PRELIMINARY GEOTECHNICAL EVALUATION
UNIVERSITY INNOVATION DISTRICT EIR
CHULA VISTA, CALIFORNIA
HELIX PROJECT NO. CCV-08

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May 27, 2016
Project No. 107508002

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Subject: Preliminary Geotechnical Evaluation
University Innovation District EIR
Chula Vista, California
Helix No. CCV-08

Dear Mr. Brownwood:

In accordance with your request and authorization, we have performed a preliminary geotechnical evaluation for the University Innovation District EIR project in Chula Vista, California. Work was initiated in February 2013. The attached report presents our methodology, findings, opinions, and recommendations regarding the geology and soils conditions at the site.

We appreciate the opportunity to be of service on this project.

Respectfully submitted,
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EXECUTIVE SUMMARY

The proposed University Innovation District (UID) Project is located in the city of Chula Vista in southern San Diego County, California. Specifically, the project is in the Otay Ranch and Eastlake communities of eastern Chula Vista. The project area consists of two separate parcels, the Main Campus Property (353.8 acres) and the Lake Property (30 acre) with a total of 10,066,200 square feet of proposed development.

The proposed Main Campus Property site is located on the southeast side of Hunte Parkway and extends to the southeast towards the Otay River valley. The proposed Lake Property site is located on the west side of Wueste Road, west of Lower Otay Reservoir. As shown on Figure 2, the project area is generally undeveloped, with the exception of the existing High Tech High School campus located on the northern portion of the project area. Residential development is located north of the project area and the Olympic Training Center is located north of the Lake Property.

Elevations across the Main Campus Property range from approximately 620 feet above mean sea level (MSL) on the northwestern portion of the project near Hunte Parkway to approximately 340 feet MSL at the southeast end of the project near the Otay River valley. Elevations across the Lake Property range from approximately 500 feet MSL at the north end to approximately 560 feet MSL at the south end.

Geologic and geotechnical constraints evaluated for the project include:

- Surface and near-surface soils at the project are mapped as alluvial deposits and units of the Otay Formation. Fill materials associated with the construction of the existing paved roadways as well and topsoil and colluvium are also anticipated at the project. Geotechnical constraints related to soils at the project are:
    - *Soft Ground* – Areas with soft ground or loose soils can be found in active alluvial channels (low areas) of the project.
    - *Expansive Soils* – The project soils are expected to have a moderate to high potential for expansion.
    - *Fill Soils* – Fill soils placed without engineering supervision may be loosely or inadequately compacted, may contain oversize materials unsuitable for reuse in engineered fills, and may contain unsuitable organic or expansive materials and debris that may preclude their use in engineered fills.
- The closest known major active fault is the Rose Canyon Fault, which is located approximately 11.5 miles west of the project. Geotechnical constraints related to faulting and seismic events at the project are:
    - *Ground Shaking* – The project has a moderate potential for strong ground motions due to earthquakes on nearby active faults.

- *Liquefaction* – The alluvial soils near the Salt Creek valley may be subject to static settlement or liquefaction during a nearby seismic event.

- Shallow groundwater may be expected to occur beneath those portions of the project currently underlain by alluvial ravines and valleys. This is presumably the case in the areas of the Salt Creek valley, Otay River valley, Lower Otay Reservoir.

- According to Tan (1995) the project is in areas classified with the slope stability designation 3-1, which are classified as being generally susceptible to landsliding.

- Due to the elevation of the project, dam inundation and significant flooding of the site are not considered to be significant hazards to the project.

- Based on previous work in the project area, the soils at the project site may be corrosive.

1. INTRODUCTION

In accordance with your request, Ninyo & Moore has completed a preliminary evaluation of geologic and soil conditions for the proposed University Innovation District (UID) Project, located in the Otay Ranch and Eastlake communities of Chula Vista in San Diego County, California (Figure 1). The project area encompasses approximately 10,066,200 square feet, divided between two parcels: the Main Campus Property site located south of Hunte Parkway and the Lake Property site located to the east of the Main Campus Property near Lower Otay Reservoir.

Our evaluation is based on a geologic reconnaissance, published and non-published reports, aerial photographs, in-house data, and the assessment of the potential geologic hazards in the project area. The purpose of this survey was to estimate the potential for existing environmental impacts to the area from geologic or soils conditions on or in proximity to the area, and to discuss measures that can be implemented to reduce or mitigate the potential impacts with respect to the design and construction of the proposed project.

2. SCOPE OF SERVICES

Ninyo & Moore's scope of services for this geologic and soils evaluation included the activities listed below:

- Review of readily available regional, local, and site-specific geologic and geotechnical reports.
- Review of readily available background information including topographic, soils, mineral resources, geologic, and seismic and geologic hazard maps, and stereoscopic aerial photographs.
- Performance of a geologic reconnaissance of the site vicinity.
- Compilation and analysis of the data obtained from our background reviews and site reconnaissance.
- Preparation of this report documenting findings and providing opinions and recommendations regarding possible geologic and soil impacts at the site. The findings were evaluated with respect to questions A through H listed in Section 6, "Geology and Soils" within Appendix G, "Environmental Checklist Form" of the "Guidelines for Implementation of the California Environmental Quality Act (CEQA)."

3. REGULATORY FRAMEWORK

Geologic resources and geotechnical hazards within the proposed project area are governed by the City of Chula Vista. The City's Building Division plans contain conservation and safety elements for the protection of geologic features and avoidance of geologic hazards. The procedures for construction related earthwork and excavation are established by these local grading ordinances developed by the City of Chula Vista Engineering Department. The site is also governed by the regulations of the California Code of Regulations (CCR), 2013 California Building Code (CBC).

The CBC is promulgated under CCR, Title 24, Parts 1 through 12, also known as the California Building Standards Code, and is administered by the California Building Standards Commission (CBSC). The CBSC is responsible for administering California's building codes.

4. SITE AND PROJECT DESCRIPTION

The project proposes to develop a 4-year University campus, campus support uses and Innovation District on approximately 380 acres of land located within the City's Eastern University District, specifically the University Focus Area. The proposed project would implement the goals, objectives and policies identified for the University Focus Area consistent with the Chula Vista General Plan, Otay Ranch General Development Plan (GDP) and Eastlake III GDP, as amended. Approximately 353.8 acres of the project area (herein referred to as the Main Campus Property) is contained within Planning Area 10/University Site of Otay Ranch GDP, while approximately 30 acres occur on a portion of the Eastlake III GDP (herein referred to as the Lake Property). Collectively, the Main Campus Property and the Lake Property are referred to as the project area. The proposed 353.8-acre Main Campus Property site is located on the southeast side of Hunte Parkway and extends to the southeast roughly 3,500 feet towards the Otay River valley. The proposed 30-acre Lake Property site is located west of the Lower Otay Reservoir along the western side of Wueste Road. Off-site sewer and drainage improvements will also be constructed as part of the project in the locations shown on Figure 1.

As shown on Figure 2, the majority of the project area is currently undeveloped, with the exception of the existing High Tech High School campus located on the south side of Hunte Parkway on the northern portion of the Main Campus Property parcel. Residential development is located north of the Main Campus Property parcel and the Olympic Training Center is located north of the eastern parcel. The adjacent land to the west, south, and east of the project area is currently undeveloped. The north-south trending drainage for Salt Creek is located between the two campus properties (Figure 2).

Elevations on the Main Campus Property parcel range from approximately 620 feet above mean sea level (MSL) on the northwestern portion of the project near Hunte Parkway to approximately 340 feet MSL at the southeastern end of the parcel. Elevations on the Lake Property parcel range from approximately 500 feet MSL near the northern end of the parcel to approximately 560 feet MSL at the southern point of the parcel.

5. GEOLOGY

The following sections present our findings relative to regional and site geology, geologic hazards (e.g., landslides or expansive soils), groundwater, faulting, and seismicity.

5.1. Regional Geologic Setting

The project site is situated in the coastal foothill section of the Peninsular Ranges Geomorphic Province. The province encompasses an area that extends approximately 900 miles from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California (Norris and Webb, 1990; Harden, 1998). The province varies in width from approximately 30 to 100 miles. In general, the province consists of rugged mountains underlain by Jurassic metavolcanic and metasedimentary rocks, and Cretaceous igneous rocks of the southern California batholith. Along the western edge of the province, which includes the project area, the metavolcanic and plutonic rocks are overlain by Cretaceous to Pleistocene-aged sedimentary rocks.

The Peninsular Ranges Province is traversed by a group of sub-parallel faults and fault zones trending roughly northwest (Jennings, 2010). Several of these faults are considered active. The Elsinore, San Jacinto and San Andreas faults are active fault systems located northeast of the project area and the Rose Canyon, Coronado Bank, San Diego Trough, and San Clemente faults are active faults located west of the project site. Major tectonic activity associated with these and other faults within the regional tectonic framework consists primarily of right-lateral, strike-slip movement. Specifics of faulting are discussed in following sections of this report.

5.2. Site Geology

Published geologic maps for this area include the Otay Mesa 7.5' Quadrangles (Tan and Kennedy, 2002), a portion of which is included as Figure 3. As shown on Figure 3, geologic mapping indicates that the geology at the project includes the following units (Tan and Kennedy, 2002):

- Qvoa: Alluvial deposits (middle to early Pleistocene) – Poorly consolidated, poorly sorted flood plain deposits consisting of gravel, sand, silt, and clay. These materials are anticipated to exist along the bottoms of drainages that cross the site.

- To: Otay Formation (Oligocene to Miocene) – Poorly indurated, massive, light-colored sandstone, siltstone, and claystone interbedded with bentonite lenses. This unit is anticipated to underlie the majority of the Main Campus Property and was observed during our site reconnaissance in road cuts along Hunte Parkway and near the High Tech High School.

- Tof: Otay Formation-Fanglomerate Facies (Oligocene to Miocene) – Poorly cemented cobble and boulder conglomerate and coarse-grained sandstone. This unit interfingers with the overlying Otay Formation. The fanglomerate materials are mapped adjacent to Lower Otay Reservoir and were observed during our reconnaissance in road cuts along Wueste Road on the eastern edge of the Lake Property.

Fill materials were observed during our site reconnaissance along the northwestern edge of the Main Campus Property associated with the construction of Hunte Parkway and under some areas of the High Tech High School campus. Shallow fills may also be present in the area of buried utilities and trails that are present over the project area. The nature and depth of these fill materials is not known.

Topsoil is expected to mantle the undeveloped portions of the site. These soils generally consist of 1- to 4-foot of thicknesses of light to dark brown, soft to loose, sandy clay and clayey sand. These soils will be thicker on lower portions of existing slopes and grade into alluvial soils within site drainages.

Colluvium is anticipated to be present at the surface along the slopes of canyons and drainages. These soils generally consist of 4- to 6-foot thick sections of sandy clay and clayey sand with scattered gravel and cobbles.

5.3. Groundwater

Sources provided by the California Department of Water Resources (DWR) and the California State Water Resources Control Board (SWRCB) were reviewed for information pertaining to groundwater quality and occurrence in the vicinity of the project. According to the SWRCB Water Quality Control Plan for the San Diego Basin, the northern portions of the project along Hunte Parkway are located within the Otay Valley Hydrologic Area in the Otay Hydrologic Unit. Portions of the project located near the Lower Otay Reservoir are located within the Savage Hydrologic Subarea of the Dulzura Hydrologic Area within the Otay Hydrologic Unit.

No DWR wells are located along the project or its adjacent properties (DWR, 2013). We researched information on the SWRCB GeoTracker website reported for properties with wells located in proximity to the project; however, information relevant to the depth and flow direction of groundwater in the project area was not available (SWRCB, 2013). Based on the topography of the site and proximity to the Lower Otay Reservoir, Salt Creek, and Otay River, groundwater beneath the project is presumed to flow generally in a southwest/westerly direction (groundwater flow typically follows surface topography). Depths to groundwater in the Otay Hydrologic Unit are generally 25 feet or less (DWR, 1967). Depth to groundwater may be shallower in valleys near drainages and near the Lower Otay Reservoir.

There are no existing beneficial uses of groundwater in these hydrologic areas; however, potential beneficial uses have been designated for municipal, agricultural, and industrial supply purposes.

5.4. Faulting and Seismicity

As shown on Figure 4, there are several active faults in the region. Therefore, like most of southern California, the project area is considered to be seismically active. The closest known active fault is the Rose Canyon Fault, which is capable of generating an earthquake magnitude of 7.2 (California Geological Survey [CGS], 2003). The Rose Canyon Fault is located approximately 12 miles west of the site (Figure 4).

In general, hazards associated with seismic activity include ground surface rupture, strong ground motion, liquefaction, and tsunamis. These hazards are discussed in the following sections.

5.4.1. Ground Surface Rupture

Ground surface rupture due to active faulting is not considered likely in the project area due to the absence of known active faults underlying the site. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

5.4.2. Strong Ground Motion

The 2013 California Building Code (CBC) recommends that the design of structures be based on the horizontal peak ground acceleration (PGA) having a 1 percent probability of exceedance in 50 years which is defined as the Maximum Considered Earthquake (MCE). The statistical return period for the risk-targeted PGA_{MCE} is approximately 4,975 years. The probabilistic PGA_{MCE} for the site was calculated as 0.38g using the United States Geological Survey (USGS, 2013) ground motion calculator (web-based). The mapped and design PGA was estimated to be 0.26g, using the USGS (2013) calculator and the American Society of Civil Engineers (ASCE) 7-10 Standard.

As noted, the nearest active known fault is the Rose Canyon Fault, located approximately 12 miles west of the project site. Table 1 below lists principal known active faults that may affect the subject site, the maximum moment magnitude (M_{max}) and the fault types as published for the CGS by Cao et al. (2003). The approximate fault to site distance was calculated by the computer program FRISKSP (Blake, 2001).

Table 1 – Principal Active Faults

Fault	Approximate Distance miles (km)[1]	Maximum Moment Magnitude (M_{max})[1]	Fault Type[2]
Rose Canyon	12 (19.3)	7.2	B
Coronado Bank	20 (32.2)	7.6	B
Elsinore (Julian Segment)	40 (64.3)	7.1	A
Elsinore (Coyote Mountain Segment)	42 (67.6)	6.8	A
Earthquake Valley	43 (69.2)	6.5	B
Newport-Inglewood (Offshore)	46 (74.1)	7.3	B
Elsinore (Temecula Segment)	53 (85.3)	6.8	A
San Jacinto-Coyote Creek	60 (96.6)	6.8	A
San Jacinto-Borrego	60 (96.6)	6.6	A

Notes:
[1] Cao, et al., 2003.
[2] California Building Code (CBC), 2010; Cao, et al., 2003.

5.4.3. Liquefaction and Seismically Induced Settlement

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils and non-plastic silts that are saturated by a relatively shallow groundwater table are susceptible to liquefaction. Based on the generally dense nature of the subsurface materials and the absence of near surface groundwater, it is our opinion that the potential for liquefaction over most of the project area is not a design consideration. However, existing alluvial soils within the Salt Creek valley (located between the project parcels) may be subject to liquefaction or static settlement during a nearby seismic event.

5.4.4. Tsunamis and Seiches

Tsunamis are long wavelength seismic sea waves (long compared to the ocean depth) generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. Based on the inland location and elevation of the project, the potential for a tsunami to impact the site is not a design consideration.

Seiches are oscillations of enclosed or partially enclosed bodies of water often generated by seismic activity. Although the smaller eastern parcel of the project is located near the Lower Otay Reservoir, based on the elevation of the parcel, the potential for seiches to impact the site is considered low.

5.5. Landsliding

Based on our review of published geologic literature, aerial photographs, site reconnaissance, and our subsurface evaluations, no landslides or related features underlie or are adjacent the project and the potential for landslides is considered low.

According to the Landslide Hazards Map (Tan, 1995), portions of the project area fall within zones classified as 3-1. Areas with the 3-1 classification are described as being generally susceptible to landsliding. The Otay Formation, the formational unit that underlies the site, is considered potentially prone to landsliding and slope instability.

5.6. Flood Hazards

Based on review of Federal Emergency Management Agency (FEMA) Mapping Information Platform website (2014), the project parcels are not located within the mapped 100 or 500-year floodways. Portions of the Salt Creek drainage, located between the parcels, are mapped as within an active floodway. Based on review of the flood maps and the elevation of the project parcels above Salt Creek, the Otay River Valley, and Lower Otay Reservoir, the potential for significant flooding to impact the project is not a project constraint. In addition, the potential for dam inundation is not considered a project constraint for the same reasons.

5.7. Expansive Soils

Expansive soils generally result from specific clay minerals that have the capacity to shrink or swell in response to changes in moisture content. Shrinking or swelling of foundation soils can lead to damage to slabs, foundations, and other engineered structures, including tilting and cracking. Clayey topsoils and siltstone and claystone portions of the Otay Formation may be expansive. The Otay Formation is also known to contain lenses of bentonite claystone, which can be highly to very highly expansive. In general, the soils and earth materials at the project may be expected to have a moderate to high potential for expansion.

5.8. Corrosive Soils

Caltrans corrosion (2012) criteria define as soils with more than 500 parts per million (ppm) chlorides, more than 0.2 percent sulfates, or a pH less than 5.5. Soil corrosivity testing was not performed for the proposed project in preparation for this specific project. Based on laboratory testing performed on soil samples from Ninyo & Moore projects near the project area and Caltrans corrosion (2012) criteria, soils in the project area have been classified as corrosive to ferrous metals. The potential for similar soils to occur at the project is considered high.

5.9. Mineral Resources

According to the California Geological Survey reports (CGS, 1963; Kohler and Miller, 1982) the project area is located in Mineral Resource Zone 3 (MRZ-3). MRZ-3 areas are locations in San Diego County that have been identified as areas that contain known mineral deposits that may qualify as a mineral resource.

5.10. Client-Provided Documents

Ninyo & Moore reviewed three prior geotechnical reports for the project area, dated March 2014, and prepared by Geocon, one of which encompasses portions of the Main Campus property. The report covers approximately 565 acres of land in Otay Ranch Village (ORV) 10, some of which are within the western portion of the Main Campus Property. According to the report, Ge-

ocon's subsurface investigation in the area of the Main Campus Property encountered fill, colluvium, topsoil, alluvium, and materials of the Otay Formation. Groundwater was not encountered during Geocon's subsurface investigation.

6. CONCLUSIONS

Based on our review of the referenced background data and our geologic field reconnaissance it is our opinion that geologic and geotechnical considerations at the project site include the following:

- Surface and near-surface soils at the project are mapped as alluvial deposits and units of the Otay Formation. Topsoil, colluvium, and fill materials associated with the construction of the existing roadways and High Tech High School are also anticipated to be present at the project sites. Geotechnical constraints related to soils at the project are:
    - *Soft Ground* – Areas with soft ground or loose soils can be found areas underlain by existing topsoils and in drainages and alluvial channels (low areas) of the project.
    - *Expansive Soils* – The project soils are expected to have a moderate to high potential for expansion.
    - *Fill Soils* – Fill soils placed without engineering supervision may be loosely or inadequately compacted, may contain oversize materials unsuitable for reuse in engineered fills, and may contain unsuitable organic or expansive materials and debris that may preclude their use in engineered fills.
- The closest known major active fault is the Rose Canyon Fault, which is located approximately 12 miles west of the project. Geotechnical constraints related to faulting and seismic events at the project are:
    - *Ground Shaking* – The project has a moderate potential for strong ground motions due to earthquakes on nearby active faults.
    - *Liquefaction* – Based on the generally dense nature of the formational materials underlying the site and the absence of near surface groundwater, the potential for liquefaction over most of the project area is not a design consideration. Alluvial soils near the Salt Creek valley may be subject to dynamic settlement or liquefaction during a nearby seismic event.
- Shallow groundwater may occur beneath portions of the project in existing drainages and alluvial valleys.
- According to Tan (1995), portions of the project areas are classified as slope stability designation 3-1, which is classified as being generally susceptible to landsliding.

- Due to the elevation of the project, significant flooding or dam inundation are not considered design constraints.

- Based on previous work in the project area, some soils at the project site may be expansive and corrosive.

The conditions described above would increase the cost and duration of grading and construction of the project, but would not preclude development of the project.

7. RECOMMENDATIONS

Based on the geologic and geotechnical considerations at the project site presented in the previous section, our general recommendations are presented below. These recommendations assume that a geotechnical evaluation, including subsurface evaluation and laboratory testing, will be conducted prior to finalization of project plans and specific recommendations will be provided at that time.

- Soft Ground – Soils in areas with soft ground or loose soils in the area of the proposed project may be subject to settlement. A recommendation to mitigate this condition could typically include removal and/or replacement of soils as engineered compacted fill. The extent of soft soils and recommended removals may be evaluated by subsurface investigation and laboratory testing.

- Expansive Soils – Expansive soils may lead to damage to foundations and engineered structures. If expansive soils exist on site, the following recommendations may be implemented during construction: the soils may be removed from distress sensitive areas and placed in deeper fill areas; the soils may be excavated and removed from the site; or the expansive soils may be treated (i.e., lime treatment) to mitigate their potential for expansion. The extent of expansive soils and recommended mitigation measures may be evaluated by subsurface investigation and laboratory testing.

- Ground Shaking – Proposed structures should be designed appropriately to mitigate strong ground shaking in the event of an earthquake on a nearby fault.

- Liquefaction – The majority of the site is underlain by dense earth materials without shallow groundwater and is not considered susceptible to liquefaction and dynamic settlement. Alluvial soils near the Salt Creek valley may be subject to static settlement or liquefaction during a nearby seismic event. If development is proposed in this area, the following recommendations may be implemented during construction; removal and replacement of soils susceptible to static settlement or liquefaction; densification of these soils; or lowering of the groundwater table. The extent of liquefiable soils and recommended mitigation measures may be evaluated by subsurface investigation and laboratory testing.

- Shallow groundwater – Shoring and dewatering may be required if construction is proposed in areas of shallow groundwater.

- Landsliding – Landslides have not been mapped on the site and none were observed during our site reconnaissance. However, much of the project area is classified as being generally susceptible slope instability and to landsliding. If encountered, the following recommendations may be implemented during construction to mitigate landsliding: removal of the slide masses and replacement with engineered fill; the placement of buttress fills; or a combination of these recommendations. The extent of on-site landsliding and potentially unstable earth materials and recommended mitigation measures may be evaluated by subsurface investigation and laboratory testing.

- Corrosive Soils – If corrosive soils exist on the site, a corrosion engineer may be required to assist in the design of improvements in contact with the soil. The extent of corrosive soils and recommended mitigation measures may be evaluated by subsurface investigation and laboratory testing

8. IMPACT ANALYSIS

Based upon the results of our Geology and Soils Evaluation, our opinions, and recommendations are provided in the following sections.

8.1. Significance Thresholds

In evaluating the significance of potential environmental concerns in a particular study area, the criteria to consider, as they relate to geologic and soil conditions, are presented in the CEQA Guidelines. In accordance with the scope of work, the findings of this study were evaluated with respect to Questions A through E of Section 6 “Geology and Soils” with in Appendix G of the CEQA Guidelines (2009).

8.2. Project Impacts and Significance

Based on the above criteria and the results of the evaluation, the potential impact by geologic and soil conditions at the project have been identified, and are discussed below.

A. Would the project expose people or structures to 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 known fault?

The potential for ground surface rupture due to active faulting is considered low in the project area due to the absence of known active faults underlying the site. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

ii. Strong seismic ground shaking?

The project has a moderate potential for strong ground motions due to earthquakes on nearby active faults.

iii. Seismic related ground failure, including liquefaction?

Based on the generally dense nature of the subsurface materials and the absence of groundwater, it is our opinion that the potential for liquefaction over the majority of the project site is not a design consideration. However, alluvial soils along the drainage of Salt Creek may be subject to static settlement or liquefaction during a nearby seismic event.

iv. Landslides?

Landslides were not observed on or adjacent to the project. Therefore, the potential for existing landslides is considered low. However, portions of the project are mapped as being susceptible to landslides and slope instability.

B. Would the project result in substantial soil erosion or the loss of topsoil?

If the site is developed in an accordance with current building codes and industry standards, the potential for substantial soil erosion is considered to be low. The potential for substantial loss of topsoil due to the proposed development is considered high.

C. Would the project be located on 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?

The alluvial soils within the Salt Creek drainage may be subject to static settlement or liquefaction during a nearby seismic event. The formational unit underlying the site, the Otay Formation, is considered potentially prone to landsliding and slope instability issues.

D. Would the project 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?

The soils on the project site are expected to have a moderate to high potential for expansion.

9. LIMITATIONS

The field evaluation and geotechnical analyses presented in this report have been conducted in accordance with current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No warranty, implied or expressed, is made regarding the conclusions, recommendations, and professional opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered. Our preliminary conclusions and recommendations area based on an analysis of the observed conditions and the referenced background information.

The purpose of this study was to evaluate geologic and geotechnical conditions within the project site and to provide a preliminary geotechnical evaluation report to assist in the preparation of environmental impact documents for the project. A comprehensive geotechnical evaluation, including subsurface exploration and laboratory testing, should be performed prior to design and construction of structural improvements.

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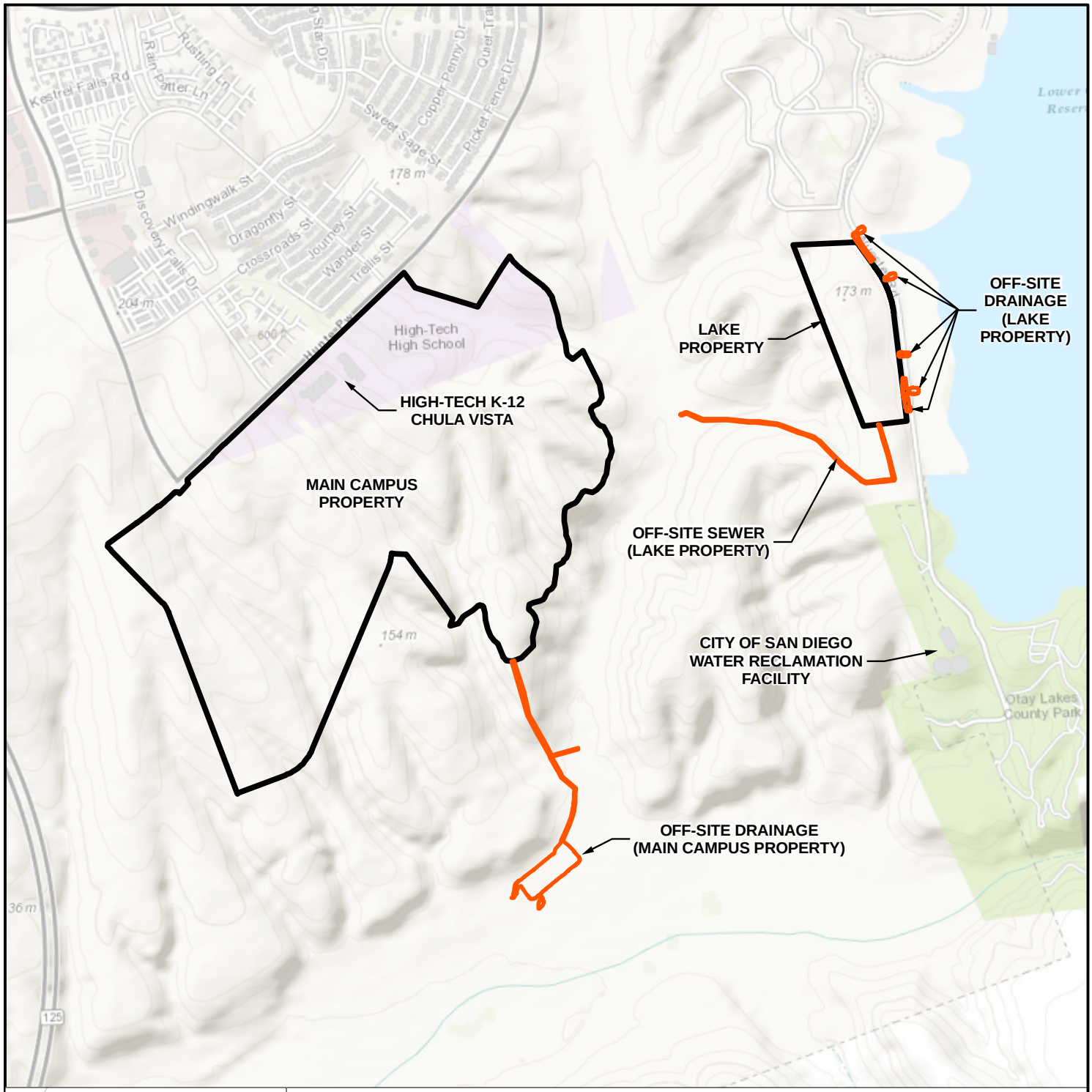
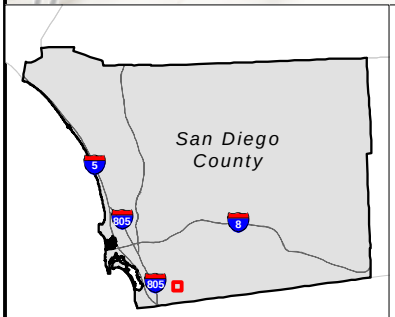
AERIAL PHOTOGRAPHS

Source	Date	Flight	Numbers	Scale
USDA	March 31, 1953	AXN-3M	71-74	1:24,000



SOURCE: USGS, FAO, NPS, EPA, ESRI, DELORME, TANA, OTHER SUPPLIERS



MAP INDEX

LEGEND

PROJECT AREA

OFF-SITE AREA

N

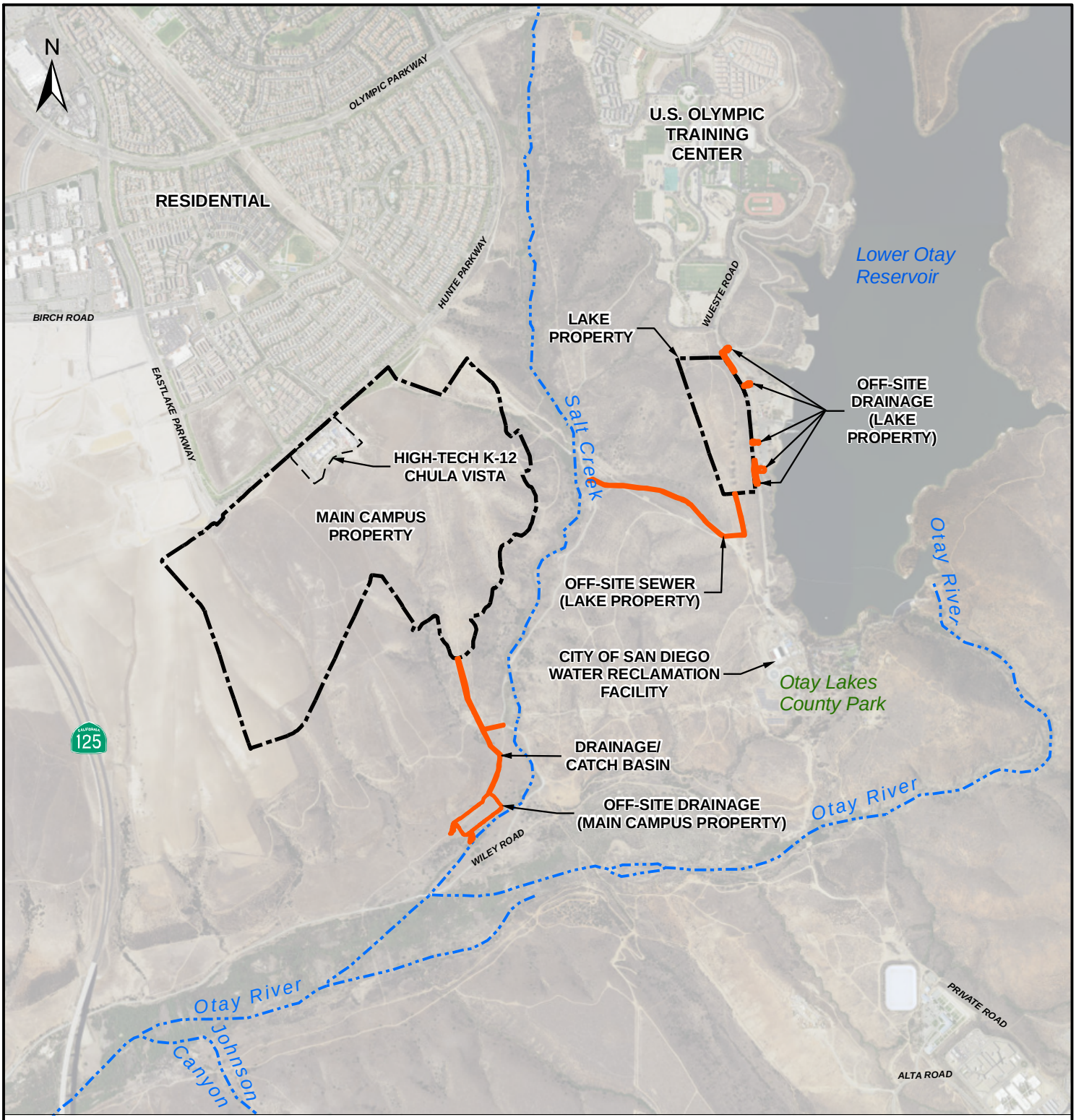
SCALE IN FEET

0 1,500 3,000

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

Ninyo & Moore	PROJECT AREA LOCATION	FIGURE
PROJECT NO. / DATE	UNIVERSITY INNOVATION DISTRICT CHULA VISTA, CALIFORNIA	1
107508002 / 5/16		

1_107508002_SL.mxd 4/15/2014 10:22:53 AM AOB



SERVICE LAYER CREDITS: IMAGE COURTESY OF USGS © 2013 MICROSOFT CORPORATION

LEGEND

- PROJECT AREA BOUNDARY
- OFF-SITE AREA
- RIVER/STREAM

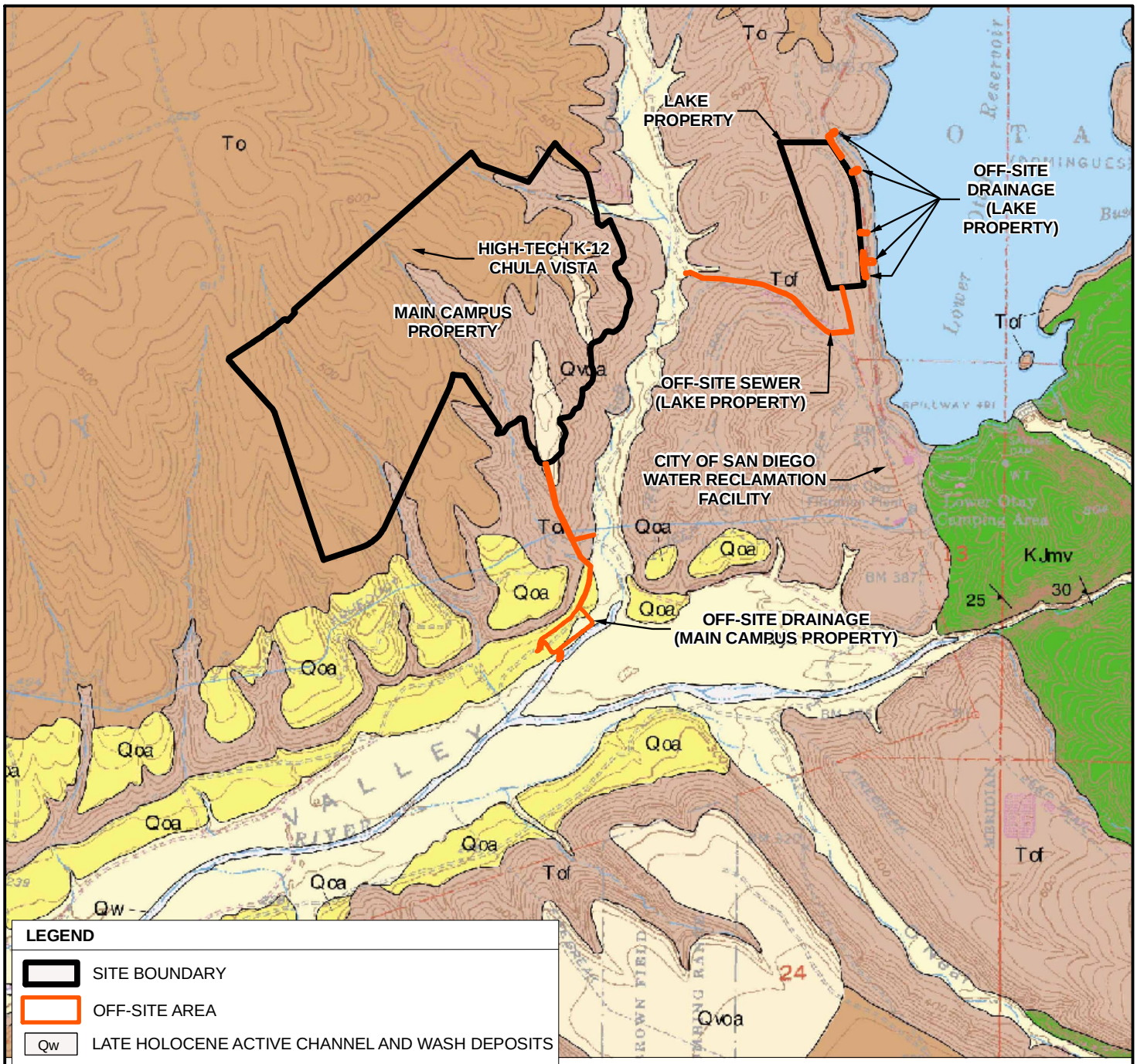
SCALE IN FEET

0 2,000 4,000

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore	PROJECT AREA AND VICINITY	FIGURE
PROJECT NO. 107508002 / DATE 5/16	UNIVERSITY INNOVATION DISTRICT CHULA VISTA, CALIFORNIA	2

2_107508002_PV.mxd 4/15/2014 AOB



LEGEND

- SITE BOUNDARY
- OFF-SITE AREA
- Qw — LATE HOLOCENE ACTIVE CHANNEL AND WASH DEPOSITS
- Qya — HOLOCENCE ALLUVIAL DEPOSITS
- Qoa — ALLUVIAL DEPOSITS
- Qvoa — ALLUVIAL TERRACE DEPOSITS
- Tsd — SAN DIEGO FORMATION
- To — OTAY FORMATION
- Tof — OTAY FORMATION-FANGLOMERATE
- KJmv — METAVOLCANIC ROCKS
- 7 — STRIKE AND DIP OF INCLINED SEDIMENTARY BEDS
- 30 — STRIKE AND DIP OF FOLIATION IN METAVOLCANIC ROCKS

SOURCE: KENNEDY, M.P., AND TAN, S.S., 2002, GEOLOGIC MAP OF THE OTAY MESA 7.5' QUADRANGLE, SAN DIEGO COUNTY, CALIFORNIA

N

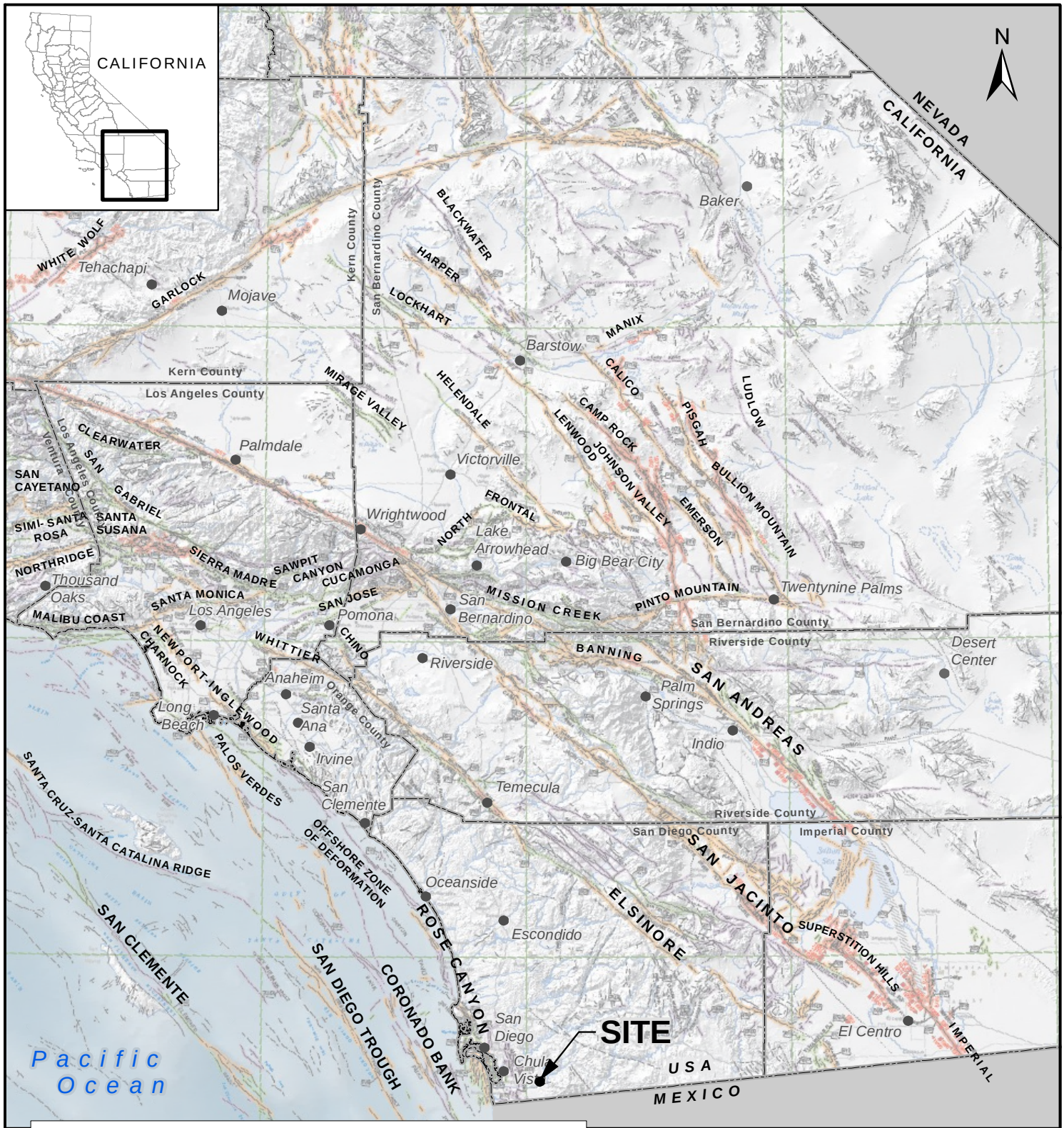
APPROXIMATE SCALE

0 2,000 4,000 FEET

NOTES: ALL DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

3_107508002_G_93.mxd AOB

Ninyo & Moore	GEOLOGY	FIGURE
PROJECT NO. 107508002 / DATE 5/16	UNIVERSITY INNOVATION DISTRICT CHULA VISTA, CALIFORNIA	3



LEGEND

CALIFORNIA FAULT ACTIVITY

- HISTORICALLY ACTIVE
- HOLOCENE ACTIVE
- LATE QUATERNARY (POTENTIALLY ACTIVE)
- QUATERNARY (POTENTIALLY ACTIVE)
- STATE/COUNTY BOUNDARY

SOURCE: JENNINGS, C.W., AND BRYANT, W.A., 2010, FAULT ACTIVITY MAP OF CALIFORNIA, CALIFORNIA GEOLOGICAL SURVEY.

SCALE IN MILES

0 30 60

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore

PROJECT NO.	DATE
107508002	5/16

FAULT LOCATIONS

UNIVERSITY INNOVATION DISTRICT
CHULA VISTA, CALIFORNIA

FIGURE

4

4_107508002_F_93.mxd AOB