GEOTECHNICAL
PROFESSIONALS INC.

GEOTECHNICAL AND GEOLOGIC EVALUATION
PROPOSED COACHELLA AIRPORT BUSINESS PARK
NWC STATE HIGHWAY 86 AND AIRPORT BOULEVARD
COACHELLA, CALIFORNIA

Prepared for:
Haagen Co., LLC
12302 Exposition Boulevard
Los Angeles, California 90064

Prepared by:
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Project No. 2884.1I December 18, 2023 (Revised January 4, 2024)

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Haagen Co., LLC
12302 Exposition Boulevard
Los Angeles, California 90064

Attention: Mr. Larry Larson

Subject: Geotechnical and Geologic Evaluation
Proposed Coachella Airport Business Park
NWC State Highway 86 and Airport Boulevard
Coachella, California
GPI Project No. 2884.1I

Dear Mr. Larson:

Transmitted herewith is our report of geotechnical and geologic evaluation in support of the environmental document for the subject project. Evaluations in this report are based on review of available published documents and our previous subsurface explorations at the site.

We are providing this report in an electronic format. Further copies of the report can be provided if required for City submittal upon request.

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 contact us if you have any questions regarding our report or need further assistance.

Very truly yours,
Geotechnical Professionals Inc.

James E. Harris V, P.E.
Project Engineer

Donald A. Cords, G.E.
Principal

2884-1I-01L (01/24)

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of a geotechnical evaluation performed by Geotechnical Professionals Inc. (GPI) to support the preparation of an environmental document for the proposed business park at the subject site in Coachella, California. The site location is shown on the Site Location Map, Figure 1.

1.2 PROJECT DESCRIPTION

The overall proposed project site will be developed for industrial uses comprising of large and small warehouses, personal vehicle storage and self-storage units, small business uses spaces, a small retail and restaurant, an electrical substation, a billboard sign, as well as a fuel station with convenience store as well as associated landscaping, parking, lighting, and signage. The overall project site consists of 47.96 acres.

Six large warehouse structures ranging in size from 22,400 to 48,800 square feet (sf) for a total of approximately 233,100 sf of warehouse space will be located along the northern portion of the site, in close proximity to the proposed electric substation. Five small warehouse structures, ranging in size from 9,600 to 24,000 sf for an approximate total of 96,000 sf, will be located along the site’s eastern frontage along SR 86.

Four structures for personal storage vehicles averaging 19,200 sf (for an estimated total of 76,800 sf) with an internal open space area will be located to the north of the small business buildings and to the west of the proposed small warehouse buildings on site.

Seventeen self-storage buildings, for a total of 128,600 sf ranging in size between 5,200 and 10,400 sf, will be located in the center portion of the site, west of the small warehouse buildings.

Eighteen proposed small business buildings, each approximately 4,500 sf in size each with a total of approximately 81,000 sf, will be located along the site’s eastern frontage along SR 86 and to the north of the fuel station and convenience store site.

The approximate 4,000 sf fuel station with associated convenience store and parking would be located towards the northern portion the site’s entrance along Airport Boulevard. The fuel station will also include an approximate 4,650 sf retail and drive-through restaurant located to the northeast of the site entrance.

The proposed buildings on the site will range from 24 to 50 feet in height, consisting of primarily one- and two-story structures but with some four-story structures.

An electrical substation will be located at the northern end of the overall project site. The new 315-foot x 315-foot electrical substation is required in order to provide adequate power for the proposed Project.

A 44-foot tall electronic billboard sign, measuring 14 by 48 feet, will be constructed along the small business frontage along SR 86. Site signage will be provided with a pylon mounted sign visible from SR 86 and a project sign adjacent to Airport Boulevard.

Figure 2 provides the layout of the proposed project site.

1.3 PURPOSE OF EVALUATION

The primary purpose of this report is to provide an evaluation of the geotechnical and geologic conditions as they relate to the proposed development of the site. The information in this report will be used to support the analysis in the environmental document.

1.4 SCOPE OF WORK

This geotechnical and geologic evaluation presents a summary of conditions at the subject site and identifies and evaluates constraints that are likely to be factors with respect to the proposed development. In order to accomplish this objective, the following scope of services was performed:

- Research and review of available published reports and geologic maps pertaining to the site and vicinity (see References);
- Review of readily available historical aerial photographs;
- Review of existing site-specific geotechnical data including a previous subsurface investigation performed by GPI (GPI, 2018);
- Summarize anticipated on-site earth units and their engineering and geologic characteristics;
- Prepare evaluation report, which includes a summary of the researched information and a discussion of the possible geologic-seismic hazards and geotechnical conditions that may affect the subject site and the proposed construction.

1.5 AVAILABLE SUBSURFACE INFORMATION

We previously performed a subsurface investigation at the subject site. (GPI, 2018). Our investigation included cone penetration tests (CPTs), hollow-stem auger borings, and laboratory testing. We performed twenty three CPTs and eleven borings, which extended to depths of 6 to 81½ feet below existing grades. The information contained in our previous report has been used to the extent possible in developing our evaluations. Laboratory testing included determinations of moisture content and dry density, Atterberg Limits, grain size, compressibility (consolidation), shear strength (direct shear), collapse, R-value, and corrosion.

1.6 SITE HISTORY

The site is located on an undeveloped parcel located directly between State Route 86 and an unlined storm water channel (Whitewater River). We observed no evidence of previous development at the site. Historic aerials (historicaerials.com) indicate the land has been undeveloped since prior the 1950's. Minor grading may have been performed along the property lines associated with the channelization of Whitewater River and the roadway construction.

2.0 SITE CONDITIONS

2.1 GEOLOGIC SETTING

The site is located in the Colorado Desert Geomorphic Province, an area characterized as low-lying desert terrain up to 245 feet below sea level. The province includes the Coachella and Imperial valleys and extends from the end of the Gulf of California to the south to Banning Pass area to the north. The valleys are also known as the Salton Trough, occupied in the lowest area by the Salton Sea. During the Pleistocene, the trough was occupied by a large lake, Lake Cahuilla, and the surface sediments in much of the basin consist of lake deposits. Tectonic models indicate that the basin is underlain by and was formed by rifting of the East Pacific Rise, which transitions to a transform fault, the San Andreas Fault, on the east side of the basin.

The site is relatively flat sloping very gently to the south. In general, the north side of the site is approximately 8 feet higher than the southern side over a distance of approximately 3,000 feet. Existing ground surface elevations ranged from about -112 to -120 feet MSL based on a topographic map.

A geologic map of the site vicinity is presented on Figure 3, Local Geology Map.

2.2 TECTONIC SETTING

The project site is located in the Colorado Desert Geomorphic Province within the Coachella Valley. The Coachella Valley is the northern portion of a structural feature commonly known as the Salton Trough, a rift-zone valley that represents the extension of the Gulf of California. As shown on the attached Geologic Map, Figure __, the site is located near the central portion of the valley in an area underlain by alluvium and lake deposits from ancestral Lake Cahuilla, which once occupied the basin during the Pleistocene.

The geologic structure of the site area is dominated by active, northwest-trending faults associated with the San Andreas and related faults, which are actively creating the rift valley known as the Salton Trough. The closest trace of the San Andreas Fault Zone, termed the Banning-Mission Branch, is approximately 2.7 miles northeast of the site. The San Andreas Fault system represents the plate boundary between the Pacific Plate to the west and the North American Plate to the east. The fault extends from the Salton Trough to the southeast to Cape Mendocino to the north, a distance of over 1000 kilometers. Fault activity on the San Andreas is responsible for two of the largest earthquakes in California history, the 1906 San Francisco and 1857 Fort Tejon earthquakes. These earthquakes occurred on two separate segments of the fault system north of the southern segment, which lies adjacent to the site area. Many experts believe that the southern segment is due for a moderate or large earthquake event, as the segment has not ruptured in historic times.

2.3 LOCAL AND REGIONAL FAULTS

A computer search using the 2008 USGS fault database was used to identify known active faults within a 40-mile radius of the project site. The names and distances to the project site of the faults lying within 40 miles of the project site are provided in the following Table 2.3-1.

Table 2.3-1 – Significant Regional Faults

Fault Name	Approximate Distance* (mi)
San Andreas	2.7
San Jacinto	20.3
Burnt Mountain	24.6
Eureka Peak	24.7
Pinto Mountain	33.5
Pisgah-Bullion Mountain	34.7
Emerson-Copper Mountain	35.4
Calico-Hidalgo	36.3
Landers	39.5
Elmore Ranch	39.9

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

Active and potentially active faults within the Coachella Area are shown on Figure 4, Regional Fault Map.

Active faults are defined as faults that exhibit evidence of movement in the last 11,000 years (Holocene age). Active faults have the greatest risk of fault rupture and the greatest potential for strong ground shaking. Potentially active faults are defined as faults that exhibit evidence of movement greater than 11,000 years ago but less than 1,600,000 years ago (Plestocene age). Potentially active faults should be considered a potential source for fault rupture but with less risk and less potential for strong ground shaking. Inactive faults have not shown evidence of movement in the past 1,600,000 years.

The project site is not located in an area mapped with known active, potentially active or inactive faults traces or their projections. The site does not lie within an Alquist-Priolo Earthquake Fault Zone as designated by the California Geological Survey (CGS, 2015).

The nearest active fault from the site is the San Andreas fault, which is mapped approximately 2¾ miles east of the site. The San Andreas fault provides the greatest risk of fault rupture and potential ground shaking in Coachella.

The most significant faults due to their proximity from the site and their potential to generate significant earthquakes and ground motions are the San Andreas and San Jacinto. These faults are described below:

2.3.1 San Andreas Fault Zone

The San Andreas Fault Zone is the boundary between the Pacific and North American plates. The fault runs continuously from San Francisco to the Salton Sea. The fault zone is a strike slip fault represented by three segments in the Southern California Region. The Mojave Desert segment, the San Bernardino Mountains segment, and the Coachella Valley Segment, the portion in the Coachella Valley. The segment present in the Coachella Valley has an estimated long term slip rate of approximately 25 mm/yr and an average recurrence interval of 220 years.

2.3.2 San Jacinto Fault Zone

The San Jacinto Fault is one of several, major active faults within the Peninsular Ranges Geomorphic Province and its closest trace is within approximately 20 miles of the site. The SCEDC lists the fault as a right lateral, strike slip fault with a total length of 210 kilometers. Surface rupture occurred on the southern segment of the fault on April 9, 1968 during a magnitude 6.5 earthquake. The estimated slip rate of the fault is 7 to 17 mm/yr and the interval between surface rupture events is approximately 100 to 300 years.

2.4 HISTORICAL SEISMICITY

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. The project site and vicinity has experienced strong ground shaking due to earthquakes in historic time from several local earthquakes. Damage from the recent earthquakes has been relatively minor.

The locations of earthquake epicenters through 1999 with respect to the subject site are shown on Figure 5, Historical Earthquakes.

2.5 SURFACE CONDITIONS

The 47.96 acres site is bounded by Airport Road to the south, State Route 86 to the east, undeveloped land to the north, and the storm water channel to the west. The majority of the site is vacant and fenced with sparce shrub coverage. The northern portion of the site (approximately 5.6 acres) is covered with dense trees and shrubs.

The site is relatively flat sloping very gently to the south. In general, the north side of the site is approximately 8 feet higher than the southern side over a distance of approximately 3,000 feet. Existing ground surface elevations ranged from about -112 to -120 feet MSL based on a topographic map.

Along the property limits, there are minor slopes adjacent to the site. State Route 86 is, in general, a few feet higher than the site with a minor descending slope. Directly adjacent to the western side of the site, an unpaved maintenance road is located at the top of the storm channel on a berm, which is approximately 2 to 3 feet higher than the project site at the southern end of the site and approximately 8 to 10 feet higher than the project site at the northern end of the site. The berm appears to have been constructed as a levee for the storm water channel. The bottom of the storm channel appears to be on the order of 6 to 8 feet lower than project site.

2.6 SOIL AND GEOLOGIC UNITS/SUBSURFACE CONDITIONS

Our field investigation disclosed a subsurface profile consisting of native lacustrine deposits. Though significant fill soils were not encountered, some fills are expected at the top of the slope immediately adjacent to the storm water channel.

The natural soils consist of interbedded layers of sands, silts, and clays and their mixtures. The consistencies of the sandy soils ranged typically from loose to medium dense in the upper 30 feet and medium dense to dense at greater depths. The sandy soils in the upper 30 feet exhibit moderate strength and moderate to low compressibility characteristics. Very dense sand layers were encountered at depths greater than approximately 55 to 60 feet.

The fine-grained soils (silts and clays) are generally firm to stiff with some very stiff to hard layers in the upper 20 feet. In general, the fine-grained soils within the upper 20 to 30 feet varied from firm to stiff and moderately compressible. The underlying fine-grained soils become predominantly stiffer with depth, exhibiting moderate strength and moderate to low compressibility characteristics.

Clay soils were not observed in the near surface soils. The near surface soils can be anticipated to have very low expansion characteristics.

2.7 GROUNDWATER

In the borings, groundwater was measured at depths of 14 to 20 feet immediately after drilling. Due to the method of drilling, accurate depths to groundwater and the potential for caving were very difficult to determine. Groundwater may rise from the deeper measured levels if allowed to stabilize with time. Based on the moisture content of the soil samples, we anticipate a stabilized groundwater level at a depth of 10 to 15 feet below existing grade. The historical high groundwater has not been determined in the area by the State of California. Groundwater measurements at a well located approximately 1,200 feet southwest of the site have shown varying groundwater levels from 14 to 38 feet below the ground surface between 2011 and 2019 (wdl.water.ca.gov).

The sandy soils are expected to cave in dry loose soils in the upper 10 feet of the soil profile and severely cave below the groundwater.

2.8 MINERAL RESOURCES

The project site is located in a State Mineral Zone (MRZ) 1, which indicates that the area contains adequate information that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence. Due to this, future development of the site would not impact future mineral resource availability of production for the area.

Figure 6 shows the site location on the State Mineral Resources Map.

3.0 GEOLOGIC AND SEISMIC HAZARDS

Geologic hazards known to impact projects in Southern California include seismic events, slope stability, subsidence, flooding, expansive/collapsible soils, and erosion. More detailed assessment of the geologic and seismic hazards at the site are discussed below:

3.1 FAULT RUPTURE

There are no known active faults or potentially active faults crossing or projecting through the site. The site is not located in an Alquist-Priolo Earthquake Fault Zone. Therefore, the potential for ground surface rupture at this site due to faulting to impact the project is considered very low.

Figure 7 shows the site location on the Earthquake Fault Zones Map.

3.2 SEISMICITY

The site is located in a seismically active area of Southern California and is likely to be subjected to strong ground shaking due to earthquakes on nearby faults.

We assume the seismic design of the proposed development will be in accordance with the California Building Code, 2022 edition. Based on the ASCE 7 Hazard Tool (asce7hazardtool.online) and USGS websites, we computed that the site could be subjected to a peak ground acceleration (PGA_M) of 0.97g for a modal magnitude 7.5 earthquake. This acceleration has been computed using the mapped Maximum Considered Geometric Mean peak ground acceleration from ASCE 7-16 and a site coefficient (F_{PGA}) based on site class. The predominant earthquake magnitude was determined using a 2-percent probability of exceedance in a 50-year period, or an average return period of 2,475 years. The structural design will need to incorporate measures for the effects of strong ground motion.

3.3 LIQUEFACTION POTENTIAL

Soil liquefaction is a phenomenon in which saturated cohesionless soils undergo a temporary loss of strength during severe ground shaking and acquire a degree of mobility sufficient to permit ground deformation. In extreme cases, the soil particles can become suspended in groundwater, resulting in the soil deposit becoming mobile and fluid-like. Liquefaction is generally considered to occur primarily in loose to medium dense deposits of saturated soils. Thus, three conditions are required for liquefaction to occur: (1) a cohesionless soil of loose to medium density; (2) a saturated condition; and (3) rapid large strain, cyclic loading, normally provided by earthquake motions.

The site is located within an area mapped by the City of Coachella as having a potential for soil liquefaction (City of Coachella, 2014). The State of California has not determined a historical high groundwater depth in the project area. Groundwater was encountered at depths of 14 to 20 feet below existing grades immediately after drilling in our recent explorations.

The potential for liquefaction was evaluated using the methods presented by the NCEER and updated by Robertson (Robertson, 2009) and modifications provided in Special Publication 117A. We considered a ground acceleration of 0.80g for a magnitude 6.9 earthquake for our analyses, which corresponds to the PGAM obtained using the methods described above. Criterion for liquefaction susceptibility of the fine-grained soils was based on methods presented in Bray and Sancio (2006). We used a groundwater depth of 10 feet for our evaluations.

Based on our preliminary evaluation of the field data using the methods and ground accelerations above, generally isolated and thin layers of silty sands occurring at depths of approximately 10 to 55 feet exhibit a potential for liquefaction. Based on our analyses, we anticipate that liquefaction is likely at the site during a design-level seismic event. The magnitude of seismic induced settlement could be on the order of 2 to 3 inches.

Mat foundations, pile foundations, or ground improvement may also be used to mitigate the potential liquefaction settlements.

3.4 LATERAL SPREADING

A potential result of soil liquefaction at the site is lateral spreading. Lateral spreading is defined as the horizontal movement of soils resulting from the loss of shear strength during liquefaction combined with either a sloping ground surface or a nearby free face condition. Conditions contributing to the potential for lateral spreading include the extent and severity of liquefaction, grain size of liquefiable materials, distance to the causative fault, and extent of surficial grade changes.

The unlined storm water channel on the east side of the site is an open face excavation (free face condition) with an estimated depth on the order of approximately 6 to 8 feet. The slope to the storm water channel is approximately 100 to 150 feet from the western property line at the site. The project site is essentially flat with a very minor ground slope of about 0.3 percent towards the southeast paralleling the storm water channel.

These conditions along with the liquefaction potential of underlying soils are consistent with areas that may be subject to lateral spreading. Utilizing this geometry and the analytical method described above, we determined the potential total lateral-spreading induced displacement from approximately 3 to 12 inches could occur at the western portion of the site.

Ground improvement (or combination of ground improvement and structural mitigation) may be used to mitigate the impacts of lateral spreading. Structural mitigation including, but not limited to, the use of mat foundations, may be considered for mitigating up to 12 inches of horizontal lateral ground displacement. If total lateral ground displacement exceeds 12 inches, ground modification is generally required.

If mat foundations or footings tied together with grades beams are used to support the buildings, the relatively minor amounts of lateral spreading discussed above is not expected to adversely impact the building from a life and safety standpoint. Mitigation measures such as repairing utility connections and parking lot grades along the west side of the site may be required should lateral spreading occur during a design earthquake event. To minimize impacts of lateral spreading, ground improvement would likely consist of a deep barrier wall with multiple rows of soil-cement columns along the entire western boundary of the property.

3.5 SLOPE STABILITY

The project site is relatively flat with no slopes. The proposed development is not anticipated to construct permanent slopes. Therefore, the existing and proposed development will not impact the site with respect to the potential for slope instability, including debris flows.

3.6 EXPANSION AND HYDROCONSOLIDATION POTENTIAL

Expansive soil consists 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 on our previous explorations, expansive soils are not present near the surface at the project site.

Collapsible soils consist of loose, dry, low-density materials that collapse and compact under the addition of water or excessive loading. Laboratory testing performed on samples from our explorations determined that the potential for soils to consolidate due to hydroconsolidation was unlikely.

3.7 SUBSIDENCE AND SETTLEMENT

Ground subsidence is defined as the downward movement of surface soils caused by the removal of underground fluids. Groundwater withdrawal or petroleum extraction is not being performed at the site or known to be performed at nearby sites. Therefore, the potential for subsidence to adversely affect the project site is considered very low.

The placement of building loads, structural loads of minor ancillary structures, or a significant thickness of fill has the potential to result in ground surface settlement due to the compression of the undocumented fill at the surface. Construction measures will be required to remove the undocumented fills under structural loads during site grading. Preliminary plans indicate that significant fills are not planned for the project. Provided the undocumented fills have been removed, ground improvement or piles are installed under loaded areas, the potential for settlement to adversely affect the project is considered to be low.

3.8 CORROSIVE SOILS

Laboratory testing indicates that the near surface soils exhibit a soluble sulfate content up to 4,080 mg/kg (0.44 percent by weight). For the 2022 CBC, foundation concrete should conform to the requirements for severe sulfate exposure as outlined in ACI 318, Section 4.3. Typical mitigation measures to mitigate the impacts of the sulfates should include cement types, minimum compressive strength, and water content.

Resistivity testing of representative samples of the on-site surficial soils by HDR indicate that the soils are severely corrosive to ferrous metals (resistivity measurements of 160 to 1,040 ohm-cm). Should the use of buried metal pipe be proposed, a corrosion engineer should be consulted to mitigate the potential for corrosion.

Typical mitigation procedures for buried metals include cathodic protection, coatings such as paint or tar, or wrapping with protective materials.

3.9 SUBSURFACE INFILTRATION

Current regulations require that storm water be infiltrated in the site soils of new developments when possible. The soil types present at the site control the ability of water to infiltrate into the subgrade. Based on our subsurface investigation, groundwater was encountered within 14 feet of the existing ground surface at portions of the site and the upper 15 feet of the soil profile consists predominantly of loose to medium dense silty sands and firm to stiff sandy silts.

Our analysis indicate that the silty sands and sandy silts in the upper 15 feet of the soil profile exhibit a potential for settlement from liquefaction upon saturation. Storm water infiltration into the underlying soils may adversely impact the proposed buildings and improvements as well as the adjacent public roadways. As mitigation storm water infiltration should not be used at the subject site due to the risk for potential liquefaction settlement of soils underlying infiltration areas.

3.9 TSUNAMI 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.

Tsunamis are long-period waves caused by sudden displacement of water from earthquakes or volcanic eruptions under the sea. The project site is located approximately 77 miles inland from the Pacific Ocean. There is no potential for flooding from a tsunami at the site.

A seiche is an earthquake-induced wave in a confined body of water, such as a lake, reservoir, or bay. Since the site does not lie in close proximity to an enclosed body of water, the probability of flooding due to a seiche is considered to be very low. A serious consequence of a seiche would be the overtopping or failure of a dam. The probability of flooding due to dam failure is considered very low.

3.11 FLOODING

Although this area is currently in a flood zone as described below, ongoing work by Coachella Valley Water District is being performed to complete the flood channel in this area. It is our understanding that once completed, the new channel would provide mitigation for the flood zone designation.

According to a flood map (Map Number 06065C2270H, dated March 6, 2018 prepared by the Federal Emergency Management Agency (FEMA), the project site is located within a mapped flood zone (msc.fema.gov).

The site is mapped in Zone AE, defined as a special flood hazard area subject to inundation by the 1-percent annual chance of flood (100-year flood). For sites located within Zone AE, the base flood elevation has been determined. Within the limits of the subject site, the base flood elevations range from approximately -112 feet to -118 feet. Mitigation for the potential flood hazard should be provided by the Project Civil Engineer.

The limits of the flood inundation zones as described above are shown on the attached Figure 8, FEMA Flood Zones Map.

3.12 EROSION

The existing site is predominantly bare or covered with sparce vegetation. The proposed project should not increase the potential for wind or water erosion at the site except during the demolition, grading, and construction phases. Proper construction BMPs should be implemented during these phases as mitigation to avoid soil erosion during construction. A landscape plan for the development should be prepared to control erosion of topsoil after completion of construction. As such, the potential for erosion to adversely impact the site is considered low.

5.0 LIMITATIONS

This report, and other materials resulting from GPI's efforts were prepared exclusively for Haagen Co., LLC, and their consultants in developing the environmental document for the proposed development. The report is not intended to be suitable for reuse on extensions or modifications of the project or for use on projects other than the currently proposed development, as it may not contain sufficient or appropriate information for such uses.

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 by others are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Detailed geologic and geotechnical evaluations and analysis should be performed during the design level of the development of the project. During the design level, we should conduct sufficient subsurface explorations and laboratory testing of soil samples in order to properly address the issues presented in this report and to provide specific design recommendations for the earthwork and structures. Furthermore, we recommend that a proper level of field observation and construction review should be provided by GPI during grading, excavation, and foundation construction.

Our 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 expressed or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.

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REFERENCES

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FIGURES

BASE MAP REPRODUCED FROM GOOGLE MAPS © 2018

GEOTECHNICAL PROFESSIONALS, INC.

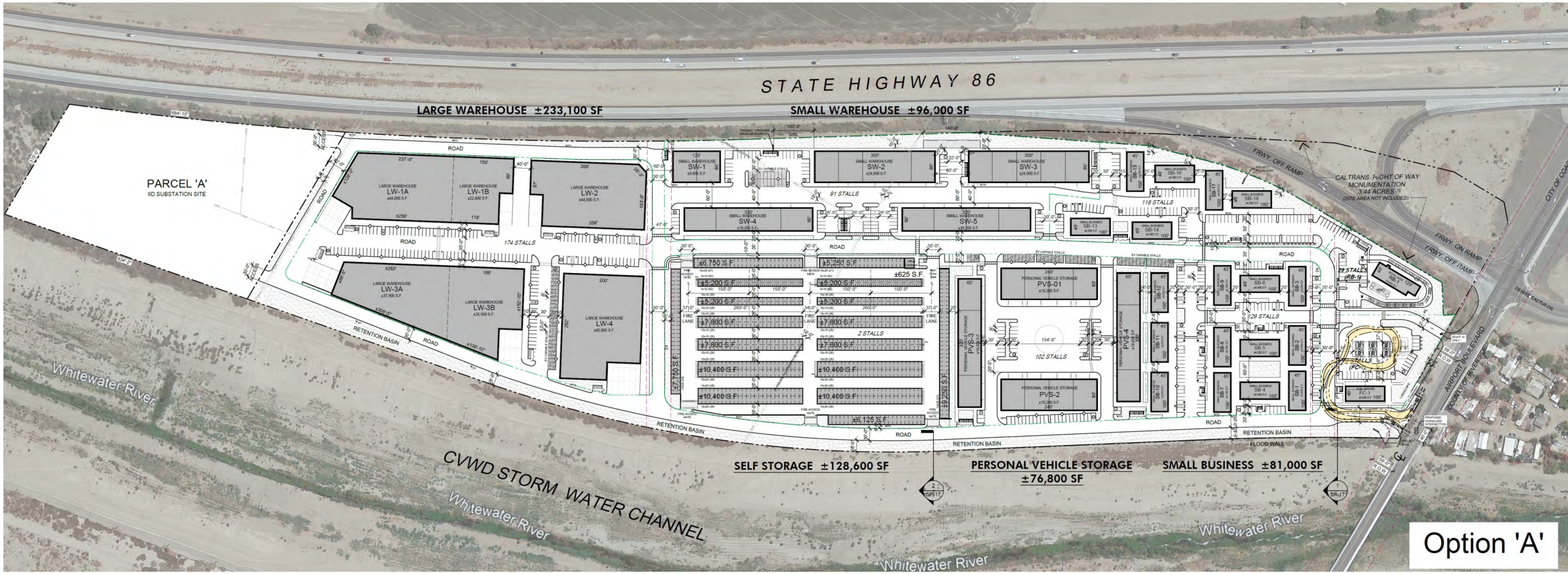
SITE LOCATION MAP

COACHELLA BUSINESS PARK

GPI PROJECT NO.: 2884.1I

SCALE: 1" = 3000'

FIGURE 1



0 250 500 FEET

BASE MAP REPRODUCED FROM PROPOSED SITE PLAN BY MCKENTLY MALAK ARCHITECTS DATED 11/6/23

GPI GEOTECHNICAL PROFESSIONALS, INC.

COACHELLA BUSINESS PARK

GPI PROJECT NO.: 2884.1I

SCALE: 1" = 250'

SITE PLAN

FIGURE 2

PALM DESERT AND COACHELLA MAP (DF-373)
LEGEND

SURFICIAL SEDIMENTS
Unindurated, undissected alluvial sediments
Qg *Alluvial sand and gravel of Whitewater River*
Qa *Alluvial sand and clay of valley areas*
Qs *Wind-laid dune sand*
Qc *Clay of playa lakes, light gray, generally alkaline, with some micaceous silt*
Qf *Alluvial fan gravel*

LANDSLIDE
Qls *Rock rubble*

— UNCONFORMITY —

OLDER SURFICIAL SEDIMENTS
Weakly indurated, dissected; age, Pleistocene
Qoa *Older alluvial gravel*
Qog *Boulder gravel, gray, massive, composed of unsorted boulders and cobbles of mostly Mesozoic plutonic and dike rocks, in weakly consolidated matrix of granitic sandstone*

— UNCONFORMITY —

BAUTISTA BEDS
(of Fraser, 1931) Terrestrial deposits, weakly lithified; age, Plio-Pleistocene
QTs *Alluvial sandstone, light gray to tan, semi-lithified, bedded, fine to coarse grained, arkosic, includes thin layers of gray claystone, and pebble-cobble conglomerate of granitic detritus; mapped as* **QTc** *on SW edge where mostly clay*
QTf *Alluvial fan gravel and sand*

— UNCONFORMITY —

OCOTILLO FORMATION
(Indio Hills Formation of Stotts, 1965) Terrestrial deposits; age, Pliocene
Qo-u *(Differentiated locally as upper Toro) Upper unit, boulder-conglomerate, gray*
Qo *Fanglomerate of mostly gray conglomerate, sandstone, silts and tuff; some vertebrate fossil fragments*
Qo-l *Lower member, pebble-cobble conglomerate*

CANEBREAK CONGLOMERATE
Weakly to moderately indurated, dissected; age, Pliocene
Tca *Canebrake Fanglomerate, locally called lower Toro*

— UNCONFORMITY —

PALM SPRING FORMATION
(Thousand Palms Formation of Stotts, 1965) Terrestrial sedimentary rocks, weakly to moderately lithified; age, Pliocene
Tp *Sandstone, light pink-gray, arkosic, with interbedded red clays, includes fossil hardwoods; grades laterally into* **Qo**

— UNCONFORMITY —

MECCA FORMATION
Terrestrial alluvial fan sediments, weakly to moderately lithified; age, Miocene-Pliocene
Tma *Clay, sandstone, and conglomerate containing coarse angular to sub-rounded clasts of granitic and metamorphic debris, reddish to gray and yellow; conformable and unconformable with the overlying Palm Spring Formation*

— UNCONFORMITY —

PLUTONIC ROCKS
Granitic and dioritic rocks of Peninsular Ranges, intrude into Paleozoic or older metamorphic rocks; age, Mesozoic
grd *Gray biotite-rich granodiorite to quartz diorite*
qm *Quartz monzonite*
qdi/qd *Quartz diorite, light gray, massive to gneissoid, contains some xenoliths locally, abundant biotite, coherent*
qdi-gn/qd-gn *Same as* **qdi** *and* **qd** *but more gneissoid, includes some gneiss migmatite*
mqd *Same as* **qd** *but sheared (at depth) to mylonite, foliated*
di *Diorite gabbro*

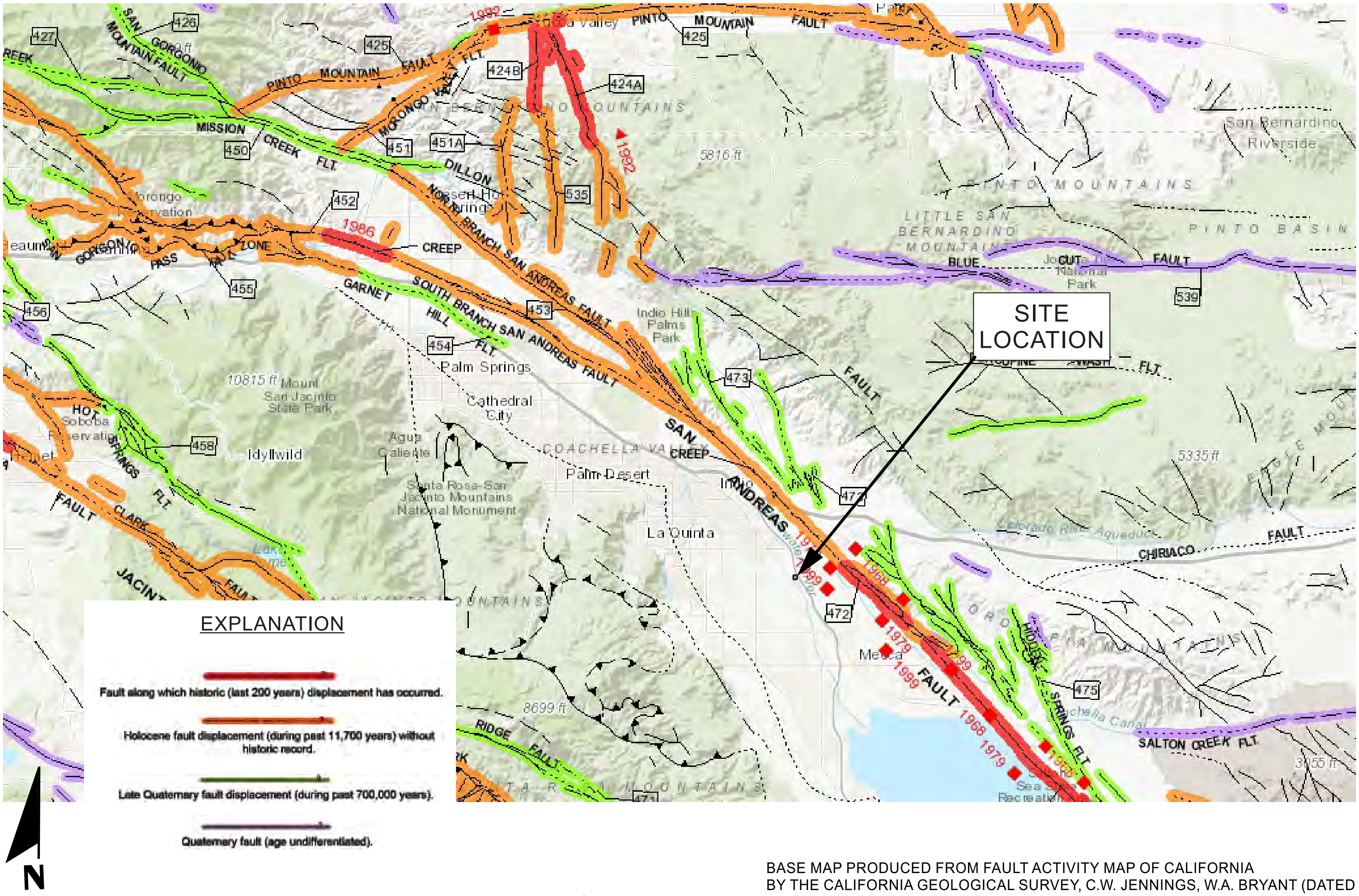
METASEDIMENTARY ROCKS
Metasedimentary complex; deformed sedimentary rocks; age, Mesozoic or older
ms/ms-gn *(Includes metasediments of Palm Canyon Complex of Miller 1946) Mica schist to phyllite and gneiss, dark gray, foliated, locally includes hornfels, tactite*
ml *Marble, limestone to dolomite, white to light blue-gray, fine to medium, crystalline, bedded*

GNEISSIC ROCKS
Metasedimentary complex; deformed sedimentary rocks; age, probably Precambrian
gn *Gneiss, gray, medium grained, holocrystalline, with thin layers undulating or contorted, in many places complexly migmitized, hard but closely fractured*

Holocene / Pleistocene / Pliocene / Miocene — QUATERNARY / TERTIARY — CENOZOIC; CRETACEOUS — MESOZOIC; PRECAMBRIAN (?)

BASE MAP REPRODUCED FROM GEOLOGICAL MAP OF THE PALM DESERT AND COACHELLA 15 MINUTE QUADRANGLES BY THOMAS W. DIBBLEE, JR. (DATED 2008)

GPI GEOTECHNICAL PROFESSIONALS, INC.		LOCAL GEOLOGY MAP
COACHELLA BUSINESS PARK		
GPI PROJECT NO.: 2884.1I	NO SCALE	FIGURE 3



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

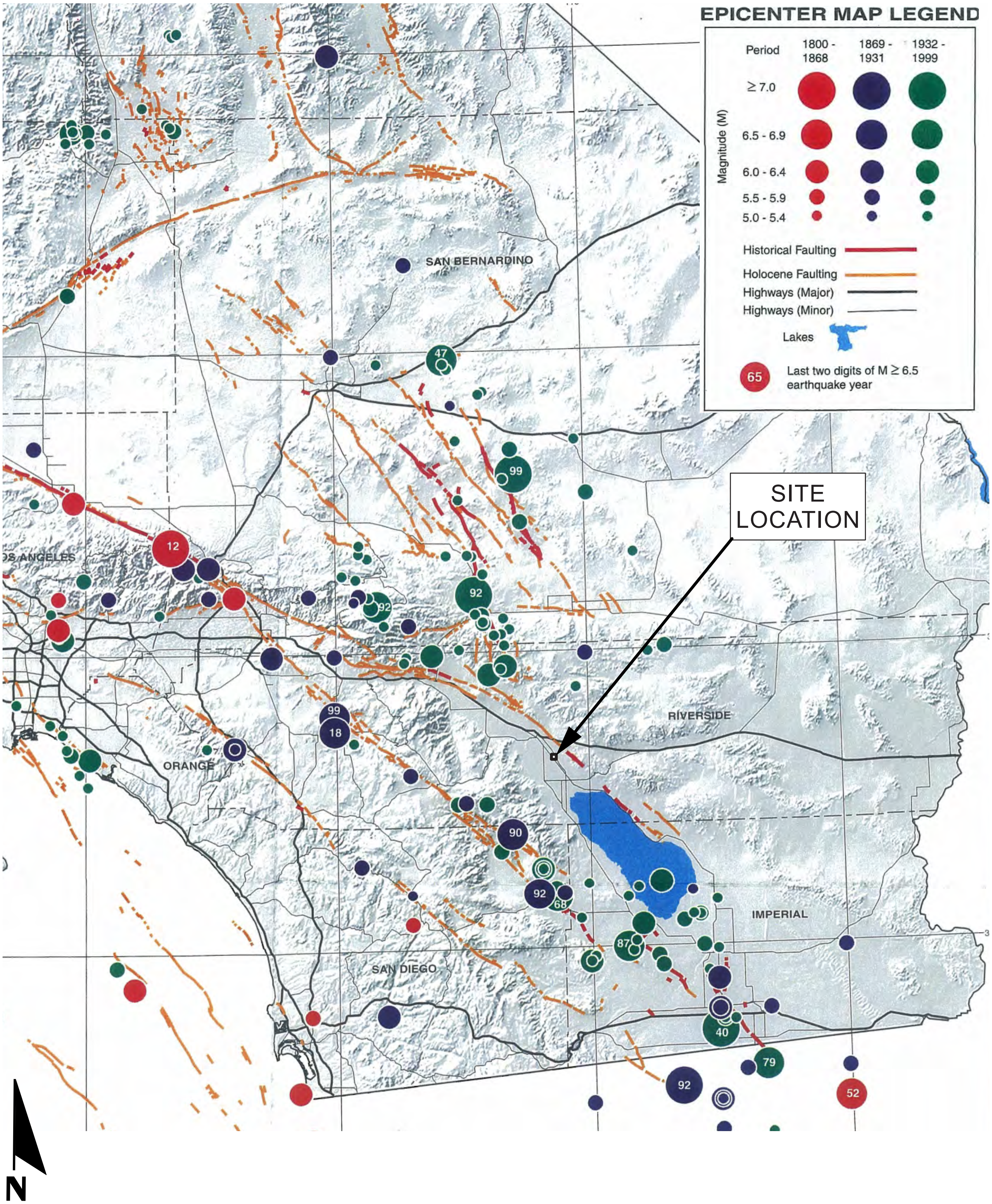
GEOTECHNICAL PROFESSIONALS, INC.

COACHELLA BUSINESS PARK

GPI PROJECT NO.: 2884.1I | NO SCALE

REGIONAL FAULT MAP

FIGURE 4



BASE MAP PRODUCED FROM EPICENTERS OF AND AREAS DAMAGED BY M>5 CALIFORNIA EARTHQUAKES, 1800 - 1999 BY CALIFORNIA DEPARTMENT OF CONSERVATION

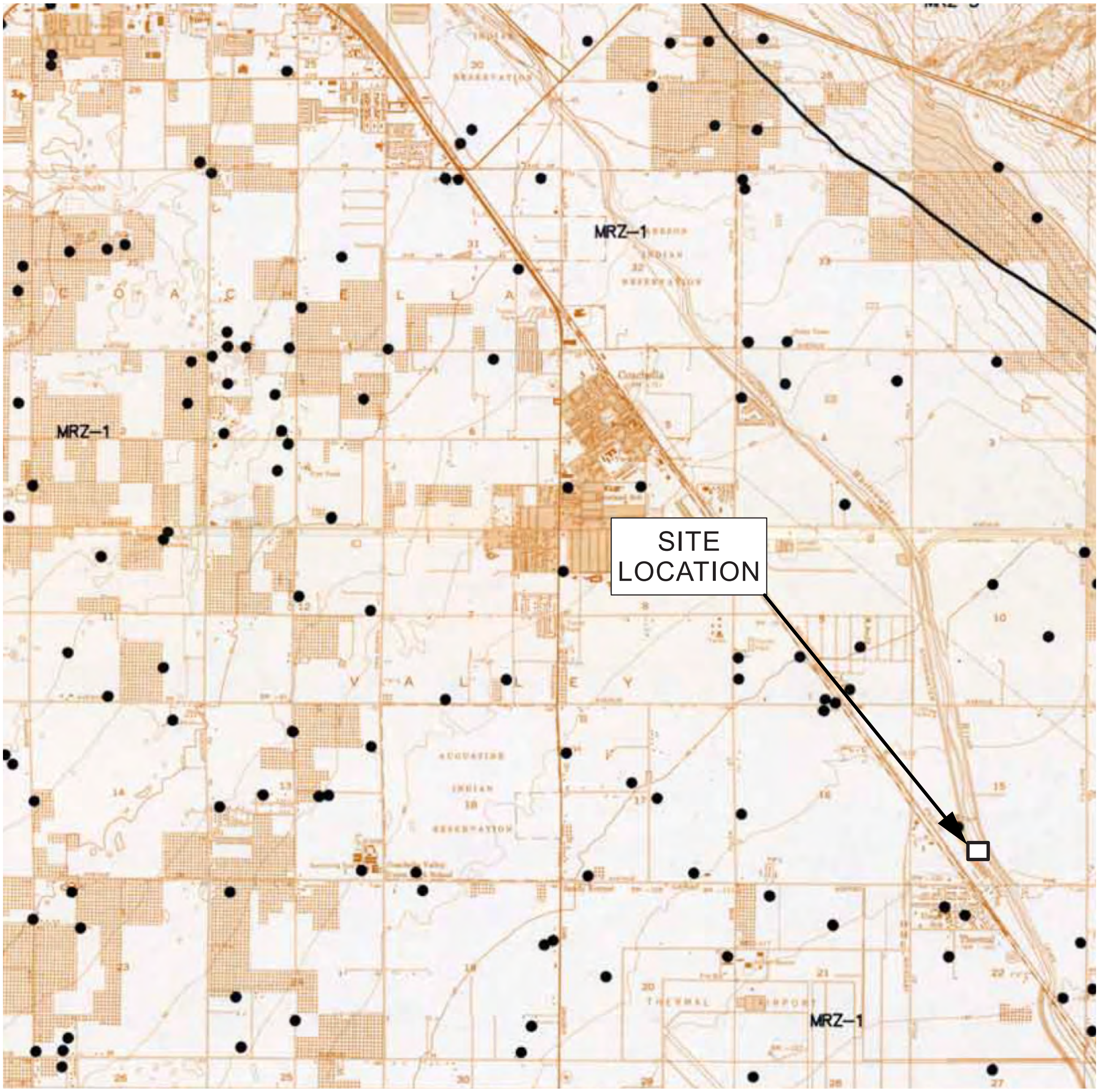
GPI GEOTECHNICAL PROFESSIONALS, INC.

COACHELLA BUSINESS PARK

GPI PROJECT NO.: 2884.1I | NO SCALE

HISTORICAL EARTHQUAKES

FIGURE 5



EXPLANATION

MRZ-1 Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This zone shall be applied where well-developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is nil or slight.

MRZ-2 Areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence. This zone shall be applied to known mineral deposits or where well-developed lines of reasoning, based upon economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRZ-3 Areas containing mineral deposits, the significance of which cannot be evaluated from available data.

MRZ-4 Areas where available information is inadequate for assignment to any other MRZ zone.

N

BASE PLAN REPRODUCED FROM MINERAL LAND CLASSIFICATION MAP - SR-153 PLATE 20
BY THE CALIFORNIA DEPARTMENT OF CONSERVATION DIVISION OF MINES AND GEOLOGY (DATED 1982)

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COACHELLA BUSINESS PARK

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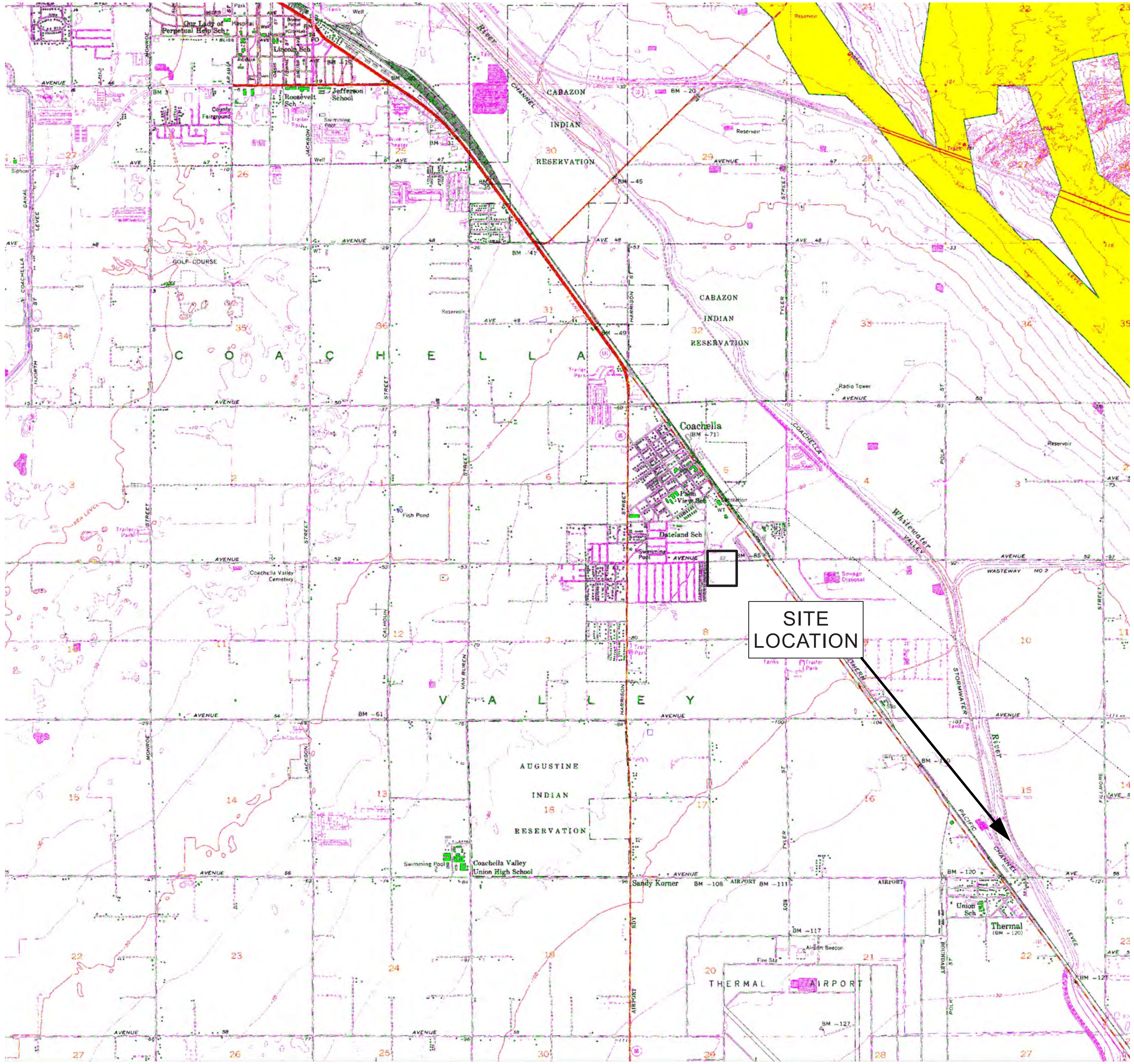
MINERAL RESOURCES MAP

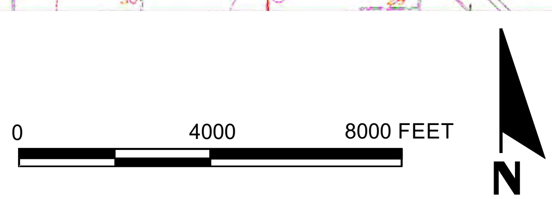
FIGURE 6



MAP EXPLANATION

EARTHQUAKE FAULT ZONES

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



BASE MAP REPRODUCED FROM EARTHQUAKE FAULT ZONES OF THE INDIO QUADRANGLE SAN DIEGO COUNTY, CALIFORNIA BY JOHN PARRISH (DATED: 2015)

GEOTECHNICAL PROFESSIONALS, INC.

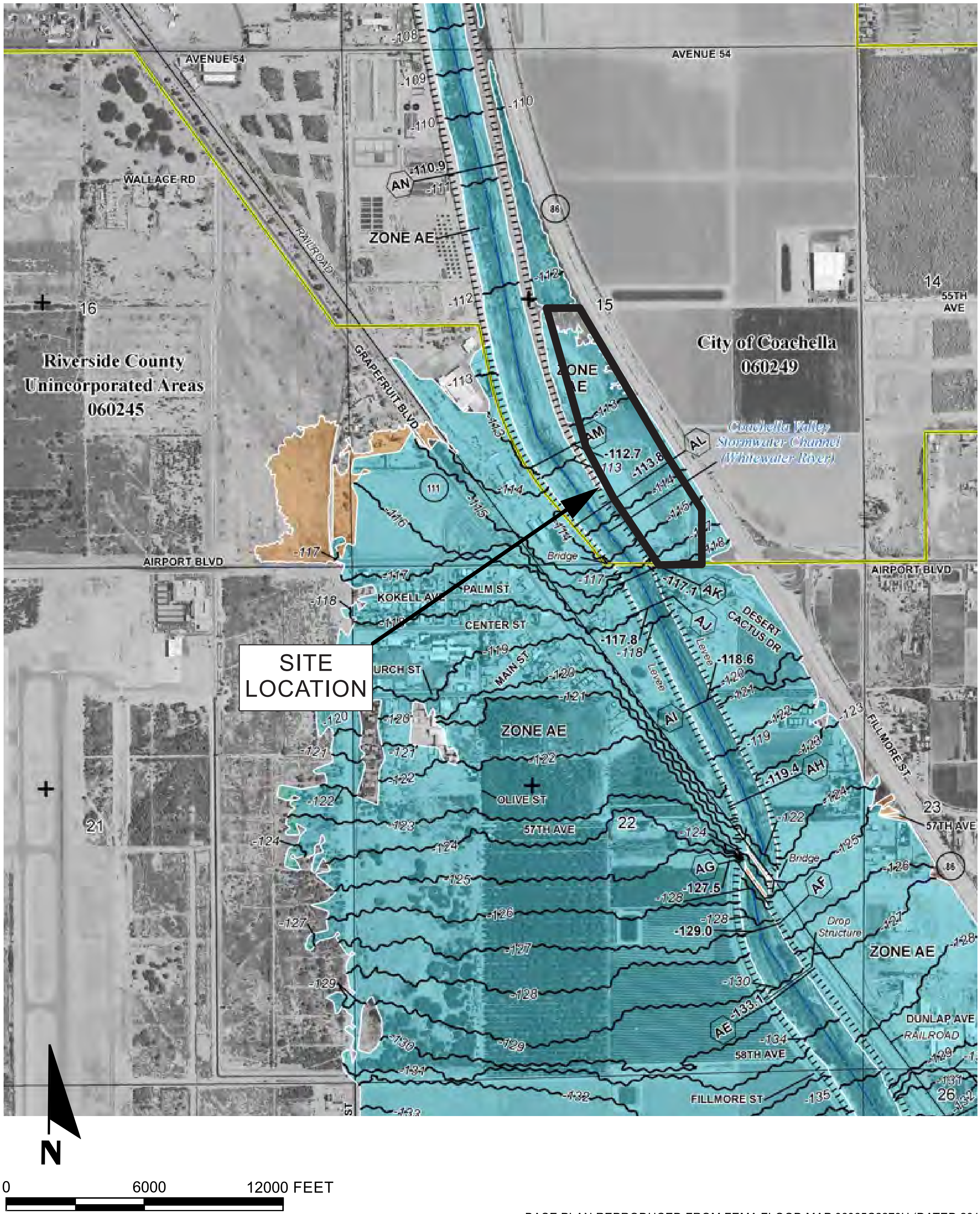
COACHELLA BUSINESS PARK

GPI PROJECT NO.: 2884.1I

SCALE: 1" = 4000'

GEOLOGIC HAZARDS MAP

FIGURE 7



BASE PLAN REPRODUCED FROM FEMA FLOOD MAP 06065C2270H (DATED 2018)

GEOTECHNICAL PROFESSIONALS, INC.

SARES REGIS - SAN DIEGO

GPI PROJECT NO.: 2837.1I | SCALE: 1" = 6000'

FEMA FLOOD MAP

FIGURE 8