CHJ Consultants
A Terracon COMPANY

March 2, 2017

G & GF Enterprise, LLC
163 Pavillion Park
Irvine, California 92618
Attention: Mr. Om P. Garg

Job No. 17060-8

Dear Mr. Garg:

This letter transmits the Geotechnical/Geologic Evaluation for CEQA Study, Dolores Lake Park, located along Interstate 15 near Newberry Springs, California.

We appreciate this opportunity to provide geotechnical services for this project. If you have questions or comments concerning this report, please contact us at your convenience.

Respectfully submitted,
CHJ CONSULTANTS, a Terracon Company

John S. McKeown

John S. McKeown, E.G.
Senior Geologist

JSM:lb

Distribution: G & GF Enterprise, LLC (electronic)

GEOTECHNICAL/GEOLOGIC EVALUATION
FOR CEQA STUDY
DOLORES LAKE PARK
HACIENDA ROAD AND MOUNTAIN VIEW ROAD
NORTH OF INTERSTATE HIGHWAY 15
NEWBERRY SPRINGS, CALIFORNIA
PREPARED FOR
G & GF ENTERPRISE, LLC
CHJ JOB NO. 17060-8

CHJ Consultants
A Terracon COMPANY

March 2, 2017

G & GF Enterprise, LLC
163 Pavillion Park
Irvine, California 92618
Attention: Mr. Om P. Garg

Job No. 17060-8

Dear Mr. Garg:

Attached is our Geotechnical/Geologic Evaluation report for CEQA Study, Dolores Lake Park, located along Interstate 15 near Newberry Springs, California.

The report was based upon a scope of services generally outlined in our proposal dated February 7, 2017, and other written and verbal communications. As noted in our proposal, your consultant will use the findings and recommendations from our Geotechnical/Geologic Evaluation report to prepare a CEQA document.

Our report includes data from the U.S. Department of Agriculture for the soils found on site, as well as a discussion of the mineral resource potential for the area of your project. Although the Dolores Lake site is not within a state- or county-designated earthquake fault zone, nonetheless the site is within a seismically active region. The report therefore summarizes important faults in the area of your project and discusses potential geotechnical/geologic concerns, such as fault rupture, liquefaction and erosion.

We appreciate this opportunity to provide geotechnical services for Dolores Lake Park. It was a pleasure to revisit the project, for which, as you know, C.H.J., Incorporated performed work in 1997. If you have questions or comments concerning this report, please contact this firm at your convenience.

Respectfully submitted,
CHJ CONSULTANTS, a Terracon Company

John S. McKeown

John S. McKeown, E.G.
Senior Geologist

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INTRODUCTION

This report presents the results of our limited geotechnical/geologic evaluation for CEQA study for the proposed improvements at the Dolores Lake Park. The site is located along Interstate Highway 15 in the Mojave Desert near Newberry Springs, California. This report is based in part on prior field investigations and on available reports, maps, aerial photographs and documents.

To orient our evaluation, a Site Plan, dated October 2015, that depicts the general site configuration and project phasing was provided. The plan includes recreational, office/administrative, parking, open space and commercial developments. The approximate location of the site is shown on the attached Index Map (Appendix "A").

The results of our evaluation, including a description of geotechnical conditions, potential hazards and mitigation measures, are presented in this report.

PROJECT CONSIDERATIONS

As we understand it, several planned developments are proposed for the existing Dolores Lake Park area. These improvements include retail/commercial, amenities for travelers, hospitality, waterpark and lake attractions, RV camping and on-site utility provisions to be developed during several project phases.

A geotechnical investigation was previously performed by C.H.J, Incorporated (1997) at the site for design and construction of existing waterpark improvements. The prior investigation included eight hollow-stem auger borings that encountered interbedded silty sands and poorly graded sands with silt lenses to depths up to 51-1/2 feet. Groundwater was not encountered during the 1997 explorations, and depth to groundwater was estimated to be approximately 80 feet at that time. Geologic hazards were not addressed in the study by C.H.J., Incorporated.

GEOTECHNICAL CONDITIONS

GEOLOGIC SETTING:

The site is located within the Mojave Desert geomorphic province, which includes the northwest-trending faults of the Eastern California Shear Zone. The Mojave Desert province is bounded on the southwest by the San Andreas fault and the Transverse Ranges (locally, San Bernardino Mountains) and on the northeast by the Garlock fault. The Mojave Desert is an ancient feature formed in response to the inception of movement on the San Andreas and Garlock faults. The region is characterized by broad alluviated basins that conceal the previously mountainous topography. The relationship of the site to local geologic features is depicted on Enclosure "A-3", Geologic Index Map.

Aerial imagery was examined for evidence of past land usage and geotechnical conditions. The site is situated on a flat-lying plain of low relief and has been developed with ponds by excavation of materials that were apparently placed as fill to create a large mound in the northern portion of the waterpark area. Shallow fills were also noted west of the lake area. Imagery dated 1995 indicates the presence of structures in the now-existing "lake" area, water in ponds located in the now-existing waterpark area, the fill mound, a north pond feature and a windrow of trees along the western side of the developed area. Imagery dated 2004 indicates modification of the fill mound with above-grade slides, excavation and development of the lake feature, buildings and infrastructure in the waterpark area, a water tank on a fill pad east of the waterpark, and a gravel-covered parking area in the east portion of the waterpark. The water ride chutes appear to be removed in imagery dated 2005,

and surface water is not visible in ponds or water features. The general site configuration was similar to the 2005 imagery at the time of our site reconnaissance in February 2017.

SOILS:

Based on soils mapping performed by U.S. Department of Agriculture (2017), the project site is underlain by several USDA soils types including Cajon Sand, Cajon Gravelly Sand and Cajon Loamy Sand. These soils vary in depth, depending on slope aspect (with deeper soils occurring on areas of lower gradient), degree of permeability (with less permeable soils derived from parent materials/bedrock having clay-forming mineralogies) and susceptibility to erosion.

The following table summarizes the USDA properties for soils units identified on the site. The unit numbers correspond to the areas shown on Enclosure "A-6", USDA Soils Map.

Summary of USDA Soil Properties					
Unit Name	**Map Unit**	**Acres % of Site**	**Surface Water Management**	**Subsurface Water Management**	**Erosion Hazard (Road, Trail)**
Cajon Sand 2 to 9 percent slopes	113	24.4	Somewhat limited	Very limited	Slight
Cajon Sand 9 to 15 percent slopes	114	4.1	Not rated	Not rated	Moderate
Cajon Gravelly Sand 2 to 15 percent slopes	115	18.2	Not rated	Not rated	Moderate
Cajon Loamy Sand 0 to 2 percent slopes	117	48.1	Not rated	Not rated	Slight
Nebona-Cuddeback Complex, 2 to 9 percent slopes	151	1.6	Not rated	Not rated	Moderate
Rock-outcrop Lithic Torriorthents Complex, 15 to 50 percent slopes	158	0.4	Not rated	Not rated	Not rated
Water	178	3.2	Not rated	Not rated	Not rated

The rating for surface water management is based on the soil properties that affect the capacity of the soil to convey water across the landscape. The term "somewhat limited" for surface water management rating indicates that the soil has features that are moderately favorable for the specified use and that limitations can be overcome or minimized by planning, design or installation.

The rating for subsurface water management is based on the soil properties that affect the capacity of the soil to be drained. The term "very limited" for subsurface water management indicates that the soil has features that are unfavorable for the specified use. Poor performance can be expected. The includes several soil types outside of the area designated as "very limited" for subsurface water management. An existing underground septic system has performed well during park operations

from 1998-2004. It is expected that suitable soils with the capacity to serve future septic systems are present on site. Therefore, no mitigation of subsurface water conditions is required.

The ratings for erosion hazard indicate the hazard of soil loss from unsurfaced roads and trails. The term "slight" indicates that the no erosion is likely. The term "moderate" indicates that some erosion is likely.

The site is to be developed with infrastructure, flatwork and parking areas. Past agricultural use of the site is not documented. Future site use may include agricultural developments. Site improvements are anticipated to include drainage controls and protective features to minimize soil erosion. The potential for erosion is considered low.

The capacity of site soils to infiltrate storm water flows or effluent seepage will be addressed in project-specific investigations, if necessary. Based on the thickness of unconsolidated sediments beneath the site, it is anticipated that soils with suitable infiltration capacity are available.

GEOLOGIC MATERIALS:

As depicted on published geologic mapping (Dibblee and Bassett, 1966; Phelps and others, 2012) the site is underlain by Holocene- and Pleistocene-age alluvium mantled by eolian sand deposits. As encountered in geotechnical borings drilled in 1997 to depths between 15-1/2 and 91 feet below the existing ground surface (bgs), the site materials consist of silty sand and poorly graded sand with interbeds of sandy silt. The near-surface soils were medium-dense to dense. Fill is present in a man-made hill and as reworked native soils in previously graded areas of the site.

The soils were reported to be granular and non-expansive. Bedrock was not encountered within the maximum 91-foot depth attained in the prior borings.

Enclosure "A-3", Geologic Index Map, depicts the geologic units in the site region.

MINERAL RESOURCES:

The aggregate resource potential for the area of the site is addressed in a report titled, "Mineral Land Classification of Concrete Resources in the Barstow-Victorville Area" (CDMG, 1993). This report addresses the sand and gravel resource potential according to the presence or absence of significant sand and gravel deposits for use in construction-grade aggregate. The resource quality of surrounding lands was reported according to the following Mineral Resource Zone (MRZ) classification system:

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.

MRZ-2: Areas where adequate information indicates mineral deposits are present, or where it is judged that a high likelihood for their presence exists.

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.

The site is situated in primarily alluvial terrain underlain by unconsolidated sediments. No economically significant sources of aggregate material were observed within the site. The project site is placed within MRZ-3a defined as "may contain significant aggregate deposits". No aggregate mining currently occurs in similar geologic terrain in the immediate project vicinity.

The mineral resource potential for the area of the site is addressed in a report titled, "Mineral Land Classification of a Part of Southwestern San Bernardino County: The Barstow-Newberry Springs Area, California" (CDMG, 1997). This report addresses the mineral resource potential according to the presence or absence of significant metallic or industrial mineral deposits. The resource quality of surrounding lands was reported according to the following MRZ classification system:

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.

MRZ-2: Areas where adequate information indicates mineral deposits are present, or where it is judged that a high likelihood for their presence exists.

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.

The site is situated approximately 1 mile northwest of the Harvard Hill prospect, which occurs in an isolated bedrock outcrop and is described as a unknown metallic mineral deposit. No economically significant sources of metallic or industrial materials were observed within the site. The project site is placed within MRZ-4, defined as "unknown mineral resource significance".

As the project area is not presently used for mineral resource extraction and does not contain identified sources of aggregate materials, the proposed project will not result in the loss of availability of any known mineral resources. Thus, no significant impacts are anticipated.

LANDSLIDES:

According to the County of San Bernardino General Plan (2010), the site is not located within an area identified as having a potential for slope instability. The site is situated in relatively flat-lying terrain that lacks significant natural relief or slopes. Man-made fill slopes present within the site are maintained and managed to preclude instability or landsliding. The potential for landslide or slope instability is considered low.

SOIL CHEMICAL TESTS AND CORROSION POTENTIAL:

Chemical tests performed for the prior site investigation indicate values that are considered potentially "mild" with regard to sulfate attack.

GROUNDWATER:

The site is located in Section 20 of Township 10 North Range 3 West in the Lower Mojave River Valley groundwater basin. Groundwater was not encountered in prior borings drilled to a depth of 91 feet bgs in July 1997. Data from wells in the site vicinity are summarized in the following table.

Summary of Groundwater Data				
Data ID	**Date**	**Depth to Water (feet)**	**Water Surface Elevation (feet amsl)**	**Location Relative to Site**
Well 10N03E20C001S	6-17-1959	82.7	1,754.3	On site
Well 10N03E21A001S	12-4-1957	84	1,733	1 mile NE
Well 10N03E21C001S	6-17-1959	104.8	1,727.2	1/4 mile E
Well 10N03E21D001S	6-1-1989	147.8	1,699.2	1/8 mile E
Well 10N03E19R001S	6-18-1959	106	1,746	1/2 mile SW
Groundwater Depth Contour Maps				
Subsurface Surveys (1990)	1990	175	--	--
USGS Mojave Groundwater Resources	2000	125	1,700	--
	2002	125	1,700	--
	2004	125	1,700	--
	2006	125	1,700	--
	2008	115	1,710	--
	2010	115	1,710	--
	2012	115	1,710	--
	2014	115	1,710	--

Based on the available groundwater data, the historic-high groundwater level beneath the site is anticipated to be approximately 82 feet bgs. An on-site caretaker reported a water depth of approximately 140 feet bgs in two wells located within the site.

FAULTS:

The tectonics of the Southern California area are dominated by the interaction of the North American plate and the Pacific plate, which are sliding past each other in a transform motion. Although some of the motion may be accommodated by rotation of crustal blocks such as the western Transverse Ranges (Dickinson, 1996), the San Andreas fault zone (SAFZ) is thought to represent the major surface expression of the tectonic boundary and to be accommodating most of the transform motion between the Pacific plate and North American plate. Some of the plate motion is accommodated along other northwest-trending, strike-slip faults that are related to the San Andreas system, such as the Newport-Inglewood, San Jacinto and Elsinore faults. The Eastern California Shear Zone within the Mojave Desert Region accommodates a significant component of slip along the North American/Pacific plate margin.

The site does not lie within or immediately adjacent to an Alquist Priolo Earthquake Fault Zone (APZ) designated by the State of California to include traces of suspected active faulting. The closest APZs are designated for the Calico-Hidalgo fault zone and Newberry fracture zone, located approximately 4.2 miles southwest and southeast of the site, respectively. According to the County of San Bernardino General Plan (Hazard Overlay Map – Harvard Hill), the site is not located in a County-designated Earthquake Fault Zone. The Manix fault projects toward the site from the west. This fault is further discussed below.

Manix Fault

The Manix fault is a north-dipping, left-lateral, strike-slip fault consisting of three segments that together extend approximately 22 miles from the Yermo area to Afton Canyon. The western segment of the Manix fault is located 0.2 mile west of the site and projects toward the site (Enclosure "A-3"). Historic rupture of the central segment of the Manix fault, located approximately 6 miles east of the site, was observed after the 1947 magnitude 6.4 Manix earthquake. The Manix fault is considered Holocene active for planning purposes.

Dolores Lake Fault

The Dolores Lake fault is depicted in mapping by Reheis and others (2015) as an inferred (concealed) fault extending from Harvard Hill to a point approximately 3-1/2 miles north of the site. Dudash (2006) depicts a northwest extension of the Dolores Lake fault extending from Agate Hill (located north-northwest of the site) southward as a concealed fault trace. As reported by Dudash, Meek (1994) documented uplifted Mojave River gravels south of Agate Hill, and extending discontinuously to Harvard Hill, that are postulated earliest Holocene to latest Pleistocene age, suggesting a potentially active age for the Dolores Lake fault.

Faults of the Eastern California Shear Zone

The Eastern California Shear Zone (ECSZ) is a zone of surface tectonism that includes a system of predominantly northwest-trending strike-slip faults traversing the Mojave Desert. The Calico section of the Calico-Hidalgo fault zone is located approximately 4.9 miles southwest of the site. The Camp Rock, Pisgah, Lenwood-Lockhart and Black Mountain faults are also included within the ECSZ. Evidence for Holocene displacement along several of these faults includes sag ponds, fresh fault scarps, offset drainages, linear scarps, shutter ridges and faceted spurs. The Newberry fracture zone, a northeast striking zone of en echelon faults located approximately 4-1/2 miles southeast of the site, is interpreted as an offshoot of the Calico fault and formed during the 1992 Landers earthquake.

A number of faults of the ECSZ system, including the Camp Rock-Emerson fault, ruptured in combination during the 1992 Landers earthquake. Aftershocks of that event extended into the Barstow area on several faults (Hauksson, 1993). The more recent Hector Mine earthquake of 1999 occurred on the Lavic Lake fault. The Camp Rock fault is located approximately 14 miles southwest of the site.

San Andreas Fault Zone

The San Bernardino Mountains segment of the San Andreas fault zone is located approximately 63 miles southwest of the site. The mountain front in the San Bernardino Valley approximately marks the active trace of the San Andreas fault, here characterized by youthful fault scarps,

vegetation lineaments, springs and offset drainages. Field and others (2014) assigned a 53 percent probability to a magnitude 6.7 or greater earthquake occurring on the southern segment of the San Andreas fault between 2014 and 2044.

HISTORICAL EARTHQUAKES:

The site is located within the seismically-active southern California region. The following table summarizes the historic seismic events in the site region.

Summary of Historic Earthquakes				
Event ID	**Date**	**Magnitude**	**Distance from Site (miles)**	**Direction from Site**
Manix	4/10/1947	6.5	11	SE
Hector Mine	10/16/1999	7.1	33	SE
Galway Lake	5/31/1975	5.2	49	SW
Big Bear	6/28/1992	6.4	51	SW
Landers	6/28/1992	7.3	52	SE
Yucaipa (14155260*)	6/16/2005	4.9	65	SW
North of Cabazon	7/8/1986	5.9	66	SE
Palm Springs Area	4/23/1992	6.2	74	SE
North of Indio	6/29/1992	5.5	76	SE
Upland	2/28/1990	5.4	79	SW
Mojave	7/11/1992	5.7	80	NW
Sierra Madre	6/28/1991	5.8	87	SW
Lake Matthews Area	4/21/1918	6.6	88	SW
Chino Hills	7/29/2008	5.4	91	SW
Whittier Narrows	10/1/1987	5.9	100	SW
Sylmar	2/9/1971	6.6	104	NW
Tehachapi	7/21/1952	7.3	110	W
Northridge	1/17/1994	6.7	117	SW
Long Beach	3/10/1933	6.4	117	SW

The Manix, Galway Lake, Landers and Hector Mine earthquakes attest to the potential for future seismic events in the Mojave region to produce strong ground shaking. Any of the active faults of the Mojave region are capable of producing strong ground shaking during earthquakes. Construction or restoration of site improvements according to applicable building codes can mitigate the potential for damage to site facilities.

GEOTECHNICAL HAZARDS

FAULT RUPTURE:

The site does not lie within or immediately adjacent to an Alquist Priolo Earthquake Fault Zone, designated by the State of California to include traces of suspected active faulting. The site is not included in a County-designated fault hazard zone. However, the western segment of the Manix fault projects toward the site from the west. The Manix fault produced a surface-rupturing earthquake in 1947 and is classified as Holocene active for planning purposes. The standard of practice in the site region is to evaluate or investigate the potential for surface rupture for new developments or improvements to existing facilities where a potential for fault rupture beneath human-occupancy structures may occur. Further investigation of the potential for fault rupture may be required. A consultation with the County Planning Department regarding fault investigation requirements is recommended. We expect that a phased fault investigation could include geophysical methods to locate subsurface fault traces followed by trench excavation and geologic examination/logging.

SEISMICITY:

The site is located within a seismically active region; therefore, strong ground shaking may occur during the design life of the proposed project.

2016 CALIFORNIA BUILDING CODE - SEISMIC PARAMETERS

Based on the geologic setting and anticipated earthwork for construction of the proposed project, the soils underlying the site are classified as Site Class "D, stiff soil profile", according to the 2016

California Building Code (CBC). The seismic parameters according to 2016 CBC are summarized in the following table.

2016 CBC - Seismic Parameters	
Mapped Spectral Acceleration Parameters	S_s = 1.21 and S_1 = 0.45
Site Coefficients	F_a = 1.02 and F_v = 1.55
Adjusted Maximum Considered Earthquake Spectral Response Parameters	S_{MS} = 1.23 and S_{M1} = 0.70
Design Spectral Acceleration Parameters	S_{DS} = 0.82 and S_{D1} = 0.47
Geometric Peak Ground Acceleration (PGA_m)	0.49g
De-aggregated Magnitude	7.39

SLOPE STABILITY AND LANDSLIDES:

According to County of San Bernardino General Plan (2010), the site is not located within an area identified as having a potential for slope instability. Significant natural slopes are not present on the site. The fill mound consists of an engineered fill with slope angles of approximately 2(h) to 1(v) or flatter—indications of gross instability were not observed.

EROSION:

The native soils mantling the site are considered slightly to moderately susceptible to erosion, based on data available from the USDA (2017). Surficial erosion can be addressed by site development and inclusion/repair of drainage improvements.

LIQUEFACTION AND SEISMIC-INDUCED SETTLEMENT:

Liquefaction is a process in which strong ground shaking causes saturated soils to lose their strength and behave as a fluid. Ground failure associated with liquefaction can result in severe damage to structures. The geologic conditions for increased susceptibility to liquefaction are: 1) shallow groundwater (generally less than 50 feet in depth), 2) the presence of unconsolidated sandy alluvium,

typically Holocene in age, and 3) strong ground shaking. All three of these conditions must be present for liquefaction to occur.

The site is not located within an area identified as having a potential for liquefaction by the County of San Bernardino General Plan (2010). Based on the anticipated historic high groundwater depth (82 feet bgs), liquefaction is not considered a hazard at the site.

TSUNAMIS, INUNDATION, SEICHES AND FLOODING:

The site is not located in a coastal area; therefore, tsunamis are not considered a hazard at the site.

According to the County of San Bernardino General Plan (2010), the site is not located within a potential inundation area for seismically induced dam/reservoir failure.

The site is not located in an area designated by the Federal Emergency Management Agency (2008) as a flood hazard zone. A more accurate determination of the flood hazard to the site and the adequacy of existing flood and drainage improvements near the site is not within the scope of this investigation. Flooding is not considered a significant hazard to the site.

SUBSIDENCE:

The site is not located in an area of known subsidence associated with groundwater or petroleum fluid withdrawal, peat oxidation or hydroconsolidation.

EXPANSIVE AND CORROSIVE SOILS:

Plasticity index values available from the USDA (2017) indicate non-plastic soils. The soils on the site are generally considered non-expansive based on the reported plasticity index values.

Chemical tests performed for a prior site investigation indicate a "negligible" anticipated exposure to sulfate attack.

VOLCANIC HAZARDS:

The Mojave Desert region contains several volcanic centers that include basalt flows and cinder cones. The closest volcanic center to the site is the Lavic Lake Field, which includes Pisgah Crater, located approximately 22 miles to the southeast. The estimated age of last activity within the Lavic Field is 10,000 years before present. The threat potential as listed by USGS (2015) is "low to very low".

WASTEWATER:

Use of septic tanks or other wastewater disposal systems is feasible to service portions of the subject project. In addition, an on-site treatment facility may be constructed in the future.

OFF-SITE IMPACTS:

Potential geotechnical impacts to off-site areas are not anticipated due to requirements regarding grading permitting, erosion control and avoidance of non-permitted disturbance to off-site areas required by local regulations. The flat-lying character of regional topography precludes slope effects to off-site or adjacent properties.

MITIGATION MEASURES FOR POTENTIAL GEOTECHNICAL HAZARDS

GENERAL:

As a part of mitigation for the project on a general basis, existing and proposed structures and site infrastructure and improvements will be designed and repaired/constructed in compliance with applicable building codes. The County of San Bernardino will require that local building code requirements and project considerations be met prior to issuing a building permit. Proper design and construction in conformance with the recommendations of project geotechnical reports, and compliance with applicable building codes, will reduce the potential adverse impacts of identified geotechnical hazards.

SEISMICITY AND GROUND SHAKING:

The potential for strong ground shaking at the site during the design life of the proposed project is moderate to high. The proposed improvements and structures will be designed according to seismic design parameters and procedures presented in the applicable building code for earthquake ground motions that are expected to occur in the site region. While potential impacts of ground shaking that could affect the proposed development will be reduced with proper design and construction, adverse effects due to ground shaking can occur.

SURFACE FAULT RUPTURE POTENTIAL:

The site does not lie within or immediately adjacent to an Alquist Priolo Earthquake Fault Zone designated by the State of California to include traces of suspected active faulting. The closest APZs are designated for the Calico-Hidalgo fault zone and Newberry fracture zone, located approximately 4.2 miles southwest and southeast of the site, respectively. According to the County of San Bernardino General Plan (Hazard Overlay Map – Harvard Hill), the site is not located in a County-designated Earthquake Fault Zone. The Manix fault projects toward the site from the west. This fault is further discussed below.

For planning purposes, faults in California are generally classified as active, potentially active or inactive. Active faults are those that exhibit surface displacement within Holocene time (about the last 11,000 years). Potentially active faults are those that exhibit evidence of surface displacement during Quaternary time (last 1.6 million years) but not Holocene displacement. Inactive faults have not shown evidence of movement in the last 1.6 million years.

The 1947 Manix earthquake and associated surface rupture on the central segment of the Manix fault located east of the site attest to its active status. Note that evidence of movement along the western segment of the Manix fault (projecting toward the site) was not documented. Mitigation of the potential for surface rupture along active faults includes placement of structures based on subsurface investigation of site strata to determine the location, age and extent of fault traces. The western and central segments of the Manix fault, if connected, project through the site as an inferred trace. The

potential for surface rupture within the site can be mitigated by subsurface investigation and setback from any faults that are identified as potentially hazardous.

SLOPE STABILITY:

The relatively flat-lying topography of the site and surrounding area precludes the potential for instability of natural slopes. Site development will include geotechnical evaluation of existing fill slopes and, if required, engineered grading or foundation designs that reduce the potential for slope instability of fill slopes. The potential for landslide or slope instability is considered low.

EROSION:

The native and disturbed soils mantling the site are considered slightly to moderately susceptible to erosion. Positive drainage should be provided, and water should not be allowed to pond anywhere on the site. Water should not be allowed to flow over any graded or natural areas in such a way as to cause erosion. Finish graded areas should be protected from the effects of runoff so as to reduce the potential impact from erosion to a less than significant level.

EXPANSIVE OR CORROSIVE SOILS:

The on-site soils are granular and are not considered critically expansive. Soils utilized beneath structures should consist of granular, non-clay-bearing soils.

Chemical tests performed for a prior site investigation indicated a "mild" anticipated exposure to sulfate attack.

MINERAL RESOURCES:

The project area is not presently used for mineral extraction, and as no documented mineral resources have been identified on or adjacent to the project area, the proposed project will not result in the loss of availability of any known mineral resources. Thus, no significant impacts are anticipated.

DISCLAIMER

CHJ Consultants has striven to perform our services within the limits prescribed by our client and in a manner consistent with the usual thoroughness and competence of reputable geotechnical engineers and engineering geologists practicing under similar circumstances. No other representation, express or implied, and no warranty or guarantee is included or intended by virtue of the services performed or reports, opinion, documents, or otherwise supplied.

This report reflects the testing conducted on the site as the site existed during the investigation, which is the subject of this report. However, changes in the conditions of a property can occur with the passage of time, due to natural processes or the works of man on this or adjacent properties. Changes in applicable or appropriate standards may also occur whether as a result of legislation, application or the broadening of knowledge. Therefore, this report is indicative of only those conditions tested at the time of the subject investigation, and the findings of this report may be invalidated fully or partially by changes outside of the control of CHJ Consultants. This report is therefore subject to review and should not be relied upon after a period of one year.

The conclusions and recommendations in this report are based upon observations performed and data collected at separate locations, and interpolation between these locations, carried out for the project and the scope of services described. It is assumed and expected that the conditions between locations observed and/or sampled are similar to those encountered at the individual locations where observation and sampling was performed. However, conditions between these locations may vary significantly. Should conditions that appear different from those described herein be encountered in the field by the client or any firm performing services for the client or the client's assign, this firm should be contacted immediately in order that we might evaluate their effect.

If this report or portions thereof are provided to contractors or included in specifications, it should be understood by all parties that they are provided for information only and should be used as such.

The report and its contents resulting from this investigation are not intended or represented to be suitable for reuse on extensions or modifications of the project or for use on any other project.

CLOSURE

We appreciate this opportunity to be of service and trust this report provides the information desired at this time. Should questions arise, please do not hesitate to contact this office.

Respectfully submitted,

CHJ CONSULTANTS, a Terracon Company

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Principal Geologist

JSM/JJM:lb

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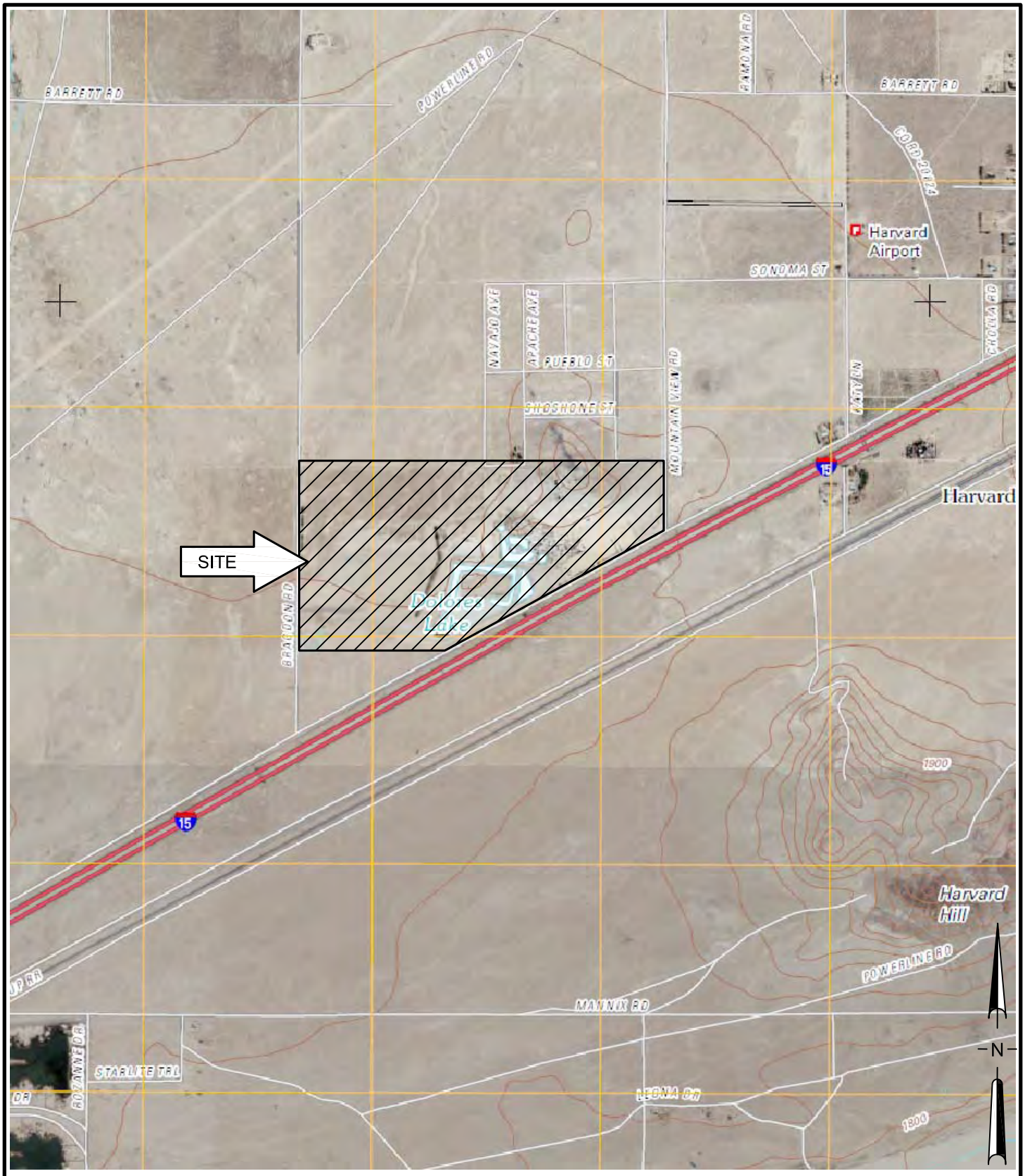
APPENDIX "A"

GEOTECHNICAL MAPS

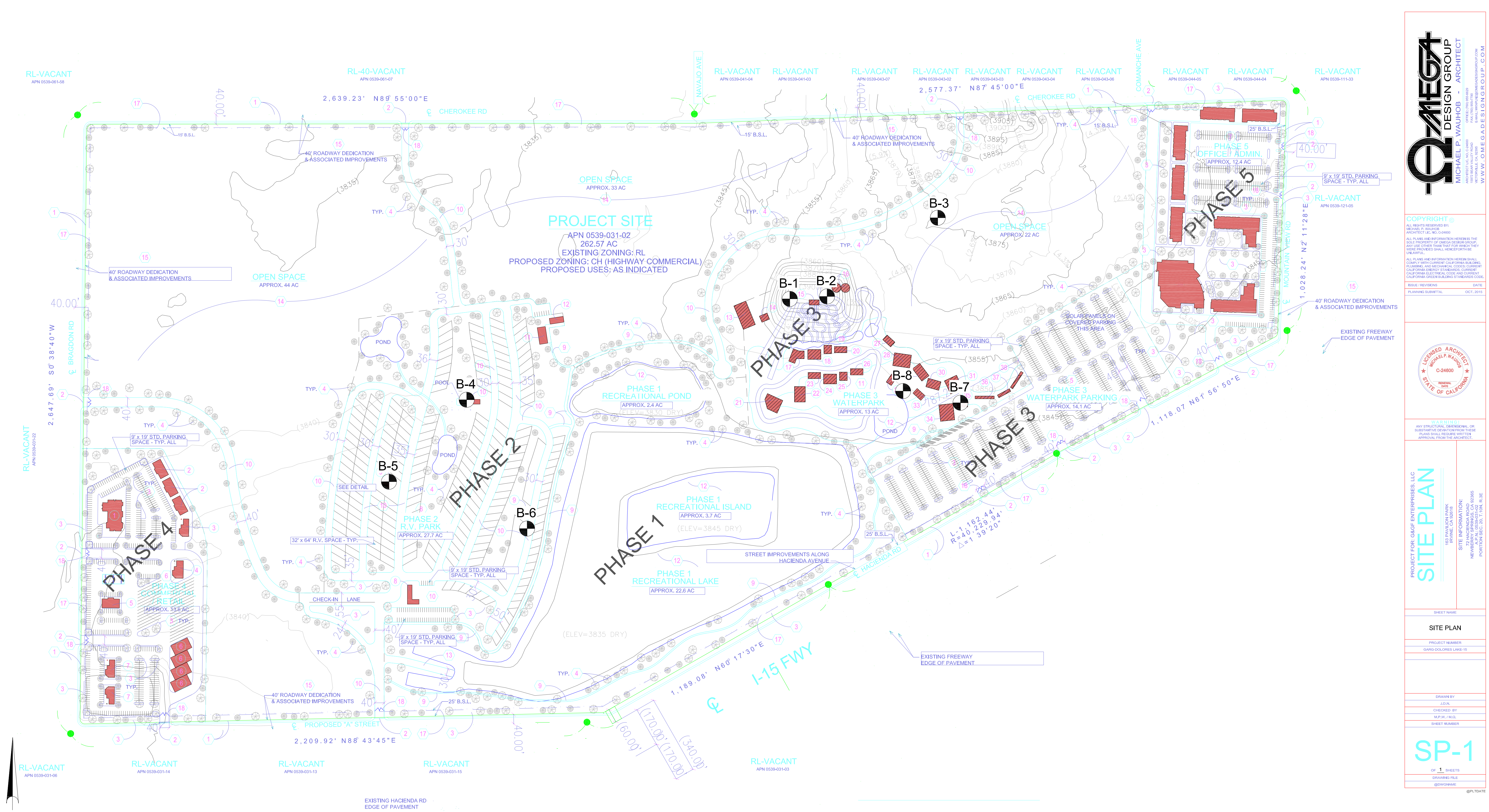


SCALE: 1" = Approx.2000'

INDEX MAP

FOR: G & GF ENTERPRISE, LLC	GEOTECHNICAL/GEOLOGIC EVALUATION FOR CEQA STUDY DOLORES LAKE PARK HACIENDA ROAD AND MOUNTAIN VIEW ROAD NORTH OF INTERSTATE HIGHWAY 15 NEWBERRY SPRINGS, CALIFORNIA	ENCLOSURE "A-1"
DATE: MARCH 2017		JOB NUMBER 17060-8

CHJ Consultants
A Terracon COMPANY



PROJECT SITE
APN 0539-031-02
262.57 AC
EXISTING ZONING: RL
PROPOSED ZONING: CH (HIGHWAY COMMERCIAL)
PROPOSED USES: AS INDICATED
PHASE 1
PHASE 2
PHASE 3
PHASE 4
PHASE 5
B-1
B-2
B-3
B-4
B-5
B-6
B-7
B-8
OPEN SPACE
APPROX. 33 AC
OPEN SPACE
APPROX. 44 AC
OPEN SPACE
APPROX. 22 AC
PHASE 1
RECREATIONAL POND
APPROX. 2.4 AC
PHASE 1
RECREATIONAL ISLAND
APPROX. 3.7 AC
PHASE 1
RECREATIONAL LAKE
APPROX. 22.6 AC
PHASE 2
R.V. PARK
APPROX. 27.7 AC
PHASE 3
WATERPARK
APPROX. 13 AC
PHASE 3
WATERPARK PARKING
APPROX. 14.1 AC
PHASE 5
OFFICE / ADMIN.
APPROX. 12.4 AC
PHASE 4
COMMERCIAL
RETAIL
APPROX. 13.6 AC
CHEROKEE RD
HACIENDA RD
PROPOSED "A" STREET
MOUNTAIN VIEW RD
BRAGDON RD
NAVAJO AVE
COMANCHE AVE
I-15 FWY
2,639.23' N89 55'00"E
2,577.37' N87 45'00"E
2,209.92' N88 43'45"E
1,189.08' N60 17'30"E
1,118.07 N61 56' 50"E
1,028.24' N2 11'28"E
2,647.69' S0 38'40"W
RL-VACANT
RL-40-VACANT
EXISTING FREEWAY EDGE OF PAVEMENT
EXISTING HACIENDA RD EDGE OF PAVEMENT
STREET IMPROVEMENTS ALONG HACIENDA AVENUE
40' ROADWAY DEDICATION & ASSOCIATED IMPROVEMENTS
SOLAR PANELS ON COVERED PARKING THIS AREA
CHECK-IN LANE
SEE DETAIL
32' x 64' R.V. SPACE - TYP.
9' x 19' STD. PARKING SPACE - TYP. ALL
OMEGA DESIGN GROUP
MICHAEL P. WAUHOB - ARCHITECT
WWW.OMEGADESIGNGROUP.COM
SITE PLAN
SP-1

N

SCALE: 1" = 400'

0 200 400

LEGEND:

B-8 — PRIOR GEOTECHNICAL BORING BY C.H.J., INC. (1997)

SITE PLAN

FOR: G & GF ENTERPRISE, LLC

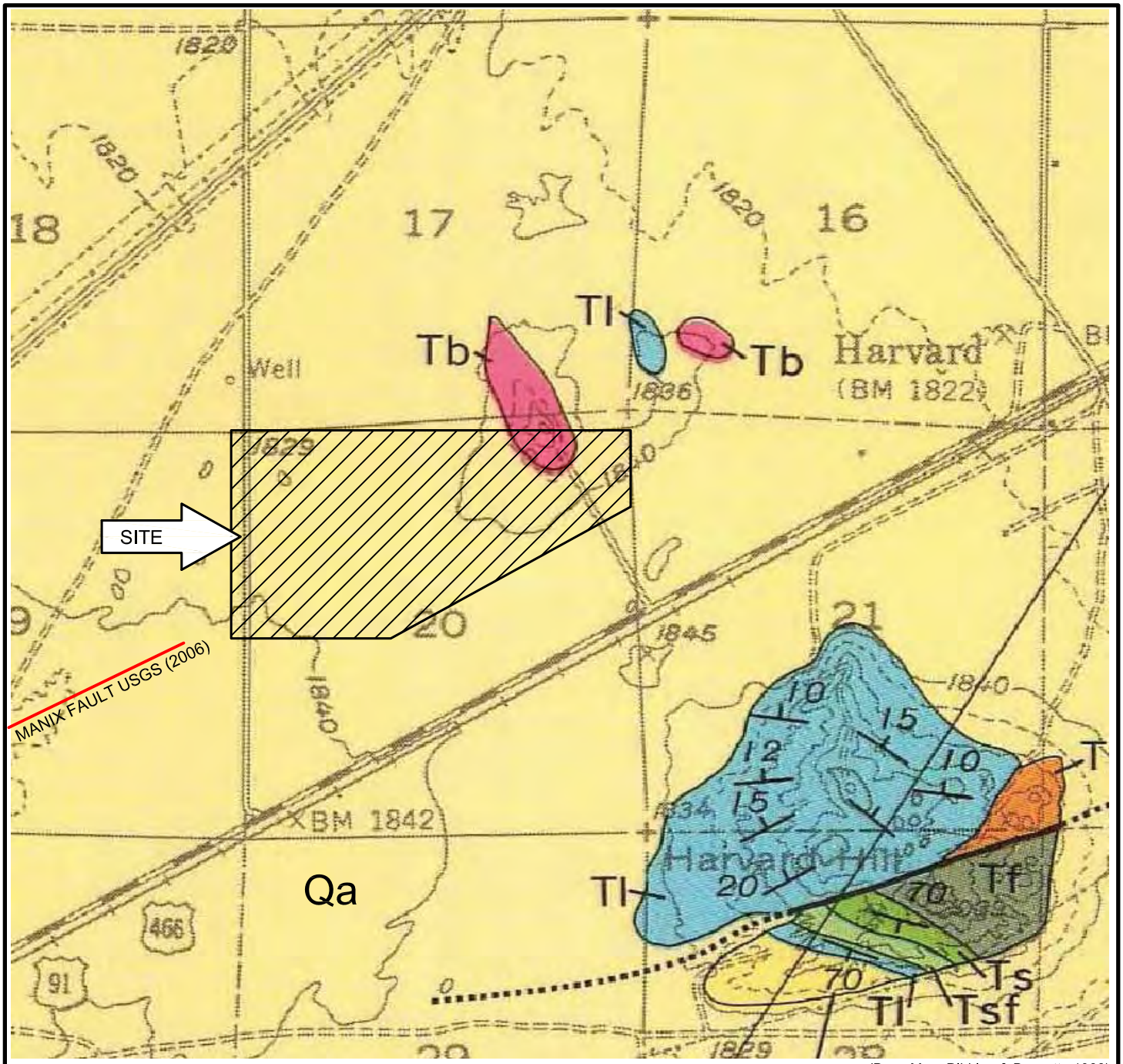
DATE: MARCH 2017

GEOTECHNICAL/GEOLOGIC EVALUATION FOR CEQA STUDY
DOLORES LAKE PARK
HACIENDA ROAD AND MOUNTAIN VIEW ROAD
NORTH OF INTERSTATE HIGHWAY 15
NEWBERRY SPRINGS, CALIFORNIA

ENCLOSURE "A-2"

JOB NUMBER 17060-8

CHJ Consultants
A Terracon COMPANY



(Base Map: Dibblee & Bassett,, 1966)

GEOLOGIC UNITS:

Qa - young alluvium
Qof - older fan deposits
Tl - limestone & claystone
Ts - sandstone & claystone
Tsf - fanglomerate
Tb - basalt
Tf - fanglomerate

geologic contact

fault, dotted where concealed

5 strike and dip of beds & lava flows

SCALE: 1" = Approx.2000'

N

GEOLOGIC INDEX MAP

FOR: G & GF ENTERPRISE, LLC	GEOTECHNICAL/GEOLOGIC EVALUATION FOR CEQA STUDY DOLORES LAKE PARK HACIENDA ROAD AND MOUNTAIN VIEW ROAD NORTH OF INTERSTATE HIGHWAY 15 NEWBERRY SPRINGS, CALIFORNIA	ENCLOSURE "A-3"
DATE: MARCH 2017		JOB NUMBER 17060-8

CHJ Consultants
A Terracon COMPANY

SITE

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
						ON LAND	OFFSHORE
Quaternary	Late Quaternary	Holocene Historic				Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
			200			Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	10,000			Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Pleistocene age.
	Early Quaternary		700,000			Undivided Quaternary faults – most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
			1,600,000			Late Cenozoic faults within the Sierra Nevada, including parts of, but not restricted to, the Foothills fault system. These faults may have been active in Quaternary time.	
Pre-Quaternary			4.5 billion (Age of earth)			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive. Pre-Quaternary faults not shown in Nevada and Oregon.	Fault cuts strata of Pliocene or older age.

N

SCALE: 1" = Approx.15 miles

REGIONAL FAULT MAP

FOR: G & GF ENTERPRISE, LLC

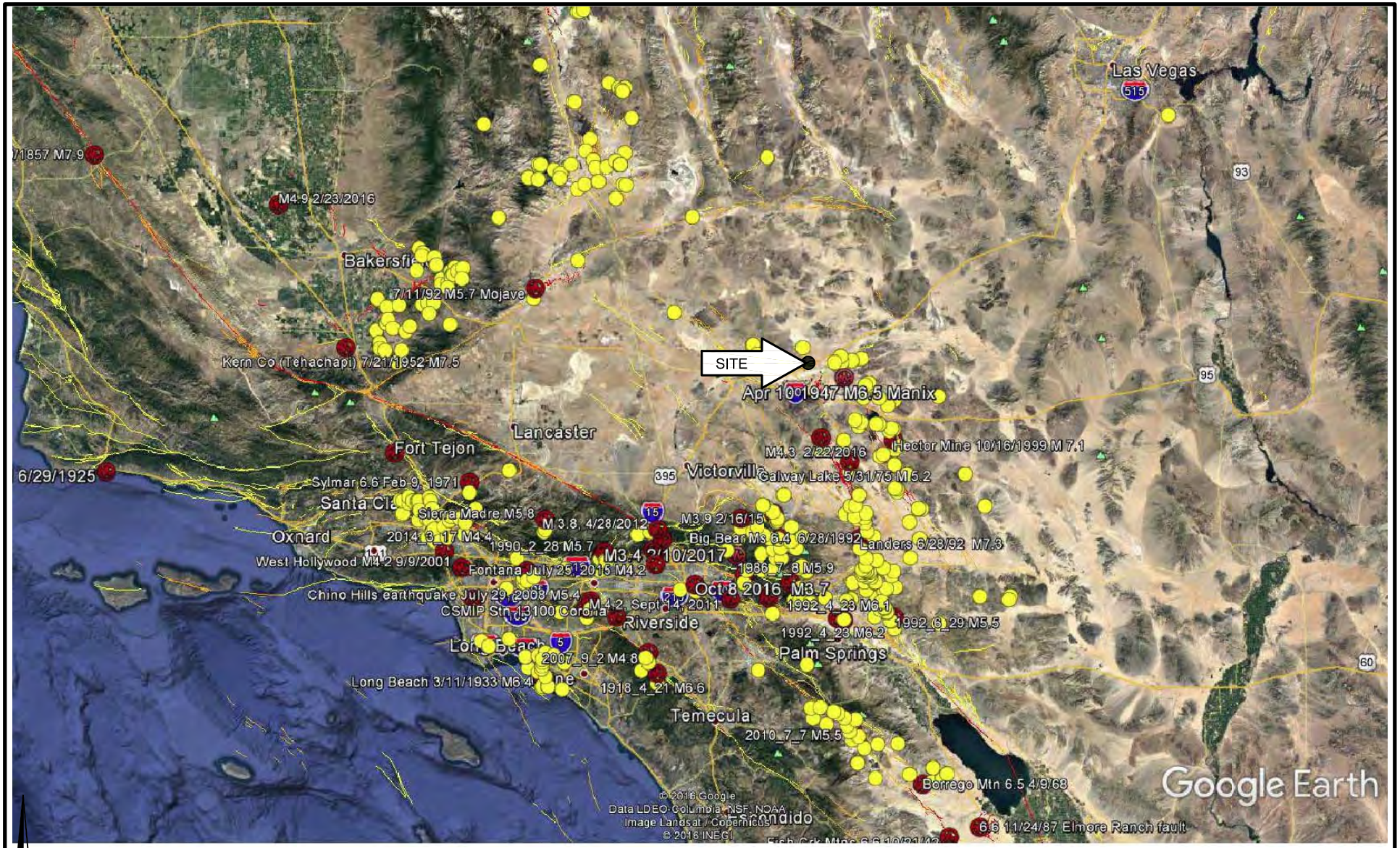
DATE: MARCH 2017

GEOTECHNICAL/GEOLOGIC EVALUATION FOR CEQA STUDY
DOLORES LAKE PARK
HACIENDA ROAD AND MOUNTAIN VIEW ROAD
NORTH OF INTERSTATE HIGHWAY 15
NEWBERRY SPRINGS, CALIFORNIA

ENCLOSURE "A-4"

JOB NUMBER 17060-8

CHJ Consultants
A Terracon COMPANY



N

SCALE: 1" = Approx. 40 miles

REGIONAL SEISMICITY MAP

FOR: G & GF ENTERPRISE, LLC	GEOTECHNICAL/GEOLOGIC EVALUATION FOR CEQA STUDY DOLORES LAKE PARK HACIENDA ROAD AND MOUNTAIN VIEW ROAD NORTH OF INTERSTATE HIGHWAY 15 NEWBERRY SPRINGS, CALIFORNIA	ENCLOSURE "A-5"
DATE: MARCH 2017		JOB NUMBER 17060-8

CHJ Consultants
A Terracon COMPANY

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Survey Areas
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

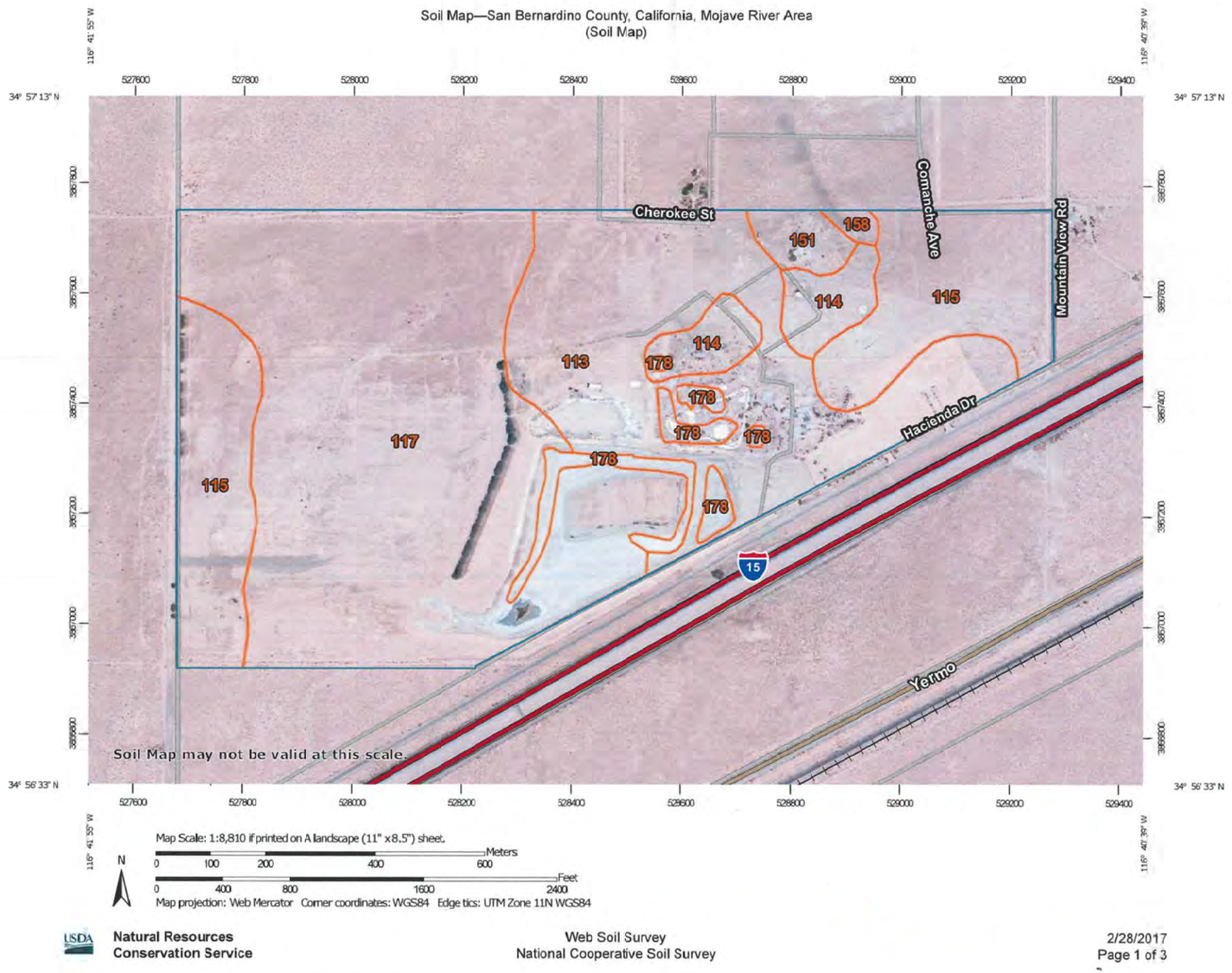
This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 8, Sep 12, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 5, 2010—May 16, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



Map Unit Legend

San Bernardino County, California, Mojave River Area (CA671)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
113	CAJON SAND, 2 TO 9 PERCENT SLOPES	62.5	24.4%
114	CAJON SAND, 9 TO 15 PERCENT SLOPES	10.5	4.1%
115	CAJON GRAVELLY SAND, 2 TO 15 PERCENT SLOPES	46.6	18.2%
117	CAJON LOAMY SAND, LOAMY SUBSTRATUM, 0 TO 2 PERCENT SLOPES	123.4	48.1%
151	NEBONA-CUDDEBACK COMPLEX, 2 TO 9 PERCENT SLOPES*	4.2	1.6%
158	ROCK OUTCROP-LITHIC TORRIORTHENTS COMPLEX, 15 TO 50 PERCENT SLOPES*	1.1	0.4%
178	WATER	8.1	3.2%
Totals for Area of Interest		256.5	100.0%

USDA SOIL MAP

FOR: G & GF ENTERPRISE, LLC	GEOTECHNICAL/GEOLOGIC EVALUATION FOR CEQA STUDY DOLORES LAKE PARK HACIENDA ROAD AND MOUNTAIN VIEW ROAD NORTH OF INTERSTATE HIGHWAY 15 NEWBERRY SPRINGS, CALIFORNIA	ENCLOSURE "A-6"
DATE: MARCH 2017		JOB NUMBER 17060-8

CHJ Consultants
A Terracon COMPANY