

DOCKETED

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ATTACHMENT DR GEO-1

Revised SPPE Application Section 4.7 with References

4.7 GEOLOGY AND SOILS

The following discussion is supported by a Geotechnical Investigation Report (December, 2024) prepared by Langan, CA Inc. The report is attached as Appendix E of this Application.

4.7.1 CEQA Checklist

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
<u>Geology and Soils</u>				
Would the project:				
1) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
- Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
- Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
- Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
- Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3) Be located on a geologic unit or soil that is unstable, or that will become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) Be located on expansive soil, as defined in the current California Building Code, creating substantial direct or indirect risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

4.7.2 Environmental Setting

4.7.2.1 Regulatory Framework

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed following the 1971 San Fernando earthquake. The act regulates development in California near known active faults due to hazards associated with surface fault ruptures. Alquist-Priolo maps are distributed to affected cities, counties, and state agencies for their use in planning and controlling new construction. Areas within an Alquist-Priolo Earthquake Fault Zone require special studies to evaluate the potential for surface rupture to ensure that no structures intended for human occupancy are constructed across an active fault.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (SHMA) was passed in 1990 following the 1989 Loma Prieta earthquake. The SHMA directs the California Geological Survey (CGS) to identify and map areas prone to liquefaction, earthquake-induced landslides, and amplified ground shaking. CGS has completed seismic hazard mapping for the portions of California most susceptible to liquefaction, landslides, and ground shaking, including the central San Francisco Bay Area. The SHMA requires that agencies only approve projects in seismic hazard zones following site-specific geotechnical investigations to determine if the seismic hazard is present and identify measures to reduce earthquake-related hazards.

California Building Standards Code

The California Building Standards Code (CBC) prescribes standards for constructing safer buildings. The CBC contains provisions for earthquake safety based on factors including occupancy type, soil and rock profile, ground strength, and distance to seismic sources. The CBC requires that a site-specific geotechnical investigation report be prepared for most development projects to evaluate seismic and geologic conditions, such as surface fault ruptures, ground shaking, liquefaction, differential settlement, lateral spreading, expansive soils, and slope stability. The CBC is updated every three years; the current version is the 2022 CBC.

California Division of Occupational Safety and Health Regulations

Excavation, shoring, and trenching activities during construction are subject to occupational safety standards for stabilization by the California Division of Occupational Safety and Health (Cal/OSHA) under Title 8 of the California Code of Regulations and

Excavation Rules. These regulations minimize the potential for instability and collapse that could injure construction workers on the site.

Paleontological Resources Regulations

Paleontological resources are the fossilized remains of organisms from prehistoric environments found in geologic strata. They range from mammoth and dinosaur bones to impressions of ancient animals and plants, trace remains, and microfossils. These are valued for the information they yield about the history of the Earth and its past ecological settings.

Section 5097.5 prohibits “knowing and willful” excavation, removal, destruction, injury, and defacement of any “vertebrate paleontological site, including fossilized footprints,” on public lands, except where the agency with jurisdiction has granted express permission. “As used in this section, ‘public lands’ means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.”

Public Resources Code (PRC) Section 30244 requires reasonable mitigation for impacts on paleontological resources that occur as a result of development on public lands.

The sections of the California Administrative Code relating to the State Division of Beaches and Parks afford protection to geologic features and “paleontological materials” but grant the director of the State Park system authority to issue permits for specific activities that may result in damage to such resources, if the activities are in the interest of the State park system and for State Park purposes (California Administrative Code, Title 14, Section 4307 – 4309).

4.7.2.2 Existing Conditions

The site is approximately 12 acres and located at the northeast corner of the intersection of East Vernon Avenue and Soto Street. The site is bound on the north by a vacant lot and the Los Angeles River Channel and on the east by existing industrial developments.

The site is within the southern half of a property formerly developed with an industrial facility that was recently demolished. The prior development included approximately eight industrial buildings and an engine room associated with the most recent site usage as a meat processing and distribution facility. Approximately five of the prior industrial buildings and the engine room were located within the site. An access tunnel crossing beneath East Vernon Avenue and Soto Street was also present on the south side of the site. Subterranean building and tunnel components within the site were demolished, including subterranean building levels, foundations, and floor slabs and the areas were subsequently backfilled, typically with processed miscellaneous base.

Soil Conditions

As described in Appendix E, page 3 fill materials were encountered in the current and prior borings ranging in thickness from approximately one to 15 feet. The fill consists of engineered fill and artificial fill noting that for the purposes of the Appendix E report, engineered fill is fill that was placed under our observation, documentation, and testing; and artificial fill is fill that was not observed, documented nor tested during placement.

Engineered fill is present at the locations shown on Figure 2 of Appendix E and was encountered in boring B-18 and generally consists of dense to very dense sandy gravel noting that the fill materials are comprised of processed miscellaneous base (PMB) generated from demolition of the prior on-site structures.

Artificial fill generally consists of loose to medium dense sand, silty sand, and sand with silt with varying amounts of gravel. As described in Appendix E, page 3, the underlying native soils consist of alluvial deposits composed of loose to medium dense sand, silty sand to depths of approximately eight to ten feet bgs. The upper alluvial sand and silt were typically underlain by medium dense to dense sand, and silty sand, sand with silt, and clayey sand to depths of approximately 28 to 35 feet.

As described on page 3 of Appendix E, a fine-grained layer consisting primarily of stiff to hard clayey and silty soils was encountered in the borings and CPTs beneath the medium dense to dense sandy soils to depths of approximately 33 to 49 feet below ground surface (bgs).

As described on page 3 of Appendix E, primarily dense to very dense sand, gravelly sand, clayey sand, and silty sand with varying amounts of gravel were encountered below the fine-grained layer to the maximum depth explored of approximately 75 feet bgs.

Groundwater

As described on page 4 of Appendix E, groundwater was not encountered in the current or prior borings to a maximum drilled depth of approximately 66 feet bgs. Based on a review of the *Seismic Hazard Evaluation of the Los Angeles and South Gate 7.5-Minute Quadrangles, Los Angeles County, California, Seismic Hazard Zone Reports 029 & 34*, the historical high groundwater level (HHGWL) at the site is greater than approximately 60 feet bgs as shown on Figure 4 in Appendix E.

Seismicity and Seismic-Related Hazards

As described on page 5 of Appendix B, the site is located near the northwestern end of the Peninsular Ranges Geomorphic Province of Southern California. The Peninsular Ranges Geomorphic Province consists of a series of mountain ranges separated by

northwest trending valleys that are subparallel to faults that branch from the San Andreas Fault.

More specifically, the site is within the Central Block of the Los Angeles Basin, an extensive sediment-filled depression bound by the San Gabriel Mountains and Santa Monica Mountains to the north, and the Pacific Ocean on the west, the Palos Verdes Peninsula on the west, the Santa Ana Mountains on the southeast, and the Puente, San Jose, and Chino Hills on the northeast. The basin's structural history includes extension and strike-slip faulting, followed by oblique contraction via thrusting and strike-slip faulting (Yerkes et al, 1965).

Regional geologic maps of the area by Campbell et al. (2014) indicates the site is underlain by late Pleistocene-aged, alluvial fan deposits (map unit Qya2). This soil is described as 'Unconsolidated, generally friable, stream-deposited silt, sand and gravel on flood plains, locally including related alluvial fans and streambeds.'

The data from the current exploration borings are generally consistent with the geologic conditions summarized by Campbell et al. (2014).

Figure 5 of Appendix E represents a regional geologic map depicting the surficial geologic deposits at the site.

As described in Appendix E, the site is in an active seismic area that has historically been affected by generally moderate to occasionally high levels of ground motion. Therefore, the proposed development will probably experience moderate to potentially high levels of ground motion from nearby faults as well as ground motions from other area active seismic areas of the southern California region.

A search of the USGS ANSS Comprehensive Earthquake Catalog (ComCat) using a web-based Earthquake Archive Search and URL builder tool, confirmed that as of May 15, 2023, 40 earthquakes with magnitudes of 5.0 or greater have occurred within a 100-km radius of the site since 1800 as shown on Figure 6A and 6B of Appendix E.

A review of the *California Geological Survey (CGS) Earthquake Zones of Required Investigation map for the Los Angeles and South Gate Quadrangles, and the City of Vernon General Plan – Safety Element*. Based on the review, the site is not located within a State- or City-designated active fault zone.

Therefore, the potential for ground surface rupture is very low.

The site location relative to the mapped seismic hazard zones is presented on Figure 7 of Appendix E.

Liquefaction is a phenomenon in which saturated, cohesionless soils lose their inherent shear strength and stiffness due to build-up of excess pore water induced by cyclic loading, such as that caused by an earthquake. Liquefaction potential depends on several

factors, primarily the (a) relative density and type of soil, (b) the depth to the groundwater, (c) overburden pressures, and (d) the duration and intensity of seismic shaking (PGA). Loose, saturated granular materials (sands and low to non-plastic silts) are most susceptible to liquefaction. Cyclic softening is a phenomenon in which saturated silts and clays exhibit significant strains and strengths loss during cyclic loading.

Liquefaction generally occurs in saturated, loose to medium dense granular soil and soft to moderately firm non-plastic silts and clays because of strong ground shaking. As the density and/or particle size of the soil increases and as the confinement (overburden pressure) increases, the potential for liquefaction decreases.

The footprint of the GEP is not located within a State- or City-designated liquefaction hazard zone as shown on Figure 7 in Appendix E.

The historic high groundwater level for the site is sufficiently deep to preclude liquefaction potential during the design seismic event. Therefore, the potential for liquefaction at the site is very low.

Lateral spreading and ground lurching are seismically induced slope instability conditions that may occur where either liquefaction potential is present in conjunction with a nearby slope wherein a liquefiable layer daylight within an exposed slope face or cracks form on the slope surface during a seismic event due to relatively loose soil exposed on the slope.

The project site is generally flat, and the subsurface soils are not susceptible to liquefaction. Therefore, the potential for lateral spreading and ground lurching at the site is negligible.

Seismic (dry) settlement can occur in loose to medium dense, granular soil because of strong ground shaking. Loose and/or undocumented sand and silty sand were encountered in the upper approximately eight to 10 feet bgs at the site. The upper loose soils are subject to seismically induced settlement and the results of the preliminary analysis indicates approximately ½ inches may occur in these soils due to strong ground shaking at the site.

The site is not located in a zone of required investigation for Earthquake-Induced Landslides per CGS's Earthquake Zones of Required Investigation, Los Angeles, and South Gate Quadrangles, as shown on Figure 7 in Appendix E.

The site is relatively flat and there are no sloped boundary conditions. Thus, the potential for earthquake-induced landsliding is negligible at the site.

Hydro-collapse is a phenomenon that occurs when loose, predominately sandy soils are subjected to saturated conditions. The loose nature of these soils undergoes a decrease

in volume (i.e. densification) when the particle-to-particle contact is disturbed with the introduction of pore water, resulting in settlement that could manifested to the ground surface.

Based on data available from the current and prior laboratory testing, the upper loose granular soils are subject to hydro-collapse if saturated.

Based on information and maps available from the CGS, the site is not located within a Tsunami Inundation Area. Based on review of adjacent water bodies, the site is not subject to inundation from seiche. Based on Review of the City of Vernon General Plan, the site is located within inundation areas from the Sepulveda and Hansen Dams. Inundation scenarios from either of these dams are not available from the Dam Breach Inundation Map Web Publisher hosted by the California Division of Safety of Dams (DSOD).

Land Subsidence

Land subsidence may be induced from withdrawal of oil, gas, or water from wells. Based on a search of the CalGEM (formerly known as Division of Oil, Gas, and Geothermal Resources [DOGGR]) GIS Well Finder online tool, the site is not located within an Oil/Gas field; active and inactive oil or gas wells are not located onsite.

According to review of the available information from CalGEM, the likelihood of land subsidence caused by oil or gas withdrawal from oil wells is very low.

Expansive Soils

Expansive soils swell and shrink when the moisture content in the soil changes due to cyclic wet/dry weather cycles, installation of irrigation systems, change in landscape plantings, or changes in grading. Swelling and shrinking soils can result in differential movement of structures including floor slabs and foundations, and site work including hardscape, utilities, and sidewalks.

Based on the results of testing performed on samples collected from our current borings and prior borings in or within proximity to the site, the upper on-site soils have a very low potential for expansion.

Paleontological Resources

The information relies on Appendix E and the *DRAFT Paleontological Resources Technical Report for the 2020–2045 Regional Transportation Plan and Sustainable*

Communities Strategy for the Southern California Association of Governments, October 2019, prepared by SWCA Environmental Consultants.

The site is located near the northwestern end of the Peninsular Ranges Geomorphic Province of Southern California. The Peninsular Ranges Geomorphic Province consists of a series of mountain ranges separated by northwest trending valleys that are subparallel to faults that branch from the San Andreas Fault.

More specifically, the site is within the Central Block of the Los Angeles Basin, an extensive sediment-filled depression bound by the San Gabriel Mountains and Santa Monica Mountains to the north, and the Pacific Ocean on the west, the Palos Verdes Peninsula on the west, the Santa Ana Mountains on the southeast, and the Puente, San Jose, and Chino Hills on the northeast.

The Peninsular Ranges extend from the Mexican border in the south to the Transverse Ranges in the north and northeast and are bordered by the Pacific Ocean on the west and the Colorado Desert on the east.

The core of the Peninsular Ranges is made up of Mesozoic plutonic rocks and represents the roots of a magmatic arc formed by active subduction along the Pacific Plate boundary (Harden 2004). Two main batholiths (western and eastern) form the core of the Peninsular Ranges. The western batholith is 140 to 105 million years old (Ma) and consists of mafic plutonic rocks, while the eastern batholith is 99 to 92 Ma and is made of more silica-rich granodiorites and tonalities (Kimbrough et al. 2001). These plutonic rocks intruded into the older rocks of a Paleozoic through Jurassic carbonate platform and forearc basin, heavily metamorphosing them locally (Harden 2004). Above these plutonic rocks, around 130 to 120 Ma, the Santiago Peak Volcanics were deposited as primarily andesitic and silicic flows, and then metamorphosed by the batholith emplacement (Fife et al. 1967). Cretaceous sedimentary rocks deposited as turbidity currents overlie the plutons and volcanic rocks (Kimbrough et al. 2001). These rocks are in turn overlain by more recent sedimentary deposits leading up to the present day. These deposits were marine through the Eocene and then shifted to terrestrial volcanic and sedimentary strata by the Oligocene and lower Miocene (Powell 1993).

According to the University of California Museum of Paleontology, Berkeley, Los Angeles County has over 2,100 recorded paleontological sites. None of the recorded sites are identified as located in the City of Vernon; a number of the recorded sites do not have a specific location identifier¹. Notwithstanding any documented discoveries, it is not possible to conclude that the site has low potential for discovery of paleontological resources.

¹ <https://ucmpdb.berkeley.edu/loc.html>

The potential to disturb paleontological resources could occur during the construction activities requiring earth moving, such as grading, trenching, excavation for foundations, and installation of support structures, where native soil would be disturbed. The maximum depth of soil disturbance is estimated to be up to 10 feet for over-excavation within the building footprint and up to 50 feet for foundation auger cast pile installation.

It is therefore possible that undiscovered paleontological resources could be encountered during ground-disturbing activities. Damage to or destruction of a paleontological resource would be considered a potentially significant impact under local, state, or federal criteria.

4.7.3 Environmental Impact Discussion

For purposes of analyzing potential Geology and Soils- related impacts, it is not necessary or prudent to separate the potential impacts of the VBGF and the GEP. Therefore, the following analysis uses the term “Project” which encompasses both construction and operation of the VBGF, the GEP and all related ancillary facilities.

4.7.3.1 Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault; strong seismic ground shaking; seismic-related ground failure, including liquefaction; or landslides.?

As discussed in Section 4.7.2.2, there are no known active or potentially active faults crossing the project site. However, the site is in an active seismic area that has historically been affected by generally moderate to occasionally high levels of ground motion. Therefore, the proposed development will probably experience moderate to potentially high levels of ground motion from nearby faults as well as ground motions from other area active seismic areas of the southern California region.

Geologic conditions on the site would require the new building be designed and constructed in accordance with standard engineering techniques and current California Building Code requirements, to avoid or minimize potential damage from seismic shaking and liquefaction on the site.

The project site is not located in a mapped liquefaction hazard zone nor due to the lack of high groundwater is not subject to liquefaction. The site is not located within a landslide hazard zone. The project incorporates Project Design Measure **PDM GEO-1** outlined in Section 4.7.4 below. With the implementation of **PDM GEO-1** of this the project will not result in earthquake-related impacts. **(Less than Significant Impact)**

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

Ground disturbance at the site would be required for grading and construction of the on-site improvements. Ground disturbance would expose soils and increase the potential for wind or water related erosion and sedimentation at the site until construction is complete. Compliance with the erosion control measures, as required by the National Pollutant Discharge Elimination System (NPDES) is the primary means of enforcing erosion control measures through the grading and building permit process. Construction activities would be subject to the requirements of the regulatory programs and policies in place and, therefore, would have a less than significant soil erosion impact. **(Less than Significant Impact)**

4.7.3.3 Would the project be located on a geologic unit or soil that is unstable, or that will become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

The project site soils have a low potential for liquefaction. The site is not located within a landslide hazard zone. **(Less than Significant Impact)**

4.7.3.4 Would the project be located on expansive soil, as defined in the current California Building Code, creating substantial direct or indirect risks to life or property?

The project site is not located on expansive soil as defined in Section 1803.5.3 of the CBC. **(Less than Significant Impact)**

4.7.3.5 Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

The project site is located within an urban area of City of Vernon where sewers are available to dispose wastewater from the project site. Therefore, the project site would not need to support septic tanks or alternative wastewater disposal systems. **(No Impact)**

4.7.3.6 Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

As discussed above, the site has a potential for the discovery of paleontological resources. Damage to or destruction of a paleontological resource would be considered a potentially significant impact under local, state, or federal criteria. The GEP would require excavation of depths of up to 10 feet and up to 50 feet for foundation auger cast pile installation. Although unlikely, paleontological resources could be encountered during

construction. GIC Vernon has treated the site as if it will encounter fossils during excavation and therefore has incorporated **PDM GEO-2** to address the potential for discovery of paleontological resources during excavation in native materials. See Section 4.7.4.

With the implementation of **PDM GEO-2** any potential impacts from the excavation activities would be reduced to less than significant levels. (**Less than Significant Impact**).

4.7.4 Project Design Measures

No mitigation measures are necessary because the project applicant has incorporated the following Project Design Measures into the project.

PDM GEO-1: In order to ensure the project design conforms to the requirements of a final geotechnical engineering investigation and California and local building standards and codes, the following is proposed as mitigation incorporated into the project. Incorporation will ensure seismic hazards are reduced to less than significant levels.

To avoid or minimize potential damage from seismic shaking, the project would be built using standard engineering and seismic safety design techniques. Building redevelopment design and construction at the site shall be completed in conformance with the recommendations of a design-level geotechnical investigation, which will be included in a report to the City. The report shall be reviewed and approved by the City of Vernon's Building Division as part of the building permit review and issuance process. The building shall meet the requirements of applicable Building and Fire Codes, including the 2022 California Building Code, as adopted or updated by the City. The project shall be designed to withstand potential geologic hazards identified on the site and the project shall be designed to reduce the risk to life or property to the extent feasible and in compliance with the Building Code.

PDM GEO-2: Prior to the commencement of construction, the applicant shall secure the services of a qualified paleontological specialist. The specialist shall prepare a Worker Environmental Awareness Program (WEAP) to instruct site workers of the obligation to protect and preserve valuable paleontological resources for review by the City of Vernon. This program shall be provided to all construction workers via a recorded presentation and shall include a discussion of applicable laws and penalties; samples or visual aids of resources that could be encountered; instructions regarding the need to halt work in the vicinity of any potential paleontological resources encountered; and measures to notify their supervisor, the applicant, and the specialists.

The applicant shall secure the services of a qualified professional paleontologist, as defined by the Society of Vertebrate Paleontology, to be on-call prior to the

commencement of construction. The paleontologist shall be experienced in teaching non-specialists to recognize fossil materials and how to notify supervisors in the event of encountering a suspected fossil. If suspected fossils are encountered during construction, the construction workers shall halt construction within 50 feet of any potential fossil find and notify the paleontologist, who shall evaluate its significance.

If a fossil is encountered and determined to be significant and avoidance is not feasible, the paleontologist will develop and implement an excavation and salvage plan in accordance with Society of Vertebrate Paleontology standards. Construction work in the immediate area shall be halted or diverted to allow recovery of fossil remains in a timely manner. Fossil remains collected shall be cleaned, repaired, sorted, and cataloged, along with copies of all pertinent field notes, photos, and maps.

The paleontologist shall prepare a paleontological resource monitoring report that outlines the results of the monitoring program and any encountered fossils. The report shall be submitted to the City of Vernon for review and approval. The report and any fossil remains collected shall be submitted to a scientific institution with paleontological collections.

4.7.5 Governmental Agencies

The only governmental agency that would be affected by the project is the City of Vernon as it is the agency with authority to implement the building codes during its project review and monitoring of construction.