CITYPLACE

SANTA CLARA

VOLUME 2

INFRASTRUCTURE MASTER PLAN & TECHNICAL MEMORANDUMS

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PRELIMINARY INFRASTRUCTURE MASTER PLAN

for

CITY PLACE SANTA CLARA
Santa Clara, CA

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1.0 INTRODUCTION

1.1 Overview

This Preliminary Infrastructure Master Plan (the "Plan") has been prepared for Related Santa Clara, LLC ("Related") to support the planned City Place Santa Clara (the "Project") mixed-use development project in the City of Santa Clara, Santa Clara County, California. The Plan addresses roadway and utility infrastructure and other related improvements.

The Plan establishes the general layout, design standards, guidelines, criteria, and specifications for the Project's infrastructure including streets, domestic and fire water, recycled water, wastewater, stormwater drainage and management, utility corridors, other infrastructure, and coordination of infrastructure installation with the landfill operation and maintenance systems.. More specific conceptual plans for infrastructure for each development area within the project will be submitted with each Development Area Plan, and the applicable tentative subdivision map. Such submittals shall be consistent with this Plan.

The Plan focuses on the infrastructure required to build the Project as described in the Master Community Plan (MCP). The process of developing this plan included City Department Head meetings to review each infrastructure element, developing an understanding of the project's usage/demand based on the overall MCP, developing an understanding of the City's infrastructure needs and establishing infrastructure design criteria based on existing and available information. The conceptual infrastructure design is based on the preliminary layout of the Project and the MCP and other design requirements, but it is expected to be updated and refined as the Project proceeds through Development Area Plan (DAP) approval, tentative and final subdivision map approval, grading and building permit approvals. and regulatory approvals associated with the landfill.

1.2 Property Acquisition, Dedication and Easements

The Mapping, property acquisition, dedication and acceptance of streets and other infrastructure improvements will occur through the Subdivision Map process in accordance with the City's Subdivision Code and Regulations. Except as otherwise noted, all infrastructure described in this Plan shall be constructed within the public right-of-way or dedicated easements to provide for access and maintenance of infrastructure facilities. The eventual project layout within the Project boundaries will ultimately determine the entity that owns, operates and maintains each infrastructure element.

City Resolutions to address the private infrastructure elements and specific public utility easements will be allowed within the Project as may be necessary to service the development. Utilities in these areas will be installed in accordance with the standards in this Plan and applicable City Regulations for public acquisition and acceptance within public utility easement areas, including provisions for maintenance access.

1.3 Technical Memoranda / Reports

Each infrastructure element described herein is more fully described in a Technical Memorandum included as an appendix to this Plan.. These memoranda identify the design criteria and provide more detailed conceptual layouts of each infrastructure system. Each utility system will be constructed according to the provisions of relevant City Standard Plans and Specifications, except where the City approves a deviation. The Technical Memoranda included as appendices are as follows::

- Appendix A: Grading and Site Access Technical Memorandum
- Appendix B: Stormwater Technical Memorandum
- Appendix C: Water Technical Memorandum
- Appendix D: Sanitary Sewer Technical Memorandum

1.4 Revisions

This Infrastructure Master Plan and the technical memoranda included as appendices may be revised with the approval of the Santa Clara Director of Public Works without amending the Master Community Plan.

2.0 PROJECT DESCRIPTION

2.1 Site Description

The overall site (the "Site") for the Project is the former Santa Clara All Purpose Landfill and two additional sites (see Figure 1). The subject property includes five parcels: Parcel 1, Parcel 2, Parcel 3, Parcel 4 and Parcel 5 totaling approximately 240 acres. The landfill is no longer active and the Final Closure and Post-Closure Maintenance Plan (FCPMP) was approved in December 1992 and amended multiple times, most recently in December 2013. The site boundaries include Lafayette Street, Great America Parkway, , Tasman Drive, the Guadalupe River and the San Tomas Aquino Creek.

2.2 Planned Development

The development currently envisioned includes office, hotel, mixed-used retail, restaurant, entertainment, residential and parking structures with significant site improvements. The City has reported that the existing infrastructure systems were designed and constructed based on the 2010-2035 General Plan. The approvals for the Project include a zoning change to Planned Development –Master Community ("PD-MC") from the "B" zoning district and the ((Public, Quasi-Public and Public Park or Recreation) for Parcels 1 through 4 and from the "CP" (Commercial Park) zoning district in Parcel 5 is zoned "CP". MCP authorizes up to 9,164,400 gross square feet (gsf) with associated parking and site improvements. The current breakdown by parcel is as follows:

Table 1
Current Development Program

Parcel	Site Area (acres)	Potential Development Area (gsf)
1	49.6	1,440,000
2	60.9	2,592,000
3	34.9	0
4	86.6	4,259,400
5	8.0	873,000

This information was used to develop the initial water demand, sewer generation and electric load estimates. The preliminary estimates are provided in the Technical Memoranda.

2.3 Project Phasing

The current project planning includes a phasing strategy for full development of the five parcels in seven phases. Parcel 4 and 5, the location of City Center, would be developed in the first four Phases. Parcel 3 may be developed as a City Park in Phase 5, Parcel 1 would be developed in Phase 6 and Parcel 2 in Phases 6 and 7. The infrastructure will be phased with the parcel development as defined in the Development Area Plans.

The design of both the landfill operation and maintenance systems and the roadway and utility infrastructure for the development of the Project will consider the phasing strategy. The impact of the phasing will be handled through the design of each infrastructure element, considering which elements need to be designed, permitted and constructed prior to other elements. The design and construction of the roadway infrastructure and access to each site will be phased with the development and with the EIR Mitigation, Monitoring and Reporting Program (MMRP) requirements. Site earthwork may require moving existing fill material between parcels as well as phasing the earthwork to accommodate the landfill operation systems reconstruction. The Post Closure Land Use Plan (PCLUP) documents the requirements for the landfill systems as part of the Project.

3.0 SITE CONSTRAINTS

A Base Map (aka Site Constraints Map) has been prepared to compile all of the relevant information received to date. The Map includes but is not limited to information from the City's 2013 aerial topography, preliminary title report, easements, ENA documents, GIS mapping, record utility maps, State and City codes, landfill activity (haul roads) sketches and landfill records, as well data provided verbally from various sources including the City and previous City employees. A copy of the latest version of the Site Constraints Map is provided in the Technical Memoranda.

The site is proximate to a significant amount of existing infrastructure. The City owned and operated systems include sanitary sewer, stormwater drainage, water (domestic and fire), recycled water, landfill operation systems (gas extraction, leachate collection and monitoring) within and adjacent to the Site. Utility providers and infrastructure owners with facilities near the site include Silicon Valley Power (SVP), a City owned utility, Comcast, AT&T, Santa Clara

Valley Water District (SCVWD), Pacific Gas & Electric (PG&E), Union Pacific Railroad (UPRR) and Valley Transportation Authority (VTA). Each system is briefly described below and record maps are provided in the Technical Memoranda.

- The stormwater drainage system includes gravity underground conveyance piping, surface drainage channels, retention basin and two pump stations that discharge stormwater runoff to the east to the Guadalupe River and to the west to San Tomas Aquino Creek.
- The domestic and fire water distribution system includes water mains, pumps, hydrants and other appurtenances; the sources for the system available to the City include an extensive local underground aquifer and imported water supplies delivered by the Santa Clara Valley Water District (SCVWD) and the San Francisco Hetch Hetchy system.
- The recycled water distribution system is a source of water available to the City for irrigation and other purposes via the San Jose/Santa Clara Water Pollution Control Plant's South Bay Recycled Water facility.
- The wastewater (sanitary sewer) system includes pump stations and both force and gravity sewers that convey sewage to the existing San Jose/Santa Clara Regional Wastewater Facility (Water Pollution Control Plant) located northeast of the site, adjacent to the San Francisco Bay.
- The landfill operation systems within Parcel 1, 2, 3 and 4 include a landfill gas extraction system and leachate collection system. The landfill gas is extracted via a system of vertical wells and horizontal pipes, and the gas is conveyed to a landfill gas-to-energy flare system operated by Ameresco, a private company under contract with the City. The leachate collection system (within Parcel 1 and Parcel 3 only) includes a central sump, laterals, risers and pump that discharge to the City sanitary sewer. Additionally, a groundwater monitoring well system and a landfill gas monitoring probe network are present at the Site.
- The UPRR infrastructure includes a single track within a 50-ft right-of-way between the west side of Lafayette Street and the east sides of Parcel 3 and 4. There is an existing Station, Santa Clara – Great America Station to the east of Parcel 5 accessible via Stars and Stripes Drive.
- The VTA operates a light rail on Tasman Drive south of Parcel 5.
- The SCVWD is responsible for the existing levees along the entire west side of Parcel 4 along Sam Tomas Aquino Creek and the entire east side of Parcel 1 and Parcel 2 along the Guadalupe River.
- The Silicon Valley Power electric system, Santa Clara's municipal electric utility, includes both overhead and underground facilities.
- The PG&E facilities include high-voltage overhead electric and buried gas services.
- AT&T and Comcast telecommunications are located in underground facilities.

4.0 GEOTECHNICAL AND ENVIRONMENTAL CONSIDERATIONS

Structural improvements developed on landfills must comply with specific construction standards set forth in the California Code of Regulations (CCR), Title 27, §21190. Planning documents, design, and construction of these improvements will need to be submitted as part of the Post-Closure Land Use Plan, Closure Plan and Post-Closure Maintenance Plan, and

associated regulatory submittals to the County Local Enforcement Agency (LEA), CalRecycle, and the Regional Water Quality Control Board. Title 27 requires that post-closure construction on the site maintain the integrity of the landfill, including any existing final cover, drainage and erosion control systems, and gas monitoring and control systems. Modifications to these systems must be designed to be protective of public health and safety and the environment. Other post-closure land use requirements include monitoring and ventilating landfill gases beneath proposed buildings and installing improvements designed to keep moisture from penetrating into the landfill materials.

The former landfill consists of waste deposited during several episodes of filling on the separate parcels. It has been reported that landfill operations occurred between 1934 and 1994; however, based on historical aerial photographs and topographic maps, it appears that landfill operations began in the late 1960s (beginning in Landfill Parcel 4). The Landfill received final landfill closure certification in September 1994. The landfill on Parcel 4 operated between the 1960s and 1970s; landfill operations at the other parcels took place from the late 1970s through early 1990s. Our research indicates the lower portion of refuse was placed by excavating slots (*drag* technique) into the native soil and backfilling the slots with refuse. The topography indicates that soil embankments were constructed around the waste units and that refuse continued to be placed which created large mounds above current street elevation. On the basis of the available subsurface information, the refuse on Parcels 1 and 3 ranges from about 40 ft to 80 ft thick. On Parcels 2 and 4, the thickness of refuse ranges from about 20 ft to 50 ft. The area of the refuse is approximately 136 acres within the four Parcels. The refuse is underlain by alluvial deposits consisting predominately of clay and sandy clay layers with occasional interbedded layers of sand and silt. Groundwater table elevations are generally in or within 10 ft of the bottom portion of the waste unit based on data from the groundwater monitoring program, and from groundwater levels observed in the recently drilled borings.

5.0 SITE GRADING AND STORMWATER MANAGEMENT

The existing site topography varies significantly, with low elevations near sea level and high elevations above 65 feet North American Vertical Datum of 1988 (NAVD 88). This large range in elevation is a result of the placement of the underlying refuse discussed in Section 4 above. In order to accommodate the planned development significant earth moving to provide for safe and accessible access to the proposed facilities on each of the five parcels will be required.

Based on the preliminary grading, the earthwork estimates to achieve subgrade for each Parcel are as follows:

Table 2
Earthwork Estimates

Parcel	Total Earthwork (CY)
1	410,000
2	220,000
3	250,000
4	500,000
5	350,000

Due to the underlying refuse and the on-going settlement, the final site grading design will be a complex exercise. It is preferable to avoid cutting into the refuse for reasons such as cost, air quality and health and safety. Additionally, because the refuse has very low compressive strength, adding fill to the site will surcharge the weak refuse and potentially result in additional settlement. These constraints combined with respecting the continuity and integrity of the landfill cap (clay soil layer) result in strict grading criteria and the development of detailed method statements that will focus on minimizing the disturbance required to grade the site. As the site grading plan is developed and the site improvements plans are prepared, interaction with the City and Local Enforcement Agency (LEA) will be required. The Grading and Site Access Technical Memorandum shows a preliminary grading scheme for the Project which includes general pad elevations and access road grading for the proposed development.

Drainage of the site is also complicated by the underlying refuse. The addition of water to the refuse can result in the production of toxic leachate, and can also contribute to settlement by further surcharging the already weak refuse. Due to these factors, infiltration of stormwater runoff is not feasible on the majority of the site. This non-infiltration based design will be discussed with the City, LEA, Regional Water Quality Control Board and Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) to ensure the mechanisms are in-place to exclude the site from any stormwater infiltration requirements.

Because the project will replace more than 10,000 square feet of impervious surface area on the project site, the project must comply with the City of Santa Clara Stormwater C.3 provision requirements and the State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) permit. In order to meet C.3 and NPDES requirements, the project will include low impact development (LID) measures to reduce runoff pollutant loads including bio-retention (with underdrain), flow-through planters, tree wells with media filter, infiltration trenches (with underdrain), landscaped open space, catch basin filters, green roofs, rainwater harvesting and on-site re-use and green streets (bioretention/permeable pavements with underdrain). The proposed treatment facilities will be numerically sized in accordance with City requirements to ensure that they will have sufficient capacity to treat the requisite volume of stormwater runoff entering the storm drainage system. In addition, the project will be required to to ensure continued maintenance and performance of the post-construction measures.

Both the San Tomas Aquino Creek and Guadalupe River are contained within FEMA certified levees adjacent to the site. As such, no increase in the 100 year flood elevation as a result of the development will be permitted without recertifying the levees. The on-site stormwater management and treatment features for each Parcel will be dynamically modeled during final design including buildings, parking garages, site, landscape, etc. The results of the modeling will 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 separate Stormwater Management Report inclusive of detailed hydrologic and hydraulics calculations, analysis and conclusions will be prepared to document the final design of the stormwater management and storm drain system and to obtain the requisite approvals.

6.0 PROJECT ACCESS

6.1 Overview

The City Place Santa Clara site is currently serviced by two existing freeways. US Route 101 is an eight lane divided freeway running north-south up the Peninsula, along the west side of the San Francisco Bay. It is a major commuter route providing access from San Francisco to South San Jose. US 101 passes to the south of the development site and is accessed by travelling on Great America Parkway or Lafayette Street and Montague Expressway. State Route 237 is a six lane divided highway running east-west from Milpitas to Mountain View, connecting the east and west sides of the Silicon Valley. SR 237 passes to the north of the site, with access from Lafayette Street and the Gold Street Connector or Great America Parkway. Currently there are no plans to expand either US 101 or SR 237.

Local access to the Project is provided by three arterial streets. Great America Parkway is a north-south six lane divided major arterial to the west side of the development. There is a short frontage along Parcel 4, approximately 350 ft. Great America Parkway provides primary access to US 101 and SR 237. Tasman Drive is an east-west six lane divided arterial to the south of the Project and includes a center-running VTA owned and operated light rail. Lafayette Street is a north-south four lane arterial between the east and west side parcels of the development and includes the UPRR right-of-way along its west side. Lafayette Street provides access to US 101 by way of Montague Expressway and SR 237 by way of the Gold Street Connector. Great America Parkway and Tasman Drive are currently developed with no apparent opportunities for expansion. Lafayette Street has limited opportunity for expansion on the east side and no opportunity for west expansion.

It is a development goal to make City Place Santa Clara both bike and pedestrian friendly. Currently, north-south bicycle access to the site is provided by dedicated bicycle trails along San Thomas Aquino Creek to the west of the site and the Guadalupe River Trail. There are also on street bike lanes along Great America Parkway, as well as bike lanes on Lafayette Street that extend to Calle de Luna just to the south of the development. Bike access to City Place in the east-west direction is more limited. Bike lanes currently exist on Tasman Drive, but they terminate near Lick Mill Boulevard east of the site. To the west, there are on street bike lanes along Old Mountain View-Alviso Road which provide access to residential neighborhoods in northern Sunnyvale.

A Traffic Impact Assessment will be prepared as part of the EIR. The following is intended to briefly summarize the current conditions and address how these conditions and the planned development impact the infrastructure planning for the Project. This section relies heavily upon the Fehr & Peers memoranda entitled "Existing Conditions Assessment for the Proposed City Place Santa Clara Mixed-Use Project" dated 2 May 2014 and "Preliminary Transportation Review of the Proposed City Place Santa Clara Mixed-Use Project" dated 14 May 2014.

6.2 Site Access

There are many challenges in providing access to City Place Santa Clara. The most difficult of these challenges is the amount of automobile congestion during commute hours. Both major

freeways are operating above capacity now, with little opportunity for expansion. There is also little opportunity for expansion of existing arterial surface streets to boost capacity. A development of the scale of City Place will add to the traffic load of the surrounding area.,

Another challenge is that there is limited frontage to major arterials which makes it difficult to locate access points which will have adequate capacity to meet the demands of the Project. Parcel 1 and Parcel 2 front only to Lafayette Street on the west. They are bounded to the north, east and south by SR 237, the Guadalupe River and Lafayette Industrial Park, respectively, leaving only Lafayette Street available for access. Because it is surrounded by the Santa Clara Gateway Property to the west and north, the UPRR to the east and Parcel 4 to the south, Parcel 3 is essentially land locked. It is also significantly higher in elevation than the surrounding area, which adds constraints to access because of road grading and the existing landfill. Parcel 4 has limited frontage along Great America Parkway to the west, but is bounded to the north by Parcel 3, the east by the UPRR, the south by Stars and Stripes Drive and the south-west by the San Tomas Aquino Creek. Tasman Drive will provide multiple points of access to Parcel 5 and Parcel 4 via Centennial Boulevard, three new access locations (Avenue A, Avenue B and Avenue C (variant)) and an eastbound slip ramp to Stars and Stripes Drive. There are other access options that will be studied as the design of the Project is further developed.

6.3 Streets and Intersections

A new on-site street network comprised of both public and private streets, and improvements to some of the off-site roadways and intersections outside of the project boundary will be constructed to serve the Project. The following descriptions are based on the initial planning exercises and will require further evaluation as part of the TIA and final review and approval by the City.

Based upon the current concept plan and the initial preliminary transportation review, the conceptual parcel access summary is as follows:

Table 3
Conceptual Access Summary

Parcel	No. of Access Lanes In	No. of Access Lanes Out
1	4	4
2	4	4
3	1	1
4	9	10
5	4	4

The street and intersection improvements for site access may vary from the table above and the descriptions below after detailed engineering evaluations with respect to lane configuration,

dimensions, signalization, etc. The following summarizes the current planning for the existing, new and modified intersections for the Project. Additional design information is provided in the Grading and Site Access Technical Memorandum.

6.3.1 Parcel 1

- One access point from Lafayette Street with a minimum of two entrance and three exit lanes. This access may be further developed in a "jug handle" configuration to serve as the primary access to Parcels 1, 2, and 4 and negate the need for the "urban interchange" described below.
- A new "Urban Interchange" which involves raising Lafayette Street and a new bridge over the UP Railroad providing access to Parcels 1, 2 and 4 with two entrance and three exit lanes, including bypass lanes for through traffic on Lafayette Street in each direction.
- One access point from the north at Great America Way.
- Multiple connection points to Parcel 2 located along shared parcel line with a minimum one lane in each direction.

6.3.2 Parcel 2

- One access point from Lafayette Street with a minimum of two entrance and three exit lanes. This access may be further developed in a "jug handle" configuration to serve as the primary access to Parcel 2 with secondary access to Parcels 1and 4 and negate the need for an "urban interchange," as defined below.
- A new "Urban Interchange" which involves raising Lafayette Street and a new bridge over the UP Railroad providing access to Parcels 1, 2 and 4 with two entrance and three exit lanes, including bypass lanes for through traffic on Lafayette Street in each direction.
- One access point from the south via the Lick Mill extension.
- One connection to Parcel 4 via a new bridge over Lafayette.
- Multiple connection points to Parcel 1 located along shared parcel line with a minimum one lane in each direction.

6.3.3 Parcel 3

- One connection point to Parcel 4 with one lane in each direction and a turning circle.

6.3.4 Parcel 4

- A new "Urban Interchange" which involves raising Lafayette Street and a new bridge over the UP Railroad providing access to Parcels 1, 2 and 4 with two entrance and three exit lanes, including bypass lanes for through traffic on Lafayette Street in each direction.
- One access point from Great America Parkway just north of Great America Parkway/San Tomas Aquino Creek crossing with a minimum two entrance and three exit lanes.

- Supplemental access point from Great America Parkway through the existing convention center property via a new bridge over the San Tomas Aquino Creek.
- Three access points from Stars and Stripes Drive via Avenue A, Avenue B and Avenue C with a minimum three entrance and three exit lanes.

6.3.5 Parcel 5

- Main access from the Tasman Drive / Centennial Boulevard intersection, and Stars and Stripes Drive (access to the below grade parking garage will need to be coordinated considering both vehicular and pedestrian movements).
- Supplemental right-in/right-out access to Tasman Drive via new Avenue A, Avenue B and possibly right-in / right-out / left-out at Avenue C (variant.)
- Supplemental access from a new Tasman Drive (eastbound) slip ramp to Stars and Stripes Drive.

The Lafayette Street "Urban Interchange" has numerous design and regulatory permitting challenges. There are overhead PG&E transmission lines on both sides of Lafayette Street and overhead SVP electric on the east side of Lafayette. The interchange will have to provide the proper clearances (or necessary relocation or undergrounding) from these utilities. It will also have to meet minimum vertical clearance requirements above the UPRR on the west side of Lafayette Street.

The access point at Great America Parkway will be the marquee entrance to the development. It will be designed to set the atmosphere for the entire development. There are challenges in the layout and design of this access point. As proposed, the access road from Lafayette Street to Great America Parkway follows the northern parcel line for Parcel 4, which meets Great America Parkway at a skew. Per the Caltrans Highway Design Manual, Section 403.3, the minimum interior angle must be 75°, which will affect the approach of the access road. Because the Parcel 4 frontage on Great America Parkway is limited, the location of the access point is relatively fixed. This location is approximately 200-ft from the existing bridge crossing San Thomas Aquino Creek, which means that any improvements to Great America Parkway must conform to the existing bridge. There is also a potential sight distance issue as the intersection in approached from the south due to the existing vertical curve on the San Tomas Aquino bridge structure. Approximately 550-ft north of the access point is the intersection of Great America Parkway and Old Mountain View-Alviso Road. The traffic impacts of locating an access point close to this intersection will need to be studied. The Grading and Site Access Technical Memorandum show the concept site access locations for each Parcel.

7.0 STORMWATER DRAINAGE

The Site is adjacent to the San Tomas Aquino Creek and the Guadalupe River. A brief description of each as provided by the Santa Clara Valley Urban Runoff Pollution Protection Program (SCVURPPP) is summarized below.

The San Tomas Aquino Creek watershed covers an area of approximately 45 square miles. San Tomas 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 watershed is developed as high-density residential neighborhoods, with additional areas developed for commercial and industrial uses. 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 Highway 101).

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 actually begins on the Valley floor at the confluence of Alamitos Creek and Guadalupe Creek, just downstream of Coleman Road in San Jose. From there it flows north, approximately 14 miles until it flows into the Lower South San Francisco Bay via the Alviso Slough. The upper 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.

The climate of the City of Santa Clara is characterized as dry-summer subtropical (often referred to as Mediterranean), with cool wet winters and relatively warmer dry summers. The mean annual precipitation in the vicinity of Santa Clara is approximately 15 inches (95 percent of which falls between October and April) per the 2007 Santa Clara County Drainage Manual (SCCDM). This value is typical of Santa Clara County east of the coastal range. It is important to note that the Site can be subject to a wide range of annual precipitation.

Due to the nature of the existing topography and drainage infrastructure, the five parcels along with the tributary off-site areas have been divided into four distinct sub-watersheds: San Tomas, East Basin, Eastside Channel and Basin Direct. Each watershed, the existing stormwater drainage system and the proposed infrastructure improvements are described in detail in Stormwater Technical Memorandum.

7.1 Existing Systems

The existing City owned and operated drainage system includes pump stations, retention basins, open drainage channels, underground conveyance piping and appurtenant drainage structures. The on-site drainage system is made up of an intricate corrugated poly-pipe network and inlet structures. The off-site drainage systems that convey the stormwater runoff from the Project to the discharge locations are shown on the City's Storm Drain System Information Maps.

Parcel 1, 2, 3 and about 45% of Parcel 4 are tributary to the Guadalupe River. The stormwater runoff from these parcels is collected in the Eastside Retention Basin, which has a surface area of approximately 5.3 acres and had a 1972 design storage capacity (retention volume) of 30 acre-feet, and discharged to the Guadalupe River via the Eastside Pump Station. The basin also

collects runoff from off-site areas to the south and west of the Site. The Basin and Pump Station are operated and maintained by the City. The remainder of Parcel 4 and Parcel 5 are tributary to the San Tomas Aquino Creek. The surface water runoff is discharged to the Creek via two existing gravity outfalls (12 inch diameter) and the Golf Course Club House Storm Drain Pump Station and outfall (30 inch diameter).

The Eastside Pump Station was originally constructed in 1973, was last upgraded in 2005 and has a design capacity of 50,000 gallons per minute (gpm). There are approximately 524 acres of the City tributary to this pump station, which includes about 180 acres (34% of watershed) from the Project. The City prepared a Hydrologic Investigation for the Eastside Pump Station Report in 2000. This Report concluded that the existing pumps had sufficient capacity to prevent the 100-year runoff from ponding in Lafayette. However, future pump upgrades were identified as a possibility under worst case scenario conditions.

The Eastside Drainage Channel was constructed in 1971. The City prepared an Initial Study in 2010 for the Eastside Retention Basin Drainage Swale Vegetation Clearing Project. The project proposed to clear vegetation within the drainage channel, desilt the Eastside Retention Basin, which had not been done since the late 1980's, and establish a recurring maintenance program for these drainage facilities. Reportedly, the construction project was not initiated.

The Golf Course Pump Station was originally constructed in 1987 and has a design capacity of 11,100 gpm. There is approximately 65.8 acres tributary to this pump station including about 43.6 acres from Parcel 4 (66% 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 parking garage. The system utilizes the depressed area on Parcel 4 within the golf course driving range for detention and includes submersible pumps and an outfall to the San Tomas Aquino Creek.

7.2 Proposed Infrastructure

The storm drainage system for the Project will be an underground gravity network of pipes, catch basin, manholes, water quality treatment measures and other appurtenances. The building drainage will be via internal systems piped directly to the storm drains. A complete storm drain study for the 10-year and 100-year storm events prior to grading permit issuance will be prepared and submitted for review and approval by the City. For final design, the public underground piped storm drain conveyance system will be capable of conveying the 10-year peak runoff as well as safely convey the 100-year event peak flows from the Site via a combination of the piped system and surface conveyance. Public streets shall be designed such that the 100-year event flow remains within the roadway limits and not extend into private property.

The stormwater runoff from Parcels 1, 2 and 3 will discharge to the Eastside Retention Basin and be pumped to the Guadalupe River via the existing Eastside Pump Station. The preliminary results indicate there is sufficient storage and pumping capacity within the current system (assuming existing conditions) to safely convey the post-development peak runoff from the 100-year storm. From Parcels 1 and 2 there will be multiple new outfalls from the Site to the existing Eastside Drainage Channel. The channel should be cleared of vegetation in order to safely convey the peak flows from 100-year storm event for existing and proposed conditions.

From Parcel 3, the existing drainage infrastructure located north of the parcel, west of the UPRR and west of the parcel in the adjacent Gateway property will be utilized. The stormwater runoff from Parcel 4 and Parcel 5 will discharge to the San Tomas Aquino Creek via three new stormwater outfalls. The invert of the outfalls will be set above the bottom of the Creek at a final elevation to be coordinated with the SCVWD to ensure the location is above sediment levels within the Creek. The Golf Course Pump Station will likely be abandoned and removed.

As previously stated, the goal for the final stormwater management design will be to reduce the proposed peak flows to existing peak flow levels through the incorporation of sustainable stormwater measures. During final design, the extent of the stormwater management measure such as low-impact development (LID) stormwater treatment best management practices (BMPs), rainfall harvesting and re-use within the Project will be determined, and the potential off-site improvements will need to be further studied.

8.0 POTABLE WATER

8.1 Existing System

The water system in the City of Santa Clara is operated and maintained by the City of Santa Clara Water and Sewer Utility. This system is supplied with potable water from three main sources; the Santa Clara Valley Water District (the "SCVWD"), the San Francisco Public Utility Commission (the "SFPUC Hetch Hetchy"), and 27 groundwater wells operated by the Water and Sewer Utility. The potable water supply is augmented with recycled water from South Bay Water Recycling. This recycled water is not permitted for potable use, but it can be used for irrigation, toilet flushing and approved industrial uses.

The existing domestic water system near the Site is provided on the City of Santa Clara Water Base Maps W93 – W115. There is a network of water mains around all four sides of Parcel 3, Parcel 4 and Parcel 5. This network is also located along the west and south sides of the Parcel 1 and Parcel 2.

8.2 Proposed Infrastructure

It is anticipated that: 1) Parcel 1 and Parcel 2 will be served by the existing water main in Lafayette Street; 2) Parcel 3 will be served by the same water main in Lafayette Street, a stubbed main beneath the UPRR tracks to the east of Parcel 3, and 3) Parcel 4 and Parcel 5 will be served by the existing water mains in Great America Parkway, Stars and Stripes Drive, Centennial Boulevard and Tasman Drive.

Each site will include a combined domestic and fire water system "looped" network with a minimum two points of connection to the existing system. The Water Technical Memorandum shows a preliminary layout of the water system, including possible connection points. Due to the height of some proposed buildings, it may be necessary to include booster pumps in the looped system to maintain water pressure for fire flows. Location of these pumps either within or external to the buildings will be evaluated. Connections to the public system will be provided by the City of Santa Clara Water Utility. Each connection to the existing public water

system will require a meter and backflow preventer to keep water from flowing from the project back into the public system.

California Code of Regulations, 22CCR§64572.(f) states that new water mains shall not be installed within 100-ft of the nearest edge of any sanitary landfill, wastewater disposal pond, etc. The City is seeking a waiver from this requirement. Specific water utility materials, methods of construction, locations of appurtenances such as valves, meters, backflow devices, etc. must be addressed and approved by the City. Some sections of the water system on Parcel 4 may need to be private due to the inclusion of the structural platform and site design features.

Based upon the current concept plan, the estimated water demand per Parcel is as follows:

Table 4
Estimated Water Demand

Parcel	Potential Development Area (gsf)	Water Demand (gpd)
1	1,440,000	211,680
2	2,592,000	381,024
3	0	0
4	4,259,400	1,000,619
5	873,000	255,213

As the design is finalized, these estimates will be refined and used to design a system which meets the needs and phasing of the Project. Additional design information is provided in the Water Technical Memorandum.

Implementation of the water system as currently designed will likely require some offsite improvements to the existing utility systems. A considerable amount of fill may be added to Stars and Stripes Drive. Per the City of Santa Clara Council/Staff Work Study Session (see Appendix C) on 11/20/2013, this will require the existing utilities in Stars and Stripes to be raised. The City also noted approximately 2,000-ft of domestic water mains that may need to be upsized. Specifically, these include the 8 inch asbestos cement main in Great America Parkway, the 8-inch asbestos cement main in Lafayette Street, and parts of the loop in Calle de Luna and Calle del Mundo. An extension of the existing water main in Tasman Drive may also be necessary. More study will be required to determine if these sections or others will need to be upsized to meet the water demand of the Project.

9.0 RECYCLED WATER

9.1 Existing Distribution

The existing recycled water distribution system near the Site is provided on the City of Santa Clara Water Base Maps RCW93 – RCW115. There is a network of recycled water mains along the north, east and west sides of Parcel 1, the east and south side of Parcel 2, and between Parcel 3 and Parcel 4.

Recycled water is supplied to the Site from the South Bay Water Recycling Program. It is conveyed from the plant to the northeast corner of Parcel 1 by a 16-inch plastic pipe. This pipe travels beneath State Route 237 then crosses the Guadalupe River. On the west bank of the Guadalupe River the recycled water main splits. One 12-inch Yelomine (plastic) pipe is located along the east side of Parcel 1 and Parcel 2 until it reaches Tasman Drive. It then turns west and mixes with a 30 inch steel recycled water main located along Tasman Drive before crossing this main and continuing in Lick Mill Road. The second branch of the recycled water system is a 16 inch plastic main along the north side of Parcel 1. At Lafayette it turns to the south and travels approximately 1,500-ft, passing through a reducer to become a 12-inch plastic pipe. At the boundary between Parcel 3 and Parcel 4 the main turns west and travels through a 30-ft wide Recycled Water and Sanitary Sewer easement to Great America Parkway. At Great America Parkway, the main turns north before continuing west along Old Mountain View – Alviso Road. The City of Santa Clara Water Utility estimates pressure in the recycled water system to be between 80 and 90 psi in the vicinity of the Site.

9.2 Proposed Infrastructure

The recycled water system for each parcel will have two points of connection to maintain recycled water service. Potential connection points for each of the parcels are as follows. For both Parcel 1 and Parcel 2, the recycled water distribution will include one point of connection to the existing recycled water main in Lafayette Street and one point of connection to the recycled water main along the eastern edge of Parcel 1 and Parcel 2. For Parcel 4, the recycled water distribution will include one point of connection to the existing recycled water main located in the easement between Parcel 3 and Parcel 4. Parcel 5 will connect to the new infrastructure in Parcel 4.

As the Project is designed, the use of recycled water will be evaluated. The recycled water system can be used to supply non-potable water for different uses such as irrigation, HVAC equipment (cooling tower make-up), and toilet flushing. As these systems are designed, the entire water balance (domestic source, recycled source, reuse source) can be developed. Each connection for each use will require a separate meter as well as City and State approval via an independent recycled water permitting process. Additional design information is provided in the Water Technical Memorandum.

10.0 WASTEWATER

10.1 Existing System

The existing wastewater collection system for the City of Santa Clara includes a series of gravity trunk sewers, pump stations and sanitary force mains. The system conveys the wastewater to the existing San Jose/Santa Clara Regional Wastewater Facility (WWTF) located approximately 2 miles northeast of the Site. The Site is located at the downstream end of the piped collection system. From Great America Parkway on the west side of the Project, two main sewers are located between Parcel 3 and Parcel 4. The northernmost gravity trunk sewer is a 33-inch Reinforced Concrete Pipe (RCP), and the southernmost is a 42-inch RCP. Within Lafayette Street there is a 36-inch gravity trunk sewer. These three sewers join in Lafayette Street into two 42-inch RCP's and continue north in Lafayette Street between Parcel 3 and 1.

At the northern edge of Parcel 1, these sewers turn to the northeast, following the Parcel 1 boundary to the existing diversion structure which diverts the flow to both the existing Rabello Pump Station and the Northside Pump Station. There is a 12-inch sewer in Stars and Stripes Drive, which connects to the 36-inch sewer in Lafayette Street.

The gravity sewer that bypasses the Rabello Pump Station continues beneath the Guadalupe River and California State Highway 237, where it flows to the Northside Pump Station. From the Northside Pump Station, the wastewater is pumped and conveyed in a force main to the WWTF. The Rabello Pump Station will pump wastewater to the WWTF through a secondary force main, which follows the alignment of the Northside Pump Station gravity sewer and its force main once crossing beneath the Guadalupe River and Highway 237.

The current pump station operation includes the Rabello and Northside Pump Stations working in parallel to pump the wastewater to the WWTF. The maximum capacity of this system, referred to as the Firm Capacity, is defined as the maximum capacity of the combined pump stations with the largest pump for each pump station out of commission. This builds some redundancy into the system, allowing it to function even if one of the pumps for each pump station is out of service. The Northside Pump Station has 4 pumps running in parallel to pump effluent, and the Rabello Pump Station has 8 pumps running in parallel. Currently, the City of Santa Clara estimates the Firm Capacity of these two stations to be 38.2 Million Gallons per Day (MGD). Per RMC's Sanitary Sewer Capacity Evaluations for the Project both dated 14 November 2014, the peak wet weather flow (PWWF) results predicted by the model are 49.8 MGD without the Project and 53.1 MGD with the Project. Another study would be needed to determine the required improvements to increase the pump stations total firm capacity to convey the predicted flow in 2035 General Plan PWWF.

10.2 Proposed Infrastructure

Based upon the current concept plan, the estimated sewage generation per Parcel is as follows:

Table 5
Estimated Sewage Generation

Parcel	Potential Development Area (gsf)	Sewage Generation (gpd)
1	1,440,000	201,600
2	2,592,000	362,800
3	0	0
4	4,259,400	952,970
5	873,000	243,152

It is anticipated that the proposed sanitary sewer system for the Project will connect to the existing City gravity trunk sewers between Parcels 3 and 4, in Lafayette Street and in Stars and Stripes Drive. The preliminary locations for the points of connection and for the routing of the sewers within a development parcel are provided in the Sanitary Sewer Technical Memorandum. The preliminary design includes multiple gravity sanitary sewer systems with

laterals, mains, manholes and cleanouts designed per City standards. The pipes will be sized for the capacity to convey the total peak wet weather flow at a minimum velocity of 2 fps when flowing half full and no more than 75% full. Preliminarily, Parcel 1 and Parcel 2 will connect to the westernmost existing 42-inch sewer in Lafayette Street and Parcel 4 will connect to the existing 42-inch sewer located between Parcels 3 and 4. Parcel 5 will connect to the Stars and Stripes Drive system. It is anticipated that the Stars and Stripes Drive system will need to be completely replaced to accommodate the proposed below grade parking structures. The systems are proposed as a looped system to provide redundancy as required by the City.

As the design is finalized, these estimates will be refined and used to design a system which meets the needs and phasing of the Project. A detailed hydraulic analysis of the sewer system should be performed to confirm the findings in the RMC Technical Memoranda, as well as to evaluate the timing for upgrades to the Rabello and North Side Pump Stations.

11.0 ELECTRIC, GAS AND TELECOMMUNICATIONS

11.1 Electrical Distribution System

Pacific Gas and Electric (PG&E) provides gas and electrical services to the vast majority of Northern California. However, some cities have historically provided their own municipal electric company. Such is the case for the City of Santa Clara whose municipal electric utility is referred to as Silicon Valley Power (SVP). SVP provides electric utility power to all residences and commercial businesses in the City of Santa Clara. Since the City is surrounded by PG&E territory, there are locations within Santa Clara where PG&E owned electric transmission systems exist, within appropriate right-of-ways. PG&E transmission systems traverse all five parcels.

11.1.1 Existing System

PG&E maps indicate that two separate PG&E 115kV overhead transmission pole lines run "north-south" along the westerly side of Lafayette Street. There is a 175-ft wide easement within Parcels 5, 4 and 3 for these transmission lines. Additionally, a PG&E overhead transmission pole line runs "north-south" along the east side of Lafayette Street. These pole lines are in dedicated rights-of-way, which typically forbid structures of any kind.

SVP's electric distribution maps indicate that an existing 12kV underground distribution line provides service to existing commercial buildings along Stars and Stripes Drive. Additionally, there is an existing 12kV overhead line running north-south under the PG&E transmission pole line on the easterly side of Lafayette Street. This pole line branches easterly to serve the residential development southeast of the proposed new development. SVP underground electric 12kV feeder-lines exist along Great America Parkway, adjacent to Parcel 4, and along the Guadalupe River adjacent to Parcel 2. Discussions with SVP indicate that all of the existing underground and overhead distribution lines in the immediate vicinity of the new development are fully utilized and could not be extended to serve the new development.

11.1.2 Proposed Infrastructure

It is common for parking lots to intrude into PG&E easement areas. When that occurs, care must be taken to avoid placement of parking lot lights and trees within the easement. PG&E would need to be consulted to obtain approval for any development (i.e. grading/landscape plans) planned within the easement areas. Additionally, site improvements would be designed to avoid conflict with existing transmission line steel support poles. It is conceivable, however, that PG&E would allow a support pole to be adjusted to be "taller" or moved "tangentially" along the north-south corridor to eliminate a conflict with proposed grading or utility improvements. Moving poles perpendicularly to the north-south route should be avoided because it is impractical to add the necessary "down-guys" and provide the additional easements, to consider off-setting the transmission pole line.

SVP has confirmed that to provide electrical service to the new development, new circuits would need to be installed and extended from the existing "Northern Receiving Substation" located south of Levi's stadium. Specifically, it is expected that four new 600A, 12kV feeder lines would be needed to serve Parcel 4 and Parcel 5. Two more feeder lines would be required for Parcel 2, and one for Parcel 1, for a total of 7 new feeders.

The feeder lines would be installed as part of a multi-circuit conduit bank of up to four 5 inch primary conduits. Accordingly, it is expected that two new trench routes, each typically 36 inch x 60 inch, would need to be extend approximately 1,800-ft from the substation to the south end of the new development. To the extent that spare conduits were previously extended north toward Tasman from the substation, SVP has indicated that those conduits may be utilized to provide service to the project. Further study is needed to determine the appropriate routing of the new feeder-lines throughout the development.

SVP manholes would be needed, typically spaced no more than 500-ft apart, to facilitate cable pulling and to allow the installation of pad mount switches and transformers. Further study is needed to determine the number and locations of manholes, switches and transformers that would be required to serve the new development.

The applicant would be responsible for trenching and installing all new SVP conduits and substructures. SVP does not utilize sub-surface equipment. All switches and transformers would be pad-mounted and locations would need to be coordinated with SVP during the design stages.

Streetlights will be part of the Project on all new streets. If new streets are to be dedicated as public streets, SVP would provide public streetlights (e.g. electroliers) as part of their electric service. If the streets are to be "private", the applicant would be required to bear the cost of providing City approved street lights.

SVP has recently announced "fiber services" are being offered to schools and residential developments. The extent and locations of SVP "fiber" services for each of the five development parcels would need to be coordinated with SVP during the design stages.

11.2 Natural Gas Distribution System

11.2.1 Existing System

PG&E would be the service provider for natural gas to the development**.** PG&E's maps indicate that an existing 24 inch high-pressure gas transmission main is located north-south along Lafayette Street. Specifically, the gas main is along the west side of Lafayette Street from the south, northward, until it reaches the midpoint of Parcel 4, then it crosses to the east side and traverses northward along the east-side of Lafayette Street along the entire frontage of Parcels 1 and 2. Any street improvements to Lafayette Street (i.e. road widening, road overlay) would need to be reviewed by PG&E to ensure the integrity to their gas facilities would be maintained.

PG&E's gas distribution maps also indicate that 2 inch and 1¼ inch distribution gas mains exist along Stars and Stripes Drive. Also a 4-inch gas main is located north-south along the east side of Lafayette Street, and a second 4-inch main is located along the east side of Great America Parkway adjacent to Parcel 4.

11.2.2 Proposed Infrastructure

It is feasible that the 4 inch existing gas mains in the vicinity could be extended into the new development to provide gas service, assuming standard "commercial gas loads" are needed. If any "campus boiler/steam" type systems or "bloom box generators" are being considered, specific studies would be required for PG&E planning to evaluate. It is not likely that the gas facilities along Stars and Stripes Drive could be utilized, except perhaps to serve only the two nearby proposed buildings.

Extending the gas service from the 4 inch gas main from Lafayette Street into Parcels 5 and 4 would require crossing the UPRR right-of-way. This crossing, if necessary, would require railroad permits and a "jack and bore" crossing. As an alternative, it is feasible that a gas sleeve could be incorporated into any new bridge structures that may span the rail right-of-way and Lafayette Street.

If the total expected gas loads of the new development are sufficiently large, PG&E may require the installation of a new gas regulator station to serve the development. The proximity of the high-pressure transmission line provides the capacity to provide service to a gas regulator station should one be required. A new gas regulator station would take approximately 3 years for PG&E to plan, design, and build.

PG&E gas mains would typically be extended in a trench joint with SVP electric facilities. SVP trenches are typically minimum 36 inches wide and often 48 inches wide when accommodating all four utilities. This is because SVP requires 12 inch horizontal separation from gas, telephone/catv facilities.

The applicant is responsible for all trenching and has the option to install gas facilities and to be credited by PG&E for the estimated cost of the installation. It is recommended that gas meters be located outside of proposed new buildings, either in an alcove, or perhaps adjacent to

landscape walls. PG&E clearances and truck access to gas meters would need to be provided. PG&E does allow gas meters to be located in "gas rooms", but the requirements are strict (E.G. forced air ventilation system, gas detection, explosion proof fixtures, etc.), and the process typically delays the PG&E approval process significantly (6 to 12 months additional).

11.3 Telecommunication Service

11.3.1 Existing System

AT&T service maps indicate that minimum AT&T facilities exist along Stars and Stripes Drive. It does appear, however, that significant AT&T facilities existing on a north-south "wood pole line" along the east side of Lafayette Street.

Comcast service maps indicate that facilities exist along Stars and Stripes Drive, and it appears that significant Comcast facilities exist on a north-south "wood pole line" along the east side of Lafayette Street.

11.3.2 Proposed Infrastructure

AT&T will provide service to one Minimum Point of Entry (MPOE) for up to one building on each non-contiguous property. AT&T will serve multiple buildings on one property, but the applicant will be billed for the estimated cost of the additional AT&T services. The applicant is responsible for trenching and installation of AT&T conduits.

It is typical for developers to discuss the possible extension of "fiber services" with AT&T. If desired, a utility consultant would work with AT&T's engineering department to discuss the need for fiber pads if fiber service is ultimately to be provided to the project.

Conduits for new Comcast service would typically be installed by Comcast contractors in an "open trench" provided by the developer. Number and sizes of conduits would be based on the types of services desired for the development program.

It would be necessary for AT&T and Comcast to cross the UPRR right-of-way to serve Parcel 4 and Parcel 5. This crossing would require railroad permits and a "jack and bore" crossing (the same jack and bore pits that would be needed for gas facilities could be used for these services, however, separate conduit/sleeves would be required to provide separation). As an alternative, it is feasible that the conduits could be incorporated into any new bridge structures that may span the rail right-of-way and Lafayette Street.

12.0 ADDITIONAL FACTORS

12.1 Landfill Infrastructure

The development of the site will impact the current configuration of portions of the landfill operations monitoring, collection and removal systems. Initial assumptions for abandonment and replacement or maintenance of the above systems include the following:

- Protection and maintenance of groundwater monitoring wells and groundwater piezometers;
- Protection and maintenance of the existing leachate collection and removal system during site development;
- Abandonment and replacement of the landfill gas collection and removal system including the landfill gas monitoring probes; and
- Protection and maintenance of the existing composite barrier wall along the north and west boundary of the development area.

As the LEA and City is further engaged, the specific landfill infrastructure components including the Landfill Gas Extraction System Re-Design, Landfill Gas Mitigation System at Building Pads, Landfill Leachate Collection System Re-Design and Landfill Monitoring Features will be defined.

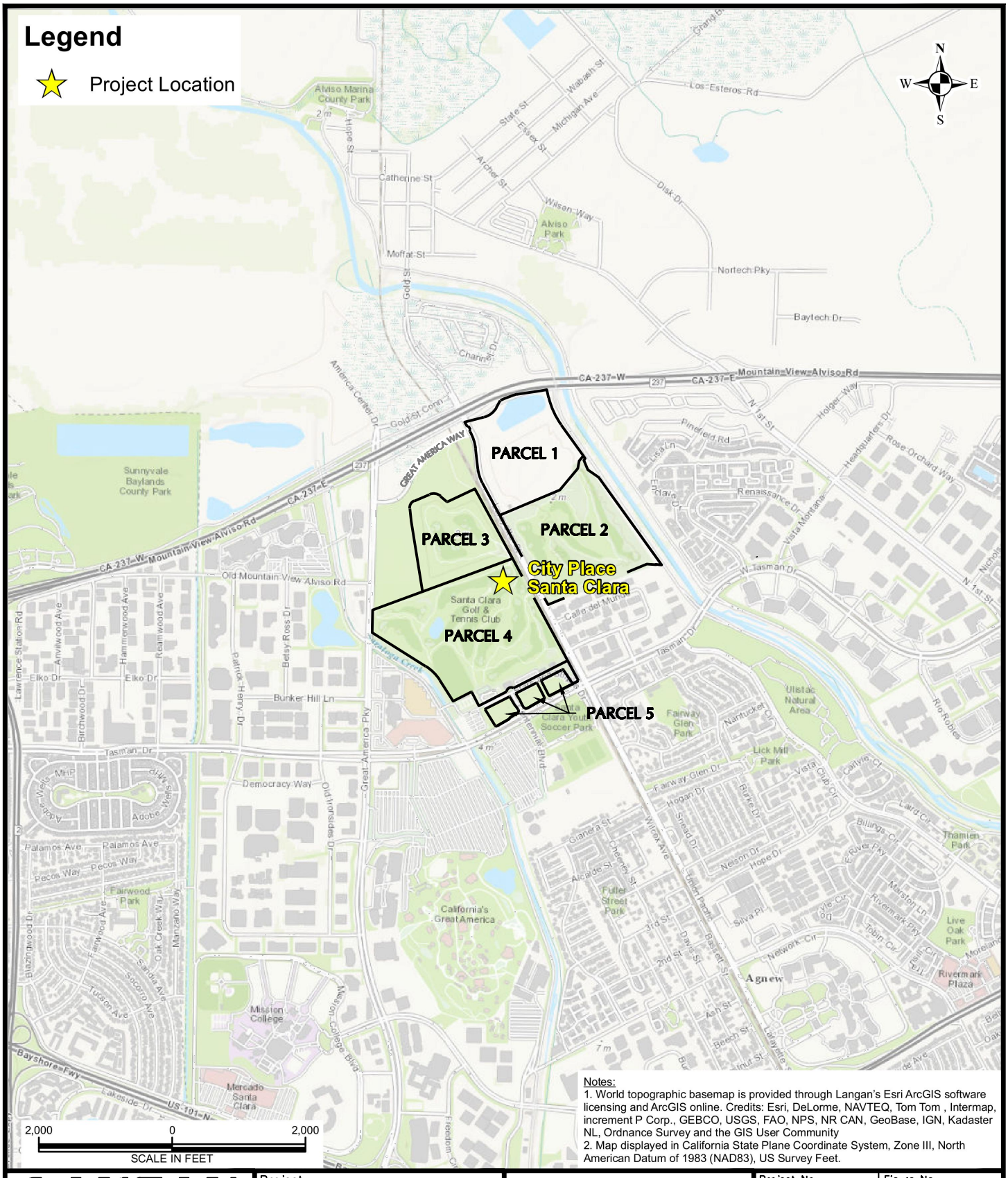
12.2 Non-Standard Design Elements

Some of the non-standard design elements that may be incorporated into the site design to address the landfill issues for the Project include interstitial spaces, settlement slabs, settlement vaults/flexible connections, special utility trenching for landfill cap disruption and refuse handling and considerations for landfill gas. Typical utility/roadway corridor sections have been prepared for several variations of roadways, streetscape amenities and the multiple utilities that will be located within each street (sewer, storm drain, domestic/fire water, recycled water, gas, joint trench, automated waste collection, landfill gas extraction system). The following briefly discusses some of the non-standard elements that will be incorporated into the final design of the system.

- Interstitial Spaces – Beneath the buildings within the City Center portion of the Project and other select office buildings there will be an interstitial space. The current design assumes a 4-ft to 5-ft high interstitial space, which will allow the building utility laterals to be accessible from within the building first floor space without disrupting the landfill systems.
- Settlement Vaults/Flexible Connections – At locations where differential settlement is expected settlement vaults and/or flexible connections will be included in the design. These direct buried vault structures will either enclose a flexible connection (such as a Flex-Tend device) or be located adjacent to a building structure to allow for a piped configuration within the vault to settle. There are two conditions that will need to be addressed; 1) transition from structure to direct bury support over refuse, and 2) transition from direct bury to direct bury over refuse.
- Structural Slabs – Within City Center the majority of the infrastructure systems will be constructed on a structural slab supported on deep foundations. The slabs will support the roadways between the proposed City Center buildings and have been designed to minimize disruption to the landfill cap and refuse. The gravity utility systems have a direct impact on the depth of the structural slab relative to street grade, and may require deeper utility corridors in the slab, which may impact/disrupt the landfill cover and refuse.
- Utility Trenching for Landfill Cap Disruption – Utility corridors, which may or may not be within a roadway, may need a subgrade improvement program to reduce total and differential settlements. Utility trenching that penetrates the landfill cap will require

excavating and disposing of all the material encountered below the cap. The exposed trench will be lined with a polyethylene liner to re-establish the cap and the trench will be backfilled with clean fill. This will allow for the future maintenance of the utility without encountering landfill material and impacting the cap.

FIGURES



Notes:
1. World topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Credits: Esri, DeLorme, NAVTEQ, Tom Tom , Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NR CAN, GeoBase, IGN, Kadaster NL, Ordnance Survey and the GIS User Community
2. Map displayed in California State Plane Coordinate System, Zone III, North American Datum of 1983 (NAD83), US Survey Feet.

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Project
CITY PLACE
SANTA CLARA
SANTA CLARA CALIFORNIA

SITE LOCATION MAP

Project No. 770611601	Figure No. 1
Date 7/22/2016	
Scale 1" = 2000	
Drawn By STAFF / Checked By DJH	
Submission Date 7/22/2016	

Filename: \\langan.com\data\SJO\data6\770611601\Cadd Data - 770611601\SheetFiles\Technical Memo and Report Figures\FIGURE 1.dwg Date: 7/21/2016 Time: 11:18 User: alara Style Table: Langan.stb Layout: Fig 1

APPENDIX A
Grading and Site Access Technical Memorandum

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DRAWINGS

1.0 INTRODUCTION

Grading and Site Access Technical Memorandum (the "Memo") is to document the existing and proposed site grading, existing roadway network and proposed access intersections for the City Place Santa Clara Project (the "Project").

2.0 PROJECT DESCRIPTION

2.1 Site Description

The overall site (the "Site") for the Project includes the former Santa Clara All Purpose Landfill and two additional sites (see Figure 1). The subject property includes five parcels: Parcel 1, Parcel 2, Parcel 3, Parcel 4, and Parcel 5 totaling approximately 240 acres. The landfill is no longer active and the Final Closure and Post-Closure Maintenance Plan was approved in December 1992 and amended multiple times, most recently in December 2013.

The former landfill consists of individual landfills on the four separate parcels. It has been reported that landfill operations occurred between 1934 and 1994; however, based on historical aerial photographs and topographic maps, it appears that landfill operations began in the late 1960s (beginning in Landfill Parcel 4). The Landfill received final landfill closure certification in September 1994. Open burning took place at the first landfill and, to our knowledge, waste types accepted at the landfills included industrial and construction/demolition debris. The topography indicates that soil embankments were constructed and that refuse was placed which created large mounds. On the basis of the available subsurface information, the refuse in Parcels 1 and 3 ranges from about 40 to 80 feet thick. In Parcels 2 and 4 the thickness of refuse ranges from about 20 to 50 feet.

The Site is proximate to a significant amount of existing roadway and utility infrastructure. The roadways providing current access to the boundaries of the Site include Lafayette Street, Great America Parkway, Great America Way, Stars and Stripes Drive, Centennial Boulevard, and Tasman Drive. The City owned and operated systems include sanitary sewer, stormwater drainage, water (domestic and fire), recycled water and landfill operation systems (gas extraction, leachate collection and monitoring) within and adjacent to the Site. Utility providers and infrastructure owners include Silicon Valley Power (SVP), Comcast, AT&T, Santa Clara Valley Water District (SCVWD), Pacific Gas & Electric (PG&E), Union Pacific Railroad (UPRR) and Valley Transportation Authority (VTA).

2.2 Planned Development

The planned development currently envisioned includes office, hotel, mixed-used retail, restaurant, entertainment, residential and parking structures with significant site improvements. The approvals for the Project include a zoning change to Planned Development –Master Community ("PD-MC") from the "B" zoning district and the (Public, Quasi-Public and Public Park or Recreation) for Parcels 1 through 4 and from the "CP" (Commercial Park) zoning district in Parcel 5 is zoned "CP". MCP authorizes up to 9,164,400 gross square feet (gsf) with associated parking and site improvements. The current breakdown by site is as follows:

Table 1
Current Development Program

Parcel	Area (acres)	Potential Development Area (gsf)
1	49.6	1,440,000
2	60.9	2,592,000
3	34.9	0
4	86.6	4,259,400
5	8.0	873,000

3.0 BASIS OF DESIGN

3.1 References

The following reports and standards are supplemental to the design requirements and were used in the preliminary conceptual design of the grading and access intersections. These documents, or updated versions of these documents, should be used in the final design of the Project.

- "Design Criteria for Improvements in Public Right-of-Ways and City Easements" City of Santa Clara, Public Works Department, September 17, 2014.
- "Standard Specifications for Public Works" City of Santa Clara, Public Works Department, latest edition.
- "Standard Details" City of Santa Clara, Public Works Department, latest edition.
- "Santa Clara City Code Title 10 and 12."
- "State of California Highway Design Manual" latest edition.
- CALDAG 2013 and ADA Standards, latest edition
- 2013 California Building Code (CBC)
- "Preliminary Geotechnical Investigation City Place Santa Clara, August 22, 2014.
- Topographic Survey (via aerial photogrammetry) provided by City of Santa Clara, performed on November 15, 2013.
- "Existing Conditions Assessment for the Proposed City Place Santa Clara Mixed-Use Project," May 2, 2014.
- "Preliminary Transportation Review of the Proposed City Place Santa Clara Mixed-Use Project," May 14, 2014.
- FEMA Flood Insurance Rate Map (FIRM) include Panels 61, 62, 63 and 64 of 830, Map Numbers 06085C0061H, 06085C0062J, 06085C0063H and 06085C0064H dated May 18, 2009
- Anderson Dam EAP 2009 Flood Inundation Map, Santa Clara Valley Water District
- Tsunami Inundation Map for Emergency Planning, State of California Emergency Management Agency, California Geological Survey, 2009.

3.2 Design Criteria

The City of Santa Clara Public Works Department, CALDAG and the CBC have some general design criteria relative to grading and streets. Some of key items that will need to be considered for final design, as well as the non-standard design elements to address the landfill aspects of the Project are as follows, subject to the City approving deviations.

- Minimum standard Section 3.3 of the Master Commmunity Plan specifies approximate right-of way and roadway widths (face of curb to face of curb) as follows:
    - ResidentialMinor arterial spines
        - Right-of-Way – 102 ft
        - Roadway Width – 70 ft
    - IndustrialCollector streets
        - Right-of-Way – 75-90 ft
        - Roadway Width – 45-55-ft
    - CommercialLocal streets
        - Right-of-Way - 60-96 ft
        - Roadway Width – 36-56 ft
- Minimum allowable street grades:
    - South of State Highway 101: 0.3%
    - North of State Highway 101: 0.25%
    - Around Curb Returns: 0.5%
- Undulated street grades shall have a favorable fall to the low point of the drainage basin such that a grade line drawn through the high points of the undulation would not be less than 0.05% grade. The elevation at any low point must not be more than six (6) inches below the lower adjacent high point elevation.
- Cul-de-sacs shall drain toward the intersecting street.
- In areas of street widening, the cross slope shall be designed between 2% and 4%. Greater cross slopes may be allowed only with the permission of the Director of Public Works/City Engineer.
- When the vehicle travel way of an existing street is being reduced (i.e., installation of "traffic calming" features) the effect of grade changes to the street must be investigated and clearly indicated on the plans. The cross slope shall be designed between 2% and 4%.
- Vertical curves shall be used whenever a 1.5% grade differential or more occurs. Vertical curves shall be 200 feet minimum.
- The centerline profile of the through street shall be continuous through the intersection. The cross street centerline profile shall meet the through street cross slope at the centerline except when the through street pavement width is 60 feet or more. In this case, the cross street centerline profile shall meet the through street cross slope at 10 feet from the face of curb of the through street with the cross street profile sloping away from the through street.
- Medians with landscaping shall require curbing. The top of curbs shall be constructed 8.5 inches above street surface grade, or in areas of median extension, match the existing curbing height as allowed by the Director of Public Works/City Engineer. Depending on the scope of the project root barriers and/or median subdrains may be required by the Director of Public Works/City Engineer.
- Slurry seal shall be required on portions of existing streets that have been modified and then newly paved, as well as on newly paved trenches, and potholes.. The slurry seal shall extend 12 inches beyond the limits of pavement reconstruction.
- Proposed bridges over Lafayette St. shall have a minimum 20-ft height clearance over existing pavement and 23-ft 10-inches height clearance over top of rail.
- Accessible routes – "Accessible routes shall consist of one or more of the following components: walking surfaces with a running slope not steeper than 1:20, doorways, ramps, curb ramps excluding the flared sides, elevator and platform lifts [2013 CBC 11B-206, 2010 ADA Standards 206] (CALDAG 2013)"

- Accessible means of egress – "Means of egress shall comply with CBC Chapter 10, Section 1007. Accessible spaces shall be provided with not less than one accessible means of egress. [2013 CBC 11B-207.1, 2010 ADA Standards 207.1] (CALDAG 2013)".
- Walking surfaces – "Walkways shall be of sufficient width to accommodate pedestrian traffic, but in no case shall they be less than 4 feet in width. Walkways shall be provided with a durable walking surface. [2013 CBC CBC 3306.2, 2010 ADA Standards 403]. The running slope of walking surfaces is not steeper than 1:20. The cross slope of the walking surfaces is not steeper than 1:48. [2013 CBC 11B-403.3, ADA Standards 403] (CALDAG 2013)."
- Ramps - "A walking surface which has a running slope steeper than one unit vertical in 20 units horizontal (5%slope). Cross slope of ramp runs are not steeper 1:12 (8.33%). Cross slope of ramp runs are not steeper than 1:48 (2.08%). The clear width of ramp run shall be 48 inches minimum. The rise of any ramp is 30 inches maximum. Ramps have landings at the top of the bottom of each ramp run. The landing clear length is 60 inches long minimum. [2013 CBC 11B-405.1, 11B-405.1.2, 11B-405.1.3, 11B-405.1.7;,ADA Standards 405] (CALDAG 2013)."
- Curb ramps – "A sloping pedestrian way, intended for pedestrian traffic, which provides access between a walk and sidewalk to a surface located above or below an adjacent curb face. Ramp runs have a running slope not steeper than 1:12 (8.33%). Landings are provided at the tops of curb ramps and blended transitions. The landing clear length is 48 inches minimum. A turning space 48 inches minimum is provided at the bottom of the curb ramp. The slope of the turning space in all directions is 1:48 maximum (2.08%). [2013 CBC 11B-406.2.1, 11B-406.2.1, 11B-406.3.2, 11B-405.1.7; ADA Standards 405] (CALDAG 2013)."
- Detectable warning and detectable directional texture – "Detectable warning surface shall be installed as provided in the California Code of Regulations (CCR), Title 24, Part 1 Chapter 5, Articles 2,3 and 4. Detectable warnings shall consist of a surface of truncated domes. For curb ramps, detectable warnings shall extend 36 inches in the direction of travel. Detectable warning shall extend the full width of the ramp excluded any flared sides. [2013 CBC 11B-247, 11B-247.1.2, 11B-247.2.2, ADA Standards 247] (CALDAG 2013)".

3.3 Flood Potential

The site is located within Zone X "Other Flood Areas" identified as areas of 0.2% chance of flood, areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 1% annual chance flood. The relevant FEMA Flood Insurance Rate Map (FIRM) include Panels 61, 62, 63 and 64 of 830, Map Numbers 06085C0061H, 06085C0062J, 06085C0063H and 06085C0064H dated May 18, 2009. Within the Site, Map 06085C0061H includes the following caveat "Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system.

The eastern edge of Parcel 2 (Eastside Drainage Channel) and the eastern edge and northern section of Parcel 1 (Eastside Retention Basin area north of the landfill) are identified within a special flood hazard area subject to inundation by the 1% annual chance flood (100-year flood). The area is identified as Zone AH with flood depths of 1 to 3 feet (usually areas of ponding) and a Base Flood Elevation of el. 6.0.

The Site is located within the inundation area of the Anderson Dam. Anderson Dam and Reservoir is the largest of ten Santa Clara Valley Water District reservoirs and provides a reliable supply of

water to Santa Clara County. It has a total storage capacity of 89,073 acre-feet. Anderson Dam and Reservoir was built in the 1950s and named after the key founder and first president of the water district, Leroy Anderson. Currently, a storage restriction of about 45 feet below the dam crest has been put in place to protect the public with a reduced storage capacity of 61,810 acre-feet. Water district staff and the regulatory agencies (California Division of Safety of Dams and the Federal Energy Regulatory Commission) have approved the restriction and believe that this would prevent the uncontrolled release of water in case of a failure after a major earthquake. The Site is located approximately 26 miles downstream of the Dam. The inundation mapping prepared by the Santa Clara Valley Water District indicate that in the event of a dam breach during the inflow design flood, the potential maximum flood elevation of +19.94 would occur at the Site within 9 hours 18 minutes. If the event happened during "fair weather" then the potential maximum flood elevation of el. 16.84 would occur within 11 hours 17 minutes.

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

4.0 SITE GRADING

4.1 Existing Topography

The existing topography of the Site was provided by the City of Santa Clara in an AutoCAD file of an aerial photogrammetric survey performed on November 15, 2013. All elevations noted herein are in the North American Vertical Datum of 1988 (NAVD88). An updated topographic survey and detailed boundary and utility survey will be required for final design.

- Parcel 1 – The existing elevations around the perimeter of Parcel 1 vary between elevation (el.) 5 and el. 8. The elevation high points are within the central portion of the parcel at about el. 60 and at the northwest corner at about el. 70. The grades fall from the high points to the edge of the refuse mound to about el. 40 to the east and northeast and to about el. 55 to the west and south. From the top of edge of the landfill the side slopes down to the perimeter elevations vary from 3H:1V to 5H:1V. Based on City records and previous investigations performed to date, it is anticipated that the top of the refuse layer varies between el. 47 and el. 37. The surface grades vary between 5 ft and 15 ft higher than the refuse.

  There is an existing driveway access to Lafayette Street in the southwest corner of the Parcel at about el. 8. The paved driveway slopes up into the Parcel at about an 8% grade to provide access to the existing BMX facility and for golf course maintenance. There is also a City drainage conveyance ditch along the entire eastern edge of the Parcel at el. 0 and a levee for the Guadalupe River with the top of berm at el. 25.

- Parcel 2 – The existing elevations around the perimeter of Parcel 2 vary between el. 5 and el. 8. The elevation high point is within the north central portion of the Parcel at about el. 52. The grades fall from the high point to the edge of the refuse mound to about el. 35 to the east, el. 25 to the south and el. 20 to the west. From the top of edge of the landfill the side slopes down to the perimeter elevations vary from 2H:1V to 3H:1V. Based on City records and previous investigations performed to date, it is anticipated that the top of the refuse

layer varies between el. 19 and el. 40. The surface grades vary between 7 ft and 10 ft higher than the refuse.

There is an existing golf cart bridge over Lafayette Street from Parcel 4 that connects to Parcel 2 at about el. 25. The bridge span reaches high point of about el. 39. There is also a City drainage conveyance ditch along the entire eastern edge of the Parcel at el. 0 and a levee for the Guadalupe River with the top of berm at el. 25.

- Parcel 3 – The existing elevations around the perimeter of Parcel 3 vary between el. 9 and el. 11. The elevation high point is within the central portion of the parcel at about el. 82. The grades fall from the high point to the edge of the refuse mound to between el. 53 to el. 56 around the majority of the edge and el. 68 in the southwest corner. From the top of edge of the landfill the side slopes down to the perimeter elevations are at about 3H:1V. Based on City records and previous investigations performed to date, it is anticipated that the top of the refuse layer varies between el. 31 and el. 54. The surface grades vary between 10 ft and 35 ft higher than the refuse. There is an existing paved golf cart access path in the southeast corner from Parcel 4 that slopes up to Parcel 3 from el. 12 to el. 54 at about a 10% slope. There is also an access location in the northeast corner of the Parcel from the adjacent property to the north from el. 10 to el. 30. The Union Pacific railroad tracks are located along the entire eastern edge of Parcel 3 at about el. 9. There is also a City drainage conveyance ditch along the entire eastern edge of the Parcel at about el. 17 and along the southern edge of the Parcel between el. 8 and el. 11.

- Parcel 4 – The existing elevations around the perimeter of Parcel 4 vary between el. 10 and el. 20. The elevation high points are located throughout the Parcel up to about el. 34. The grades around the edge of the refuse mound are el. 20. There is an area within the Parcel where no refuse exists and existing grades drop to as low as el. 7 (within a portion of the existing driving range and lined pond). Based on City records and previous investigations performed to date, it is anticipated that the top of the refuse layer varies between el. 18 and el. 27. The surface grades vary between 3 ft and 7 ft higher than the refuse.

  The elevation of Great America Parkway along the approximate 340-ft frontage is between el. 15 and el. 22. Stars and Stripes drive along the majority of the southern boundary of the Parcel is between el. 13 and el. 19. The UPRR tracks are located along the entire eastern edge of Parcel 4 at about el. 10 to el. 13. There is also a City drainage conveyance ditch along most of the northern edge of the Parcel between el. 8 and el. 11. The City has the following utilities under the drainage conveyance ditch between Parcels 3 and 4: 33-inch and 42-inch sanitary sewers; and 12-inch recycled water main. Grading (excavation or backfill) shall be designed and performed in such a manner that has no impact to said City utilities.

- Parcel 5 – The existing elevations around the perimeter of Parcel 5 vary between el. 24 and el. 40 along Tasman Drive and between el. 12 and el. 19 along Stars and Stripes Drive. The existing parking lots slope south to the north with the low points around el. 12. The 90-ft wide Centennial Boulevard splits Parcel 5 sloping from el. 23.8 at Tasman Drive to el. 15.7 at Stars and Stripes Drive. The parking lots are access from Stars and Stripes Drive. Stars and Stripes Drive provides access to the existing City parking garage at approximately el. 15.5.

4.2 Proposed Site Grading

The goals for the proposed grading of the Site include:

- Minimizing disturbance of existing refuse.
- Phasing of earthwork to efficiently replace, relocate, operate and maintain the landfill collection systems.
- Satisfying and maintaining ADA slope and access guidelines recommendations for buildings, site and access to public areas.
- Strategically designing site grades to accommodate future settlement of landfill and to not impact existing utilities.
- Site aesthetics.

The City Center section of the Project, inclusive of all buildings, parking garages, plazas and streets, within Parcel 4 will be structurally supported on a deep foundation system. The structural system for the retail buildings will include interstitial space between the first floor and subgrade. The grading of the streets and plaza areas will be coordinated with the first floor elevations of the retail, office and parking structures. The development within Parcel 5 and beneath Stars and Stripes Drive and Centennial Boulevard will include a below grade parking structure. The grades will need to correspond to the existing Tasman Drive elevations and the southern edge of the Parcel 4 structure. For the remainder of the development, the buildings and parking structures will be supported on deep foundations and the streets, plazas and open space/landscaped areas will be supported on terra firma (on-grade). The three different preliminary foundation sections (over landfill area) are included herein as Figures 31 to 33.

The design maintains the first floor elevation (for the Parcel 4 settlement slab and other buildings and parking garage structures) a minimum of 10 feet above the anticipated refuse elevations to minimize excavation of waste. Mass earthwork will include grading each Parcel to a subgrade elevation, which is about 5 feet above the refuse. This will allow for the protection of the existing clay cap during earthwork, provide a working pad for the installation of the landfill gas collection system, maintenance of the leachate recovery system risers, deep foundations, and a provide vertical clearance above the refuse to minimize refuse disturbance during earthwork, pile cap, utility corridor, and building slab construction. There are instances where the clay cover will be disrupted by utilities trenches and refuse will be impacted.

Based on the preliminary grading, the earthwork estimates to achieve subgrade for each Parcel are as follows:

Table 2
Earthwork Estimates

Parcel	Total Earthwork (CY)
1	410,000
2	220,000
3	250,000*
4	500,000
5	350,000

*Assumes Parcel 3 is graded to provide fill for use on other parcels. Otherwise earthwork will be less, depending on City's park development plans.

The preliminary grading design has minimized the disturbance of refuse to achieve the subgrade elevations. Some access locations may require cutting into the refuse. The preliminary estimate is approximately 25,000 CY, of which 10,000 CY is at the new Lick Mill Boulevard access (southeast corner of Parcel 2).

The final design for the on-grade streets, plazas and open space/landscape areas will be designed with a combination of hinged slabs, adjustable footings and other "situation specific" elements such as lightweight fill. Because of the heterogeneity of the refuse, it is difficult to accurately predict the amount of settlement over a given period of time, or where it will occur. Once the settlement locations are determined, the final grading plans will be designed for the ultimate grade after site settlement. Building entrances, plazas, and access pathways will be designed to maintain compliance with the requirements of the California Building Code, CALDAG and ADA Standards. A periodic monitoring and maintenance program will need to be implemented to maintain compliance and site aesthetics.

5.0 SITE ACCESS

5.1 Existing Roadway Network

Primary automobile access to the site is provided by US 101, SR 237, Great America Parkway, Tasman Drive and Lafayette Street. These roadways are described below and shown on Figure 28:

- US 101 is an eight-lane divided freeway that extends from east San Jose to San Francisco along the west side of San Francisco Bay, connecting communities along the Peninsula.
- State Route 237 is a six-lane divided freeway that connects the east and west sides of Silicon Valley via Mountain View, Sunnyvale, Santa Clara and north San Jose.
- Great America Parkway is a six-lane divided major arterial that extends from SR 237 to Homestead Road, providing access to US 101, Central Expressway and El Camino Real. South of US 101 it continues as Bowers Avenue, narrowing to two lanes in each direction south of Central Expressway. It provides primary access from the site to SR 237 and US 101.
- Lafayette Street is a four-lane arterial that connects to SR 237 immediately north of the City Place Santa Clara site (via Gold Street) and to US 101 approximately two miles south of the site. Lafayette is below-grade at Tasman Drive and connects directly to Great America Way. Union Pacific railroad tracks with Amtrak and ACE commuter rail passenger service, and high-voltage power lines run along the west (southbound) side of the street.
- Tasman Drive is a four-lane divided arterial with center-running light rail, running between I-880 in the east to Java Drive in the West. The VTA Mountain View-Winchester Light Rail Line runs within the median of Tasman Drive.
- Stars and Stripes Drive is a two-lane local east-west street that connects directly to the existing City parking garage (to the west) and turns south at its east end and goes under Tasman Drive to provide access to the commuter rail station, parking lot and Santa Clara Youth Soccer Park.

- Centennial Boulevard is a five-lane divided local street that connects Tasman Drive to Stars and Stripes Drive.

5.2 Site Access Intersections

An existing conditions assessment and a preliminary transportation review of the Project was performed by Fehr and Peers. A detailed traffic impact study has been prepared for the Project as part of the CEQA Environmental Impact Report. Based on the current planning being performed for the Project, the following presents the conceptual locations for potential access intersections and conceptually summarizes some of key elements of each. Figure 29 provides access locations being evaluated. As the design of the Project progresses, the feasibility of each access locations as well as alternative access locations and configurations will be assessed. The intersection and lane configurations, roadway slopes, vision triangles, turning radius and other design elements will be designed to meet City standards (inclusive of turning lanes, bike lanes, sidewalks, crosswalks, queue lengths, etc.) and the needs of the phased Project. The preliminary access locatons are as follows:

- Great America Parkway (main)
    - Provides direct access to Parcel 4
    - Signalized (new)
    - Lanes:
        - South/Eastbound (in) - two
        - North/Eastbound (in) - one
        - Westbound (out) – two left turn / one right turn
    - Requires modifications to existing Great America parkway median
    - Requires incorporation of existing commercial development right-in/right-out access into the intersection
    - Limited southbound left turn stacking distance due to limited frontage and Old Mountain View Alviso Road / Private site driveway intersection

- Great America Parkway (secondary)
    - Provides direct access to Parcel 4
    - Signalized (new)
    - Lanes:
        - South/Eastbound (in) - two
        - North/Eastbound (in) - one
        - Westbound (out) – two left turn / one right turn
    - Requires modifications to existing Great America parkway median, existing bike trail and maintenance roadways
    - Requires new bridge structure over San Tomas Aquino Creek and approval from Santa Clara Valley Water District (and joint agency approval from Regional Water Quality Control Board, California Department of Fish and Game, and the US Army Corps of Engineers and their Federal consulting agencies)

- Lafayette Street Urban Interchange
    - Provides direct access to Parcel 4, Parcel 1 and Parcel 2
    - Signalized (new)
    - Lanes:

        - South/Westbound (in) - two
        - North/Westbound (in) - two
        - Westbound (out) - three
        - South/Eastbound (in) - one
        - North/Eastbound (in) - one
        - Eastbound (out) - two
    - Requires construction of new bridge overpass structure to span Lafayette Street and railroad and modifications to existing Lafayette Street
    - Requires northbound bypass lane within Parcel 2
    - Requires additional structural span over infrastructure corridor between Parcels 3 and 4 (required to avoid impact to existing City sanitary sewer and recycled water main utilities within the drainage conveyance ditch)
    - Requires accommodations be made to maintain access to the infrastructure corridor during construction
    - Requires under-grounding of existing SVP electric infrastructure along east side of Lafayette Street and possible replacement/relocation of existing sanitary sewer
    - Requires approval from City, PG&E (including California Public Utilities Commission – CPUC), UPRR and SVP - Final configuration of the interchange will consider all comments from these agencies

- Lafayette Street (Middle)
    - Provides direct access to Parcel 1 and access to Parcel 4 via new Lafayette Street Bridge
    - Signalized (new)
    - Lanes:
        - South/Eastbound (in) - one
        - North/Eastbound (in) - one
        - Westbound (out) – two
    - Utilizes existing access location
    - May require site improvements to existing gas collection facility
    - Lane alignments need to ensure acceleration, deceleration and through lanes

- Great America Way
    - Provides direct access to Parcel 1
    - Signalized (new)
    - Lanes:
        - South/Eastbound (in) - one
        - North/Eastbound (in) - one
        - Westbound (out) - three
    - Requires improvements to area adjacent to existing Rabello Pump Station and Eastside Retention Basin
    - Requires coordination with future expansion of Rabello Pump Station and new recycled water tank
    - Requires long side-hill access roadway, possible retaining walls, bridge structure (to span existing City sanitary sewers, PG&E gas transmission mains and City recycled water main) and possible refuse disruption (cut)
    - Requires protecting the sanitary sewers, PG&E gas and recycled water within the infrastructure corridor along the sewer easement/access road

- Lick Mill
  - Provides direct access to Parcel 2
  - Unsignalized
  - Lanes:
    - Northbound (in) - two
    - Southbound (out) - two
  - Requires access easement, improvements to existing Lick Mill and Tasman Drive intersection and additional off-site property
  - Requires refuse disruption (cut)

- Parcel 3 Access
  - Access from Parcel 4 via one internal street
  - Unsignalized
  - Lanes:
    - Northbound (in) - one
    - Southbound (out) – one
  - Includes turning circle at end of roadway to redirect traffic back to City Center

- Parcel 4/2 Connector
  - Provides access between Parcel 2 and Parcel 4
  - Lanes:
    - East/Westbound – one in each direction
  - Requires construction of new bridge overpass structure to span existing Lafayette Street and railroad
  - Requires approval from City, PG&E (including California Public Utilities Commission – CPUC), UPRR and SVP

- Stars and Stripes Drive
  - Provides direct access to Parcel 4
  - Three unsignalized intersections - Avenue A, Avenue B and Avenue C
  - Lanes:
    - Southbound (out) - three
    - Northbound (in) – three
  - Requires coordination with existing parking deck access and ingress/egress to below grade parking garages

- Tasman Drive/Centennial Boulevard/Avenue A/Avenue B / Avenue C (variant)
  - Provides direct access to Parcel 5 and below grade parking garages via Centennial Boulevard, Avenue A and Avenue B, and Avenue C (variant)
  - Two new unsignalized right-in only intersections – Avenue A and Avenue B
  - Existing signalized Centennial Boulevard intersection
  - Lanes:
    - West/Northbound (in) – two
    - East/Northbound (in) – four
    - South/Westbound (out) – four
    - South/Eastbound (out) - two
  - Requires coordination with below grade parking garage access

  - Requires modifications to existing Tasman median and signal timing
  - Requires approval from VTA
  - Requires significant public utility relocation

- Tasman Slip Ramp/Stars and Stripes Drive
  - Provides direct access to north/south section of Stars and Stripes Drive and Parcel 4 and 5 from eastbound Tasman Drive
  - Unsignalized at Tasman Drive / possible new signal at Stars and Stripes
  - Lanes:
    - West/Northbound (in) - one
  - Requires modifications to existing Tasman Drive embankment for adjacent bridge structure (including new retaining walls) and City approval

- Lafayette Street Bridge (option)
  - Provides access between Parcel 1, 2 and 4
  - Requires construction of new bridge overpass structure to span Lafayette Street and UPRR and modifications to existing Lafayette Street
  - Requires under-grounding of existing SVP electric infrastructure along east side of Lafayette Street

- Lafayette Street (jug-handle north and south option)
  - Provides direct access to Parcel 1 (same location as Lafayette Street Middle) and Parcel 2, and access to Parcel 4 via the new Lafayette Street Bridge
  - Signalized (new)
  - Lanes (for each):
    - South/Eastbound (in) - one
    - North/Eastbound (in) - two
    - West/Northbound (out) – two
    - West/Southbound (out) – two
    - North (through) – two
    - South (through) - two
  - Requires refuse disruption (cut) and possibly retaining walls
  - Lane alignments need to ensure acceleration, deceleration and through lanes
  - Some right-of-way acquisition from Parcel 1 may be required
  - Depending on required queueing length, additional transmission poles may be affected.
  - Requires approval from City, PG&E (including California Public Utilities Commission – CPUC), UPRR and SVP

The following table presents a parcel access summary based on intersections presented above.

Table 3
Parcel Access

Parcel	Proposed	
	In	Out
1	4	4
2	4	4
3	1	1
4	9	10
5	4	4

5.3 On-Site Streets

Because the traffic demand is not known at this time we have developed recommended pavement sections for traffic indices (TI) of 4.5 through 6.5. The driveway traffic index assumes passenger car traffic and light to moderate truck traffic for a 20-year period. Table 4 provides the recommended flexible pavement sections (based on assumed R-value of 20) for the various TI's as provided in the Preliminary Geotechnical Investigation Report.

Table 4
Recommended Flexible Pavement Sections

Design TI	Asphalt Concrete (inches)	Class II Aggregate Base (R=78) (inches)	Full Depth AC Thickness (inches)
4.5	2.0	7.0	8.0
5.0	2.5	8.5	8.0
5.5	3.0	9.0	8.0
6.0	3.0	10.5	9.0
6.5	3.5	11.5	9.5

After placement of utility trench backfill, the final soil subgrade in paved areas should be scarified to a depth of six inches, moisture-conditioned, and compacted to at least 95 percent relative compaction to provide a smooth, non-yielding surface. Aggregate base should conform to the current State of California (Caltrans) Standard Specifications and be compacted to at least 95 percent relative compaction.

Due to the "urban" nature of the City Center portion of the development, green streets will be considered to assist the Project in complying with stormwater management regulations. One

principle of green infrastructure involves reducing and treating stormwater close to its source. Green streets achieve multiple benefits, such as improved water quality through the integration of stormwater treatment techniques which use natural processes and landscaping. Green streets can incorporate a wide variety of design elements. Although the design and appearance of green streets will vary, the functional goals are the same: provide source control of stormwater, limit its transport and pollutant conveyance to the collection system, and provide environmentally enhanced roads. A typical green street detail is provided as Figure 54 for future design consideration. The system would provide multiple benefits along the street right-of-way including:

- Integrated system of stormwater management within the right-of-way
- Volume reductions in stormwater (via storage and evapo-transpiration)
- Key linking component in community efforts to develop local green infrastructure networks
- Aesthetic enhancement
- Improved pedestrian experience along the street right of way

Green streets are not part of the City Department of Public Works Standard Details and Specifications and will require review and approval by the City during entitlements.

6.0 PHASING

The current project planning includes a preliminary phasing strategy for the full development of the five sites in seven phases. Parcel 4 and Parcel 5, the location of City Center, would be developed in the first four Phases. Parcel 3 may be developed as a City Park in Phase 2a, Parcel 1 would be developed in Phase 5 and Parcel 2 in Phases 6 and 7. The project approval documents provide for a process to align the implementation of the site access improvements with the development phasing.

GRADING PHASING MATRIX		
Phase / Parcel	**Gross Sq. Footage**	**Approximate Earthwork**
1 / 5	873,000	350,000 CY cut from Parcel 5 to Parcel 4
2 / 4	2,701,250	500,000 CY cut/fill on Parcel 4 and 250,000 CY (from Parcel 3 to Parcel 4)
3 / 4	757,750	Fine Grading – See Note 1
4 / 4	800,000	Fine Grading – See Note 1
5 / 1	1,440,000	410,000 CY
6 / 2	1,296,000	220,000 CY
7 / 2	1,296,000	Fine Grading – See Note 3

Notes:
1. Earthwork performed during Phase 2 to accommodate gas extraction system replacement/relocation.
2. Earthwork performed during Phase 2 (250,000 CY of cut to Parcel 4).
3. Earthwork performed during Phase 7 to accommodate gas extraction system replacement/relocation.

FIGURES

DRAWINGS

APPENDIX B
Stormwater Technical Memorandum

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DRAWINGS

APPENDICES

1.0 INTRODUCTION

The purpose of this Stormwater Technical Memorandum (the "Memo") is to assist Related Santa Clara, LLC in the preliminary design of the City Place Santa Clara Development (the "Project") and to provide updated information for preliminary cost estimating. The Memo documents the existing storm drainage system, stormwater design criteria and storm drain infrastructure. It also provides stormwater management and treatment options for sustainable development and addresses the non-standard landfill design elements for the Project.

2.0 PROJECT DESCRIPTION

2.1 Site Description

The overall site (the "Site") for the Project is the former Santa Clara All Purpose Landfill and two additional sites (see Figure 1). The subject property includes five parcels: Parcel 1, Parcel 2, Parcel 3, Parcel 4 and Parcel 5 totaling approximately 240 acres. The landfill is no longer active and the Final Closure and Post-Closure Maintenance Plan was approved in December 1992 and amended multiple times, most recently in December 2013. The site boundaries include Lafayette Street, Great America Parkway, Tasman Drive, the Guadalupe River and the San Tomas Aquino Creek.

The former landfill consists of individual landfills on the four separate parcels. Parcel 4 operated between the 1930s and 1970s; landfill operations at the other parcels took place from the late 1970s through early 1990s. Open burning took place at the first landfill and, to our knowledge, waste types accepted at the landfills included industrial and construction/demolition debris. The topography indicates that soil embankments were constructed and that refuse was placed which created large mounds. On the basis of the available subsurface information, the refuse in Parcels 1 and 3 ranges from about 40 to 80 feet thick. In Parcels 2 and 4 the thickness of refuse ranges from about 20 to 50 feet.

The Site is proximate to a significant amount of existing infrastructure. The City owned and operated systems include sanitary sewer, stormwater drainage, water (domestic and fire), recycled water and landfill operation systems (gas extraction, leachate collection and monitoring) within and adjacent to the Site. Utility providers and infrastructure owners with facilities near the Site include Silicon Valley Power (SVP), Comcast, AT&T, Santa Clara Valley Water District (SCVWD), Pacific Gas & Electric (PG&E), Union Pacific Railroad (UPRR) and Valley Transportation Authority (VTA).

2.2 Planned Development

The planned development currently envisioned includes office, hotel, mixed-used retail, restaurant, entertainment, residential and parking structures with significant site improvements. The approvals for the Project include a zoning change to Planned Development –Master Community ("PD-MC") from the "B" zoning district and the ((Public, Quasi-Public and Public Park or Recreation) for Parcels 1 through 4 and from the "CP" (Commercial Park) zoning district in Parcel 5 is zoned "CP". MCP authorizes up to 9,164,400 gross square feet (gsf) with associated parking and site improvements. The current breakdown by site is as follows:

Table 1
Current Development Program

Site	Site Area (acres)	Potential Development Area (gsf)
1	49.6	1,440,000
2	60.9	2,592,000
3	34.9	0
4	86.6	4,259,400
5	8.0	873,000

3.0 EXISTING CONDITIONS

3.1 Watershed Characteristics

The Site is tributary to the San Tomas Aquino Creek and the Guadalupe River. A brief description of each as provided by the Santa Clara Valley Urban Runoff Pollution Protection Program (SCVURPPP) is summarized below.

The San Tomas Aquino Creek watershed covers an area of approximately 45 square miles. San Tomas 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 watershed is developed as high-density residential neighborhoods, with additional areas developed for commercial and industrial uses. 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 Highway 101).

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 actually begins on the Valley floor at the confluence of Alamitos Creek and Guadalupe Creek, just downstream of Coleman Road in San Jose. From there it flows north, approximately 14 miles until it flows into the Lower South San Francisco Bay via Alviso Slough. The upper 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.

The climate of the City of Santa Clara is characterized as dry-summer subtropical (often referred to as Mediterranean), with cool wet winters and relatively warmer dry summers. The mean annual precipitation in the vicinity of Santa Clara is approximately 15 inches (95 percent of which falls between October and April) per the 2007 Santa Clara County Drainage Manual

(SCCDM). This value is typical of Santa Clara County east of the coastal range. It is important to note that the Site can be subject to a wide range of annual precipitation.

Due to the nature of the existing topography and drainage infrastructure, the five parcels along with the tributary off-site areas have been divided into four distinct sub-watersheds referenced herein and shown on Figure 2 as the San Tomas, East Basin, Eastside Channel and Basin Direct. Note that the East Basin, Eastside Channel and Basin Direct are tributary to the Guadalupe River via the Eastside Retention Basin and Pump Station.

- San Tomas – The San Tomas sub-watershed includes the areas from Parcel 4 that drain directly to the San Tomas Aquino Creek via existing outfalls. The Golf Course Pump Station conveys runoff to the Creek from areas of Parcel 4, Parcel 5 and sections of Stars and Stripes Drive, Centennial Boulevard, Tasman Drive and the existing City parking garage.

- East Basin – The East Basin sub-watershed includes areas from Parcels 1, 2, 3 and 4 along with the off-site areas that drain through the west ditch/channel to the Eastside Retention Basin.

- Eastside Channel – The East Side Channel sub-watershed includes areas from Parcels 1 and 2 and the off-site areas that drain to the Eastside Retention Basin via the existing Eastside Drainage Channel.

- Basin Direct – The Basin Direct sub-watershed includes areas that surface flow directly to the Eastside Retention Basin.

Within these sub-watersheds the drainage characteristics for each of the Parcels are as follows:

- Parcel 1 – The 49.6 acre Parcel 1 includes open space, a BMX facility, a landfill gas recovery facility, access roads, the Eastside Retention Basin, and City operated pump stations for sanitary sewer and stormwater. The existing surface cover consists of shrub land, gravel, pavement and open water. The surface water hydrology includes overland flow and piped conveyance with surface runoff tributary to the Eastside Retention Basin and Guadalupe River. The drainage areas and patterns are shown on Figure 3.

- Parcel 2 – The 60.9 acre Parcel 2 includes golf course open space, golf cart paths and access roads. The existing surface cover consists of golf course features (grass, sand traps, paved golf cart paths), shrub land, gravel and pavement. The surface water hydrology includes overland flow and piped conveyance systems with surface runoff tributary to the Eastside Retention Basin and Guadalupe River. The drainage areas and patterns are shown on Figure 4.

- Parcel 3 – The 34.9 acre Parcel 3 includes golf course open space, golf cart paths and access roads. Additional fill was placed over the landfill cover creating an elevated ridge within the center of the site. The existing surface cover consists of golf course features (grass, sand traps, paved golf cart paths), shrub land, gravel and pavement. The surface water hydrology includes overland flow and piped conveyance systems with surface runoff

tributary to the Eastside Retention Basin/Guadalupe River. There is an open depressed area along the toe of the southern slope of the landfill on Site 3 that collects surface water runoff from both Parcel 3 and Parcel 4. This area is utilized as a utility corridor for the City's recycled water and sanitary sewer systems. The drainage areas and patterns are shown on Figure 5.

- 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 existing surface cover consists of golf course features (grass, sand traps, paved golf cart paths), shrub land, open water ponds, gravel, paved areas and building structures. The northern portion of the 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 (located adjacent to Lafayette Street), the western portion of the site drains directly to the San Tomas Creek gravity outfalls and the southern portion of the site drains to the piped conveyance system in Stars and Stripes Drive. This storm drain system is tributary to the Golf Course Club House Pump Station. In addition, there is a lined open water pond located within Parcel 4. The drainage areas and patterns are shown on Figure 6.

- Parcel 5 – The 8.0 acre Parcel 5 includes parking lots and some open space areas. The existing surface cover consists of pavement and vegetated landscape. 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 Club House Pump Station. The drainage areas and patterns for Parcel 5 are provided in Table 1 and on Figure 7.

3.2 Existing Drainage System

The existing City owned and operated drainage system includes pump stations, retention basins, open drainage channels, underground conveyance piping and appurtenant drainage structures. The on-site drainage system is made up of an intricate corrugated poly-pipe network and inlet structures. The off-site drainage systems that convey the stormwater runoff from the Project to the discharge locations are shown on the City's Storm Drain System Maps included herein as Appendix A.

Parcel 1, 2, 3 and about 45% of Parcel 4 are tributary to the Guadalupe River. The stormwater runoff from these parcels is collected in the Eastside Retention Basin, which has a surface area of approximately 5.3 acres and had a 1972 design storage capacity (retention volume) of 30 acre/feet, and discharged to the Guadalupe River via the Eastside Pump Station. The basin also collects runoff from off-site areas to the south and west of the Site. The Basin and Pump Station are operated and maintained by the City. The remainder of Parcel 4 and Parcel 5 are tributary to the San Tomas Aquino Creek. The surface water runoff is discharged to the Creek via two existing gravity outfalls (12 inch diameter) and the Golf Course Club House Storm Drain Pump Station and outfall (30 inch diameter).

The Eastside Pump Station was originally constructed in 1973, was last upgraded in 2005 and has a design capacity of 50,000 gpm. There is approximately 524 acres of the City tributary to

this pump station, which includes about 180 acres (34% of watershed) from the Project. The City prepared a Hydrologic Investigation for the Eastside Pump Station Report in 2000. This Report concluded that the existing pumps had sufficient capacity to prevent the 100-year runoff from ponding in Lafayette. However, future pump upgrades were identified as a possibility under worst case scenario conditions.

The Eastside Drainage Channel was constructed in 1971. The City prepared an Initial Study in 2010 for the Eastside Retention Basin Drainage Swale Vegetation Clearing Project. The project proposed to clear vegetation within the drainage channel, desilt the Eastside Retention Basin, which had not been done since the late 1980's, and establish a recurring maintenance program for these drainage facilities. Reportedly, the construction project was not initiated.

The Golf Course Pump Station was originally constructed in 1987 and has a design capacity of 11,100 gpm. There is approximately 65.8 acres tributary to this pump station including about 43.6 acres from Parcel 4 (66% 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 parking garage. The system utilizes the depressed area on Parcel 4 within the golf course driving range for detention and includes submersible pumps and an outfall to the San Tomas Aquino Creek.

4.0 BASIS OF DESIGN

4.1 References

The following reports and standards are supplemental to the design requirements and were used in preliminary design. These documents should be used in the final design of the Project's storm drainage and stormwater management systems for temporary (during construction) and permanent conditions.

- Santa Clara Valley Urban Runoff Pollution Prevention Program Watersheds.
- Santa Clara Valley Water District Permit Application Requirements
- "Golf Course Pump Station – Pump Station Design Report" by City of Santa Clara / GHD, 2012.
- "Santa Clara Storm Drain Pump Station Evaluation" for City of Santa Clara by Schaaf & Wheeler, November 2010. (Appendix B)
- "Findings of Hydrologic Investigation for Eastside Pump Station" for City of Santa Clara by Schaaf & Wheeler, November 2000. (Appendix B)
- San Francisco Bay Board adopted Municipal Regional Stormwater NPDES Permit Order R2-2009-0074 NPDES Permit No. CAS612008 (Adopted 10-14-2009 and amended by Order No. R2-2011-0083 on 11-28-2011).
- C.3 Stormwater Handbook, Santa Clara Valley Urban Runoff Pollution Prevention Program, April 2012.
- Santa Clara County Drainage Manual, 2007.
- "Design Criteria for Improvements in Public Right-of-Ways and City Easements" City of Santa Clara, Public Works Department, September 17, 2014.
- "Standard Specifications for Public Works" City of Santa Clara, Public Works Department, latest edition.
- "Standard Details" City of Santa Clara, Public Works Department, latest edition.

- Sheets D94, D103, D104, D105, D113, D114, City of Santa Clara Storm Drain System Maps, City of Santa Clara, August 2014.

4.2 Applicable Codes and Regulations

The development is subject to federal, state, county and local municipality regulations. The regulations provide requirements for stormwater system design, stormwater quality and base flood elevation. The amended Clean Water Act of 1987 required stormwater discharges to be in compliance with a National Pollution Discharge Elimination System (NPDES) Permit. In California this permit is issued through the State Water Resources Control Board (SWRCB) which is made up of nine (9) Regional Water Quality Control Boards (RWQCB). The San Francisco Bay Board adopted Municipal Regional Stormwater NPDES Permit Order R2-2009-0074 NPDES Permit No. CAS612008 (Adopted 10-14-2009 and amended by Order No. R2-2011-0083 on 11-28-2011), aka the Bay Area Municipal Regional Stormwater Permit (MRP).

In Santa Clara County, the cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, the towns of Los Altos Hills and Los Gatos, the Santa Clara Valley Water District, and the County of Santa Clara (Co-permittees) have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP). These entities share a common permit to discharge stormwater to South San Francisco Bay with a mission to assist in the protection of beneficial uses of receiving waters by preventing pollutants generated from activities in urban service areas from entering runoff to the maximum extent practicable.

The Program's Permit Provision C.3 contains requirements for controlling the potential impacts of land development on stormwater quality and flow. In 2006, the C.3 requirements became effective for projects that create or replace 10,000 square feet or more of impervious surface. To meet the C.3 requirements, projects must include appropriate site design measures, pollutant source controls and treatment control measures. Projects that produce increases in runoff peak flows, volumes and durations that may cause erosion in downstream receiving water must also include hydromodification control measures. The SRVURPPP 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 MRP.

The Santa Clara Valley Water District (SCVWD) has jurisdiction over the San Tomas Aquino Creek and Guadalupe River, their existing levees and the conveyance of stormwater to these waterways. Since the existing levees adjacent to the Site are certified by FEMA, any impacts to or proposed modifications of the levee will require SCVWD review and approval, and may require a submission to FEMA for levee re-certification. Furthermore, the SCVWD requires that no increase to the 100-year peak flood elevation within these waterways is permissible without levee certification.

The Project will disturb one or more acres of soil and is required to obtain coverage under the General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit, 2009-0009-DWQ). Construction activity subject to this permit includes clearing, grading and disturbances to the ground (e.g., stockpiling or excavation). The

Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography (both before and after construction) and drainage patterns across the project. The SWPPP will list BMPs that will be used to protect stormwater runoff and the placement of those BMPs. In addition, the SWPPP will contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the Site discharges directly to a water body listed in the Clean Water Act Section 303(d) list for specific water bodies in California.

4.3 Design Requirements

The final design for the stormwater management and storm drainage system will meet the following criteria. Note that there are numerous non-standard design elements to address the landfill aspects of the project including settlement vaults, flexible connections, settlement slabs and utility corridors in refuse.

- The storm drain pipe system shall be designed to convey the 10-year event flow. The storm drain pipe system near storm drain pump stations, as determined by the Director of Public Works/City Engineer, shall be designed to convey the 100-year event flow.
- When a proposed development increases the storm discharge such that it will surcharge the existing storm drain system and/or breach the discharge capacity limit of the existing pump station, the developer shall upgrade/supplement the existing storm drain system and/or existing pump station to accommodate the proposed development.
- For runoff calculations, use the Rational Method of Design (Q = CIA).
- Use County of Santa Clara Standard Form DM-2 (see Exhibit "G") found in the Santa Clara County Drainage Manual 2007 for tabulating design calculation and pipe size selection. Submit completed form DM-2 and tributary area drainage map with improvement plans. Hydrology software providing similar inputs and outputs may be used, if accepted by the Director of Public Works/City Engineer.
- Pipe slope shall generally be parallel with the ground gradient of the drainage basin.
- Roughness coefficient (n) for Reinforced Concrete Pipe shall be 0.013.
- A drop in hydraulic grade line (HGL) shall be provided for head losses due to transitions such as bends, pipe size changes, grade changes, and at drainage structures (e.g., manholes).
- Curved storm drain conduit shall not be used except when written permission is obtained from the Director of Public Works/City Engineer.
- Full flow velocity shall not be less than 2 fps.
- Maximum flow velocity shall be 10 fps.
- Minimum size of conduit shall be 12-inch inside diameter.
- Storm conduit generally shall be located 5 feet from the street centerline on the side opposite the sanitary sewer.
- Pipe material shall be reinforced concrete pipe with minimum strength of Class III (1350- D). Pipe shall be Class V in areas of high electrolysis (e.g., north of Highway 101). *Note that the Project will likely propose the use HDPE pipe over landfill areas within the Parcels and may request use of HDPE pipe within designated City right-of-way over landfill areas.*

- Minimum cover over pipe shall be 2 feet to street subgrade for mains, and 2 feet to lip of gutter for catch basin laterals.
- In general, storm drain main lines should be designed such that all other parallel facilities have at least an eight-foot clear distance separation. Pipelines that have large diameters or are deeper/shallower in elevation may require greater separation from other facilities as determined by the Director of Public Works/City Engineer.
- Drainage structures (e.g., manholes) shall be located at the following points:
    - Changes in direction, slope and size;
    - Intersections of mains and laterals (unless a concrete lug connection is permitted by the Director of Public Works/City Engineer as shown in the City Standard Details);
    - Changes in pipe material; and
    - A nominal spacing of 450 feet with a maximum spacing of 500 feet.
    - The Standard Manhole (as shown in the City Standard Details) is applicable in most cases where a drainage structure is required. However, the drainage structure shall be individually designed for any of the following conditions:
        - Through mains larger than 39 inch with less than a 5 degree change in alignment;
        - 27 inch or larger through mains with a 5 degree or larger change in alignment;
        - Side mains larger than 24 inch; and
        - Other special conditions as identified by the Director of Public Works/City Engineer.
    - Street pickup points shall not exceed 1,000-foot intervals. Use City standard curb inlet catch basins; or Type "A" catch basins, with approval of the Director of Public Works/City Engineer.
    - Maximum depth of City standard catch basins shall be eight feet. Deeper inlet structures require individual designs and approval by the Director of Public Works/City Engineer.
    - Backflow protection devices shall be provided whenever the pipe system discharges into a flood control channel in which the 100-year event water surface elevation is higher than the lowest natural ground elevation of the drainage basin. Whenever this occurs, an overflow release protection system, such as culvert, channel, or drainage swale, shall be provided for the ultimate delivery of water to a flood control facility.
    - A backflow preventive device shall be provided for on-site storm drain laterals when an on-site elevation of a pick-up point is more than 6 inches below the lowest top of curb on the fronting street(s). The backflow device shall be located in a private structure outside the street right-of-way and maintained by the property owner.
    - Private property connections to the City storm system shall be first authorized by proper permits and then connected to the City's storm drain system either directly at an existing or new manhole or to the back of an existing catch basin or, if no storm drain exists, by means of curb face drainage, if permitted by the Director of Public Works/City Engineer.
    - Force main delivery from on-site pump systems shall not flow directly through curb face, or into City storm drain system.
    - Cross connections between the sanitary sewer system and the storm drainage system are prohibited.
    - Storm drain lines shall be constructed by new development or redevelopment up to the property and include capacity for the upstream watershed area.
    - Storm drain lines shall be constructed downstream to a point of adequate discharge.

- Pipe stubs with plugs shall be provided at points of known future extensions.
- Outfalls and work within the Santa Clara Valley Water District (SCVWD) right-of-way are subject to approval and issuance of permits by the SCVWD.
- Maximum water surface elevation in the Eastside Retention Basin shall be el. 5.0 NAVD88 as determined in the final Stormwater Management Report for the Project.
- Bridge crossings over the San Tomas Aquino Creek must maintain a freeboard over the 100-year flood elevation as recently advised during a preliminary application meeting with SCVWD. This freeboard clearance will be discussed further with SCVWD as part of the Encroachment Permit application review and approval process.
- Hydraulic grade analysis for design of new outfall and pipeline shall take into consideration the 10-year and 100-year storm event water surface elevations of the receiving river or creek.
- SCVWD requires that there be no increase in the 100-year flood elevation within the San Tomas Aquino Creek or Guadalupe River resulting from the Project.

5.0 ANALYSIS

5.1 Methodology

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 tributary to the San Tomas Aquino Creek and Guadalupe River for the 10-year and 100-year events. In a highly urbanized area with relatively small watersheds with largely impervious areas this method has a long history of usefulness for peak flow estimation and stormwater runoff conveyance design. The Rational Method is generally considered acceptable to determine peak design discharges for small urban catchments for tributary areas less than or equal to 200 acres. The Rational Method is defined as Q=CiA, where:

- Q = peak flow rate (cfs)
- C = weighted runoff coefficient
- i = design rainfall intensity (inches per hour) for a specific time of concentration (Tc)
- A = drainage area (acres)

The Unit Hydrograph Method, as prescribed in the Santa Clara County Drainage Manual, was used to estimate peak discharges for the combined on-site and off-site areas tributary to the Eastside Retention Basin, Pump Station and Guadalupe River.

Utilizing the Autodesk Hydraflow Storm Sewers computer application, the sections of the existing City storm drain pipe network and the proposed on-site storm drain pipe networks were modeled. The computer application Hydrologic Modeling System (HEC HMS) was utilized to model the entire 524 acre watershed tributary to the Eastside Retention Basin and estimate a peak runoff rate for the 100-year storm event. The rainfall data and other pertinent hydrologic information are included as Appendix C. The existing and proposed tributary areas are shown on Figures 2 through 8.

The computer application HEC-RAS – Hydrologic Engineering Centers River Analysis System was used to evaluate the water surface impacts to the existing San Tomas Aquino Creek,

Guadalupe River and Eastside Drainage Channel. The existing HEC-RAS model for the San Tomas Aquino Creek and Guadalupe River was provided by the SCVWD.

The hydrologic characteristics of the existing and proposed sub-watershed areas were estimated using the watershed criteria defined in the Santa Clara County Drainage Manual, provided in past report and based on visual observation. The following Table 2 indicates the runoff coefficients (C) for the Rational Method and Curve Numbers (CN) Antecedent Moisture Condition II-1/2 (AMC II-1/2) for the Unit Hydrograph Method used in the preliminary analysis. The final runoff coefficients will be determined as part of the final Hydrologic and Hydraulic Study and Stormwater Management Report for the Project).

Table 2
Runoff Coefficients

Land-Use	**C (Rational Method)**	**CN (AMC II-1/2) (Unit Hydrograph)**
Residential (low-density)	0.45	92
Commercial	0.80	96
Golf Course/Landfill	0.75	86
Pavement	0.85	98
Urban Open Space	0.45	91

5.2 Evaluation

The points-of-discharge for the four sub-watersheds were modeled (using the Rational Method) and evaluated during the 10-year and 100-year storm events, and the peak flows were estimated for the existing (pre-development) and proposed (post-development) conditions assuming no on-site stormwater attenuation. The following Table 3 and Table 4 present the preliminary results.

Table 3
Area Summary

Parcel	Size (Acres)	Existing Impervious / Pervious		Proposed Impervious / Pervious	
		Acres	% of Site	Acres	% of Site
1	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%	1.0 / 33.9	2.7% / 97.3%
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%
Totals	240.0	25.3 / 214.7	10.5% / 89.5%	110.8 / 129.2	46.2% / 53.8%

Table 4
Peak Flow Summary (by Sub-Watershed)

Sub - Watershed	10-year Peak Flow		100-year Peak Flow	
	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)
San Tomas	78.3	54.2	124.2	88.5
East Basin	168.5	111.1	288.8	161.7
Eastside Channel	68.0	82.8	117.5	143.1
Basin Direct	9.7	11.9	13.1	16.1

The proposed peak flow estimates do not take into account any on-site stormwater management or treatment. The flows are only provided for comparison between the existing and proposed conditions based on the current preliminary level of design. The goal for the final stormwater management design will be to maintain the reduction in proposed peak flows to existing peak flows, or lower, through the incorporation of sustainable stormwater measures as further discussed herein Section 6.0.

The Project is exempt from the SCVURPPP Permit Provision C.3.f.i (Hydromodification Control Requirements) since the Site is beyond the hydromodification zone limits. All points-of-discharge drain to sections of the Guadalupe River and San Tomas Aquino Creek identified with hardened channels or in tidal areas. The HMP Applicability Map for the City of Santa Clara is provided as Appendix D. As such, there are no restrictions on the timing, peak discharge and volume of runoff from the Site resulting from the development of the Project. However, the SCVWD requires that the 100-year flood water surface elevation within their jurisdictional waterways cannot be increased unless FEMA approval is obtained.

The preliminary evaluation included assessing the hydraulic impacts of the Project on the downstream "receiving waterways" including the Golf Course Storm Drain Pump Station, San Tomas Aquino Creek, Eastside Drainage Channel, Eastside Retention Basin, Eastside Storm Drain Pump Station, existing storm drains serving Parcel 3 and the Guadalupe River. The model also included additional upstream information included in the previous studies prepared for the City. The preliminary analysis indicated that there is sufficient capacity within these off-site waterways to convey the peak stormwater runoff for the Project. Minor improvements to accommodate the Project may be required depending on the final design of the stormwater management systems.

The following summarizes the results of the preliminary hydrologic and hydraulic evaluation at each point-of-discharge. The preliminary calculations are provided in Appendix G.

1. San Tomas Aquino Direct – The existing 100-year peak flow in the San Tomas Aquino Creek is approximately 7,100 cfs within the reach adjacent to Parcel 4. The corresponding 100-year peak water surface elevation is el. 19.39 at the Great American Parkway Crossing and el. 21.16 at Tasman Drive. Based on the preliminary estimates, the peak flow from the 100-year storm event to the San Tomas Aquino Creek will be reduced. The SCVWD will need to review the final development design and calculations as part of the required Encroachment Permit and verify that the 100-year water surface elevation within the Creek will not be impacted.

2. Golf Course Pump Station – The reported capacity of the existing Golf Course Pump Station is 11,100 gpm (24.7 cfs). The 2012 Design Report 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 assumed the utilization of the Parcel 4 golf course driving range for detention. The report also identified a series of pump station improvements as the facility has surpassed its 25 year maintenance/replacement interval. The City report is included as Appendix E and the proposed improvements are on Page 4. Plans and specifications were previously prepared for the proposed improvements.

   Preliminarily, the Golf Course Pump Station can be abandoned and the existing outfall abandoned or re-used. 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 Tasman Drive (south side) may need to be routed to the existing Stars and Stripes Drive drainage system south of Tasman Drive.

3. 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 ft from Tasman Drive to the Eastside Retention Basin terminating at a 64 inch by 43 inch arch culvert under an existing basin access roadway. The City prepared an Initial Study in 2010 to clear vegetation from the

drainage channel to restore its conveyance capacity. Reportedly, the construction project was not initiated.

The Project will connect to the existing channel via a series of new outfalls from Parcel 1 and 2. The design conveyance capacity within the drainage channel is approximately 250 cfs (assuming a 5 ft flow depth) and the capacity of the culvert (inlet controlled) is approximately 210 cfs without overtopping the roadway. We visually assessed the conditions within the channel, and have reduced its available conveyance capacity to approximately 65 cfs (75% reduction) as there is significant vegetation and silt within the entire length of the channel. The channel should be cleared of vegetation in order to safely convey the peak flows from 100-year storm event for existing and proposed conditions. These flows are estimated to be 177.2 cfs and 204.0 cfs, respectively, and can be safely conveyed by the existing channel once cleared.

4. Eastside Retention Basin and Pump Station – The Eastside Retention Basin and Pump Station has a reported pumping capacity of 50,000 gpm (111.4 cfs) and had a reported 1972 design storage capacity (retention volume) of 30 acre-feet. The Hydrologic Evaluation for the Eastside Pump Station Report prepared in 2000 indicated that Basin retention volume was originally 37 acre-feet and was expanded to 45 acre-feet in 1978. The volume was further estimated to be 54 acre-feet up to el. 6.7 NAVD88 by overtopping of the embankment and utilizing the broad, flat area bound by Route 237. This Report concluded that the existing pumps had sufficient capacity to prevent the 100-year local runoff from ponding in Lafayette Street, which would occur at el. 7.7 NAVD88, assuming a Guadalupe River tailwater elevation of el. 20.7 NAVD88. The Eastside Retention Basin storage capacity was slightly reduced in 1992 when Highway 237 was widened. Some of the pumping equipment was reportedly replaced in 2005, and the City's 2010 evaluation indicated that some of the equipment should be considered for replacement in 2023. The City prepared an Initial Study in 2010 to desilt the East Drainage Basin to restore its 45 acre-feet storage capacity within the Basin itself.

   We performed a bathymetric survey of the Basin (see Figure 33) and estimated the available storage capacity, up to el. 5.7 NAVD88, to be 51.6 acre-feet. The 524 acre watershed tributary to the Basin was modeled in HEC-HMS utilizing the information provided in previous evaluations and the Santa Clara County Drainage Manual. Since the evaluation performed in 2000, the SCVWD has estimated the 100-year water surface elevation in the Guadalupe River at Route 237 to be el. 19.0 NAVD88. Utilizing additional stage-storage and pump on-off information from the 2000 Hydrologic Evaluation the basin was modeled assuming a static water level of el. -0.3 NAVD88, which is the lowest elevation that a pump is set to turn on. The preliminary results indicate there is sufficient storage and pumping capacity within the current system (assuming existing conditions) to safely convey the post-development peak runoff from the 100-year storm. The peak elevation in the Basin is el. 5.14 NAVD88 for existing conditions and el. 5.25 NAVD88 for proposed conditions (based on current concept design).

There is also a west ditch that conveys stormwater to the Basin from existing storm drains in Lafayette Street and Great America Way. Depending on the final configuration of the on-site stormwater management and drainage system for Parcel 3, improvements to the ditch and some of the City storm drain system through the existing commercial property to the north may be required. However, other options for Parcel 3 drainage including the use of the drainage channel between Parcel 3 and 4 and of the existing City storm drain system within the existing commercial property to the west will be evaluated.

6.0 PROPOSED SYSTEM

6.1 Storm Drainage System

The storm drainage system for the Project will be an underground gravity network of pipes, catch basin, manholes, water quality treatment measures and other appurtenances. The building drainage will be via internal systems piped directly to the storm drains. For final design, the public underground piped storm drain conveyance system will be capable of conveying the 10-year peak runoff as well as safely convey the 100-year event peak flows from the Site via a combination of the piped system and surface conveyance. Public streets shall be designed such that the 100-yearevent flow remains within the roadway limits and not extend into private property.

The stormwater runoff from Parcel 4 and Parcel 5 will discharge to the San Tomas Aquino Creek via three new stormwater outfalls. The invert of the outfalls will be set above the bottom of the Creek at a final elevation to be coordinated with the SCVWD to ensure the location is above sediment levels within the Creek. As indicated, the Golf Course Pump Station will likely be abandoned and removed.

The stormwater runoff from Parcels 1, 2 and 3 will discharge to the Eastside Retention Basin and be pumped to the Guadalupe River via the existing Eastside Pump Station. From Parcels 1 and 2 there will be multiple new outfalls from the Site to the existing Eastside Drainage Channel. From Parcel 3, the existing drainage infrastructure located north of the Parcel and west of the railroad will be utilized. The preliminary storm drain design is provided on Figures 9 through 21 and Drawings CSD-2.01 through CSD-2.04.

As previously stated, the goal for the final stormwater management design will be to reduce the proposed peak flows to existing peak flow levels through the incorporation of sustainable stormwater measures. During final design, the extent of the stormwater management measures (such as LID stormwater treatment, harvesting and re-use) within the Project will be determined, and the potential off-site improvements will need to be further studied.

The non-standard design elements that are incorporated into the preliminary design of the storm drain system to address the landfill issues for the Project include interstitial spaces, structural slabs, settlement vaults/flexible connections, special utility trenching for landfill cap disruption and refuse handling and considerations for methane gas. Typical utility/roadway corridor sections have been prepared for several variations of roadways, streetscape amenities and the multiple utilities that will be located within each street (sewer, storm drain,

domestic/fire water, recycled water, gas, joint trench, automated waste collection, landfill gas extraction system). The following briefly discusses some of the non-standard elements that will be incorporated into the final design of the system and preliminary details are provided as Figures 22 through 32.

- Interstitial Spaces – Beneath the buildings within the City Center portion of the Project and other select office buildings there will be an interstitial space. The current design assumes a 4-ft to 5-ft high interstitial space, which will allow the storm drain lateral, as well as other building utilities, to be accessible from within the building first floor space without disrupting the landfill systems. The storm drains will need to be supported within the interstitial space and transition to the laterals at the perimeter of the buildings.

- Settlement Vaults/Flexible Connections – At locations where differential settlement is expected settlement vaults and/or flexible connections will be included in the design. Specific for storm drains, these vaults, which will be direct buried concrete structures, will either enclose a flexible connection (such as a Flex-Tend device) or be located adjacent to a building structure to allow for a piped configuration within the vault to settle. There are two conditions that will be addressed; 1) transition from structure to direct bury support over refuse, and 2) transition from direct bury to direct bury over refuse. The locations of the settlement vaults based on the preliminary storm drainage design are included on the plans.

- Structural Slabs – Within City Center the majority of the storm drain system will be constructed on a structural slab supported on deep foundations. The approximate limits of the structural slabs within the City Center portion of the Project are provided on the Drawings. The structural slabs will support the roadways between the proposed City Center buildings and have been designed to minimize disruption to the landfill cap and refuse. The storm drains are currently designed as a gravity system, which has a direct impact on the depth of the structural slab relative to street grade. The Storm Drain Plans identify the areas where the deeper slabs, as set by the gravity storm drain (and sewer), may impact the landfill cover and refuse. The slabs should extend to the limits of the refuse to allow for a smooth transition within the settlement vaults.

- Utility Trenching for Landfill Cap Disruption – As the gravity storm drain (and sanitary sewer) systems get deeper, there are instances where, based on our current information, the landfill cap will be disrupted by the utility trench and refuse will need to be removed. The Storm Drain Plans preliminarily identify these areas and details showing the preliminary trenching are provided.

6.2 Stormwater Management and Treatment

As required by the Bay Area Municipal Regional Stormwater Permit (MRP), post-construction stormwater controls will be required for the Project. A combination of site design measures, source control measures and stormwater treatment will be designed and implemented. The site design and source control measures will be addressed as part of the planning and operation of the development. The stormwater treatment measures are engineered systems

designed to remove pollutants from stormwater using filtration, infiltration and sedimentation. Since infiltration is not feasible due to the landfill, the stormwater treatment measures will need to rely on measures designed and built into the structure of the development.

For hydraulic sizing purposes, the measures are either volume-based, flow-based or combination volume/flow based. Typically, volume-based design includes the computation of a water quality design volume, while a flow-based design uses rainfall intensity (0.2 inches per hours). In either case, the measures include an overflow to safely convey the more intense less frequent rainfall events. The following stormwater treatment measures 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
- Rainwater Harvesting and Reuse
- Green Roofs
- Green Streets (with bioretention, impermeable liner and underdrain)
- Pervious Pavements (impermeable liner with underdrain – no infiltration into landfill)

A minimum of 4% of the site area will need to be used for the stormwater treatment measures. As part of final design, these treatment measures for the Site will be incorporated into the aesthetics of the landscape. Some attenuation of the peak flows can be recognized depending on the measures selected.

The stormwater management and treatment features for each parcel will be modeled during final design including buildings, parking garages, site, landscape, etc. Dynamic modeling, such as the EPA Storm Water Management Model (SWMM), will be used. SWMM tracks the quantity and quality of runoff generated within each subcatchment, and the flow rate, flow depth, and quality of water in each pipe and channel during a simulation period comprised of multiple time steps. The results of the modeling will 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. The preliminary design for the on-site stormwater management is provided on Drawings CT2.01 through CT2.04.

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

7.0 PHASING

The current Project planning includes a phasing strategy for the full development of the five parcels in seven phases. Parcels 4 and 5, the location of City Center, would be developed in the first four phases. Parcel 3 may be developed as a City Park in Phase 2a, Parcel 1 would be developed in Phase 5 and Parcel 2 in Phases 6 and 7. Based on this current phasing the following Stormwater Phasing Matrix provides details and quantities for the various

components of the stormwater management system for the Project. The matrix has also captured the potential off-site storm drain related improvements that may be required depending on the on-site stormwater management implemented into the Project. The matrix can be adjusted as the design is developed and phasing is modified such that costs can be properly allocated.

STORMWATER PHASING MATRIX								
Phase / Parcel	**Gross Sq. Footage**	**Storm Pipe (LF)**	**Manholes (#)**	**Catch Basins (#)**	**Laterals (LF)**	**Settlement Vaults (#)**	**Refuse Trenching (CY) Note 2**	**Off-Site Improvements**
1 / 5	873,000	526 - 12″ 856 - 18″ 286 - 24″ 176 - 30″ 300 - 36″ 1,231 - 42″	14	28	-	-	-	Abandon Golf Course Pump Station Outfall to San Tomas Creek - sized for future phases
2 / 4	2,701,250	256 - 15″ 2,587 - 18″ 1,808 - 24″ 796 - 30″ 1,922 - 36″ 217 - 42″ 418 - 48″ 476 - 54″	40	80	244 - 15″ 684 - 18″	6	4,000	Outfalls to San Tomas Aquino Creek (3) sized for future phases
3 / 4	757,750	-	2	4	372 - 18″	11	-	-
4 / 4	800,000	622 - 18″	3	6	-	7	-	-
5 / 1	1,200,000	1,809 - 18″ 374 - 24″ 1,408 —36″	18	36	-	8	9,000	Eastside Drainage Channel , Retention Basin and Pump Station – See Note 1
6 / 2	1,080,000	1,,436 - 18″ 1,108 - 24″ 1,033 - 36″ 276 - 42″	13	26	-	6	2,500	Eastside Drainage Channel , Retention Basin and Pump Station – See Note 1
7 \2	1,080,000	1,732 - 18″ 493 - 36″	8	16	-	6	4,500	Eastside Drainage Channel , Retention Basin and Pump Station – See Note 1

Notes:
1. The clearing of the Eastside Drainage Channel and Eastside Pump Station upgrades (approximate cost of $1,260,000 in 2010) and Basin improvements (approximate cost of $250,000) may be required by the City (possibly in Phases 5, 6, 7 or 8).
2. Refuse Trenching for structural slab include average width of 20-ft and depth of 5-ft.

APPENDIX C
Water Technical Memorandum

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DRAWINGS

APPENDICES

1.0 INTRODUCTION

The purpose of this Water Technical Memorandum (the "Memo") is to assist Related Santa Clara, LLC in the preliminary design of the City Place Santa Clara Development (the "Project") and to provide updated information for preliminary cost estimating. The Memo documents the existing domestic and recycled water systems, water design criteria and proposed water infrastructure. It also provides information about the water supply and addresses the non-standard landfill design elements for the Project.

2.0 PROJECT DESCRIPTION

2.1 Site Description

The overall site (the "Site") for the Project is the former Santa Clara All Purpose Landfill and two additional sites (see Figure 1). The subject property includes five parcels: Parcel 1, Parcel 2, Parcel 3, Parcel 4 and Parcel 5 totaling approximately 240 acres. The landfill is no longer active and the Final Closure and Post-Closure Maintenance Plan was approved in December 1992 and amended multiple times, most recently in December 2013. The site boundaries include Lafayette Street, Great America Parkway, Tasman Drive and the Guadalupe River and the San Tomas Aquino Creek.

The site is proximate to a significant amount of existing infrastructure. The City owned and operated systems include sanitary sewer, stormwater drainage, water (domestic and fire) and landfill operation systems (gas extraction, leachate collection and monitoring) within and adjacent to the site. Utility providers and infrastructure owners include South Bay Water Recycling, Silicon Valley Power (SVP), Comcast, AT&T, Santa Clara Valley Water District (SCVWD), Pacific Gas & Electric (PG&E), Union Pacific Rail Road (UPRR) and Valley Transportation Authority (VTA).

2.2 Planned Development

The planned development currently envisioned includes office, hotel, mixed-used retail, restaurant, entertainment, residential and parking structures with significant site improvements. The approvals for the Project include a zoning change to Planned Development –Master Community ("PD-MC") from the "B" zoning district and the ((Public, Quasi-Public and Public Park or Recreation) for Parcels 1 through 4 and from the "CP" (Commercial Park) zoning district in Parcel 5 is zoned "CP". MCP authorizes up to 9,164,400 gross square feet (gsf) with associated parking and site improvements. The current breakdown by site is as follows:

Table 1
Current Development Program

Parcel	Area (acres)	Potential Development Area (gsf)
1	49.6	1,440,000
2	60.9	2,592,000
3	34.9	0
4	86.6	4,259,400
5	8.0	873,000

3.0 EXISTING CONDITIONS

3.1 Existing Water Usage

The City of Santa Clara Water and Sewer Utility estimates that the existing Santa Clara Golf and Tennis Club located on the Site uses approximately 38,000 gpd of potable water and 238,000 gpd of recycled water for a total water usage of 276,000 gpd.

3.2 Existing Water Supply

The water system in the City of Santa Clara is operated and maintained by the City of Santa Clara Water and Sewer Utility. This system is supplied with potable water from three main sources; the Santa Clara Valley Water District (the "SCVWD"), the San Francisco Public Utility Commission (the "SFPUC Hetch Hetchy"), and 27 groundwater wells operated by the Water and Sewer Utility. The potable water supply is augmented with recycled water from South Bay Water Recycling. This recycled water is not permitted for potable use, but it can be used for irrigation, toilet flushing and approved industrial uses.

3.3 Existing Domestic Water System

The existing domestic water system near the Site is provided on the City of Santa Clara Water Base Maps W 93, 94, 95, 103, 104, 105, 113 and 114 included in this memo as Appendix A. There is a network of water mains around all four sides of Parcel 3, Parcel 4 and Parcel 5. This network is also located along the west and south sides of the Parcel 1 and Parcel 2.

Domestic water is conveyed to the Site from the 16 inch ductile iron main. This main connects to a 12 inch asbestos cement main in Tasman Drive, which travels both east and west. To the east, the water main in Tasman Drive intersects a 12 inch plastic main in Centennial Boulevard. The Centennial main travels north to an intersection with the 12 inch plastic main in Stars and Stripes Drive. The water main in Stars and Stripes Drive services the Santa Clara Golf and Tennis Club on the south boundary of Parcel 4. It also follows Stars and Stripes to the east and then turns south. After Stars and Stripes Drive passes beneath Tasman Drive, the domestic water main is connected by an encased 12 inch pipe beneath the UPRR right-of-way to the 12 inch asbestos cement main in Lafayette Street. The main in Lafayette Street travels north to an offshoot 12 inch asbestos cement loop that follows Calle de Luna and Calle del Mundo before returning to Lafayette Street. The Lafayette main then continues north approximately 2,400 feet (ft). At this point a 12 inch asbestos cement pipe branches to the west beneath the UPRR

right of way and terminates near the northern boundary of Parcel 3. The main in Lafayette also reduces size to an 8 inch asbestos cement pipe and continues north until it intersects a 12 inch plastic pipe located at the intersection of Lafayette Street and Great America Way. A 2 inch water service is located along the north side of Parcel 1 to the East Side Retention Basin Pump Station.

From the intersection of Lafayette Street and Great America Way, a 12 inch plastic main travels west along Great America Way until it intersects an 8 inch asbestos cement main in Great America Parkway. This main travels south approximately 900-ft, where it passes a reducer to connect to a 12-inch asbestos cement main. The 12-inch main in Great America Parkway travels south, passes a loop serving the Santa Clara Convention Center, and continues until it meets the 12-inch main in Tasman Drive, completing the loop around Parcel 3 and Parcel 4.

The City reported a current pressure in the existing public water mains around the site of 80 pounds per square inch (psi). The 28 April 2015 letter from the City is included in Appendix B.

3.4 Existing Recycled Water Distribution

The existing recycled water distribution system near the Site is provided on the City of Santa Clara Water Base Maps RCW 93, 94, 95, 103, 104, 105, 114 and 115 included in this memo as Appendix A. There is a network of recycled water mains along the north, east and west sides of Parcel 1, the east and south side of Parcel 2, and between Parcel 3 and Parcel 4.

Recycled water is supplied to the Site from the South Bay Water Recycling Program. It is conveyed from the plant to the northeast corner of Parcel 1 by a 16 inch plastic pipe. This pipe travels beneath State Route 237 then crosses the Guadalupe River. On the west bank of the Guadalupe River the recycled water main splits. One 12 inch Yelomine (plastic) pipe is located along the east side of Parcel 1 and Parcel 2 until it reaches Tasman Drive. It then turns west and mixes with a 30 inch steel recycled water main located along Tasman Drive before crossing this main and continuing in Lick Mill Road. The second branch of the recycled water system is a 16 inch plastic main along the north side of Parcel 1. At Lafayette it turns to the south and travels approximately 1,500 ft, passing through a reducer to become a 12 inch plastic pipe. At the boundary between Parcel 3 and Parcel 4 the main turns west and travels through a 30 ft wide Recycled Water and Sanitary Sewer easement to Great America Parkway. At Great America Parkway, the main turns north before continuing west along Old Mountain View – Alviso Road. The City of Santa Clara Water Utility estimates pressure in the recycled water system to be between 80 and 90 psi in the vicinity of the Site.

4.0 BASIS OF DESIGN

4.1 References

The following reports and standards are supplemental to the design requirements and were used in preliminary design as provided herein. These documents should be used in the final design of the Project's water system for temporary (during construction) and permanent conditions.

- "City of Santa Clara Council/Staff Work Study Session – Centennial Gateway & Santa Clara City Place" November 20, 2013.
- "Design Criteria for Improvements in Public Right-of-Ways and City Easements" City of Santa Clara, Public Works Department, September 17, 2014.
- "Standard Specifications for Public Works" City of Santa Clara, Public Works Department, latest edition.
- "Standard Details" City of Santa Clara, Public Works Department, latest edition.
- "Standard Details" City of Santa Clara, Water and Sewer Utility Department
- "Santa Clara City Code Chapter 13.15."
- "Santa Clara City Code Chapter 15.35."
- Sheets W93, W94, W95, W103, W104, W105, W113, W114, City of Santa Clara Water Distribution System Map, City of Santa Clara, July 2012.
- Sheets RCW93, RCW94, RCW103,RCW104, RCW105, RCW113, RCW114, RCW115 City of Santa Clara Recycled Water System Map, City of Santa Clara, July 2012.
- "California Regulations Related to Drinking Water", California Department of Public Health, July 1, 2014.
- "California Regulations Related to Recycled Water", California Department of Public Health, June 18, 2014.
- "California Fire Code 2013 - California Code of Regulations, Title 24, Part 9"

4.2 Applicable Codes and Regulations

The development is subject to federal, state, county and local municipality regulations. The regulations provide requirements for domestic water system design and potable water quality. The applicable codes and regulations include, but are not limited to, the USEPA Safe Drinking Water Act, the California Health and Safety Code, California Code of Regulations Title 17, California Code of Regulations Title 22, the California Fire Code 2013, the Uniform Plumbing Code 2012, Santa Clara City Code Chapter 13.15, and Santa Clara City Code Chapter 15.35.

4.3 Design Requirements

The final design for the domestic water system will meet the following criteria. Note that there are numerous non-standard design elements to address the landfill aspects of the project including settlement vaults, flexible connections, and settlement slabs.

- Materials and installation must comply with the standards of the American Water Works Association. Depth Requirements (PVC/DIP only):
    - The typical depth of new potable and recycled water mains from top of near side curb (or finished grade for non-standard or non-street locations) to invert of the pipe:
        - 4-inch pipe - 3.50 ft
        - 6-inch pipe - 3.70 ft
        - 8-inch pipe - 4.10 ft
        - 10-inch pipe - 4.50 ft
        - 12-inch pipe - 5.00 ft
        - Pipe over 12-inches - top of pipe at 4 feet below finished grade
    - A minimum cover of 3 ft from finished grade to top of pipe.

  - A minimum cover of 2 ft from scarified sub-grade to top of pipe during construction.
  - For horizontal alignment, the centerline of the potable/recycled water main shall be located seven feet from face of curb into the street. Other situations should be reviewed with the Water and Sewer Utilities Department prior to beginning of design.
- Minimum Horizontal Clearance Requirements:
  - From potable water mains, services and facilities:*
    - To all sanitary sewer mains, manholes, and laterals - 10 ft
    - To all recycled water mains, services, and facilities - 10 ft
    - To all trees - 10 ft**
    - To other utilities and general conflicts - 5 ft

      *If either pipes are 12 inches diameter or smaller, the clearance dimension noted above shall be measured from center to center of the pipes. If either pipe is larger than 12 inch diameter, clearance shall be the clear distance between the edges of the pipes.

      **A note shall be placed on the landscape drawings to indicate that there is a 10 ft clearance requirement from trees and public water, recycled water and sewer facilities (i.e., mains, FH's, WM's, sewer manholes, C/O's, etc.) unless City-approved Tree Root Barriers (TRB) are utilized. TRB's must be 5 ft from the public facility. The TRB's must be shown on the plans and the TRB criteria must be included on the plans.
  - Provide a minimum of 12 inches of clearance around water meter boxes from any above-ground structures such as mail boxes, or fences.
- Minimum Vertical Clearance Requirement:
  - Vertical clearance when crossing typical conflicts shall be 12 inches minimum from outside of pipe to outside of pipe (or conduit). For crossings with less than 12 inches clearance, a concrete saddle shall be installed. Vertical separation is required only when the horizontal distance between a water main and pipeline is less than ten feet.
- Other Miscellaneous Requirements:
  - To clear conflicts, the pipe should be gradually deflected up or down sufficiently in advance to cross with the proper clearance without using fittings. In cases where this is not possible standard fittings shall be used.
  - Use air release valves at locations where the peak of the deflected pipe is more than one pipe diameter above the general elevation of the main. Air release valve cabinets shall be located in landscaped or non-paved areas behind the sidewalk at the nearest most convenient location.
  - Main line gate valves should be installed at tees for branching mains, large services, and fire hydrants, and at approximately:
    - After every three major connections to the water system (i.e. water services greater than three inches, fire services, and fire hydrants).
    - After every two fire hydrants with no other services.
- Fire hydrants are general placed at 300 to 350 ft intervals on the same side of the street as the main. Typically, fire hydrant locations are at (or near) the returns of street intersections, seven feet minimum from driveways, on property lines between

properties, etc. The Fire Department requires three feet of clearance around all fire hydrants.

- Any utilities crossing the public main are required to cross at or near 90 degrees.
- Water meters shall be located in landscaped or non-paved areas with a minimum of 12 inches clearance from above-ground structures such as mailbox posts of fences on all sides of the meter box. They shall be located in front of the property to be served.
- Cooling towers require a separate water meter (credit for evaporation will only be provided if a separate meter is installed).
- Provide minimum five feet clearance around all above-grade water utilities and water services over 2 inches. Include bollards as needed to protect the utilities.

5.0 PROPOSED SYSTEM

5.1 Proposed Water Demand

For preliminary design purposes, the estimated water demand for the Project in gallons per day (gpd) estimated at approximately 105% of the average dry weather flow wastewater generation as provided in the Sanitary Sewer Technical Memorandum for City Place Santa Clara is provided in Table 2.

Table 2
Water Demand

Phase 1 - Parcel 5 **8.0 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Residential	200,000	36,960
Retail - Inline Retail	62,000	4,948
Retail - Food and Beverage	25,000	27,300
Office	306,000	44,982
Hotel	280,000	141,120
	Total	**255,310**

Phase 2 – Parcel 4 **52.2 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Residential	865,000	159,240
Retail - Anchor	267,250	20,485
Retail - Inline Retail	580,000	46,284
Retail - Food and Beverage	205,000	223,860
Retail - Entertainment	190,000	95,760
Office	296,000	43,512
Hotel	298,000	150,192
	Total	**739,945**

Phase 3 - Parcel 4 **18.5 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Residential	615,000	113,652
Retail - Inline Retail	60,000	4,788
Retail - Food and Beverage	20,000	21,840
Retail - Anchor	62,750	4,810
	Total	**145,090**

Phase 4 - Parcel 4 **15.9 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Retail - Inline Retail	30,000	2,394
Office	770,000	113,190
	Total	**115,584**

Phase 5 - Parcel 1 **49.6 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Office	1,440,000	211,680
	Total	**211,680**

Phase 6 - Parcel 2 **25.7 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Office	1,296,000	190,512
	Total	**190,512**

Phase 7 - Parcel 2 **35.2 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Office	1,296,000	190,512
	Total	**190,512**

Total By Parcel **240 Acres**

Building Type	Gross Sq. Footage	Water Demand (gpd)
Parcel 1	1,440,000	211,680
Parcel 2	2,592,000	381,024
Parcel 3	0	0
Parcel 4	4,259,400	1,000,619
Parcel 5	873,000	255,310
Totals	**9,164,400**	**1,836,591**

5.2 Proposed Water Supply

As part of the Environmental Impact Report for the Project, the City of Santa Clara Water and Sewer Utility prepared a Water Supply Assessment (WSA) to assess the availability of water to serve the Project. There are differences between the water demand projections provided in the WSA and the demand projections presented herein due to differing development schemes and phasing, and projection methodologies.

5.3 Proposed Domestic Water System

It is assumed for the purposes of this memo that each Parcel/Building will be served by its own public water system. Should this not be permitted, the Project will be served by a privately maintained and operated system. Section 5.5 of this memo provided more information about a public water system versus a private water system.

The domestic water systems for each Parcel will be part of the public system and have multiple connections to the existing water system to maintain the required volume and residual pressure during fire flow scenarios. The preliminary layout and points of connection for each Parcel can be found on Figures 2 through 14 as well as Drawings CU-2.01 through CU-2.04. The preliminary points of connection for Parcel 1 and Parcel 2 are located in Lafayette Street. Due to its size, Parcel 4 has 3 preliminary connections. The first is located at the intersection of Great America Parkway and City Place Parkway, the second at Tasman Drive and Avenue A, and the third at Tasman Drive and Centennial Boulevard. Parcel 5 will connect to the main in Tasman Drive and include the removal and replacement of the Stars and Stripes water main and the potential extension of the water main in Tasman Drive to Avenue B to accommodate the below grade parking.

The proposed domestic water mains will be located in each street to the opposite side of the centerline alignment from the sanitary sewer and recycled water and maintain a minimum 10 ft horizontal clearance from said utilities and 5 ft horizontal clearance from storm drains. The domestic water mains would also maintain a 12 inch vertical clearance over all utilities. See Figure 44 of this memo for a typical street/utility section. Within the proposed below grade parking (beneath Stars and Stripes Avenue, Centennial Boulevard, Avenue A and Avenue B), the mains will be hung from the structure. Each building will have a water service connection from a proposed or existing water main. Each water service connection will have a separate backflow prevention device, a meter to determine water usage, and a dedicated fire service connection with a backflow prevention device. Due to the elevation difference between the project site and the surrounding area, it is likely that booster pumps (fit with backup emergency backup generators) will be required to maintain fire flows and residual pressure on the top floors of proposed buildings. It is assumed that each building will require its own booster pump, and that the pumps will be integrated into the design of the building systems. An alternative is to provide public booster pumps. Water mains and laterals shall be sized to meet the minimum fire flow pressures in accordance with Appendix B and C of the California Fire Code, as well as to meet the peak daily demand for domestic water service.

The non-standard design elements that are incorporated into the design of the domestic water system to address the landfill issues for the Project include interstitial spaces, settlement slabs

and settlement vaults/flexible connections. Typical utility/roadway corridor sections have been prepared for several variations of roadways, streetscape amenities and the multiple utilities that will be located within each street (sewer, storm drain, domestic water, recycled water, gas, joint trench, automated waste collection, landfill gas extraction system). A variety of water details are provided as Figures 15 through 44 and a description of how each non-standard element is incorporated into the design are as follows:

- Structural Slabs – With respect to Parcel 4 and the proposed City Center, the majority of the domestic water system will be constructed on a structural slab supported on deep foundations. The approximate limits of the structural slabs within the City Center portion of the Project are provided on Drawing CU-2.04. The slabs will support the roadways between the proposed City Center buildings and have been designed to minimize disruption to the landfill cap and refuse. The slabs should extend to the limits of the refuse to allow for a smooth transition within the settlement vaults as the swath of non-refuse area within Parcel 4 is being utilized for the deeper gravity system utilities.

- Settlement Vaults/Flexible Connections – At locations where utilities transfer from a structurally supported condition (over a settlement slab or from a pile-supported building) to a typical "terra firma" (on sub-grade) support condition settlement vaults and/or flexible connections are included in the design. Specifically for domestic water, these vaults, which will be direct buried concrete structures, will enclose a flexible connection (such as a Flex-Tend device). The locations of the settlement vaults based on the preliminary domestic water design are included on the plans.

5.4 Proposed Recycled Water Distribution

The proposed recycled water distribution for the Project will be designed for each parcel to have its own internal system. The proposed recycled water system can be used to supply non-potable water for different uses such as irrigation, HVAC equipment (cooling tower make-up), and toilet flushing. As these systems are designed, the entire water balance for the Project can be developed.

The recycled water distribution system for each parcel will have two points of connection to maintain recycled water service. The preliminary layout and points of connection for each Parcel can be found on Drawings CU-2.01 through CU-2.04. For both Parcel 1 and Parcel 2, the recycled water system will have one point of connection to the existing recycled water main in Lafayette Street and one point of connection to the recycled water main along the eastern edge of Parcel 1 and Parcel 2. For Parcel 4, the recycled water system will have two points of connection to the existing recycled water main located in the easement between Parcel 3 and Parcel 4. Parcel 5 will connect to the new recycled water mains in Parcel 4.

The proposed recycled water mains will be located in each street to the same side of the centerline alignment as sanitary sewer and opposite the domestic water. The proposed recycled water mains will maintain a minimum clear distance of 10 ft from the sanitary sewer. They will also maintain a minimum clear distance of 10 ft from the domestic water. See Figure 44 of this memo for a typical street/utility section.

5.5 Off-Site Improvements

Implementation of the water system as currently designed will likely require some offsite improvements to the existing utility systems. It may not be in an acceptable condition to serve the project. A considerable amount of fill may be added to Stars and Stripes Drive. Per the City of Santa Clara Council/Staff Work Study Session (see Appendix C) on 11/20/2013, this will require the existing utilities in Stars and Stripes to be raised. The City also noted approximately 2,000 ft of domestic water mains that may need to be upsized. Specifically, these include the 8 inch asbestos cement main in Great America Parkway, the 8 inch asbestos cement main in Lafayette Street, and parts of the loop in Calle de Luna and Calle del Mundo. More study will be required to determine if these sections or others will need to be upsized to meet the water demand of the Project. The off-site improvements are conceptually shown on Drawing EX-01.

6.0 PHASING

The current project planning includes a phasing strategy for the full development of the five sites in seven phases. Parcel 4 and Parcel 5, the location of City Center, would be developed in the first four phases. Parcel 3 may be developed as a City Park in Phase 2a, Parcel 1 would be developed in Phase 5 and Parcel 2 in Phases 6 and 7. Based on this current phasing, the following Domestic Water and Recycled Water Phasing Matrices provide details and quantities for the various components of the domestic water system and recycled water system for the Project. The matrix can be adjusted as the design is developed and phasing is modified such that costs can be properly allocated.

DOMESTIC WATER PHASING MATRIX											
								Booster Pumps			
Phase / Parcel	Gross Sq. Footage	Water Main (LF)	Laterals (LF)	Settlement Vault (#)	Water Meter (#)	Back Flow Preventer (#)	FD Connection (#)	Infrastructure (#)	Building (#)	Fire Hydrant (#)	Off-Site
1 / 5	873,000	5,860	505	-	4	4	4	-	4	3	See Note 1
2 / 4	2,701,250	2,900	3,645	10	23	23	23	-	23	8	-
3 / 4	757,750	1,330	2,775	6	14	14	14	-	14	3	-
4 / 4	800,000	240	650	4	4	4	4	-	4	3	See Note 2
5 / 1	1,440,000	5,445	1,585	8	8	8	8	1	8	10	-
6 / 2	1,296,000	5,052	1,075	6	6	6	6	1	6	9	
7 / 2	1,296,000	1,800	400	6	6	6	6	-	6	3	-

Notes:

1. Approximately 1,500 LF of existing water mains along Stars and Stripes Dive and Centennial Boulevard need to be raised or replaced based on the amount of fill needed. Existing domestic mains may be required to be upsized on sections of Great America Parkway. Lafayette Street, Calle de Luna, and Calle del Mundo, see attached exhibit.
2. Possible improvements required on an existing abandoned 12-inch main connecting to Great America Parkway.

RECYCLED WATER PHASING MATRIX					
Phase / Parcel	**Gross Sq. Footage**	**Recycled Water Main (LF)**	**Laterals (LF)**	**Settlement Vaults (#)**	**Water Meters (#)**
1 / 5	873,000	5,075	221	-	4
2 / 4	2,701,250	1,880	1,548	9	23
3 / 4	757,750	945	1,178	7	14
4 / 4	800,000	1,380	160	4	4
5 / 1	1,440,000	5,532	490	8	8
6 / 2	1,296,000	4,470	216	6	6
7 / 2	1,296,000	4,556	232	6	6

APPENDIX D
Sanitary Sewer Technical Memorandum

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DRAWINGS

APPENDICES

1.0 INTRODUCTION

The purpose of this Sanitary Sewer Technical Memorandum (the "Memo") is to assist Related Santa Clara, LLC in the design of the City Place Santa Clara Development (the "Project") and to provide updated information for preliminary cost estimating. The Memo documents the wastewater design criteria, demands and sanitary sewer infrastructure required to support the Project, and addresses the non-standard landfill design requirements.

2.0 PROJECT DESCRIPTION

2.1 Site Description

The overall site (the "Site") for the Project is the former Santa Clara All Purpose Landfill and two additional sites (see Figure 1). The subject property includes five parcels: Parcel 1, Parcel 2, Parcel 3, Parcel 4 and Parcel 5 totaling approximately 240 acres. The landfill is no longer active and the Final Closure and Post-Closure Maintenance Plan was approved in December 1992 and amended multiple times, most recently in December 2013. The site boundaries include Lafayette Street, Great America Parkway, Tasman Drive, the Guadalupe River and the San Tomas Aquino Creek.

The former landfill consists of individual landfills on the four separate parcels. Parcel 4 operated between the 1930s and 1970s; landfill operations at the other parcels took place from the late 1970s through early 1990s. Open burning took place at the first landfill and, to our knowledge, waste types accepted at the landfills included industrial and construction/demolition debris. The topography indicates that soil embankments were constructed and that refuse was placed which created large mounds. On the basis of the available subsurface information, the refuse in Parcels 1 and 3 ranges from about 40 to 80 feet thick. In Parcels 2 and 4 the thickness of refuse ranges from about 20 to 50 feet.

The site is proximate to a significant amount of existing infrastructure. The City owned and operated systems include sanitary sewer, stormwater drainage, water (domestic and fire) and landfill operation systems (gas extraction, leachate collection and monitoring) within and adjacent to the Site. Utility providers and infrastructure owners include South Bay Water Recycling, Silicon Valley Power (SVP), Comcast, AT&T, Santa Clara Valley Water District (SCVWD), Pacific Gas & Electric (PG&E), Union Pacific Rail Road (UPRR) and Valley Transportation Authority (VTA).

2.2 Planned Development

The planned development currently envisioned includes office, hotel, mixed-used retail, restaurant, entertainment, residential and parking structures with significant site improvements. The approvals for the Project include a zoning change to Planned Development –Master Community ("PD-MC") from the "B" zoning district and the ((Public, Quasi-Public and Public Park or Recreation) for Parcels 1 through 4 and from the "CP" (Commercial Park) zoning district in Parcel 5 is zoned "CP". MCP authorizes up to 9,164,400 gross square feet (gsf) with associated parking and site improvements. The current breakdown by site is as follows:

Table 1
Current Development Program

Parcel	Area (acres)	Potential Development Area (gsf)
1	49.6	1,440,000
2	60.9	2,592,000
3	34.9	0
4	86.6	4,259,400
5	8.0	873,000

3.0 EXISTING CONDITIONS

3.1 Existing System

The existing wastewater collection system for the City of Santa Clara includes a series of gravity trunk sewers, pump stations and sanitary force mains. The system conveys the wastewater to the existing San Jose/Santa Clara Regional Wastewater Facility (WWTF) located approximately 2 miles northeast of the Site. The Site is located at the downstream end of the piped collection system. From Great America Parkway on the west side of the Project, two main sewers are located between Parcel 3 and Parcel 4. The northernmost gravity trunk sewer is a 33 inch Reinforced Concrete Pipe (RCP), and the southernmost is a 42 inch RCP. Within Lafayette Street there is a 36 inch gravity trunk sewer. These three sewers join in Lafayette Street into two 42 inch RCP's and continue north in Lafayette Street between Parcel 3 and 1. At the northern edge of Parcel 1, these sewers turn to the northeast, following the Parcel 1 boundary to the existing diversion structure which diverts the flow to both the existing Rabello Pump Station and the Northside Pump Station. There is a 12 inch sewer in Stars and Stripes Drive, which connects to the 36 inch sewer in Lafayette Street. A map showing the City infrastructure adjacent to the Site is provided as Figure 2.

The gravity sewer that bypasses the Rabello Pump Station continues beneath the Guadalupe River and California State Highway 237, where it flows to the Northside Pump Station. From the Northside Pump Station, the wastewater is pumped and conveyed in a force main to the WWTF. The Rabello Pump Station will pump wastewater to the WWTF through a secondary force main, which follows the alignment of the Northside Pump Station gravity sewer and its force main once crossing beneath the Guadalupe River and Highway 237.

The current pump station operation includes the Rabello and Northside Pump Stations working in parallel to pump the wastewater to the WWTF. The maximum capacity of this system, referred to as the Firm Capacity, is defined as the maximum capacity of the combined pump stations with the largest pump for each pump station out of commission. This builds some redundancy into the system, allowing it to function even if one of the pumps for each pump station is out of service. The Northside Pump Station has 4 pumps running in parallel to pump effluent, and the Rabello Pump Station has 8 pumps running in parallel. Currently, the City of Santa Clara estimates the Firm Capacity of these two stations to be 38.2 Million Gallons per Day (MGD). Per RMC's Sanitary Sewer Capacity Evaluation for the Project dated 6 August 2015, the peak wet weather flow (PWWF) results predicted by the model are 43.0 MGD without the Project and 44.8 MGD with the Project. Another study would be needed to

determine the required improvements to increase the pump stations total firm capacity to convey the predicted flow in 2035 General Plan PWWF.

3.2 Wastewater Treatment

The San Jose/Santa Clara Regional Wastewater Facility was built in 1956 and is the largest advanced wastewater treatment facility in the western United States. The Facility is a round-the-clock operation that cleans an average of 110 million gallons of wastewater per day, and has the capacity to clean up to 167 million gallons per day. Advanced (tertiary) level treatment is necessary to meet the region's strict state regulations for the shallow waters and sensitive ecosystem of the southern Bay.

The Facility is located on 2,600 acres at the South Bay shoreline, covering more area than twice the size of San Francisco's Golden Gate Park, and includes a 175-acre wastewater operations area, a 750-acre sludge drying area, and an 850-acre former salt production pond. The remaining acreage is open land that buffers adjacent communities from odors and hazardous operations. The Facility serves eight cities, including the City of Santa Clara, with 1.4 million residents and a business sector with more than 17,000 main sewer connections. The wastewater undergoes a 10.5-hour treatment process that simulates the way nature cleans water. Reportedly, the Facility removes 99 percent of the impurities before the cleaned water is discharged into the South San Francisco Bay or recycled for other uses such as industrial processes, cooling towers, and flushing toilets. There are no current treatment capacity concerns or issues for the treatment of the project wastewater generated by the Project.

4.0 BASIS OF DESIGN

4.1 References

The following reports and standards are supplemental to the design requirements and were used in the preliminary design of the sanitary sewer system as provided herein. These documents should be used in the final design of the Project's sanitary sewer system.

- "San Jose – Santa Clara Water Pollution Control Plant Specific Use Code & Sewage Coefficient."
- "Design Criteria for Improvements in Public Right-of-Ways and City Easements" City of Santa Clara, Public Works Department, September 17, 2014.
- "Standard Specifications for Public Works" City of Santa Clara, Public Works Department, latest edition.
- "Standard Details" City of Santa Clara, Public Works Department, latest edition.
- "Santa Clara City Code Chapter 13.10."
- Sanitary Sewer Capacity Assessment for General Plan Update, RMC Water and Environment, September 1, 2009 and November 14, 2014**
- Sanitary Sewer Capacity Evaluation for the City Place Development (APN: 097-01-039 and -073, 104-01-102, 104-03-036 through 040), RMC Water and Environment, August 6, 2015**
- Sheets S93, S94, S95, S103, S104, S105, S113, S114, S115, City of Santa Clara Sanitary Sewer System Map, City of Santa Clara, July 2012 and November 2013.

**Note: The Sanitary Sewer Capacity Evaluation Report output has changed based on approved projects and may change again pending development applications and future projects. The report output does not guarantee or in any way reserve or hold sanitary sewer conveyance capacity until the Project has been entitled.

4.2 Sewage Coefficients

The Sewage Coefficients (based on the San Jose – Santa Clara Water Pollution Control Plant Specific Use Code and Sewage Coefficient Table – provided as Appendix B), used to determine the Average Dry Weather Flow, are provided below as Table 2.

Table 2
Sewage Coefficients

Land Use	Sewage Coefficient
Bars	0.350 gpd/sf
Dwellings (2 – 4 units)	176 gpd/unit
Dwellings (5+ units)	121 gpd/unit
Home Furnishings (retail)	0.027 gpd/sf
Hotels (small)	0.350 gpd/sf
Hotels (large, w/ convention facilities	0.480 gpd/sf
Markets (grocery)	0.240 gpd/sf
Movie Theater (indoor)	4.8 gpd/seat
Office Building	0.140 gpd/sf
Parks – Community Center	0.110 gpd/sf
Public Agency	0.210 gpd/sf
Retail (large structure)	0.073 gpd/sf
Retail (small structure)	0.076 gpd/sf
Restaurant (full service)	1.040 gpd/sf
Single Family (attached, townhouses)	180 gpd/unit

4.3 Design Requirements

The final design for the sanitary sewer system will meet the following criteria. Note that there are numerous non-standard design elements to address the landfill aspects of the project including settlement vaults, flexible connections, settlement slabs and utility corridors in refuse.

- Pipe material shall conform to Section 02062, FURNISHING AND INSTALLING OF PIPE, of the City's Technical Provisions. For pipe sizes 24 inches in diameter or less, use vitrified clay pipe. For pipe sizes greater than 24 inches in diameter, fully lined reinforced concrete pipe may be used. Polyvinyl Chloride (PVC) SDR 26 pipe 12 inches or less may be used. PVC pipe larger than 12 inches in diameter may be used upon approval by the Director of Public Works/City Engineer.
- In general, sanitary sewers shall be placed in every street with a 5-foot offset from street centerline on the side opposite the storm drain.
- Minimum cover over mains shall be 6 feet from finished grade.
- Design:
  - Coefficient of friction "n":
    - Vitrified Clay Pipe: 0.013
    - Reinforced Concrete Pipe: 0.013
    - Polyvinyl Chloride Pipe: 0.011
  - Minimum pipe diameter:
    - Residential: 8 inch
    - Commercial: 10 inch
    - Industrial: 12 inch
- Sufficient slope shall be used to provide a minimum flow velocity of 2 feet per second (fps) when flowing full or half full.
- For design of pipes, the Proposed Development Peak Flow shall not be less than 2.5 times the computed average flow.
- The Design Flow (total peak flow) shall be as determined below.
  - $Q_D = Q_M + Q_{WWGWI} + Q_{RDI/I} + Q_{PD}$, where:
    - Q = Flow
    - D = Design
    - M = Monitored
    - WWGWI = Wet Weather Groundwater Infiltration
    - RDI/I = Rainfall-Dependent Infiltration and Inflow
    - PD = Proposed Development
    - Q_D = Design Flow
    - Q_M = The Monitored Peak Flow or 2.5 times the Monitored Average Flow, whichever is greater.
    - Q_{WWGWI} = The gpd/acre value is obtained by using Figure 3-3 and Table 3-2 of the Sanitary Sewer Capacity Assessment Report, May 2007. Multiply the factor by the Tributary Area served by the sanitary sewer main being monitored.
    - $Q_{RDI/I}$ = Same as QWWGWI above. For now, use 1,000 gpd/acre.
    - Q_{PD} = Proposed Development Peak Flow.
- Sanitary sewers shall be considered full at a d/D (ratio of liquid depth to pipe diameter) value of 0.75 or greater.
- At all changes of direction, a drop in flow line shall be installed equal to the velocity head times the ratio of angular change to 90 degrees.
  - $V^2/2g \times A°/90° =$ Head Loss = drop in flow line*, where:
    - V = velocity in ft./sec
    - g = acceleration of gravity (32.17 ft./sec2)
    - A° = the angular change in degrees

*If junction is fully shaped, this value may be reduced by 30%. This value shall not be less than 0.1 foot.

- Where minor mains connect to trunk main, the crown of the minor main shall match the crown of the trunk main.
- A drop in hydraulic grade line (HGL) shall be provided for head losses due to transitions such as bends, pipe size changes, grade changes, and at drainage structures (e.g., manholes).
- The sanitary sewer system shall be designed as a complete grid system.
- In general, sanitary sewer main lines should be designed such that all other parallel facilities have at least an eight-foot clear distance separation. Sanitary sewer main lines that have large diameters or are deeper/shallower in elevation may require greater separation from other facilities as determined by the Director of Public Works/City Engineer.
- Curved sanitary sewer conduit shall not be used except when written permission is obtained from the Director of Public Works/City Engineer.
- Cross connections between the storm drainage system and the sanitary sewer system are prohibited.
- Drainage structures (e.g., manholes) shall be located at the following points:
  - Change in direction;
  - Change in slope;
  - Change in size;
  - Intersection of mains;
  - Changes in pipe material;
  - A nominal spacing of 450 feet with a maximum spacing of 500 feet;
  - Upstream end of lines; and
  - Where laterals are the same size as the main or are 8 inches or larger.
- The Standard Manhole (as shown in the City Standard Details) is applicable in most cases where a drainage structure is required. However, the drainage structure shall be individually designed for any of the following conditions:
  - Through mains larger than 39 inch with less than a 5 degree change in alignment;
  - 27 inch or larger through mains with a 5 degree or larger change in alignment;
  - Side mains larger than 24 inch; and
  - Other special conditions as identified by the Director of Public Works/City Engineer.
- Laterals:
  - Laterals for residential dwellings up to four (4) units shall be at least 4 inches in diameter. All others will be 6 inches or larger;
  - Laterals shall have a minimum slope of 2% and be installed at right angles or radial to street right-of-way;
  - Laterals with clean-outs shall be provided to every lot and known future developments; and
  - Lateral to main connections:
    - Connection to a manhole shall be made wherever possible. Manhole connections shall be as follows:
      - When lateral and main are constructed at the same time, the lateral and main crowns shall have the same elevation.
      - When connecting to an existing manhole, the outside bottom of lateral pipe shall be at or above the manhole shelf. The maximum height of

lateral flow line above the manhole shelf floor shall be one and one half feet (see City Standard Details).

- When main and lateral are constructed at the same time, and a manhole connection is not possible, a wye connection is to be used as shown in the City Standard Details.
- A 4 inch or 6 inch lateral connection to an existing larger main shall be made by the "Tap-tite" method as shown in the City Standard Details.
- Lateral cover measured from top of curb shall not be less than 4.5 feet.
- Siphon connections to mains are prohibited.

  - Clean-outs shall be installed on all sanitary sewer laterals at the street right-of-way or easement line as shown in the City Standard Details. If the sanitary sewer lateral is 8 inches or larger, a manhole shall be used in place of a clean-out; and
  - On-site sanitary sewer pump system force mains shall not discharge directly into the City's sanitary sewer system.

- Grit Traps:
  - Grit traps shall be placed just upstream of siphons and at other locations as determined by the Director of Public Works/City Engineer.
  - Grit traps shall be designed with adequate capacity to accommodate the peak flow(s) of the sanitary sewer main(s) discharging into the grit trap.
- A Condition Assessment will need to be performed per City standards of all City mains from the Project to the Rabello and Northside Sanitary Sewer Pump Stations and the force mains for said pump stations to the junction structure at the Treatment Plant, and Related and the City will need to develop a plan to correct any deficiencies

5.0 PROPOSED SYSTEM

5.1 Wastewater Generation

The wastewater generation (Average Dry Weather Flow) for the Project based on the Concept Program Option E-1 yield Summary and wastewater demands identified above are as follows. For sewer design purposes, the Average Dry Weather Flow (ADWF) is converted to the Proposed Development Peak Flow (or total peak wet weather flow under design storm conditions) by applying the 2.5 peaking factor and adding the Wet Weather Groundwater Infiltration (WWGI) and Rainfall-Dependent Infiltration and Inflow (RDI/I). The City will also apply diurnal flows curves for the variety of residential, commercial, office, hotel and public space uses in determining the peak flows.

Table 3
Wastewater Generation

Phase 1 - Parcel 5 **8.0 Acres**

Building Type	Gross Sq. Footage	Sewage Coefficient (gpd/SF)	Wastewater Generation (gpd)
Residential	200,000	0.176	35,200
Retail - Inline Retail	62,000	0.076	4,712
Retail - Food and Beverage	25,000	1.040	26,000
Office	306,000	0.140	42,840
Hotel	280,000	0.480	134,400
		Total ADWF	243,152
WWGI & RDI/I (approximate)			8,000
		Total Peak Flow	615,880

Phase 2 - Parcel 4 **52.2 Acres**

Building Type	Gross Sq. Footage	Sewage Coefficient (gpd/SF)	Wastewater Generation (gpd)
Residential	865,000	0.176	152,240
Retail - Anchor	267,250	0.073	19,509
Retail - Inline Retail	580,000	0.076	44,080
Retail - Food and Beverage	205,200	1.040	213,200
Retail - Entertainment	190,000	0.480	91,200
Office	296,000	0.140	41,440
Hotel	298,000	0.480	143,040
		Total ADWF	704,709
WWGI & RDI/I (approximate)			52,200
		Total Peak Flow	1,813,973

Phase 3 - Parcel 4 **18.5 Acres**

Building Type	Gross Sq Footage	Sewage Coefficient (gpd/SF)	Wastewater Generation (gpd)
Residential	615,000	0.176	108,240
Retail - Inline Retail	60,000	0.076	4,560
Retail - Food and Beverage	20,000	1.040	20,800
Retail - Anchor	62,750	0.073	4,581
		Total ADWF	138,181
WWGI & RDI/I (approximate)			18,500
		Total Peak Flow	363,952

Phase 4 - Parcel 4 **15.9 Acres**

Building Type	Gross Sq Footage	Sewage Coefficient (gpd/SF)	Wastewater Generation (gpd)
Retail – Inline Retail	30,000	0.076	2,280
Office	770,000	0.140	107,800
		Total ADWF	110,080
WWGI & RDI/I (approximate)			15,900
		Total Peak Flow	291,100

Phase 5 - Parcel 1 **49.6 Acres**

Building Type	Gross Sq Footage	Sewage Coefficient (gpd/SF)	Wastewater Generation (gpd)
Office	1,440,000	0.140	201,600
		Total ADWF	201,600
WWGI & RDI/I (approximate)			49,600
		Total Peak Flow	553,600

Phase 6 - Parcel 2 **25.7 Acres**

Building Type	Gross Sq Footage	Sewage Coefficient (gpd/SF)	Wastewater Generation (gpd)
Office	1,296,000	0.140	181,440
		Total ADWF	181,440
WWGI & RDI/I (approximate)			25,700
		Total Peak Flow	479,300

Phase 7 - Parcel 2 **35.2 Acres**

Building Type	Gross Sq Footage	Sewage Coefficient (gpd/SF)	Wastewater Generation (gpd)
Office	1,296,000	0.140	181,440
		Total ADWF	181,440
WWGI & RDI/I (approximate)			35,200
		Total Peak Flow	488,800

Total By Parcel **240 Acres**

Building Type	Gross Sq Footage	Total Generation (gpd)
Parcel 1	1,440,000	201,600
Parcel 2	2,592,000	362,880
Parcel 3	0	0
Parcel 4	4,259,400	952,970
Parcel 5	873,000	243,152
	Total ADWF	**1,760,602**
	Total WWGI & RDI/I (estimate)	**205,100**
	Total Peak Flow	**4,606,605**

5.2 Proposed System

It is anticipated that the proposed sanitary sewer system for the Project will connect to the existing City gravity trunk sewers between Parcels 3 and 4, in Lafayette Street and in Stars and Stripes Drive. The preliminary locations for the points of connection and for the routing of the sewers within a development parcel are provided on Figures 2 through 14 and Drawings CSS-2.01 through CSS-2.04. The preliminary design includes multiple gravity sanitary sewer systems with laterals, mains, manholes and cleanouts designed per City standards. The pipes will be sized for the capacity to convey the total peak wet weather flow at a minimum velocity of 2 fps when flowing half full and no more than 0.75 full. Parcel 1 and Parcel 2 will connect to the westernmost existing 42 inch sewer in Lafayette Street. Parcel 4 will connect to the existing 42 inch sewer located between Parcels 3 and 4. Parcel 5 will connect to the Stars and Stripes Drive sewer system, which may need to be completely replaced to accommodate the development. The proposed sanitary systems are proposed as looped systems to provide redundancy as required by the City. Note the preliminary sewer sizes vary from 10 to 14 inches, and the quantities are provided in Section 6 Phasing Matrix and on the Figures.

The non-standard design elements that are incorporated into the design of the sanitary sewer system to address the landfill issues for the Project include interstitial spaces, settlement slabs, settlement vaults/flexible connections, special utility trenching for landfill cap disruption and refuse handling and considerations for methane gas. Typical utility/roadway corridor sections have been prepared for several variations of roadways, streetscape amenities and the multiple utilities that will be located within each street (sewer, storm drain, domestic/fire water, recycled water, gas, joint trench, automated waste collection, landfill gas extraction system). A variety of sanitary sewer details are provided as Figures 15 through 24 and a description of how each non-standard element is incorporated into the design are as follows:

- Interstitial Spaces – Beneath the buildings within the City Center portion of the Project there will be an interstitial space. The current design assumes a 5-ft interstitial space and sanitary sewer invert at the building point-of-connection at 5-ft below first floor elevations (FFE). The interstitial space will allow the sewer utility, as well as other

building utilities, to be accessible from within the building first floor space without disrupting the landfill systems. The sewer will need to be hung from the first-floor slab within the interstitial space and transition to the sewer lateral (2% minimum slope) at a cleanout positioned in the sidewalk adjacent to the building.

- Structural Slabs – With respect to Parcel 4 and the proposed City Center, the majority of the sanitary sewer system will be constructed on a structural slab supported on deep foundations. The approximate limits of the structural slab within the City Center portion of the Project are provided on Drawing CSS-2.04. The slabs will support the roadways between the proposed City Center buildings and have been designed to minimize disruption to the landfill cap and refuse. The sewers are currently designed as a gravity system, which has a direct impact on the depth of the structural slab relative to street grade. The City requires a minimum depth of cover of 6-ft for sewer mains and 4.5-ft for sewer laterals (at curb). These cover requirements set the depth of the sewer at the upstream end of the system and impact the depth of the settlement slab. The Sewer Plans identify the areas where the deeper settlement slabs, as set by the gravity sewer (and storm drain), may impact the landfill cover and refuse. The settlement slabs should extend to the limits of the refuse to allow for a smooth transition within the settlement vaults as the swath of non-refuse area within Parcel 4 is being utilized for the deeper sewer mains.

- Settlement Vaults/Flexible Connections – At locations where utilities transfer from a structurally supported condition (over a settlement slab or from a pile-supported building) to a typical "terra firma" (on sub-grade) support condition settlement vaults and/or flexible connections are included in the design. Specific for sanitary sewers, these vaults, which will be direct buried concrete structures, will either enclose a flexible connection (such as a Flex-Tend device) or be located adjacent to a building structure to allow for a piped configuration within the vault to settle. The locations of the settlement vaults based on the preliminary sanitary sewer design are included on the plans.

- Utility Trenching for Landfill Cap Disruption – As the gravity sewer (and storm drain) systems get deeper, there are instances where, based on our current information, the landfill cap will be disrupted by a sewer utility trench and refuse will need to be removed. Within Parcel 4, this will occur towards the edges of the settlement slab and within Parcels 1 and 2 will occur as the sewer makes the final transition down the landfill slope. The Sewer Plans identify the areas where the deeper utility trenches as set by the gravity sewer (and storm drain), may impact the landfill cover and refuse.

5.3 Off-Site System

A Sanitary Sewer Capacity Evaluation for City Place Development dated August 6, 2015 was prepared for the City by RMC Water and Environment (included in Appendix C). The model predicted that the downstream pipes of the development would be approaching full capacity with the additional flow, but no surcharge was triggered. The technical memorandum summarized a hydraulic model showing the sanitary sewer system capacity with and without the respective development. This model was based upon the 2035 peak wastewater

generation provided in the City of Santa Clara General Plan Phase 3. The model predicts that without the City Place Santa Clara development, the total effluent flow based on the 2035 flow will be 43.0 MGD. With the City Place Santa Clara development, the total effluent flow to the pump stations is estimated to be 44.8 MGD.

The City's model did not include the Rabello and Northside pump stations. However, the 2035 estimated peak wet weather flow of 44.8 MGD, which includes the Project, is approximately 6.6 MGD higher than the current Rabello and Northside Pump Station system's Firm Capacity of 38.2 MGD. Due to this, the Firm Capacity of these pump stations will need to be upgraded to meet the demand of the 2035 General Plan Load. The upgrades would include additional wet well and pumping capacity as well as force main improvements.

The City's peak flow estimates included all planned major developments and redevelopments as well as potential increased densities in certain areas consistent with the City's 2035 General Plan. As such, the Project is not the sole contributor of wastewater to the system and should not be solely responsible for the system upgrades that will be required as part of the 2035 General Plan. An assessment of the pumping station capacity should be performed and used to determine the timing of the improvements and the contributors. As no flow from the Site was previously included in the City's hydraulic model developed for the 2035 General Plan, the Project will be responsible for a portion of the pump station improvement costs. The threshold for when the pump stations improvements would be required remains to be determined by the City. An estimate of the potential timing of the pump station improvements would need to be completed soon after the Project is entitled. The current phasing is provided in the Section 6 Phasing Matrix. This timing should be updated as the City continues assessing the sewer capacity issues as part of the General Plan updates.

6.0 PHASING

The current Project planning includes a phasing strategy for the full development of the five sites in seven phases. Parcels 4 and 5, the location of City Center, would be developed in the first four phases. Parcel 3 may be developed as a City Park in Phase 2a, Parcel 1 developed in Phase 5 and Parcel 2 in Phases 6 and 7. Based on this current phasing the following Sanitary Sewer Phasing Matrix provides details and quantities for the various components of the sanitary sewer system for the Project. The matrix can be adjusted as the phasing is modified such that costs can be properly allocated.

SANITARY SEWER PHASING MATRIX								
Phase / Parcel	**Gross Sq. Footage**	**Sewer Pipe (LF)**	**Manholes (#)**	**Laterals (LF)**	**Clenaouts (#)**	**Settlement Vaults/Flexible Connections (#)**	**Refuse Trenching (CY) Note 2**	**Off-Site Improvements**
1 / 5	873,000	1,418 – 14″	4	332	2	0	0	New Stars and Stripes Sewer
2 / 4	2,701,250	941 – 10″ 2,980 – 12″ 1,586 – 14″	20	1,556	24	10	7,500	Two MH Connections to P3/P4 42 inch sewer See Note 1
3 / 4	757,750	947 – 10″	5	1,133	14	7	1,000	See Note 1
4 / 4	800,000	489 – 12″	2	183	4	4	0	See Note 1
5 / 1	1,440,000	1,636 – 10″ 686 – 12″	15	489	8	8	9,200	One MH Connection to Lafayette Street sewer
6 / 2	1,296,000	1,692 – 10″ 606 – 12″	10	253	6	6	6,600	One MH Connection to Lafayette Street sewer
7 / 2	1,296,000	1,343 – 10″	6	231	6	6	4,600	-

Notes:
1. Depending on pace of development in the City improvements to Rabello and Northside pump stations may be required. (The potential timing of the upgrades is discussed in Section 5.3).
2. Refuse Trenching for settlement slab include average width of 20-ft and depth of 5-ft.

LANGAN TREADWELL ROLLO