APPENDIX G

GEOTECHNICAL REPORT

GEO-ENGINEERING SOLUTIONS, INC.

Geotechnical Engineering • Engineering Geology • Materials Testing

FEASIBILITY LEVEL GEOTECHNICAL ENGINEERING AND GEOLOGIC HAZARDS STUDY

Good Samaritan Hospital Entitlements
2425 Samaritan Drive
San Jose, California 95124

October 17, 2022

Prepared for:

Perkins & Will
617 West 7th Street, Suite 1200
Los Angeles, CA 90017

Prepared by:

GEO-ENGINEERING SOLUTIONS, INC.
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Project No. 133-1442

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October 17, 2022

Attention: Mr. Russell Triplett

Subject: Feasibility Level Geotechnical Engineering and Geologic Hazards Study
Good Samaritan Hospital Entitlements
2425 Samaritan Drive, San Jose, CA
Geo-Eng Project No. 133-1442

Dear Mr. Triplett:

In accordance with your authorization, **Geo-Engineering Solutions, Inc. (Geo-Eng)** has completed a Feasibility Level Geotechnical Engineering and Geologic Hazards Study to provide geotechnical services for the main campus of Good Samaritan Hospital in San Jose, California. Transmitted herewith are the results of our findings, conclusions, and recommendations.

Should you or members of the design team have questions or need additional information, please contact the undersigned by email: nhaddad@geo-eng.net or eswenson@geo-eng.net or at (925) 433-0450. We greatly appreciate the opportunity to provide our services and to be involved in the design of this project.

Sincerely,

GEO-ENGINEERING SOLUTIONS, INC.

Nicolas B. Haddad, P.E.
Senior Geotechnical Engineer

Eric J. Swenson, G.E., C.E.G.
President

TABLE OF CONTENTS

FIGURES

1.0 INTRODUCTION

1.1 Purpose and Scope

We understand that HCA is going through the initial entitlement process of new modifications and additions to the main campus of Good Samaritan Hospital in San Jose, California. As part of this process, a geotechnical feasibility study is required to outline geologic hazards as well as possible geotechnical design issues which would affect this development.

The purpose of our work was to prepare a Feasibility Level Geotechnical Engineering and Geologic Hazards Study for the site and provide preliminary geotechnical recommendations for the proposed development at the site. Based on our experience, this study is based on previously published works as well as a review of any available subsurface data on the campus. The intent of the study is to provide a context of possible global geologic hazards and not to provide specific design level recommendations. This study did not include an in-depth assessment of potentially toxic or hazardous materials that may be present on or beneath the site.

1.2 Site Description

The Good Samaritan Hospital is located at 2425 Samaritan Drive in San Jose, California, as shown on the attached Figure 1-Site Vicinity Map. The site is approximately 20-acre and is bordered by Samaritan Drive to the east and south, Highway 85 to the north, and existing medical office buildings to the west. Several buildings exist on the campus which occupies the center of the site with at grade parking on the east and west sides of the site.

The topography of the site is generally flat with elevations on the order of +280 feet above mean sea level, based on Google Earth elevations. The average geographic coordinates of the site, used in our engineering analyses, are 37.2523 degrees north latitude and -122.9466 degrees west longitude.

1.3 Proposed Development

Based on the proposed Master Plan, prepared by Perkins & Will, we understand that the proposed development project will include the addition of a new diagnostic and treatment building to the north, a Medical Office building to the southeast, and two six-story at grade parking garages on the east and west sides of the site, Figure 2-Site Development Map. Surface parking, driveways, and landscaping would also be included in the proposed project. It is assumed there will also be other associated minor site improvements such as site grading, landscaping and utilities.

2.0 GEOLOGIC AND SEISMIC OVERVIEW

2.1 Geologic Setting

The site is located within the central portion of the Coast Ranges geomorphic province of California. The Coast Ranges geomorphic province consists of numerous small to moderate linear mountain ranges trending north to south and northwest to southeast. The Coast Ranges lies between the Pacific Ocean to the west and the Great Valley Geomorphic Province to the east. This province is approximately 400 miles long and extends from the Klamath Mountains in the north to the Santa Ynez River within Santa Barbara County in the south. It generally consists of marine sedimentary rocks and volcanic rocks. The province is characterized by northwest-trending faults and folds, as well as erosion and deposition within the broad transform boundary between the North American and Pacific plates. Translational motion along the plate boundary occurs across a distributed zone of right-lateral shear expressed as a nearly 50-mile-wide zone of northwest-trending, near-vertical active strike-slip faults. This motion occurs primarily along the active San Andreas, Hayward, Calaveras and San Gregorio faults.

The site is located within the southwestern portion of the Santa Clara Valley, which is a large depositional valley located at the southern end of the San Francisco Bay. Historically, sediments from this valley are sourced from the Santa Cruz Mountains located to the west and the Diablo Range to the east, as wells as interbedded bay deposits. The Santa Cruz Mountains primarily consist of Cretaceous to Miocene sandstone and basalt. Near the vicinity of Santa Clara Valley, the Diablo Range primarily consists of middle to upper Miocene shale, sandstone, pebble conglomerate, and claystone from the Claremont, Briones, and Orinda Formations (Wentworth et al., 1999).

The subject property overlies Quaternary alluvial fan deposits consisting of sand, silt, and gravel (Dibblee and Minch, 2007), Figure 3-Site Vicinity Geology Map. Based on the mapped geological unit and our experience at other sites in the vicinity, we anticipate the site is underlain by low plasticity, relatively dense silty and clayey sand, gravel and cobbles.

West of the property are Pliocene conglomerate, sandstone, siltstone, claystone, and mudstone of the Santa Clara Formation. In addition, stream alluvium consisting of gravel, sand, silt and clay is located within the vicinity of Los Gatos Creek, located north of the site.

2.2 Regional Faulting and Tectonics

Regional transpression has caused uplift and folding of the bedrock units within the Coast Ranges. This structural deformation occurred during periods of tectonic activity that began in the Pliocene and continues today. The site is located in a seismically active region that has experienced periodic, large magnitude earthquakes during historic times. This seismic activity appears to be largely controlled by displacement between the Pacific and North American crustal plates, separated by the San Andreas Fault zone located about 6 miles southwest of the site. This plate displacement produced regional strain that is concentrated along major faults of the San Andreas Fault System including the San Andreas, Hayward, and Calaveras faults in the greater San Francisco Bay area.

The subject property is in a seismically active region dominated by the San Andreas Fault, located about 6 miles (9.7 km) southwest of the site, and the Hayward Fault, located approximately 12 miles (19.3 km) northeast of the site. Other major faults within the vicinity of the site include the northern portion of the Calaveras Fault, located 14 miles (22.5 km) northeast of the site. The site is not mapped within an Alquist-Priolo Earthquake Fault Zone. The site location relative to active and potentially active faults in the San Francisco Bay Area is shown on Figure 4, Regional Fault Map.

According to the California Department of Conservation's Fault Activity Map of California, the subject property is situated between the Cascade Fault and Monte Vista-Shannon Fault. According to this map, the Cascade Fault is located about 0.6 miles northeast of the site and the Monte Vista-Shannon Fault is located about 0.3 miles southwest of the site. The Cascade Fault is a potentially active reverse fault that is about 22 miles long (California Department of Transportation, 2017).

2.3 Groundwater

Based on the Seismic Hazard Zone Report for the San Jose Quadrangle prepared by the California Geologic Survey (CGS) historic ground water in the vicinity of the subject site is expected to be on the order of 30 to 40 feet below ground surface. Groundwater levels can vary in response to time of year, variations in seasonal rainfall, well pumping, irrigation, and alterations to site drainage.

3.0 GEOLOGIC HAZARDS

3.1 Seismic Induced Hazards

Seismic hazards resulting from the effects of an earthquake generally include ground shaking, liquefaction, lateral spreading, dynamic settlement, fault ground rupture and fault creep, dam inundation, and tsunamis and seiches. The site is not necessarily impacted by all of these potential seismic hazards. Nonetheless, potential seismic hazards are discussed and evaluated in the following sections in relation to the planned construction.

3.1.1 Ground Shaking

The site may experience moderate to strong ground shaking from a major earthquake originating from one or more of the close or major Bay Area faults such as the San Andreas and Hayward faults. Earthquake intensities vary throughout the region depending upon the magnitude of the earthquake, the distance of the site from the causative fault, the type of materials underlying the site and other factors. Potential mitigation of strong ground shaking includes designing new structures to meet current building codes and applicable requirements.

In addition to shaking of the structure, strong ground shaking can induce other related phenomena that may have an effect on structures, such as liquefaction and dynamic densification settlement.

3.1.2 Liquefaction Induced Phenomena

Research and historical data indicate that soil liquefaction generally occurs in saturated, loose granular soil (primarily fine to medium-grained, clean sand deposits) during or after strong seismic ground shaking and is typified by a loss of shear strength in the affected soil layer, thereby causing the soil to flow as a liquid. However, because of the higher inter-granular pressure of the soil at greater depths, the potential for liquefaction is generally limited to the upper 40 feet of the soil. Potential hazards associated with soil liquefaction below or near a structure include loss of foundation support, lateral spreading, sand boils, and areal and differential settlement.

Lateral spreading is lateral ground movement, with some vertical component, as a result of liquefaction. The soil literally rides on top of the liquefied layer. Lateral spreading can occur on relatively flat sites with slopes less than two percent under certain circumstances, generally when the liquefied layer is in relatively close proximity to an open, free slope face such as the bank of a creek channel. Lateral spreading can cause surficial ground tension cracking (i.e., lurch cracking) and settlement.

The site is not mapped by the CGS in a geologic hazard zone requiring liquefaction investigation, as shown in Figure 5-Liquefaction Hazard Map. The site is underlain by low plasticity, relatively dense silty and clayey sand, gravel and cobbles. These soils are expected to be generally less susceptible to liquefaction due to their relatively moderate fine-grain content and moderate density. Therefore, the potential for liquefaction of the site subsurface soils is judged to be moderate.

The site is not considered to be susceptible to lateral spreading due to the lack of a nearby free slope face. Therefore, the potential for future seismic settlement due to lateral spreading is judged to be very low.

3.1.3 Dynamic Compaction (Settlement)

Dynamic compaction is a phenomenon where loose, relatively clean sandy soil located above the water table is densified from vibratory loading, typically from seismic shaking or vibratory equipment. The site soils generally consist of relatively dense silty and clayey sand, gravel and cobbles. Therefore, in our opinion, dynamic settlement and/or any potential effect of dynamic settlement on the proposed construction is not expected to be significant.

3.1.4 Fault Ground Rupture and Fault Creep

The State of California adopted the Alquist-Priolo Earthquake Fault Zone Act of 1972 (Chapter 7.5, Division 2, Sections 2621 – 2630, California Public Resources Code), which regulates development near active faults for preventing surface fault rupture hazards to structures for human occupancy. In accordance with the Alquist-Priolo (A-P) Act, the California Geological Survey established boundary zones, or Earthquake Fault Zone surrounding faults or fault segments judged to be sufficiently active, well-defined, and mapped for some distance. Structures for human occupancy within designated Earthquake Fault Zone boundaries are not permitted unless surface fault rupture and fault creep hazards are adequately addressed in a site-specific evaluation of the development site.

The site is not currently mapped or within a designated Earthquake Fault Zone as defined by the State (Hart and Bryant, 1997). The closest Earthquake Fault Zone is associated with the San Andreas Fault located about 6 miles southwest of the site, as shown on Figure 4. However, the Cascade Fault is located about 0.6 miles northeast of the site and the Monte Vista-Shannon Fault is located about 0.3 miles southwest of the site.

Since the site is not within or near an A-P Earthquake Fault Zone, and there are no faults mapped through the site or trending toward the site, the potential for fault ground rupture and fault creep hazards are judged to be very low.

3.1.5 Tsunamis and Seiches

Tsunamis are long-period sea waves generated by seafloor movements from submarine earthquakes or volcanic eruptions that rapidly displace large volumes of water. Coastal communities along the Pacific Ocean are particularly susceptible to such phenomena. The project site is located at an elevation of about 280 feet above mean sea level and approximately 15 miles south of the San Francisco Bay. Therefore, the potential for tsunami inundation at the site is considered to be nil.

Earthquake-induced waves generated within enclosed bodies of water are called seiches. Such waves may overtop dam embankments or extreme cases, cause dam failure, and in either case result in downstream inundation. The site is not within the downstream drainage area of any significant body of water. Therefore, the site is not considered to be susceptible to seiches.

3.2 Other Hazards

Potential geologic hazards other than those caused by a seismic event generally include ground failure and subsidence, consolidation settlement, landslides under static loading conditions, expansive and collapsible soils, flooding, naturally occurring asbestos (NOA) and soil erosion. These are discussed and evaluated in the following sections.

3.2.1 Ground Cracking and Subsidence

Withdrawal of groundwater and other fluids (i.e. petroleum and the extraction of natural gas) from beneath the surface has been linked to large-scale land subsidence and associated cracking on the ground surface. Other causes for ground cracking and subsidence include the oxidation and resultant compaction of peat beds, the decline of groundwater levels and consequent compaction of aquifers, hydro-compaction and subsequent settlement of alluvial deposits above the water table from irrigation, or a combination of any of these causes. Determining the impacts from subsidence on the project is beyond the scope of this study however, subsidence generally impacts a region, and should not produce excessive differential settlement in a single location. Local and regional locations prone to subsidence generally subside equally over time.

3.2.2 Consolidation Settlement

Consolidation is the densification of soil into a denser arrangement from additional loading, such as from new fills or foundation loads. Consolidation of clayey soils is usually a long-term process, whereby the water is squeezed out of the soil matrix with time. Sandy soils consolidate relatively rapidly with an introduction of a load. Consolidation of soft and loose soil layers and lenses can cause settlement of the ground surface or buildings. Based on relatively dense silty and clayey sand, gravel and cobbles at the site, the near-surface soils are considered to have a low potential for consolidation settlement.

3.2.3 Landslides

Landslides can occur under a variety of loading conditions, including both static and seismic, but involve sloping ground. As shown on Figure 4 the subject site is not adjacent to an "earthquake-induced landslide zone." The site and immediate vicinity are moderately flat and does not exhibit landslide features as determined by our geologic site reconnaissance and literature review. Therefore, the site is not susceptible to landsliding.

3.2.4 Flooding

The site is not located in a mapped area of flooding hazard, as shown on Figure 6-Flood Hazard Map, based on the FIRM (2009) map produced for the site vicinity. The site is located within Zone D, described as "Areas in which flood hazards are undetermined but possible". We recommend the project civil engineer be retained to verify the base flood elevation.

Based on our review of the Santa Clara Valley Water District Inundation Maps, the site is located within a dam failure inundation area for Lexington Reservoir.

3.2.5 Soil Erosion

Present construction techniques and agency requirements have provisions to limit soil erosion and resultant siltation during construction. These measures will reduce the potential for soil erosion at the site during the various construction phases. Long-term erosion at the site will be reduced by designing landscaping and/or hardscape areas such as parking lots and walkways with appropriate surface drainage facilities.

3.2.6 Naturally Occurring Asbestos (NOA)

The project site is not located within 10 miles of a mapped geographic ultramafic rock unit (GURU) or serpentinite, as shown on Figure 3. Therefore, it is our opinion that the subject site should be exempt from any special regulation or mitigation procedures relating to NOA before and during construction.

3.2.7 Other Geologic Hazards

Due to the site's location and geology, subsurface soil conditions, groundwater levels and land use factors, the site is not subject to the potential geologic hazards of loss of mineral resources, volcanism, cyclic softening of soils or loss of unique geologic features.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and engineering recommendations are based upon the analysis of the information gathered during the course of this study and our understanding of the proposed improvements.

4.1 Conclusions

The site is considered suitable from a geotechnical and geologic perspective for the proposed improvements provided the recommendations of this report are incorporated into the design and implemented during construction. The predominant geotechnical and geological issues that could affect design and construction at this site are summarized below.

Seismic Considerations – The site is located within a seismically active region and expected to be subjected to moderately strong to very strong ground shaking during the life of the new structures. As a minimum, the building designs should consider the effects of seismic activity in accordance with the latest edition of the California Building Code (CBC).

Undocumented Fill Soils –Undocumented onsite fill soils if encountered in the new building pad and loose or debris laden soils if encountered in other areas, should be completely removed and replaced by engineered compacted fill. The portion of over-excavated material not consisting of debris or organic topsoil may be reused as fill material upon approval of the Geotechnical engineer.

Grading in previously paved areas – The contractor should take notice that they are removing an existing paved area and moisture is often trapped below paved surfaces. Additional drying and working should be anticipated to achieve required moisture content for compaction.

4.2 Potential Foundation Recommendations

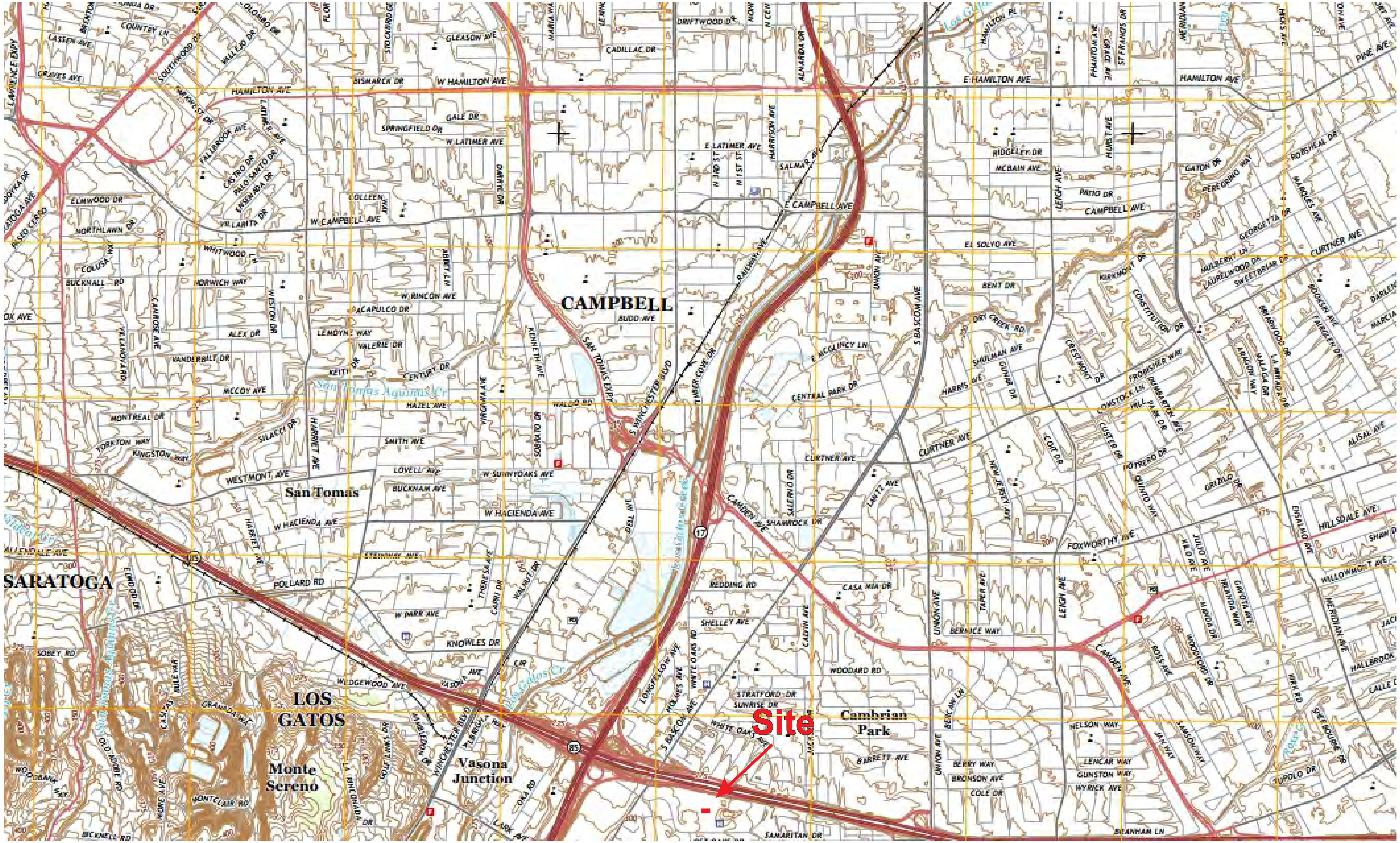
For the design of the new buildings and the addition to the existing facilities, we anticipate that smaller buildings on the order of 2 to 3 stories can readily be supported on continuous and /or isolated spread footings bearing on undisturbed stiff to very stiff, onsite native soil. The feasibility of the spread footings should be evaluated further during the design-level geotechnical investigation. Larger or heavier structures may require a deep foundations depending on structural loading conditions. If the total or differential settlement cannot be tolerated, an alternative foundation system such as deep concrete pile foundations or auger-cast pile system will be required.

4.3 Design-Level Geotechnical Investigation

The feasibility recommendations contained in this report were based on the provided design plans and available published information for the site and the vicinity. It is recommended that Geo-Eng be retained to perform a design-level geotechnical investigation for the improvement project at the Good Samaritan Hospital.

FIGURES

FIGURES



QUADRANGLE LOCATION

Map Scale

KILOMETERS 1 0.5 0 1 2
METERS 1000 500 0 1000 2000
MILES 1 0.5 0 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

Source: San Jose West Quadrangle, California, US Topographic Map
7.5-Minute Series, United States Geological Survey (2015)

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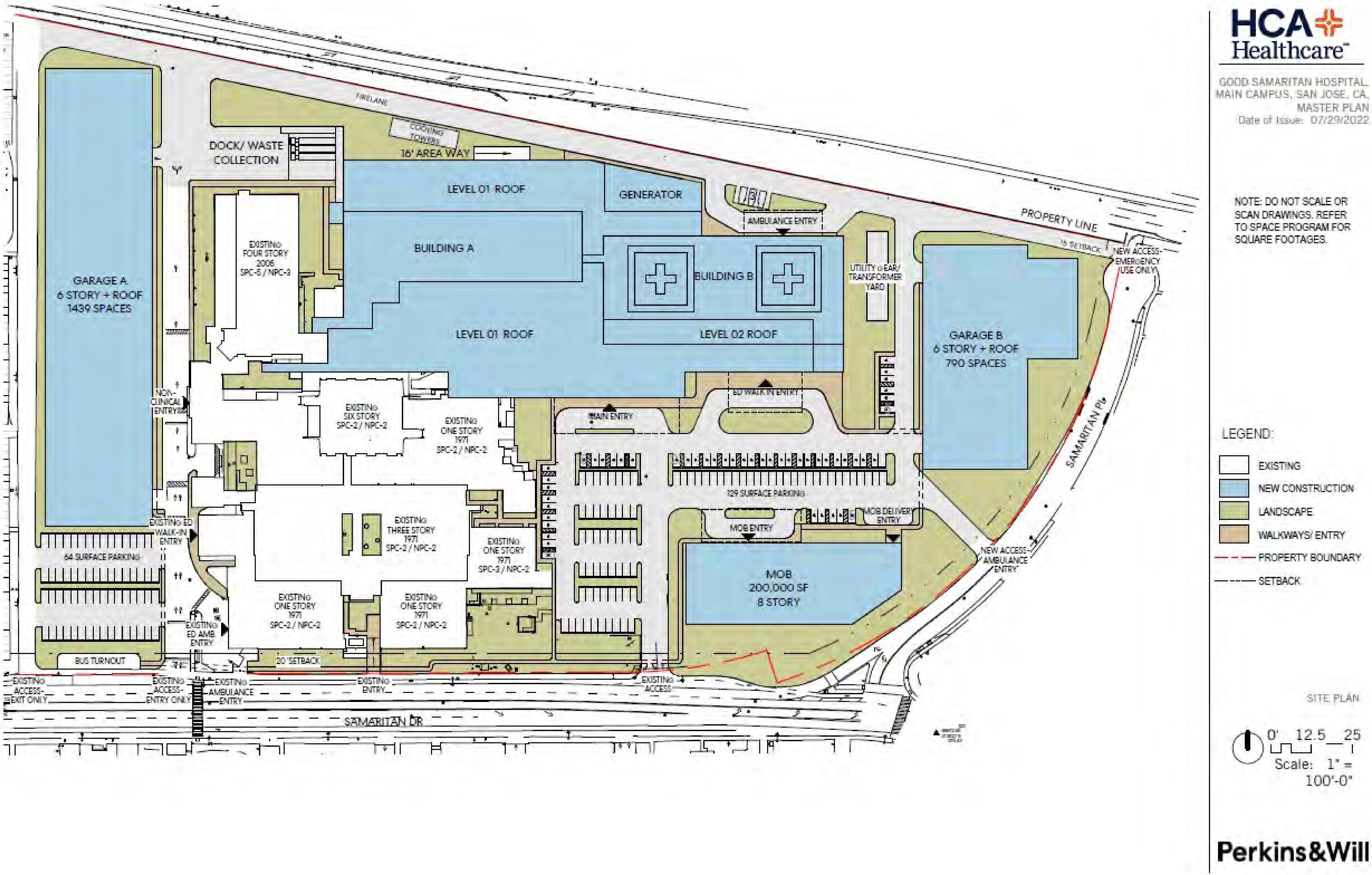
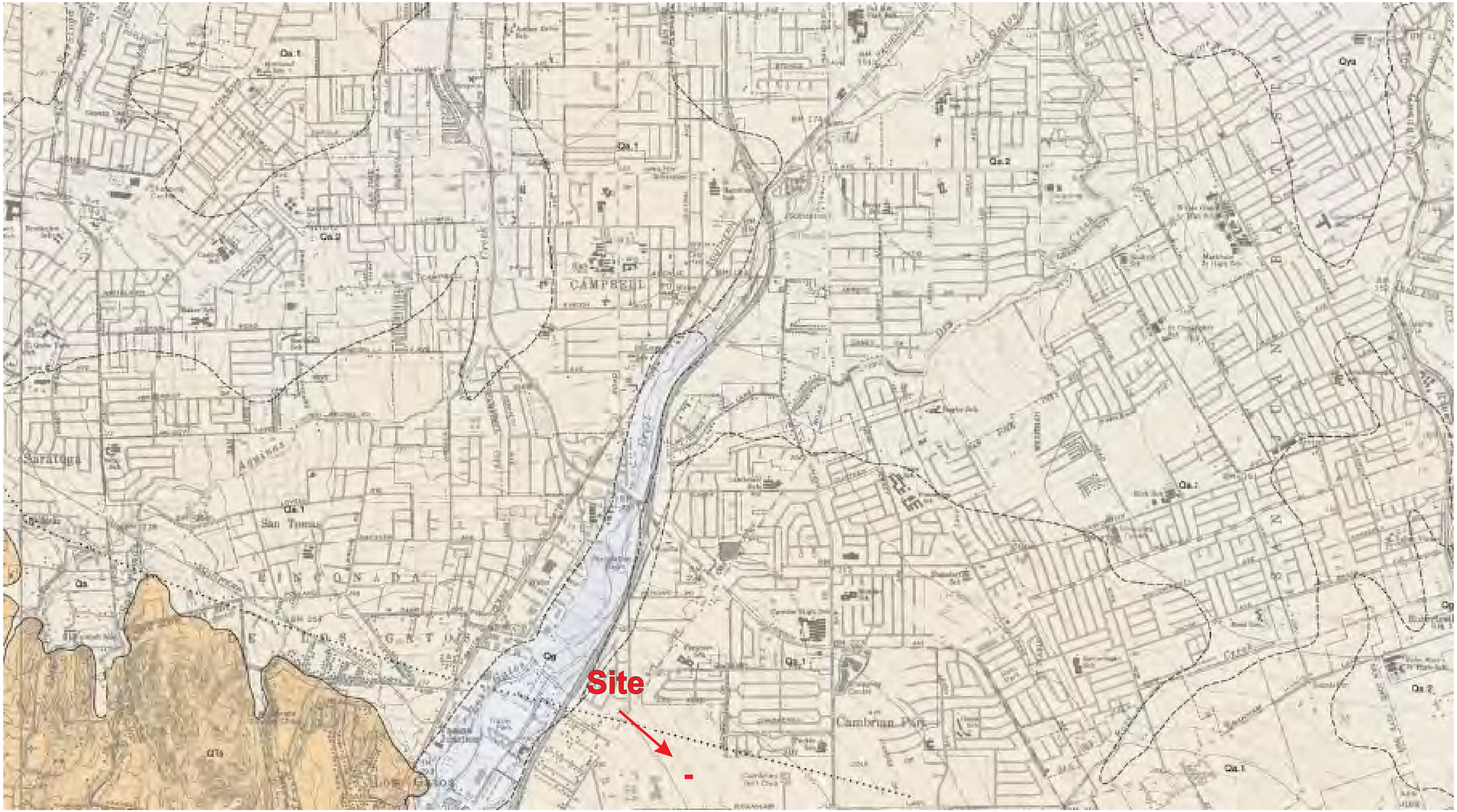
Good Samaritan Hospital 2425 Samaritan Drive San Jose, CA	133-1442	October 2022
	Site Vicinity Map	Figure 1



GEO-ENGINEERING SOLUTIONS, INC. A PEI COMPANY Geotechnical Engineering • Engineering Geology • Materials Testing	Good Samaritan Hospital 2425 Samaritan Drive San Jose, CA	133-1442	October 2022
		Site Development	Figure 2



Source: USGS w/ California Geologic Survey Scientific Investigations Map 2918, Geologic Map of the San Francisco Bay Region

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Geologic Faults
Geologic Contacts

af - Artificial fill
Qha - Alluvium, Holocene
Qpa - Alluvium, Pleistocene
QTs - Sediments, early Pleistocene and/or Pliocene

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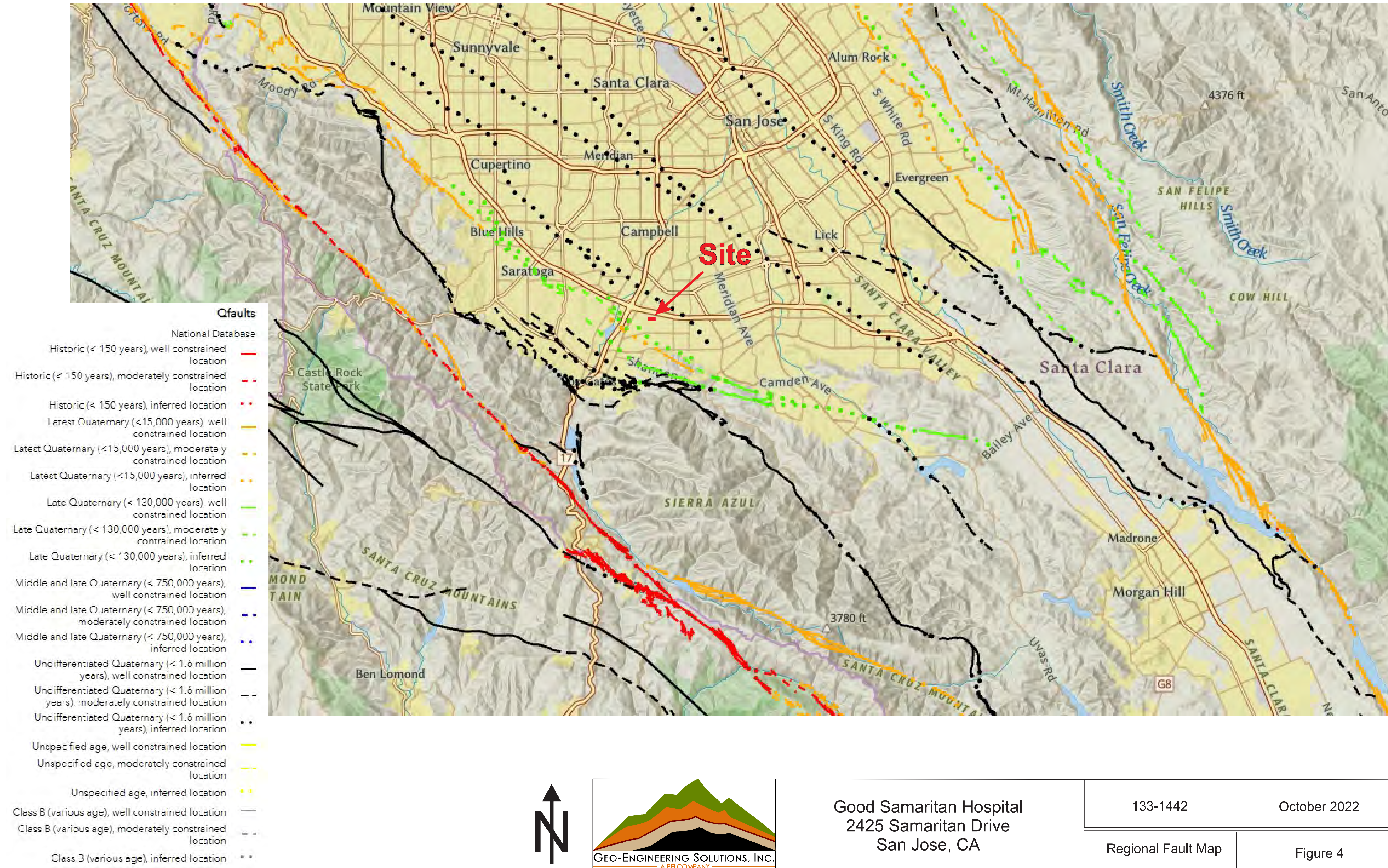
Good Samaritan Hospital 2425 Samaritan Drive San Jose, CA	133-1442	October 2022
	Site Vicinity Geology Map	Figure 3



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Good Samaritan Hospital 2425 Samaritan Drive San Jose, CA	133-1442	October 2022
	Regional Fault Map	Figure 4

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

1906 C ?

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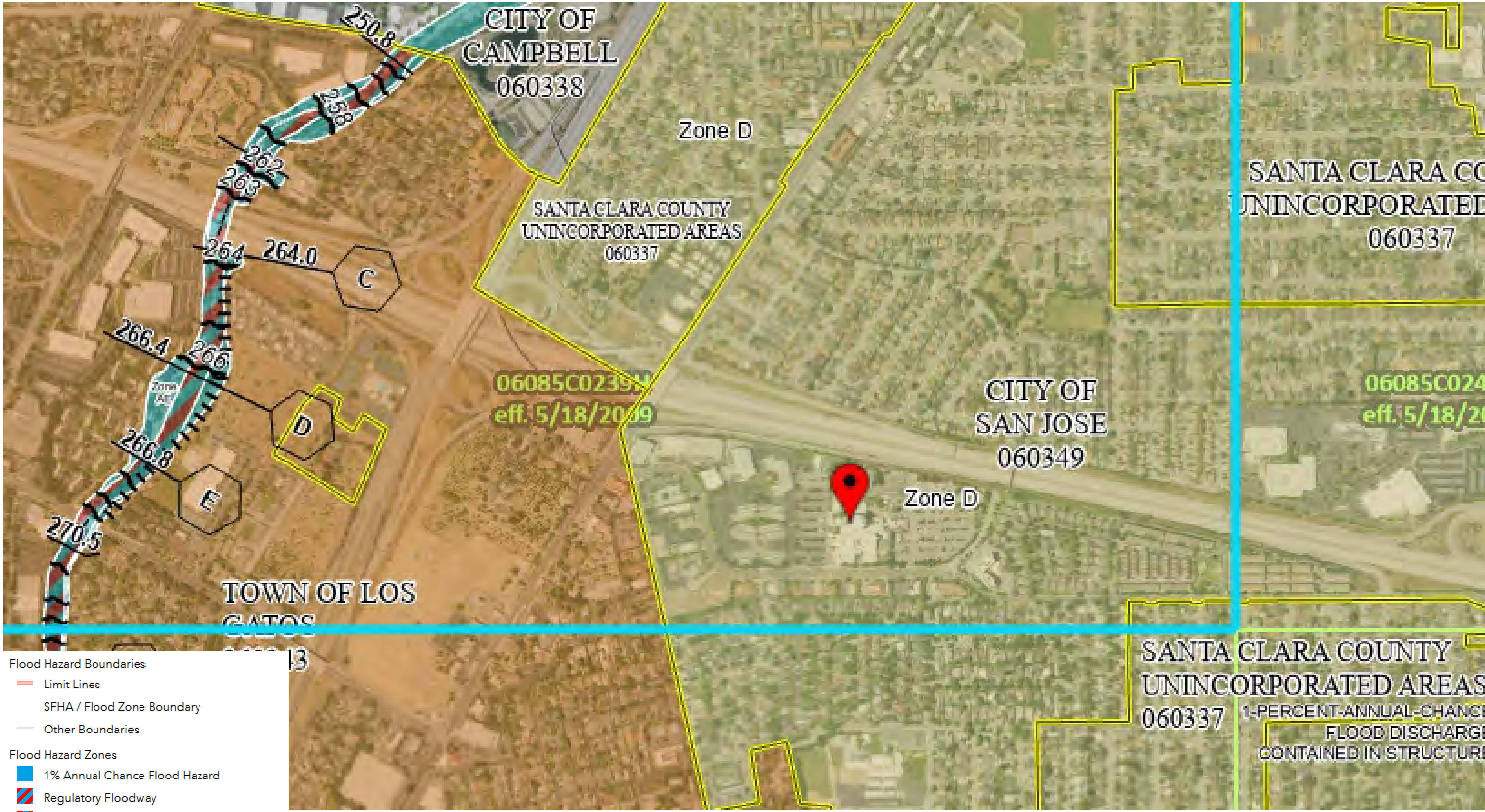
Good Samaritan Hospital 2425 Samaritan Drive San Jose, CA	133-1442	October 2022
	Liquefaction Hazard Map	Figure 5



Flood Hazard Boundaries

- Limit Lines
- SFHA / Flood Zone Boundary
- Other Boundaries

Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

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	Flood Hazard Map	Figure 6