g., burrows for burrowing owls), as well as indirect impacts from noise and an increase in human activity near nesting habitat. An increase in noise and human activity could reduce the quality of that habitat and ultimately change the behavior of nesting birds, resulting in nest abandonment. Construction activities, as well as operation of the Project, have the potential to produce higher noise levels than those that currently exist in the Project area.

The Project would introduce buildings on the Project site up to approximately 17 stories (up to approximately 190 feet) above future on-site street grade. Injury or death to birds could result from collisions with buildings due to transparent or reflective glass and from improper lighting at the Project site, which could misdirect or confuse birds during flight. The potential for these types of impacts could be heightened by the Project being located near areas where birds are present. These impacts are considered ***significant***.

MITIGATION MEASURES. Implementation of Mitigation Measure BIO-1.1 would reduce potential nesting migratory bird impacts from the Project to less than significant. However, it is unknown whether Mitigation Measure BIO-1.2 would be enough to mitigate impacts related to bird collisions. As such, this impact is considered ***significant and unavoidable***.

BIO-1.1: *Protect Nesting Birds.* The Project Developer and its contractors shall avoid conducting vegetation removal during the migratory bird nesting season (February 1–August 31). If Project-related activities must commence during the migratory bird nesting season, the Project Developer shall retain a qualified wildlife biologist to conduct a survey for nests of migratory birds. Surveys for nesting migratory birds shall occur within 3 days prior to the commencement of ground disturbance and vegetation removal in areas that will be affected by Project construction activities. Multiple nest surveys shall be required if construction is phased or when construction work stops for more than 2 weeks at a portion of the site where suitable nesting habitat remains. If construction is ongoing for multiple years, these surveys shall be conducted each year. In addition to nesting-season surveys, surveys shall be conducted during the non-nesting season (September 1–January 31) for overwintering burrowing owls. The surveys shall also be conducted as described above, with a goal of identifying overwintering owls so they can be appropriately avoided during construction.

If an active nest is discovered, a no-disturbance buffer zone around the nest tree or shrub (or, for ground-nesting species, the nest itself) shall be established. The no-disturbance zone shall

[20] Live Oak Associates, Inc. "Tree Survey and Report for the HERO site in the City of Santa Clara, California (PN 1891-01). September 11, 2014.

[21] HortScience. "Tree Assessment, City Center, Santa Clara." Memorandum. December 23, 2014.

be marked with flagging or fencing that is easily identified by the construction crew and shall not affect the nesting bird or attract predators to the nest location. In general, the minimum buffer zone widths shall be as follows: 50 feet (radius) for non-raptor ground-nesting species, 50 feet (radius) for non-raptor shrub- and tree-nesting species, and 300 feet (radius) for raptor species. Buffer widths may be modified based on discussion with DFW. Buffers shall remain in place as long as the nest is active or young remain in the area and are dependent on the nest. If a burrowing owl nest is identified during pre-construction surveys, no-activity buffers will adhere to the recommendations in the 2012 California Department of Fish and Game Staff Report on Burrowing Owl Mitigation.[22] Most Project activities would result in a *high* level of disturbance, constituting a 1,640-foot (500-meter) required buffer around occupied nests during any time of year.[23]

BIO-1.2: *Implement Bird-Safe Design Standards into Project Buildings and Lighting Design.* The Project Developer or its contractor shall prepare and implement a set of specific standards for minimizing hazards to birds in the Development Area Plan submitted for approval by the City. These specific standards shall include the following measures to minimize hazards to birds:

- Reduce large areas of transparent or reflective glass.
- Locate water features and other bird habitat away from building exteriors to reduce reflection.
- Reduce or eliminate the visibility of landscaped areas behind glass.
- To the extent consistent with the normal and expected operations of the office, hotel, retail, food/beverage, entertainment and residential uses of the Project, take appropriate measures to avoid use of unnecessary lighting at night, especially during bird migration season (February–May and August–November) through the installation of motion-sensor lighting, automatic light shut-off mechanisms, downward-facing exterior light fixtures, or other effective measures to the extent possible.

Impact BIO-2: Impacts on Special-Status Species—Burrowing Owls. The Project could result in the loss of burrowing owl habitat. (LTS/M)

The land cover types on the Project site that provide habitat for burrowing owls include annual grassland and ruderal land cover types. There are currently approximately 50 acres of annual grassland and 50 acres of ruderal land cover on the Project site. Burrowing owls were last observed nesting on the Project site in 2006, during surveys conducted between March and June of that year. No nesting burrowing owls were located on the Project site during 2014 nesting surveys. However, in 2014, nesting burrowing owls were documented approximately 0.4 mile south of the Project site and approximately 1 mile northeast of the Project site at the Water Pollution Control Plant (which has designated burrowing owl habitat on its site). Thus, it is plausible that burrowing owls could use the Project site for foraging, though in both cases the nesting owls would have to navigate significant infrastructure (Levi's Stadium to the south and State Route 237 to the north) to forage on the golf course. Because no

[22] California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. State of California Natural Resources Agency. March 7. Available: http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html#Mammals.

[23] Scobie, D., and C. Faminow. 2000. Development of Standardized Guidelines for Petroleum Industry Activities that Affect COSEWIC Prairie and Northern Region Vertebrate Species at Risk. Environment Canada, Prairie and Northern Region, Edmonton, Alberta, Canada.

burrowing owls have been observed foraging on the Project site during recent surveys, loss of habitat on the Project site in the immediate future would not result in the loss of burrowing owls due to provisions in Mitigation Measure BIO-2.1, below.

Because of the presence of nesting burrowing owls in the vicinity of the Project (less than 1 mile away), and the use of habitat on the Project site in the past, it is possible that burrowing owls could move back onto the site at some point in the future, prior to development, and begin nesting. Should that occur, development of the Project would result in the loss of occupied burrowing owl nesting habitat and potentially the direct loss of burrowing owls or their nests. Under a scenario where burrowing owls begin nesting on the Project site prior to development, the loss of habitat in this location would be ***significant***.

MITIGATION MEASURES. Implementation of Mitigation Measures BIO-1.1, BIO-2.1, and BIO-2.2 would reduce potential nesting burrowing owl impacts from the Project to a ***less-than-significant*** level.

BIO-2.1: *Detection of Burrowing Owls.* The Project Developer shall allow access to the Project site or off-site areas for biologists who participate in the annual burrowing owl nest survey coordinated by the Santa Clara Valley HCP/NCCP. Burrowing owl surveys are conducted between March and August of each year. Access to the site for burrowing owl surveys shall be granted until the Project site or off-site area is completely built out. The Project Developer shall not, however, be required to postpone planned development activities to provide such access, except to the extent such postponement is necessary to meet regulatory requirements.

BIO-2.2: *Mitigation for Loss of Burrowing Owl Habitat during Construction*. Should burrowing owls begin nesting on developable portions of the Project site or off-site areas that remain undeveloped as phases of the Project are constructed, or suitable habitat within 600 meters of an active nest is removed from the Project site, then lost burrowing owl habitat shall be replaced at a ratio of at least 1:1 prior to ground-disturbing activities in the area of the Project site or off-site area with an active nest. Affected habitat shall be defined as suitable habitat (based on the habitat mapping completed for this EIR) within a 600 meter radius of an active burrowing owl nest. Suitable land cover types include annual grassland, ruderal, or barren areas. Mitigation sites shall have documented nesting occurrences from at least 1 year within the previous 3 years.

If burrowing owls move onto undeveloped portions of the Project Site or off-site areas, including the Retention Basin, once the site is fully constructed, there shall be no requirement to provide replacement habitat, unless that undeveloped habitat is developed in the future.

Impact BIO-3: Impacts on Special-Status Species—Western Pond Turtle. The Project could result in impacts on western pond turtle. (LTS/M)

Western pond turtle has not been observed on the Project site, but the retention pond and drainage swale on the northern part of the site, the ponds within the golf course, San Tomas Aquino Creek, and the Guadalupe River all provide suitable habitat for western pond turtles. If western pond turtles occur within the footprint of construction activities in aquatic habitats, they could be injured or killed inadvertently by construction equipment. This impact is considered ***significant***.

MITIGATION MEASURE. Implementation of Mitigation Measure BIO-3.1 would reduce impacts on western pond turtles to a ***less-than-significant*** level.

BIO-3.1: *Protect Western Pond Turtles.* Prior to the start of construction activities in or within 50 feet of aquatic habitats, the Project Developer shall retain a qualified biologist to conduct preconstruction surveys for western pond turtles in all suitable habitats (aquatic and upland) in the vicinity of the work site. Surveys shall take place no more than 72 hours prior to the onset of site preparation and construction activities with the potential to disturb turtles or their habitat. If preconstruction surveys identify active nests on the Project site, the biologist shall establish no-disturbance buffer zones around each nest using temporary orange construction fencing. The demarcation shall be permeable to allow young turtles to move away from the nest following hatching. The radius of the buffer zone and the duration of exclusion shall be determined in consultation with DFW. The buffer zones and fencing shall remain in place until the young have left the nest, as determined by the qualified biologist. If western pond turtles are found on the Project site, the Project developer shall still retain a qualified biologist to monitor construction activities in the vicinity of suitable habitat and implement appropriate measures to protect the western pond turtle. Such measures may include removal and relocation of western pond turtles in proposed construction areas to suitable habitats outside the Project limits, consistent with DFW protocols and permits. Relocation sites shall be subject to DFW approval.

Impact BIO-4: Impacts on Special-Status Species and Critical Habitat—Central California Coast Steelhead, Including Critical Habitat and Central Valley Fall-Run Chinook Salmon. The Project could result in indirect effects on San Tomas Aquino Creek and the Guadalupe River, including native fish species. (LTS/M)

San Tomas Aquino Creek and the Guadalupe River watershed are heavily developed. The section of San Tomas Aquino Creek adjacent to the Project site is a riparian channel, serving primarily as a flood retention feature; there are no special-status species present in this creek. However, special-status fish species are present in the Guadalupe River reach adjacent to the Project site when flows are high enough to provide adequate passage. Steelhead and Chinook salmon use the Guadalupe River as a migratory route to upstream spawning habitat. Critical habitat for steelhead is present in the Guadalupe River.

To access Parcel 4, a new bridge would be constructed over San Tomas Aquino Creek. This bridge would be similar in design and appearance to the existing bridges over San Tomas Aquino Creek to the north (Great America Parkway) and to the south (Tasman Drive), but would require the removal of 104 trees in the vicinity of the creek. The bridge would allow direct access to Parcel 4 for bicycles and pedestrians from the existing San Tomas Aquino Creek Trail. A trail bypass would be constructed under the proposed bridge (below the current grade of the trail), immediately adjacent to the creek, for the bicyclists and pedestrians who prefer to continue traveling on the trail.

The edge of the Project site is approximately 0.03 miles from the Guadalupe River top of bank. Noise, vibrations, artificial light, and other physical disturbances adjacent to the Guadalupe River can harass fish, disrupt, or delay normal activities, and cause injury or mortality. The potential magnitude of effects depends on a number of factors, including the type and intensity of the disturbance, proximity of the action to the water body, timing of actions relative to the occurrence of sensitive life stages, and frequency and duration of activities. For most activities, the effects on fish would be limited to avoidance behavior in response to movements, noises, and shadows caused by construction personnel and equipment operating adjacent to the water body. However, survival may be altered if disturbance causes fish to leave protective habitat (i.e., increased exposure to predators) or is of sufficient duration and magnitude to affect growth and spawning success. Injury or mortality may result from direct and

indirect contact with humans and machinery, vibration, sound pressure, and physiological stress. This impact is considered ***significant***.

Runoff from proposed construction activities could temporarily degrade water quality in San Tomas Aquino Creek and the Guadalupe River. Special-status fish species present in the Guadalupe River downstream of the Project site could be adversely affected. Excessive sediment deposited in or near stream channels can degrade aquatic habitats. Increased turbidity can increase fish mortality, reduce feeding opportunities for fish, and cause fish to avoid important habitat. Contaminants include toxic substances, such as metals, petroleum products, pesticides, fertilizers, sewage, and uncharacteristically high sediment loading. Construction materials, such as concrete, sealants, oil, and paint, could adversely affect water quality if accidental spills occur during Project construction. Increased pollutant concentrations could limit fish production, abundance, and distribution through direct mortality of fish or their prey.

The Project Developer and its contractor shall comply with the Construction General Permit. Standard erosion control measures and other best management practices (BMPs) would be identified in a Stormwater Pollution Prevention Plan (SWPPP). These measures would be implemented during construction to reduce contamination of waterways. BMPs for inclusion in the SWPPP would be required to represent the best available technology (BAT) that is economically achievable and the best conventional pollutant control technology (BCT) to reduce pollutants. Commonly practiced BMPs may consist of a wide variety of measures implemented to reduce pollutants in stormwater and other nonpoint-source runoff. These permits and measures are discussed in greater detail in Section 3.10, *Hydrology and Water Quality*. Compliance with the SWPPP would ensure that construction-related impacts on the Guadalupe River and San Tomas Aquino Creek would remain ***less than significant***.

The Project could result in increased stormwater runoff during Project operation from an increase in the amount of impervious surfaces, which may contain contaminants that could affect water quality in San Tomas Aquino Creek and the Guadalupe River as well as steelhead, Chinook salmon, and other native fish species with potential to be present in either channel. The effects from increased stormwater runoff would be the same as those discussed above. The Project would be required to comply with San Francisco Bay Municipal Separate Storm Sewer Systems Permit, Provision C.3, Stormwater Technical Guidance (SF Bay MS4 Permit), because it would involve the replacement of impervious surface area equal to 50 percent or more of the pre-Project impervious surface area. These permit requirements are discussed in greater detail in Section 3.10, *Hydrology and Water Quality*.

The phasing of the Project would require modifications to be completed as the final development plans, per phase, are approved and constructed so that no runoff occurs. Compliance with the SF Bay MS4 Permit would be required for development and would mitigate impacts on biological resources resulting from stormwater runoff. Thus, the impact would be ***less than significant***.

MITIGATION MEASURE. Implementation of Mitigation Measure BIO-4.1 would reduce impacts on steelhead and fall-run Chinook salmon resulting from construction activities adjacent to the Guadalupe River to a ***less-than-significant*** level.

BIO-4.1: *Protect Central California Coast Steelhead, Critical Habitat, and Chinook Salmon.* Construction, operations, and maintenance on the riverbank, as well as areas within 200 feet of the Guadalupe River, that could result in disturbed sediment depositing within the banks of the channel shall be limited to the summer low-precipitation period (June 1 to October 15),unless otherwise approved by appropriate resource agencies. Limiting riverbank disturbance during these months would reduce the likelihood of adverse effects on adult and juvenile salmonid migration.

Impact BIO-5: Substantial Effect on Wetlands and Other Waters. The Project could result in the loss of or damage to wetlands and other waters. (LTS/M)

There are 6.7 acres of ponds and wetlands, as well as a drainage ditch, on the Project site. In addition, San Tomas Aquino Creek and the Guadalupe River are adjacent to the site. The Project would require roadway work in San Tomas Aquino Creek.

As a result of the Project, some aquatic land cover types would be lost. The retention pond, although not being altered as part of the Project, could be affected during construction activities. Although some drainage ditches and creeks could be avoided, because roadways and bridges may cross over them, for the sake of this analysis it is assumed that drainage ditches internal to the Project site would be removed. The internal golf course and driving range ponds and vegetated depressions would be removed with build-out of the Project. In addition, there would be impacts in San Tomas Aquino Creek from instream work associated with the new bridge footings in the creek. Final impacts on ditches creeks, ponds, and vegetated depressions would be calculated once final design of Project features is complete. If these features are determined to be jurisdictional and if impacts are unavoidable, the Project Developer shall coordinate with DFW, USACE, and the Regional Water Board, as required and appropriate, to develop a compensation plan for the loss of waters of the United States and State per existing regulations. If compensation is required, construction activities (e.g., grading, excavation) associated with habitat creation or enhancement could temporarily disturb waters of the United States and State. These impacts are considered ***significant***.

Waters of the United States, including those in California, could be indirectly affected by erosion and stormwater runoff from construction activities. Erosion from land-disturbing construction activities and exposed stockpiles could result in a temporary increase in sediment loads in receiving waters, thereby degrading water quality. Construction of the new bridge over San Tomas Aquino Creek could also temporarily cause erosion and the discharge of construction-related pollutants, which could contaminate any flows that are present. As described under Impact BIO-4, the Project would be required to comply with the SWPPP and San Francisco Bay MS4 Permit Provision C.3, Stormwater Technical Guidance. Compliance with these permits would be required for development and would mitigate water quality impacts associated with runoff from construction activities. Thus, the impact would be ***less than significant***. Operational impacts associated with increased stormwater runoff are not expected because the amount of stormwater runoff would not increase compared with existing conditions.

MITIGATION MEASURES. Implementation of Mitigation Measures BIO-5.1 and BIO-5.2 would reduce impacts on wetlands and other waters to a ***less-than-significant*** level.

BIO-5.1: Protect Retention Pond and Drainage Swale Aquatic Habitat during Construction. For construction activities within 50 feet of the aquatic habitat associated with the retention pond and drainage swale, protective measures shall be put in place to ensure that impacts on those aquatic features shall be avoided and minimized. The following measures shall be deployed during construction:

- Install orange construction barrier fencing around the boundaries of wetland resources that are to be avoided prior to initiation of construction activities.
- Designate the protected area an Environmentally Sensitive Area and clearly identify the area in the construction specifications.

- Maintain fencing throughout the grading and construction period.
- Prohibit grading, construction activity, traffic, equipment, or materials in fenced wetland areas.

BIO-5.2: *Compensate for Wetland Loss.* If impacts on jurisdictional ponds, wetlands, or drainage ditches; San Tomas Aquino Creek; or the Guadalupe River cannot be avoided, the Project Developer shall obtain permits or approvals to develop from USACE, the Regional Water Board, and DFW, as appropriate and required. To ensure that the Project results in no net loss of wetland habitat functions and values, the Project Developer shall compensate for the loss of wetland resources through either on-site restoration/creation following completion of construction and/or off-site protection and enhancement of riparian and wetland habitat prior to activities that would affect the equivalent Project resource (as determined by a qualified wetland biologist). The size and location(s) of the area(s) to be restored/created shall be based on appropriate mitigation ratios, as derived in consultation with DFW, USACE, and the Regional Water Board. Mitigation ratios shall be at least 2:1. The Project Developer shall prepare and implement a mitigation plan, which shall include monitoring requirements and success criteria, in consultation with DFW, USACE, and the Regional Water Board. The mitigation plan shall include measure to avoid and minimize the effects of construction on surrounding native habitats. Monitoring shall occur for a minimum of 5 years, at which time, if the success criteria are met, wetland compensation shall be deemed complete.

Impact BIO-6: Conflicts with Local Policies or Ordinances Protecting Biological Resources. The Project would not result in conflicts with the City's Heritage Tree Ordinance. (LTS)

Construction activities associated with the Project would remove 951 protected trees in the Project area and approximately 153 protected trees at the Tasman East industrial/office development for the Lick Mill Boulevard extension. In addition, 79 protected trees could be removed at the Santa Clara Convention Center for construction of the roadway from Great America Parkway over San Tomas Aquino Creek. No heritage trees, as defined by the City's Heritage Tree List, are present. The Project would adhere to the City of Santa Clara General Plan, *Policy 5.3.1-P10,* which requires developments to replace trees at a ratio of 2:1 (replaced/lost). Therefore, assuming all trees are removed, the Project Developer would be required to plant at least 2,810 new trees on the Project site. Additionally, if all trees are removed at the Tasman East industrial/office development and the Santa Clara Convention Center off-site locations as a result of the Project, up to 676 additional trees could be planted in their place. It is unknown how many trees could be affected by the Tasman Drive slip-ramp, but tree removal in that area would also be subject to a 2:1 replacement ratio. The replacement trees would be located throughout the Project site and would not be implemented on a parcel by parcel basis. Thus, the impact would be ***less than significant***.

Cumulative Impacts

Unless otherwise identified below, the geographic context for the analysis of cumulative biological resources impacts includes the Bay Area. This analysis considers anticipated cumulative growth within this geographic area as represented by full implementation of the County and City General Plans, including the projects identified in Section 3.0, *Environmental Impact Analysis.*

Cumulative impacts are only addressed for those thresholds that have a Project-related impact, whether it is less than significant, significant, or significant and unavoidable. If the Project results in no impact

under a particular threshold, it is not considered to contribute to any cumulative impact, and no analysis is required. The Project would have no direct impact related to the loss or damage of special-status plants, potential interference with migration routes or nursery sites for common wildlife species, or conflict with a Habitat Conservation Plan or Natural Community Conservation Plan. Thus, these topics are not analyzed for cumulative impacts. This cumulative analysis examines the effects of the Project in the relevant geographic area, in combination with other current projects, probable future projects, and projected future growth.

Impact C-BIO-1: Cumulative Biological Resources Impacts. The Project, in combination with other foreseeable development in the vicinity, would have a significant cumulative impact without mitigation on migratory birds, special-status species and their habitats, and wetlands and other waters and/or conflict with local policies or ordinances to protect biological resources. The Project's contribution to a cumulative impact would be less than significant with mitigation. (LTS/M)

Migratory Birds

The removal of nest trees, shrubs, or other nesting substrates from the Project area and larger region could adversely affect migratory birds, either by causing a loss of young birds or the abandonment of an active nest. The increase in human activity and noise levels near nesting habitats could reduce the quality of such habitat, ultimately also resulting in nest abandonment. With future development in the Bay Area, it is reasonable to expect that there would be a loss of trees, shrubs, or other types of vegetation that provide nesting habitat and an increase in the presence of structures that contribute to bird hazards. Native migratory bird species are protected by both federal (MBTA of 1918) and State (California Fish and Game Code Sections 3503 and 3513) laws. It is assumed that all development would comply with these regulations. Although compliance with federal and State laws that protect native migratory bird species would help reduce impacts from the cumulative effects of all development, it cannot be guaranteed that compliance with applicable regulations would reduce the cumulative impact on migratory birds to a less-than-significant level. Disturbances to migratory birds and their habitats from the cumulative effects of all development could result in a significant cumulative impact.

The Project would involve the removal of nest trees or shrubs, or other nesting substrate, on the Project site. It would also result in indirect impacts from noise and an increase in human activity near nesting habitat. Therefore, the Project's cumulative contribution, prior to the application of mitigation measures, could be considerable, with the removal of 1,743 trees at the Project site and at off-site areas (not including the Tasman Drive slip-ramp). However, Mitigation Measure BIO-1.1 requires pre-construction surveys for nests of migratory birds prior to the removal of vegetation during the migratory bird nesting season and the establishment of a no-disturbance buffer zone around the nest tree or shrub if an active nest is discovered. The Project's proposed structures could result in an increase in the number of injuries or deaths from birds colliding with Project buildings. Mitigation Measure BIO-1.2 prescribes the implementation of bird-safe design standards in Project buildings and Project site lighting to minimize bird hazards. In addition, the City normally requires a 2:1 replacement ratio for trees, which would compensate for the potential loss of nesting trees due to Project development. Compliance with these mitigation measures would reduce the Project's contribution to a cumulative impact to ***less than cumulatively considerable with mitigation*** because it would reduce impacts on migratory birds from Project construction and operation.

Special-Status Species and Their Habitats

Special-status species are protected by both federal (ESA) and State (CESA and California Fish and Game Code) laws. It is assumed that all development would comply with these laws and associated regulations. Although compliance with federal and State laws that protect special-status species would help reduce impacts from the cumulative effects of all development, it cannot be guaranteed that compliance with applicable regulations would necessarily reduce the cumulative impact on special-status species to a less-than-significant level.

The cumulative impacts on special-status species and their habitats presented below are addressed only for those species that would incur a Project-related impact, whether it be less than significant, significant, or significant and unavoidable. If the Project results in no impact on a species on a Project-level basis, it is not considered contributory to any cumulative impact, and no analysis is required.

Burrowing Owl. Nesting burrowing owls in the greater San Francisco Bay Area, and in the South Bay area in particular, are a dwindling resource. In the early 1990s, there were an estimated 150 to 170 breeding pairs in the San Francisco Bay Area, 75 percent of which occurred in Santa Clara County.[24] Activities that result in the removal of existing occupied habitat for burrowing owls (annual grassland and ruderal land cover types) could adversely affect burrowing owls, either by causing a loss of the species or the abandonment of nests. With future development in Santa Clara County, it is reasonable to expect that there would be a loss of occupied habitat and suitable habitat. Within the HCP/NCCP area, preservation, enhancement, and compensation are provided for burrowing owls by the HCP/NCCP on a comprehensive basis. Outside the HCP/NCCP area, including Santa Clara and the Project site, there is no comprehensive approach to management of burrowing owl habitat, although individual projects do relocate and provide compensatory habitat when burrowing owls are encountered on-site. Disturbances to burrowing owl habitats, in combination with the potential loss of similar habitat in the South Bay, particularly outside the HCP/NCCP area, could result in significant cumulative impacts if not fully mitigated.

The Project would result in the removal of approximately 100 acres of annual grassland and ruderal land cover types on the Project site that provide suitable habitat for burrowing owls. However, burrowing owls have not been documented on-site since 2006 and have not been identified on-site from surveys in 2014 and 2015. If burrowing owls occupy the site in the future, the removal of suitable habitat on-site could result in the loss of individual burrowing owls or occupied nesting habitat. In light of the declining trend in breeding pairs, current threats posed by development, and the assumption that burrowing owl habitat in Santa Clara County will continue to be lost, if burrowing owls are present in the future, the Project's cumulative contribution to impacts prior to the application of mitigation measures would be considerable. However, implementation of Mitigation Measures BIO-1.1, BIO-2.1, and BIO-2.2 would reduce the Project's contribution to this impact to less than cumulatively considerable. Mitigation Measure BIO-1.1 would require pre-construction surveys for burrowing owl nests prior to ground disturbance and the removal of vegetation during the nesting season as well as the establishment of a no-disturbance buffer zone around the burrow if an active nest is discovered. Mitigation Measures BIO-2.1 and BIO-2.2 prescribe burrowing owl surveys on the Project site between March and August of each year until the site is completely built out and the replacement of burrowing owl habitat at a ratio of 1:1 (replaced/removed) if burrowing owls are discovered to be nesting on the

[24] Santa Clara Valley Habitat Agency. 2012. *Final Santa Clara Valley Habitat Plan*. Appendix M. Western Burrowing Owl Conservation Strategy. August. Prepared for the City of San José, City of Morgan Hill, City of Gilroy, Santa Clara Valley Water District, Santa Clara County, and Santa Clara Valley Transportation Authority. Available: http://scv-habitatagency.org/178/Final-Habitat-Plan. Prepared by ICF International.

Project site. Thus, the Project's contribution to any cumulative impact related to burrowing owl would be ***less than cumulatively considerable with mitigation***.

Western Pond Turtle. Activities in aquatic areas that provide suitable habitat for western pond turtle could inadvertently injure or kill the species through contact with construction equipment. Disturbances to western pond turtle habitat, in combination with the assumed loss of similar habitat in the Bay Area due to future development, would result in a significant cumulative impact.

The Retention Basin and drainage swale on the northern part of the Project site, the ponds within the golf course, San Tomas Aquino Creek, and the Guadalupe River all provide suitable habitat for western pond turtle. Although no western pond turtles have been observed on the Project site, surveys have not been conducted. Western pond turtles are known to occur in San Tomas Aquino Creek and the Guadalupe River. If turtles are present in affected aquatic habitats, Project construction could inadvertently injure or kill turtles. Therefore, the Project's contribution to a cumulative impact, prior to the application of mitigation measures, could be considerable. However, Mitigation Measure BIO-3.1 would reduce the Project's contribution to this significant cumulative impact to less than cumulatively considerable because it would require pre-construction surveys for western pond turtles prior to construction in suitable aquatic and upland habitats and the establishment of a no-disturbance buffer zone around each nest if an active nest is discovered. Thus, the Project's contribution to any cumulative impact related to western pond turtle would be ***less than cumulatively considerable with mitigation***.

Serpentine Grassland and Supported Special-Status Species, including Bay Checkerspot Butterfly. Nitrogen emissions from stationary, area and mobile sources results in nutrient enrichment in the serpentine grasslands south and east of San José (and other areas). This favors nonnative vegetation to the detriment of common native and rare plant species, including the host plant for the threatened Bay checkerspot butterfly. Serpentine grassland is considered a "sensitive natural community" by DFW. Serpentine grassland provides habitat for several listed/rare plants, including Tiburon Indian paintbrush (federally endangered), coyote ceanothus (federally endangered), fragrant fritillary (CNPS 1B), Santa Clara Valley dudleya (federally endangered), smooth lessingia (CNPS 1B), Mt. Hamilton thistle (CNPS 1B), Metcalf Canyon jewelflower (federally endangered), and most beautiful jewel-flower (CNPS 1B).

Air quality modeling conducted for the Santa Clara Valley HCP/NCCP pertaining to existing (2005) and future (2035) nitrogen deposition shares in different areas for deposition in the Coyote Ridge area is shown in Table 3.8-1. Fenn et al., 2010, estimated that the critical load for N-deposition in serpentine grassland, is 5 to 6 kg-N/ha/yr, which is the threshold at which nonnative grasses can compete with and invade natural serpentine grassland areas. As shown in Table 3.8-1, total deposition in both 2005 and 2035 exceeds this threshold value, and thus, the cumulative impact of nitrogen deposition is significant. The project's emissions are only a portion of the regional nitrogen emissions and thus on their own would not result in nitrogen deposition above the threshold value. However, the Project's nitrogen emissions, combined with existing and future emissions, would result in cumulative nitrogen deposition levels that would be well above the threshold value noted above, which would result in habitat alteration and harm to Bay checkerspot butterfly, rare plant species, and serpentine grassland habitat overall.

As shown in Table 3.8-1, although the largest sources of nitrogen deposition are located in areas covered by the HCP/NCCP, meaningful contributions to cumulative nitrogen deposition within the boundaries of the HCP/NCCP occur because of emissions from outside the HCP/NCCP area (i.e., in other parts of Santa Clara County, including the Project area) and in areas outside Santa Clara County.

Table 3.8-1. Estimates of Sources of Existing and Cumulative Nitrogen Deposition in Serpentine Grassland Habitats in Coyote Ridge in Santa Clara County

	Existing Deposition[1]		2035 Deposition[1]	
Source Area	Nitrogen Deposition in Sensitive Habitats (kg/ha/year)	Share of Nitrogen Deposition (%)	Nitrogen Deposition in Sensitive Habitats (kg/ha/year)	Share of Nitrogen Deposition (%)
HCP Area	3.0	46%	4.1	49%
Other Santa Clara County	1.1	17%[2]	1.5	18%
Other Bay Area	0.7	1 %	0.9	11%
Other California/Nevada	1.7	26%	1.8	22%
TOTAL	**6.6**	**100%**	**8.3**	**100%**

Source: HCP/NCCP, Appendix E.

Notes:

Totals may not match because of rounding.

1. Some of the specific amounts were not identified in the HCP/NCCP tables and thus were estimated (based on percentage shares described in the HCP/NCCP text) and/or inferred (based on the data presented in the HCP/NCCP).

2. 13 percent when excluding Morgan Hill and Gilroy.

The prevailing wind direction at the Project site is to the southeast. As noted above, the serpentine grassland habitats of concern for this impact are located primarily south and east of San José which means that the Project site is upwind of these habitat areas and nitrogen emissions from the project vicinity will be carried in the direction of the habitat areas. Other cumulative development in upwind areas outside the Santa Clara Valley HCP/NCCP will also result in nitrogen emissions and deposition that will also affect downwind habitat areas.

The Community Multiscale Air Quality (CMAQ) modeling system was used for the Santa Clara Valley HCP/NCCP analysis to compare the effect of nitrogen emissions from the Project to the average effect of equivalent emissions from within the HCP/NCCP area. Nitrogen deposition per unit of emissions in the vicinity of the Coyote Ridge habitat area was estimated for nitrogen emissions originating from the vicinity of the Project to the average nitrogen deposition per unit of emissions in the Coyote Ridge habitat area from the HCP/NCCP area for 2035. The year 2035 was chosen since the Project's build-out year will be approximately 2030 or later. The analysis reviewed mobile and non-mobile emission sources separately, since the Project's emissions are predominantly mobile with lesser area and point sources. The comparison indicated that mobile and non-mobile emissions in the area containing the City Place project would result in 34 percent and 75 percent, respectively, of the nitrogen deposition per unit of emissions compared to the average nitrogen deposition per unit of mobile and non-mobile emissions in the HCP/NCCP area. Taking into account the Project's emissions profile (the Project's mobile NOx emissions are approximately 87 percent of its total NOx emissions), the Project would result in 39 percent of the average nitrogen deposition of an equivalent amount of emissions in the HCP/NCCP area. Thus, while nitrogen emissions from the Project would contribute to cumulative nitrogen deposition, on a per-unit of emissions basis, Project emissions would have a lesser effect on nitrogen deposition than average development in the HCP/NCCP area. The calculations for this analysis are presented in Appendix 3.4 (Air Quality).

New development in the Santa Clara Valley HCP/NCCP area is required to contribute nitrogen deposition fees to the Santa Clara Habitat Agency, which uses the fees for land acquisition, management, and monitoring (i.e., for Bay checkerspot butterfly and serpentine covered plant species). Development in non-HCP/NCCP areas is not required to contribute nitrogen deposition fees. The City of Santa Clara is not part of the Santa Clara Valley HCP/NCCP and thus the Project is not required, per the HCP/NCCP requirements, to pay a nitrogen deposition fee.

Because of cumulative nitrogen emissions from upwind areas outside the HCP/NCCP, there will be cumulative nitrogen deposition that will have unmitigated effects on serpentine grassland and associated rare and common species. The Project is one of the larger land use projects in Santa Clara County to be proposed in recent times and thus its contribution to cumulative nitrogen deposition, even taking into the account the different depositional characteristics described above,[25] would be ***cumulatively considerable***.

MITIGATION MEASURE. The Project Developer has proposed to voluntarily make a contribution to the voluntary nitrogen deposition fee program of the Santa Clara Habitat Agency. The Santa Clara Habitat Agency uses such voluntary fees to help manage serpentine grasslands and address adverse nitrogen deposition effects. Mitigation Measure BIO-C.1 would require the Project Developer to fulfill its voluntary commitment. Implementation of Mitigation Measure BIO-C.1 would reduce the Project's contribution to cumulative nitrogen deposition impacts on serpentine grassland and supported special-status species to a ***less-than-considerable*** level.

BIO-C.1: Make a Fair-Share Nitrogen Deposition Fee Contribution to the Santa Clara Habitat Agency's Voluntary Fee Payment Program. Consistent with its voluntary commitment to contribute a nitrogen deposition fee through the fee program of the Santa Clara Habitat Agency, the Project Developer shall make a pro-rated per-vehicle-trip nitrogen deposition fee contribution, which will be based on the amount charged by the Santa Clara Valley Habitat Agency under its Voluntary Fee Payments Policy (http://scv-habitatagency.org/DocumentCenter/View/345). Specifically, the per-vehicle trip fee shall be adjusted as set forth below to take into account the different dispersion characteristics of the Project vs. the average dispersion characteristics for development in the HCP/NCCP area.

The Project is located farther from serpentine grassland habitat than average development within the Santa Clara Valley HCP/NCCP area. Thus, the required fair-share contribution shall be figured as 39 percent (based on the ICF analysis) of the established fee of the habitat agency for the year in which the building permits are issued for the Project The fee may be paid up front or in installments in proportion to mitigated vehicle trip generation for the phase of the Project for which the building permits are issued. For fiscal year 2015–2016, the adopted HCP/NCCP nitrogen deposition fee was $4.20 per new vehicle trip. Using Scheme B's

[25] One way to think about the comparative nitrogen deposition effect would be to envision a mixed commercial/resident project that would be 39 percent the size of the City Place project (39 percent of 9.2 million sf = 3.6 million sf) but would be located at an "average" location within the HCP/NCCP area. The "average" location would be one where the dispersion and deposition characteristics are the average of the entire HCP/NCCP area. Given that most of the development in the HCP/NCCP area is in San José, but the HCP/NCCP also includes development in Gilroy, Morgan Hill and some parts of Santa Clara County, conceptually that "average" location would be somewhere south of downtown San José. This conceptual 3.6 million sf mixed use project, presumed to have the same emissions profile as the project, but smaller, would have the same nitrogen deposition effect on the Coyote Ridge habitat area as the City Place project. The adjustment of the HCP/NCCP nitrogen deposition fee in Mitigation Measure BIO-C.1 takes into account the different dispersion and deposition characteristics of the site vs. the average in the HCP/NCCP area.

estimated trip generation (140,730 trips/day), taking into account the trip reduction effect of Mitigation Measure TRA-1.1 (reduction to 137,910 trips/day), and the 39 percent adjustment factor, if all fees were paid in 2015, the estimated total would be $225,897.

Central California Coast Steelhead and Central Valley Fall-Run Chinook Salmon. Activities that result in the disturbance or degradation of water quality could adversely affect central California coast steelhead and Central Valley fall-run Chinook salmon by reducing feeding opportunities, preventing migratory movement, causing fish to avoid important habitat, or resulting in injury or mortality. With future development in the Bay Area, it is reasonable to expect that there will be impacts on migratory routes or loss of habitat though disturbance, degradation, or contamination association with development. Special-status species are protected under both federal (ESA) and State (CESA) laws, and it is assumed that all development would comply with these regulations. Further, water quality is protected from degradation through compliance with the SF Bay MS4 Permit and implementation of the BMPs identified in the SWPPPs for all developments. It is assumed that all development would comply with these regulations as well. Although compliance with federal, State, and local laws that protect special-status species and water quality would help reduce impacts from the cumulative effects of all development, it cannot be guaranteed that compliance with applicable regulations would reduce the cumulative impact on special-status fish species to a less-than-significant level. Impacts on the migratory routes and habitats of special-status fish, in combination with the potential loss of similar habitat in the Bay Area, would result in a significant cumulative impact.

The Guadalupe River reach adjacent to the Project site serves as a migratory route to upstream spawning habitat for central California coast steelhead and Central Valley fall-run Chinook salmon. It also provides critical habitat for steelhead salmon. Project construction or maintenance noise, vibration, lighting, or other physical disturbances adjacent to the Guadalupe River could directly or indirectly harass the fish or cause injury or mortality. Further, sedimentation, turbidity, and pollutant runoff from Project construction or maintenance could degrade water quality and affect special-status fish in the Guadalupe River. However, normal Project operations would not require disturbances within the Guadalupe River, and the Project would treat stormwater runoff prior to discharge through an on-site stormwater collection and conveyance system, which would include stormwater treatment measures. Thus, operations (other than maintenance) would not contribute to impacts on salmonids. Although the Project's cumulative contribution to impacts related to construction or maintenance prior to the application of mitigation measures could be considerable, Mitigation Measure BIO-4.1 would restrict construction and operational/maintenance activities near the Guadalupe River riverbank to the low-precipitation period in the summer (June 1 to October 15) to reduce the likelihood of adverse effects on adult and juvenile salmonid migration. Thus, the Project's contribution to cumulative impacts would be ***less than cumulatively considerable with mitigation***.

Wetlands and Other Waters

Project construction could remove jurisdictional waters or wetlands directly through land development as well as bridge and outfall construction and indirectly affect jurisdictional resources through erosion or the discharge of construction-related pollutants that degrade water quality. With future development in the Bay Area, it is reasonable to expect that there will be additional impacts on wetlands and other waters. Waters of the United States and waters of the State are protected by both federal (CWA Sections 401 and 404) and State (Porter-Cologne Water Quality Control Act) laws, and it is assumed that all development would comply with these regulations. Although compliance with federal and State laws that protect jurisdictional waters would help reduce impacts from the cumulative effects of all development, it cannot be guaranteed that compliance with applicable regulations would reduce the

cumulative impact on jurisdictional waters to a less-than-significant level. The direct and indirect impact on (or loss of) wetlands and other waters, in combination with the potential indirect impact on (or loss of) these features from the cumulative effects of all development, would result in a significant impact.

The Project could result in temporary and permanent impacts on the on-site jurisdictional drainage ditches (some with wetlands) through site development as well as off-site impacts on San Tomas Aquino Creek (associated with a new bridge and storm drain outfalls) and the Guadalupe River (associated with new storm drain outfalls).[26] Because wetlands and other waters support beneficial uses, an unmitigated loss of jurisdictional waters and wetlands would contribute considerably to cumulative impacts in the San Tomas Aquino Creek and Guadalupe River. Mitigation Measure BIO-5.1 prescribes protective actions to avoid and minimize impacts on the Retention Basin and the aquatic habitat of the drainage swale during construction. Mitigation Measure BIO-5.2 requires the Project Developer to compensate for the loss of wetlands/water resources through either on-site restoration/creation and/or off-site protection and enhancement of riparian and wetland habitat. The Project's contribution to cumulative impacts on waters and wetlands would be ***less than cumulatively considerable with mitigation*.**

Conflicts with Local Policies or Ordinances to Protect Biological Resources

Individual jurisdictions have different criteria for evaluating the loss of protected resources. The context for an analysis of cumulative impacts from conflicts with local policies or ordinances that protect biological resources is the city. The City's Heritage Tree Ordinance is the only local policy that protects biological resources relevant to cumulative projects. As described above under Impact BIO-7, on-site and off-site construction activities would result in the removal of 1,743 trees (not including the Tasman Drive slip-ramp). With future development in the city, it is reasonable to expect that there will be an additional loss of protected trees, although it would be speculative to attempt to calculate the exact number or magnitude of this loss. However, all future development in the City would be required to comply with Policy 5.3.1-P10 of the City's General Plan, which requires new development to replace removed trees at a 2:1 ratio. Under this policy, at least 2,810 new trees would be planted on the Project site, and up to 676 additional trees could be planted on off-site removal locations. Tree removal associated with construction of the Tasman Drive slip-ramp would also be subject to a 2:1 replacement ratio. Because the Project would replace trees at a ratio that would be consistent with City's General Plan policies, it would result in a ***less than cumulatively considerable*** contribution to any cumulative impact related to local policies and ordinances.

[26] The Project would include the removal of approximately 1 acre of golf course ponds. It is presumed that, because of their isolated and artificial nature, the ponds are not jurisdictional waters of the State or waters of the United States and, as such, would not require replacement with compensatory mitigation to satisfy State or federal permitting requirements. The Project Developer will need to confirm this with the regulatory agencies prior to developing the site.

Table 3.8-2. Special-Status Plants with Potential to Occur in Project Footprint

Common and Scientific Name	Status[a] Federal/ State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Potential to Occur in and adjacent to the Project Footprint[b]
Astragalus tener var. *tener* Alkali milk-vetch	–/–/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, east San Francisco Bay area.	Grassy flats and vernal pool margins, on alkali soils, below 200 feet above mean sea level (MSL).	Mar–Jun	None. Suitable habitat is not present.
Atriplex depressa Brittlescale	–/–/1B.2	Alameda, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Solano, Stanislaus, Tulare, Yolo counties.	Alkaline, clay, chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools, below 1,050 feet above MSL.	Apr–Oct	None. Suitable habitat is not present.
Atriplex joaquiniana San Joaquin spearscale	–/–/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, east San Francisco Bay area.	Alkaline soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, below 2,740 feet above MSL.	Apr–Oct	None. Suitable habitat is not present.
Atriplex minuscula Lesser saltscale	–/–/1B.2	Alameda, Butte, Fresno, Kern, Madera, Stanislaus, Tulare counties.	Alkaline, sandy, chenopod scrub, playas, valley and foothill grassland, between 50 and 660 feet above MSL.	May–Oct	None. Suitable habitat is not present.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	–/–/1B.2	East San Francisco Bay Area, Salinas Valley, Los Osos Valley.	Annual grassland, on lower slopes, flats, and swales, sometimes on alkaline or saline soils, below 700 feet above MSL.	Jun–Nov	None. Floristic surveys for Congdon's tarplant were conducted in the Project area during the appropriate blooming period, and this species is not present.
Chloropyron maritimum ssp. *palustre* [*Cordylanthus maritimus* ssp. *palustris*] Point Reyes bird's-beak	–/–/1B.2	Coastal northern California from Humboldt to Santa Clara counties; Oregon.	Coastal salt marsh, below 35 feet above MSL.	Jun–Oct	None. Suitable habitat is not present.

Common and Scientific Name	Status[a] Federal/ State/ CNPS	Geographic Distribution	Habitat Requirements	Blooming Period	Potential to Occur in and adjacent to the Project Footprint[b]
Chorizanthe robusta var. *robusta* Robust spineflower	E/–/1B.1	Alameda, Monterey, Marin, Santa Clara, Santa Cruz, San Francisco, San Mateo counties.	Sandy or gravelly, chaparral (maritime), cismontane woodland (openings), coastal dunes, coastal scrub, between 10 and 980 feet above MSL.	Apr–Sep	None. Suitable habitat is not present.
Eryngium aristulatum var. *hooveri* Hoover's button-celery	–/–/1B.1	San Benito, San Luis Obispo, and Santa Clara counties.	Vernal pools.	July	None. Suitable habitat is not present.
Lasthenia conjugens Contra Costa goldfields	E/–/–	Alameda, Contra Costa, Mendocino, Monterey, Marin, Napa, Santa Barbara, Santa Clara, Solano, Sonoma counties.	Mesic, cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools, below 1,540 feet above MSL.	Mar–Jun	None. Suitable habitat is not present.
Malacothamnus hallii Hall's bush-mallow	–/–/1B.2	Contra Costa, Lake, Mendocino, Merced, Santa Clara, San Mateo, Stanislaus counties.	Chaparral, coastal scrub, between 30 and 2490 feet above MSL.	May–Oct	None. Suitable habitat is not present.
Navarretia prostrate prostrate vernal pool navarretia	–/–/1B.1	Alameda, Fresno, Los Angeles, Merced, Monterey, Orange, Riverside, San Bernardino, San Benito, Santa Clara, San Diego, San Luis Obispo counties.	Mesic, coastal scrub, meadows and seeps, valley and foothill grassland (alkaline), vernal pools, between 50 and 3,970 feet above MSL.	Apr–Jul	None. Suitable habitat is not present.
Suaeda californica California seablite	E/–/1B.1	Morro Bay, San Luis Obispo County; historically found in the south San Francisco Bay.	Margins of tidal salt marsh.	Jul–Oct	None. Suitable habitat is not present.
Trifolium hydrophilum (*T. depauperatum* var. *hydrophilum*) Saline clover	–/–/1B.2	Sacramento Valley, central western California.	Salt marsh, mesic alkaline areas in grasslands, vernal pools.	Apr–Jun	None. Suitable habitat is not present.

[a] Status Explanations

Federal

E	=	listed as endangered under the federal Endangered Species Act
T	=	listed as threatened under the federal Endangered Species Act
–	=	no listing

State

E	=	listed as endangered under the California Endangered Species Act
T	=	listed as threatened under the California Endangered Species Act
R	=	listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation
–	=	no listing

California Native Plant Society

1A	=	List 1A species: plants presumed extinct in California and elsewhere
1B	=	List 1B species: rare, threatened, or endangered in California and elsewhere
2	=	List 2 species: rare, threatened, or endangered in California but more common elsewhere
3	=	List 3 species: plants about which more information is needed to determine their status
4	=	List 4 species: plants of limited distribution
0.1	=	seriously endangered in California
0.2	=	fairly endangered in California
0.3	=	not very endangered in California

[b] Potential Occurrence in and adjacent to the Project footprint

High:	Known occurrence of plant in project vicinity from CNDDB or other documents, or presence of suitable habitat conditions and suitable microhabitat conditions
Moderate:	Known occurrence of plant in project vicinity from CNDDB or other documents; suitable habitat is present but suitable microhabitat conditions are not
Low:	Plant not known to occur in project vicinity from CNDDB or other documents, or habitat conditions are of poor quality, or species presumed extirpated from project vicinity
None:	Plant not known to occur in project vicinity from CNDDB or other documents, or suitable habitat not present in any condition

Table 3.8-3. Special-Status Fish and Wildlife with Potential to Occur in Project Footprint

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Potential to Occur in and adjacent to the Project Footprint[b]
Invertebrates				
Branchinecta conservation Conservancy fairy shrimp	E/--	Disjunct occurrences in Solano, Merced, Tehama, Ventura, Butte, and Glenn counties.	Large, deep vernal pools in annual grasslands.	None. Suitable habitat is not present.
Euphydryas editha bayensis Bay checkerspot butterfly	T/--	Disjunct occurrences in San Mateo and Santa Clara counties.	Associated with specific host plants that typically grow on serpentine soils.	None. Suitable habitat is not present.
Lepidurus packardi Vernal pool tadpole shrimp	E/--	Shasta County south to Merced County.	Vernal pools and ephemeral stock ponds.	None. Suitable habitat is not present.
Tryonia imitator California brackishwater snail (=mimic tryonia)	--/--	Throughout coast from Salmon Creek, Sonoma County south to Tijuana River, San Diego County.	Coastal tidal lagoons, estuaries, and marshes.	None. Suitable habitat is not present.
Fish				
Acipenser medirostris Green sturgeon	T/SSC	Spawn in Sacramento, Klamath and Trinity Rivers (Moyle 2002). Forage and rear in San Pablo Bay and the Bay Delta.	Spawn in large river systems with well-oxygenated water, with temperatures from 8.0°C to 14°C. Occur in ocean and estuary habitat.	Low. A few green sturgeon individuals could stray into Guadalupe River from the Bay. However, it is unknown how much they use the South Bay as habitat.
Hypomesus transpacificus Delta smelt	T/T	Primarily in the Sacramento–San Joaquin Estuary, but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay.	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand (Moyle 2002).	None. Suitable habitat is not present.

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Potential to Occur in and adjacent to the Project Footprint[b]
Oncorhynchus mykiss Central California coast and Central Valley steelhead	T/-- (both), CH	Coastal drainages along the central California coast. Sacramento and San Joaquin River and their tributaries.	Cold, clear water with clean gravel of appropriate size for spawning. Most spawning occurs in headwater streams. Steelhead migrate to the ocean to feed and grow until sexually mature. Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 7.8°C to 18°C (Moyle 2002). Habitat types are riffles, runs, and pools.	High. Central California coast steelhead occur in the Guadalupe River and would use the project reach as migratory habitat. No spawning habitat immediately adjacent to the Project area. Critical habitat is present in the project reach for Central California Coast steelhead.
Oncorhynchus tshawytscha Central Valley and Sacramento River Chinook salmon	T (spring run)/- E (winter run)/- C (fall)/-	Sacramento and San Joaquin River and their tributaries.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0°C to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High (Fall-run only). Central Valley Chinook salmon occur in the Guadalupe River and would use the project reach as migratory habitat. No spawning habitat immediately adjacent to the Project area.
Spirinchus thaleichthys Longfin smelt	T/--	Upstream from Rio Vista (on the Sacramento River in the Delta) including the Cache Slough region and Medford Island (on the San Joaquin River in the Delta) through Suisun Bay and Suisun Marsh, San Pablo Bay, San Francisco Bay (main), South San Francisco Bay, the Gulf of the Farallones, Humboldt Bay, Eel River estuary, and local coastal areas.	Occurs in waters below 22°C and can tolerate a large range of salinities. Spend adult life in bays, estuaries, and near shore coastal areas and migrate into freshwater rivers to spawn. Found mid-water and near the bottom, but migrate up and down the water column for prey (Moyle 2002).	Low. Longfin smelt have been captured in Coyote Slough, close to the project area. However, it is unknown if longfin would use the Guadalupe River in the Project reach.
Amphibians and Reptiles				
Ambystoma californiense California tiger salamander	T/T	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet above MSL, and coastal region from Sonoma County south to Santa Barbara County.	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.	None. Suitable habitat is not present.

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Potential to Occur in and adjacent to the Project Footprint[b]
Rana draytonii California red-legged frog	T/SSC	Found along the coast and coastal mountain ranges of California from Mendocino County to San Diego County and in the Sierra Nevada from Butte County to Stanislaus County.	Permanent and semi-permanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods.	None. Suitable habitat is not present.
Emys marmorata Western pond turtle	–/SSC	The western pond turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries.	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Nests are typically constructed in upland habitat within 0.25 mile of aquatic habitat.	Low. Not observed on-site but there is potential for the species to occur in aquatic habitats in the study Area.
Masticophis lateralis euryxanthus Alameda whipsnake	T/T	Restricted to Alameda and Contra Costa Counties; fragmented into five disjunct populations throughout its range.	Valleys, foothills, and low mountains associated with northern coastal scrub or chaparral habitat; requires rock outcrops for cover and foraging.	None. Suitable habitat is not present.
Birds				
Accipiter cooperii Cooper's hawk	--/--	Throughout most of California from sea level to above 9000 feet in elevation.	Wooded habitat from dense forests to patchy woodlands and backyards.	Moderate; no suitable nesting habitat in study area but foraging habitat is present.
Agelaius tricolor Tricolored blackbird	--/SSC	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony.	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties.	None. Suitable habitat is not present.

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Potential to Occur in and adjacent to the Project Footprint[b]
Ardea herodias Great blue heron	--/--	Nests in suitable habitat throughout California except at higher elevations in Sierra Nevada and Cascade mountain ranges.	Widely distributed in freshwater and calm-water intertidal habitats.	None. Suitable habitat is not present.
Athene cunicularia Burrowing owl	--/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast.	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows.	Moderate. Foraging habitat present on the Project site in ruderal and annual grassland land cover. No nest locations during 2014 nesting survey.
Charadrius alexandrines nivosus Western snowy plover	T/SSC	Population defined as those birds that nest adjacent to or near tidal waters, including all nests along the mainland coast, peninsulas, offshore islands, and adjacent bays and estuaries. Twenty breeding sites are known in California from Del Norte to Diego County.	Coastal beaches above the normal high tide limit in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent.	None. Suitable habitat is not present.
Circus cyaneus Northern harrier	--/SSC	Breeds from sea level to 5700 feet in elevation in the Central Valley and Sierra Nevada and up to 3600 feet in northeastern California. Permanent resident of the northeastern plateau and coastal areas; less common resident of the Central Valley.	Open (treeless) habitats from Arctic tundra to prairie grasslands, fields and marshes.	Moderate. No suitable nesting habitat in study area but foraging habitat is present.
Corynorhinus townsendii Townsend's big-eared bat	--/SSC	Coastal regions from Del Norte County south to Santa Barbara County.	Roosts in caves, tunnels, mines, and dark attics of abandoned buildings. Very sensitive to disturbances and may abandon a roost after one on-site visit.	None. Suitable habitat is not present.

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Potential to Occur in and adjacent to the Project Footprint[b]
Elanus leucurus White-tailed kite	--/FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border.	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging.	Moderate. No suitable nesting habitat in study area but foraging habitat is present.
Geothlypis trichas sinuosa Saltmarsh common yellowthroat	--/SSC	Found only in the San Francisco Bay Area in Marin, Napa, Sonoma, Solano, San Francisco, San Mateo, Santa Clara, and Alameda Counties.	Freshwater marshes in summer and salt or brackish marshes in fall and winter; requires tall grasses, tules, and willow thickets for nesting and cover.	None. Suitable habitat is not present.
Melospiza melodia pusillula Alameda song sparrow	--/SSC	Found only in marshes along the southern portion of the San Francisco Bay.	Brackish marshes associated with pickleweed; may nest in tall vegetation or among pickleweed.	None. Suitable habitat is not present.
Pelecanus occidentalis californicus California brown pelican	E/E	The Pacific coast from Canada through Mexico.	Coastal areas. Nests on islands. Occasionally along Arizona's lakes and rivers.	None. Suitable habitat is not present.
Rallus longirostris obsoletus California clapper rail	E/E, FP	Found along the Pacific Coast in Monterey and San Luis Obispo counties.	From tidal mudflats to tidal sloughs.	None. Suitable habitat is not present.
Sternula antillarum browni California least tern	E/E	Found along the Pacific Coast of California from San Francisco to Baja California.	Nest on open beaches kept free of vegetation by natural scouring from tidal action.	None. Suitable habitat is not present.
Mammals				
Reithrodontomys raviventris Salt marsh harvest mouse	E/E,FP	The San Francisco Bay Estuary and Suisun Marsh.	Saline to brackish salt marsh habitat.	None. Suitable habitat is not present.
Sorex vagrans halicoetes Salt-marsh wandering shrew	-/SSC	Southern arm of the San Francisco Bay in San Mateo, Santa Clara, Alameda, and Contra Costa counties.	Salt marshes from 6 to 9 feet above mean sea level (MSL).	None. Suitable habitat is not present.

Common and Scientific Name	Status[a] Federal/State	California Distribution	Habitats	Potential to Occur in and adjacent to the Project Footprint[b]
Vulpes macrotis mutica San Joaquin kit fox	E/T	Principally occurs in the San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties, from Kern County north to Contra Costa County.	Saltbush scrub, grassland, oak, savanna, and freshwater scrub.	None. Suitable habitat is not present and outside of species range.

[a] Status Explanations

Federal
E = listed as endangered under the ESA
T = listed as threatened under the ESA
PT = proposed for federal listing as threatened under the ESA
C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded
D = delisted
– = no listing
CH = Critical habitat
State
E = listed as endangered under CESA
T = listed as threatened under CESA
FP = fully protected under the California Fish and Game Code
SSC = species of special concern in California
D = delisted
– = no listing

[b] Potential Occurrence in and adjacent to the Project footprint
High: Known occurrences of the species within the study area, or CNDDB, or other documents, records the occurrence of the species within a 5-mile radius of the study area; suitable habitat is present within the study area
Moderate: CNDDB, or other documents, records the known occurrence of the species within a 5-mile radius of the study area; poor quality suitable habitat is present within the study area
Low: CNDDB, or other documents, does not record the occurrence of the species within a 5-mile radius of the study area; suitable habitat is present within the study area

3.9 Geology and Soils

This section describes the geologic and seismic setting of the City Place Santa Clara Project (Project) site, including the regional and local geology, soils, and hydrogeology; the regulatory framework relevant to the Project; and the potential environmental effects of the Project related to geology and soils. The impacts examined include risks related to geologic hazards, such as earthquakes, liquefaction, expansive soils, and structural settlement, and impacts on the environment related to soil erosion and sedimentation. This section identifies both Project-level and cumulative environmental impacts and explains how application of design standards and applicable regulations would reduce or avoid the identified impacts.

Two preliminary geotechnical investigations were conducted for the Project site (one for Parcels 1–4 and one for Parcel 5). Reports documenting these investigations were prepared by Langan, referred to hereafter as Preliminary Geotechnical Investigation (Parcels 1–4),[1] and Cornerstone Earth Group, referred to hereafter as Preliminary Geotechnical Investigation (Parcel 5).[2] No geotechnical investigations have been conducted for the Retention Basin north of Parcel 1. Information and conclusions from these documents are incorporated into this section. Additional information was obtained from other geotechnical reports and memoranda and government agency documents and websites.

Issues identified in response to the Notices of Preparation (NOP) (Appendix 1) were considered in preparing this analysis. Applicable issues that were identified pertain to the extent and estimated depth for below-grade excavations and the potential for development to disturb the clay cap and liner of the former Santa Clara All-Purpose Landfill (Landfill). These issues are addressed in this section and also analyzed in Section 3.11, *Hazardous Materials*.

Existing Conditions

Regulatory Setting

Federal

National Earthquake Hazards Reduction Program

The National Earthquake Hazards Reduction Program (NEHRP) was established by the U.S. Congress when it passed the Earthquake Hazards Reduction Act of 1977, Public Law (PL) 95–124. In establishing NEHRP, Congress recognized that earthquake-related losses could be reduced through improved design and construction methods and practices, land use controls and redevelopment, prediction techniques and early-warning systems, coordinated emergency preparedness plans, and public education and involvement programs. The four basic NEHRP goals are:

- Develop effective practices and policies for earthquake loss reduction and accelerate their implementation.
- Improve techniques for reducing earthquake vulnerabilities of facilities and systems.

[1] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22. (Parcels 1–4)

[2] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation*. Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California. May 2. (Parcel 5)

- Improve earthquake hazards identification and risk assessment methods, and their use.
- Improve the understanding of earthquakes and their effects.

Several key federal agencies contribute to earthquake mitigation efforts, with four primary NEHRP agencies:

- National Institute of Standards and Technology (NIST) of the Department of Commerce
- National Science Foundation (NSF)
- U.S. Geological Survey (USGS) of the Department of the Interior
- Federal Emergency Management Agency (FEMA) of the Department of Homeland Security

Implementation of NEHRP priorities is accomplished primarily through original research, publications, and recommendations to assist and guide state, regional, and local agencies in the development of plans and policies to promote safety and emergency planning.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (A-PEFZA) was passed in 1972 by the State legislature to mitigate the hazard of surface fault rupture by regulating structures designated for human occupancy near active faults. As required by the act, the California Geological Survey (CGS) has delineated Earthquake Fault Zones along known active faults in California.

California Building Code

The 2013 California Building Code (CBC), which refers to Part 2 of the California Building Standards Code in Title 24 of the California Code of Regulations, is based on the 2012 International Building Code. The 2013 CBC covers grading and other geotechnical issues, building specifications, and non-building structures. The CBC requires that a site-specific geotechnical investigation report be prepared by a licensed professional for proposed developments of one or more buildings greater than 4,000 square feet to evaluate geologic and seismic hazards. Buildings less than or equal to 4,000 square feet also are required to prepare a geologic engineering report, except for one-story, wood-frame and light steel-frame buildings of Type V construction that are located outside of the Alquist-Priolo Earthquake Fault Zones.

The purpose of a site-specific geotechnical investigation is to identify seismic and geologic conditions that require project mitigation, such as surface fault ruptures, ground shaking, liquefaction, differential settlement, lateral spreading, expansive soils, and slope stability. Requirements for the geotechnical investigation are presented in Chapter 16, *Structural Design*, and Chapter 18, *Soils and Foundation*, of the 2013 CBC.

Seismic Hazards Mapping Act

In 1990, following the 1989 Loma Prieta earthquake, the State legislature enacted the Seismic Hazards Mapping Act (SHMA) to protect the public from the effects of strong ground shaking, liquefaction, landslides, and other seismic hazards. The SHMA established a statewide mapping program to identify areas subject to violent shaking and ground failure; the program is intended to assist cities and counties in protecting public health and safety. The CGS is mapping SHMA Zones and has completed seismic hazard

mapping for the portions of California most susceptible to liquefaction, ground shaking, and landslides, primarily the San Francisco Bay Area and Los Angeles Basin. A geotechnical investigation for projects within seismic hazard zones must be conducted and appropriate mitigation measures incorporated into the project design before development permits will be granted. The vicinity of the Project site has been mapped under this program, and the site-specific hazards are described further below.

Landfill Closure, Monitoring, and Maintenance

Under the requirements of Title 27 of the California Code of Regulations (CCR), operators of Class II and Class III municipal solid waste facilities are required to monitor and maintain the facility once it is closed to protect against hazards that could result from the decomposition and settlement of the buried refuse, such as the generation of methane, which is a potentially explosive gas, and the potential release into the environment of other hazardous constituents The primary agencies overseeing the closure and post-closure operations of landfills in Santa Clara County are the Santa Clara County Department of Environmental Health Local Enforcement Agency (LEA), the San Francisco Bay Regional Water Quality Control Board (Regional Water Board), CalRecycle, and the Bay Area Air Quality Management District (BAAQMD). The technical documents required to assess future land uses on closed solid waste landfills are described below.

The owner and operator of the Landfill (the City of Santa Clara) is responsible for developing and implementing a Closure Plan and Post-Closure Maintenance Plan (PCMP) to ensure that the Landfill is closed in a manner that will protect human health and the environment and that adequate resources are available to properly accomplish landfill closure and maintain the Landfill post-closure. The requirements for developing these plans are described in 27 CCR 21790–21840.

The primary goal of landfill closure is to design a final cover that will minimize the infiltration of water into the waste and thereby minimize the production of leachate and emissions of landfill gas. The final cover design must include a low-permeability layer and erosion control measures. In accordance with 27 CCR 21800, the final Closure Plan must describe the cost, schedule, and approach for closing the Landfill. The final Closure Plan must also include, but is not limited to, a description of the following activities related to geology and soils:

- Proposed post-closure land uses pursuant to 27 CCR 21190 (27 CCR 21790(b)(5))
- Final cover and grading design pursuant to 27 CCR 21140 and 21142 (27 CCR 21790(b)(8)(B))
- Drainage and erosion control systems pursuant to 27 CCR 21150 (27 CCR 21790(b)(8)(D))

For post-closure land uses that involve structures within 1,000 feet of the disposal area, structures on top of waste, modification of the low permeability layer, or irrigation over the waste, a separate Post-Closure Land Use Plan (PCLUP) must be prepared and submitted to the LEA, Regional Water Board, and BAAQMD for review. Please refer to Section 3.11, *Hazards and Hazardous Materials*, for additional information about the Closure Plan, PCMP, and PCLUP.

Local

Santa Clara City Code

Chapter 15.15 of the City Code officially adopts the 2013 CBC (the 2012 International Building Code, as amended by the State of California and the City of Santa Clara) as the City Building Code, which is enforced by the City Building Official.

Santa Clara General Plan

The City's current general plan[3] includes policies and programs associated with structural design and geologic conditions as follows:

> **Goal 5.10.5-G1.** Protection of life, the environment, and property from natural catastrophes and man-made hazards.
>
> *Policy 5.10.5-P5.* Regulate development, including remodeling or structural rehabilitation, to ensure adequate mitigation of safety hazards, including flooding, seismic, erosion, liquefaction, and subsidence dangers.
>
> *Policy 5.10.5-P6.* Require that new development is designed to meet current safety standards and implement appropriate building codes to reduce risks associated with geologic conditions.
>
> *Policy 5.10.5-P7.* Implement all recommendations and design solutions identified in project soils reports to reduce potential adverse effects associated with unstable soils or seismic hazards.

Environmental Setting

Regional Setting

Geology

The Project site is in the Santa Clara Valley at the southern end of San Francisco Bay, between the Diablo Range to the east and the Santa Cruz Mountains to the west. The bedrock geology underlying most of the Project vicinity consists of folded, faulted, sheared, and altered sedimentary, igneous, and metamorphic rock (mélange) of the Jurassic-Cretaceous age Franciscan complex (formed 65–190 million years ago). Within the Santa Clara Valley, this bedrock is overlain by deep alluvial deposits that reach a thickness of up to 1,500 feet near the Project site.[4] Geologic mapping indicates that the refuse and fill materials on the Project site overlie Holocene alluvium consisting of Bay mud, basin, and levee deposits.[5] The average thickness of the Holocene deposits (formed less than 11,000 years ago) in the center of the valley is about 30 feet.[6] The Holocene alluvial deposits in the Project vicinity overlie older Pleistocene alluvial fan deposits ranging from about 1 million to 10,000 years ago. Based on changes in the density, color, and texture of alluvial deposits, the top elevation of the Pleistocene deposits ranges from about -30 to -40 feet (NAVD88).[7,8] The Pleistocene and younger Holocene deposits overlie the older Santa Clara formation.

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[3] City of Santa Clara. 2010. *City of Santa Clara 2010–2035 General Plan*. Adopted: November 16, 2010. Last amended: December 9, 2014. Available: <http://santaclaraca.gov/index.aspx?page=1263>. Accessed: December 22, 2014.

[4] San Francisco Bay Regional Water Quality Control Board. 2003. *A Comprehensive Groundwater Protection Evaluation for the South San Francisco Bay Basins.* Appendix B, South Bay Geology. May.

[5] Wentworth, C.M, M.C. Blake, Jr., R.J. McLaughlin, and R.W. Graymer. 1999. *Preliminary Geologic Description of the San José 30 x 60 Minute Quadrangle. California*. A Digital Database. U.S. Geological Survey Open File Report 98-795.

[6] Holzer, T.L, T.E. Noce, and M.J. Bennett. 2009. Scenario Liquefaction Hazard Maps of Santa Clara Valley, Northern California. *Bulletin of the Seismological Society of America*, Vol. 99, No. 1, pp. 367–381, doi: 10.1785/0120080227. February.

[7] Helley, E.J. 1990. *Preliminary Contour Map Showing Elevation of Surface of Pleistocene Alluvium under Santa Clara Valley, California*. U.S. Geological Survey Open File Report 90-633.

[8] NAVD88 is the North American Vertical Datum; all elevations in this chapter are based on this vertical datum because the geotechnical reports use this datum.

Ground Shaking

Ground shaking is a general term referring to all aspects of motion of the earth's surface resulting from an earthquake, and is normally the major cause of damage in seismic events. The extent of ground shaking is controlled by the magnitude and intensity of the earthquake. Magnitude is a measure of the energy released by an earthquake and is reported as moment magnitude (Mw). The Modified Mercalli Intensity (MMI), presented in Table 3.9-1, is a subjective measure of the perceptible effects of an earthquake at a given point and varies with distance from the epicenter and local geologic conditions. Intensity can also be quantitatively measured using accelerometers (strong motion seismographs) that record ground acceleration at a specific location. Acceleration is measured as a fraction or percentage of the acceleration of gravity (g).

Table 3.9-1. Modified Mercalli Scale[a]

	Intensity	Effects	v[b] cm/s	g[c]
M_w[d]	I.	Not felt. Marginal and long-period effects of large earthquakes.		
3	II.	Felt by persons at rest, on upper floors, or favorably placed.		
	III.	Felt indoors. Hanging objects swing. Vibration-like passing of light trucks. Duration estimated. May not be recognized as an earthquake.		0.0035–0.007
4	IV.	Hanging objects swing. Vibration-like passing of heavy trucks or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV wooden walls and frame creak.		0.007–0.015
	V.	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.	1–3	0.015–0.035
5	VI.	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle – CFR).	3–7	0.035–0.07
6	VII.	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments – CFR). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.	7–20	0.07–0.15
	VIII.	Steering of motorcars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.	20–60	0.15–0.35

Table 3.9-1. Modified Mercalli Scale[a]

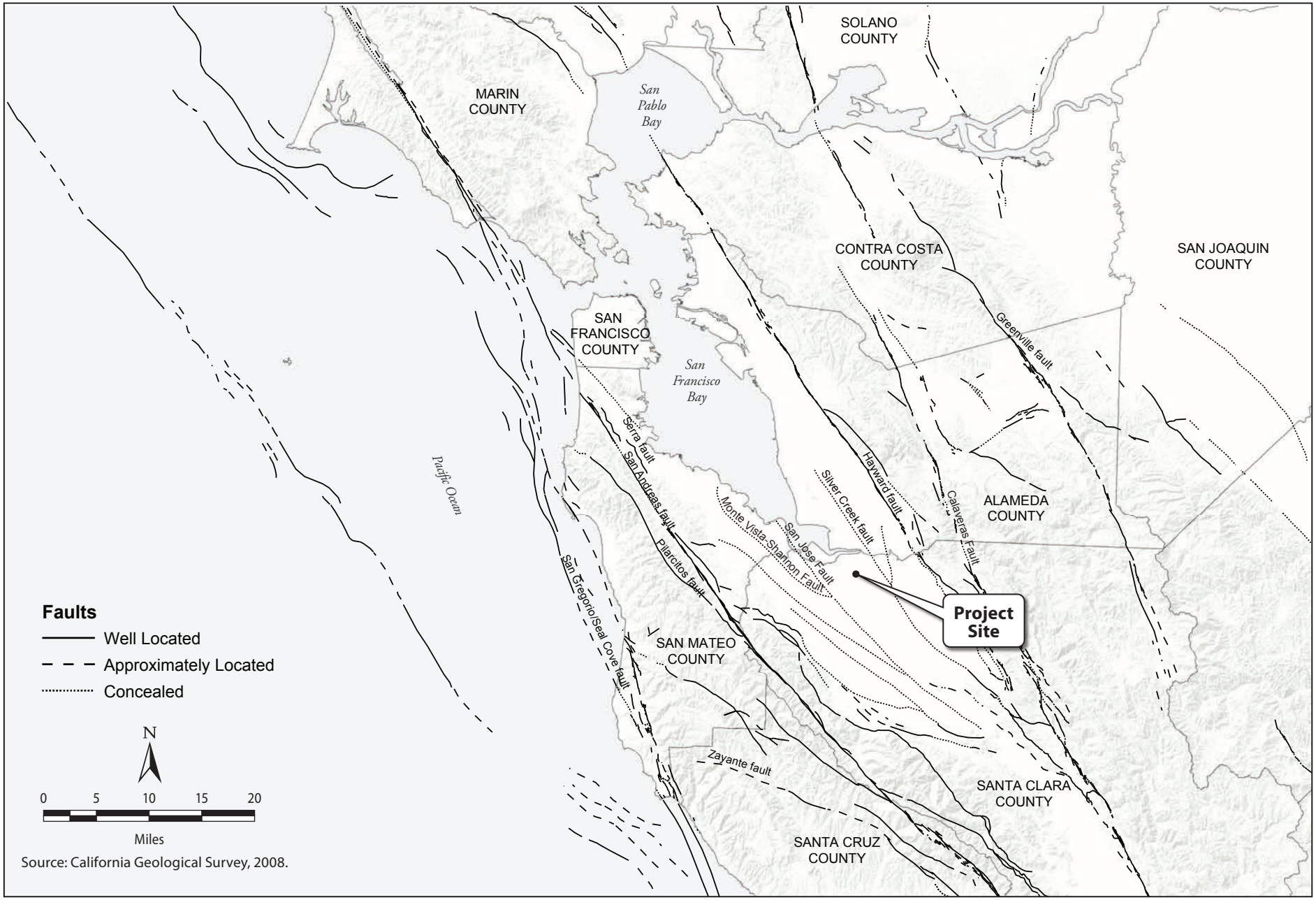
	Intensity	Effects	v[b] cm/s	g[c]
7	IX.	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations – CFR.) Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluviated areas sand and mud ejected, earthquake foundations, sand craters.	60–200	0.35–0.7
8	X.	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.	200–500	0.7–1.2
	XI.	Rails bent greatly. Underground pipelines completely out of service.		> 1.2
	XII.	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.		

[a] From Richter (1958).
[b] Average peak ground velocity, centimeters per second (cm/s).
[c] Average peak acceleration (away from source).
[d] Richter magnitude correlation.
CFR – Charles F. Richter additions to the 1931 scale.
Note: Masonry A, B, C, D. To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following lettering (which has no connection with the conventional Class A, B, C construction).
Masonry A: Good workmanship, mortar, and design, reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.
Masonry B: Good workmanship and mortar, reinforced, but not designed to resist lateral forces.
Masonry C: Ordinary workmanship and mortar; no extreme weaknesses such as non-tied-in corners, but masonry is neither reinforced nor designed against horizontal forces.
Masonry D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

Regional Seismicity

The San Francisco Bay Area is a seismically active region. Numerous earthquakes have been recorded in the region in the past, and significant earthquakes can be expected to occur in the future. The main feature generating the seismic activity in the region is the tectonic plate boundary between the North American and Pacific plates. Locally, this boundary is referred to as the San Andreas Fault Zone (SAFZ), which includes the San Andreas fault and several other active faults. The SAFZ includes numerous faults found by the CGS under the Alquist-Priolo Earthquake Fault Zoning Act to be "active" (i.e., to have evidence of fault rupture in the past 11,000 years). Some of the major active faults within the SAFZ, and those closest to the Project site, include the Northern San Andreas, Hayward-Rodgers Creek, and Calaveras faults (Figure 3.9-1 and Table 3.9-2).

Structural geologic features in the Bay Area, including faults, are created as the result of collisions between the North American and Pacific tectonic plates. The resulting strains on rock formations have created numerous active or potentially active faults in the Project vicinity (Table 3.9-2), of which the



Source: California Geological Survey, 2008.

Graphics ... 00333.14 (5-16-2015)

Figure 3.9-1
Regional Faults
City Place Santa Clara

Northern San Andreas, Hayward-Rodgers Creek, and Calaveras are the closest faults with the potential to create a significant earthquake.

Table 3.9-2. Regional Faults

Fault Segment	Approximate Distance from Site in Miles	Direction from Site	Mean Characteristic Moment Magnitude (M_w)
Hayward-Rodgers Creek	7	Northeast	7.33
Monte Vista-Shannon	9	Southwest	6.50
Calaveras	9	East	7.03
Northern San Andreas – Peninsula	12	Southwest	7.23
Northern San Andreas (1906 event)	12	Southwest	8.05
Northern San Andreas-Santa Cruz	16	South	7.12
Zayante-Vergeles	22	South	7.00
Mount Diablo Thrust	23	Northeast	6.70
Greenville Connected	24	Northeast	7.00
San Gregorio Connected	25	West	7.50
Great Valley	33	Northeast	6.90
Green Valley	34	North	6.80
Monterey Bay-Tularcitos	35	South	7.30

Source: Edited from Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

The most recent earthquake forecast model for California prepared by the U.S. Geological Survey, referred to as the third Uniform California Earthquake Rupture Forecast, indicates that the likelihood of a magnitude 6.0 (or greater) earthquake to occur on a San Francisco Bay Area fault (or combination of faults) is 98 percent in the next 30 years (starting in 2014). The likelihood of a magnitude 7.0 (or greater) is 51 percent.[9]

Regional Hydrogeology

The Project site is located within the San Francisco Bay Hydrologic Region. The site is located within the Santa Clara Valley Groundwater Basin, Santa Clara Subbasin. Groundwater within the Santa Clara Subbasin is generally found within aquifers consisting of high permeability sand and gravel layers interbedded between low-permeability clay and silt layers. The low-permeability layers confine the aquifers and limit the migration of groundwater between aquifers.

Project Site

As described in Chapter 2, *Project Description*, most of the Project site was formerly used as the Santa Clara All-Purpose Landfill, which was a 210-acre site with a waste footprint of approximately 183 acres. The Landfill historically consisted of distinct units, known as Landfill Parcels 1, 1NW, 2, 3/6, and 4

[9] U.S. Geological Survey. 2015. *UCERF3: A New Earthquake Forecast for California's Complex Fault System*. Fact Sheet 2015–3009, March.

(Figure 2-3),[10] which operated at different times. The Landfill reportedly opened in 1934 as an open-burn dump. However, based on a review of historical aerial photographs and topographic maps, observable landfill operations appear to have begun in the late 1960s, beginning in Parcel 4.[11] The operation was changed to a sanitary landfill[12] after the Regional Water Board adopted Resolution No. 713 in December 1965. This resolution permitted the City to operate a sanitary landfill on Landfill Parcel 4, which was initially used as an open burning dump and later accepted only dry material, construction debris, yard wastes, and non-garbage items.

The landfill on Parcel 4 stopped accepting waste on October 1, 1993.[13] Landfill Parcel 1 received waste from 1982 to 1986, Landfill Parcel 2 from 1977 to 1984, and Landfill Parcel 3/6 from 1986 to 1991. Landfill operations resumed in the northwest corner of Landfill Parcel 1 (Landfill Parcel 1NW) in 1991 and continued until the last waste was accepted in 1993. The Landfill initiated the closure process in the early 1990s and received final landfill closure certification in September 1994. The total mass of waste placed is estimated to be 5.5 million tons.[14]

A portion of the Landfill was closed by the late 1970s and early 1980s and subsequently converted to a municipal golf course in 1986[15] by the City's Sports and Open Space Authority (Authority). The City-owned golf course is located on 155 acres of the Project site (the majority of the area west of Lafayette Street and the southern portion to the east of Lafayette Street). In addition to the golf course facility, this portion of the Project site includes Santa Clara Fire Station 10, a clubhouse, restaurant, banquet facility, and tennis courts. A BMX track, operated by the Santa Clara Police Activities League (P.A.L.) BMX, is also located on the former landfill in the northeast portion of the Project site at 5401 Lafayette Street adjacent to the Ameresco Methane Plant. In addition, the Project site includes two City-owned parcels to the south of the Landfill and a City-operated stormwater Retention Basin. The two City-owned parcels to the south of the Landfill are undeveloped and used as paved surface parking lots. The Retention Basin is located to the north of Parcel 4 and south of State Route (SR) 237.

Site Topography

Elevations at the Project site range from about 5 to 82 feet and have been significantly altered from pre-development conditions by the historic landfill operations, the placement of the final Landfill cap, and the development of the golf course and BMX track over the majority of the Project site. During landfill operations, soil embankments were constructed around the waste units and refuse was piled above the embankments creating large mounds above the current ground elevation.

At Landfill Parcels 1, 2 and 3, elevations around the perimeter of the parcels vary between approximately 5 and 11 feet, with high points, typically near the center of the parcels, reaching from 52

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[10] Note that these parcels do not correspond with the existing assessor's parcel numbers or the parcels proposed under the Project. For discussion purposes, the historic parcels associated with the Landfill are referred to as *Landfill Parcels*.

[11] Langan Treadwell Rollo. 2015. *Site Investigation and Environmental Risk* Assessment. City Place Santa Clara, Santa Clara, California. January 23.

[12] A sanitary landfill is a site where waste is isolated from the environment using systems such as liners, caps, and leachate collection.

[13] San Francisco Bay Regional Water Quality Control Board. 1994. *Waste Discharge Requirements, Santa Clara All Purpose Landfill*. Order No. 94-050.

[14] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[15] Geomatrix. 2008. *Phase I Environmental Site Assessment.* Centennial Boulevard Site, Santa Clara, California. May.

to 82 feet.[16] Landfill Parcel 4 has elevations around the perimeter of 10 to 20 feet with a maximum elevation of approximately 34 feet.

As shown in Figure 2-12 in Chapter 2, *Project Description*, there are approximately 13.3 acres at Landfill Parcel 4 that were not used for refuse landfilling (Landfill Parcel 4 non-refuse areas), currently used as part of a driving range and lined pond, with an elevation of 7 feet. These areas of Landfill Parcel 4 that do not include refuse are underlain by about 20 feet of fill and, below that, native soils. The existing elevations around the perimeter of Parcel 5 vary between 24 to 40 feet along Tasman Drive and 12 to 19 feet along Stars and Stripes Drive.

The Retention Basin has a surface area of approximately 5.3 acres and a measured storage capacity of 51.6 acre-feet, up to an elevation of 5.7 NAVD88.[17]

Site Stratigraphy

Stratigraphy at the Project site consists of an engineered landfill soil cap, landfill refuse, and native soils. In the northwestern portion of Parcel 1 and Parcel 3, the refuse and native soil layers are separated by a clay landfill liner. At the time of landfill operations at the other portions of the Project site, clay liners were not typically installed at municipal (Class III) landfills.[18] At the other parcels (Parcels 2 and 4 and the southern portion of Parcel 1), draglines[19] were used to excavate existing subsurface material. This resulted in irregular bottom topography beneath the refuse layer in these areas with discrete trenches or pits surrounded by relatively undisturbed soil. At the Parcel 4 non-refuse areas, Parcel 5, and the Retention Basin, no refuse layer or Landfill cap is present (these areas are underlain by native soils and fill).

A generalized cross section of the landfill portions of the Project site is presented in Figure 3.9-2. Details regarding the distribution and thickness of native soils, clay liner, refuse, and Landfill cap are presented below and summarized in Table 3.9-3.

Native Soils. Native soils consist of alluvial deposits, consisting primarily of clay and sandy clay layers with occasional interbedded layers of sand and silt.[20] These deposits extend to at least 200 feet below the ground surface (bgs), the depth of exploration conducted for the Project site Preliminary Geotechnical Investigation (Parcels 1–4). Native soils occur under the refuse and at the surface in the vicinity of the Retention Basin. At Parcel 5, geotechnical borings were drilled to a depth of 45 feet bgs. Underlying materials, which include fills associated with landfill demolition and backfill consisting of sandy clay with some gravel, overlie native alluvial soils.[21]

Clay Liner. No bottom clay liner was installed beneath Parcels 2 and 4 (and a portion of Parcel 1), consistent with landfill practices at the time of filling. The northwest corner of Parcel 1 and Parcel 3 were developed with clay base liners and a leachate collection system. Because the Landfill does not extend to Parcels 5 or the Retention Basin, no clay liner underlies these areas.

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[16] Langan Treadwell Rollo. 2015. *Grading and Site Access Technical Memorandum*. City Place Santa Clara Development, Santa Clara, California. Draft. June 30.

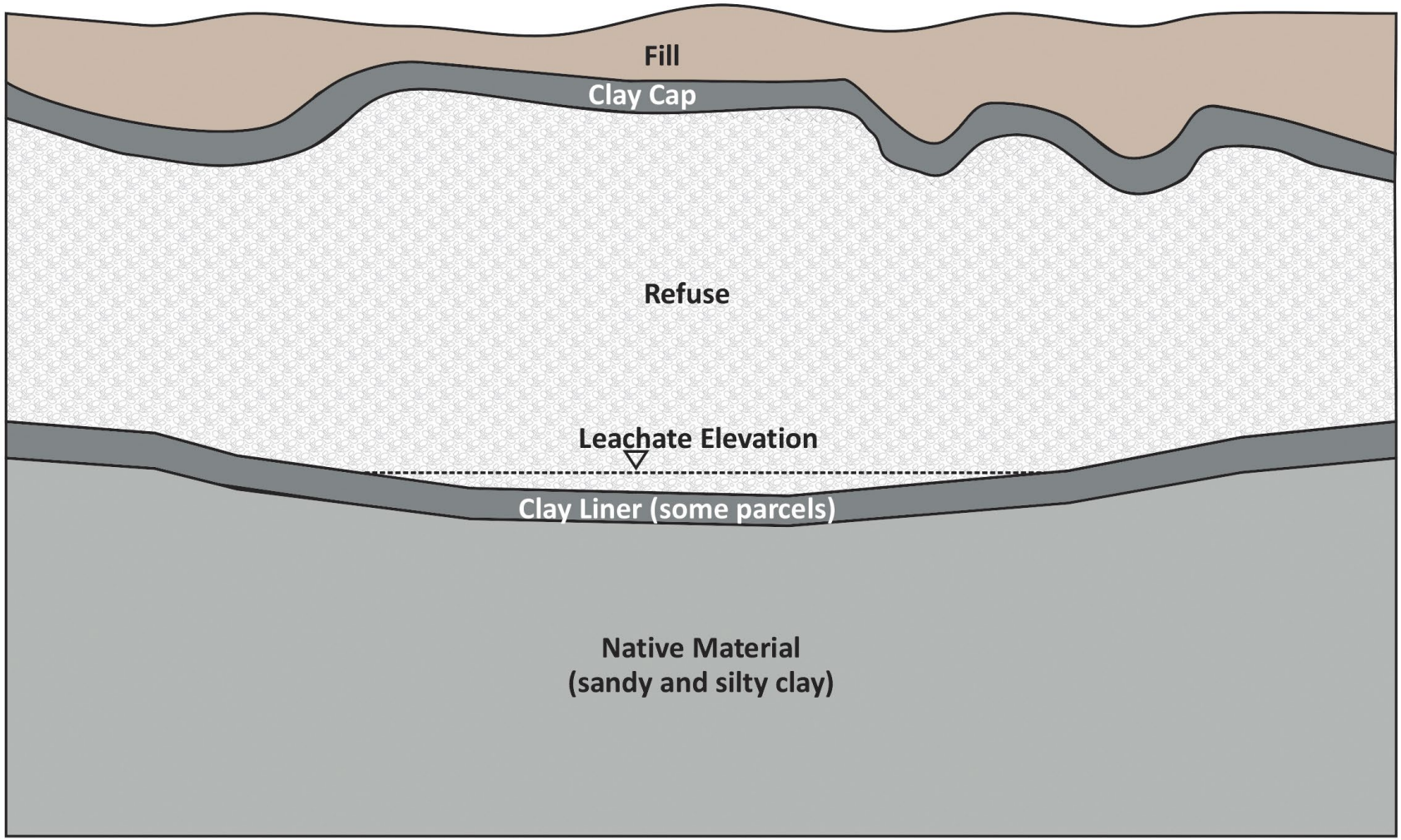
[17] Langan Treadwell Rollo. 2015. *Stormwater Technical Memorandum for City Place Santa Clara*. Santa Clara, California. June 30.

[18] A "Class III landfill" is a municipal landfill that is not authorized to accept hazardous waste.

[19] Draglines are large excavators with buckets that are pulled in by a wire cable.

[20] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[21] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California.*



Note: Not drawn to scale.

Source: BASELINE, 2015.

Graphics ... 00333.14 (5-16-2015)

Figure 3.9-2
Project Site Generalized Cross-Section
City Place Santa Clara

Table 3.9-3. Site Stratigraphy

Parcel	Native Soils	Clay Liner	Approximate Thickness of Refuse Layer (ft)	Approximate Thickness of Low Permeability Layer and Cover Soil above Refuse Layer (ft)
Parcel 1	Present at a depth of 30 to 60 feet bgs	Northwest corner only	59.5	5–15
Parcel 2	Present at a depth of 20 to 40 feet bgs	No	30	7–10
Parcel 3	Present at a depth of 20 to 60 feet bgs	Yes	45 (estimated)	10–35
Parcel 4	Present at a depth of 5 feet bgs (near eastern border) to 40 feet bgs	No	10.5–33	3–10
Parcel 5	Present at depths ranging from 6.5 to 20 feet bgs. Uppermost material is fill.	Not applicable	None	Not applicable
Retention Basin	Native soils at surface	Not applicable	None	Not applicable

Sources: Depths and thicknesses based on review of topography, boring logs, and cross section data found in the following:

Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California, 22 August;

Langan Treadwell Rollo. 2015. *Site Investigation And Environmental Risk Assessment.* City Place Santa Clara, Santa Clara, California. Draft report, Table 7. January 23.

Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.

Refuse Layer. The refuse layer consists of municipal refuse at Parcels 1, 2, and 3. This refuse most likely consists of everyday items, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries, that were generated by homes, schools, hospitals, and businesses. Parcel 4 was initially used as a burn pit but later filled with dry material, construction debris, and yard wastes.[22] The available mapping and an inspection of available geologic boring logs indicate that no refuse underlies Parcel 5 or the Retention Basin.[23,24]

Landfill Cap. The landfill portion of the Project site is underlain by varying thicknesses of cover soil, an artificial fill that consists of mixed sands, gravels, and silts. A low permeability layer, which varies in thickness from 1 to 7 feet throughout the site, consisting of stiff dark-brown clay, lies under the cover soil (Table 3.9-3).[25] Near-surface localized clay layers and drainage systems have been installed at the

[22] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[23] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[24] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California.*

[25] Langan Treadwell Rollo. 2015. *Site Investigation and Environmental Risk Assessment*. City Place Santa Clara, Santa Clara, California. Draft report, Table 7. January 23.

golf course (above the waste). These are found beneath ponds and areas that require irrigation. Because the Landfill does not extend to Parcel 5 or the Retention Basin, a Landfill cap is not found in those areas.

Fault Rupture

The site is not within a mapped Earthquake Fault Zone, and no known active or potentially active faults exist on the site.[26] Fault rupture of the surface typically occurs along existing faults that have ruptured the surface in the past. Because faults with known surface rupture have been mapped in California, and none are known to occur at the Project site, fault rupture at the Project site is considered unlikely to occur.

Ground Shaking

The CGS Probabilistic Seismic Ground Motion Interpolator calculates the expected peak ground acceleration due to gravity ("g") at the site, with a 10 percent chance of being exceeded within 50 years, to be 0.518 g.[27] This corresponds to violent shaking (IX) on the Modified Mercalli scale. Violent ground shaking can create considerable damage even in specially designed structures; well-designed frame structures may be thrown out of plumb; damage may be great in substantial buildings, with partial collapse; and smaller buildings may be shifted off foundations (Table 3.9-1).

Local soil or subsurface conditions can greatly amplify the shaking in an earthquake. Passing from rock to soil, seismic waves slow down but get bigger. Hence a soft, loose soil, or an area underlain by unconsolidated refuse (like the Project site) may shake more intensely than firm native soils or hard rock at the same distance from the same earthquake.

Liquefaction

The Project site is located within a zone designated with the potential for liquefaction, as identified by CGS mapping.[28] Specifically, the map shows the site is in an area "where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693 (c) would be required."

A site-specific liquefaction analysis was performed as part of the Preliminary Geotechnical Investigation (Parcels 1–4). The analysis noted the presence of saturated layers of loose to medium dense sand within and just below the refuse limit in one of the borings (Boring B-4, located in Parcel 4).[29] The analysis indicated that this layer could liquefy and result in seismically induced settlement on the order of 4 inches. However, no other potentially liquefiable soil layers were identified in the other five borings completed for the Preliminary Geotechnical Investigation (Parcels 1–4). The Preliminary Geotechnical Investigation (Parcels 1–4) concluded that the potential for liquefaction would be limited to isolated areas and is not a widespread concern at the Project site. However, additional borings will be conducted as part of the design-level geotechnical investigation.

Ground rupture can occur when the pore water pressure within liquefiable soil layers are great enough to break through and create a rupture in the overlying non-liquefiable soil layer. The ground

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[26] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[27] California Geological Survey. 2008. *Ground Motion Interpolator*. Available: <http://www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html>. Accessed: December 12, 2014.

[28] California Geological Survey. 2004. *State of California Seismic Hazard Zones, Milpitas Quadrangle*. October 19.

[29] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

rupture hazard tends to mirror the liquefaction hazard for a site. Because the potential for liquefaction would be limited to isolated areas, ground rupture would not be a widespread concern at the Project site. The Preliminary Geotechnical Investigation (Parcel 5) indicated that several layers could experience liquefaction that could result in soil softening and post-liquefaction total settlement ranging from 0 to 0.75 inch.[30]

Lateral Spreading

Lateral spreading is a form of horizontal displacement of soil toward an open channel or other "free" face, such as an excavation boundary. In a lateral spread failure, a layer of ground at the surface is carried on an underlying layer of liquefied material over a nearly flat surface toward a river channel or other bank. The lateral spreading hazard tends to mirror the liquefaction hazard for a site. Because there are no continuous potentially liquefiable layers near the slope faces of the former landfill, the Preliminary Geotechnical Investigation (Parcels 1–4) report concluded the potential for lateral spreading is low at the Parcels 1–4.[31] Lateral spreading was also determined to be a low hazard at Parcel 5 because the only open channel or free face in this area where lateral spreading could occur is along the bank of San Tomas Aquino Creek and the subsurface at this location was improved when the adjacent parking structure was built.[32] Geotechnical ground improvements, which include systems such as impact piers, soil/cement mixing, or other similar methods, provide vertical support and reduce liquefaction potential, resulting in a reduced lateral spreading hazard.

Settlement and Compaction

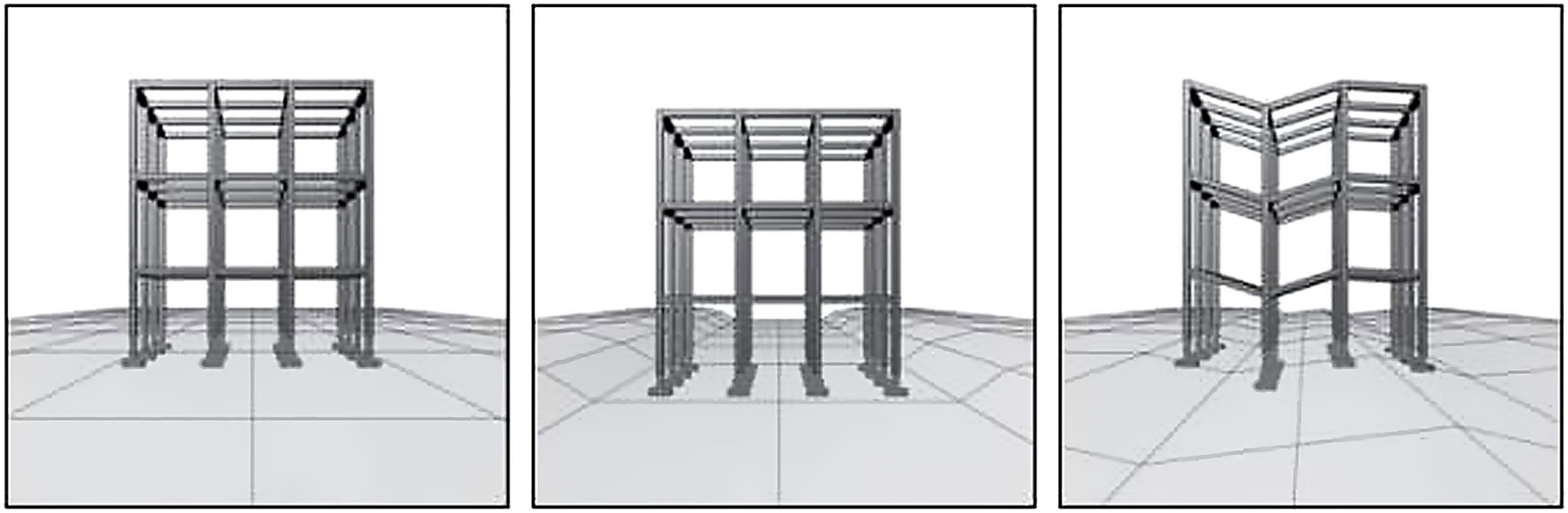
Settlement may occur when loads, such as structures or fill, are placed on compressible subsurface materials. The resulting compaction of the subsurface materials can result in changes to the final ground surface, which may adversely affect buildings, pavement, and other improvements at a site. The existing landfill gas and leachate collection systems are subject to damage (e.g., cracked pipes) from ongoing settlement.

If the underlying subsurface material and the loads do not vary over an area, uniform settlement may occur (Figure 3.9-3), and the resulting ground surface remains level. This may not affect the integrity of the overlying structure, but can damage underground utilities connecting to the structure as well as damage or deform paved entryways or other surrounding improvements. If the underlying subsurface material and loads are not consistent, differential settlement may occur (Figure 3.9-3), with an uneven resulting ground surface. In addition to damaging underground utilities and surrounding improvements, differential settlement creates internal lateral stresses within a structure, which can threaten its integrity.

[30] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.

[31] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[32] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.



(a) Building before settlement occurs. (b) Uniform settlement. (c) Differential settlement.

Source: The Civil Builders. 2013. Foundation Settlement. Available: <http://www.thecivilbuilders.com/2013/04/foundation-settlement.html.> Accessed February 3, 2015.

Graphics ... 00333.14 (5-16-2015)

Figure 3.9-3
Foundation Settlement
City Place Santa Clara

Underground utilities may be adversely affected by uniform and differential settlement if the settlement results in flattening the slope of pipes that rely on gravity for drainage, such as sewer lines. Settlement can also result in breaks in utility lines, primarily at pipe joints and at the points where the utilities enter the structure.

Primary compression is the initial reaction to the load. For the Landfill refuse layer, primary compression is expected to have been completed within 1 to 5 years of the placement of the overlying Landfill cap, while secondary compression occurs gradually over time. Secondary compression occurs due to physical-chemical changes, such as corrosion, oxidation, and biochemical degradation of the landfill materials. The majority of secondary compression would be expected to be completed within 50 years of landfill closure (i.e., by approximately 2044). However, because refuse does not have uniform engineering properties, the actual rates and magnitudes of compression will most likely vary over the Project site.

Because the Landfill was closed in 1994, and a load consisting of the Landfill cap and fill were placed on the parcels, the primary and much of the secondary compression is believed to have already occurred. However, the Preliminary Geotechnical Investigation (Parcels 1–4) estimates that under existing conditions at Landfill Parcels 1 and 3, an additional 2.0 feet of settlement may occur at the site where refuse thickness is 40 feet, and 8.0 feet of settlement may occur where refuse thickness is 80 feet.[33] At Landfill Parcels 2 and 4, an additional 0.25 feet of settlement may occur at the site where refuse thickness is 20 feet, and 1.25 feet of settlement may occur where refuse thickness is 40 feet.

Based on the findings of the Preliminary Geotechnical Investigation (Parcel 5), fill thicknesses in the northwestern portion of Parcel 5 are highly variable, with up to 20 feet of undocumented fill. The potential for significant differential settlement due to the undocumented and highly variable fills was high.[34]

Subsidence

Subsidence is a form of settlement, resulting in the lowering of the land surface elevation due to groundwater pumping and subsequent consolidation of loose aquifer sediments. Significant subsidence occurred in the Santa Clara Valley after development until the 1960s, when measures were undertaken to limit groundwater extraction and replenish aquifers. Subsidence would not be expected to significantly affect the Project site. More information regarding subsidence is provided in Section 3.10, *Hydrology and Water Quality*, of this Draft EIR.

Expansive Soils

Expansive soils expand and contract in response to changes in soil moisture, most notably when near surface soils change from saturated to a low moisture content condition, and back again. Expansion and contraction of soils is a negligible hazard in moderate to deep soils where minimal moisture changes and overlying material loads limit movement. Native clayey and clayey sand near-surface soils are prone to expansion or contraction as moisture levels change. However, over most of the Project site, these native soils are overlain by a refuse layer and an engineered Landfill cap, thereby isolating them materials from the surface. Because there are limited areas where native clayey soils with potentially high expansion potential occur at the surface, the shrink-swell hazard posed from native clayey soils at Parcels 1–4 is

[33] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[34] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.

minimal. Plasticity index test results performed on clay used for the low permeability layer in Parcel 4 varied from 14 to 46, which indicates the clay varies from low expansion potential to very highly expansive.[35] However the clay is generally covered by a few feet of sandy soil, which provides some cover to reduce moisture changes in the clay and reduce the shrink swell potential of the clay under existing conditions.

Corrosive Materials in Subsurface

Soils and refuse underlying the Project site may be classified as corrosive to metals and/or concrete. This classification depends on a variety of variables, including moisture, electrical conductivity, chloride content, pH, and dissolved salt content. Preliminary results indicate the presence of elevated levels of hydrogen sulfide in landfill gas in the subsurface.[36] The presence of elevated hydrogen sulfide and other sulfur-based gases can react with moisture in the landfill gas to form acids that can corrode construction materials, such as concrete, pipeline materials, and electrical equipment and instrumentation. Soils underlying the Project site and materials within the refuse layer may potentially be classified as corrosive depending on the physical and chemical properties of the refuse within them.

Landslide Hazards

Slope failure can occur as either rapid movement of large masses of soil (landslide) or imperceptibly slow movement of soils on slopes (creep). The primary factors influencing the stability of a slope are the nature of the underlying soil or bedrock, the geometry of the slope (height and steepness), and rainfall. The presence of historic landslide deposits is a good indicator of future landslides. Landslides are commonly triggered by unusually high rainfall and the resulting soil saturation, by earthquakes, or a combination of these conditions.

Based on a CGS landslide inventory, no historic landslides are located at or near the Project site,[37] indicating that the landslide hazard is low. However, the irregular topography at the Project site due to landfill operations, particularly around the perimeter of Parcels 1, 2, 3, and 4, include relatively steep slopes (up to 3:1, horizontal: vertical). The elevation difference from slope top to bottom is more than 50 feet, which could create slope stability concerns.

Groundwater

Shallow groundwater at the Project site is located in two non-contiguous zones.[38] The top of the upper sand zone is encountered between 0 and 25 feet below the pre-landfill ground surface. The second sand zone is encountered around 40 feet below the pre-landfill ground surface. Groundwater has been observed between approximately 18.5 and 52 feet bgs at the Site during drilling.[39] Groundwater flow is to the north-northeast, toward San Francisco Bay.[40] Additional information regarding groundwater and groundwater quality is provided in Section 3.10, *Hydrology and Water Quality*, of this Draft EIR.

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[35] Langan Treadwell Rollo. 2014. *Draft Landfill Cover Investigation*. City Place Santa Clara, Santa Clara California. December 19.

[36] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[37] California Geological Survey. 2011. *Landslide Inventory Map of the Milpitas Quadrangle, Alameda. and Santa Clara Counties, California.* June.

[38] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[39] Langan Treadwell Rollo. 2015. *Grading and Site Access Technical Memorandum*. City Place Santa Clara Development, Santa Clara, California. Draft, June 30.

[40] Golder Associates. 2013. *Second Semiannual 2012 Self-Monitoring Program Report and 2012 Annual Summary, City of Santa Clara All-Purpose Landfill*. January.

Off-Site Areas

As explained in Chapter 2, *Project Description*, construction for proposed site access could occur within several off-site areas (Tasman East, the Convention Center, San Tomas Aquino Creek, and Santa Clara Gateway [site access variant][41]). In addition, Fire Station 10, Option 2, could be located at the Convention Center surface parking lot. Because grading and excavation could occur in these areas under the Project, a description of the geologic conditions at these off-site areas is provided below.

No settlement associated with primary or secondary compression of waste would occur at the off-site areas because these areas are not underlain by waste. Subsidence related to groundwater pumping would not be expected to affect the off-site areas significantly because groundwater pumping in the basin is managed so as to prevent excessive groundwater reductions, which could result in subsidence.

The off-site areas and site access variant location are not within a mapped Earthquake Fault Zone, and no known active or potentially active faults exist on the off-site areas.[42] Since fault rupture generally follows preexisting faults, which are zones of weakness, the fault rupture at the off-site areas is considered unlikely to occur. The off-site areas are subject to moderate to very strong (MMI 6-8), which would occur during a major earthquake on the Hayward or San Andreas faults, respectively.[43]

Tasman East

The geology along the Tasman East alignment is mapped as Holocene Alluvium.[44] No geologic boring logs for this off-site area were available for review. Based on mapping maintained by the Association of Bay Area Governments (ABAG), the Tasman East alignment is "highly susceptible" to liquefaction.[45] This designation appears to coincide with saturated unconsolidated deposits associated with the nearby Guadalupe River. Lateral spreading hazards typically increase with increasing liquefaction hazards; however, because there are no steep slopes or "free faces" in the Tasman East area, the lateral spreading hazard is considered negligible.

Soils along the Tasman East alignment are mapped as Urbanland-Clear Lake complex, with 0 to 2 percent slopes. These soils have high shrink-swell potential, and therefore could, if not properly managed, pose a geotechnical hazard (related to expansion and contraction) to foundations and utilities constructed in these soils. No site-specific information related to soil corrosivity is available. The Tasman East area is relatively flat; therefore, landslide hazards are minimal.

Limited depth-to-groundwater information is available for the off-site areas. However, based on the results of an investigation related to a cleaning solvent release approximately 900 feet east of the Tasman Drive extension site (at a similar elevation), depth to groundwater is approximately 7 feet bgs.[46]

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[41] All other site access variants, as described in Chapter 2, *Project Description*, are located on the Project site.

[42] California Division of Mines and Geology (now California Geological Survey), 1982. State of California Special Studies Zones, Milpitas Quadrangle, January 1.

[43] Association of Bay Area Governments, 2015. Resilience Program, Interactive Shaking Hazard map, Accessed: August 31, 2015.

[44] U.S. Geological Survey. 2006. *Geologic Map of the San Francisco Bay Area*. Available: <http://geomaps.wr.usgs.gov/sfgeo/geologic/details.html>. Accessed: March 10, 2015.

[45] Association of Bay Area Governments. n.d. *Liquefaction Susceptibility Map*. Available: <http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility>. Accessed: March 10, 2015.

[46] Langan Treadwell Rollo. 2014. *First Semi-Annual 2013 Groundwater Monitoring Report, 2301 Calle de Luna, Santa, Clara.* January 10.

Santa Clara Convention Center

The geology at the Convention Center and the area of the proposed Fire Station 10 is mapped as Holocene Alluvium.[47] No geologic boring logs for these off-site areas were available for review. Based on mapping maintained by the ABAG, the Convention Center area is "highly susceptible" to liquefaction.[48] This designation appears to coincide with the saturated unconsolidated deposits associated with nearby San Tomas Aquino Creek. Lateral spreading hazards typically increase with increasing liquefaction hazards; however, because there are no steep slopes or "free faces" in the Convention Center area, the lateral spreading hazard is considered negligible.

Soils at the proposed Fire Station 10 site are mapped as Urbanland-Campbell complex, 0 to 2 percent slopes. These soils have moderate to high shrink-swell potential,[49] and, therefore, could pose a geotechnical hazard (related to expansion and contraction) to foundations and utilities constructed in these soils if not properly managed. No site-specific information related to soil corrosivity is available. The Convention Center area is relatively flat; therefore, landslide hazards are minimal.

Based on results of an investigation related to a leaking underground storage tank approximately 550 feet northwest of the Convention Center site (at a similar elevation), depth to groundwater is approximately 14 to 19 feet bgs.[50]

San Tomas Aquino Creek

San Tomas Aquino Creek, a creek with a contributing watershed of approximately 45 square miles, is a channelized urban creek in the vicinity of the Project site. The majority of the creek through the City of Santa Clara has been modified and constrained to a 100- to 150-foot-wide constructed channel. The banks of the channel in the vicinity of the Project site crest at about 20 feet, with a channel bottom of 4 to 6 feet.

The geologic materials underlying the creek are mapped as Holocene Alluvium.[51] No geologic boring logs for the creek or its banks were available for review. Based on mapping maintained by the ABAG, the San Tomas Aquino Creek alignment is "highly susceptible" to liquefaction.[52] Lateral spreading hazards typically increase with increasing liquefaction hazards. Because the banks of the creek represent "free faces," the lateral spreading hazard could be significant. However, no site-specific geotechnical studies have been completed at this location.

Soils along San Tomas Aquino Creek are mapped as Urbanland-Campbell complex. These soils have moderate to high shrink-swell potential[53] and, therefore, could pose a geotechnical hazard (related to expansion and contraction) to foundations and abutments constructed on these soils if not properly

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[47] U.S. Geological Survey. 2006. *Geologic Map of the San Francisco Bay Area.* Available: <http://geomaps.wr.usgs.gov/sfgeo/geologic/details.html>. Accessed: March 10, 2015.

[48] Association of Bay Area Governments. n.d. *Liquefaction Susceptibility Map*. Available: <http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility>. Accessed: March 10, 2015.

[49] Natural Resource Conservation Service. 2015. *Web Soil Survey*. Available: <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Accessed: March 10, 2015.

[50] Conestoga-Rovers & Associates. 2007. *Groundwater Monitoring Report – Second Quarter 2007, Shell-branded Service Station, 5390 Great America Parkway*. August 10.

[51] U.S. Geological Survey. 2006. *Geologic Map of the San Francisco Bay Area.* Available: <http://geomaps.wr.usgs.gov/sfgeo/geologic/details.html>. Accessed: March 10, 2015.

[52] Association of Bay Area Governments. n.d. *Liquefaction Susceptibility Map*. Available: <http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility>. Accessed: March 10, 2015.

[53] Natural Resource Conservation Service. 2015. *Web Soil Survey*. Available: <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Accessed: March 10, 2015.

managed. No site-specific information related to soil corrosivity is available. The banks of the creek are relatively steep and could be subject to slope instability (i.e., landslides). However, no site-specific geotechnical studies have been completed at this location.

Based on results of an investigation related to a leaking underground storage tank approximately 1,000 feet northwest of the San Tomas Aquino creek crossing (at a similar elevation), depth to groundwater is approximately 14 to 19 feet bgs.[54]

Tasman Drive Slip-Ramp

The geology at the proposed location of the Tasman Drive slip-ramp is mapped as Holocene Alluvium.[55] No geologic boring logs for this off-site area were available for review. Based on mapping maintained by ABAG, the Tasman Drive slip-ramp location has a moderate susceptibility to liquefaction.[56] Lateral spreading hazards typically increase with increasing liquefaction hazards; because there are steep slopes in the area, there is a potential lateral spreading hazard. Soils at the Tasman Drive slip-ramp area are mapped as Urbanland-Clear Lake complex.[57] These soils have high shrink-swell potential, and therefore could, if not properly managed, pose a geotechnical hazard (related to expansion and contraction) infrastructure constructed in these soils. No site-specific information related to soil corrosivity or groundwater is available.

Santa Clara Gateway (Site Access Variant)

The geology at the Santa Clara Gateway property is mapped as Holocene Alluvium.[58] No geologic boring logs for this off-site area were available for review. Based on mapping maintained by ABAG, the Santa Clara Gateway Variant has a moderate susceptibility to liquefaction.[59] Lateral spreading hazards typically increase with increasing liquefaction hazards; however, because there are no steep slopes or "free faces" in the Santa Clara Gateway Variant area, the lateral spreading hazard is considered negligible. Soils at the Santa Clara Gateway property are mapped as Xerorthents, trash substratum, with 0 to 2 percent slopes.[60] These soils have a relatively low shrink-swell potential and, therefore, would not be expected to pose a substantial geotechnical hazard (related to expansion and contraction) to pavements constructed on these soils. No site-specific information related to soil corrosivity is available. This area is relatively flat; therefore, landslide hazards are minimal.

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[54] Conestoga-Rovers & Associates. 2007. *Groundwater Monitoring Report – Second Quarter 2007, Shell-branded Service Station, 5390 Great America Parkway*. August 10.

[55] U.S. Geological Survey. 2006. *Geologic Map of the San Francisco Bay Area*. Available: <http://geomaps.wr.usgs.gov/sfgeo/geologic/details.html>. Accessed: March 10, 2015.

[56] Association of Bay Area Governments. n.d. *Liquefaction Susceptibility Map*. Available: <http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility>. Accessed: September 27, 2015.

[57] Natural Resource Conservation Service. 2015. *Web Soil Survey*. Available: <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Accessed: September 27, 2015.

[58] U.S. Geological Survey. 2006. *Geologic Map of the San Francisco Bay Area*. Available: <http://geomaps.wr.usgs.gov/sfgeo/geologic/details.html>. Accessed: March 10, 2015.

[59] Association of Bay Area Governments. n.d. *Liquefaction Susceptibility Map*. Available: <http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility>. Accessed: September 27, 2015.

[60] Natural Resource Conservation Service. 2015. *Web Soil Survey*. Available: <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Accessed: August 24, 2015.

Based on results of an investigation related to a leaking underground storage tank approximately 2,400 feet north of the Santa Clara Gateway property (at a similar elevation), depth to groundwater is approximately 14 to 19 feet bgs.[61]

Environmental Impacts

This section describes the impact analysis relating to geology and soils for the Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving (1) 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 or based on other substantial evidence of a known fault; (2) strong seismic ground shaking; (3) seismically related ground failure, including liquefaction; and (4) landslides.
- Result in substantial soil erosion or the loss of topsoil.
- 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 an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), or on corrosive subsurface materials, creating substantial risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater.

For the purpose of this Draft EIR, a significant impact could result from any of the soil and/or seismic conditions listed above. Such impacts would be so unfavorable that they could not be mitigated by reasonable design, construction, and maintenance practices.

Methods for Analysis

The Preliminary Geotechnical Investigation prepared for Parcels 1–4 included the drilling of six soil borings and the interpretation of data from those borings. The Geotechnical Investigation also used the following previously completed geotechnical investigations at the Project site:

- Emcon Associates. 1985. *Geotechnical Investigation, City of Santa Clara Sanitary Landfill, Parcel 3/6 Landfill Development Study*. Reference #16, Santa Clara, California;
- Emcon Associates. 1992. *Well Completion Reports for L5 and L6*. Completed by EMCON for Water Development;

[61] Conestoga-Rovers & Associates. 2007. *Groundwater Monitoring Report – Second Quarter 2007, Shell-branded Service Station, 5390 Great America Parkway*. August 10.

- Emcon Associates. 1996. *Site Plan, Cross Section, and Exploratory Boring Logs, City of Santa Clara All-Purpose Landfill, Santa Clara County*;
- Golder Associates. 1999. *Geotechnical Investigations for the Barrier Wall Design*. Santa Clara Gateway Development, The Irvine Company, Santa Clara, California;
- Kenneth D. Schmidt and Associates. 1968. *Results of the Water Part of the Solid Waste Assessment Test at the City of Santa Clara Landfill;*
- Lowney Associates. 1998. *Geotechnical Exploration, Exploratory Test Pits, Santa Clara Golf and Tennis Club, Santa Clara, California*;
- Lowney Associates. 2003. *Geotechnical Investigation, Santa Clara Parking Structure and Pedestrian Bridge, Tasman Drive, Santa Clara, California*;
- United Soil Engineering, Inc. 1975. *Subsurface Soil Investigation for Proposed Sanitary Landfill Area, Parcel 2, Phase "A" along Underdrain in Alignment East of Lafayette Street, Santa Clara, California; and*
- Woodward-Clyde Consultants. 1986. *Final Geotechnical Report, Santa Clara Golf Course Clubhouse, Santa Clara, California.*

The Preliminary Geotechnical Investigation prepared for the Parcel 5 included the drilling of five soil borings and 12 cone penetration tests and the interpretation of data from those borings. The geotechnical investigation also used following previously completed geotechnical investigations at the Project site:

- Woodward-Clyde. 1986. *Geotechnical Report for the Santa Clara Clubhouse Settlements*. August 21; and
- Cornerstone Earth Group. 2010. *Geotechnical Investigation, Tasman Drive Parking Structure, Tasman Drive, Santa Clara, California*. June 23.

Based on these data, the preliminary geotechnical investigations performed engineering analyses to develop preliminary conclusions and recommendations regarding appropriate foundation types, design parameters, and seismic coefficients for Project development.

No site-specific geotechnical investigation reports were available for the off-site areas (Lick Mill Boulevard extension in the Tasman East area, Fire Station 10 at the Santa Clara Convention Center, Tasman Drive slip-ramp, and the Santa Clara Gateway Variant). Information on geologic hazards in these off-site areas was obtained from government agency documents and websites, as discussed below.

Scheme Analysis

As described in Chapter 2, *Project Description*, this document analyzes two schemes: Scheme A and Scheme B. These schemes represent a variety of uses and site plans, but include the same amount of total build-out of 9.16 million gsf. The two schemes would vary primarily in the types of land use and would not result in a significant difference in the nature or magnitude of impacts related to geology in soils. Therefore, the general proposed development footprints, foundations designs, and approaches to addressing the geotechnical challenges of Schemes A and B are analyzed in this section.

Impacts Not Evaluated In Detail

Septic Tanks and Alternative Wastewater Systems. Sewer services at the Project site would be provided by the City of Santa Clara Sewer Utility. No septic tanks or alternative wastewater systems are proposed. Because the Project does not require soils capable of supporting septic systems, resulting in ***no impact***, this topic is not further evaluated.

Impacts and Mitigation Measures

Impact GEO-1: Soil Erosion. Construction of the Project would expose soil and buried refuse, potentially resulting in substantial soil erosion. (LTS/M)

Because of the uneven topography at the Project site, created by the underlying refuse layers, the site grading required for the Project would be complex. During the grading activities, large areas of soil (including topsoils, subsoils, and unconsolidated sediments) and refuse may be exposed. This may allow erosion from wind and stormwater runoff to occur.

Earthwork at the Project site is intended to grade each parcel to a fairly uniform subgrade elevation, which would be approximately 5 feet above the refuse layer. This is intended to allow for protection of the existing clay Landfill cap to the extent possible during construction, provide access for the installation of utility corridors, and allow for the replacement/relocation of the existing landfill gas collection system.

Grading at the Project site is anticipated to affect approximately 1.73 million cubic yards (cy) of material, as detailed in Table 3.9-4. One of the goals of the grading plan is to "balance" the cut and fill on-site so that the need for soil import and export is minimized. Balancing the cut and fill would necessitate the movement of soils cut from one or more parcels for use as fill at one or more other parcels. For example, most of the grading from Parcel 3 would be "cut" to lower the elevation of that parcel. The "cut" or removed soil from Parcel 3 would likely be used as "fill" on Parcel 4 since the elevation of this parcel would need to be raised.

Table 3.9-4. Earthwork Estimates

Parcel	Total Earthwork (cubic yards)
1	410,000
2	220,000
3	250,000
4	500,000
5	350,000
TOTAL	1,730,000

Source: Langan Treadwell Rollo. 2015. *Grading and Site Access Technical Memorandum*. City Place Santa Clara Development, Santa Clara, California. Draft. June 30.

Another goal of the site redevelopment grading plan is to minimize disturbance of the low permeability layer and the underlying refuse. The preliminary design specifies that the first-floor elevation (for the Parcel 4 structural slab[62] as well as the buildings and parking garage structures) would be at an elevation that would largely achieve this goal. However, because of the irregular topography of the low

[62] The structural slab is proposed to have an interstitial space above it for a vapor barrier and utilities and a topping slab over that interstitial space.

permeability layer and the refuse, it may be necessary to cut into the refuse at some locations—or it may be encountered by accident.

In addition to grading activities at Parcels 1–5, the Project would also include excavation and grading activities associated with the placement of a roadway over the Retention Basin,[63] the Lick Mill Boulevard extension in the Tasman East area, construction of a bridge over San Tomas Aquino Creek (including excavation and placement of footings/abutments in the creek banks), potentially the construction of Fire Station 10 at the Santa Clara Convention Center, and possibly the Santa Clara Gateway access variant. These excavation and grading activities (which are also reflected in the earthwork totals summarized in Table 3.9-4) would be conducted in proximity to receiving water bodies (i.e., the Guadalupe River and San Tomas Aquino Creek) and could, if not managed properly, result in discharges of sediment-laden runoff to these waters.

Because approximately 1.73 million cy of material would be disturbed, this could expose soil and buried refuse, resulting in a ***significant*** impact related to soil erosion.

MITIGATION MEASURE. The following mitigation measure would reduce potential erosion impacts at the Project site and off-site areas during construction activities to a ***less-than-significant*** level. Additional measures to prevent the entrainment of soils and refuse in stormwater runoff during construction will be required as part of compliance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activities (Construction General Permit), as described in more detail in Section 3.10, *Hydrology and Water Quality*.

GEO-1.1: *Detailed Grading and Erosion Control Plan.* A detailed grading and erosion control plan shall be prepared and submitted to the City Building Department. The plan shall cover all Project parcels (not just the landfill portions) and off-site areas and include all information required to demonstrate that earthwork activities will be in compliance with CCR 21190 *et seq*. and incorporate by reference the Project's Storm Water Pollution Prevention Plan, as required by the Construction General Permit.

Impact GEO-2: Unstable Soils. Unstable soils, perimeter sideslopes susceptible to landslides, and areas subject to liquefaction at the Project site and off-site areas may result in damage to, or settlement of, buildings and other improvements and/or ground failure. This has the potential to create significant risks to structures and human lives. (LTS/M)

Geotechnical hazards associated with the Project are discussed below, followed by a discussion of the recommendations for addressing the hazards included in the Project geotechnical reports.

Settlement

The non-refuse areas of Parcels 4 and 5, the roadway extension through the Retention Basin, and off-site Project elements at Tasman East, the Santa Clara Convention Center, the Tasman Ramp slip-ramp area, and the Santa Clara Gateway property are not underlain by refuse and, therefore, would not be affected by excessive settlement. However, buildings, streets, sidewalks, utilities, and other improvements at Parcels 1–4 would be built on top of soils with a refuse layer of 20 to 80 feet thick. Over the life of the Project, the refuse layer is expected to continue to compact. Under existing

[63] An elevated structure would connect Lick Mill Boulevard on Parcel 1 with Lafayette Street. The structure would start at an elevation of approximately 40 feet above msl on Parcel 1, cross over the Retention Basin area at an elevation of 9 to 23 feet above msl, and connect with Lafayette Street at 9 feet above msl.

conditions at Landfill Parcels 1 and 3, an additional 2.0 feet of settlement may occur at the site where refuse thickness is 40 feet, and 8.0 feet of settlement may occur where refuse thickness is 80 feet. At Landfill Parcels 2 and 4, an additional 0.25 feet of settlement may occur at the site where refuse thickness is 20 feet, and 1.25 feet of settlement may occur where refuse thickness is 40 feet.[64] With the new loading proposed by the Project, which would occur in some, but not all, areas (i.e., from the placement of fill), the induced settlements (in addition to ongoing settlement of refuse layers) are estimated to range from 5 feet (where refuse thickness is 40 feet) to 14 feet (where refuse thickness is 80 feet).[65] Given the heterogeneous nature of refuse, it is likely that this settlement would be uneven, creating lateral forces on buildings, utilities, and other improvements that could threaten their structural integrity. Settlement and the associated potential for damage to infrastructure and Project improvements is a ***significant*** impact.

The Preliminary Geotechnical Investigation (Parcels 1–4) and Preliminary Building Pile/Foundation Evaluation Technical Memo[66] provided recommendations to address the potential for settlement of the Project site ground surface over the life of the Project. Those recommendations are detailed below.

Foundation Options

The Building Pile/Foundation Memorandum and Preliminary Geotechnical Investigation (Parcels 1–4) identified two recommended foundation options for Parcels 1–4, as discussed below. However, these recommendations may be modified based on the results of the design-level geotechnical investigation. Foundation options for Parcel 5 are relatively conventional (compared with the foundations required over the closed landfill at Parcels 1–4). Depending on proposed structure loads and final geotechnical investigation results, possible building foundation options for Parcel 5 may include a mat foundation and grouted auger cast piles.

Drilled Displacement Columns (DDCs). The first recommended foundation option for Parcels 1–4 would involve constructing structures on isolated and continuous spread footings bearing on DDCs. This foundation type was determined to be appropriate in areas with relatively thin refuse layers (40 feet or less) and where relatively lightweight structures (i.e., up to about four stories in height) are planned. DDCs, between 18 and 36 inches in diameter, would be constructed through the refuse layer and about 5 to 10 feet into the underlying native soil. The auger would drill a shaft to the calculated depth (based on load-bearing requirements), displacing refuse, soil, and leachate laterally, to the side of the shaft. As the auger is removed, the column material (such as concrete or grout) would be injected continuously under pressure.

An advantage of this method is that the auger is designed to displace material laterally, so would not push contaminated materials into deeper, clean layers or bring substantial quantities of soil or refuse to the surface requiring disposal. The injected column material would penetrate into the voids in the refuse and soil surrounding the pile, effectively sealing the interface between the pile and the adjacent soil. Because the DDCs would not need to extend more than 5 or 10 feet below the refuse layer, this foundation type would not have the potential to create a potential pathway between shallow groundwater and leachate to deeper groundwater aquifers.

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[64] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[65] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22. Figures 7 and 8.

[66] Langan Treadwell Rollo. 2014. *Building Pile/Foundation Evaluation Technical Memorandum*. City Place Santa Clara, Santa Clara, California. July 11.

Auger Cast-in-Place (ACIP) Piles. The second recommended foundation option for Parcels 1–4, ACIP piles, would be appropriate in areas where refuse thickness is greater than 40 feet or the building loads are relatively large. Similar to the DDC option, 16- to 24-inch shafts would be drilled to the appropriate depth (calculated by the geotechnical engineer) using continuous hollow-stem augers. Grout or concrete would be injected continuously under pressure as the augers are withdrawn. A steel reinforcing cage would be inserted into the shaft while the grout was still fluid. The ACIP piles would be deeper than under the DDC option, extending at least 50 feet into the native soil below the refuse, and potentially as deep as 150 feet, increasing in depth depending on the loads the piles are designed to support. Settlement in areas that are underlain by thicker layers of refuse could be as high 14 feet over the life of the Project (as estimated for Parcels 1 and 3 in the Preliminary Geotechnical Investigation [Parcels 1–4]).[67] Placement of additional fill could be required 20 to 50 years after the completion of construction to maintain the lateral capacity of the foundation system.

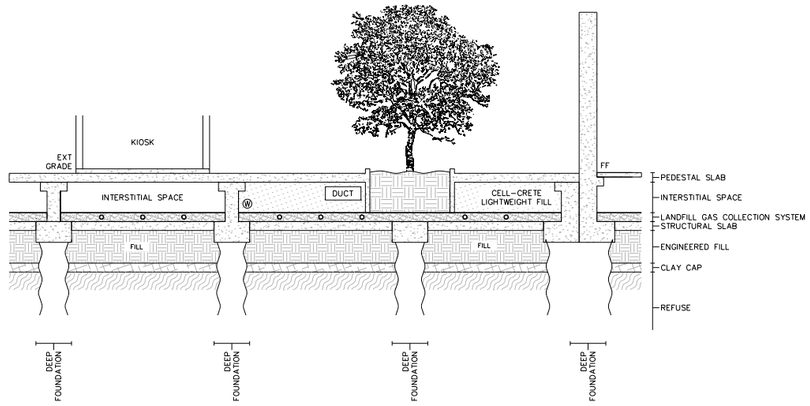
The ACIP piles are not considered likely to create a potential pathway between shallow groundwater and leachate to deeper groundwater aquifers. The continuous augers and pressure injection of cement grout from the bottom to the top of the shaft during construction would essentially seal the shaft created through the refuse layer. The presence of mostly fine-grained soil (silts and clays) beneath the refuse layer would further limit contaminant migration. In addition, the hydrologic setting of the Project site, including lack of hydraulic pressure (created through difference in elevation) between leachate levels and the regional shallow groundwater elevations and the relatively limited extent of impacted groundwater beneath the site, would limit potential groundwater impacts from contaminant migration.

Combined DDC and ACIP Pile Foundation. Both DDCs and ACIP piles could be used for the City Center Zone in Parcel 4. The foundation elements would support a structural concrete slab that would span most of the City Center Zone. Below most buildings, an interstitial space above the slab would be used for utilities and accessing landfill gas and groundwater monitoring locations. This area would be covered by a topping slab. Building foundations, pavement, landscaping, and other improvements would be built on this topping slab above the fill/interstitial space. Figure 3.9-4 includes a schematic drawing (Foundation Concept Type I) of an idealized cross-section of this foundation system. The use of the large structural slab would minimize the potential for any differential settlement at the City Center portion of the proposed development (with the exception of those landscaped areas that are not supported by the structural slab) as well as the potential for differential settlement for utilities and paved areas on top of the structural slab. However, settlement of up to 5 feet (as estimated for Parcel 4 in the Preliminary Geotechnical Investigation [Parcels 1–4])[68] could expose the upper portions of the foundation piles. In addition, there may be potential for settlement at the junction between the structural slab and adjacent areas of the Project site, including connecting streets.

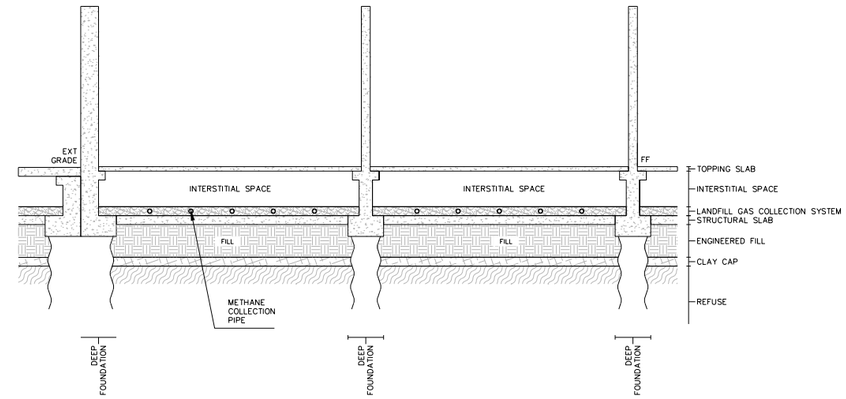
Landscaped areas that would not be supported by engineered foundation systems (both within and outside of the City Center) would be subject to differential settlement. Management of differential settlement in landscaped areas outside of the structural slab would depend on the design of the area, the amount of settlement to be corrected, and proximity to structurally supported slabs. In general, maintenance may include importing fill soil to raise the grade, reconstructing paved pathways to meet the grade, and adjusting flexible footings/hinged slab areas, as necessary.

[67] Langan Treadwell Rollo, 2014. *Preliminary Geotechnical Investigation*, City Place Santa Clara, Santa Clara California, 22 August. Figures 7 and 8.

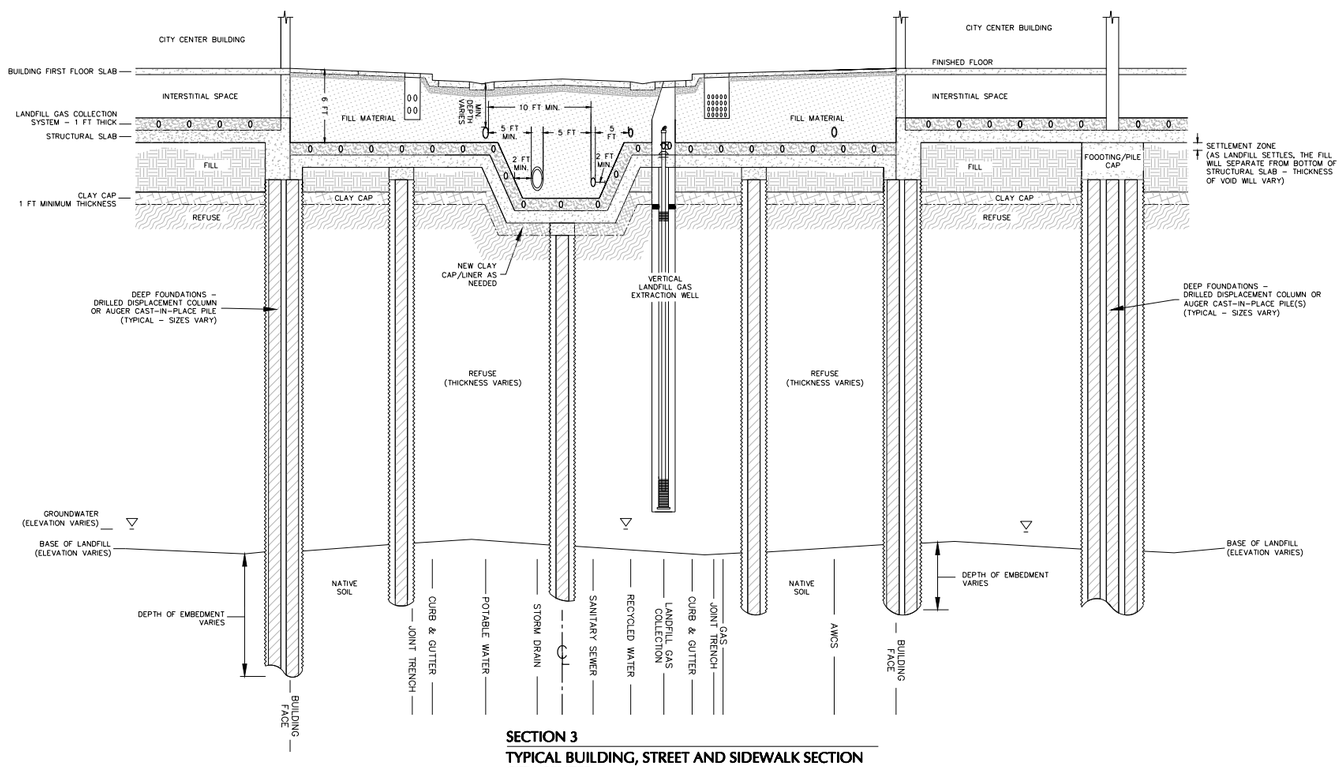
[68] Langan Treadwell Rollo, 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22. Figures 7 and 8.



SECTION 1
TYPICAL PLAZA SECTION - CITY CENTER



SECTION 2
TYPICAL BUILDING SECTION



SECTION 3
TYPICAL BUILDING, STREET AND SIDEWALK SECTION
CITY CENTER

Source: Langan 2015.

Graphics: 00233.14 (10-5-2015)

Figure 3.9-4
Generalized Foundation Cross-Sections
City Place Santa Clara

Roadways and Pavement

Roadway and other paving on Parcels 1–4 not located above an area-wide structural slab would be vulnerable to differential settlement and should be constructed with flexible materials, such as asphalt or interlocking pavers. The use of concrete and other non-flexible materials should be minimized. Where non-flexible material is used, expansion and spacing joints that allow rigid materials to shift without breaking should be used to allow for anticipated settlement.

Building Access Points

Exterior slabs and ramps attached to buildings should be hinged to allow the end of the slab or ramp not attached to the building to move downward as settlement occurs. The design should not allow building entrance slabs to exceed a 5 percent grade, to comply with Americans with Disabilities Act (ADA) access requirements, and vehicular entrances should not be allowed to exceed an 11 percent grade, to prevent vehicles scraping during entry or exit.

Utilities

Underground utilities not located above an area-wide structural slab, as shown in Figure 3.9-4, would need to be designed to take into account the predicted settlement and final ground surface elevation. Utilities may require hangers beneath foundations designed to support the load of the pipe and any backfill material above the pipe. Any utilities requiring gravity for proper operation should be designed to be operational after settlement to the final ground surface elevation. For Parcel 4 of the City Center, the Water Technical Memorandum indicates that the use of settlement vaults and flexible connections will be required at locations where utilities transfer from a pile-supported building to a non-supported area.[69] However, this requirement should apply to all phases of development.

Settlement Conclusions

These preliminary recommendations generally address the potential impacts from differential settlement, but additional detail would be required to support final Project design. A design-level geotechnical investigation would be required to evaluate the effects of structural loads from buildings, pavement, and other improvements and to determine the predicted final ground surface elevation at the Project site. Based on this information, foundations, pavement, utilities, and other improvements may be designed to minimize impacts from settlement.

Despite the best planning and design, it is likely that differential settlement would affect Project site development, particularly for utilities and paved areas between buildings supported by the DDC and ACIP pilings. Monitoring of the site would be necessary to determine where settlement is occurring. Repair or replacement of utilities, pavement, and building entries may be required in areas where settlement is greater than predicted or the design remedies are not as effective as predicted. The amount of settlement would likely be greatest during the first years following development, as new and increased loads are applied to the Project site ground surface, tapering off as secondary compaction of the refuse layer completes over the next 20 to 50 years.

As discussed above, Parcel 5 is not underlain by landfill refuse. Based on the findings of the Preliminary Geotechnical Investigation (Parcel 5), total settlement for heavy structures (i.e., greater than about four stories in height) at Parcel 5 over the life of the Project, resulting from static and seismic loading

[69] Langan Treadwell Rollo, 2015. *Water Technical Memorandum for City Place Santa Clara, Santa Clara, California*. May 1.

conditions, is estimated to range from about 2.5 to 4 inches. Differential settlement within a typical building footprint is estimated to be up to about 2.5 inches.[70] No site-specific geotechnical studies have been completed for the off-site areas; therefore, the potential magnitude of settlement at these locations is unknown. Based on the magnitude of settlement anticipated at Parcels 1–5, as described above, and the unknown magnitude of potential settlement at the off-site areas, the Project would result in ***significant*** impacts related to settlement of buildings and other improvements at the Project site.

Liquefaction

As described in the setting above, the Project site and off-site parcels (Tasman East, the Santa Clara Convention Center, the Tasman Drive slip-ramp area, and the Santa Clara Gateway property) are located within areas that are mapped as being moderately to highly susceptible to liquefaction.[71,72] The site-specific liquefaction analysis that was performed as part of the Preliminary Geotechnical Investigation (Parcels 1–4) noted the presence of saturated layers of loose to medium dense sand within one of the borings (Boring B-4, located in Parcel 4).[73] The analysis indicated that this layer could liquefy and result in seismically induced settlement on the order of 4 inches. However, no other potentially liquefiable soil layers were identified in the other five borings completed for the Preliminary Geotechnical Investigation (Parcels 1–4). Additional analysis conducted in the northwest corner of Parcel 5 indicates that seismic settlement ranging from about 0 to 3.25 inches could occur and that several layers in other portions of Parcel 5 could experience liquefaction that could result in soil softening and post-liquefaction total settlement ranging from 0 to 0.75 inch.[74] No site-specific geotechnical investigation has been conducted for the off-site areas (Tasman East, the Santa Clara Convention Center, the Tasman Drive slip-ramp area, and the Santa Clara Gateway property).

Placement of new structures, including residential and commercial buildings, in areas that are subject to liquefaction could expose people to injury or death and could result in substantial damage to physical improvements (e.g., buildings, infrastructure, roadways). Liquefaction and the associated potential for injuries to occupants and damage to infrastructure and Project improvements is a ***significant*** impact.

Slope Instability

The Project site, particularly around the perimeter of Parcels 1–4, includes relatively steep slopes (up to 3:1, horizontal: vertical) and the elevation differences from slopes, top to bottom, are over 50 feet. These slopes may be unstable under existing conditions and slope instability could be increased if new loads (e.g., fills, buildings) are placed on top of these slopes. Furthermore, any grading or excavation of the slopes or removal of material at the toe of the slopes could increase instability. The Preliminary Geotechnical Investigation (Parcels 1–4) does not address slope instability at the Project site, but states that once grading plans have been established slope stability studies of the perimeter slopes should be

[70] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.

[71] California Geological Survey. 2004. *State of California Seismic Hazard Zones, Milpitas Quadrangle*. October 19.

[72] Association of Bay Area Governments. n.d. *Liquefaction Susceptibility Map*. Available: <http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility>. Accessed: March 10, 2015.

[73] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[74] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.

performed.[75] The majority of Parcel 5 is flat and does not include significant slopes; however, a slope of 25 feet in height, at its maximum, is located between Tasman Drive and Parcel 5. The slopes are similar on the other side of Tasman Drive where the off-site slip-ramp would be constructed. These areas could be affected by Project grading activities during the construction of a new roadway access point from Tasman Drive to Avenue B (including the New Tasman Drive Intersection Variants). No significant slopes are present at the off-site areas where Fire Station 10 and access points could be constructed. The potential for the Project to increase slope instability and cause landslides, which could affect existing roadways and/or off-site properties, is a ***significant*** impact.

Lateral Spreading

Lateral spreading is a form of horizontal displacement of soil toward an open channel or other "free" face, such as an excavation boundary. In a lateral spread failure, a layer of ground at the surface is carried on an underlying layer of liquefied material over a nearly flat surface toward a river channel or other bank. The lateral spreading hazard tends to mirror the liquefaction hazard for a site, but requires that a free face is present (liquefaction can occur without a free face). The Preliminary Geotechnical Investigation Preliminary (Parcels 1–4) report concluded the potential for lateral spreading is low at Parcels 1–4 because there are no continuous potentially liquefiable layers near the slope faces of the former landfill. Lateral spreading was also determined to be a low hazard at Parcel 5 because the only open channel or free face in this area where lateral spreading could occur is along the bank of San Tomas Aquino Creek and the subsurface at this location was improved when the adjacent parking structure was built. There is no site-specific geotechnical information available for the off-site areas. However, the lateral spreading hazard is expected to also be low because there are no significant free faces at these offsite areas with the exception of the Tasman Drive slip-ramp, which currently contains steep slopes and, thus, could be subject to lateral spreading. However, since the construction of the Tasman Drive slip-ramp would require grading of the area and a reduction in the steepness of the slope, no significant impacts are expected to occur. Because there does not appear to be any continuous potentially liquefiable layer near the slope faces, the potential for lateral spreading to affect the Project is ***less than significant***.

Expansive Soils

Limited investigation of the expansion potential for Project site and off-site soils has been conducted. The Preliminary Geotechnical Investigation (Parcels 1–4) does not specifically address expansive soils; however, because the buildings would be above a structural slab and would be supported on DDCs or ACIP, and the expansive clay would have several feet of soil cover, the improvements on Parcels 1–4 would not be adversely impacted. At Parcel 5, the surficial fills are underlain by very highly expansive clay.[76] Based on Natural Resource Conservation Service (NRCS) mapping, soils at the off-site Project areas at Tasman East, Santa Clara Convention Center, and the Tasman Drive slip-ramp area have moderate to high shrink-swell potential. Therefore, if not properly managed, these soils could pose a geotechnical hazard (related to expansion and contraction) to Project building foundations and utilities constructed in these soils. The potential for the Project improvements outside of Parcels 1–4 to be damaged by expansive soils is a ***significant*** impact.

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[75] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22. Page 25.

[76] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.

Corrosive Soils

Corrosive soils can corrode construction materials, such as concrete, pipeline materials, and electrical equipment and instrumentation, causing damage to infrastructure. Soils underlying the Project site and materials within the refuse layer may potentially be classified as corrosive. No specific information on the corrosiveness of the Project site (Parcels 1–4) or off-site soils is available. The Preliminary Geotechnical Investigation (Parcels 1–4) does not address corrosive soils at the Project site, but states that the piles should also be designed to account for the presence of corrosive soil; a corrosion consultant should be retained to provide specific recommendations regarding the long-term corrosion protection of pile elements.[77] The Preliminary Geotechnical Investigation (Parcel 5) indicates that, in general, the corrosion potential for site soils to adversely affect buried concrete on Parcel 5 is low. However, the soils are considered corrosive to mildly corrosive to buried metallic structures, such as metal pipes.[78] The potential for the Project improvements to be damaged by corrosive soils is a ***significant*** impact.

MITIGATION MEASURES. The following mitigation measures would reduce potential impacts due to unstable soils to a ***less-than-significant*** level by: 1) requiring a design-level geotechnical investigation prior to commencement of grading, or construction, including additional characterization of settlement potential, liquefaction potential, analysis of slope stability, distribution of expansive soils, and testing of soil and subsurface corrosion potential; 2) developing specific design measures to address each of the identified geologic hazards (e.g., specification of use of corrosion-resistant concrete in areas of moderate to high soil corrosion potential); 3) implementing the specified design measures during construction; 4) implementing a Site Operation, Monitoring, and Maintenance Plan that includes regular inspections, including a funding mechanism to address any issues that may arise during the operation period; and 5) assignment of responsible parties for implementation.

GEO-2.1: Design-Level Geotechnical Investigation. Prior to the issuance of demolition, grading, or construction permits at the Project site, a design-level geotechnical investigation shall be conducted by a qualified professional (the qualified professional shall be retained by the Project Developer). The investigation shall include further field exploration (e.g., borings, cone penetration tests, test pits and/or geophysical surveys) to develop design-level recommendations to address erosion and other geotechnical concerns for the Project. The design-level geotechnical investigation shall include:

- *Evaluation of anticipated settlement.* Additional soil borings shall be installed to determine the depth to the refuse layer for aid in preparing grading plans. Additional samples shall be analyzed to determine potential settlement and determine the likely final post-settlement surface elevation. The potential magnitude of differential settlements between improvements supported by a combination of structural slab and deep foundations and those that are supported by other foundation systems shall be fully analyzed and detailed in the design-level geotechnical report.
- *Evaluation of liquefaction potential.* Additional borings shall be drilled at the Project site and off-site areas to fully characterize the liquefaction hazard associated with the Project.

[77] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22. Page 28.

[78] Cornerstone Earth Group. 2014. *Preliminary Geotechnical Investigation, Santa Clara HERO, Tasman Drive and Centennial Boulevard, Santa Clara, California*.

- *Evaluation of slope instability.* A detailed slope stability analysis for all existing slopes that would remain under the Project, including the perimeter landfill slopes, and all proposed new slopes shall be prepared.
- *Evaluation of expansive soils.* Additional borings shall be drilled at the Project site and off-site areas to fully characterize the expansive soil hazard associated with the Project.
- *Evaluation of corrosive soils.* Project site and off-site soils and, in those areas where foundation components would come into contact with landfill materials, refuse shall be evaluated for corrosion potential.

The design-level geotechnical investigation work plan shall be submitted for review and approval in accordance with Mitigation Measure GEO-2.6.

GEO-2.2: *Final Geotechnical Report Review.* A final geotechnical report shall be prepared by a qualified professional based on the findings of the design-level geotechnical investigation (the qualified professional shall be retained by the Project Developer). The final report shall be submitted for review and approval in accordance with Mitigation Measure GEO-2.6. The final geotechnical report shall include:

Measures to address anticipated settlement:

- Specifications of methods to address differential settlement between improvements supported by a combination of structural slab foundations and those that are supported by other deep foundation systems or unsupported areas.
- Exterior slabs and ramps attached to buildings shall be hinged to allow the end of the slab or ramp not attached to the building to move downward as settlement occurs. The design shall not allow building entrance slabs to exceed a 5 percent grade, in compliance with ADA access requirements, and vehicular entrances shall not be allowed to exceed an 11 percent grade to prevent vehicles from scraping during entry or exit.
- Settlement vaults and flexible connections shall be required at locations where utilities transfer from a pile-supported building to a non-supported area for all phases of construction.
- Roadway and other paving at the Project site not located above an area-wide structural slab shall be constructed with flexible materials, such as asphalt or interlocking pavers. The use of concrete and other non-flexible materials shall be minimized. Where non-flexible material is used, expansion and spacing joints that allow rigid materials to shift without breaking shall be used to allow for anticipated settlement.

Measures to address liquefaction:

- In those areas not supported by the structural slab foundation (which would effectively mitigate the liquefaction hazard), other measures shall be developed to mitigate the hazard, such as shallow footings constructed over ground improvement. Foundations for structures shall be designed to completely mitigate settlement hazards associated with liquefaction (i.e., no liquefaction-induced settlement damage shall be accepted for the final design).

Measures to address slope instability:

- Measures (e.g., reducing slope steepness, providing structural support, or ground improvement) to ensure that an appropriate factor of safety (both static and seismic) is achieved for each slope.

Measures to address expansive soils:

- In those areas not supported by the structural slab foundation (which would effectively mitigate the hazard), other measures shall be developed to mitigate the hazard, such as removal of the problematic soils, treatment of the soils, or specification of appropriate foundation design. If any soils characterized as highly or moderately expansive (linear extensibility of 3.0 percent or more) are to remain at the surface or be used as fill in the upper 5.0 feet, these soils shall be treated (using calcium-based treatment or similar approach) such that the soils are reduced to a low expansion potential (linear extensibility of less than 3.0 percent).

Measures to address corrosive soils:

- A corrosion consultant shall be retained to provide specific recommendations regarding the long-term corrosion protection of pile elements and other subsurface materials. The recommendations of the corrosion consultant, which may include use of specific corrosion-resistant materials and/or treatment of corrosive soils, shall be implemented during construction.

GEO-2.3: *Construction Quality Assurance Plan.* A Construction Quality Assurance (CQA) Plan that covers both the Project site and off-site areas shall be prepared by the Project Developer for review and approval by the Director of Public Works. The CQA Plan shall establish procedures for testing final cover materials, detail the responsibilities of construction monitoring personnel, and provide procedures for addressing unexpected geologic conditions during grading activities.

GEO-2.4: *Final Project Design Review.* Final Project design plans that cover both Project site and off-site areas shall be prepared by the Project Developer and submitted for review and approval in accordance with Mitigation Measure GEO-2.6. Project site structures shall be designed to accommodate predicted ground settlement, as determined in the design-level geotechnical investigation for the Project improvements (see Mitigation Measure GEO-1.1).

For the portion of the Project overlying the Landfill, the Post-Closure Land Use Plan shall demonstrate that Project design will be protective of public health and safety and the environment, as required by 27 CCR 21190. Because of the potential for encountering buried obstructions, contingencies for relocating Auger Cast-in Place Piles and Drilled Displacement Columns during construction shall be included in the foundation design. The Project design plans shall be subject to review and approval by the City Building Department prior to initiation of field activities.

GEO-2.5: *Site Operation, Monitoring, and Maintenance Plan.* A Site Operation, Monitoring, and Maintenance Plan that covers both the Project site and off-site areas shall be prepared by the Project Developer and submitted for review and approval in accordance with Mitigation Measure GEO-2.6. The Site Operation, Monitoring, and Maintenance Plan shall establish procedures for inspecting structures and improvements as well as evaluating the effects of

settlement. It will also establish a mechanism for funding and implementing the Plan's activities throughout the life of the Project.

Inspections that focus on documenting settlement, particularly at locations where different support systems meet, shall take place at least quarterly during the first 2 years following the completion of each phase of Project construction. Documentation of each inspection shall be submitted to for review and approval in accordance with Mitigation Measure 2.6 within 30 days of inspection completion. After 2 years, the frequency of inspections may be adjusted with written consent from each agency that approved the Site Operation, Monitoring, and Maintenance Plan Site Operation, Monitoring, and Maintenance Plan. The Site Operation, Monitoring, and Maintenance Plan shall detail the qualifications and responsibilities of monitoring personnel, including immediate notification of the City Building Department of any settlement that could affect the structural integrity of a building and/or structure or settlement that could create a hazard for the public (e.g., separations that create trip hazards for pedestrians). If the types of settlements are observed that could compromise structural integrity or cause hazards for the public, based on the judgment of the qualified inspector, remedial action shall be promptly completed. The Plan shall designate financial responsibility for remedial actions should the effects of settlement be identified and provide timetables for any required remedial action. All remedial action shall be overseen by the qualified geotechnical consultant designated by the Plan and approved by each agency that approved the Site Operation, Monitoring, and Maintenance Plan Site Operation, Monitoring, and Maintenance Plan. Quarterly reports detailing inspection and remedial activities shall be submitted to each agency that approved the Site Operation, Monitoring, and Maintenance Plan following each inspection for review and approval.

GEO-2.6: Review and Approval by Relevant Regulatory Agencies. To the extent reports and plans required by Mitigation Measures GEO-2.1, -2.2, -2.3, -2.4 or -2.5 address the portion of the Project site overlying the Landfill, they shall be submitted jointly by the City (as owner and operator of the landfill) and the Project Developer for review and approval to the following: (i) the Local Enforcement Agency as principal landfill regulator; (ii) the Regional Water Board for approval of the issues related to the low permeability layer of the final landfill cover pursuant to 27 CCR 21990 (d) and pilings installed in or through the bottom liner of the landfill liner pursuant to 27 CCR 21990 (e)(6), and for review but not approval of other aspects of the plans and reports; (iii) to Cal Recycle for review, but not approval; and (iv) any other agency which is specifically required by applicable law to approve a particular report, plan or component thereof. To the extent reports and plans required by this mitigation measure relate to other portions of the site not overlying the Landfill, they shall be submitted by the Project Developer to the City, and to any agency which is specifically required by applicable law to approve a particular report, plan or component thereof, for review and approval.

Impact GEO-3: Strong Seismic Ground Shaking. The Project site could be subject to fault rupture and/or strong ground shaking from a seismic event during its design life, which has the potential to present a significant risk to structures and human lives. (LTS)

As shown in Figure 3.9-1 and Table 3.9-2, no faults cross the Project site and the site is not within an Alquist-Priolo Earthquake Fault Zone. Since faults with known surface rupture have been mapped in California, and none are known to occur at the Project site, fault rupture at the Project site would be considered very unlikely. Because fault rupture hazard is considered very unlikely, this impact is ***less than significant***.

As indicated above, the Project site is located in a seismically active region. The likelihood of a magnitude 6.0 (or greater) earthquake occurring on a San Francisco Bay Area fault (or combination of faults) is 98 percent in the next 30 years (starting in 2014). The likelihood of a magnitude 7.0 (or greater) is 51 percent. Ground shaking at the Project site may be violent and potentially to a greater degree on top of the Landfill. Ground shaking could result in significant damage, though not collapse, even to properly designed structures.

The Project site buildings and improvements shall be constructed in accordance with the current CBC (as amended), as required by the Santa Clara Municipal Code. The Preliminary Geotechnical Investigation (Parcels 1–4) has established design parameters as appropriate to protect Project structures in accordance with the seismic requirements in the CBC. These site-specific design parameters are based on the ground shaking produced by the Maximum Considered Earthquake, as predicted in USGS models. The design parameters are intended to ensure that buildings retain structural integrity during the most severe ground shaking that would be expected at the site.

Project site structures must meet these seismic design parameters of the CBC, as enforced by the City Building Official. The current CBC represents the best available guidance for design and construction to limit seismic risk. No mitigation is required to reduce this impact to a ***less-than-significant*** level.

Cumulative Impacts

The geographic context for the analysis of impacts resulting from geologic hazards is generally site specific rather than cumulative in nature. Every project has unique geologic considerations that are subject to uniform site development and construction standards. As such, the potential for cumulative impacts to occur is limited. For impacts related to exposure to seismic hazards, the geographic context is the Bay Area because the entire region is seismically active, with people subject to risk of injury and structures subject to damage as a result of seismic ground shaking.

Cumulative impacts are addressed only for those thresholds that would result in a Project-related impact, whether it be less than significant, significant, or significant and unavoidable. If the Project would result in no impact with respect to a particular threshold, it would not contribute to a cumulative impact. Therefore, no analysis would be required.

The Project would not require soils to be capable of supporting septic tanks and alternative wastewater systems, resulting in no impact for this topic. Therefore, this topic was not analyzed for cumulative impacts.

This cumulative analysis examines the effects of the Project in the relevant geographic area in combination with other current projects, probable future projects, and projected future growth.

Impact C-GEO-1: Cumulative Soil Erosion, Soil Hazards, and Seismic Hazards Impacts. The Project, in combination with other foreseeable development in the vicinity, would not substantially increase soil erosion potential, soil hazards, or the risk of exposure of people or structures to seismic hazards. Therefore, this cumulative impact would be less than significant. (LTS)

Soil Erosion

The geographic context for the analysis of impacts related to development and the geotechnical aspects of erosion (i.e., permanent loss of soil or topographic changes that cause or exacerbate erosion) is generally site specific; the impacts would not be compounded by additional development. Development

of other current projects could expose soil and alter soil conditions; however, to minimize the potential for cumulative impacts related to erosion, all projects in the City would be required to conform to the provisions of the applicable ordinances and State regulations pertaining to the control of erosion and sediment. Projects would comply with the measures prescribed in the NPDES Construction General Permit to prevent the entrainment of soils and refuse in stormwater runoff during and post-construction. Cumulative water quality impacts associated with contaminated stormwater runoff, including the contribution from soil erosion, are discussed in Impact C-WQ-1 in Section 3.10, *Hydrology and Water Quality*. There would be no significant cumulative impact with respect to soil erosion because impacts would be addressed through compliance with City and State regulations and Project mitigation measures. Thus, the cumulative impact regarding soil erosion would be ***less than significant***.

Soil Hazards

The geographic context for the analysis of impacts related to unstable soil conditions, including compressible soils, settlement, or other conditions that could cause structural problems, is site specific; it would not be compounded by additional development. Further, all development is required to undergo an analysis of geological and soil conditions. The analysis is applicable to a specific individual project. Restrictions on development would be applied in the event that geological or soil conditions pose a risk to safety (i.e., as a result of site-specific geologic conditions or soil instability). Because the City and neighboring jurisdictions use and enforce the requirements of the CBC as part of their code, new buildings and facilities are required to be sited and designed in accordance with the most current geotechnical guidelines. Projects are required to include all necessary design features, including those recommended in geotechnical investigations and associated documents, to reduce the risk from uneven soil settlement, which could threaten the structural integrity of buildings, utilities, and other improvements. With adherence to the City Code and related plans, regulations, and design and engineering guidelines and practices, the cumulative impact with respect to soil hazards would be ***less than significant***.

Seismic Hazards

Future population growth in the Bay Area, including the population associated with the Project and other development, will increase the number of people and structures that would be exposed to seismic hazards. Given the risk from seismic activity associated with all development in seismically active areas, this cumulative impact would be significant if it were not mitigated by State building code requirements. Construction in California is strictly regulated by the CBC, as adopted and enforced by each jurisdiction, including the City, to reduce risks from seismic events to the maximum extent possible. Because the City and neighboring jurisdictions use and enforce the requirements of the CBC as part of their code, new buildings and facilities are required to be sited and designed in accordance with the most current geotechnical and seismic guidelines and recommendations. Development of all projects would include the necessary design features, including those recommended by site-specific geotechnical studies (required for all development), to reduce the risk from seismic activity, unstable slopes, and soil limitations. Therefore, there would be no significant cumulative impact. With adherence to the building requirements in City Code and related plans, regulations, and design and engineering guidelines and practices, the cumulative impact would be ***less than significant***.

3.10 Hydrology and Water Quality

This section describes the affected environment and regulatory setting for hydrology and water quality. It also describes the impacts on hydrology and water quality that would result from implementation of the Project and mitigation measures that would reduce these impacts. Reports used for the analysis in this section include *Hydrology/Water Quality Report for City Place Santa Clara* (June 30, 2015), *Stormwater Technical Memorandum for City Place Santa Clara* (June 30, 2015), and the *Preliminary Geotechnical Investigation* (August 22, 2014), all prepared by Langan Treadwell Rollo. The Project's potential impacts on water supply are discussed in Section 3.14, *Utilities and Service Systems*.

Issues identified in response to the Notices of Preparation (NOPs) (Appendix 1) were considered in the preparation of this analysis. One NOP comment was received regarding the analysis of water pollution from increased traffic on adjacent roadways. Potential impacts from increased vehicle use are discussed in Impact WQ-1.

Existing Conditions

Regulatory Setting

Federal

Clean Water Act

The federal Clean Water Act (CWA) was enacted with the primary purpose of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. The CWA directs states to establish water quality standards for all "waters of the United States" and to review and update such standards on a triennial basis.

The U.S. Environmental Protection Agency (EPA) has delegated responsibility for implementation of portions of the CWA, including water quality control planning and control programs, such as the National Pollutant Discharge Elimination System (NPDES) program (discussed below), to the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Board (Regional Water Board). The State Water Board establishes statewide policies and regulations for the implementation of water quality control programs mandated by federal and State water quality statutes and regulations. The Regional Water Boards develop and implement water quality control plans (basin plans) that identify the beneficial uses of surface and ground waters, water quality characteristics, and water quality problems.

Section 303(d) and Total Maximum Daily Loads. The CWA contains two strategies for managing water quality. One is a technology-based approach that includes requirements to maintain a minimum level of pollutant management using the best available technology (BAT). The other is a water quality-based approach that relies on evaluating the condition of surface waters and setting limitations on the amount of pollution that the water can be exposed to without adversely affecting the beneficial uses of those waters. Section 303(d) of the CWA bridges these two strategies. Section 303(d) requires that the states make a list of waters that are not attaining standards after the technology-based limits are put into place. For waters on this list (and where the EPA administrator deems they are appropriate), the states are to develop total maximum daily loads (TMDLs). TMDLs are established at the level necessary

to implement the applicable water quality standards. The CWA does not expressly require the implementation of TMDLs. However, federal regulations require that an implementation plan be developed along with the TMDL and Sections 303(d), and 303(e), and their implementing regulations require that approved TMDLs be incorporated into basin plans. EPA has established regulations (40 Code of Federal Regulations [CFR] 122) that require that NPDES permits be revised to be consistent with any approved TMDL. A mercury TMDL has been established for the San Francisco Bay (Bay) and approved by the State Water Board (Resolution 2007-0045). TMDLs for the other constituents that contribute to impairment are scheduled to be completed by 2019.

In addition to the impaired water body list required by CWA Section 303(d), CWA Section 305(b) requires states to develop a report that assesses statewide surface water quality. Both CWA requirements are being addressed through the development of a 303(d)/305(b) Integrated Report, which will address both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board developed a statewide 2010 California Integrated Report based on the Integrated Reports from each of the nine Regional Water Boards. The *2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report)—Statewide* (2010 California Integrated Report) was approved by the State Water Board on August 4, 2010, and approved by EPA on November 12, 2010. A 2012 California Integrated Report with 303(d) listings is currently in development.

Section 404 Dredge/Fill Permitting. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of this act and, specifically, under Section 404 (Discharges of Dredge or Fill Material) of the CWA. Section 404 of the CWA regulates placement of fill materials into the waters of the United States. Section 404 permits are administered by the U.S. Army Corps of Engineers (USACE).

Section 401 Water Quality Certification. Section 401 of the CWA requires that an applicant pursuing a federal permit to conduct an activity that may result in a discharge of a pollutant obtain a Water Quality Certification (or waiver). A Water Quality Certification requires the evaluation of water quality considerations associated with dredging or placement of fill materials into waters of the United States. Water Quality Certifications are issued by one of the nine geographically separated Regional Water Boards in California. Under the CWA, the Regional Water Board must issue or waive a Section 401 Water Quality Certification for a project to be permitted under CWA Section 404.

Section 402—National Pollutant Discharge Elimination System. The 1972 amendments to the federal Water Pollution Control Act established the NPDES permit program to control discharges of pollutants from point sources (Section 402). The 1987 amendments to the CWA created a new section of the CWA devoted to stormwater permitting (Section 402[p]). EPA has granted the State of California (the State Water Board and Regional Water Boards) primacy in administering and enforcing the provisions of CWA and NPDES. NPDES is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States.

NPDES General Permit for Construction Activities. Most construction activities that disturb 1 acre of land or more are required to obtain coverage under the NPDES General Permit for Construction Activities (Construction General Permit). The State Water Board has issued a statewide Construction General Permit (Order No. 2009-0009-DWQ, NPDES No. CAR000002), adopted September 2, 2009. Construction activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as stockpiling or excavation, that result in soil disturbances of at least 1 acre of total land area.

The Construction General Permit requires the applicant to file a notice of intent (NOI) to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP). The

SWPPP includes a site map and a description of proposed construction activities, along with a demonstration of compliance with relevant local ordinances and regulations, and an overview of the best management practices (BMPs) that would be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. Permittees are further required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants.

NPDES General Industrial Stormwater Permit. The General Permit (Order No. 97-03-DWQ) for Stormwater Discharges Associated with Industrial Activities (Industrial General Permit) is an NPDES permit that regulates discharges associated with 10 broad categories of industrial activities. The General Industrial Permit requires the implementation of management measures that will achieve the performance standard of economically achievable BAT and best conventional pollutant control technology (BCT). The General Industrial Permit also requires the development of an Industrial SWPPP and a monitoring plan. BMPs specified under the Industrial SWPPP include good housekeeping practices, non-stormwater management, proper waste handling, secondary containment for hazardous materials and waste, education and training.

The City requested a Notice of Termination (NOT) from the Industrial General Permit (WDID No. 2 43S006565) in 1996. However, the quality of runoff from the site must be monitored for at least one year, and the NOT was unable to be terminated. As a result, the Project site is still covered under the Industrial General Permit. The 1997 Industrial General Permit (Order No. 97-03-DWQ) was recently superseded by the new 2015 Industrial General Permit (Order 2014-0057-DWQ) on July 1, 2015, by which time all existing regulated permittees needed to submit new permit registration documents, such as a revised Industrial SWPPP, to maintain coverage. This new Industrial General Permit covers stormwater discharges from landfills, land application sites, and open dumps that receive or have received industrial waste from any facility covered by this Industrial General Permit. However, facility operators of closed landfills that are regulated by WDRs may or may not be required to comply with the Industrial General Permit. The existing closed landfill is currently covered under waste discharge requirements (WDRs), which is described further below, and therefore it is unclear as to whether they will need to maintain coverage under the new Industrial General Permit.

NPDES General Municipal Stormwater Permit. CWA Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4) (MS4 Permit). Phase I MS4 regulations cover municipalities with populations greater than 100,000, certain industrial processes, or construction activities disturbing an area of 5 acres or more. Phase II (Small MS4) regulations require that stormwater management plans be developed by municipalities with populations under 100,000 and construction activities that disturb 1 or more acres of land area.

MS4 Permits require that cities and counties develop and implement programs and measures to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. As part of permit compliance, these permit holders have created stormwater management plans for their respective locations. These plans outline the requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. These requirements may include multiple measures to control pollutants in stormwater discharge. During implementation of specific projects under the program, project applicants will be required to follow the guidance contained in the stormwater management plans as defined by the permit holder in that location.

National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) is responsible for determining, based on USACE studies, flood elevations and floodplain boundaries. FEMA is also responsible for distributing the Flood Insurance Rate Maps (FIRMs), which are used in the National Flood Insurance Program (NFIP). These maps identify the locations of special flood hazard areas, including the 100-year floodplain. FEMA allows non-residential development in the floodplain; however, construction activities are restricted within the flood hazard areas, depending on the potential for flooding within each area.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) is established and implemented by the State Water Board and nine Regional Water Boards. The State Water Board is the primary State agency responsible for protecting the quality of the State's surface and groundwater supplies, or "waters of the State." Waters of the State are defined more broadly than "waters of the United States;" they are defined as any surface water or groundwater, including saline waters, within the boundaries of the State. This includes waters in both natural and artificial channels. It also includes all surface waters that are not waters of the United States or non-jurisdictional wetlands, which are essentially distinguished by whether they are navigable. If waters are not navigable, then they are considered to be isolated and, therefore, fall under the jurisdiction of only the Porter-Cologne Act and not the CWA. The Regional Water Boards are responsible for implementing CWA Sections 401, 402, and 303(d), as previously mentioned and described in more detail below.

The Porter-Cologne Act authorizes the State Water Board to draft State policies regarding water quality. The act requires projects that are discharging, or proposing to discharge, wastes that could affect the quality of the State's water to file a waste discharge report with the appropriate Regional Water Board. The Porter-Cologne Act also requires that the State Water Board or a Regional Water Board adopt basin plans for the protection of water quality. Basin plans are updated and reviewed every 3 years and provide the technical basis for determining WDRs, taking enforcement actions, and evaluating clean water grant proposals. A basin plan must include the following sections.[1]

- A statement of beneficial water uses that the Regional Water Board will protect.
- Water quality objectives needed to protect the designated beneficial water uses.
- Strategies and time schedules for achieving the water quality objectives.

In basin plans, Regional Water Boards designate beneficial uses for all water body segments in their jurisdictions and then set criteria necessary to protect these uses. Consequently, the water quality objectives developed for particular water segments are based on the designated use and vary, depending on such use. The *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan) specifies region-wide and water body–specific beneficial uses and sets numeric and narrative water quality objectives for several substances and parameters in numerous surface waters in its region. Specific objectives for concentrations of chemical constituents are applied to bodies of water based on their designated beneficial uses.[2]

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[1] San Francisco Bay Regional Water Quality Control Board. 2011. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Originally published January 18, 2007. Last updated in 2011.

[2] San Francisco Bay Regional Water Quality Control Board. 2011. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Originally published January 18, 2007. Last updated in 2011.

In addition, the State Water Board identifies waters that fail to meet standards for specific pollutants, which are then state listed in accordance with CWA Section 303(d). If it is determined that waters are impaired for one or more constituents, and the standards cannot be met through point-source or non-point source controls (NPDES permits or WDRs), the CWA requires the establishment of TMDLs. TMDLs may establish daily load limits for the pollutant or, in some cases, require other regulatory measures, with the ultimate goal of reducing the amount of the pollutant entering the water body to meet water quality objectives. The latest 303(d) impairments are listed in the 2010 California Integrated Report.[3]

The Project lies within the jurisdiction of the San Francisco Bay Regional Water Board. The San Francisco Bay Regional Water Board is responsible for the protection of beneficial uses of water resources in the San Francisco Bay Basin, which includes Alameda, Contra Costa, San Francisco, Santa Clara (north of Morgan Hill), San Mateo, Marin, Sonoma, Napa, and Solano Counties. The Basin Plan was last updated in 2011.[4] Beneficial uses, water quality objectives, and Section 303(d)-listed impairments are described for the Project area below in the *Surface Water Quality* section.

The Basin Plan also establishes beneficial water uses for groundwater basins within the region. The Santa Clara groundwater subbasin underlies the Project site and is listed in the Basin Plan as providing beneficial uses that include municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply. One of the main water quality issues for the northern Santa Clara groundwater subbasin is saltwater intrusion. Saltwater from San Francisco Bay and adjacent salt ponds has intruded freshwater-bearing aquifers. Local agencies, including the Santa Clara Valley Water District, have implemented measures to prevent saltwater intrusion.

In 1996, the Regional Water Boards and the California EPA initiated an effort to encourage local stewardship in the Santa Clara basin as part of the statewide Watershed Management Initiative. The Santa Clara Basin Watershed Management Initiative is a broad-based stakeholder group of 32 signatories from local, state, and federal public agencies, business and trade associations, and civic and environmental groups and programs. The purpose of this Watershed Management Initiative is "to develop and implement a comprehensive watershed management program—one that recognizes that healthy watersheds mean addressing water quality problems and quality of life issues for the people, animals, and plants that live in the watershed." This Watershed Management Initiative has produced watershed assessments and a watershed action plan. It continues to develop its priorities for implementation to protect and improve water quality.

California Water Code

All projects resulting in discharges, whether to land or water, are subject to Section 13263 of the California Water Code. Section 13260 states that persons discharging or proposing to discharge waste that could affect the quality of waters of the State, other than into a community sewer system, shall file a waste discharge report that contains information that may be required by the appropriate Regional Water Board. The projects are then required to obtain approval of WDRs from the appropriate Regional Water Board. Land and groundwater-related WDRs (i.e., non-NPDES WDRs) regulate discharges of

[3] California State Water Resources Control Board. 2011. *2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report)—Statewide*. San Francisco Bay Regional Water Quality Control Board. USEPA approved: October 11, 2011. Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml. Accessed: December 3, 2014. Accessed: April 15, 2013.

[4] San Francisco Bay Regional Water Quality Control Board. 2011. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Available: http://www.waterboards.ca.gov/rwqcb2/basin_planning.shtml.

privately or publicly treated domestic wastewater and process and wash-down wastewater. WDRs for discharges to surface waters also serve as NPDES permits.

Waste Discharge Requirements for Closed Landfill Activities

The Project site is covered under WDRs for the City of Santa Clara All-Purpose Landfill, Inactive Class III Solid Waste Disposal Site (Order No. R2-2002-0008). The City WDRs (Order No. 94-050) for the Landfill were updated in 2002. The 2002 Order includes a Discharge Monitoring Program for surface, groundwater and leachate monitoring and maintenance reporting requirements and other provisions related to leachate removal and control systems, site conditions, and stormwater. The WDRs contain monitoring requirements for water quality data and volatile organic compounds (VOCs) at 24 active groundwater wells, six leachate wells, and four surface water sites in San Tomas Aquino Creek and Guadalupe River. More information on monitoring activities is provided below. The City will submit a new Report of Waste Discharge (or application for WDRs) to the San Francisco Bay Water Board to reflect changes as part of the Project, and new WDRs will be issued for the Project.

California Department of Fish and Game Code 1602 Lake and Streambed Alteration Agreement

Under Division 2, Chapter 6, of the California Fish and Game Code, the California Department of Fish and Wildlife (CDFW) is responsible for the protection and conservation of the State's fish and wildlife resources. Section 1602 et seq. of the Code defines the responsibilities of CDFW and requires that public and private applicants obtain an agreement to "divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake." A streambed alteration agreement is required under Section 1602 of the California Fish and Game Code for all activities that involve temporary or permanent activities within State jurisdictional waters. A Section 1602 Streambed Alteration Agreement will be required for the Project due to its effects on water bodies located throughout the vicinity of the Project site.

Local

San Francisco Bay Municipal Regional Stormwater Permit

The San Francisco Bay Regional Water Board most recently issued the MS4 Phase I San Francisco Bay Region Municipal Regional Stormwater NPDES Permit No. CAS029718 (Order No. R2-2009-0074-DWQ, Revised November 28, 2011; NPDES Permit No. CAS612008) (San Francisco Bay MS4 Permit) on October 14, 2009. Several cities and counties (including the City of Santa Clara [City]) are covered as Permittees under this permit and are required to address protection of stormwater quality in their jurisdictions through the implementation of stormwater programs. The City of Santa Clara is a Permittee under the San Francisco Bay MS4 Permit for the discharge of stormwater runoff from the MS4s. The following requirements apply to all projects regardless of size, as appropriate:

- Construction-phase BMPs
- Post-construction site design measures to maximize infiltration in pervious areas
- Post-construction source control measures to help keep pollutants out of stormwater

The following requirements listed below apply to certain projects based on project size and/or location:

- Post-construction stormwater treatment measures are required for most projects with 10,000 square feet or more of impervious surface
- Post-construction stormwater quantity (flow-peak, volume, and duration) controls are required for projects in certain locations with 1 acre or more of impervious surface, in accordance with local Hydromodification Management Plans (HMPs)[5]

Provision C.3 of the San Francisco Bay MS4 Permit requires new development and redevelopment source control, site design, and stormwater treatment measures to address pollutant discharges in stormwater runoff. This goal is accomplished through low-impact development (LID) techniques, including infiltration and biotreatment. The current MS4 regulates stormwater treatment for new development, but recognizes that certain urban infill, higher density and transit-oriented developments have some inherent environmental benefits and challenges. These types of projects, known as "Special Projects," are allowed to use specific types of non-LID treatment measures to treat a certain percentage of the site's runoff.

The Project is a new development project, and therefore would be considered a Regulated Project under the Municipal Regional Permit. More specifically, the Project falls within the "Other Redevelopment Projects" category within the C.3 Provision, which is defined as "any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred." These projects include those that create or replace 10,000 square feet or more of impervious surface, which applies to the Project. To meet the Provision C.3 requirements, projects must include appropriate site design measures, pollutant source controls and treatment control measures. More information on this Provision is provided below in the discussion on the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP).

The San Francisco Bay Water Board released a Tentative Order for reissuance of the current San Francisco Bay MS4 Permit on May 11, 2015, and is expected to be reissued by early 2016. The majority changes in the proposed Order are related to Provision C.3, such as operation and maintenance of stormwater treatment systems and development of Green Infrastructure Plans.

City of Santa Clara General Plan

The City's current General Plan[6] includes policies and programs associated with hydrology and water quality, as follows:

> **Goal 5.10.4-G2.** High water quality maintained throughout the City.
>
> *Policy 5.10.4-P10.* Work with Santa Clara Valley Water District to minimize undesirable compaction of aquifers and subsidence of soils.
>
> *Policy 5.10.5-P10.* Support efforts by the Santa Clara Valley Water District to reduce subsidence.
>
> *Policy 5.10.5-P11.* Require that new development meet stormwater and water management requirements in conformance with State and regional regulations.
>
> *Policy 5.10.5-P12.* Continue to participate in the National Flood Insurance Program and encourage all property owners within flood hazard areas to carry flood insurance.

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[5] More information on hydromodification is provided below in the SCVURPPP section.

[6] City of Santa Clara. 2010. *City of Santa Clara 2010–2035 General Plan*. Adopted: November 16, 2010. Last amended: December 9, 2014. Available: http://santaclaraca.gov/index.aspx?page=1263. Accessed: December 22, 2014.

Policy 5.10.5-P13. Require that development complies with the Flood Damage Protection Code.

Policy 5.10.5-P14. Coordinate with the Federal Emergency Management Agency to ensure appropriate designation and mapping of floodplains.

Policy 5.10.5-P18. Implement the Santa Clara Valley Nonpoint Source Pollution Control Program, Santa Clara Valley Urban Runoff Pollution Prevention Program and the Urban Runoff Management Plan.

Policy 5.10.5-P5. Regulate development, including remodeling or structural rehabilitation, to ensure adequate mitigation of safety hazards, including flooding, seismic, erosion, liquefaction, and subsidence dangers.

Santa Clara Valley Urban Runoff Pollution Prevention Program

The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) (formerly known as the Santa Clara Valley Nonpoint Source Pollution Control Program) is an association of 13 cities and towns in the Santa Clara Valley, Santa Clara County (County), and the Santa Clara Valley Water District (SCVWD) that are Permittees of the San Francisco Bay MS4 Permit. SCVURPPP's Urban Runoff Management Plan (URMP) consists of an area-wide plan and individual agency plans that describe what the 15 co-permittees will do, collectively and individually, to reduce urban runoff pollution. As a participant in the SCVURPPP, in accordance with NPDES permit requirements, the City implements control measures to reduce stormwater pollutants from construction sites, areas of new development, or areas of significant redevelopment to the maximum extent practicable (MEP). These requirements are enforced by the City during development review.

The Project would be required to comply with the San Francisco Bay MS4 Permit Provision C.3 Stormwater Technical Guidance because it would involve the replacement of impervious surface area equal to 50 percent or more of the pre-Project impervious surface area. The provision also states, however, that "all projects regardless of size should consider incorporating appropriate source control and site design measures that minimize stormwater pollutant discharges to the maximum extent practicable." Regardless of a project's need to comply with Provision C.3, municipalities apply the MEP standard, including standard stormwater conditions of approval for projects that receive development permits. The SCVURPPP prepared a C.3 Stormwater Handbook dated April 2012 to assist projects in designing appropriate post-construction stormwater controls to meet local jurisdictional requirements and the requirements of the San Francisco Bay MS4 Permit.

SCVURPPP Provision C.3.f.i (Hydromodification Control Requirements) specifies that post-project runoff shall not exceed estimated pre-project rates and/or durations where the increased stormwater discharge rates and/or durations will result in increased potential for erosion and other effects. Hydromodification is a change in the runoff hydrograph (flow patterns) from an area due to land management. This could result in increased peak flows, volumes, and durations from increased impervious area, decreased vegetation, grading/compaction of soils, or construction of drainage facilities. The effects of hydromodification include increased bed and bank erosion in the receiving water, loss of habitat, increased sediment transport and deposition, and increased flooding. The SCVURPPP developed an HMP report, adopted by the San Francisco Water Board in 2005,[7] which delineates areas where increases in runoff are most likely to affect channel health and water quality and

[7] Santa Clara Valley Urban Runoff Pollution Prevention Program. 2005. *Hydromodification Management Plan.* Final report. April 21. Available: http://www.eoainc.com/hmp_final_draft/hmp_sections/hmp_complete_032905.pdf. Accessed: July 15, 2015.

provides management options to maintain pre-project runoff patterns (Figure 3.10-1). It is designed to prevent erosion in watersheds where new projects as well as redevelopment projects are located. Stormwater treatment and site design measures may include non-mechanical water quality improvement techniques (e.g., grassy swales, bioretention, detention in landscaping), or may be stormwater detention systems. The non-mechanical water quality improvement techniques are generally preferred to promote "natural" water quality improvements. The SCVURPPP HMP complies with the San Francisco Bay Region MS4 permit. The Project is exempt from SCVURPPP Permit Provision C.3.f.i because the site is outside the limits of hydromodification areas.

Santa Clara Valley Water District

The SCVWD is responsible for managing the County's water supply, including groundwater, as well as overseeing flood protection. Its jurisdiction encompasses streams and creeks, underground aquifers, and District-built reservoirs. The SCVWD's watershed stewardship responsibilities include creek restoration, wildlife habitat protection, stream water pollution prevention, and natural flood protection. Natural flood protection considers the best methods for improving a creek's capacity for floodwater while minimizing impacts on the ecosystem.

The SCVWD has jurisdiction over San Tomas Aquino Creek and the Guadalupe River, their existing levees and the conveyance of stormwater to these waterways. Because the existing levees adjacent to the Project site are certified by FEMA, any impacts on or proposed modifications to the levee will require SCVWD review and approval and may require a submission to FEMA for levee re-certification. Furthermore, the SCVWD does not permit any increase to the 100-year peak flood elevation within these waterways.

Environmental Setting

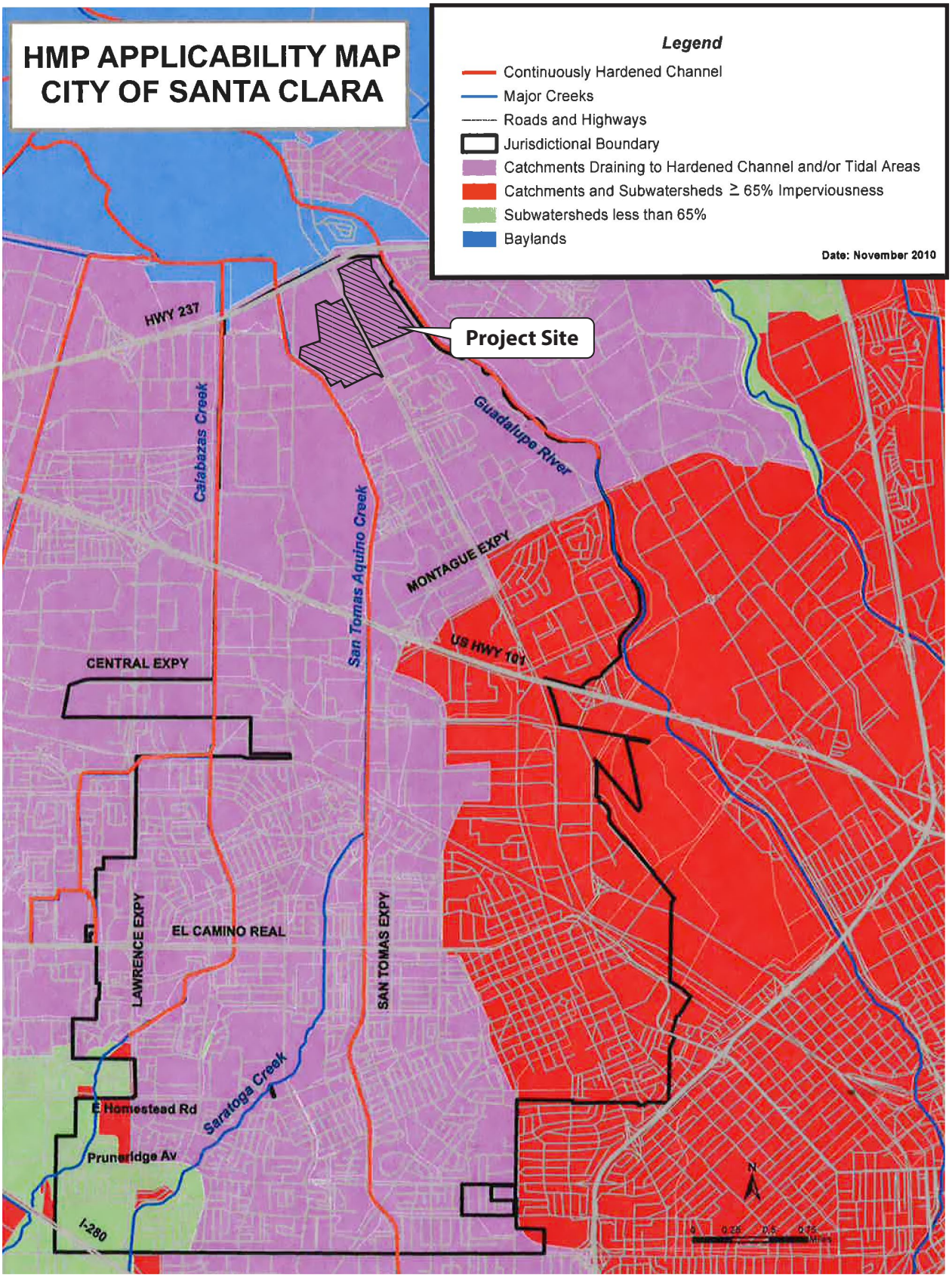
Surface Water

Watershed Hydrology

The Project area is within the Santa Clara Basin of the Lower San Francisco Bay watershed. It is bordered on the northeast (Parcels 1 and 2) by the Guadalupe River and on southwest (Parcel 4) by San Tomas Aquino Creek. The existing drainage patterns for the Project site include the discharge of surface water runoff to the Guadalupe River and San Tomas Aquino Creek. Of the 240 acres that make up the Project site, approximately 76 percent are tributary to the Guadalupe River and 24 percent are tributary to San Tomas Aquino Creek.[8] Parcels 1, 2, 3 and about 45 percent of Parcel 4 drain to the Guadalupe River. The remaining 55 percent of Parcels 4 and 5 drain to San Tomas Aquino Creek. Figure 3.10-2 illustrates the hydrological features in the Project area. Both the San Tomas Aquino Creek and Guadalupe River watersheds ultimately drain to the Lower San Francisco Bay watershed.

The San Tomas Aquino Creek watershed covers an area of approximately 45 square miles. San Tomas Aquino Creek originates in the forested foothills of the Santa Cruz Mountains, flowing in a northern direction through the cities of Campbell and Santa Clara, into the Guadalupe Slough, and finally into the Lower South San Francisco Bay. The major tributaries to San Tomas Aquino Creek include Saratoga, Wildcat, Smith and Vasona Creeks. Most of the San Tomas Aquino Creek watershed is developed as high-density residential neighborhoods, with additional areas developed for commercial and industrial uses.

[8] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.



Source: Santa Clara Valley urban Runoff Pollution Prevention Program. 2010. Hydromodification Management Applicability Maps. November. Available: http://www.scvurppp-w2k.com/HMP_app_maps/Santa_Clara_HMP_Map.pdf.

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Figure 3.10-1
HMP Applicability Map for the City of Santa Clara
City Place Santa Clara

Figure 3.10-2
Hydrological Features within the Project Vicinity

The majority of the San Tomas Aquino Creek channel has been modified and lined with concrete (from the Smith Creek confluence in the upper reaches downstream to US 101).[9]

The Guadalupe River watershed covers an area of approximately 171 square miles. The headwaters drain from the eastern Santa Cruz Mountains near the summit of Loma Prieta in heavily forested unincorporated County land with pockets of low-density residential developments. The Guadalupe River begins on the valley floor at the confluence of Alamitos Creek and Guadalupe Creek, just downstream of Coleman Road in San José. From here, it flows north for approximately 14 miles until it flows into the Lower South San Francisco Bay via Alviso Slough. On its journey, the Guadalupe River traverses through the town of Los Gatos and the cities of San José, Campbell, and Santa Clara. In addition, it is joined by three other tributaries: Ross, Canoas, and Los Gatos Creeks.

The upper Guadalupe River watershed is characterized by heavily forested areas with pockets of scattered residential areas. Residential density gradually increases to high density on the valley floor. Commercial development is focused along major surface streets. Industrial developments are located closer to the Bay, primarily downstream of the El Camino Real crossing. Six major reservoirs exist in the watershed: Calero Reservoir on Calero Creek, Guadalupe Reservoir on Guadalupe Creek, Almaden Reservoir on Alamitos Creek, Vasona Reservoir, Lexington Reservoir, and Lake Elsman on Los Gatos Creek.[10]

Local Drainage

The Project site drains to several drainage features. In the eastern portion of the Project site, storm drains, a drainage culvert to the Eastside Storm Retention Basin (Retention Basin), the Eastside Pump Station, and the Eastside Drainage Channel all, ultimately, lead to the Guadalupe River. There is also a channel that conveys stormwater to the Retention Basin from existing storm drains in Lafayette Street and Great America Way. In the western portion of the Project site, there are storm drains, a lined open water detention pond, the Golf Course Pump Station, and San Tomas Aquino Creek.

Topography varies within the Project site. Because of the landfill and the cap that was constructed over the landfill, the Project site is above the grade of the surrounding streets, with an elevation that ranges from approximately 0 to 82 feet above mean sea level (msl). The majority of the Project site is on the bermed landfill area, which is higher in elevation than the surrounding properties. On-site areas that are not on the landfill on Parcels 4 and 5, the Lick Mill Boulevard extension, the new bridge over San Tomas Aquino Creek, the Santa Clara Gateway vehicular access variant, and potentially the off-site fire station (Option 2) are generally at-grade with surrounding properties. The location of the Tasman Drive slip-ramp is generally on grade with Tasman Drive, but is above grade from the adjacent Santa Clara Youth Soccer Park.

Existing Sub-watersheds. Due to the nature of the existing topography and drainage infrastructure, the tributary areas (including both on-site and off-site areas) have been divided into four distinct sub-watersheds described below and shown in Figure 3.10-3 as San Tomas, East Basin, Eastside Channel, and Basin Direct. These sub-watersheds are based on existing local drainage patterns and may cross multiple parcels.

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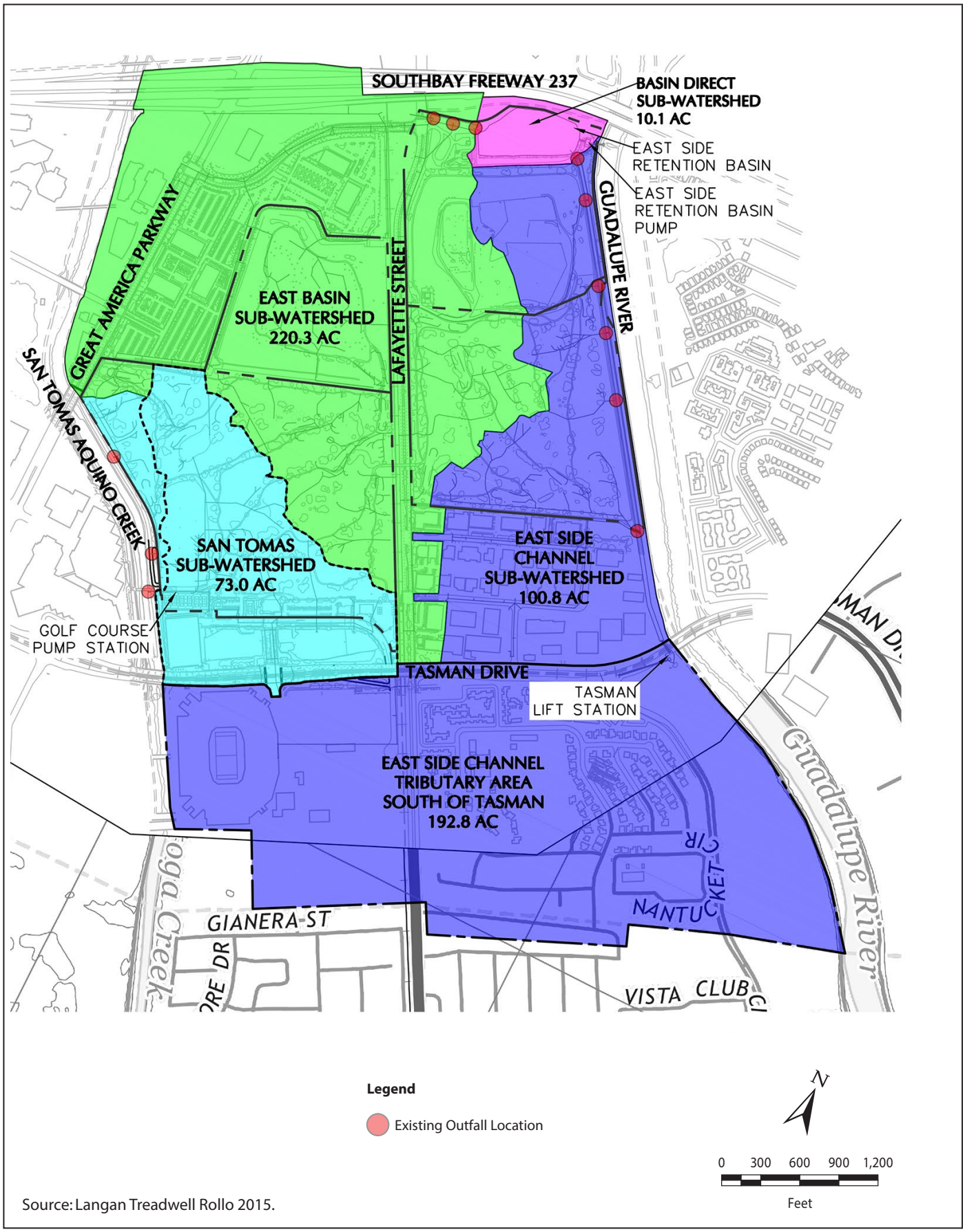
[9] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[10] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.



Source: Langan Treadwell Rollo 2015.

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Figure 3.10-3
Existing Sub-Watersheds in the Project Area
City Place Santa Clara

San Tomas Sub-watershed (73.0 acres). The San Tomas sub-watershed includes the areas from Parcels 4 that drain directly to San Tomas Aquino Creek via existing outfalls. The Golf Course Pump Station also conveys runoff to San Tomas Aquino Creek from areas of Parcel 4 and 5, and off-site areas from Stars and Stripes Drive.

East Basin Sub-watershed (220.3 acres). The East Basin sub-watershed includes areas from Parcels 1, 2, 3 and 4 as well as areas to the west and north of the Project site. On the west side of the Retention Basin, there is also channel (west channel) that conveys stormwater to the basin from existing storm drains in Lafayette Street and Great America Way.

Eastside Channel Sub-watershed (100.8 acres). The East Side Channel sub-watershed includes areas from Parcels 1 and 2 along with the off-site areas that drain to the Retention Basin via the existing Eastside Drainage Channel. The Eastside Drainage Channel is an existing trapezoidal-shaped ditch located between Parcel 1 and 2 and the earthen levee for the Guadalupe River. It extends approximately 3,780 feet from Tasman Drive to the Retention Basin, terminating at a 64- by 43-inch arch culvert under an existing basin access roadway.

Eastside Channel Tributary Area South of Tasman Drive (192.8 acres). This sub-watershed includes off-site areas south of the Project area and drains to the Retention Basin via the existing Eastside Drainage Channel.

Basin Direct Sub-watershed (10.1 acres). The Basin Direct sub-watershed includes areas on Parcel 1 where surface flows drain directly to the Retention Basin.

Existing Drainage Patterns. Below is a summary of existing drainage patterns for each parcel.

Parcel 1 and Retention Basin. This 49.6-acre area comprises Parcel 1 (36.8 acres) and the Retention Basin (12.8 acres) as well as open space, a Bicycle-Motorcross (BMX) track, a landfill gas recovery facility, access roads, a retention pond, and City-operated pump stations for sanitary sewer and stormwater. The surface water hydrology includes an overland flow and piped conveyance systems with a surface runoff tributary to the Retention Basin and Guadalupe River.[11]

Parcel 2. The 60.9-acre Parcel 2 includes golf course open space, golf cart paths, and access roads. The surface water hydrology includes an overland flow and piped conveyance systems with a surface runoff tributary to the Retention Basin and Guadalupe River.[12]

Parcel 3. The 34.9-acre Parcel 3 includes golf course open space, golf cart paths, and access roads. A soil cover clay cap was reportedly constructed over the landfill portions of the parcel. The surface water hydrology includes an overland flow and piped conveyance systems with a surface runoff tributary to the Retention Basin and Guadalupe River. There is an open depressed area along the toe of the southern slope of the landfill on Parcel 3 that collects surface water runoff from Parcels 3 and 4. This area serves as a utility corridor for the City's recycled water and sanitary sewer systems. [13]

Parcel 4. The 86.6-acre Parcel 4 includes golf course open space, golf cart paths, the golf course driving range, several buildings, access roads, parking lots, and a maintenance area. The northern portion of the

[11] Langan Treadwell Rollo. 2015a. Hydrology/Water Quality Report for City Place Santa Clara. Prepared for Related Santa Clara, LLC. June 30.

[12] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[13] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

site drains to the open depressed area along the toe of the southern slope of the landfill on Parcel 3 and the piped conveyance system within the adjacent property to the north, the eastern portion of the site drains to a ditch along the adjacent railroad right-of-way (adjacent to Lafayette Street), the western portion of the site drains directly to the San Tomas Aquino Creek gravity outfalls, and the southern portion of the site drains to the piped conveyance system in Stars and Stripes Drive. The storm drain system is tributary to the Golf Course Pump Station. In addition, there is a lined open water pond located within Parcel 4.[14]

Parcel 5. The 8.0-acre Parcel 5 includes parking lots and some open space areas. The site drains to on-site catch basins that are connected to the existing storm drainage system in Stars and Stripes Drive. This storm drain system is tributary to the Golf Course Pump Station, which ultimately discharges into San Tomas Aquino Creek.

Off-site areas. Drainage from the Great America Parkway, Santa Clara Gateway office complex, and Santa Clara Gateway vehicular access variant flow via storm drains into the Retention Basin and Guadalupe River. The proposed fire station (Option 2) would be off-site in the northern portion of the existing Convention Center surface parking lot, across San Tomas Aquino Creek to the southwest of the Project site. This location would be accessible via the proposed roadway extension through this area and Great America Parkway. Drainage from the proposed fire station location (Option 2), would be conveyed via storm drains to the Golf Course Pump Station and ultimately into San Tomas Aquino Creek.

Drainage along the proposed bridge constructed over San Tomas Aquino Creek to access Parcel 4 (San Tomas Aquino Creek Overcrossing) would be routed to drainage ducts that would lead directly to the Creek or to storm drains near the bridge approaches that discharge into San Tomas Aquino Creek.

The proposed Lick Mill Boulevard extension runs along the easternmost edge of Parcels 1 and 2, within the Guadalupe River watershed. The extension would drain into the Eastside Drainage Channel to the east and the Retention Basin to the north.

Drainage from the Tasman Drive slip-ramp area would likely be via storm drains in Tasman Drive and/or via infiltration in the pervious areas of the Santa Clara Youth Soccer Park.

[14] Langan Treadwell Rollo. 2015a. Hydrology/Water Quality Report for City Place Santa Clara. Prepared for Related Santa Clara, LLC. June 30.

Water Quality

The Basin Plan specifies beneficial uses that apply to water bodies with potential to be affected by the Project, as shown in Table 3.10-1.[15]

Table 3.10-1. Beneficial Uses for Surface Waters of Water Bodies with Potential to Be Affected by the Project

Water Body	Designated Beneficial Uses
Guadalupe River	GWR; COLD; MIGR; RARE; SPWN; WARM; WILD; REC1; REC2; NAV
San Tomas Aquino Creek	COLD; RARE; WARM; WILD; REC1; REC2; NAV
Key:	
COLD: Cold Freshwater Habitat	NAV: Navigation
GWR: Groundwater Recharge	RARE: Preservation of Rare and Endangered Species
WILD: Wildlife Habitat	REC1: Water Contact Recreation
WARM: Warm Freshwater Habitat	REC2: Noncontact Water Recreation
MIGR: Fish Migration	SPWN: Fish Spawning

Source: San Francisco Bay Regional Water Quality Control Board. 2011. San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan). Originally published January 18, 2007. Last updated in 2011.

The 303(d)-listed impairments for the Guadalupe River are shown in Table 3.10-2 and are based on the 2010 California Integrated Report.[16] San Tomas Aquino Creek has no listed 303(d) impairments by the State Water Board.

Table 3.10-2. Water Quality Impairments within the Project Alignment

Water Body	Listed Impairments per 2006 303(d) List	Potential Sources	EPA TMDL Report Completion
Guadalupe River	Diazinon	Urban runoff/storm sewers	2007
	Mercury	Mine tailings	2008
	Trash	Illegal dumping, urban runoff/storm sewers	Est. 2021

Key:
EPA = U.S. Environmental Protection Agency
TMDL = total maximum daily load
Est. = estimated completion date

Source: California State Water Resources Control Board. 2011. *2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report)—Statewide.* San Francisco Bay Regional Water Quality Control Board. EPA approved: October 11, 2011. Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml. Accessed: December 3, 2014.

[15] San Francisco Bay Regional Water Quality Control Board. 2011. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Originally published January 18, 2007. Last updated in 2011.

[16] State Water Resources Control Board. 2011. *2010 Integrated Report (Clean Water Act Section 303(d) List/305(b) Report)—Statewide.* USEPA approved: October 11, 2011. Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml. Accessed: December 3, 2014.

The Guadalupe River is designated as impaired for diazinon, a pesticide banned for residential use in 2002. In 1998, a number of the urban creeks in the Santa Clara Basin were placed on the 303(d) list of impaired waters due to toxicity attributed to diazinon. In the early 1990s, many urban creek water samples collected from selected creeks throughout the Region were toxic to aquatic organisms. Studies found that pesticides, particularly diazinon, caused the toxicity.[17]

The Guadalupe River is also designated as impaired for mercury. As of 2004, the Guadalupe Reservoir had the highest recorded fish mercury concentrations in California. Mercury mining waste is the largest source of mercury to waters of the Guadalupe River watershed and the Bay. The world's fifth-largest mercury mine (at the time) was the historic New Almaden Mercury Mining District, located in the headwaters of the Guadalupe River watershed. Current sources of mercury in the Guadalupe River watershed include 1) mercury mining waste; 2) reservoirs, lakes, and shallow impoundments, where mercury is converted to methylmercury; 3) urban stormwater runoff; 4) nonurban stormwater runoff; and 5) atmospheric deposition.[18]

The Guadalupe River is also designated as impaired for trash. The Urban Rapid Trash Assessment (URTA), developed by the SCVURPPP, collected data on trash in the water body from September 2004 through November 2006. The trash was considered a threat to aquatic life, which relates to impairment of beneficial uses, including Noncontact Water Recreation (REC2) and Wildlife Habitat (WILD), as designated for the Guadalupe River (Table 3.10-1).

Groundwater

Hydrogeology

The Project site is within the Santa Clara Valley Groundwater Basin, Santa Clara Subbasin, within the San Francisco Bay Hydrologic Region. The Basin Plan designates beneficial uses of groundwater beneath the Project site to include municipal supply, industrial process supply, and industrial service supply.

Groundwater is an important resource for the City and currently provides approximately 70 percent of the water for the City's Water and Sewer Utility.[19] The City's Water and Sewer Utility is supplied with potable water from three sources: SCVWD, which gets its water from the San Joaquin Delta, local surface water sources, and local groundwater; the San Francisco Public Utility Commission (SFPUC), which gets its water from the Hetch Hetchy system; and 27 groundwater wells that are operated by the City's Water and Sewer Utility. Groundwater for the potable water supply within the Santa Clara Subbasin is obtained from deep wells, with depths greater than 150 to 250 feet below the ground surface (bgs).[20] No municipal water supply wells are located within the Project site.[21]

Over extraction of groundwater in the past has resulted in significant problems in the Project vicinity. By the late 1960s, the groundwater level had fallen more than 200 feet from its pre-development level,

[17] San Francisco Bay Regional Water Quality Control Board. 2013. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* Incorporating all amendments approved by the Office of Administrative Law as of June 29, 2013.

[18] San Francisco Bay Regional Water Quality Control Board. 2013. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan)*. Incorporating all amendments approved by the Office of Administrative Law as of June 29, 2013.

[19] City of Santa Clara. 2010. *2010–2035 General Plan*. Environmental Quality section.

[20] Santa Clara Water District. 2011. *2010 Urban Water Management Plan.*

[21] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation.* City Place Santa Clara, Santa Clara California. August 22.

resulting in land subsidence[22] and saltwater intrusion.[23] The Santa Clara Valley was the first area in the United States where land subsidence due to groundwater withdrawal was recognized. It was also the first area where organized remedial action was undertaken. Subsidence was effectively halted by about 1969 with the importation of surface water and the establishment of groundwater recharge programs.[24]

An extensive annual monitoring program has been set up for the Santa Clara Subbasin to evaluate changes in an effort to maintain land subsidence at less than 0.01 foot (0.12 inch) per year.[25] Additionally, groundwater recharge projects have been implemented in the Santa Clara Valley to ensure that groundwater will continue to be a viable long-term water supply. The SCVWD operates and maintains 18 major recharge systems, which consist of both in-stream and off-stream facilities.[26] In addition, imported water is delivered by a raw water conveyance system to streams and ponds for the SCVWD-managed groundwater recharge program.

Groundwater within the Santa Clara Subbasin is generally found within aquifers, consisting of high permeability sand and gravel layers interbedded between low-permeability clay and silt layers. The low-permeability layers confine the aquifers and limit the migration of groundwater between aquifers. Shallow groundwater at the Project site is located in two non-continuous zones.[27] The top of the upper sand zone is encountered between 0 and 25 feet below the pre-landfill ground surface. The second sand zone is encountered around 40 feet bgs of the pre-landfill ground surface. Groundwater flow is to the north-northeast, toward the Bay.[28] As summarized in Table 3.10-3, recent on-site field exploration, which included drilling of soil borings, encountered groundwater at elevations ranging from 7 feet msl (at Parcel 4) to -10 feet msl (also at Parcel 4).[29]

Table 3.10-3. Groundwater Depths and Elevations

Location	Approximate Depth to Groundwater (feet)	Approximate Groundwater Elevation (feet rel. to msl)
Parcel 1	52	0
Parcel 2	40	-8
Parcel 3	50 to 65	0 (estimated)
Parcel 4	18.5 to 32	-10 to 7
Parcel 5	8 to 10	2 to 3

Source: Langan 2014a

[22] Removing water from storage in unconsolidated sediments in the aquifer system can cause these compressible sediments to compact permanently, resulting in land subsidence at the surface. Land subsidence is a common consequence of the groundwater level changes that can result from over-pumping groundwater.

[23] City of Santa Clara. 2010. *Op. cit*.

[24] U. S. Geological Survey. 1999. *Land Subsidence in the United States.* Circular 1182. Santa Clara, California; A Case of Arrested Subsidence. Prepared by S.E. Ingebritsen, David R. Jones, and Devin Galloway.

[25] California Department of Water Resources. 2003. *California's Groundwater*. Bulletin 118. Santa Clara Subbasin.

[26] Santa Clara Water District. 2011. *2010 Urban Water Management Plan.*

[27] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation.* City Place Santa Clara, Santa Clara California. August 22.

[28] Golder Associates. 2013. *Second Semiannual 2012 Self-Monitoring Program Report and 2012 Annual Summary, City of Santa Clara All-Purpose Landfill.* January.

[29] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

When the landfill was established at the Project site, refuse was placed directly on top of a clay layer that overlies native soils, consisting of alluvial deposits, primarily clay and sandy clay layers, with occasional interbedded layers of sand and silt.[30] The northwest corners of Parcel 1 and Parcel 3 were developed with clay base liners and a leachate collection system. No clay liner was installed beneath Parcels 2 and 4 (and a portion of Parcel 1), consistent with landfill practices at the time of filling. Because the landfill does not extend to Parcel 5 or the Retention Basin, no clay liner underlies these areas. There is no constructed liner or impermeable membrane underlying the waste. A clay cap was placed above the refuse. This cap, which varies in thickness from 1 to 7 feet throughout the Project site, consists of stiff dark-brown clay and lies under the cover soil or the fill on top of the landfill. Because the landfill does not extend to Parcel 5 or the Retention Basin, no landfill cap is located in these areas.

Groundwater was observed between approximately 8 and 65 feet bgs at the Project site during drilling.[31] Monitoring indicates that leachate[32] occurs at an elevation similar to that of the groundwater table, suggesting that leachate mixes with the uppermost groundwater within the waste.[33] Groundwater flow is to the north-northeast, toward San Francisco Bay.[34]

Limited information is available regarding depth to groundwater for the off-site areas. Based on the results of an investigation related to a leaking underground storage tank approximately 550 feet northwest of the Convention Center site (and at a similar elevation), depth to groundwater is approximately 14 to 19 feet bgs (which is an approximately elevation of 2-7 feet above msl).[35] In addition, based on the results of an investigation related to a cleaning solvent release approximately 900 feet east of the Tasman East site (and at a similar elevation), the depth to groundwater is approximately 7 feet bgs (which is approximately 5 feet above msl).[36] An investigation related to a leaking underground storage tank found that the depth to groundwater is approximately 14 to 19 feet bgs approximately 1,000 feet northwest of the San Tomas Aquino Creek crossing (and at a similar elevation).[37]

Groundwater Quality

Groundwater quality in the deeper wells used for the City's water supply is generally of high quality.[38] Total dissolved solids are well below drinking water standards, indicating that saltwater intrusion is not a significant problem for these deeper wells. Nitrates, common in groundwater within historic agricultural areas such as Santa Clara Valley, have not been identified in the deeper wells at levels of

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[30] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[31] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[32] Leachate is any liquid formed by the drainage of liquids from waste or by the percolation or flow of liquid through waste.

[33] Langan Treadwell Rollo. 2014. *Preliminary Geotechnical Investigation*. City Place Santa Clara, Santa Clara California. August 22.

[34] Golder Associates. 2013. *Second Semiannual 2012 Self-Monitoring Program Report and 2012 Annual Summary, City of Santa Clara All-Purpose Landfill*. January.

[35] Conestoga-Rovers & Associates, 2007. *Groundwater Monitoring Report – Second Quarter 2007, Shell-branded Service Station, 5390 Great America Parkway.* August 10.

[36] Langan Treadwell Rollo, 2014d. *First Semi-Annual 2013 Groundwater Monitoring Report, 2301 Calle de Luna, Santa, Clara,* January 10.

[37] Conestoga-Rovers & Associates. 2007. *Groundwater Monitoring Report – Second Quarter 2007, Shell-branded Service Station, 5390 Great America Parkway*. August 10.

[38] City of Santa Clara. 2010. *2010–2035 General Plan*. Environmental Quality Section.

concern.[39] Manganese, a naturally occurring metal, has been detected in a future water supply well, but the City will install a manganese removal system prior to placing that well into production.[40]

Semi-annual groundwater monitoring at the Project site is performed in accordance with the monitoring program contained in WDR Order No. R2-2002-0008. There are currently 18 active groundwater monitoring wells, three groundwater piezometers, four surface water monitoring locations, and one leachate discharge sampling location within the monitoring network.[41] The leachate collection system, which consists of 15 leachate extraction points, has generated relatively small quantities of leachate in the past. In 2009, an automated pumping system was installed and the system pumps about 120,000 gallons of leachate per year for discharge to the sanitary sewer.[42]

This semi-annual monitoring has detected several VOCs in groundwater in an area near the center of the Project site. The primary VOCs in groundwater are 1,1-dichloroethene (DCE), cis-1,2-DCE, trans-1,2-DCE, trichloroethene (TCE), and vinyl chloride. No other classes of contaminants in shallow groundwater at the Project site are considered a potential concern.[43]

The area with elevated VOC concentrations is limited to the northeastern portion of Parcel 4 and the southeastern portion of Parcel 3 (historical landfill parcel 3/6). Monitoring data since 2005 indicates the area of groundwater contamination is stable in contaminant concentrations and is not migrating to other parts of the Project site. Additional information regarding the VOC contamination within groundwater, and the potential impacts on human health and the environment, is presented in Section 3.11, *Hazards and Hazardous Materials*. No specific information related to groundwater quality for the off-site areas is available.

Flooding

FEMA has identified Special Flood Hazard Areas (SFHAs) on FIRMs for all communities that participate in the NFIP. The 100-year floodplain, or the areas inundated by a storm having a 1 percent annual chance of occurrence, is the regulatory standard used by federal, state, and local agencies. The 100- to 500-year floodplains, or areas inundated by a 0.2 percent annual chance of occurrence, are known as "Other Flood Areas," with moderate to minimal risk of flooding.

Project Site. The following FEMA designations existing within the Project area:[44]

- Zone AO: 100-year flood zone. Applies to river or stream flood hazard areas. Flood depths are 1 to 3 feet and average depth of flooding was determined.
- Zone AH: 100-year flood zone. Indicative of shallow flooding. Flood depths are 1 to 3 feet and Base Flood Elevations (BFEs) were determined.
- Zone X (unshaded) – 500-year flood zone. Area of minimal flood hazard.

[39] City of Santa Clara. 2010. *2010–2035 General Plan*. Environmental Quality Section.
[40] City of Santa Clara. 2010. *2010–2035 General Plan*. Environmental Quality Section.
[41] Golder Associates. 2013. *Second Semiannual 2012 Self-Monitoring Program Report and 2012 Annual Summary, City of Santa Clara All-Purpose Landfill.* January.
[42] Golder Associates. 2013. *Second Semiannual 2012 Self-Monitoring Program Report and 2012 Annual Summary, City of Santa Clara All-Purpose Landfill.* January.
[43] Golder Associates. 2013. *Second Semiannual 2012 Self-Monitoring Program Report and 2012 Annual Summary, City of Santa Clara All-Purpose Landfill*. January.
[44] Federal Emergency Management Agency. 2009. *FEMA Map Service Center*. FEMA Flood Insurance Rate Map, include Panels 61, 62, 63, and 64 of 830, Map Numbers 06085C0061H, 06085C0062J, 06085C0063H, and 06085C0064H, dated May 18, 2009. Available: https://msc.fema.gov/portal.

The majority of the Project site is within Zone X (500-year flood zone) (see Figure 3.10-4), with the caveat that this area is shown as being protected from the 1-percent-annual-chance-or-greater flood hazard by an existing levee system. The eastern edge of Parcels 1 and 2, along a portion of the Eastside Drainage Channel and the Retention Basin, is identified as Zone AH (100-year flood zone), with flood depths of 1 to 3 feet (usually areas of ponding) and at a BFE of 6.0 feet above msl, which is the elevation of the Retention Basin. There is a small strip of land along the eastern edge of Parcel 3 and adjacent to the western borders of Parcels 1 and 2 that is designated as Zone AO (100-year flood zone) as well.

Off-site Areas. The following additional FEMA designations are located off-site adjacent to or near the Project area (south of Tasman Drive):

- Zone A: 100-year flood zone. No detailed studies were performed, and no BFEs were determined.
- Zone AE: 100-year flood zone. BFEs were determined.

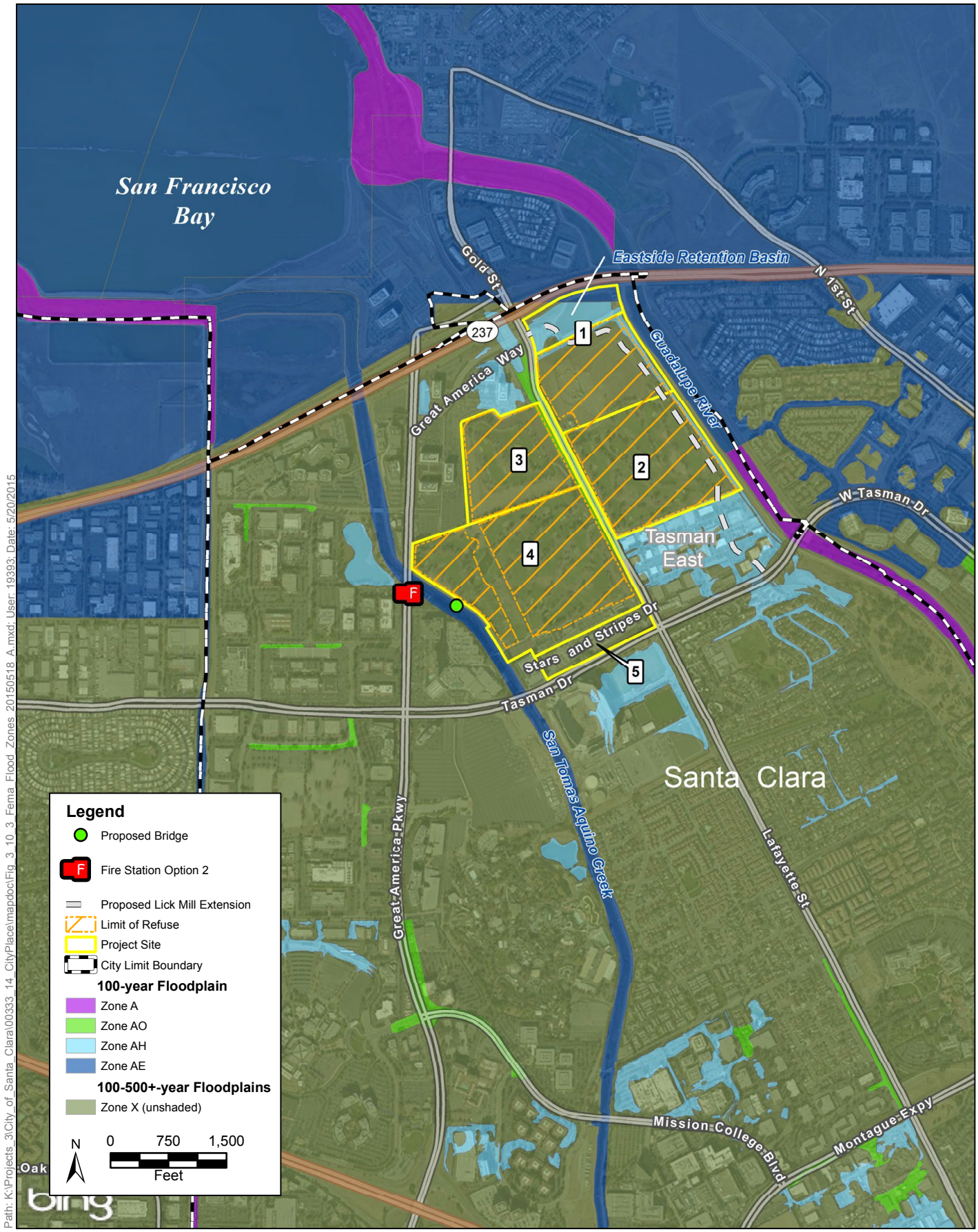
San Tomas Aquino Creek is within Zone AE (100-year flood zone) and the Guadalupe River is also within Zone AE (100-year flood zone) in the northern portion and Zone A to the south of the Project area. However, the existing Guadalupe River and San Tomas Aquino Creek are contained within FEMA certified levees and the SCVWD has not reported any flooding issues due to storm drain capacity in the area. The off-site area in Tasman East that would accommodate the Lick Mill Boulevard extension is located within Zone AH. The potential off-site fire station (Option 2) and the Santa Clara Gateway vehicular access variant would be located in Zone X. Although it is near Zone AE along San Tomas Aquino Creek, the fire station would be located in an area protected from the creek by a large berm and therefore it is outside of the FEMA-designated 100-year flood zone. North of the Parcel 3 near Gold Street, there are areas designated flood zones AH and AO. There is also an area Zone AH south of Tasman Drive and west of Lafayette Street near the Levi's Stadium. The Tasman Drive slip-ramp area is in Zone X (500-year flood zone) but the adjacent Santa Clara Youth Soccer Park is within Zone AH (100-year flood zone).

The SCVWD has jurisdiction over San Tomas Aquino Creek and the Guadalupe River, their existing levees, and the conveyance of stormwater to these waterways. Because the existing levees adjacent to the Project site are certified by FEMA, any impacts on or modifications to the levee will require SCVWD review and approval and may require a submission to FEMA for levee re-certification. Furthermore, according to the SCVWD requirements, no increase in the 100-year peak flood elevation within these waterways is permissible without levee recertification.

System Flow Capacities. Flow capacities of key drainage systems in the Project area are described below.

San Tomas Aquino Creek Direct (Parcel 4). The existing 100-year peak flow in San Tomas Aquino Creek is approximately 7,100 cubic feet per second (cfs) within the section of the creek adjacent to Parcel 4. The corresponding 100-year peak water surface elevation is 19.39 above msl at the Great America Parkway crossing and 21.16 msl at Tasman Drive.

Golf Course Pump Station (Parcels 4 and 5). The reported capacity of the existing Golf Course Pump Station is 11,100 gallons per minute (gpm) (24.7 cfs). Approximately 65.8 acres are tributary to this pump station, including about 43.6 acres from Parcel 4 (66 percent of area), all 8.0 acres of Parcel 5, and 14.2 acres from the public right-of-way, including Stars and Stripes Drive, Tasman Drive, and the City



Path: K:\Projects_3\City_of_Santa_Clara\00333_14_CityPlace\mapdoc\Fig_3_10_3_Fema_Flood_Zones_20150518_A.mxd; User: 19393; Date: 5/20/2015

Figure 3.10-4
FEMA Flood Zones within the Project Area

parking garage.[45] The 2012 Pump Station Design Report[46] by the City indicated that the current pump station had the capacity to convey the 100-year peak flow, with minor ponding in Stars and Stripes Drive. The hydraulic model developed utilizes the Parcel 4 golf course driving range for detention, per the original design. The report also identified a series of pump station improvements as the facility has surpassed its 25-year maintenance/replacement interval.

Eastside Drainage Channel (Parcels 1, 2, and off-site areas). The approximate capacity of this culvert (inlet controlled) is 210 cfs without overtopping the road.

Eastside Storm Retention Basin and Pump Station (Parcels 1, 2, 3, 4, and off-site areas). The 13-acre Retention Basin includes a large retention pond. The 1972 design storage volume of the retention pond was 30 acre-feet. A recent bathymetric survey of the basin was performed and determined that the current storage volume is approximately 51.6 acre-feet (up to el. 5.7 NAVD 88). The Eastside Pump Station has a reported pumping capacity of 50,000 gpm (111.4 cfs). The equipment at the pump station was reportedly replaced in 2005. The City reported in 2000 that the existing pumps had sufficient capacity to prevent 100-year runoff from ponding in Lafayette Street.[47] The peak elevation in the Basin is el. 5.14 NAVD 88 for existing conditions. As part of the 2010 Eastside Retention Basin Drainage Swale Vegetation Clearing Project, a maintenance plan was proposed that included desilting the retention pond to reduce sediment build-up and maintain holding capacity within the basin. As of 2015, this project has yet to be implemented. However, the City's 2010 evaluation indicated that some of the equipment should be considered for replacement in 2023.

Potential Dam and Tsunami Inundation. The Project site is located within the inundation area of the Anderson Dam and Reservoir and Lenihan Dam (formerly called Lexington Dam).

Anderson Reservoir is the largest of SCVWD's 10 reservoirs and provides a reliable supply of water to Santa Clara County. The reservoir has a total storage capacity of 89,073 acre-feet. Currently, a storage restriction of about 45 feet below the dam crest has been put in place to protect the public, resulting in a reduced storage capacity of 61,810 acre-feet. The SCVWD and the regulatory agencies have approved the restriction and believe that this would prevent the uncontrolled release of water in case of a failure after a major earthquake.[48] The Project site is approximately 26 miles downstream of the dam. The inundation mapping prepared by the SCVWD indicates that in the event of a dam breach during the inflow design flood, the potential maximum flood elevation of +19.94 NAVD88 would occur at the Project area within 9 hours 18 minutes. If the event happened during "fair weather," then the potential maximum flood elevation of +16.84 NAVD88 would occur within 11 hours 17 minutes.[49]

As a result of a 2008 Seismic Stability Evaluation that identified potential embankment instability as a result of seismic shaking and liquefaction, the Anderson Dam Seismic Retrofit Project (ADSRP) was initiated. Between 2008 and 2012, several dam safety deficiencies associated with seismic shaking, fault offset, and emergency drawdown capabilities were identified. The ADSRP consists of planning, design,

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[45] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA*. Prepared for Related Santa Clara, LLC. June 30.

[46] GHD, Inc. 2012. *Golf Course Pump Station – Pump Station Design Report*. Technical Memorandum No. 2. Submitted to Ron Eng, City of Santa Clara Engineering Department. November 7.

[47] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA.* Prepared for Related Santa Clara, LLC. June 30.

[48] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[49] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

and construction activities associated with correcting seismic, and reservoir drawdown deficiencies at the dam. The ADSRP is being conducted by the SCVWD in coordination with resource agencies, stakeholders, and the public. That project is scheduled for a 3-year construction period, beginning in 2016 and ending at the end of 2018.

Lenihan Dam is located 1 mile south of the City of Los Gatos. The dam is an earthfilled structure that was constructed across Los Gatos Creek in 1952. The dam impounds Lexington Reservoir, which has a maximum capacity of 19,044 acre-feet at the spillway elevation of 653 feet. Engineering analyses completed for SCVWD in 2012 indicate that Lenihan Dam would perform well when subjected to evaluation ground motions that represent the Maximum Credible Earthquake (MCE). Maximum crest settlements of about 1.5 feet and horizontal downstream movement of about 1 foot have been estimated. The likelihood of significant cracks forming in the crest and other areas is considered very low. As a result, the engineering analysis concluded that no seismic remedial measures were necessary. The Division of Safety of Dams (DSOD) reviewed engineering analysis done for SCVWD and also performed independent analyses of the seismic deformations of the dam. In a letter to the District dated November 1, 2012, DSOD indicated that, based on its analyses, the dam could experience up to 5 feet of settlement as a result of the MCE but that this performance was satisfactory given "the available freeboard, embankment design, and material characteristics." Therefore, DSOD agreed with the conclusion that the dam did not require seismic remediation. SCVWD completed the Lenihan Dam Outlet Modification Project in 2009, which replaced an aging outlet pipe under Lenihan Dam to improve dam safety.[50]

The Project area is not within a tsunami inundation area based on the Tsunami Inundation Map for Emergency Planning prepared by the California Emergency Management Agency and California Geological Survey.[51]

Environmental Impacts

This section describes the impact analysis relating to hydrology and water quality impacts for the Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Thresholds of Significance

In accordance with Appendix G of the California Environmental Quality Act (CEQA) Guidelines, the Project would have a significant effect if it would result in any of the conditions listed below.

- Violate any water quality standards or WDRs.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table

[50] Terra/GeoPentech. 2012. *Seismic Stability Evaluation of Chesbro, Lenhihan, Stevens Creek, and Uvas Dams, Phase A: Stevens Creek and Linhan Dams, Compilation Report*. Prepared for Santa Clara Valley Water District. December. Available: <http://www.valleywater.org/uploadedFiles/Services/CleanReliableWater/WhereDoesYourWaterComeFrom/Reservoirs/Lexington/Compilation%20Report_Dec%202012.pdf?n=8496>. Accessed: August 27, 2015.

[51] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara.* Prepared for Related Santa Clara, LLC. June 30.

level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Contribute to inundation by seiche, tsunami, or mudflow.

Methods for Analysis

All Project elements were analyzed by comparing baseline conditions, as described in the *Environmental Setting*, to conditions during construction and/or operations of the Project. The analysis focuses on issues related to surface hydrology, flood hazards, groundwater supply, and surface and groundwater quality. The key construction-related impacts were identified and evaluated qualitatively based on the physical characteristics of the Project site and the magnitude, intensity, location, and duration of activities.

- **Surface Water Hydrology.** The surface water hydrology impact analysis considered changes in water bodies, impervious surfaces, and drainage patterns. Information on the change in impervious surface, runoff quantities, and drainage patterns was provided by Langan Treadwell Rollo. The analysis of changes of on-site water bodies involved a comparison of existing on-site hydrological conditions and new/modified conditions proposed as part of the Project, which were provided in the Hydrology/Water Quality Report for the Project, by the Project Developer, and other sources.[52,53]
- **Groundwater Hydrology.** Potential impacts on groundwater supply and groundwater quality were analyzed using information from the publically available publications and site-specific technical reports, including the Preliminary Geotechnical Investigation for the Project and groundwater monitoring reports associated with the former landfill at the site. The potential for Project actions, including penetrations of the landfill cover, to mobilize contaminants and

[52] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[53] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA*. Prepared for Related Santa Clara, LLC. June 30.

degrade groundwater quality (and potentially affect groundwater supplies away from the site) was evaluated.

- **Surface and Groundwater Quality.** Impacts of the Project on surface water and groundwater quality were analyzed using information on potential existing sources of pollution generated by activities, such as vehicle use and parking, golf course and building maintenance, pesticide use, trash, and material storage. These impacts were then compared to potential Project-related sources of pollution during Project construction, such as sediments and other construction materials, and during Project operation, such as vehicle use, building maintenance, pesticide use, trash, and storage of hazardous materials.
- **Flood Hazards.** The impact analysis for flood risk was conducted using FEMA mapping to determine the existing flood zone and information from the Langan Treadwell Rollo report regarding changes in the drainage system and layout that may affect flood risk.

Scheme Analysis

As described in Chapter 2, *Project Description*, this document analyzes schemes Scheme A and B. Each scheme could have a variant, which would involve development of only retail uses on Parcel 2. The retail-only variant would result in the development of 7,523,400 gross square feet (gsf) that would be distributed throughout the Project site. As a conservative analysis, this section focuses on Schemes A and B (which result in a total development of 9,164,400 gsf) because they are expected to have larger building footprints than the retail variants.

Impacts Not Evaluated in Detail

Seiche, Tsunami, or Mudflow Impacts. The Project area is not within a planned tsunami inundation area as depicted on the Tsunami Inundation Map for Emergency Planning prepared by the California Emergency Management Agency and California Geological Survey. Therefore, the Project is not subject to inundation by a tsunami. There are no reservoirs adjacent to the Project area; therefore, the Project would not be prone to inundation by a seiche. The Project area is not within a designated landslide area, and the elevation of the Project area is higher than that of the adjacent properties on all sides. Therefore, the Project would not be subject to mudflows. Therefore, there would be *no impacts* related to flooding by seiche, tsunami, or mudflow. This impact is not evaluated further.

Topics Provided for Informational Purposes

Flooding Due to Sea Level Rise. The California Second District Court of Appeals has held that, although an EIR must analyze the environmental effects that may result from a project, an EIR is not required to examine the effects of the environment, such as sea level rise (SLR**),** on a project (see *Ballona Wetlands Land Trust v. City of Los Angeles*, 201 Cal. App. 4th 455). Based on this ruling, an analysis of the effects of flooding associated with SLR on the Project site is not required under CEQA. As such, the following is presented for informational purposes only, and no significance determination is made from the analysis.

SLR, as an effect of climate change, is projected to increase coastal flooding along the San Francisco Bay beyond levels experienced at present. Coastal flooding may be worse in the future because of projected SLR of up to 2.0 feet by 2050 and up to 5.5 feet by 2100.[54] Certain on-site and off-site portions of the Project site would be vulnerable to the effects of SLR-worsened 100-year flooding events in the future.

[54] San Francisco Bay Conservation and Development Commission. 2011. *CO-CAT 2013 for South of Cape Mendocino.*

The majority of the Project site is above the grade of the surrounding streets, with the elevated portions having an elevation ranging from approximately 21 to 65 feet above msl. These areas would not be vulnerable to potential coastal flooding effects, even with the higher range of potential SLR. However, the elements of the Project site that are at-grade with surrounding surface streets would be vulnerable to SLR-influenced 100-year flood events. As shown in Figure 3.10-5, the following areas would be vulnerable to SLR-influenced flood events by 2100:

- Southern part of Parcel 5, near Tasman Drive
- Fire station (Option 2)
- Roads:
  - The Lick Mill Boulevard extension
  - Northern part of Lafayette Street near State Route (SR) 237
  - Great America Parkway south of San Tomas Aquino Creek
  - Tasman Drive (from Guadalupe River to Great America Parkway and beyond)
  - The Santa Clara Gateway vehicular access variant

The area for the proposed fire station (Option 2) is currently protected by levees along San Tomas Aquino Creek but may become vulnerable over time if the levees are not raised high enough to address SLR effects. The southern portion of Parcel 5 by Tasman Drive would contain residential and commercial buildings. With SLR**,** the base elevation of these buildings could be inundated during future SLR influenced 100-year flood events. The Lick Mill Boulevard extension and the other roads mentioned above would also be subject to SLR-influenced flooding in the future.

Impacts and Mitigation Measures

Impact WQ-1: Violation of Water Quality Standards or WDRs. The Project could result in a violation of water quality standards or WDRs. (LTS/M)

Construction

Surface Water. The Project includes the construction of office, hotel, mixed-used retail, restaurant, entertainment, and residential uses and parking structures. In addition, the Project involves construction of a potential replacement off-site fire station and new roadway extensions, including the proposed Lick Mill Boulevard extension in Tasman East, the bridge over San Tomas Aquino Creek, the Tasman Drive slip-ramp, and the Santa Clara Gateway vehicular access variant. The existing undeveloped golf course and open space areas would be replaced by new buildings and open space amenities, including green spaces, plazas, and other public areas. The majority of Project site is located on a former landfill; therefore, runoff from the landfill areas does not infiltrate the soil. Instead, it results in overland flow. The exceptions to this condition are the approximately 13.3 acres within Parcel 4, all of Parcel 5, and the Retention Basin as well as off-site areas, such as the proposed fire station, Lick Mill Boulevard extension, the bridge over San Tomas Aquino Creek, the Tasman Drive slip-ramp, and the Santa Clara Gateway access variant, which are largely all at-grade with surrounding surface streets. The Tasman Drive slip-ramp is at grade with Tasman Drive but above grade from the Santa Clara Youth Soccer Park.

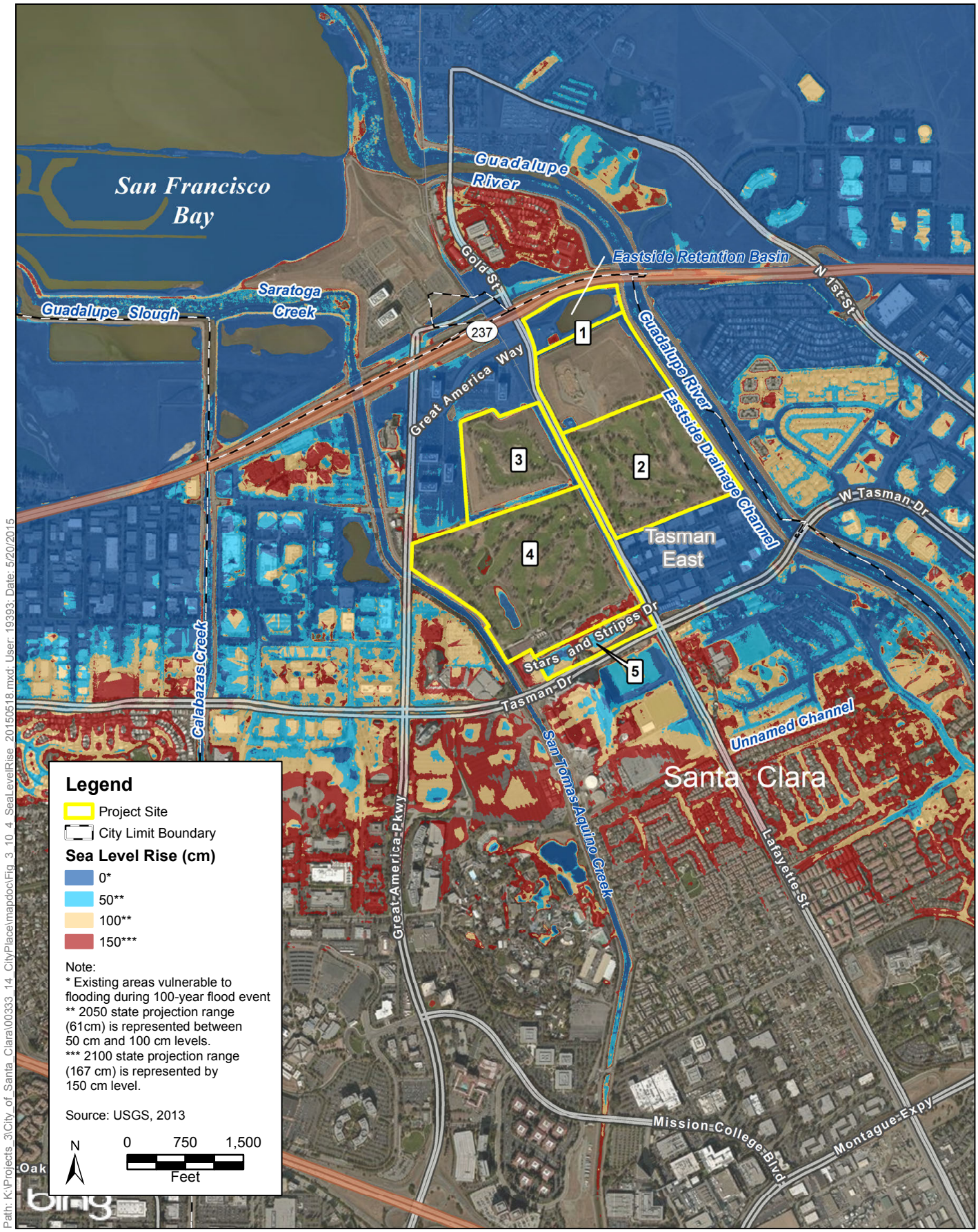

Figure 3.10-5
Vulnerability to Sea Level Rise in the Project Area

Project construction activities would include site clearing and grubbing, demolition and removal of existing structures, trees and pavement, cut-and-fill activities, grading and excavation, paving, building construction, and landscaping. Land-disturbing activities and placement of stockpiles within proximity to storm drain inlets may also result in a temporary increase in sediment loads to receiving waters. In addition, in off-site areas where new roadways could be developed as well as the replacement fire station (Option 2), land disturbance during construction could result in the discharge of sediments into nearby storm drains. The new bridge constructed over San Tomas Aquino Creek and new storm drain outfalls within San Tomas Aquino Creek and the Guadalupe River and dredge-and-fill activities within the creek and river channels, and along the banks and riparian areas could result in direct discharges of sediment to waterways. Sediment can affect surface water quality through interference with photosynthesis, oxygen exchange, and the respiration, growth, and reproduction of aquatic species. Other pollutants, such as nutrients, trace metals, and hydrocarbons, can adhere to sediment and be transported with sediment to downstream locations and degrade water quality.

The delivery, handling, and storage of construction materials and wastes (e.g., concrete debris), as well as the use of heavy construction equipment, could also result in stormwater contamination and thereby affect water quality. Construction activities may involve the use of chemicals and operation of heavy equipment, which could result in accidental spills of hazardous materials (e.g., fuel and oil). Such spills could enter nearby surface water bodies via runoff or storm drains. Constituents in fuel, oil, and grease can be acutely toxic to aquatic organisms and/or bioaccumulate in the environment. Staging areas or building sites can be sources of pollution because of the use and storage of paints, solvents, cleaning agents, and metals during construction. Impacts associated with metals in stormwater include degradation of water quality, toxicity to aquatic organisms, such as bioaccumulation, and the potential contamination of drinking supplies.

All Project construction activities would be subject to existing regulatory requirements. Because land disturbance for the Project would be more than 1 acre, coverage under the Construction General Permit would be required. As part of compliance with the Construction General Permit, standard erosion control measures and other BMPs would be identified in a SWPPP. These measures would be implemented during construction to reduce contamination of waterways. BMPs for inclusion in the SWPPP would be required to represent the BAT that is economically achievable and the BCT to reduce pollutants. Commonly practiced BMPs may consist of a wide variety of measures implemented to reduce pollutants in stormwater and other nonpoint-source runoff.

Measures would include installing erosion and sediment control such as silt fences, staked straw wattles, and geofabric to prevent silt runoff to storm drains or waterways. Topsoil and backfill would be stockpiled, protected, and replaced at the conclusion of construction activities. Remaining disturbed soil would be revegetated as soon as possible with the appropriate selection and schedule for turf, plants, and other landscaping vegetation. No disturbed surfaces would be left without erosion control measures in place during the wet season, which generally occurs between October 1 and April 30. Specific erosion and sediment control BMPs would be implemented for Project construction occurring during the wet season.

Dewatering of leachate groundwater may occur during construction, such as during excavation for utility work. Construction dewatering activities are expected to be minimal because most of the Project site is underlain by waste and a leachate collection system is in continuous operation, and the dewatering would be temporary and not impact groundwater supplies since the leachate groundwater is not a source of water supply. Golf course ponds will need to be dewatered and filled in for Project construction. This water may contain fertilizers and other pollutants. However, surface water

dewatering activities would be conducted in accordance with all relevant regulations. When dewatering groundwater leachate or surface water from golf course ponds, the water would be hauled off-site, routed to the sanitary sewer system for treatment, or discharged to storm drains after testing, in accordance with applicable legal requirements.

In order to prevent short-term (construction) impacts on water quality, the Project would comply with the requirements of the Construction General Permit, the San Francisco Bay MS4 Permit (e.g., construction stormwater measures), and the City's stormwater requirements (e.g., the Santa Clara County Grading Ordinance). A SWPPP to address the construction impacts would be prepared, implemented, and enforced.[55] Therefore, potential water quality impacts from construction activities would be ***less than significant***.

Groundwater. Grading and other excavation activities during Project construction would have the potential to temporarily modify the existing low-permeability landfill cover,[56] which could allow precipitation and runoff to infiltrate into the underlying waste. If not conducted properly and in accordance with existing regulations, downward migration of the water could mobilize contaminants in the waste and/or cause the existing VOC contaminant plume to expand. Induced migration of contaminants from their current, relatively stable condition could adversely affect groundwater supplies in the vicinity of the Project site, particularly downgradient to the northeast.

Title 27 of the California Code of Regulations (CCR), Section 21190, requires any post-closure construction at the Project site to maintain the integrity of the landfill linings, including the existing final cover. CCR Section 21190(d) specifies:

> Construction on the site shall maintain the integrity of the final cover, drainage and erosion control systems, and gas monitoring and control systems. The owner or operator shall demonstrate to the satisfaction of the Enforcement Agency[57] that the activities will not pose a threat to public health and safety and the environment. Any proposed modification or replacement of the low permeability layer of the final cover shall begin upon approval by the Enforcement Agency and the Regional Water Quality Control Board.

Application of these requirements, which are required by existing regulations, would minimize any potential adverse impacts on groundwater supplies due to grading and excavation within the former landfill area.

Installation of pilings through the refuse into deeper native soils would have the potential to create a conduit for contaminated leachate within the landfill to migrate into deeper, uncontaminated aquifers, potentially adversely affecting groundwater supplies, resulting in a violation of water quality standards or WDRs.

As noted and described in detail in Section 3.9, *Geology and Soils*, both drilled displacement columns (DDC) and auger cast-in-place (ACIP) piles are recommended by the Project geotechnical report to support Project improvements. DDCs are generally used in areas with relatively thin refuse, 40 feet thick or less, and where relatively lightweight structures are planned and are constructed by using an auger to drill a shaft to the desired depth. Refuse, soil, and leachate are displaced laterally by the auger. Grout or

[55] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[56] The potential to modify the low-permeability cover during construction is considered "temporary" because the Project proposes to maintain the cover in its current configuration and any penetrations of the cover during construction would be repaired prior to placement of overlying fill, pavement, or foundation systems.

[57] The Local Enforcement Agency is the Santa Clara County Department of Environmental Health.

concrete is then injected continuously under pressure as the auger is slowly withdrawn, replacing the soil or refuse displaced by the drilling operation.

ACIPs are used to support buildings in areas where the refuse thickness is more than 40 feet or the building loads are relatively large. ACIP piles are installed by drilling to the required depth with a hollow-stem auger[58] and removing a cylinder of material (rather than displacing the material). When the auger reaches the required depth, cement grout or concrete (hereafter referred to as "grout") is injected through the bottom port of the hollow-stem auger. Grout is injected continuously under pressure as the augers, still rotating, are slowly withdrawn, replacing the soil removed by the drilling operation. While the grout is still fluid, a steel reinforcing cage is inserted into the shaft.

Both DDC and ACIP piles rely on injection of grout under pressure to construct the deep foundation system. The pressurized injection of liquid grout from the bottom of the boring forces the grout into the pore spaces of the material (soil or waste) surrounding the boring. This movement of the grout into the surrounding material seals the interface between the pile and the adjacent soil and waste, reducing the potential for introducing leachate or groundwater into underlying aquifers during construction. The injection of grout occurs immediately after the target depth of the pile is achieved by drilling. Therefore, virtually no downward migration of leachate would occur during construction of the pile systems.

Implementation of the proposed foundation support systems within the landfill area would rely on 1) the placement of liquid grout under pressure to seal the penetrations of the cover and prevent migration of landfill contaminants and 2) require review and approval of design-level specifications of these systems by the Santa Clara County Department of Environmental Health, Local Enforcement Agency, and the Regional Water Board, which is required by existing regulations. This would minimize any potential adverse impacts on groundwater quality due to the installation of foundation systems within the landfill area.

In off-site areas where the replacement fire station (Option 2) and potential off-site roadways may be built, some dewatering of natural shallow groundwater may be needed for utility work and installation of foundation systems. However, dewatering would be minimal and temporary, and it would be hauled off-site or routed to the sanitary sewer system for treatment, if conducted. Therefore, a General Dewatering Permit would not be needed. Grading outside the bermed landfill area (including on-site areas not on the landfill on Parcels 4 and 5, the Lick Mill Boulevard extension, and the new bridge over San Tomas Aquino Creek), the Santa Clara Gateway vehicular access variant, the Tasman Drive slip-ramp, and potentially the off-site fire station (Option 2) would be relatively shallow and would not affect groundwater supply or quality, with the exception of pile driving for the bridge over San Tomas Aquino Creek, which may result in greater excavation depths and expose groundwater aquifers. Should groundwater dewatering be required, which is likely in Parcel 5 because of the proposed two-level underground parking facility, the water would be discharged into surface waters, nearby storm drains, or, if necessary, transported off-site for treatment, all in compliance with applicable legal requirements.

Overall, through compliance with applicable requirements to prevent migration of leachate groundwater into uncontaminated aquifers, the disposal of potentially dewatered leachate (within landfill area) and natural groundwater (in off-site areas) to the sanitary sewer system, and the lack of groundwater use for water supply, impacts on groundwater would be ***less than significant***.

[58] A hollow-stem auger is a drill bit and shaft with a hollow center tube that allows access to the bottom of the borrowing from the surface, either for collecting samples or injecting cement grout to seal the boring.

Operation and Maintenance

Surface Water. The Project would involve operation and maintenance of office, hotel, mixed-used retail, restaurant, entertainment, and residential uses as well as associated parking and site access. Because the Project could include residential and commercial uses, including restaurants, the anticipated pollutants could include pathogens, nutrients, pesticides, sediments, trash and debris, oxygen demanding substances, and oil and grease. New roadways may increase traffic and, therefore, contribute pollutants associated with roadways. At full development, impervious area would increase from approximately 25 acres at present (10 percent of the site) to approximately 123 acres (51 percent of the site).

Table 3.10-4 provides a summary of changes to existing and proposed impervious and pervious area by parcel.

Table 3.10-4. Impervious and Pervious Area Summary for Existing and Proposed Project Parcels (Scheme A)

		Existing Impervious/Pervious		Proposed Impervious/Pervious	
Parcel	Size (acres)	Area (acres)	% of Parcel	Area (acres)	% of Parcel
1[a]	49.6	6.6/43.0	13.3%/86.7%	17.7/31.9	35.7%/64.3%
2	60.9	2.5/58.4	4.1%/95.9%	31.5/29.4	51.7%/48.3%
3	34.9	1.0/33.9	2.7%/97.3%	13.6/21.3	39.0%/61.0%
4	86.6	9.7/76.9	11.2%/88.8%	54.6/32.0	63.0%/37.0%
5	8.0	5.5/2.5	68.7%/31.3%	6.0/2.0	75.0%/25.0%
Total	240.0	25.3/214.7	10.5%/89.5%	123.4/116.6	51.4%/48.6%

Source: Langan Treadwell Rollo. 2015b. Stormwater Technical Memorandum for City Place Santa Clara, CA. Prepared for Related Santa Clara, LLC. June 30.
Notes:
[a.] Parcel 1 includes the Retention Basin.

This increase in impervious area would most likely result in increased stormwater volumes and rates during a rain event. The Project would be exempt from SCVURPPP Provision C.3.f.i (Hydromodification Control Requirements) because Project site surface flows would discharge to sections of the Guadalupe River and San Tomas Aquino Creek, which are identified as having hardened channels or being in tidal areas, according to the HMP Applicability Map (Figure 3.10-1). Hydromodification requirements do not apply to projects that discharge to hardened or tidally influenced portions of channels where increased discharges present minimal potential for erosion or other impacts on beneficial uses. The Project site is outside hydromodification zone limits.[59] As such, there are no restrictions on the timing, peak discharge, and volume of runoff from the Project site resulting from the development of the Project relative to hydromodification concerns (e.g., channel erosion). The storm drainage system for the Project would include an underground gravity network of pipes, catch basin, manholes, water quality treatment measures and other appurtenances. The Project would also be required to comply with San Francisco Bay MS4 Permit Provision C.3, Stormwater Technical Guidance, because it would involve the creation/replacement of 10,000 square feet or more of impervious surface. The stormwater management measures proposed for the Project would utilize LID techniques to reduce pollutant discharges. Pollutants would be removed from stormwater through filtration, infiltration, and

[59] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA.* Prepared for Related Santa Clara, LLC. June 30.

sedimentation. As previously described, because the majority of the Project site is a former landfill and the infiltration of runoff is infeasible in portions of the Project site that are underlain by landfill, any treatment measure involving biotreatment within the landfill area would need to be lined to prevent infiltration of water into the landfill deposit.[60] In the landfill area, the stormwater treatment measures would need to rely on other design approaches and be built into the structure of the development. Examples of stormwater treatment measures are provided in Mitigation Measure WQ-1.1.

The Project would be designed and maintained in accordance with the City, County, and San Francisco Bay Regional Water Board water quality requirements, such as the San Francisco Bay MS4 Permit and SCVURPPP, as well as flood control requirements from the SCVWD (see separate discussion of flooding under Impact WQ-3). However, stormwater treatment measures have not been finalized and would be unique to the Project. Therefore, potential surface water quality impacts from Project operation would be ***significant***.

MITIGATION MEASURE. The Project would be designed to comply with San Francisco Bay MS4 Permit Provision C.3. With regulatory compliance and implementation of Mitigation Measure WQ-1.1, the Project would not result in any increase in 100-year peak flood elevations within San Tomas Aquino Creek and the Guadalupe River, in compliance with Santa Clara Valley Water District (SCVWD) requirements. Therefore, such measures would reduce potential flooding and water quality impacts during Project operation to a ***less-than-significant*** level.

WQ-1.1: *Design and Implement Stormwater Control Measures.* In compliance with Provision C.3 of the San Francisco Bay MS4 Permit and the Santa Clara Valley Water District's 100-year peak flood requirements, post-construction stormwater controls shall be implemented to reduce total runoff rates and associated pollutant discharges.

According to the Santa Clara Valley Urban Runoff Pollution Prevention Program's C.3. Stormwater Handbook, the three methods for hydraulically sizing flow-based stormwater treatment control measures are (1) volume-based, (2) flow-based, or (3) a combination of volume-/flow-based hydraulic sizing criteria. The simplified method for sizing bioretention areas and flow-through planters, known as the "4 percent method," is based on a runoff inflow of 0.2 inch per hour, with an infiltration rate through biotreatment soil of 5 inches per hour. The 4 percent method requires the treatment measure to be 4 percent of the impervious area that drains to it.[61]

The following stormwater treatment (or Low Impact Development [LID]) measures are examples that will be considered and carefully selected as part of the final design process for the different sections of the proposed development:

- Bioretention Areas (impermeable liner with underdrain—no infiltration into landfill)
- Flow-through Planters
- Tree Well and Media Filters
- Infiltration Trenches (impermeable liner with underdrain—no infiltration into landfill)

[60] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[61] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA*. Prepared for Related Santa Clara, LLC. June 30.

- Rainwater Harvesting and Reuse
- Green Roofs
- Green Streets (with bioretention, impermeable liner, and underdrain)
- Pervious Pavements (impermeable liner with underdrain—no infiltration into landfill)

As noted above, a minimum of 4 percent of the site area shall be used for the stormwater treatment measures. As part of final design, these treatment measures for the Project site shall be incorporated into the aesthetics of the landscape. Some attenuation of the peak flows can be recognized, depending on the measures selected. The measures shall include an overflow to safely convey the more intense, less frequent rainfall events.

The stormwater treatment measures shall capture sufficient flows so that 100-year peak flood elevations within San Tomas Aquino Creek and the Guadalupe River will not increase as part of the Project. The exact reduction in 100-year peak runoff volumes and flows that the stormwater management measures will need to accommodate will be determined during the design process for the stormwater management measures and will be provided in the detailed Project Stormwater Management Plan.

The stormwater management measures for each parcel shall be modeled during final design for buildings, parking garages, site landscaping, etc. Dynamic modeling, such as the EPA Stormwater Management Model (SWMM), shall be used. SWMM tracks the quantity and quality of runoff generated within each subcatchment as well as the flow rate, flow depth, and quality of water in each pipe and channel during a simulation period with multiple time steps. The results of the modeling shall be used to compare the proposed "permanent" stormwater peak flows and volumes for the Project with the existing peak flows and show compliance with the jurisdictional regulations.

A Stormwater Management Report, including detailed hydrologic and hydraulic calculations, analysis, and conclusions, shall be prepared to document the final design of the stormwater management and storm drain system and obtain the requisite approvals.

Groundwater. As described above, both DDC and ACIP piles rely on injection of grout under pressure to construct the deep foundation system. The pressurized injection of liquid grout from the bottom of the boring forces the grout into the pore spaces of the material (soil or refuse) surrounding the boring. This movement of the grout into the surrounding material seals the interface between the pile and the adjacent soil and refuse. This sealing process helps eliminate the potential for a preferential seepage path along the pile/soil contact during the operation and maintenance period. This would reduce any potential adverse impacts on groundwater supplies due to piling installation to a ***less-than-significant*** level.

Impact WQ-2: Effects on Groundwater Supplies and Recharge. The Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level. (LTS)

Construction

In some settings, construction activities, including operation of heavy equipment, can compact surface soils and reduce infiltration capacities so that more precipitation runs off, instead of infiltrating and recharging the underlying aquifer. Most of the Project site is currently covered with soil over a low-permeability cover intended to prevent precipitation and stormwater runoff from infiltrating into and through the underlying waste. While the surface soils (e.g., soil and turf at the golf course) allow near-surface infiltration of some precipitation, the underlying clay cover limits deep infiltration. Parcel 5 is not underlain by low-permeability cover and waste; most of it is covered with pavement and a vegetated landscape. Therefore, limited infiltration occurs in this area.

The off-site areas, including the Lick Mill Boulevard extension, the bridge over San Tomas Aquino Creek, the Santa Clara Gateway vehicular access variant, the Tasman Drive slip-ramp, and potentially the off-site fire station (Option 2), are covered mostly with impervious surfaces (e.g., parking lots, buildings) and have underlying compacted soils. These impervious surfaces and compacted soils limit infiltration under existing conditions. Therefore, construction activities (and the potential compaction of the surface soils) in these areas would have essentially no impact on net deep infiltration and groundwater recharge. Any construction dewatering that may be required is expected to be minimal because most of the Project site is underlain by a leachate collection system that is in continuous operation, proposed construction at the off-site areas would not require deep excavations that would be likely to reach groundwater levels, and construction impacts would be temporary. Thus, construction would result in a ***less-than-significant*** impact on groundwater supplies.

Operation and Maintenance

Most of the Project site is currently covered with a low-permeability clay cover, which is intended to prevent precipitation and stormwater runoff from infiltrating into and through the underlying waste. Currently, precipitation only recharges groundwater in those areas without the landfill cover. Parcel 5 is not underlain by landfill cover and waste but, rather, covered with pavement and a vegetated landscape. Therefore, under existing conditions, the Project site does not contribute significantly to groundwater supplies by direct recharge through site soils. The Project would preserve the existing low-permeability cover, and therefore, Project site recharge potential would remain essentially unchanged. As a result, the degree of subsidence potential is not expected to change at the Project site.

Off-site areas that would be affected by the Project (including the Lick Mill Boulevard extension, the bridge over San Tomas Aquino Creek, the Santa Clara Gateway vehicular access variant, the Tasman Drive slip-ramp, and potentially the off-site fire station [Option 2]) are already largely covered by impervious cover (e.g., parking lots, buildings). Therefore, redevelopment of these areas would not result in a significant decrease in infiltration and groundwater recharge. The Project would result in additional water demand from both surface and groundwater resources. However, as discussed in Section 3.14, *Utilities and Service Systems*, Impact UT-1, the projected water supply is adequate to provide water until 2035 under normal-year, single-dry-year, and multiple-dry-year scenarios. In addition, as described in the Project Water Supply Assessment (WSA) (Appendix 3.14), there is approximately 85,000 acre-feet per year of unutilized groundwater supply in the groundwater basin

below the Santa Clara Valley Groundwater Basin's safe yield, taking into account the cumulative demands of Santa Clara and other nearby cities that utilize the same groundwater basin. Therefore, the potential impact related to Project depletion of groundwater supplies, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level, would be ***less than significant***.

Impact WQ-3: Changes to the Existing Drainage Patterns. The Project could substantially alter the existing drainage pattern of the site and could result in substantial erosion, siltation, or flooding on-site or off-site. (LTS/M)

Construction

Project construction activities would alter existing drainage patterns and could result in local (on-site) and temporary erosion and siltation during construction. Sediment transport to local drainage facilities such as drainage inlets, culverts, and storm drains could also result in reduced storm flow capacity, resulting in localized ponding or flooding during storm events. However, erosion and sediment control measures, such as silt fences and straw wattles, to prevent sediment from entering storm drains and surface waters would be implemented as part of the Construction General Permit SWPPP. Therefore, this impact would be ***less than significant***.

Operation and Maintenance

During operation, the Project would alter on-site drainage patterns with development of buildings, roadways, and open space areas, which would modify elevations on the Project site and thereby alter the stormwater runoff pattern. The existing and proposed impervious and pervious areas for the Project, based on the most conservative development (i.e., the maximum potential stormwater impacts), are shown for each parcel in Table 3.10-3. At full development of the 240-acre Project site, impervious area would increase from approximately 25 acres (pre-Project) to 123 acres (post-Project).

The storm drainage system for the Project would be an underground gravity network of pipes, catch basins, manholes, and other appurtenances. Building drainage would utilize internal systems that would be piped directly to the storm drains. For final design, the public underground storm drain conveyance system would be capable of conveying 10-year peak runoff as well as safely conveying 100-year peak flows from the Project site from a combination of the piped system and surface conveyance. Public streets would be designed such that the 100-year flow would remain within the roadway limits and would not extend into private property.[62]

The Rational Method, as prescribed in the Santa Clara County Drainage Manual, was used to estimate the preliminary peak discharges for the combined on-site and off-site areas that are tributary to San Tomas Aquino Creek and the Guadalupe River for the 10-year and 100-year events. The peak flows for the four sub-watersheds were evaluated for the existing (pre-development) and proposed (post-development) conditions, assuming no on-site stormwater attenuation (Table 3.10-5). As shown in Table 3.10-5, proposed 10-year and 100-year peak flows would increase in the Eastside Channel and the Basin Direct subwatersheds, both of which flow into the Guadalupe River.

[62] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA.* Prepared for Related Santa Clara, LLC. June 30.

Table 3.10-5. Peak Flow Summary (by Sub-Watershed)

	10-year Peak Flow		100-year Peak Flow	
Sub – Watershed	Existing (cfs)	Proposed[a] (cfs)	Existing (cfs)	Proposed[a] (cfs)
San Tomas	78.3	54.2	124.2	88.5
East Basin	168.5	117.7	288.8	173.7
Eastside Channel	68.0	82.8	117.5	143.1
Basin Direct	9.7	11.9	13.1	16.1

Source: Langan Treadwell Rollo. 2015. Stormwater Technical Memorandum for City Place Santa Clara, CA. Prepared for Related Santa Clara, LLC. June 30.

Notes:

[a] The proposed peak-flow estimates do not take into account any new on-site stormwater management or treatment. The flows are provided only for comparison between the existing and proposed conditions based on the current preliminary level of design before stormwater improvements.

A preliminary hydrologic and hydraulic evaluation of the Project on the downstream receiving waterways, including San Tomas Aquino Creek, the Eastside Drainage Channel, and the Guadalupe River, was prepared. The following summarizes the results of the evaluation:[63]

- **San Tomas Aquino Creek Direct** – Stormwater runoff from Parcels 4 and Parcel 5 will discharge to San Tomas Aquino Creek from three new stormwater outfalls. The invert of the outfalls will be set above the bottom of the creek; the final elevation, as well as other elements, will be designed pursuant to SCVWD's outfall standards[64] and coordinated with the SCVWD to ensure the location is above sediment levels within the creek. Based on the preliminary estimates, the peak flow from the 100-year storm event to San Tomas Aquino Creek will be reduced as result of the Project (Table 3.10-5). However, it will need to be verified that the 100-year water surface elevation within the creek will not be affected.
- **Golf Course Pump Station** – The 2012 Pump Station Design Report[65] indicated that the current pump station has the capacity to convey the 100-year peak flow, with minor ponding in Stars and Stripes Drive. However, the Golf Course Pump Station will most likely be abandoned and removed. The development within Parcel 5 and beneath Stars and Stripes Drive and Centennial Boulevard will raise grades such that the pumping of the stormwater runoff may not be necessary. The eastern end of Stars and Stripes Drive will drain to the south to the existing storm drain system south of the overhead Tasman Drive structure, and the runoff from Tasman Drive and the existing City parking garage will be accommodated via the new Parcel 5 storm drainage system within the below-grade parking structure. Some portions of the runoff from Tasman Drive (south side) may need to be routed to the existing Stars and Stripes Drive drainage system south of Tasman Drive.

[63] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA.* Prepared for Related Santa Clara, LLC. June 30.

[64] Santa Clara Valley Water District. 2006. *User Manual: Guidelines & Standards for Land Use Near Streams*. A Manual of Tools, Standards, and Procedures to Protect Streams and Streamside Resources in Santa Clara County. Prepared by the Santa Clara Valley Water Resources Protection Collaborative. Originally adopted in August 2005. Revised: July 2006.

[65] GHD, Inc. 2012. *Golf Course Pump Station – Pump Station Design Report.* Technical Memorandum No. 2. Submitted to Ron Eng, City of Santa Clara Engineering Department. November 7.

- **Eastside Drainage Channel, Retention Basin, and Pump Station** – The Project would utilize the existing Eastside Drainage Channel, Retention Basin, and pump station to convey stormwater runoff from the Project to the Guadalupe River. Runoff from Parcels 1 and 2 would be discharged to multiple new storm drains from the Project site to the existing Eastside Drainage Channel. Runoff from Parcel 3 would flow through existing drainage infrastructure located north of the parcel and west of the railroad. The preliminary evaluation identified that a portion of the existing off-site system may need to be upsized to accommodate Parcel 3. However, these upgrades may not be required if enough of the stormwater on Parcel 3 is collected and re-used as part of stormwater management measures (Mitigation Measure WQ-1.1) or routed to the existing drainage area between Parcel 3 and 4.
    - Although the Eastside Drainage Channel was found to have sufficient design capacity to convey the post-development peak flow from the 100-year storm event, a visual assessment of the Eastside Drainage Channel indicated that its available conveyance capacity has been reduced to approximately 75 percent because of significant vegetation and silt within the entire length of the channel. The channel must be cleared of vegetation in order to safely convey the peak flows from 100-year storm event for existing and proposed conditions. As part of the 2010 Eastside Retention Basin Drainage Swale Vegetation Clearing Project, a maintenance plan was proposed that included, but was not limited to, vegetation removal within the swale. As of 2015, this project has yet to be implemented. The City has indicated that the vegetation clearing that was included as part of this project is currently not funded and will not be conducted by the City in the foreseeable future. Thus, for the purposes of this EIR, it is assumed that clearing will not be provided by the City.
    - The preliminary results indicate there is sufficient storage of the existing Retention Basin and pumping capacity of the pump station to safely convey the post-development peak runoff from the 100-year storm. It was recently determined after a bathymetric survey that the Retention Basin's storage capacity is 51.6 acre-feet.
    - Depending on the final configuration of the on-site stormwater management and drainage system for Parcel 3, improvements may need to be made to the west channel and some of the City storm drain system through the existing commercial property. However, other options for Parcel 3 drainage, including the use of the drainage channel between Parcel 3 and 4 and the existing City storm drain system within the existing commercial property to the west, are being evaluated.

The SCVWD requires no increase in the 100-year peak flood elevation within waterways under its jurisdiction (e.g., San Tomas Aquino Creek and the Guadalupe River) without recertifying the levees. In order to satisfy the SCVWD criteria, a reduction in the peak flows from the Project to pre-development conditions would be required. The building drainage would be via internal systems piped directly to the storm drains. For final design, the public underground piped storm drain conveyance system would need to be capable of conveying the 10-year peak runoff as well as safely convey the 100-year event peak flows near storm drain pump systems. Because of a reduction in capacity resulting from vegetation growth, the Retention Basin drainage swale cannot safely convey 100-year peak flows under existing conditions. Because the City has indicated that necessary vegetation clearing in the swale is not currently programmed as a City project, vegetation clearance cannot be presumed. This impact is considered ***significant***.

Public streets would need to be designed such that the 100-year event flow remains within the roadway limits and not extend into private property.[66]

The majority of stormwater runoff from the Project would be intercepted by stormwater management measures described in Mitigation Measure WQ-1.1. After being treated, the remaining un-retained stormwater runoff would be routed into the Project stormwater drainage system. These alterations would not result in on-site or off-site erosion or siltation because the majority of surface area would be paved and, therefore, no sediment would be exposed and vulnerable to erosion. In areas that are not paved, runoff would discharge to the Guadalupe River and San Tomas Aquino Creek, both of which are identified as having hardened channels or being in tidal areas, according to the HMP Applicability Map (Figure 3.10-1). As described in Mitigation Measure WQ-1.1, site drainage will be designed to avoid increasing 100-year flows of the adjacent San Tomas Aquino Creek and the Guadalupe River.

The bridge constructed above San Tomas Aquino Creek has not yet been designed but may affect 100-year flood flows. In addition, the new outfalls within San Tomas Aquino Creek have not yet been designed but could also affect 100-year flood flows and cause changes to the existing channel morphology. Implementation of Mitigation Measure WQ-3 will minimize these impacts. Impacts of the new bridge and outfalls could be ***significant***.

MITIGATION MEASURE. The Project would be designed to comply with San Francisco Bay MS4 Permit, Santa Clara Valley Water District (SCVWD), Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), and City requirements. With regulatory compliance and implementation of Mitigation Measure WQ-1.1 (see above) and Mitigation Measures WQ-3.1 and WQ-3.2, impacts from Project related to operational flooding or associated erosion would be ***less than significant***.

WQ-3.1: *Design New Bridge and Outfall Structures to Avoid Increase in 100-year Flow and Channel Erosion.* In compliance with the SCVWD's 100-year peak flood requirements, any new bridge and new outfalls in San Tomas Aquino Creek shall be designed to avoid increases in the 100-year flow and to avoid creek bed/channel erosion. The design shall be provided to the City of Santa Clara and the SCVWD for review and approval for the Project. Construction would be done in phases. For example, the new bridge over the San Tomas Creek would not be needed until Phase 4 and outfalls to the eastside drainage ditch would not be needed until Phases 6, 7, and 8. The design review approval of outfalls shall occur prior to the issuance of the building permit for the development that triggers the need for the outfall or associated construction activity, and on a schedule similar to the phases of construction.

WQ-3.2: *Vegetation Removal from the Retention Basin Drainage Swale.* In accordance with the Retention Basin Drainage Swale Vegetation Clearing Project, and prior to the placement of new impervious surfaces on Parcels 1 or 2, overgrown tule and cattails shall be removed from the entire length of the drainage swale to restore the swale's flood protection capacity and protect residents and businesses. Vegetation in the drainage swale shall be mowed by hand using rotary mowers, and tule and cattails shall be cut down to 3 to 4 inches above the ground surface. The clippings shall be loaded by hand and hauled from the drainage swale to the Retention Basin where the vegetation will dry out. Once dry, the vegetation shall be transported to the Newby Island Landfill. It is estimated that initial removal of overgrown vegetation will generate approximately 300 cubic yards of debris. Prior to performance of this work, all necessary permits shall be obtained from environmental regulatory agencies for this

[66] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA.* Prepared for Related Santa Clara, LLC. June 30.

vegetation removal, including any required compensation for loss of wetland/riparian vegetation.

Impact WQ-4: Changes to Stormwater Runoff. The Project could create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. (LTS/M)

As stated in Impact WQ-3, a preliminary evaluation of the drainage infrastructure for the Project indicated sufficient capacity to convey 100-year peak flows.[67] However, some of the infrastructure may be included in City improvement projects, such as upgrades to the off-site system near Parcel 3 and the Eastside Pump Station and clearing of the Eastside Drainage Channel, as required by Mitigation Measure WQ-3.2. Additional runoff from the Project site will not result in an increase to 100-year flood elevations, as required by the SCVWD. The City-owned and -operated Golf Course Pump Station system and Eastside Storm Drain Lift Station would continue to operate normally until such a time that improvements are identified. However, the Project would most likely ultimately abandon the existing Golf Course Pump Station system and possibly upgrade the Eastside Storm Drain Pump Station. The development within Parcel 5 will raise grades such that the pumping of the stormwater runoff may not be necessary. The Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) was used to model the entire watershed tributary to the Retention Basin and estimate a peak runoff rate for 10-year and 100-year storm events. The Hydrologic Engineering Center's River Analysis System (HEC-RAS) was used to evaluate water surface impacts on San Tomas Aquino Creek, the Guadalupe River and the Eastside Drainage Channel. The modeling will help design the storm system upgrades to ensure that the 100-year storm elevations within the waterways are unchanged as a result of elimination of the pump station system. The phasing of the Project, as well as other City development projects within the tributary areas, would require modifications to stormwater management measures to be completed as the final development plans for each phase are approved. The SCVWD has not reported any flooding issues related to storm drain capacity in the area. The Project would be located at the downstream end of both waterways, which still have capacity for some additional flows.

The final design for the stormwater management and storm drainage system would be required to meet several criteria (e.g., the Santa Clara County Drainage Manual watershed criteria, SCVURPPP Provision C.3 post-construction stormwater criteria, SCVWD levee recertification, and 100-year flood criteria) to ensure sufficient storm drain capacity for the Project. Therefore, the Project would not create or contribute runoff water that would exceed the capacity of the existing stormwater drainage systems.[68]

The SCVWD has not reported any flooding issues related to storm drain capacity in the area. The Project would be located at the near downstream end of both waterways, and the waterways still have capacity for some additional flows.

There are numerous non-standard design elements to address the landfill aspects of the Project, including settlement vaults, flexible connections, structural slabs, and utility corridors in refuse.[69] Any potential additional sources of runoff created by the Project would be treated with the stormwater management measures described in Mitigation Measure WQ-1.1. With implementation of Mitigation

[67] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA*. Prepared for Related Santa Clara, LLC. June 30.

[68] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

[69] Langan Treadwell Rollo. 2015b. *Stormwater Technical Memorandum for City Place Santa Clara, CA.* Prepared for Related Santa Clara, LLC. June 30.

Measure WQ-1.1, the Project would not provide substantial additional sources of polluted runoff.[70] Therefore, this impact would be ***less than significant***.

Impact WQ-5: Degradation of Water Quality. The Project would not otherwise substantially degrade water quality. (LTS/M)

In contrast to Impact WQ-1, which discusses impacts involving violations of water quality objectives and standards, this impact addresses "other" water quality impacts, such as those that can result from wetland dredge and fill. There are 6.7 acres of ponds and wetlands, as well as a drainage ditch, on the Project site.

The new bridge over San Tomas Aquino Creek could involve pile driving within the creek, and new storm drain outfalls within San Tomas Aquino Creek would involve excavation within the stream channels. These activities would account for dredge-and-fill activities within stream channels. In addition, the existing golf course detention pond within the Parcel 4 would be dewatered and filled for new development, as would internal drainage ditches. Excavation is not required within the Guadalupe River, nor would dredge and fill activities be necessary.

Construction within areas that are subject to USACE jurisdiction under Section 404 of the CWA, CDFW jurisdiction under California Department of Fish and Game Code Section 1602, and San Francisco Regional Water Board jurisdiction under CWA Section 401 or the Porter Cologne Water Quality Act would require permits from the relevant agency or agencies and compensation for loss of federal and state waters (including wetlands). Water/wetland loss and/or removal without avoidance, minimization, or compensation would be a ***significant*** impact. Section 3.8, *Biological Resources,* addresses this impact and identifies associated mitigation measures, including BIO-5.1 (Protect Retention Pond and Drainage Swale Aquatic Habitat during Construction) and BIO-5.2 (Compensate for Wetland Loss), to minimize associated impacts. Therefore, compliance with relevant regulations and implementation of Mitigation Measures BIO-5.1 and BIO-5.2 would reduce this impact to ***less than significant***.

Impact WQ-6: Place Housing or Structures within 100-Year Flood Hazard Area. The Project would place housing or structures within a 100-year flood hazard area during large storm events, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. (LTS/M)

As shown in Figure 3.10-4, most of the Project site is within Zone X, "Other Flood Areas," identified as areas with a 0.2 percent chance of flooding; areas with a 1 percent annual chance of flooding, with average depths of less than 1 foot; drainage areas of less than 1 square mile; and areas that are protected by levees from a 1-percent-annual-chance of flood. Therefore, residential and commercial structures placed within the Project site (Parcels 1 through 5) would be outside of the FEMA-designated 100-year flood zone's base flood elevations.

The Project site currently includes a fire station (Fire Station 10), which may be demolished during construction of the Project, thereby necessitating construction of a replacement station. All but one replacement location option under consideration (Option 2) would be located on the primary Project site. Option 2 would be located in the surface parking lot of the Santa Clara Convention Center (Convention Center), which is an off-site location, adjacent to San Tomas Aquino Creek and Great

[70] Langan Treadwell Rollo. 2015a. *Hydrology/Water Quality Report for City Place Santa Clara*. Prepared for Related Santa Clara, LLC. June 30.

America Parkway. This location is at street level and directly adjacent to Zone AE. A large berm separates the creek from the Option 2 fire station relocation site. Therefore, the site is outside of the FEMA-designated 100-year flood zone.

An area of Tasman East that would accommodate the Lick Mill Boulevard extension, the northern part of Lafayette Street, and a portion of Tasman Drive are located within 100-year Flood Zone AH. These roadways would be flooded during a 100-year flood event, which may restrict site access during large storm events. However, roadways are relatively resilient to infrequent flooding and readily repairable if damaged during such large events. Impacts would be limited to the period of a large storm event and immediately afterward but would be ***significant*** for that temporary period.

MITIGATION MEASURE. With implementation of Mitigation Measure WQ-6.1, as well as improvements implemented as part of the design to protect Project-related roadways from flooding, such as drainage improvements and as-needed road repairs, impacts would be ***less than significant***.

WQ-6.1: Incorporate Flood Warnings for the Lick Mill Boulevard Extension and Other Access Roads for Areas Vulnerable to Flooding. The Project Developer and the City shall coordinate to provide flood warnings for new and existing roadways that provide access to the site and are vulnerable to 100-year flood levels. The Project Developer shall review the City's flood warning and emergency response plan and submit a brief plan for the Project that is consistent with the City's plan. The plan shall be submitted to the City's Emergency Services Coordinator in the City's Fire Department for review and approval. The specific frequency of expected flooding on site access roads shall be determined by the Project Developer and reviewed by the City. Flood warnings may be temporary or permanent, depending on the frequency of expected flooding, as determined by the City. Information about alternative access/egress routes, based on flooding potential and other factors, shall also be provided by the Project Developer to the City's Emergency Services Coordinator in the City's Fire Department for review and approval. If other flood improvements are implemented that remove the flooding risk at the Lick Mill Boulevard extension or other site access roads, then this mitigation shall no longer be required.

Impact WQ-7: Structural Impedance of Flood Flows. The Project would include new structures within a 100-year Flood Hazard Area that could impede or redirect flood flows. (LTS/M)

As described in Impact WQ-6, Project roadways may be exposed to flooding during a 100-year flood event. However, the roadways are flat and without structures that could impede or redirect flows. The new bridge and the outfalls placed in the San Tomas Aquino Creek could impede flood flows, depending on design. Mitigation Measure WQ-6.1 requires new bridge and outfall structures to be designed to facilitate passage of the 100-year flow without causing an increase in 100-year flood levels. With implementation of Mitigation Measure WQ-6.1, this impact is considered to be ***less than significant***.

Impact WQ-8: Exposure of People or Structures to Flooding due to Levee or Dam Failure. The Project would not expose people or structures to a significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam. (LTS)

The Project site is 26 miles downstream of the Anderson Dam and Reservoir and 14 to 15 miles downstream of the Lenihan Dam/Lexington Reservoir but within the potential dam failure inundation area for both dams. The inundation mapping for the Anderson Dam indicates that, in the event of a dam breach during the inflow design flood, the potential maximum flood elevation of +19.94 feet would occur at the Project site within 9 hours and 18 minutes. If the event were to occur during "fair weather," then

the potential maximum flood elevation of +16.84 feet would occur within 11 hours and 17 minutes. Inundation mapping for the Lenihan Dam/Lexington Reservoir indicates that, in the event of a dam breach during the inflow design flood, the potential maximum flood elevation would occur at the Project site within 8 hours and 30 minutes; however, peak flood elevation data were not readily available.

The dam inundation elevations are most likely lower than the majority of grades at the Project site. However, the lower lying Project facilities that may be subject to inundation during levee or dam failure would be:

- Southern part of Parcel 5 near Tasman Drive
- Fire station (Option 2)
- Roads:
  - Lick Mill Boulevard extension
  - Northern part of Lafayette Street near SR 237
  - Great America Parkway south of San Tomas Aquino Creek
  - Tasman Drive (from Guadalupe River to Great American Parkway and beyond)
  - Santa Clara Gateway vehicular access variant

Currently, a storage restriction of about 45 feet below the crest of Anderson Dam has been put in place to protect the public from inundation due to dam failure, resulting in a reduced storage capacity of 61,810 acre-feet. The SCVWD and the regulatory agencies, including DSOD and the Federal Energy Regulatory Commission, have approved the restriction and believe that this condition will minimize structural issues that could lead to an uncontrolled release of water in case of a failure after a major earthquake. The previously described ADSRP (which will be completed before the Project is operational) will address several Anderson Dam safety deficiencies associated with seismic activity, which will help minimize the potential for dam failure.

Although Lenihan Dam may incur some settlement during a major earthquake, as noted above, the SCVWD maintains that the dam structure overall should remain intact, and the potential for significant crack formation is low. Therefore, because the risk of failure of the dam is considered remote, the Project would not present a significant risk of loss, injury, or death to people or structures involving flooding, including flooding as a result of the failure of a levee or dam. Therefore, this would be a ***less-than-significant*** impact.

Cumulative Impacts

The geographic context for the analysis of cumulative impacts associated with surface hydrology and water quality is the Santa Clara subwatershed of the Lower San Francisco Bay watershed. The context for groundwater hydrology is the Santa Clara Subbasin of the Santa Clara Valley Groundwater Basin in the larger San Francisco Bay Hydrologic Region. The context for cumulative hydrology and water quality impacts is geographic and a function of whether impacts could affect surface water features/watersheds, the City's storm drainage system, or groundwater, each of which has its own physical boundary. This analysis accounts for anticipated cumulative growth within the potentially affected geographic area, as represented by full implementation of the County and City General Plans, including the projects identified in Section 3.0, *Environmental Impact Analysis*.

Cumulative impacts are addressed only for those thresholds that would result in a Project-related impact, whether it be less than significant, significant, or significant and unavoidable. If the Project would result in no impact with respect to a particular threshold, it would not contribute to a cumulative impact. Therefore, no analysis would be required.

The Project would have no impacts related to flooding by seiche, tsunami, or mudflows.

This cumulative analysis examines the effects of the Project in the potentially affected geographic area in combination with other current projects, probable future projects, and projected future growth.

Impact C-WQ-1: Cumulative Hydrology and Water Quality Impacts. The Project, in combination with other foreseeable development in the vicinity, would have a significant cumulative impact on water quality, groundwater recharge and supplies, storm drain capacity, or current flooding. The Project's contribution to a cumulative impact would be less than significant with mitigation. (LTS/M)

Water Quality

Development of the Project, combined with other past and future development within the potentially affected geographic area, could degrade stormwater quality through an increase in impervious surface area and an increase in contaminated runoff, which could ultimately violate water quality standards, affect beneficial uses, and/or further impair 303(d)-listed waters within the Santa Clara subwatershed and the Santa Clara groundwater subbasin. The quality of stormwater runoff varies with surrounding land uses, topography, and the amount of impervious cover as well as the intensity (energy) and frequency of irrigation or rainfall. During construction, runoff may contain sediments and other construction materials and wastes (e.g., concrete debris), resulting from activities such as site clearing and grubbing, demolition and the removal of existing structures and pavement, cut-and-fill activities, grading and excavation, paving, building construction, tree removal, and landscaping. During operation, runoff may contain oil, grease, and metals accumulated in streets and driveways as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-depriving substances from landscaped areas. The highest pollutant concentrations are generally in stormwater runoff generated at the beginning of the wet season and during the "first-flush," when approximately 80 percent of total accumulated pollutants are washed off surfaces with the first 0.5 inch of rainfall. Street surfaces are the primary source of pollutants in urban areas.

Other development could affect water quality if the land use changes, the intensity changes, and/or drainage conditions are altered to facilitate the introduction of pollutants to surface or groundwater resources. Changes in land use would alter the associated type and amount of pollutants in stormwater runoff (e.g., higher fecal coliform concentrations in runoff from residential lands compared with commercial lands). An increased intensity in land use would increase potential pollutant loads. Alterations in drainage patterns could increase pollutant loads by increasing the amount of stormwater runoff, thereby transporting pollutants in stormwater runoff; cause or contribute to erosion if the rate of runoff is increased; or expose vulnerable areas to infiltration or runoff.

To prevent short-term (construction) impacts on water quality, Project construction would comply with the requirements of the Construction NPDES General Permit and the City's stormwater requirements (e.g., the Santa Clara County Grading Ordinance). If dewatering of natural groundwater is required to be discharged into surface waters or nearby storm drains, the Project would be required to be in compliance with dewatering requirements of the SFRWQCB. In addition, Project operations would be subject to the requirements of the SCVURPPP and the associated Municipal NPDES Permit. The Project

would be exempt from SCVURPPP Provision C.3.f.i (Hydromodification Control Requirements) because Project site surface flows would discharge to sections of the Guadalupe River and San Tomas Aquino Creek, which are identified as having hardened channels or being in tidal areas, according to the HMP Applicability Map (Figure 3.10-1). The applicable regulations, which have been developed to protect water quality, require implementation of stormwater BMPs. The Project would be required to develop a stormwater drainage system to meet these requirements (Mitigation Measure WQ-1.1). Through compliance with these regulations, cumulative impacts on water quality are ***less than significant.***

Groundwater Recharge and Supplies

Groundwater recharge in the Santa Clara Subbasin, where other current projects would be located, occurs primarily through streamflow infiltration and direct recharge from percolating precipitation. Most of the other current projects would be redevelopment or infill projects in highly urbanized areas where recharge would not occur. Cumulative development in highly urbanized areas would not be expected to increase the amount of impervious surfaces substantially because this development would be occurring mostly in already urbanized areas. Therefore, groundwater recharge from percolating rainfall would not be adversely affected, and an indirect lowering of the local groundwater table is not likely to occur. However, development outside of areas with prior impervious surfaces would affect groundwater recharge, and the effects may be cumulatively significant.

Because of the presence of the landfill and existing impervious spaces, the Project site contributes only minimally to groundwater recharge, and thus, impacts related to development of the Project would be ***less than cumulatively considerable*** with respect to any potential cumulative loss of groundwater recharge and supply.

Cumulative groundwater demand is addressed in Impact UT-1 in Section 3.14, *Utilities and Service Systems*.

Storm Drain Capacity

Other development could increase the rate and volume of stormwater runoff because of the overall increase in impervious surfaces. Increases in the rate or volume of stormwater runoff can cause localized flooding if storm drain capacity is exceeded or if flows exceed channel capacities and are conveyed to overbank areas where flood storage may not be available. Creeks and rivers within the City are required by the SCVWD to maintain sufficient capacity for 100-year peak flows. For the most part, the other current projects would occur in areas that are already highly developed with impervious surfaces; therefore, changes in flows that could increase localized flood risks would not be expected to be substantial. All projects would be required to include design features to reduce flows to pre-project conditions, according to San Francisco Bay MS4 Permit Provision C.3, associated SCVURPPP requirements, and SCVWD's 100-year peak flood requirements. The Project would be required to design a stormwater drainage system in compliance with these requirements, per Mitigation Measure WQ-1.1. Thus, cumulative impacts on storm drainage capacity would be ***less than significant.***

Flooding

As explained in Impacts WQ-6 and WQ-7, parts of the Project area, including the access roads, are subject to flooding. All development, including the Project, could increase impervious areas and result in greater floodflows, create impediments to flow that would raise flood levels, and/or place additional people or structures within flood-prone areas. Existing regulations and requirements, in general, require

site-specific actions to protect against increasing flood levels and placing people or structures at risk of floodflows, up to the current 100-year event condition.

The Project would be required to address 100-year flood events by designing an on-site drainage system that would avoid any increase in 100-year flood levels in San Tomas Aquino Creek and the Guadalupe River, per existing regulations at the time of development of each Project phase and Mitigation Measure WQ-1.1, and avoid any increases in flood flows due to the proposed new bridge over San Tomas Aquino Creek and the new outfalls, per Mitigation Measure WQ-6.1. Because the Project would not contribute to increased flood levels (with implementation of Mitigation Measures WQ-1.1 and WQ-6.1), the Project's contribution is ***less than cumulatively considerable***.

As explained in Impact WQ-8, the Project site is located within the potential dam failure inundation area of the Anderson Dam and Reservoir and the Lenihan Dam/Lexington Reservoir. Of the projects considered, some would be located within this dam failure inundation area. As described in Impact WQ-8, above, a storage restriction has been put into place at the Anderson Reservoir to protect the public. The SCVWD's staff and the regulatory agencies, including DSOD and the Federal Energy Regulatory Commission, have approved the restriction at Anderson Dam and believe that this condition would prevent the uncontrolled release of water in case of a failure after a major earthquake. Further, the previously described ADSRP will also address several dam safety deficiencies associated with seismic activity, which would help minimize the potential for dam failure. Regarding Lenihan Dam, the SCVWD maintains that the dam would perform well when subjected to earthquake ground motion and would have a low potential for structural failure. Thus, cumulative projects, including the Project, are not likely to be affected by flooding associated with dam failure. This cumulative impact would be ***less than significant***.