Appendix H

Geotechnical Evaluation

GEOTECHNICAL PROFESSIONALS INC.

GEOTECHNICAL EVALUATION REPORT FOR CEQA
DISTRICT NOHO MIXED-USE DEVELOPMENT
LANKERSHIM BOULEVARD AND CHANDLER BOULEVARD
NORTH HOLLYWOOD AREA
CITY OF LOS ANGELES, CALIFORNIA

5300-5320 North Bakman Avenue
11204-11270 West Cumpston Street
5311-5341, 5356-5360, 5402-5430 North Lankershim Boulevard
11000, 11163, 11264-11280, 11333-11347, 11440 West Chandler Boulevard

Prepared for:
NOHO DEVELOPMENT ASSOCIATES, LLC
c/o Trammell Crow Company
2221 Rosecrans Ave
El Segundo, California 90245

Prepared by:
Geotechnical Professionals Inc.
5736 Corporate Avenue
Cypress, California 90630
(714) 220-2211

Project No. 2860.06I

March 12, 2020

GEOTECHNICAL PROFESSIONALS INC.

March 12, 2020

NOHO DEVELOPMENT ASSOCIATES, LLC
c/o Trammell Crow Company
2221 Rosecrans Ave, Suite 200
El Segundo, California 90245

Attention: Ms. Karen Shorr
Vice President

Subject: Geotechnical Evaluation Report for CEQA
Proposed District NOHO Mixed-Use Development
Parcels 1 Through 4 and Proposed Parking Structures
Lankershim Boulevard and Chandler Boulevard
City of Los Angeles, California
GPI Project No. 2860.06I

Dear Ms. Shorr:

Transmitted herewith is our Geotechnical Evaluation Report for CEQA for the Proposed Metro North Hollywood District NoHo Mixed-Use Development. This report supersedes our January 30, 2020 report and includes modifications to the project description of Block 8. This report addresses Parcels 1 through 4 and the West Lot and East Lot parking structures proposed along the east and west sides of the development. We appreciate the opportunity of offering our services on this project and look forward to seeing the project through its successful completion. Feel free to call us if you have any questions regarding our report or need further assistance.

Very truly yours,
Geotechnical Professionals Inc.

Justin J. Kempton, G. E. 2385
Associate

Paul R. Schade, G.E. 2371
Principal

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1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of an updated preliminary geotechnical and geologic/seismic hazards study performed by Geotechnical Professionals Inc. (GPI) for the proposed District NOHO Mixed-Use Development in the North Hollywood Area of Los Angeles, California. We previously issued the results of our study for Parcels 1 through 4 (Blocks 0 through 8) in our report dated December 5, 2019 and expanded the scope of the project to include the West Lot and East Lot parking structures as presented in out January 30, 2020 report. This report supersedes our January 30, 2020 report and includes modifications to the project description of Block 8.

The purpose of the study and this report is to support due diligence efforts by providing geotechnical and geologic input for the Environmental Impact Report for the project. This includes addressing the geotechnical related issues listed in Appendix G, Environmental Checklist Form, of the State California Environmental Quality Act (CEQA) Guidelines. The location of the site is shown on Figure 1, Site Location Map. The layout of the overall development is shown on Figure 2, Overall Site Development Plan.

This study includes review of available subsurface and geologic information and limited engineering analyses. GPI conducted a limited geotechnical field exploration program within Parcels 1 through 4 of the development and presented the results in a Geotechnical Data Report dated July 30, 2018. At the time of this report, field explorations have not been performed within the West Lot and East Lot parking structure sites due to the inability to obtain site access. A comprehensive geotechnical investigation to support detailed design and construction should be conducted later for final design.

1.2 PROJECT DESCRIPTION

1.2.1 General Project Overview

The property currently owned by Los Angeles County Metropolitan Transportation Authority (LACMTA) around the Metro North Hollywood Station in the City of Los Angeles is being considered for the proposed District NOHO Mixed-Use Development. The Metro North Hollywood Station is the terminus station for the Metro Red Line Subway and the Orange Bus Line. The project is in a relatively early stage of planning and design and some details regarding the project are still being developed.

The addresses of the properties covered in this report are 5300-5320 North Bakman Avenue; 11204-11270 West Cumpston Street; 5311–5341, 5356-5360, and 5402-5430 North Lankershim Boulevard; 11100, 11163, 11264-11280, 11333-11347, and 11440 West Chandler Boulevard in the North Hollywood Area of the City of Los Angeles, California.

The overall development includes Parcels 1 through 4, the West Lot parking structure, and the East Lot parking structure. Parcels 1 through 4 are four non-contiguous development areas and total approximately 15.9 acres. The four parcels are separated into eight building sites referred to as Blocks 0 through 8. The West Lot and East Lot parking structure sites are approximately 1.01 and 1.83 acres, respectively. The locations of the individual parcels, blocks, and parking structures are shown on Figure 2. Block 5/6 is considered as one building site.

In general, Parcels 1 through 4 will include approximately 1,527 residential units, approximately 493,074 square feet of office space, and approximately 105,125 square feet of restaurant/retail space. Parcels 1 through 4 will include 3,313 parking spaces for the proposed residential, office, retail and restaurant uses; 750 replacement parking spaces for Metro users in either nearby offsite lots or a combination of up to 274 spaces within the project site and the balance within these offsite locations. The West Lot and East Lot Parking Structures are planned to have at least 520 and 395 stalls, respectively.

1.2.2 Parcels 1 Through 4 (Blocks 0 Through 8)

Each of the parcels and the blocks contained in those parcels are described below. Structural loading information is limited at this time. Proposed site grades are anticipated to be within a few feet of existing site grades.

Parcel 1: Parcel 1 is comprised of approximately 10.67 acres bounded by Cumpston Street to the north, Fair Avenue to the east, Chandler Boulevard to the south, and Lankershim Boulevard to the west. Parcel 1 is currently developed with the Metro Red Line station portal, bus turnaround and layover area, and surface parking. Parcel 1 is planned to be developed with Blocks 1 through 5/6 and a portion of Block 0 (Block 0 East) as described below.

Block 1 will include a 28-story tower building with and adjoining four-level podium structure. The tower building is planned to have approximately 313 residential units and approximately 18,492 square feet of restaurant/retail space. The building will include retail space on the ground level, a mix of residential, common, and parking areas occupying above-grade levels 2 and 3, a mix of residential and common areas on level 4, residential space from levels 5-27, and four levels of subterranean parking. Level 28 will be a mechanical penthouse. Finish ground floor elevation will be about +635 feet. The subterranean parking levels are anticipated to extend approximately 43 feet below the tower and 33 feet below the adjoining podium structure.

Block 2 will include a 20-story tower building with an adjoining four-level podium structure. The building is planned to have approximately 309 residential units and approximately 2,975 square feet of restaurant/retail space. The building will include a mix of retail space, residential, and parking on the ground level, a mix of residential and parking on levels 2 and 3, a mix of residential and common areas on level 4, residential space from levels 5-19, and two levels of subterranean parking. Level 20 will be a mechanical penthouse. Finish ground floor elevation will be about +634 feet. The subterranean parking levels are anticipated to extend approximately 24 feet below grade.

Block 3 will include a 6-story building with one subterranean parking level. This building is planned to have approximately 160 apartments. The building will generally include a mix of a mix of residential, common, and parking areas on the ground floor, a mix of residential and common areas on level 2, and residential space from levels 3-6. Finish ground floor elevation will vary from about +632 to +634 feet. The underground parking level is anticipated to extend approximately 11 feet below grade.

Block 4 will include a 7-story building with two levels of subterranean parking. This building is planned to have approximately 194 residential units and approximately 25,750 square feet of retail space. The building will include a mix of retail, residential and parking areas on the ground floor and level 2, residential space and common areas on level 3, and residential space from levels 4-7. Finish ground floor elevation will vary from about +630 to +633 feet The subterranean parking levels are anticipated to extend approximately 22 feet below grade. The northwest corner of the proposed building (approximately 2,000 square feet in plan area) will be at-grade where no subterranean levels are planned.

Block 5/6 includes a 25-story L-shaped tower building and a separate two-story retail building; both supported on four common subterranean parking levels. The tower building is planned to have approximately 400 residential units, approximately 17,802 square feet of restaurant/retail space, and approximately 91,345 square feet of office space. The tower building will include a mix of retail, office, and residential amenities on the ground floor, residential and office space on levels 2-5, residential space from levels 6-24, and four levels of parking below grade. Level 25 will be a mechanical penthouse. The separate retail building is planned to have approximately 13,024 square feet of restaurant/retail space on both floors. The parking levels are anticipated to extend approximately 46 to 51 feet below grade and extend laterally outside the footprint of the above grade buildings. Community space and common areas will also likely be on the ground floor.

A portion of Block 0 (Block 0 East) will be developed in Parcel 1 (on the east side of Lankershim Boulevard) as shown on Figure 2. Drawings indicate the building will be at grade with no subterranean levels.

Parcel 2: Parcel 2 is comprised of approximately 1.8 acres bounded by Chandler Boulevard to the north, Lankershim Boulevard to the east, Weddington Street to the south, and Bakman Avenue to the west. The western portion of Parcel 2 is currently a vacant lot and the eastern portion of Parcel 2 consists of an asphalt paved parking lot. Parcel 2 is planned to be developed with Block 8 as described below.

Block 8 will include a 22-story office tower with an adjoining six-level podium structure. The tower and podium will be supported on a common four-level subterranean parking garage. The building is planned to have approximately 488,320 square feet of office space and approximately 18,942 square feet of restaurant/retail space. The building will include parking on the four subterranean levels; retail space, office space and parking on the ground level and level 2; office space and parking on above-grade levels 3 through 6; and office space from levels 7-21. Level 22 will be a mechanical penthouse. Finish ground floor elevation will be about +630 feet. The subterranean parking levels are anticipated to extend approximately 44 feet below grade.

Parcel 3: Parcel 3 is comprised of approximately 2.69 acres and bounded by North Chandler Boulevard to the north, Lankershim Boulevard to the east, South Chandler Boulevard to the south, and Tujunga Avenue to the west. Parcel 3 is currently developed with the existing Metro Orange Line Terminus, Metro Red Line station portal, commercial buildings, and surface parking. Parcel 3 is planned to be developed with the western portion of Block 0 (Block 0 West) as described below.

Development of the western portion of Block 0 (Block 0 West) is anticipated to include at grade improvements and modification of the bus turnaround, and modification and expansion of the existing Metro Red Line Portal at and below grade. Other subterranean construction is not planned.

Parcel 4: Parcel 4 is comprised of approximately 0.68 acres bounded by a City alley to the north, Tujunga Avenue to the west, a vacant property not owned by Metro to the east (with Lankershim Boulevard further to the east), and North Chandler Boulevard to the south. Parcel 4 is developed with one- and two-story partially occupied buildings (to be demolished) currently are leased to a plumbing supply wholesaler and other commercial uses. Parcel 4 is planned to be developed with Block 7 as described below.

Block 7 will include a five-story building with one level extending below grade. This building is planned to have approximately 151 residential units. The building will include parking in the subterranean level, parking and residential amenity space on the ground level, and residential space from levels 2-5. The underground parking level is anticipated to extend approximately 10 feet below grade.

1.2.3 West Lot and East Lot Parking Structures

West Lot Parking Structure: The West Lot parking structure site will consist of approximately 1.01 acres bounded by Chandler Boulevard to the north, Tujunga Avenue to the east, and the Orange Line Busway to the south. A single story building occupies the lot just west of the site. The West Lot site is currently developed with a tall single story commercial/retail building and adjacent asphalt paved parking lot.

The proposed structure will have five levels (one at-grade level and four elevated decks) and have at least 520 stalls. One way speed ramps in the northeast and northwest corners of the structure will be used to circulate traffic up and down the parking levels. One elevator and three sets of open stairs are planned. The finish at-grade level is anticipated to be at or near existing site grades. Subterranean levels are not planned.

East Lot Parking Structure: The East Lot parking structure site will consist of approximately 1.83 acres bounded by Chandler Boulevard to the south, Fair Avenue to the west, and Vineland Avenue to the east. A baseball field and a four-story apartment building exist adjacent to the north side of the site. The site is currently paved with asphalt and used for parking.

The proposed structure will have two levels (one at-grade level and one elevated deck) and have at least 395 stalls. One way speed ramps in the northwest and southeast corners of the structure will be used to circulate traffic up to and down from the upper parking level. Four sets of open stairs are planned. The finish at-grade level is anticipated to be at or near existing site grades. Subterranean levels are not planned.

2.0 SCOPE OF WORK

Our authorized scope of work for the development included a review of readily available subsurface and geologic data, a limited field exploration program, limited field infiltration testing, limited laboratory testing, geologic and seismic hazard evaluation, preliminary foundation analyses, and preparation of the following reports.

- A Geotechnical Data Report for Parcels 1 through 4 to present the results of the limited field exploration program, field infiltration testing, and laboratory testing. This report is dated July 30, 2018.

- A Geotechnical Evaluation Report for CEQA for the overall development to address geotechnical and geologic/seismic hazards outlined in Appendix G of the State CEQA Guidelines and their potential to impact site development

This report presents the results of our study to address potential geotechnical and geologic/seismic hazards for the development.

Our preliminary field exploration program for Parcels 1 through 4 consisted of eight Cone Penetration Tests (CPTs), four exploratory borings, and three infiltration test wells. The CPTs were generally advanced to depths of approximately 30 to 50 feet below existing grades. The borings were drilled to depths of approximately 81 to 121 feet below existing grades. The infiltration wells were installed to depths of approximately 10 to 60 feet below existing grades. The locations of the subsurface explorations performed are shown on Figures 3A and 3B, Exploration Location Plans. Details and the results from the field exploration and laboratory programs are presented in our July 30, 2018 report. As of the issuance of this report, we have not yet performed explorations within the limits of the West Lot and East Lot Parking Structures due to the inability to obtain site access.

Our scope of work included review of inhouse geotechnical reports and those made available to us, on-line open file geologic hazards reports, geology maps, and groundwater data. The data presented in our July 30, 2018 report were also reviewed and engineering analyses were performed to assess potential foundation systems and other geotechnical related constraints for the proposed buildings at the subject site. The results of our data review, analyses, conclusions regarding mitigation of potential geologic/seismic hazards, and preliminary geotechnical considerations are presented in this report.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 EXISTING SITE CONDITIONS

The locations of each of the four parcels included in this study are shown on Figure 2. Information regarding the existing site conditions for each parcel are summarized below.

Parcel 1: Parcel 1 (Blocks 1 through 5/6 and the eastern portion of Block 0) is comprised of approximately 10.67 acres and is currently developed with the Metro Red Line station portal, bus turnaround and layover area and surface parking. The ground surface is comprised of asphalt and concrete pavements and concrete gutters. The parking areas are surrounded by minor amounts of landscaping and concrete hardscape. The topography of the parcel and the surrounding area is relatively flat, with less than a 1 percent downgrade to the southeast. Ground surface elevations across the parcel vary from approximately +635 feet in the northwest to approximately +627 feet in the southeast.

The North Hollywood Station entry plaza mezzanine for the Red Line is located along Lankershim Boulevard and within the portion of Block 0 that is east of Lankershim. According to the Record Drawings provided to GPI, the finish floor elevation of the lower passageway of the North Hollywood Station entry plaza mezzanine is +594.84 feet (approximately 38 feet below existing grade). The lowest bottom elevation of the Metro Red Line tunnel below Lankershim Boulevard is anticipated to be approximately 60 to 65 feet below existing grade. A subterranean Red Line subway tunnel related structure exists below Chandler Boulevard, and the depth is unknown.

Parcel 2: Parcel 2 (Block 8) is comprised of approximately 1.83 acres. The western portion of Parcel 2 is currently a vacant lot (unpaved) and the eastern portion of Parcel 2 consists of an asphalt paved parking lot. The topography of the site and the surrounding area is relatively flat, with less than a 1 percent downgrade to the southeast. Ground surface elevations across the parcel vary from approximately +632 feet in the northwest to approximately +629 feet in the southeast.

Parcel 3: Parcel 3 (western portion of Block 0) is comprised of approximately 2.69 acres and is currently developed with the existing Metro Orange Line Terminus, Metro Red Line West Entrance station portal, commercial buildings, and surface parking. The southeast corner of the parcel is vacant and unpaved. The topography of the site and the surrounding area is relatively flat, with less than a 1 percent downgrade to the southeast. Ground surface elevations across the parcel vary from about +637 feet in the northwest to +632 feet in the southeast. The Metro Red Line West Entrance station portal provides pedestrian access to the Metro Red Line Subway Station at approximate elevation +590 feet (approximately 43 feet below existing grade).

Parcel 4: Parcel 4 (Block 7) is comprised of approximately 0.68 acres and is currently developed with one- and two-story buildings leased to a costume shop and plumbing supply store. The adjacent property to the east is vacant. The topography of the site and the surrounding area is relatively flat with the exception of the sloped entry way to the plumbing store's dock high wall near the entrance. Ground surface elevations across the parcel vary from about +638 feet in the northwest to +636 feet in the southeast to +634 near the entrance to the plumbing store.

West Lot Parking Structure: The West Lot parking structure site consists of approximately 1.01 acres and is currently developed with a one-story commercial/retail building and adjacent asphalt paved parking lot. The topography of the site and the surrounding area gently slope downward to the east. Ground surface elevations across the parcel vary from about +641 feet in the northwest corner to +638 feet in the southeast corner, approximately 650 feet away (less than a 1 percent downgrade).

East Lot Parking Structure: The East Lot parking structure site consists of approximately 1.83 acres and is currently paved with asphalt and used for parking. The topography of the site and the surrounding area gently slope downward to the east. Ground surface elevations across the parcel vary from about +628 feet at the west end to +622 feet at the east end, approximately 1100 feet away (less than a 1 percent downgrade).

3.2 SITE HISTORY

Our understanding of the development history of the site is based on information provided by our client as well as the current property owner (LACMTA), a review of historical aerial photographs (Historical Aerials and Google Earth), and additional online sources. Currently, the overall development project site is occupied as follows:

- Parcel 1: Surface parking, bus layover and turnaround area, and the North Hollywood Metro Station (Red Line) entry plaza mezzanine;
- Parcel 2: Vacant lot and surface parking for an adjacent two-story building;
- Parcel 3: Orange Line bus layover and turnaround area and commercial buildings;
- Parcel 4: One- and two-story buildings with limited surface parking areas.

A brief site history for each parcel is presented below. In general, Parcels 1 through 4 have been in their approximate current configuration since 2005.

Parcel 1: Parcel 1 (Blocks 1 through 5/6 and the eastern portion of Block 0) appears to have been in its current configuration since 2002. Based on various online sources, the North Hollywood Station for the Metro Red Line was opened in 2000. In 1994 (the most recent photo available prior to 2002), aerial photographs show the parcel occupied by multiple one to two-story buildings, container storage areas, and associated surface parking. Between 1994 and 1964, the only discernible changes within Parcel 1 appear to be the presence of a few more one to two-story buildings along Cumpston Street. In 1952, the earliest photo available, it appears the majority of the southern portions of Parcel 1 were used for storage of shipping containers, likely associated with the rail line discussed below.

The southern portion of Parcel 1 also contained the now-abandoned Southern Pacific rail line, which was likely used sparingly up until 1991, when it was sold to LACMTA. Between 1956 and 1991, the rail line was likely used for non-passenger transportation, with the line potentially being severed as a "through-route" sometime in the 1980's. Prior to 1952, the rail line was operated by Pacific Electric and did offer passenger service. The line, part of the Burbank Branch of the Southern Pacific Railroad, was originally opened in 1893.

Parcel 2: Parcel 2 (Block 8) has been its current configuration since 2009. Prior to 2009, the parking lot on the southeast end of the site was not present. Between 1993 and 2009, the only noticeable changes to the site appear to be the various addition and removal of small storage containers within the vacant lot. In 1989, the now vacant portions of the site (along Bakman Avenue and Chandler Boulevard) are paved and being used for surface parking. In 1980, the eastern portions of the site (now used for parking) appear to be fully occupied by one to two-story buildings. These buildings appear to have been in place dating back to 1952, the earliest aerial photograph available. Another small building along Bakman Avenue is also visible in photographs from 1954 and 1952.

During construction of the Metro Redline subway, a temporary access ramp was constructed that traverses Parcels 2 and 3. Based on as-built plans provided by LACMTA, the access ramp appears to start at grade at Tujunga Avenue (approximately 130 north of North Chandler Avenue) and terminated at the subway alignment in Lankershim Boulevard (approximately 140 feet north of Weddington Street) at about Elevation 572 feet (approximately 56 feet below existing grades). It appears the access ramp was excavated using vertical shoring. Records were not provided regarding how the temporary access ramp was covered or infilled.

Parcel 3: Parcel 3 (Block 0) has been in its current configuration since 2005, when the Orange Line bus terminal was constructed. In 2004, the bus terminal is not in place but appears to be under construction. Between 2003 and 1989, most of the site appears to have been used as surface parking or was occupied rail associated with the Southern Pacific Railroad. It is unclear in the aerial photographs whether the line was active or abandoned between 1989 and 1991, when the rail line was sold to LAMTA. In 1980, the currently existing one-story building at the northwest corner of the site, has not yet been constructed. The site appears to generally remain in this configuration dating back to 1952, the earliest aerial photograph available.

On the southeast corner of the site is the Southern Pacific–Pacific Electric Station building, originally built during the construction of the Burbank Branch of the Southern Pacific Railroad in 1893. The station may have been used in this capacity up until 1952, when passenger service on the Pacific Electric line was terminated. More recently, the station was renovated, restored to its approximate pre-1952 design, and reopened sometime in 2017. The station building is one-story and is now used as a commuter café. Note the temporary access ramp described above that traverses Parcels 2 and 3.

Parcel 4: Parcel 4 (Block 7) appears to have remained in its approximate current configuration since 1989. The site is currently occupied by one and two-story buildings with associated surface parking. To the east of the site is a now vacant lot, which was occupied by various one or two-story buildings prior to 2007. Prior to 1980, a now present one-story building on the east end of parcel is not present. Prior to 1954, the existing building on the west end of the site (plumbing supply) is smaller, consisting only of the westernmost portion. In 1952 (earliest aerial photograph available), the site is in the same configuration as 1954.

West Lot Parking Structure: The lot for the proposed West Lot Parking Structure appears to have been in its current configuration since 1989. In 1980, the nearest earlier photograph prior to 1989, the site appears to be vacant, without the currently existing one-story structure. In aerial photographs from 1977 to 1980, the site appears to have remained vacant. In 1972, a one-story structure is visible at the eastern end of the lot, adjacent to Tujunga Avenue. Additional one-story structures are visible in 1954, to the west of the structure remaining in 1972. In addition, the site appears to have been used as storage of railyard materials in aerial photographs prior to 1964. The site appears to remain in this configuration dating back to 1952, the earliest aerial photograph that we reviewed.

East Lot Parking Structure: The lot for the proposed East Lot Parking Structure appears to have been in its current configuration (surface parking) since 2016. In 2014, the site is vacant and appears to be undeveloped. There is a notable difference in the surface conditions between the eastern and western halves of the lot, but this may be due to the western portion having surface vegetation and the eastern half exhibiting little to no vegetation. The site remained in this configuration until at latest 2007. In 2006, the subject lot and the property to the north are under construction. The site appears to have been under construction between roughly the end of 2004 and sometime in 2006. Prior to 2004, the subject lot appears to be occupied by multiple one-story structures and open areas used for storage. This configuration remained the same until at least 1978. Between 1964 and 1977, fewer one-story structures are visible and larger portions of the site appear to be used for surficial storage. In 1954, only one one-story structure is visible, with the eastern half of the subject lot appearing to be vacant and undeveloped. This configuration was consistent dating back to 1952, the earliest aerial photograph that we reviewed.

3.3 SUBSURFACE SOILS

Our preliminary field investigation conducted within Parcels 1 through 4 disclosed a subsurface profile consisting of shallow undocumented fill soils overlying natural soils. Detailed descriptions of the conditions encountered are shown on the Logs of CPTs and Borings presented in our July 30, 2018 Geotechnical Data Report.

The subsurface profile encountered in the explorations consisted of shallow fills underlain by native soils. One boring (Boring B-1) of the four drilled for the study encountered fill soils to a depth of approximately 5 feet below existing grade. The fill consisted of loose to medium dense silty sand. Less than 1 foot of undocumented fills, primarily consisting of the surface pavement and subsurface aggregate base layers was encountered in the other borings.

Although not encountered in our limited explorations in the area, we anticipate deeper fills exist adjacent to the subway station entries and subway within and adjacent to Blocks 0, 1, 5/6 and 8 along Lankershim Boulevard and Chandler Boulevard. As described previously, these subsurface structures extend on the order of 36 to 65 feet below existing grades. Deep fill is also anticipated where a temporary access ramp was constructed through Parcels 2 and 3 (Blocks 0 and 8) for construction access to the existing subway tunnel. Fills placed to backfill the temporary access ramp could extend up to 56 feet below grade. Other shallow fills should be anticipated where pre-existing utilities and structures have been demolished and/or abandoned.

The natural soils encountered in our explorations consisted of medium dense to dense, fine to coarse grained, sands and silty sands with trace amounts of gravel up to depths of approximately 38 to 45 feet below the existing grade. Layers of very stiff sandy silts, clayey silts and silts and medium dense to dense silty sands, approximately 1 to 10 feet in thickness, were encountered at depths of approximately 27 to 33 feet below grade. The sand and silty sand layers below the silt layers transitioned from dense to very dense with depth. Very dense, fine to coarse grained sands with varying amounts of gravel and occasional cobbles were encountered at depths of approximately 38 to 45 feet to the maximum depth explored. It's possible that a few random boulders (particles greater than 12 inches in size) could exist in the deeper native soils. The sandy soils were slightly moist to very moist at depth. The silts were generally very moist, with higher average moisture contents than the surrounding sandy soils.

The natural materials exhibited moderate to high strength and low to moderate compressibility characteristics. Although not tested, the upper sandy soils are anticipated to have a very low potential for expansion.

Although we did not perform explorations within the limits of the proposed West and East Lot Parking Structures, based on geologic information we anticipate the subsurface conditions to be similar to those encountered in our explorations performed within Parcels 1 to 4. More specifically, the subsurface conditions encountered in our CPT's C-1 and C-5 and our Boring B-1 (medium dense silty sands to about Elevation +615 feet, dense to very dense sands to about Elevation +602 feet, very stiff clayey silts to about Elevation +594 feet, and very dense silty sands with gravel below) are likely representative of the conditions within the West Lot.

For the East Lot, we anticipate the subsurface conditions encountered within our CPT's C-4 and C-6 and our Boring B-3 (medium dense silty sands and sands to about Elevation +615 feet, dense to very dense sands to about Elevation +592 feet, very stiff clayey and sandy silts to about Elevation +582 feet, and very dense sands with gravel below) to be likely representative.

Based on prior development, the near surface soil conditions at both the West Lot and East Lot Parking Structure sites may be different from the near surface soil conditions encountered in our nearby explorations.

4.0 REGULATORY FRAMEWORK

4.1 GENERAL

This section provides an introduction to applicable state and local laws, regulations, and codes that will govern the project.

4.2 STATE LEVEL

The State of California adopted the 2019 California Building Code (CBC), Volumes 1 and 2 effectively on January 1, 2020. The 2019 CBC makes up Part 2 of Title 24 of the California Code of Regulations. Chapter 16 of Volume 2 contains provisions for structural design. Provisions for soils and foundation studies and design are presented in Chapter 18. Appendix J of the code applies to grading. The recommendations included herein are based on the 2019 CBC.

The Alquist-Priolo Geologic Hazard Zones Act was passed by the State of California in 1972 to address the hazard and damage caused by surface fault rupture during an earthquake. The Act was renamed the Alquist-Priolo Earthquake Fault Zoning Act in January 1994. The Act has been updated since then and requires the State Geologist to establish "earthquake fault zones" along known active faults in the state. Cities and counties that include earthquake fault zones are required to regulate development projects within these zones.

The California Seismic Safety Commission was established by the Seismic Safety Act in 1975 with the intent of providing oversight, review, and recommendations to the Governor, State Legislature, as well as state and local governments regarding seismic issues. The commission was renamed the Alfred E. Alquist Seismic Safety Commission in 2006.

The Seismic Hazard Mapping Act of 1990 was enacted, in part, to address seismic hazards not included in the Alquist-Priolo Act, including strong ground shaking, liquefaction, landslides, and or other seismic related ground failures. Under this Act, the State Geologist is assigned the responsibility of identifying and mapping seismic hazard zones. The recommended guidelines and criteria for the preparation of seismic hazard zones are presented in Special Publication 118, Recommended Criteria for Delineating Seismic Hazard Zones in California. The California Geological Survey (CGS), formerly the State of California, Division of Mines and Geology (CDMG), adopted seismic design provisions in Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California (revised and readopted on September 11, 2008).

4.3 CITY LEVEL

The City of Los Angeles adopted portions of the 2019 CBC and 2018 International Building Code (IBC) together with a series of City of Los Angeles amendments as the 2020 City of Los Angeles Building Code (LABC), which became effective January 1, 2020. The compiled 2020 LABC is anticipated to become available to the public by mid-February

2020. The LABC includes provisions to address issues related to site grading, cut and fill slope design, soil expansion, geotechnical studies before and during construction, slope stability, allowable bearing pressures and settlement below footings, effects of adjacent slopes on foundations, retaining walls, basement walls, shoring of adjacent properties, and potential primary and secondary seismic effects.

The City of Los Angeles has also adopted a series of Grading Standards that supplement the requirements of the LABC. The Grading Standards include specific requirements for seismic design, slope stability, grading, foundation design, geologic studies and reports, soil and rock testing, and groundwater.

The City's primary seismic regulatory document is the Safety Element of the City of Los Angeles General Plan, adopted November 26, 1996. The City's regulations incorporate the State's requirements. As it pertains to tsunamis and other flood hazards, the Safety Element refers to the City's Flood Hazard Specific Plan.

The City of Los Angeles established citywide methane mitigation requirements in Ordinance 175790, effective March 29, 2004. The ordinance establishes the minimum requirements for the City of Los Angeles for control of methane intrusion emanating from geologic formations. The ordinance requires new buildings and paved areas in a Methane Zone or Methane Buffer Zone to comply with the ordinance and the Methane Mitigation Standards established by the Superintendent of Building.

The seismic design of select tall buildings is anticipated to be based on the performance-based earthquake engineering (PBEE) procedures in the latest Los Angeles Tall Buildings Structural Design Council Guidelines dated March 20, 2018 (LATBSDC 2017 with 2018 Supplements).

5.0 GEOLOGIC CONDITIONS

5.1 REGIONAL GEOLOGY

The subject site is located in the southern end of the Northwestern Block of a regional geologic structure termed the Los Angeles Basin, a northeast-trending structural basin filled with Tertiary age marine sedimentary rocks at depth and mantled by Recent and Pleistocene age non-marine alluvial sediments deposited by washes and streams flowing northward from the Santa Monica Mountains, located to the south of the site. This basin is the surface expression of a deep structural trough, which has been subdivided into four primary structural blocks distinguished from one another by contrasting basement rock types and stratigraphy. These structural blocks are generally separated by zones of faulting along which movement has been occurring intermittently since the middle Miocene Age (Yerkes et al, 1965).

Regionally the site is located near the border between two of California's geomorphic provinces, the Transverse ranges to the north and the Peninsular Ranges to the south. The active Hollywood Fault, located approximately 7.6 kilometers south of the site, forms the boundary of the two geomorphic provinces. The Hollywood Fault is part of an east-west trending active fault complex termed the Santa Monica-Hollywood-Raymond Fault System. This fault system generally forms the southern boundary of the Santa Monica and San Gabriel Mountains north of the fault system, and the Los Angeles Basin south of the fault system.

The Transverse Ranges are characterized by east-west trending mountain ranges, including the Santa Monica and San Gabriel Mountains, that are oriented oblique to the trend of the other major structural trends in California, including the San Andreas Fault, Sierra Nevada Mountains, and other mountain ranges in Southern California, which trend northwesterly.

The Peninsular Ranges are characterized by northwesterly trending active faults and mountain ranges related to the San Andreas and other major fault systems in the province. The province extends from the Santa Monica-Hollywood-Raymond Fault System, within the Los Angeles Basin, southeast to Baja California.

More specifically, the site is located at the southern end of the San Fernando Valley, an east-west-trending structural trough whose origin is closely related to uplift and deformation of the San Gabriel mountain range to the north. As the range has been elevated and deformed as a result of crustal shortening during Cenozoic time, the San Fernando Valley has subsided and become filled with sediment.

5.2 SITE GEOLOGY

The subject site is underlain by Quaternary age alluvial sediments and stream channel deposits. The alluvial deposits are described as consisting of clay, sand, and gravel. The stream channel deposits are described as consisting of gravel and sand (Dibblee, 1991).

Dolan et al. (1997) and other work in the area have demonstrated that the near surface alluvial sediments at the site and in many nearby surrounding areas are Holocene in age. The geologic conditions in the site area are shown on Figure 4, Local Geologic Map. Our field investigation generally confirmed the published geologic conditions. A summary of the soil conditions encountered in our explorations is provided in Section 3.3.

5.3 GROUNDWATER

As shown on Figure 5, Historical High Groundwater Map, historical data provided by the California Geological Survey (CGS) indicates a shallowest depth to groundwater of approximately 10 feet below the existing grades in the site vicinity (CGS, 1997 and 1998).

Groundwater was not encountered in the borings drilled as part of this study in 2018. Boring P-1, drilled with a hollow stem auger drill rig (a dry method) to approximately 62 feet below grade, encountered sands that were only slightly moist (between 2 and 3 percent moisture content) to the maximum depth explored. Borings B-1 through B-4 were drilled to depths of approximately 81 and 121 feet below existing grade using rotary wash drilling methods (a wet method). The moisture contents of samples from Borings B-1 through B-4 were somewhat higher and were likely influenced by the rotary wash drilling method used. In addition, after completion of drilling in Borings B-2 and B-3, the drilling mud was bailed to depths of approximately 82 and 80 feet, and no groundwater was observed. Borings B-1 and B-4 caved at depths of approximately 42 feet and 60 feet, respectfully during bailing of the boreholes but it is not clear if this was caused by the presence of groundwater. The results of the field explorations were presented in our Geotechnical Data Report dated July 30, 2018.

Earth Resources, Inc. (ERI) conducted a geologic review of available regional groundwater for the area of the San Fernando Valley Groundwater Basin (SFVGB) centered around the subject site and presented the results in their report dated June 12, 2019 (ERI, 2019). The study included an in-depth review of historical groundwater records, aquifer characteristics, development history of the San Fernando Valley, and groundwater withdrawal relative to Upper and Lower Regulatory Storage Volume Limits established by the State Water Rights Board. ERI concluded that current groundwater levels are on the order of 110 to 120 feet below ground surface and have been at least 100 feet below ground surface since around 1956. The report acknowledges the historical high ground water levels mentioned above from circa 1944 and that historic overdraft of the SFVGB has been ongoing since 1956 as the area was developed.

The ERI report further states that if groundwater levels rose to the Lower Regulatory Limit, groundwater levels would remain around 110 feet below grade and in the unlikely scenario groundwater in storage did recover to the point of historic overdraft in 1954, the groundwater level at the site would still be 85 to 90 feet below ground surface. ERI concluded that it was unlikely groundwater would rise above 110 feet below ground surface in the next 50 to 100 years and that the possibility of ground water rising above 85 feet below ground surface was nil.

With recent input from the City of Los Angeles Grading Division (Grading Division) and Bureau of Sanitation, the following conclusions and preliminary recommendations are provided for groundwater considerations in design.

- Liquefaction analyses should be based on historic high groundwater levels (approximately 10 feet below existing site grades) as reported in CGS Seismic Hazard Reports. This is required by the Grading Division.
- Since the City of Los Angeles Bureau of Sanitation gives consideration to using current groundwater levels encountered in site specific data for use in design of infiltration systems, based on the conclusion by ERI discussed above, a design groundwater level of approximately 85 feet below ground surface (bgs), or possibly up to 110 feet bgs, could be considered for preliminary design of infiltration systems.
- Temporary dewatering during construction is anticipated to be limited to dealing with nuisance water or locally perched water since current groundwater is anticipated to be deeper than planned excavations.
- For hydrostatic design of the subterranean portions of the buildings, consideration will be given to the current and forecasted groundwater levels and that historic high groundwater levels would not likely need to be used in design of the structures to resist hydrostatic pressure. It is our understanding that the City will require that a standard wall backdrain and subdrain system below the lower floor be installed to accommodate nuisance and locally perch groundwater and that a permanent dewatering system based on historic high groundwater levels will not be required.

Future geotechnical borings for final design should be conducted such that ground water measurements can be obtained.

5.4 FAULTS

5.4.1 Regional Fault Systems

The geologic structure of southern California is dominated by northwest trending faults associated with the San Andreas Fault System. Faults such as the Newport-Inglewood, Whittier, Palos Verdes Hills and San Jacinto are considered active and are associated with the San Andreas, which collectively form the boundary between the North American and Pacific tectonic plates. Most of these faults have ruptured the ground surface historically and/or produced significant earthquakes.

Anomalous to the general northwest structural fabric are a series of active east-west trending reverse or thrust faults. The majority of these occur as north dipping planes projecting along the southern base of the Santa Monica and San Gabriel Mountains in the greater Los Angeles area. The known active thrust faults in the region include the Cucamonga, Sierra Madre, San Fernando, Raymond, Santa Monica and Hollywood faults.

5.4.2 Concealed Faults

Another category of fault known as "blind thrusts" was recognized as a significant seismic hazard following the 1987 magnitude 6.0 Whittier Narrows Earthquake and then again by the 1994 San Fernando magnitude 6.7 Earthquake. A blind thrust is a deeply buried, shallow dipping thrust fault, which does not project to the ground surface. Blind thrusts are capable of generating a major earthquake that may cause uplift in the form of anticlinal hills. Some uplands that surround the Los Angeles Basin, including the Elysian Park and Repetto Hills, are products of blind thrusts. Because blind thrusts do not intersect the ground surface, primary surface fault rupture is considered unlikely as a potential hazard. Major portions of the Los Angeles Basin are now believed to be underlain by various blind thrusts ramps. Due to continued north-south convergence (shortening) across the Los Angeles Basin, slippage along these features will generate future earthquakes.

At the present time, the potential magnitudes and recurrence intervals of blind thrust produced earthquakes cannot be quantified with confidence due to the fact that many characteristics of these features (including areal extent and Quaternary slip rates) are poorly understood. Nonetheless, the proximity to densely populated urban centers and their history of producing damaging earthquakes clearly demonstrate the risk that blind thrusts pose to large metropolitan areas such as Los Angeles and surrounding cities.

5.4.3 Nearby Seismogenic Sources

We reviewed the 2008 National Seismic Hazard Maps Source Parameters (USGS, 2008) to identify known active faults within a 100-kilometer radius of the project site. The names and distances of the faults lying with 40 kilometers of the project site are provided in the following table (Table 5.4-1). The San Andreas Fault is included in Table 5.4-1 even though it lies further than 40 kilometers from the site. Significant regional faults are shown on Figure 6, Regional Fault Map.

All of the faults listed are considered capable of generating strong ground motion at the subject site. In addition, at least three of these faults (the San Andreas, Newport-Inglewood, and the Sierra Madre/San Fernando) have produced damaging earthquakes in historic time. Other significant faults located at some distance to the site, including the active faults that traverse north-central Los Angeles County and San Bernardino County (i.e., the various branches of the San Andreas, San Jacinto and Camp Rock fault systems) have also produced relatively strong ground motion in the area of the subject site.

Table 5.4-1 – Significant Regional Faults

Fault Name	Approximate Distance* (km)
Verdugo	5.8
Hollywood	7.6
Santa Monica (alt. 2)	9.4
Elysian Park (Upper)	9.6
Santa Monica (alt. 1)	11.6
Sierra Madre (San Fernando)	12.6
Sierra Madre	13.3
Newport Inglewood	14.0
Raymond	15.0
Puente Hills (Los Angeles)	15.6
Northridge	15.6
San Gabriel	18.7
Santa Susana	20.4
Malibu Coast	20.9
Anacapa-Dume	23.2
Palos Verdes	27.7
Holser	31.8
Simi-Santa Rosa	33.1
Clamshell-Sawpit	34.7
Elsinore	35.8
Anacapa-Dume (alt. 1)	36.0
Puente Hills (Santa Fe Springs)	36.4
San Andreas	48.6

* Defined as the closest distance to projection of rupture area along fault trace.

In addition to the above, there is an unnamed (possible) fault that is mapped as crossing the northwest corner of Parcel 1 (Block 1), the northwest corner of Parcel 4 (Block 7), and the northwest corner of the West Lot Parking Structure and generally trends east/northeast. The California Geological Survey (CGS) lists the fault on their database as No. 388 (Jennings, 1994). The United States Geological Survey (USGS) lists the fault in their database as No. 212 (Bryant, 2017). The mapped location of this possible fault is labeled as "inferred" within the vicinity of the subject site. Other information regarding fault length, slip-rate, and activity level are either unspecified or unknown.

GPI conducted a desktop study to evaluate the presence of an unnamed possible fault that is mapped above. The review included documents referenced by CGS and USGS that identify the unnamed possible fault, files for recently completed projects that are near, or transected by, the unnamed possible fault at the City of Los Angeles Building Department, historical aerial photographs and topographic maps that are available online for assessment of geomorphic or other features indicating the presence of a fault, and geotechnical/geologic hazard reports for nearby projects. The detailed results of the desktop study are presented in our letter dated June 14, 2019.

Based on the data reviewed, no evidence beyond that presented in the initial study (Weber, 1980) has been put forth to demonstrate that a fault is present within the proposed District NoHo Mixed-Use Development Site. Based on the data reviewed and conclusions above, it is our professional opinion that the presence of the unnamed possible fault at the site is unlikely and the potential for surface rupture due to the unnamed possible fault (if it were present) is unlikely. Further assessment of the presence of the unnamed possible fault with additional field explorations within the subject site is considered unnecessary.

The development does not lie within an Alquist-Priolo Earthquake Fault Zone as designated by the California Geological Survey (CGS, 1998 and 1999) or within a Preliminary Fault Rupture Study Area (PFRSA) as designated by the City of Los Angeles (geohub.lacity.org). In addition, named surface faults are not mapped projecting towards or through the development.

Brief details for some of the faults closest to the subject site are as follows:

Hollywood and Santa Monica Faults

The Hollywood and Santa Monica Faults comprise the western and central portions of the Santa Monica-Hollywood-Raymond fault system, a generally east-west trending series of oblique, reverse and left-lateral strike-slip faults. The faults are mapped along the foot of the southern flank of the east-west trending Santa Monica Mountains approximately 7.6 kilometers to the south of the site at closest approach. Mapping of the feature indicates the faults have a length projecting from the coast eastward to the Los Angeles River channel. The faults have been studied by several groups including Dr. Kerry Sieh at CIT (1993). Locations of the faults are poorly constrained in the field due to alluvial cover and urban development. The faults are believed to be high angle, north dipping thrust faults and have been partly responsible for uplift of the Santa Monica Mountains. Carbon dating methods indicate the faults have moved at least once between 8,000 to 17,000 years ago, which places in into a likely active category. No significant historic earthquakes have been associated with the faults. The faults are capable of producing a moment magnitude (Mw) 6.5 earthquake, and perhaps larger if coupled with simultaneous movement on an adjacent fault. Dolan et al. (2000) dated the most recent surface rupture of the Hollywood fault at between about 6,000 and 11,000 years ago, with a possible earlier surface rupture about 22,000 years ago, indicating a relatively long recurrence interval between surface rupture events. The Hollywood fault has been recently re-assessed by the State of California. However, the revised locations do not impact the proposed development.

Verdugo Fault

Located approximately 5.8 kilometers northeast of the subject site, the Verdugo fault consists of multiple strands which lie within an approximately one-half-mile-wide zone located along the southwesterly terminus of the Eagle Rock fault northwestward for a distance of about 13 miles where it is thought to join the Mission Hills fault near the city of

San Fernando. Numerous surface and subsurface features have been identified by various investigators which are suggestive of relatively recent activity along this fault, including several relatively well-defined, south-facing scarps which displace geologically young alluvial deposits in the Burbank area, and groundwater cascades which have been documented in the alluvium north of the Verdugo Mountains (Leighton and Associates, 1990). Although scattered small earthquakes have been recorded near the trace of this fault, no direct evidence of historical seismicity has been documented (Ziony, 1985).

Elysian Park Blind Thrust

The north to south structural convergence in the region is a result of deep-seated fault movement along features called “blind thrusts”. These are buried low angle north and some south dipping faults which do not project to the ground surface but cause uplift by folding during major earthquakes. In 1987, the magnitude 5.9 Whittier Narrows Earthquake occurred on a previously unknown blind thrust, which has now been given the name Elysian Park Blind Thrust or Structural Zone. This fault underlies the Elysian Park Hills at 3 km and deepens northward to 10 km of depth. Because of the 1987 event, the fault has been placed into an active category and has been tentatively mapped to underlie a major portion of the eastern Los Angeles Basin and adjacent San Gabriel Valley to the north. Subsequent to this earthquake was the 1994 M6.7 Northridge Earthquake in the San Fernando Valley. This earthquake occurred along a previously unknown similar blind thrust fault. This type of active faulting and resulting earthquake activity are considered relatively common in regions undergoing convergence. The Elysian Park Thrust has a length of 34 km, slip rate of 1.50 mm/year and is capable of generating a maximum earthquake of M6.7 (Shaw and Suppe, 1996).

Newport-Inglewood Fault

The Newport-Inglewood Fault forms the southwesterly side of the Los Angeles Basin and is defined by a series of low disconnected hills and mesa surfaces. Strike slip faulting is associated with anticlinal folding. This has resulted in the accumulation of petroleum resources along its entire length from offshore Newport Beach to the Santa Monica Mountains. In 1933 the destructive Long Beach Earthquake occurred on the fault just offshore of Newport Beach. The event caused considerable damage and a high loss of life. Since then the various strands of the fault have produced many minor earthquakes, all of which have been at a magnitude of 4.5 or less. The fault lies at a distance of approximately 14.0 kilometers to the southwest of the project sites at its closest approach. A maximum earthquake magnitude of 6.9 and slip rate of 1.0 mm/yr has been assigned to the fault.

6.0 GEOLOGIC-SEISMIC HAZARDS

6.1 GENERAL

A summary of the requirements of Section VI. Geology and Soils of CEQA Appendix G: Environmental Checklist are presented below and followed by the results of our geologic and seismic hazards evaluation for the proposed development (Parcels 1 through 4).

6.2 THRESHOLDS OF SIGNIFICANCE

In accordance with guidance provided in Section VI Geology and Soils of Appendix G of the State CEQA Guidelines, the project could have a potentially significant impact if it were to:

(a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

- i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.
- ii. Strong seismic ground-shaking.
- iii. Seismic-related ground failure, including liquefaction.
- iv. Landslides.

(b) Result in substantial soil erosion or the loss of topsoil.

(c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;

(d) Be located on expansive soil, as identified in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

(e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

(f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

The appendix of this report provides input for Section IV Geology and Soils of the CEQA Appendix G Environmental Checklist Form based on our evaluation of potential geologic and seismic hazards discussed herein. Note that GPI's evaluation did not include assessment of paleontological resources.

6.3 SURFACE FAULT RUPTURE

The site does not lie within an Alquist-Priolo (AP) Earthquake Fault Zone as designated by the California Geological Survey (CGS, 1998 and 1999) or within a PFRSA as designated by the City of Los Angeles (geohub.lacity.org). CGS, USGS and the City of Los Angeles map an unnamed, quaternary fault crossing the northwest corners of Parcels 1 and 4 (Blocks 1 and 7) and the West Lot Parking Structure and projecting towards the east/northeast. In addition to being considered a "possible" fault, the location is also inferred, likely from a portion of the fault further to the west that is considered mildly constrained. Due to the lack of information on this fault and that the site is not within an AP Fault Zone or City of Los Angeles PFRSA, shallow ground rupture is considered unlikely at this site.

6.4 SEISMIC GROUND SHAKING

As is the case with most locations in Southern California, the subject site is located in a region that is characterized by moderate to high seismic activity and is likely to be subjected to strong ground shaking due to earthquakes. The project site and vicinity has experienced strong ground shaking due to earthquakes in the past. The locations of historical earthquake epicenters with respect to the site are shown graphically on Figure 7, Historical Earthquakes Map.

6.5 LIQUEFACTION AND SECONDARY EFFECTS

Loosely compacted/deposited granular soils located below the water table can fail through the process of liquefaction during strong earthquake-induced ground shaking. In this process, there is a rapid decrease in shearing resistance of cohesionless soils, caused by a temporary increase in the pore water pressure. Factors known to influence liquefaction potential include soil type and depth, grain size, relative density, ground-water level, degree of saturation, and both intensity and duration of ground shaking.

As a result of liquefaction, a typical building structure may be exposed to several hazards, including liquefaction-induced settlement, foundation bearing failure, and lateral displacement or lateral spreading. The surface manifestation of liquefaction in deeper soil deposits often takes place in the form of sand boils and ground subsidence. Such phenomena often lead to loss of adequate support for building foundations (bearing failures) and cause tilting, excessive movement and cracking of superstructures. The severity of ground subsidence depends largely on the relative thickness of the surficial non-liquefiable layer compared to the thickness of layers undergoing liquefaction.

According to the published State Seismic Hazard Zones maps for the Burbank and Van Nuys Quadrangles, the project site is located in an area designated by the State Geologist as a "zone of required investigation" due to the potential for earthquake-induced liquefaction. See Figure 8, Seismic Hazard Zones Map. The County and City of Los Angeles Seismic Safety Elements locate the site outside of areas considered to be liquefiable (City of Los Angeles, 1996; County of Los Angeles, 1990).

As discussed above, the depth of groundwater level used in the liquefaction analyses is a significant factor in whether or not liquefaction can be triggered. Historic high groundwater is reported to be as shallow as 10 feet below grade by CGS and the City of Los Angeles requires this historical high groundwater level be used in liquefaction analyses. Under this groundwater condition, there is a potential for liquefaction to occur at the site during an earthquake. Manifestation of liquefaction is likely to result in loss of bearing support and liquefaction-induced settlement, should it occur.

In general, our preliminary analyses indicate there could be on the order of 2 to 3 inches of liquefaction induced settlement occurring at the site between depths of approximately 10 to 45 feet below grade under historic high groundwater conditions. Approximately 50 percent this settlement would occur between depths of approximately 33 and 45 feet below grade. At Parcel 3 (the western portion of Block 0), the results of one exploration (CPT C-5) indicated there could be as much as 4 inches of liquefaction induced settlement under the same conditions. If the groundwater is deeper than 45 feet below grade (which it is currently far below), the potential for liquefaction, and its associated effects, to occur is considered unlikely.

The project will be designed in accordance with the Los Angeles Building Code, which will require evaluation of liquefaction based on historic high groundwater levels. Mitigation of liquefaction, if required, could include ground modification and/or design of the building foundations to resist the effects of liquefaction. Ground modification may be required to reduce liquefaction induced settlement to tolerable limits below structures supported on shallow foundations.

Because the site is in a relatively level area, the potential for lateral spreading to occur during liquefaction is considered to be remote.

6.6 SEISMIC INDUCED (DRY SAND) SETTLEMENT

Seismic induced settlement of dry sands (not related to liquefaction induced settlements), occurs when loose, granular (sandy) soils above the groundwater are densified during strong earthquake shaking. Available subsurface data indicates that zones of loose sandy deposits could be present above the current groundwater levels within the project site, and therefore the potential for seismic induced settlement at the site is moderate.

The magnitude of seismic induced settlement is also dependent on the depth of groundwater used in our analysis and, as such, is inversely correlated with liquefaction-induced settlement. Shallower groundwater levels will likely result in increased liquefaction-induced settlements and decreased dry seismic settlements while deeper groundwater levels would result in the opposite.

Our preliminary analyses indicate there could be on the order of ¼ inch generally, and up to 1½ inches locally, of seismic induced settlement occurring at depths of approximately 10 to 15 feet below grade if groundwater is deeper than 45 feet below grade. Mitigation, if needed, would likely include design of the building foundations to resist the effects of seismic induced settlement. Foundations that extend at least 15 feet below grade are not expected to be impacted by seismic induced settlement.

6.7 SLOPE STABILITY AND LANDSLIDES

The topography across the site and surrounding area is relatively flat, with a less than 1 percent downgrade to the south. According to published State Seismic Hazard Zones maps for the Burbank and Van Nuys Quadrangles, the site is not located in an area designated by the State Geologist as an "earthquake-induced landslide zone" (CGS, 1998 and 1999). As such, landsliding is considered unlikely at this site.

6.8 TSUNAMIS AND SEICHES

Various types of seismically induced flooding, which may be considered as potential hazards to a particular site, include flooding due to a tsunami (seismic sea wave), a seiche, or failure of a major water retention structure upstream of the project. The site is located approximately 13 miles inland from the Pacific Ocean at an elevation of approximately 630 feet above mean sea level. Due to the distance to the coast and elevation at the site, the probability of flooding from due to a tsunami is considered to be nonexistent.

The site does not lie in close proximity to reservoirs. The closest reservoir (The Hollywood Reservoir) is located approximately 4.0 miles to the southeast and sits at an elevation of +715 feet. However, the subject site and the Hollywood Reservoir are separated by the Hollywood Hills, a ridge line that rises to elevations in excess of 1,000 feet. The ridgeline provides a natural barrier between the Hollywood Reservoir and the site.

According to the City of Los Angeles Seismic Safety Element, Exhibit G, the site is located in a potential inundation area (City of Los Angeles, 1996). Although unclear, the potential inundation area is potentially related to the Pacoima Reservoir or Upper Van Norman Lake, located over 10 miles north of the site, or storm runoff from the San Gabriel Mountains roughly 4 miles to the northeast of the site. Due to the distance to the above reservoirs and the distance to mountain sources of storm runoff, the potential of flooding due to seiche-like waves or failure of water retention structures is considered to be very low.

6.9 EXPANSIVE AND COLLAPSE POTENTIAL

Expansive soils generally consist of clays that can shrink and swell with changes in moisture content. Movement of soils in response to shrinkage and swelling has the potential to impact near-surface improvements such as lightly loaded foundations, floor slabs, and flatwork. Based the data reviewed, near surface soils are anticipated to have no to very low expansion potential. Therefore, the potential for expansive soils to adversely affect the project is considered to be very low.

Collapsible soils generally consist of relatively dry, low-density materials that become weaker and more compressible with the addition of water or excessive loading. Due to the dense nature of the onsite soils the potential for collapse of soils at this site to impact the project is considered very low.

6.10 SUBSIDENCE AND SETTLEMENT

The project site is not within an area of known subsidence associated with fluid withdrawal (groundwater or petroleum), peat oxidation (natural decay of organic peat materials), or hydrocompaction (compression of soils due to the introduction of water).

6.11 FLOODING AND INUNDATION

As mentioned above, the project site is located in a Potential Inundation Area of the City of Los Angeles (1996), although the source of the potential inundation hazard is unclear.

According to flood maps prepared by the Federal Emergency Management Agency (FEMA), the project site is located within a Flood Zone X for an area of minimal flood hazard (msc.fema.gov). More specifically, Zone X is defined as an “area determined to be outside the 500-year flood and protected by levee from 100-year flood.” Based on this information, the potential for flooding to negatively impact the project is considered to be very low. We recommend the project Civil Engineer confirm the site flooding potential.

We understand the project will be designed so that the buildings are between 1 to 4 feet higher than the adjacent flow line elevations and that pavement areas will be properly graded to ensure that stormwater runoff is routed to adequately sized drainage devices. We also understand that low impact development systems will be designed with overflow routes so that the potential for flooding will remain minimal in the event of a major storm.

6.12 METHANE GAS

The West Lot parking Structure Site is located within a Methane Buffer Zone, as mapped by the City of Los Angeles (NavigateLA; LADPW, 2004). The remaining portions of the Metro North Hollywood Mixed-Use Development (Parcels 1 through 4 and the East Lot Parking Structure) are not located in either a Methane Zone or Methane Buffer Zone as mapped by the City of Los Angeles. The proposed development area and nearby methane/buffer zones are shown on Figure 9, Methane Zones Map. The nearest methane zones are located southwest of the intersection of Tujunga Avenue and Chandler Boulevard and east of Vineland Avenue. The nearest Methane Buffer Zones are located west of Tujunga Avenue (the West Lot Parking Structure site) and east of Vineland Avenue (just east of the East Lot Parking Structure site.

We did not encounter detectable odors during our preliminary field investigation in Parcels 1 through 4. Measuring of potential methane concentrations was not included within the scope of our due-diligence investigation and, as such, was not performed. We should also note that as of the issuance of this report, due to the inability to obtain site access, we have not yet performed subsurface explorations within the proposed West Lot Parking Structure site, which is located within a Methane Buffer Zone as described above, or the East Lot Parking Structure site which is located adjacent to a Methane Zone and a Methane Buffer Zone (across Vineland Avenue).

Because the West Lot Parking Structure site is located within a Methane Buffer Zone, site testing of the concentration and pressure of methane gas is required to establish the Design Methane Concentration and Design Methane Pressure. These parameters are then used to determine the Site Design Level (I through V) in Table 71 of the City of Los Angeles Ordinance 175790. The testing is to be conducted in accordance with the Ordinance and the City's Site Testing Standards for Methane (City of Los Angeles Information Bulletin 2014-101 dated January 1, 2014).

All buildings located in a Methane Zone and/or a Methane Buffer Zone are required to provide a methane mitigation system outlined in Table 71 of the Ordinance based on the Site Design Level. Buildings located in a Methane Buffer Zone are not required to provide any methane mitigation system if the Design Methane Pressure is less than or equal to 2 inches of water pressure and is either of the following:

A. In an area which qualifies as Site Design Level I or II; or

B. In an area that qualifies as Site Design Level III and the utilities are installed with Trench Dams and Cable or Conduit Seal Fittings

If site specific testing results indicate that the Site Design Level is IV or V, required methane mitigation systems could include a passive system (impervious membrane and a sub-slab ventilation system) or an active system (impervious membrane, pressure and gas detection sensors, an alarm system, and mechanical extraction and ventilation systems). Trench Dams and Cable or Conduit Seal Fittings for utilities would also be required.

Depending on the design of the parking structure, it may meet the requirements for a 'Building with Natural Ventilation'. Buildings with Natural Ventilation that comply with the following criteria are required to have utilities constructed with Trench Dams and Cable or Conduit Seal Fittings.

A. The Unobstructed Openings shall exchange outside air.

B. The size of the Unobstructed Opening shall be the larger of

1. *Opening equal to at least 25 percent of the total perimeter wall area of the lowest level of the building, or*

2. *Opening equal to at least 25 percent of the floor area of the lowest level of the building.*

C. The Unobstructed Openings shall be evenly distributed and located within the upper portion of at least two opposite exterior walls of the lowest level of the building

During design, and once access becomes available, we recommend a licensed engineer or geologist specializing in methane testing and mitigation systems conduct the required studies and provide the appropriate level of design recommendations for the West Lot Parking Structure for compliance with the City's methane ordinance and the Methane Mitigation Standards established by the Superintendent of Building.

6.13 OIL WELLS

The overall Metro North Hollywood Mixed-Use Development is not located within an identified Oil/Gas Field, as mapped by the California Division of Oil, Gas, and Geothermal Resources (DOGGR). In addition, there are no known oil wells located within the proposed development area. There are three known oil wells within 1.5 miles of the overall development area as shown on Figure 10, Oils Wells Map. Oil Well No. 03705314 (No. 314 on Figure 10) is located approximately 800 feet west of the West Lot Parking Structure and 1,200 feet west of the main development area (Parcels 1 through 4) and its current status is listed as plugged and abandoned. Oil Well No. 03705309 (No. 309 on Figure 10) is located approximately 1.2 miles east of the main development area and its current status is listed as plugged and abandoned. Oil Well No. 03705527 (No. 527 on Figure 10) is located approximately 1.4 miles north of the project site and its current status is listed as buried and idle.

GPI is not in the position to evaluate whether the nearby wells have been properly abandoned or how pumping activities associated with the nearby wells may affect the deeper subsurface conditions within the proposed development area.

6.14 SEDIMENTATION AND EROSION

The majority of the ground surface at the site is relatively level and is, or will be, covered with asphalt or concrete pavements. As such, erosion is not considered a hazard at the site. During construction, provisions should be in place to mitigate potential temporary erosion and sedimentation conditions.

6.15 CORROSIVE SOILS

Limited corrosivity laboratory test data presented in our July 30, 2018 Data Report and by others suggests that the site soils are moderately corrosive to concrete and ferrous metals. If potentially corrosive soils are confirmed at the site during design level studies, the project design should implement appropriate controls to minimize the impact on the proposed project.

7.0 PRELIMINARY GEOTECHNICAL CONSIDERATIONS

7.1 GENERAL

Based on the results of our study, it is our professional opinion the project site is geotechnically suitable for the proposed development. The following sections provide preliminary (conceptual level) geotechnical conclusions regarding design and construction. The conclusions presented herein are preliminary and based on limited data. A comprehensive geotechnical investigation should be conducted to further evaluate the subsurface conditions at the site and provide design level geotechnical recommendations.

7.2 SEISMIC DESIGN CONSIDERATIONS

The proposed project should be designed in accordance with the current version of the CBC and LABC. The buildings are anticipated to be designed in accordance with the 2019 CBC and the 2020 LABC.

The available data indicates that Site Class D, (Stiff Soil) would be appropriate for use in design of at grade structures and structures with up to 2 subterranean levels and that Site Class C (Very Dense Soil and Soft Rock) would likely be appropriate for use in design of structures with at least 3 subterranean levels. It may be possible for structures with 2 subterranean levels to be designed with Site Class C if site specific field testing is conducted and substantiates using Site Class C.

We understand that the seismic design of the taller buildings at Blocks 1 and 5/6 will be based on the performance-based earthquake engineering (PBEE) procedures in the latest Los Angeles Tall Buildings Structural Design Council Guidelines (LATBSDC 2017 with 2018 Supplements). A site-specific ground motion hazard analyses and earthquake ground motion time-history study will be required during design for these structures along site specific field testing to assess the shear wave velocity of the soils and Site Class.

The project will be designed in accordance with the LABC, which will require mitigation of liquefaction based on historic high groundwater levels. Mitigation, if required, could include ground modification and/or design of the building foundation to resist the effects of liquefaction.

7.3 FOUNDATIONS TYPE AND CONSIDERATIONS

Proposed buildings at Blocks 1, 5/6, and 8 will have 22 to 28 stories above grade with 4 levels below grade. We anticipate these buildings may likely be supported on mat foundations extending into the very dense native materials. It may be possible to transition from a mat foundation under the tower to spread foundations below the adjacent parking structures at Blocks 1, 5/6, and 8 where the foundations of the tower and adjacent parking structure podium will extend well into the deeper, very dense native materials generally encountered at depths of 38 to 45 feet below grade. The type and combination of foundation types used will depend on the estimated total and differential settlements (static and seismic).

The proposed building at Block 2 is planned to have 20 levels above grade and one level below grade and will likely be supported on deep foundations. In addition, the proposed buildings on Blocks 1 and 8 may be required to be supported on deep foundations to avoid surcharging the below grade structures near a Red Line subway tunnel. Deep foundations would likely consist of Auger Pressure Grouted (APG) or Cast-In-Drilled-Hole (CIDH) piles.

Proposed buildings at Blocks 3, 4, and 7 will have 5 to 7 stories above grade with 1 to 2 level below grade. These buildings will likely to be supported on either deep foundations extending into the very dense granular deposits encountered at approximately 43 to 45 feet below grade or on shallow spread or matt foundations following implementation of a ground modification program to mitigate the potential for excessive settlement due to liquefaction, seismic induced (dry sand) settlement, and static loading. The settlement of the structure supported on a mat foundation or shallow spread foundations without implementation of a ground modification program is expected to exceed tolerable settlement criteria.

The West Lot and East Lot Parking Structures will have four above-grade levels (three elevated decks) and two above-grade levels (one elevated deck), respectively. Neither structure is currently planned to include subterranean levels. These buildings will likely be supported on either deep foundations (APG or CIDH Piles) extending into the very dense granular soils encountered below depths of 43 to 45 feet or on a mat foundation or shallow spread foundations with structurally-tied grade beams following implementation of a ground modification program to mitigate the potential for excessive settlement due to liquefaction, seismic induced (dry sand) settlement, and static loading. The settlement of the West Lot Parking Structure (four above grade levels) supported on shallow foundations without implementation of a ground modification program is expected to exceed tolerable settlements. There is a potential that settlement of the smaller East Lot Parking Structure foundation, without ground modification, may not exceed tolerable settlement criteria, but this will have to be further evaluated during the comprehensive geotechnical investigation.

We anticipate at-grade structures at Block 0 (both east and west of Lankershim Boulevard) may be supported on either mat foundations or on spread foundations following a ground modification program to reduce the compressibility and the liquefaction potential of the underlying soils. For the portion of Block 0 that is west of Lankershim Boulevard, foundation selection will also depend on the structure’s location relative to the former temporary construction access ramp to the Red Line tunnel and further characterization of the materials used to backfill the temporary access ramp. If differential non-uniform support is anticipated, the at-grade structures may be required to be supported on mat foundations or deep foundations.

For the portion of Block 0 that is east of Lankershim Boulevard, the potential surcharge pressures induced from the foundations on the existing Red Line portal and subterranean infrastructure will need to be evaluated. If the surcharge pressures on the existing subterranean structures exceed tolerable limits, the spread foundations may need to be deepened or the buildings may need to be supported on deep foundations (APG or CIDH piles as mentioned above) to extend the building loads below the existing subterranean structures. In general, for at grade structures supported on spread foundation, overexcavation on the order of 3 to 5 feet may be required to provide a uniformly graded building pad. Mitigation of potential liquefaction induced settlement would also likely be required by designing the foundations system to resist the potential adverse effects of liquefaction induced settlement or by applying ground improvement techniques in the soils below the structures.

7.4 SURCHARGE ON EXISTING STRUCTURES

The Metro Red Line subway is located under Lankershim Boulevard, which is adjacent to Blocks 0, 1, and 8, and extends approximately 60 to 65 feet below grade. The North Hollywood Station entry plaza mezzanine is also located adjacent to proposed building in the eastern portion of Block 0. A subterranean vault or structure is located within Chandler Boulevard adjacent to Building 5/6. Foundations for the proposed buildings will need to be designed so as not to impose an additional surcharge load on exiting subterranean structures.

7.5 WALLS BELOW GRADE

Walls below grade should be designed to resist lateral earth pressures and seismic lateral pressures, plus any surcharges from adjacent loads. Subterranean walls should be designed to resist hydrostatic pressures in addition to design lateral earth pressures or be provided with a positive drainage system behind the walls as discussed below.

For hydrostatic design of the subterranean portions of the buildings, consideration will be given to the current and forecasted groundwater levels and that historic high groundwater levels would not likely need to be used in design of the structures to resist hydrostatic pressure. It is our understanding that the City will require that a standard wall back drain and subdrain system below the lower floor be installed to accommodate nuisance and locally perched groundwater and that a permanent dewatering system based on historic high groundwater levels will not be required.

We anticipate the subdrain system will include a 12-inch filter layer of Class 2 Permeable Base Material. The filter layer will be underlain by drain lines consisting of perforated pipes in trenches that extend at least 6 to 12 inches below the filter layer and backfilled with Class 2 Permeable Base Material. The trenches are anticipated to be spaced approximately 40 to 50 feet on center and connected to a perimeter trench drain line that directs the water to sumps and pumps. We recommend a dewatering specialist be retained to establish design flow rates and provide recommendations regarding disposal of the collected water.

7.6 TEMPORARY EXAVATIONS AND SHORING

Excavations are anticipated to extend up to depths of 51 feet below grade for subterranean construction. Excavations will be on the order or 5 to 8 feet deeper for mat foundations and for pile caps. Temporary braced shoring can be used for temporary excavations where space is not available for slope excavations. Raker (internal) or tie-back anchor (external) bracing are both anticipated to be used.

Although current groundwater is expected to be deeper than the anticipated excavations, groundwater seepage (nuisance water) may occur during excavations at the site. Handling of nuisance water seepage should be able to be achieved by pumping from sumps within the excavations. Perched water may be encountered above layers of clayey and sandy silt encountered at depths of approximately 27 to 33 feet below grade. The silt layers are expected to have a relatively low permeability.

7.7 EARTHWORK CONSIDERATIONS

The project location is relatively flat and proposed grades will likely be within a few feet of existing grades. The placement of significant volumes of fill is not expected to be part of the project. Some removal and recompaction of the existing near surface soils may be required to provide support for minor structures, pavements and hardscape. Engineered fill should be placed and compacted in accordance with City of Los Angeles Standards.

Conventional equipment is anticipated to be suitable for excavating to the desired grades. Cobbles, with sizes ranging from 3 to 12 inches, and very few boulders (particles larger than 12 inches) may likely be encountered in the deeper deposits below approximately 45 feet below grade. Particles greater than 4 inches in diameter typically are not acceptable in engineered fill for building pads. During excavations, the oversized cobbles and boulders will need to be separated and hauled off-site for disposal. Because the borings were drilled with 4- and 8-inch auger, identification of cobbles and boulders and their quantity in the borings should be considered approximate.

7.8 STORM WATER INFILTRATION

Current regulations require that storm water be infiltrated into the ground of new developments when geotechnically feasible. Typical infiltration facilities used to introduce storm water into the ground rather than into storm drain pipes include gravel filled pits, trenches, dry wells, or various pre-manufactured products placed/constructed in the ground.

The City of Los Angeles requirements for infiltration of storm water into the subsurface soils are outlined in City of Los Angeles Department of Building and Safety Information Bulletin 2017-118, Guidelines for Storm Water Infiltration, dated January 1, 2017. The bulletin states that infiltration of storm water into subsurface soils should not adversely impact soil or bedrock conditions that could result in slope instability, settlement of footings, surcharge of retaining walls, or contributing water to subsurface dewatering devices such as basement or retaining wall back drains. The City of Los Angeles also does not allow infiltration facilities in geologically restrictive zones such as State designated Liquefaction Hazards Zones. The intent of this is to not allow water to saturate potentially liquefiable soils that may be above current groundwater levels.

Since the site is located within a State designated Liquefaction Hazard Zone, the site may not be considered to be suitable for shallow storm water infiltration by the City of Los Angeles. At a minimum, infiltration of water into zones that are potentially liquefiable but above current groundwater levels will not be allowed.

We understand, the City of Los Angeles Bureau of Sanitation will give consideration to basing storm water infiltration design on current groundwater levels. Infiltration also needs to occur at least 10 feet above current groundwater levels. Accordingly, based on the conclusion by ERI discussed above, a design groundwater level of approximately 85 feet bgs, or possibly up to 110 feet bgs, could be considered for preliminary design of infiltration systems.

With the exception of 1- to 10-foot thick layers of clayey and sandy silt encountered beginning at depths of approximately 27 to 33 feet below grade, our preliminary field explorations disclosed granular soils with gravel and cobbles extending to the depth explored (approximately 121 feet) that appear to have relatively moderate to high infiltration capabilities. The silt layers were encountered in most of the explorations at various depths but there is insufficient information to substantiate that the layer is continuous. The silt layers are expected to have a relatively low permeability and may be restrictive to infiltration.

The very dense sand deposits encountered below depths of approximately 38 to 45 feet below grade are not considered to be liquefiable due to the density of the material and are anticipated to have reasonable infiltration rates. Accordingly, deep dry wells extending to at least 55 feet below grade could be used for storm water infiltration. The wells would need to be cased and sealed, to prevent water from raising up the outside of the casing, to at least 45 feet below grade.

To reduce the impact of infiltration of stormwater below and near foundations, we recommend that dry wells be set back at least 20 feet from foundations and not be placed below buildings with subterranean levels, if it can be avoided. Where this is not possible and dry wells will be placed below buildings, analyses should be conducted during the design phase to assess the potential impact stormwater infiltration may have on the structures and foundation systems. Additional applicable requirements are presented in City of Los Angeles Information Bulletin 2017-118.

8.0 LIMITATIONS

The report, exploration logs, and other materials resulting from GPI's efforts were prepared exclusively for use by NOHO Development Associates, LLC, and their consultants in preparing the EIR for the proposed improvements. The report is not intended to be suitable for reuse on extensions or significant modifications of the project or for use on any project other than the currently proposed development as it may not contain sufficient or appropriate information for such uses. If this report or portions of this report are provided to contractors or included in specifications, it should be understood that they are provided for information only.

Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill ordinarily exercised under similar circumstances by reputable Geotechnical Engineers practicing in this area. No other representation, either express or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.

Justin J. Kempton, G.E.
Associate

Paul R. Schade, G.E.
Principal

Thomas G. Hill, C.E.G.
Consulting Geologist

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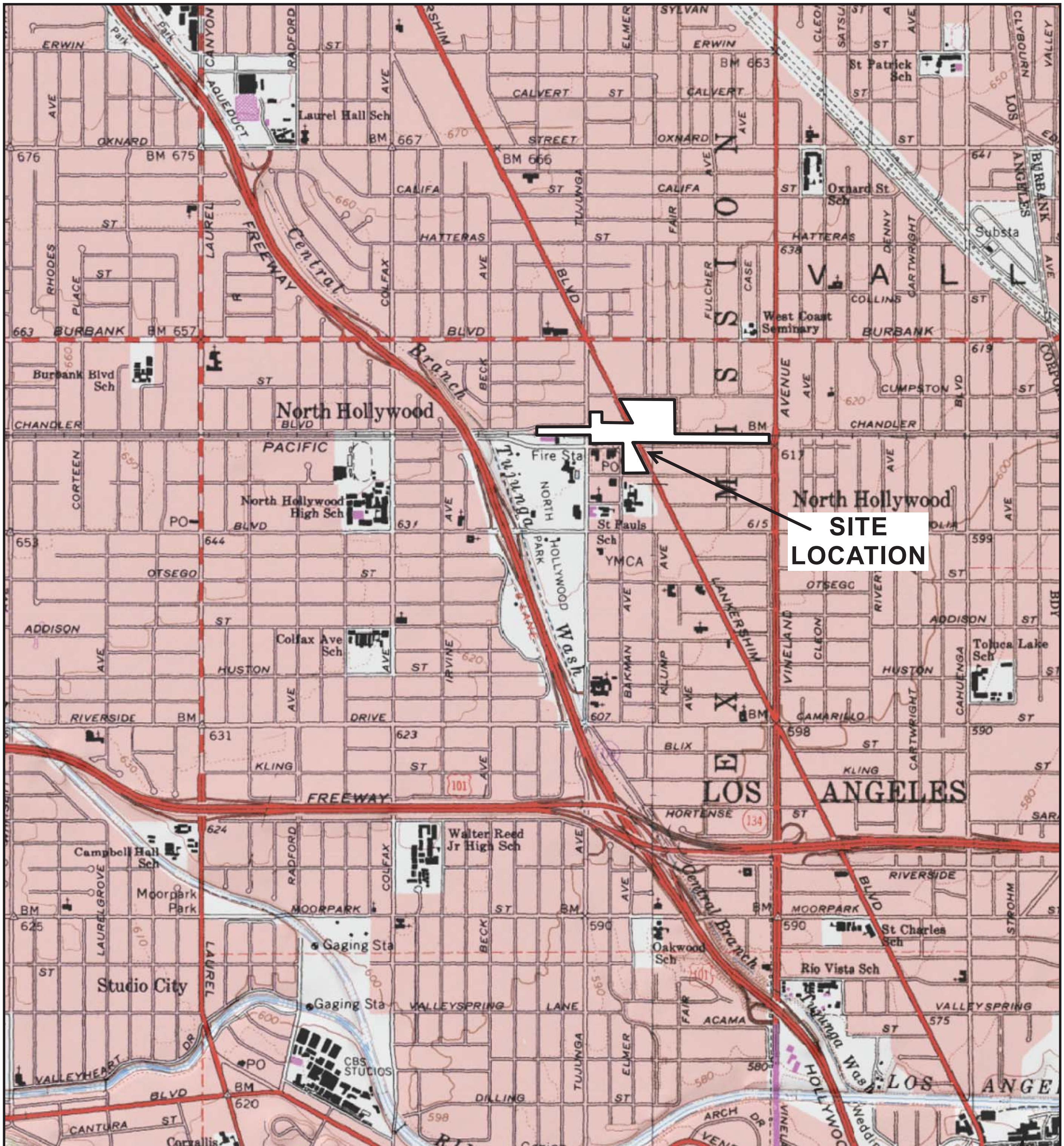

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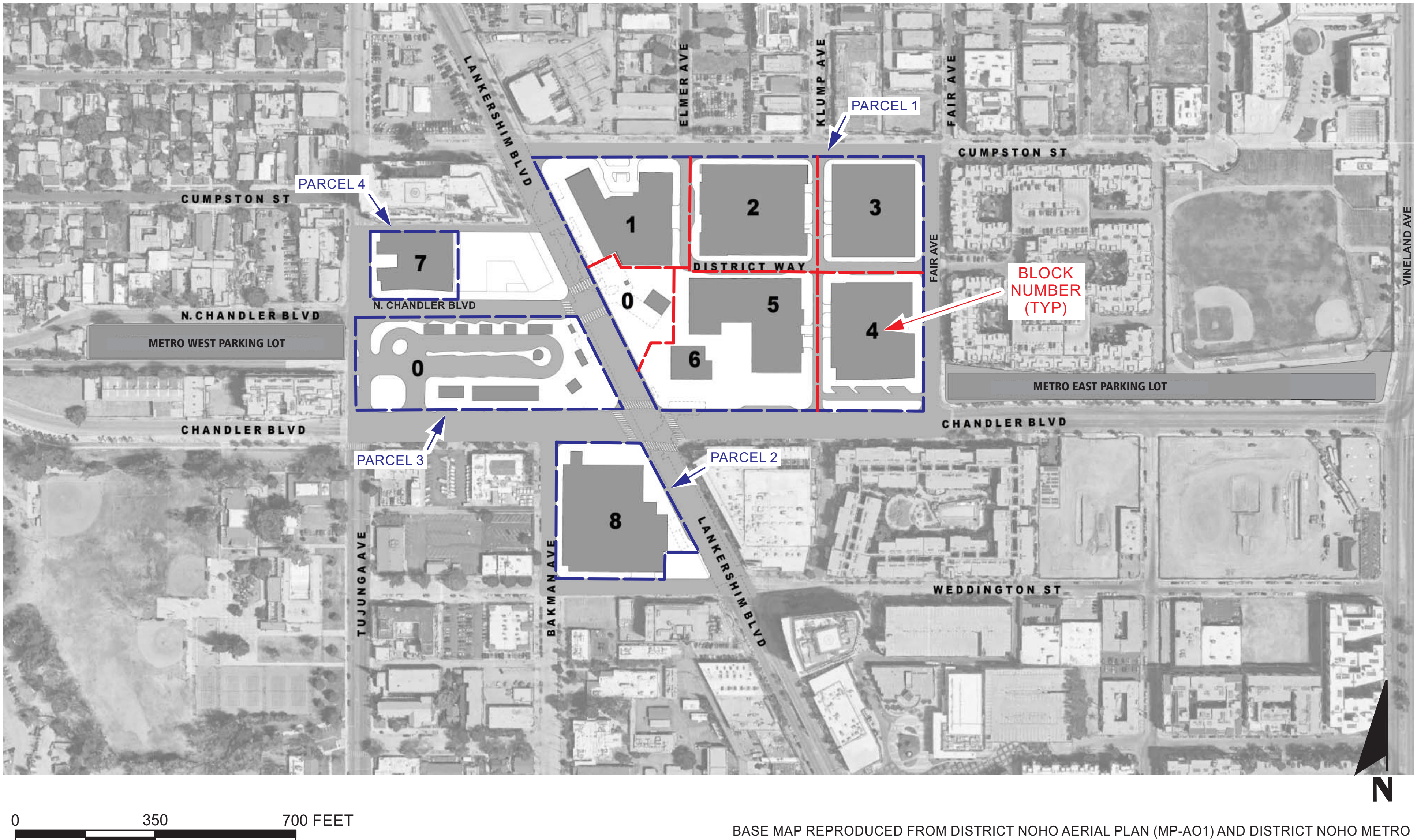
BASE MAP REPRODUCED FROM CALTOPO WGS84 - USNG ZONE 11SLT (ACCESSED MAY 2018)

GPI GEOTECHNICAL PROFESSIONALS, INC.		SITE LOCATION MAP
DISTRICT NOHO		
GPI PROJECT NO.: 2860.06I	SCALE: 1" = 2000'	FIGURE 1



BASE MAP REPRODUCED FROM DISTRICT NOHO AERIAL PLAN (MP-AO1) AND DISTRICT NOHO METRO PARKING VEHICULAR ACCESS (MP-AO2) PREPARED BY HKS REALM ARCHITECTS INC: DATED 11/01/19

GEOTECHNICAL PROFESSIONALS, INC.

DISTRICT NOHO

GPI PROJECT NO.: 2860.06I

SCALE: 1" = 350'

OVERALL SITE DEVELOPMENT PLAN

FIGURE 2

EXPLANATION

B-1 (120')	APPROXIMATE LOCATION AND NUMBER OF EXPLORATORY BORING
C-2 (50')	APPROXIMATE LOCATION AND NUMBER OF CONE PENETRATION TEST
P-3 (10')	APPROXIMATE LOCATION AND NUMBER OF INFILTRATION WELL
↑	INDICATES APPROXIMATE DEPTH OF EXPLORATION
GB-1	APPROXIMATE LOCATION OF BORING BY OTHERS (TRC, 2012)

BASE MAP REPRODUCED FROM THE GOOGLE EARTH © 2017

GPI GEOTECHNICAL PROFESSIONALS, INC.

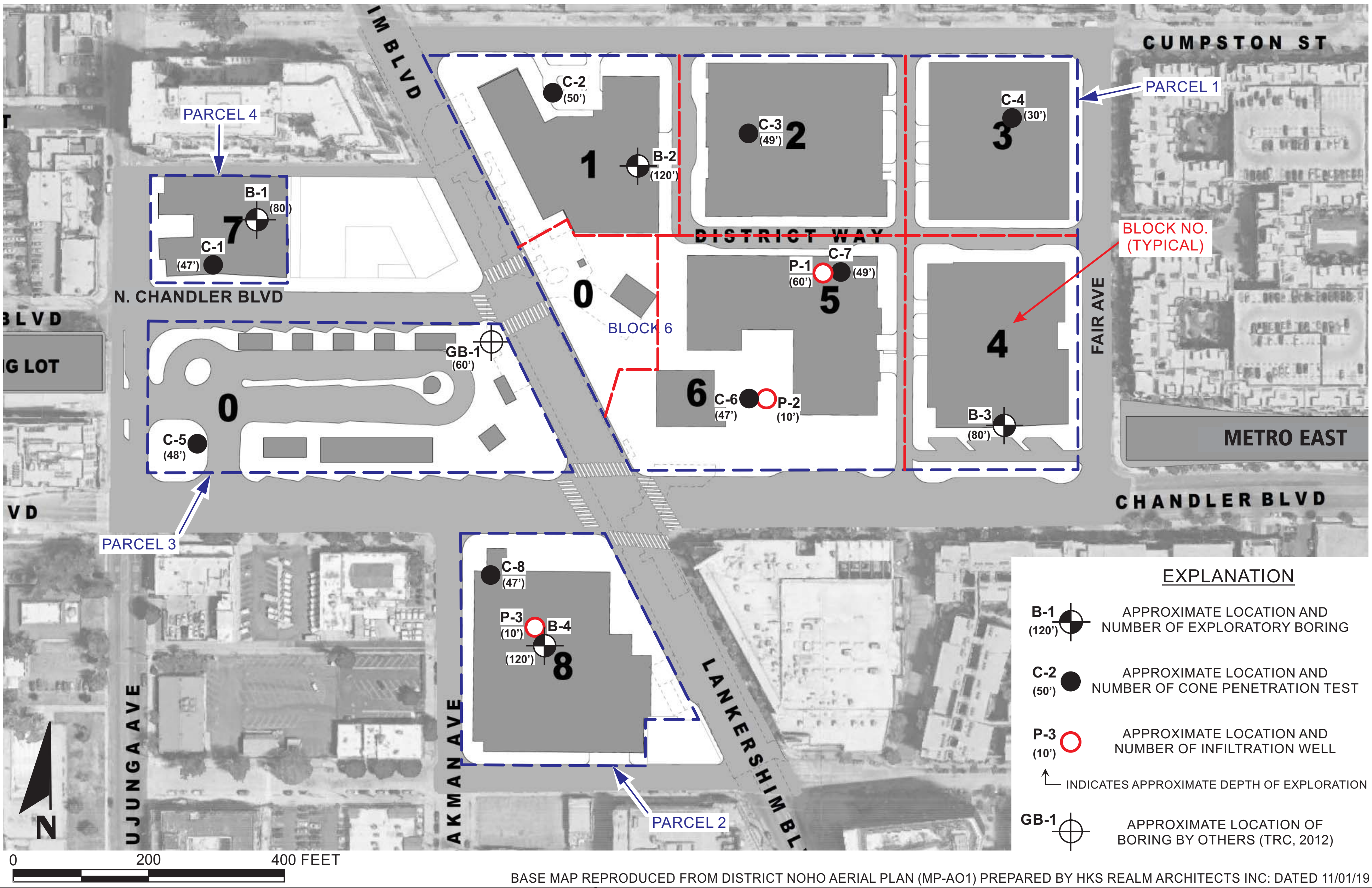
DISTRICT NOHO

GPI PROJECT NO.: 2860.06I

SCALE: 1" = 200'

EXPLORATION LOCATION PLAN: EXISTING CONDITIONS (PARCELS 1-4; BLOCKS 0-8)

FIGURE 3A



BASE MAP REPRODUCED FROM DISTRICT NOHO AERIAL PLAN (MP-AO1) PREPARED BY HKS REALM ARCHITECTS INC: DATED 11/01/19

GEOTECHNICAL PROFESSIONALS, INC.

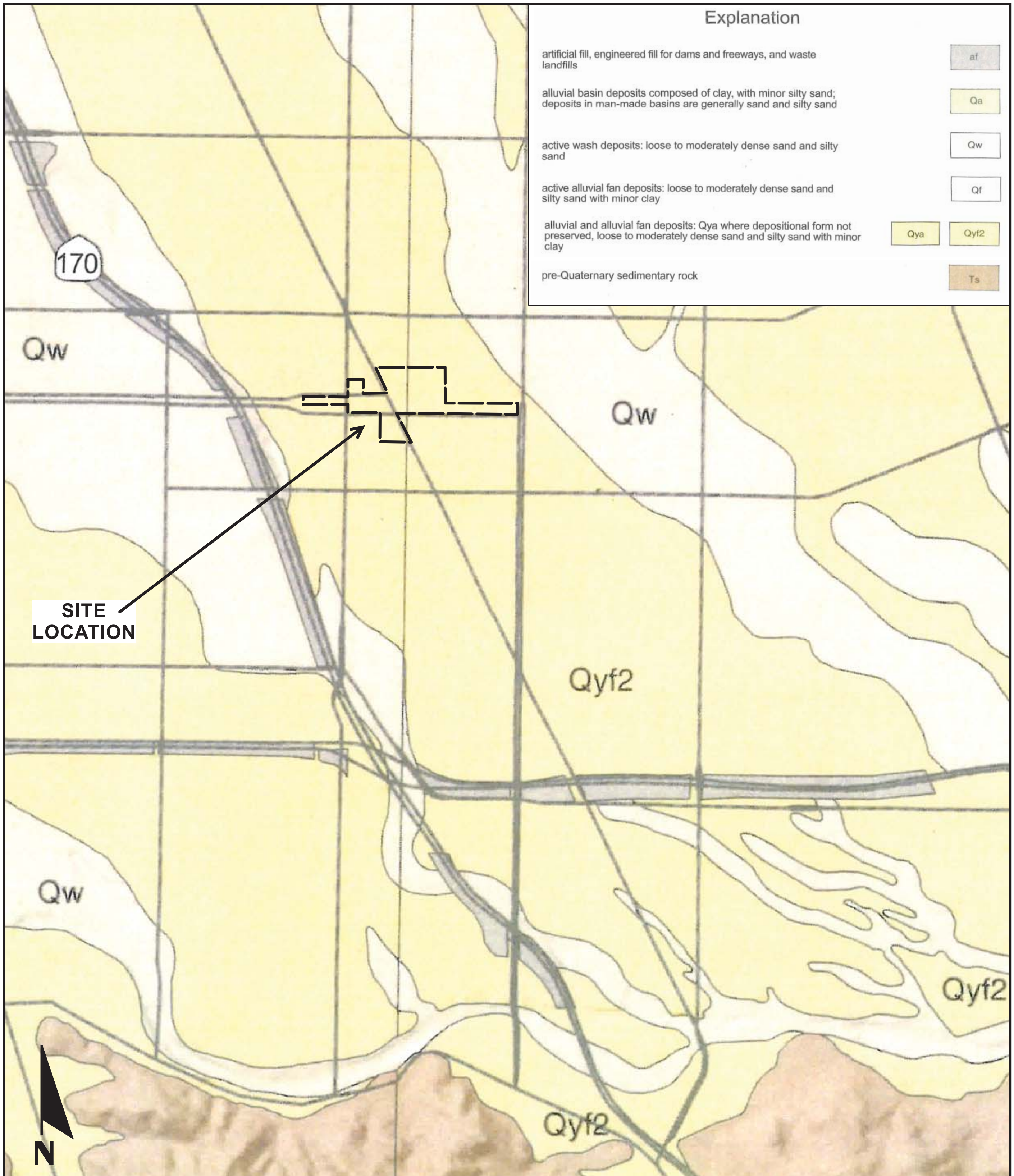
DISTRICT NOHO

GPI PROJECT NO.: 2860.06I

SCALE: 1" = 200'

EXPLORATION LOCATION PLAN: PROPOSED DEVELOPMENT (PARCELS 1-4; BLOCKS 0-8)

FIGURE 3B



BASE MAP REPRODUCED FROM THE MAP OF QUATERNARY GEOLOGY OF THE SAN FERNANDO VALLEY, LOS ANGELES COUNTY, CALIFORNIA BY C.S. HITCHCOCK AND C.J. WILLIS. (2000)

0 2000 4000 FEET

GEOTECHNICAL PROFESSIONALS, INC.

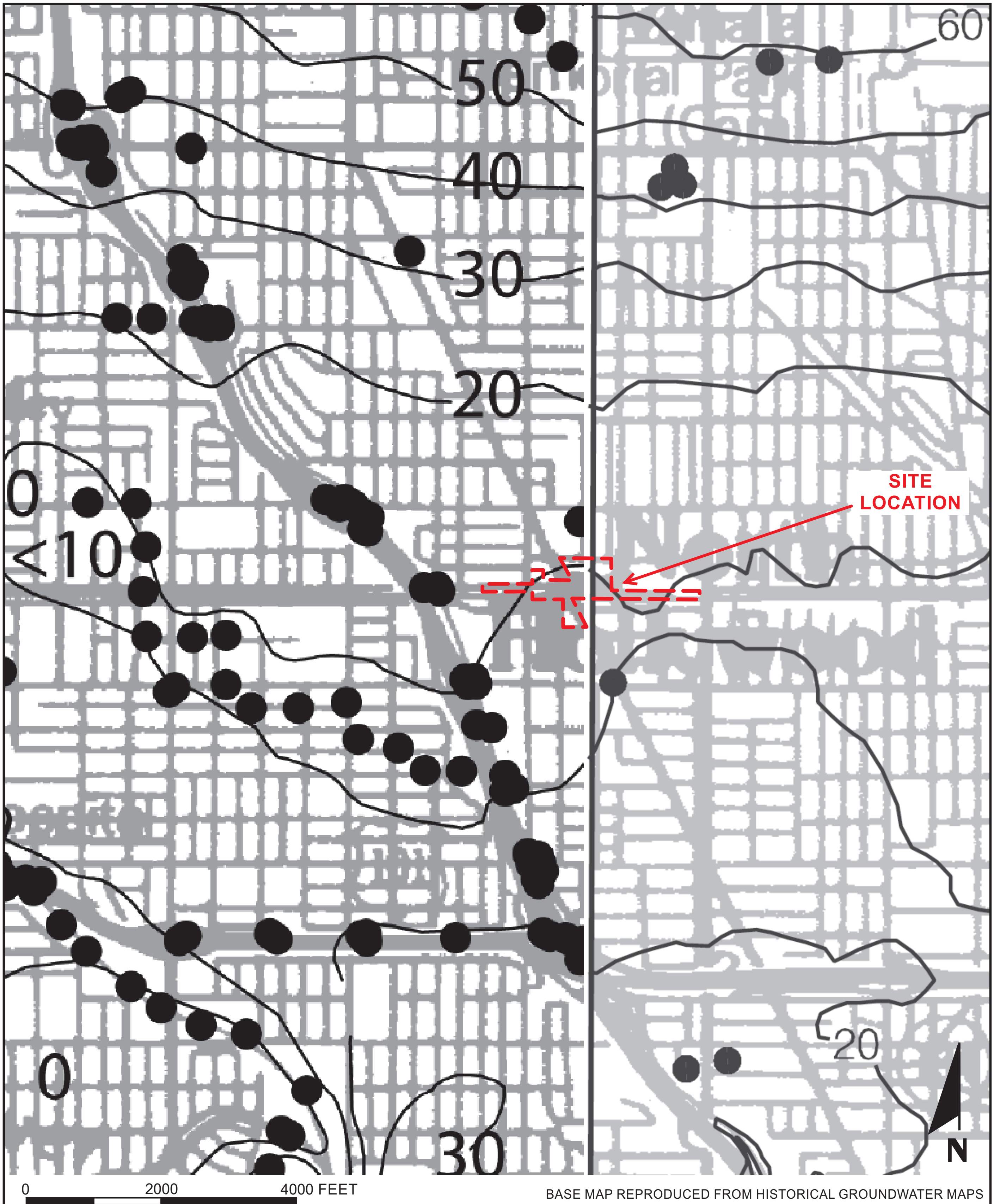
DISTRICT NOHO

GPI PROJECT NO.: 2860.06I

SCALE: 1" = 2000'

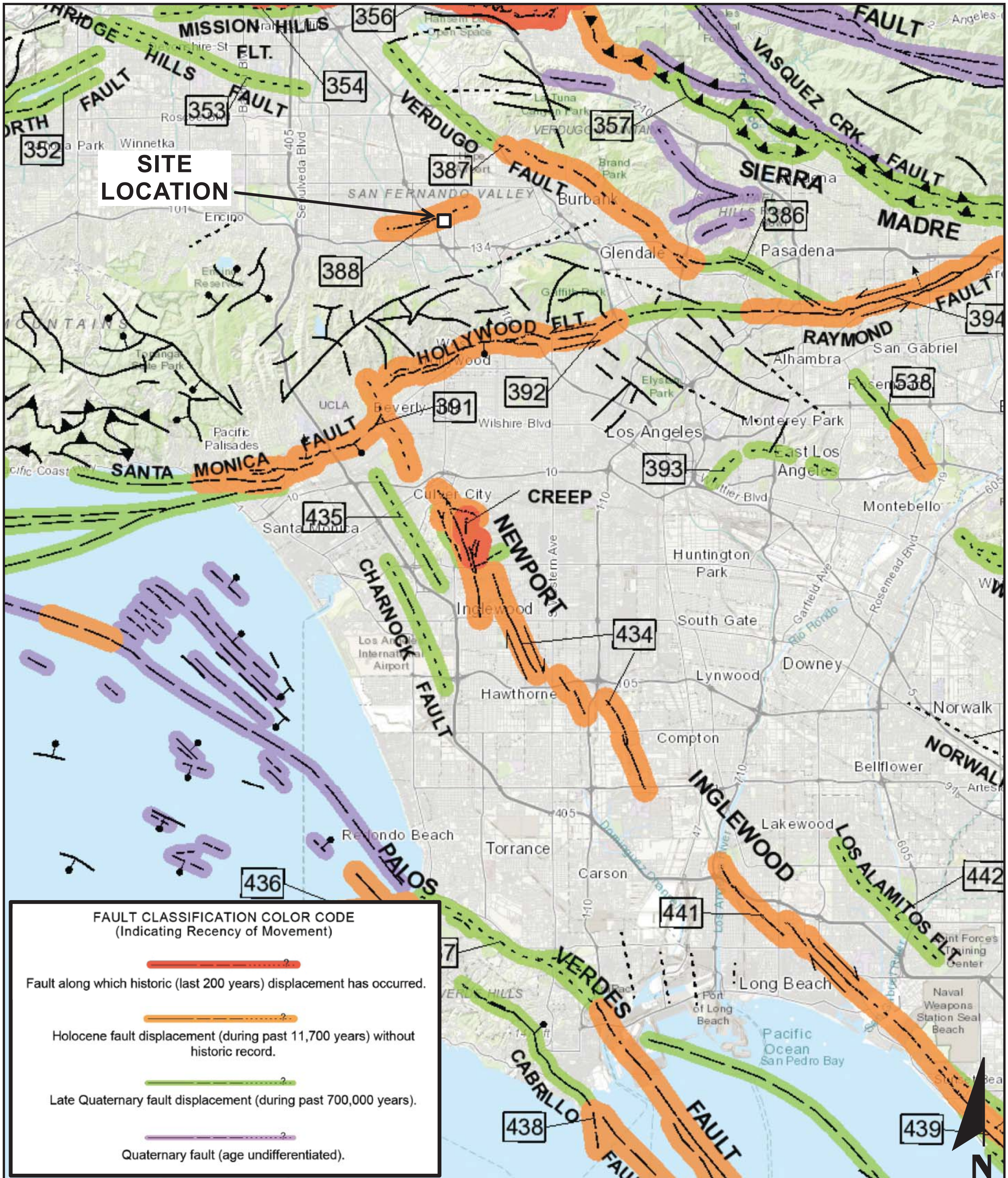
LOCAL GEOLOGIC MAP

FIGURE 4



BASE MAP REPRODUCED FROM HISTORICAL GROUNDWATER MAPS
(PLATES 1.2) FROM SEISMIC HAZARD ZONE REPORTS 008 AND 016 (1997/1998)

GPI GEOTECHNICAL PROFESSIONALS, INC.	**HISTORICAL HIGH GROUNDWATER MAP**
DISTRICT NOHO	
GPI PROJECT NO. 2860.06I / SCALE: 1" = 2000’	FIGURE 5



0 5 10 MILES

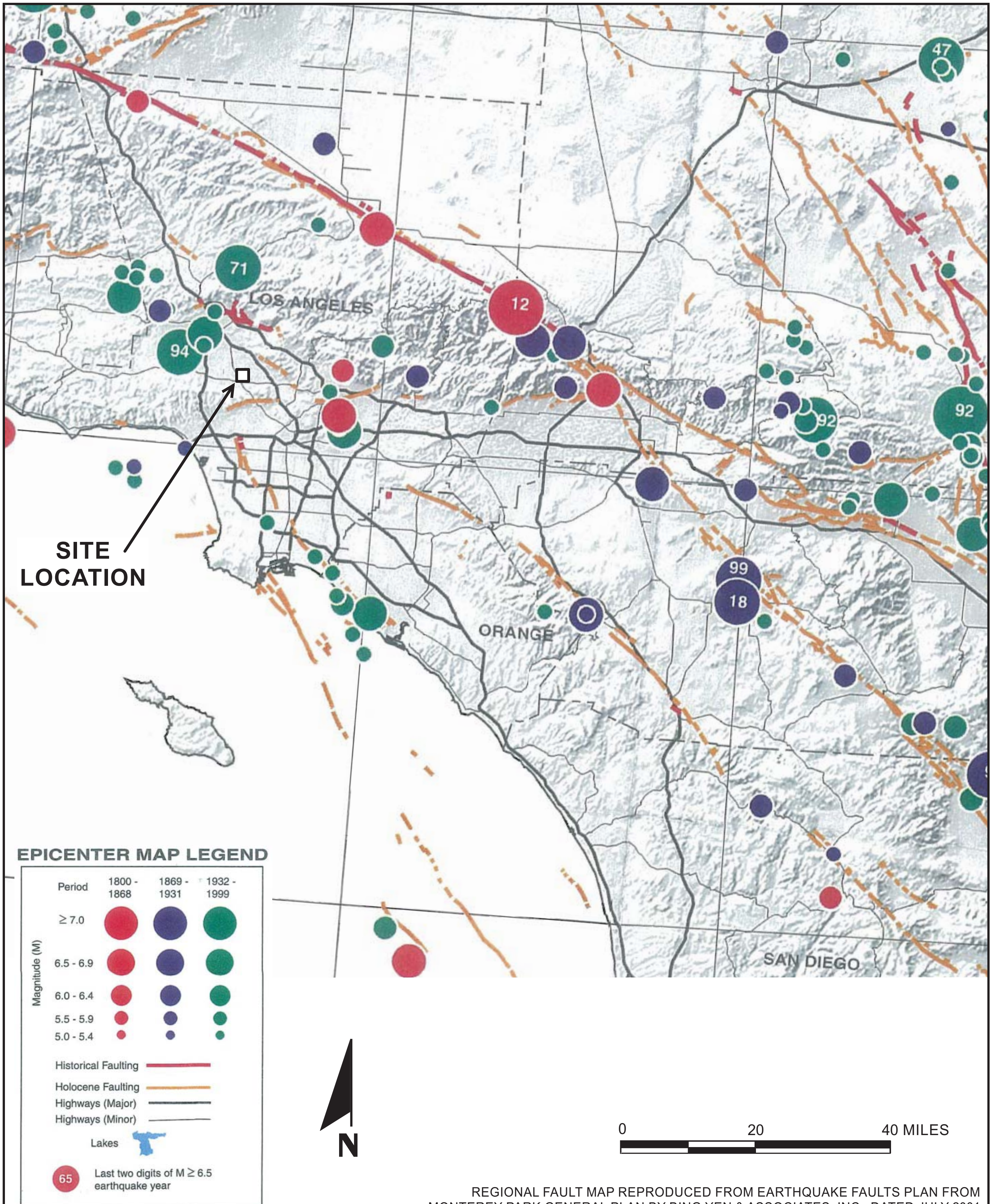
BASE MAP REPRODUCED FROM FAULT ACTIVITY MAP OF CALIFORNIA BY THE CALIFORNIA GEOLOGICAL SURVEY, C.W. JENNINGS, W.A. BRYANT: DATED 2010

GEOTECHNICAL PROFESSIONALS, INC.

REGIONAL FAULT MAP

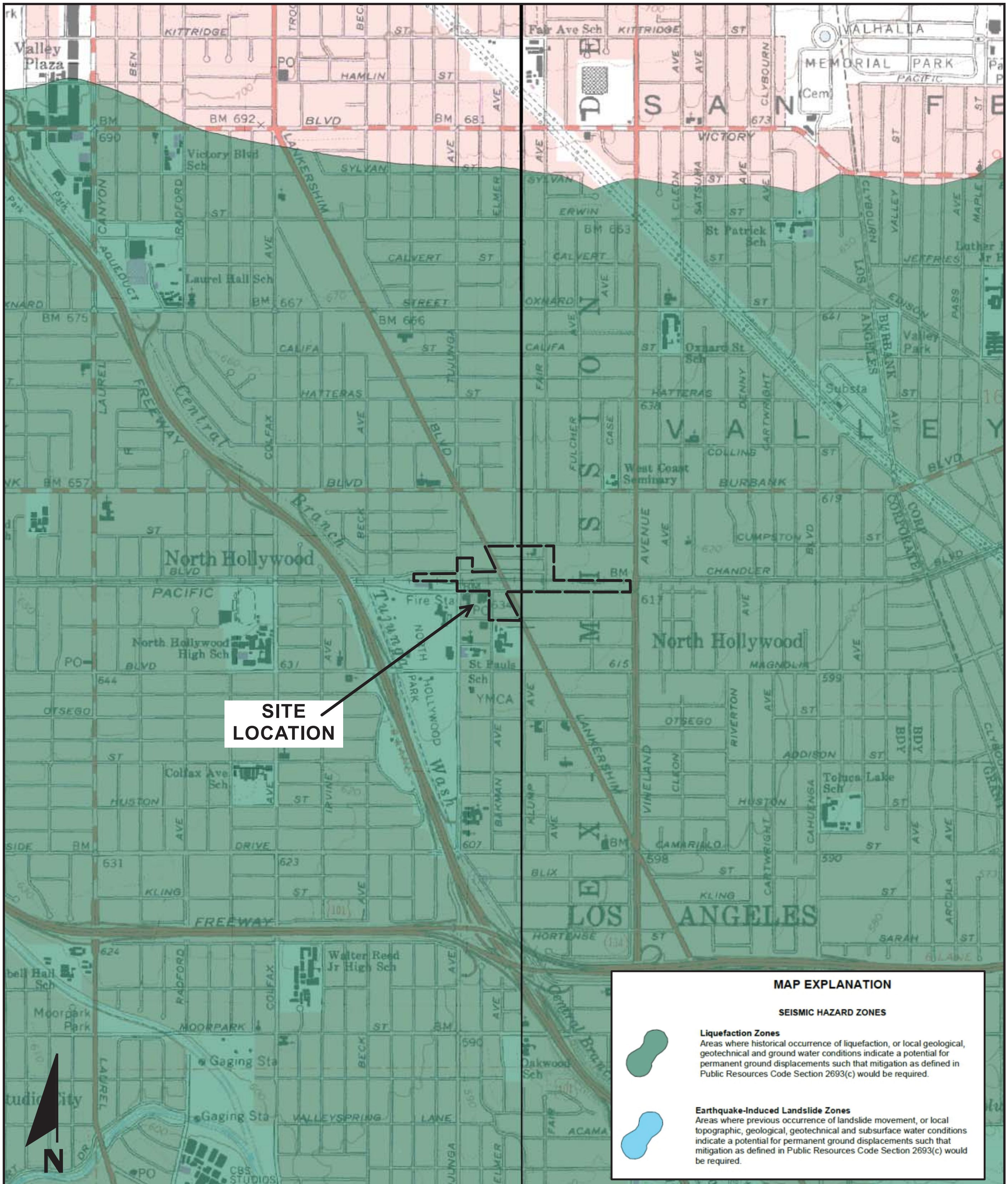
DISTRICT NOHO

GPI PROJECT NO. 2860.06I	SCALE: 1" = 5 MILES	FIGURE 6



REGIONAL FAULT MAP REPRODUCED FROM EARTHQUAKE FAULTS PLAN FROM MONTEREY PARK GENERAL PLAN BY BING YEN & ASSOCIATES, INC.: DATED JULY 2001

GPI GEOTECHNICAL PROFESSIONALS, INC.	**HISTORICAL EARTHQUAKES MAP**
DISTRICT NOHO	
GPI PROJECT NO.: 2860.06I — SCALE: 1" = 20 MILES	FIGURE 7



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BASE MAP REPRODUCED FROM THE SEISMIC HAZARDS ZONE MAPS FOR THE BURBANK AND VAN NUYS QUADRANGLES PREPARED BY THE CALIFORNIA GEOLOGIC SURVEY: RELEASED MARCH 25, 1999 AND FEBRUARY 1, 1998

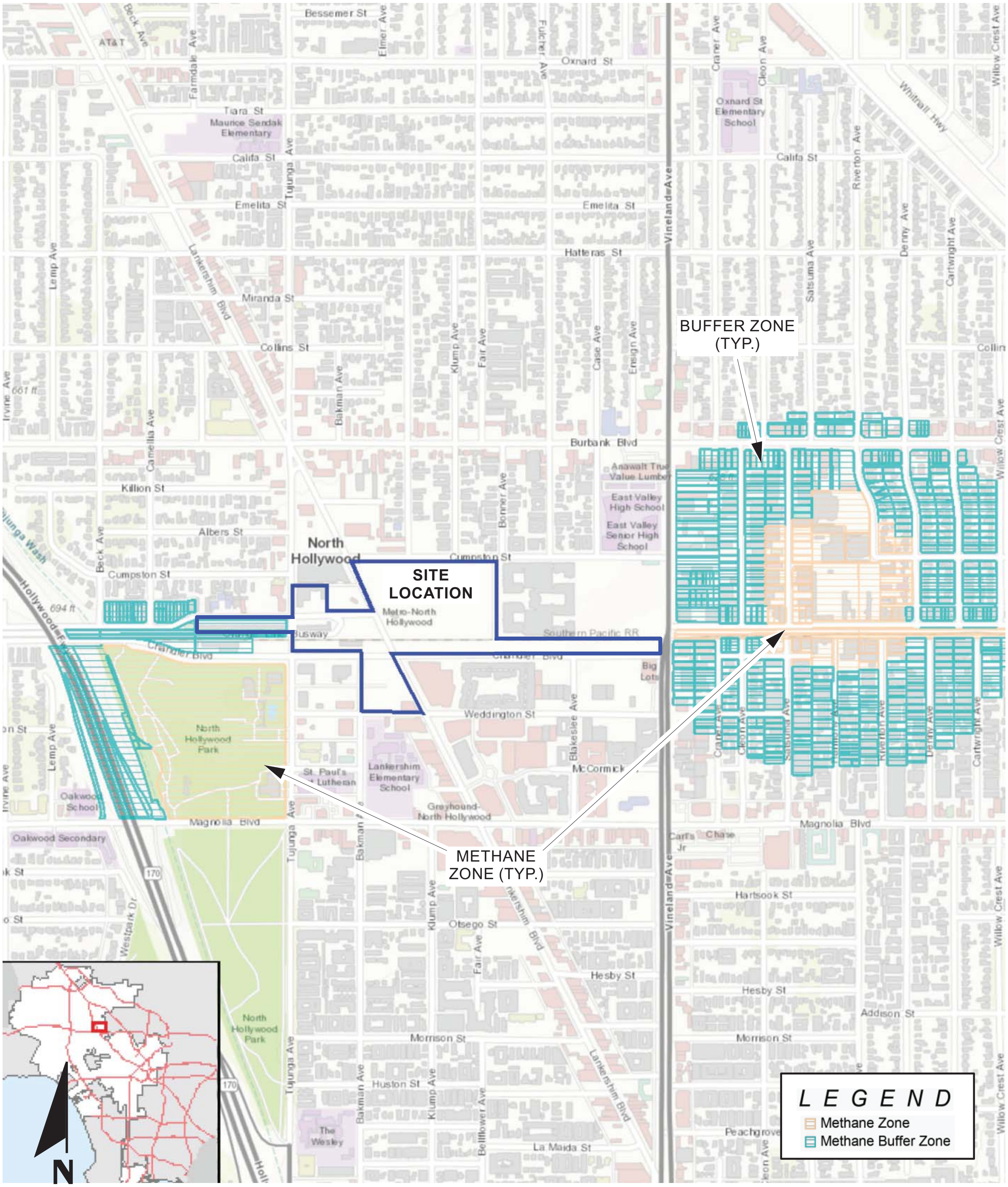
GPI GEOTECHNICAL PROFESSIONALS, INC.

DISTRICT NOHO

GPI PROJECT NO. 2860.06I | SCALE: 1" = 2000'

SEISMIC HAZARDS ZONES MAP

FIGURE 8



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BASE MAP REPRODUCED FROM THE NAVIGATE LA METHANE ZONES MAP: ACCESSED FEBRUARY 2018

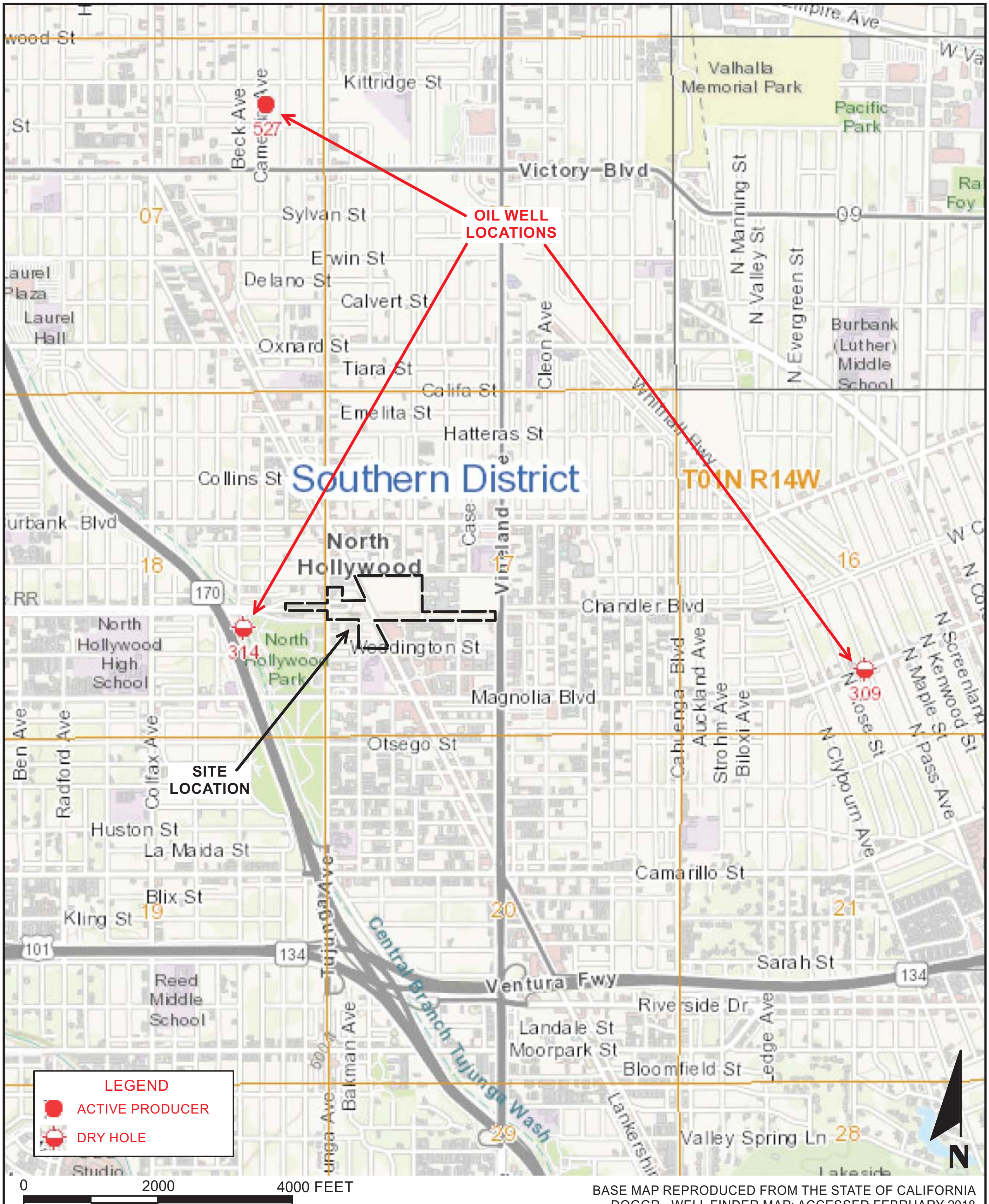
GPI GEOTECHNICAL PROFESSIONALS, INC.

METHANE ZONES MAP

DISTRICT NOHO

GPI PROJECT NO. 2860.06I | SCALE: 1" = 1000'

FIGURE 9



BASE MAP REPRODUCED FROM THE STATE OF CALIFORNIA
DOGGR - WELL FINDER MAP: ACCESSED FEBRUARY 2018

GEOTECHNICAL PROFESSIONALS, INC.

DISTRICT NOHO

GPI PROJECT NO.: 2860.06I | SCALE: 1" = 2000'

OIL WELLS MAP

FIGURE 10

APPENDIX

APPENDIX

CEQA APPENDIX G: ENVIRONMENTAL CHECKLIST FORM INPUT FOR SECTION VI GEOLOGY AND SOILS

The checklist below is provided for input into Section VI. Geology and Soils of the Appendix G CEQA Environmental Checklist Form for Parcels 1 through 4 of the proposed development. A brief explanation is provided below each item.

From CEQA Appendix G: Environmental Checklist	**Potentially Significant Impact**	**Less Than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
VI. GEOLOGY AND SOILS. Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
Brief Explanation: The site does not lie within an Alquist-Priolo Earthquake Fault Zone as designated by the California Geological Survey (CGS) or within a Preliminary Fault Rupture Study Area (PFRSA) as designated by the City of Los Angeles. CGS and USGS map an unnamed, quaternary fault crossing the northwest corners of Parcels 1 and 4 (Blocks 1 and 7) and the West Lot Parking Structure and projecting towards the east/northeast. Based on the data reviewed by GPI, it is our professional opinion that the presence of the unnamed possible fault at the site is unlikely and the potential for surface rupture due to the unnamed possible fault is unlikely. Further assessment of the presence of the unnamed possible fault with additional field explorations within the subject site is considered unnecessary.				
ii) Strong seismic ground shaking?	☐	☐	☒	☐
Brief Explanation: The site could be subjected to strong ground shaking in the event of an earthquake which could constitute a potential hazard to the project. The effects of strong seismic ground shaking can be mitigated by proper engineering design and construction in conformance with current building codes and engineering practices. The project will be designed in accordance with the Los Angeles Building Code.				
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
Brief Explanation: The project site is located in an area designated by the State Geologist as a "zone of required investigation" due to the potential for earthquake-induced liquefaction. The project will be designed in accordance with the Los Angeles Building Code and will include designing the building foundations to accommodate the potential effects of liquefaction or the liquefiable soils will be mitigated through application of ground improvement methods. Resulting impacts would be less than significant.				

From CEQA Appendix G: Environmental Checklist	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
iv) Landslides?	☐	☐	☐	☒
Brief Explanation: No landslides are mapped within or adjacent to the site and the site is relatively level. As such, landsliding is considered unlikely at this site.				
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
Brief Explanation: There is a potential for erosion of soils during construction, but this can typically be mitigated and/or significantly reduced with implementation of a Storm Water Pollution Prevention Plan (SWPPP). The potential for ongoing erosion during operation of the project is considered to be very low.				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
Brief Explanation: The project site is located in State designated Liquefaction Hazard Zone and there is a potential for liquefaction induced settlement to occur at the site. Building Code requirements to mitigate the adverse effects of liquefaction would be incorporate into design. As such, there is a low potential that project improvements will be located on unstable soils or soils that would become unstable resulting in on- or off-site seismic-induced settlement or collapse. Because the site is in a relatively level area, landsliding is considered unlikely at this site, and the potential for lateral spreading to occur during liquefaction is considered to be remote.				
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
Brief Explanation: Expansive soils were not encountered in recent exploration at the site. As such, the potential for expansive soils to impact the site of project improvements is considered unlikely.				
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
Brief Explanation: Septic tanks are not being considered for the project.				
f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.	☐	☐	☐	☒
Brief Explanation: The development is not expected to destroy a unique geological feature. Paleontological resources were not evaluated as part of GPIs study.				