5.6 GEOLOGY AND SOILS

The two components of the proposed Project analyzed herein are:

1) Adoption and implementation of the General Plan Update (Beaumont 2040 Plan);and
2) Adoption and implementation of the revised Zoning Ordinance and Zoning Map.

Of the two Project components, the revised Zoning Ordinance is not considered to have impacts related to geology and soils because it addresses site planning, building design, and community aesthetics, rather than physical changes to the land and was prepared for compatibility with the proposed Beaumont 2040 Plan. This Project component will not be analyzed further in this section.

Impacts related to the adoption and implementation of the Beaumont 2040 Plan and adoption will be addressed herein. The revised Zoning Map will reflect the land uses proposed in the Beaumont 2040 Plan for consistency purposes; therefore, all discussions which apply to the Beaumont 2040 Plan shall also apply to the proposed revisions to the Zoning Ordinance and Map.

Since an initial study was not prepared with the issuance of the Notice of Preparation (Appendix A), the focus of the following discussion is related to potential direct or indirect impacts due to seismic activity and seismic hazards; soil erosion; unstable and unsuitable soils; and unique paleontological resources or sites or unique geological features.

5.6.1 Setting

The following discussion describes the geologic units, soil characteristics, and paleontological sensitivity of the City and City's Sphere of Influence (SOI) (collectively referred to as the "Planning Area") to provide a context for understanding the nature and significance of geologic resources identified within the Planning Area.

Geologic Setting

The City is within the San Gorgonio Pass region of Southern California, south of the San Bernardino Mountains, within the San Jacinto Mountains of the Peninsular Ranges geomorphic province of California. The region surrounding the City is a geologically complex area, in part due to movement along faults such as the San Andreas Fault, Banning Fault, and San Gorgonio Fault. Annual precipitation in the area ranges from 18 to 20 inches. The City encompasses a portion of the South Coast Bioregion that is sparsely vegetated with scrub brush and grasses and populated by a variety of reptiles, small mammals, birds, and insects. (Æ(a), p. 6.)

The Peninsular Ranges extend from the Los Angeles Basin to the tip of Baja California and are bounded by the Elsinore Fault Zone and the Colorado Desert on the east and the Pacific Coast on the west. The geology in the northern reaches of the range, including the San Jacinto Mountains, consists of Paleozoic gneiss, schist, and other older metamorphic rocks; Mesozoic granitic rocks of the Southern California batholith; and Cenozoic marine and terrestrial deposits. The highest point in the range is San Jacinto Peak at approximately 10,805 feet above mean sea level (Æ(a), p. 6.)

An elevated alluvial plain, known as the Beaumont Plain (or “Beaumont Bench”), extends through the City, as shown on **Figure 5.6-1 – Geologic Features.** This elevated plateau has been incised by recent erosion along local drainage courses, the most prominent of which includes Little San Gorgonio Creek/Noble Creek and San Timoteo Creek (see **Figure 5.6-2 – Drainage Courses**).

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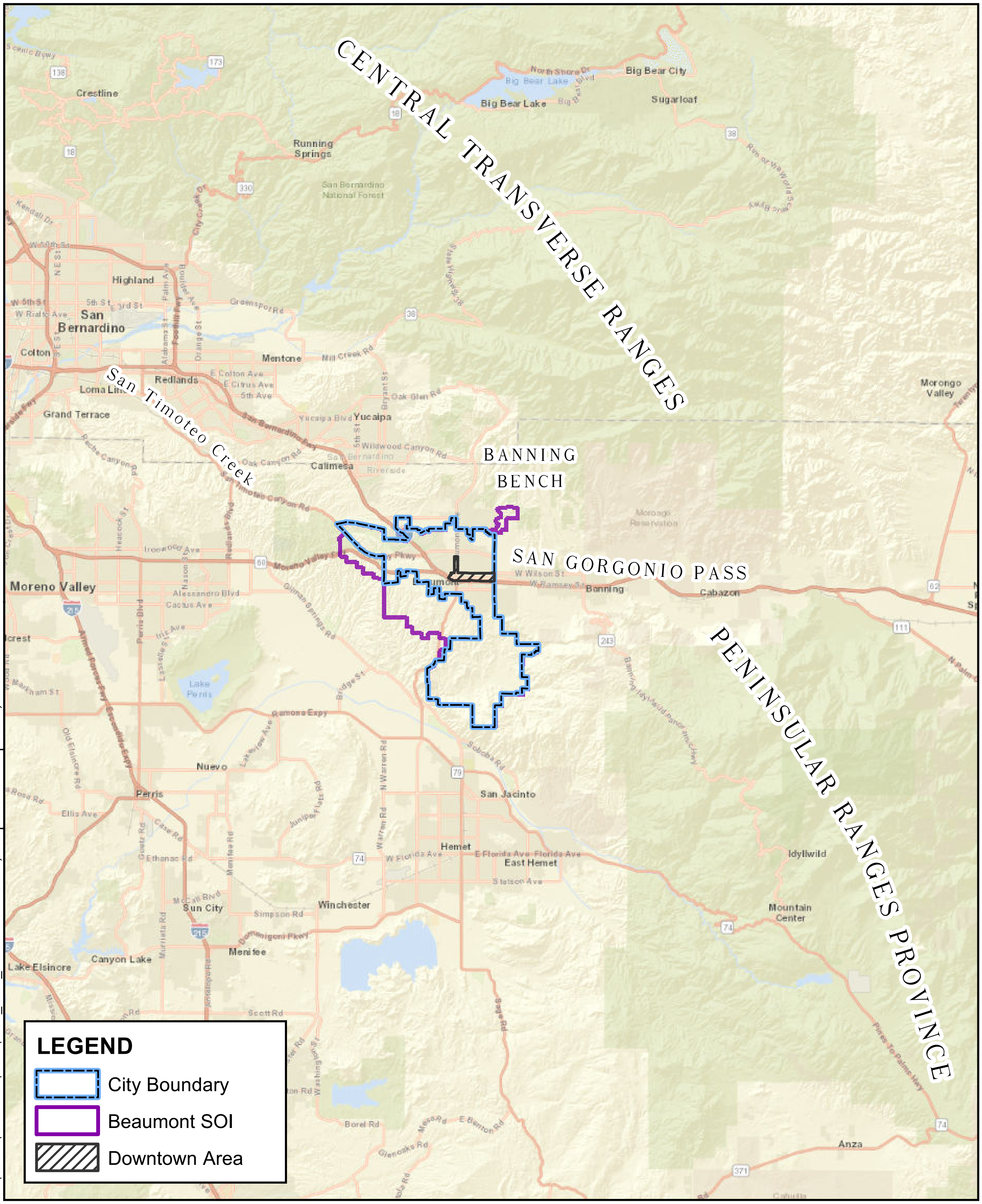

G:\2017\17-0033\GIS\EIR_Geo_Features2.mxd; Map revised April 20, 2020.

Sources: Raimi + Associates, 2019; USGS/ESRI.

0 5 10 Miles

Figure 5.6-1 Geologic Features

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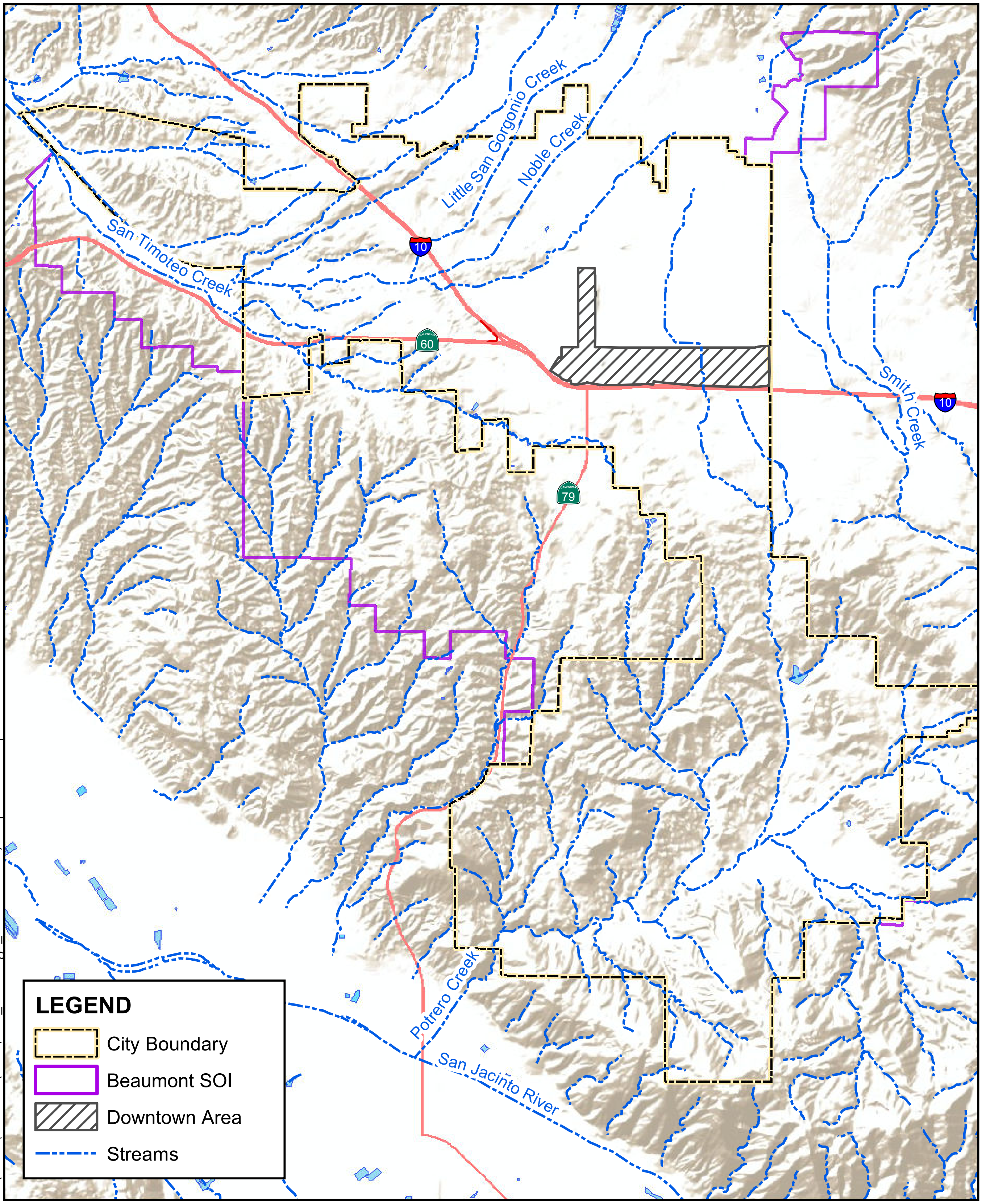

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Sources: NHD, 2016; Raimi + Associates, 2019; Riverside Co. GIS, 2020.

0 0.5 1 1.5 2 Miles

Figure 5.6-2 Drainage Courses

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Soil Resources and Characteristics

Soil Types

According to the*, Western Riverside Area Soil Survey,* published by the USDA Natural Resources Conservation Service (NRCS), the Planning Area contains approximately 29 different types of soil series classifications, as shown in **Figure 5.6-3 – Soil Series** (on the page following **Table 5.6-A**)**.**

For each group of soils, the USDA provides descriptions of the typical properties, location, and uses that can generally be expected for that group of soils, assuming optimal conditions. The typical "Use and Vegetation" that is provided for each soil series by the USDA is summarized briefly in **Table 5.6-A – Soil Series in the Beaumont Planning Area**. The descriptions suggest that some of these soils, with the addition of irrigation, are known to be used for agricultural purposes; however, others are better suited for non-cultivation purposes.

Table 5.6-A – Soil Series in the Beaumont Planning Area

Soil Series	Typical Uses and Vegetation	Acres
Altamont	Used for livestock grazing and dry farmed grains, mainly barley. The principal vegetation is annual grasses, forbs, and scattered oak trees.	28
Badland	This land is variable from erosion and consists of soft sandstone, arkose, siltstone, and beds of gravel. Vegetation consists mainly of forbs and brush in extremely sparse stands. Where this land is near areas of cropland, it provides a habitat for small game.	4,624
Chino	Commonly used for grazing. Drained areas are used for growing irrigated truck and row crops. Vegetation is annual grass, weeds, and shrubs.	146
Cieneba	Used for wildlife, recreation, watershed, and incidental grazing. Vegetation is mainly chaparral and chemise with widely spread foothill pine or oak tree. There are small area of thin annual grasses and weeds.	1,683
Crafton	The Crafton soils are used principally for range and wildlife habitat. Principal natural vegetation is chaparral shrubs, including chemise, scrub oak, lilac, and live oak. Pinyon pine occurs at higher elevations.	2
Escondido	Used for range, irrigated orchards and non-irrigated grain, grain hay and pasture. The native vegetation is oak-savanna and broadleaf chaparral.	8
Fallbrook	Extensive areas are used for grazing, but there is important production of irrigated avocados, citrus, truck crops and non-irrigated small grain and hay. Uncultivated areas are mainly annual grasses and forbs with considerable chaparral, chemise, flattop buckwheat and other shrubs.	92
Friant	These soils are used principally for grazing, wildlife, and watershed. Native vegetation is buckwheat, chaparral, and naturalized grasses and forbs.	1,534
Gorgonio	They are used mostly for range. Some areas are cultivated for growing grain and hay. Principal native plants are annual grasses and forbs with a few scattered oak trees.	446

Table 5.6-A – Soil Series in the Beaumont Planning Area

Soil Series	Typical Uses and Vegetation	Acres
Grangeville	Used intensively for growing alfalfa, grapes, cotton, truck crops and irrigated pasture. Some areas are being urbanized. Vegetation in uncultivated areas is annual grasses and forbs with native (sodic) alkali-tolerant plants and a few scattered oak and cottonwood trees.	119
Gravel Pits	Not applicable.	6
Greenfield	Used for the production of a wide variety of irrigated field, forage and fruit crops and also for growing dryland grain and pasture. Vegetation on uncultivated areas consists of annual grass, forbs, some shrubs and scattered oak trees.	978
Hanford	Hanford soils are used for growing a wide range of fruits, vegetables, and general farm crops. They are also used for urban development and dairies. Vegetation in uncultivated areas is mainly annual grasses and associated herbaceous plants.	1,907
Metz	Much of the soil is irrigated and used for growing pasture, hay, truck crops, field crops and fruit. Some areas are grazed and in willows, annual grasses and forbs.	67
Monserate	Used principally for growing grain, grain hay or pasture, some citrus, and field and truck crops when irrigation water is available. Naturalized vegetation is mainly annual grasses and forbs, widely spaced native canyon oak, and shrubs on eroded slopes.	96
Oak Glen	These soils are used for growing pasture or deciduous orchards and forested areas are used for recreation. Principal native plants are shrubs, mixed hardwoods, and pine trees. Naturalized plants are annual grasses and forbs.	3
Pachappa	Mostly under irrigation for alfalfa, small grains and row crops as well as dry farm small grains. Yields are normally good. Annual grasses, herbs and shrubs.	< 1
Placentia	Used for the production of citrus, truck crops, small grain, hay, and forage. Most uncultivated areas have annual grasses and forbs.	349
Ramona	Used mostly for production of grain, grain-hay, pasture, irrigated citrus, olives, truck crops, and deciduous fruits. Uncultivated areas have a cover of annual grasses, forbs, chamise or chaparral.	5,889
Riverwash	Sandy, gravelly, or cobbly areas that lie in the beds of major streams and larger creeks. This type has no value for farming and little value for grazing. Vegetation is annual grasses, forbs, shrubs, low willows, and a few cottonwood trees. Where the land is near tilled fields, it provides habitat for small game.	327

Table 5.6-A – Soil Series in the Beaumont Planning Area

Soil Series	Typical Uses and Vegetation	Acres
Rockland	Most areas are forested. The major species are sugar maple, white pine, green ash, quaking aspen, eastern hemlock, yellow birch, white birch, ironwood, northern white cedar and balsam fir.	176
Rough broken land	Remnants of old alluvial fans and terraces that have been dissected by drainages. Vegetation consists mainly of annual grasses and forbs. Where this land is near areas of tilled fields, it provides habitat for small game.	11
San Emigdio	Used for growing citrus fruit, alfalfa, truck crops, dryland grain, and some areas are in homesites. Uncultivated areas are annual grasses and forbs.	1,614
San Timoteo	The soils are used mostly for grazing or watershed except for small cultivated areas. Vegetation is mostly California sagebrush, flattop buckwheat, yucca, sugarbush and annual grasses.	2,649
Soboba	The soils are used mostly for pasture. The native vegetation is annual grasses and forbs and chaparral shrubs.	10
Terrace escarpments	This land is unaltered alluvial outwash with varying soil profiles. Vegetation is annual grasses, salvia, flat-top buckwheat, and chemise. This land is generally idle where it is included in tilled fields, but if the fields are pastured, some forage is provided. Where this land is near areas of cropland, it furnishes a habitat for small game.	3,114
Tujunga	This soil is used for grazing, citrus, grapes, other fruits, and urban residential or commercial development. Uncultivated areas have a cover of shrubs, annual grasses and forbs. In urban areas ornamentals and turf-grass are common.	364
Visalia	Description not provided.	10
Vista	Under irrigation avocados and citrus are grown in areas of favorable temperature. A few small areas are used for growing winter truck crops. On areas of moderate relief, grain and hay are grown without irrigation. Range is a common use in areas that are not cultivated. The natural vegetation is annual grasses and forbs and such shrubs as California sagebrush, scrub oak, lilac, chamise, sumac, and flattop buckwheat.	119

Source: USDA NRCS, https://soilseries.sc.egov.usda.gov/osdname.aspx

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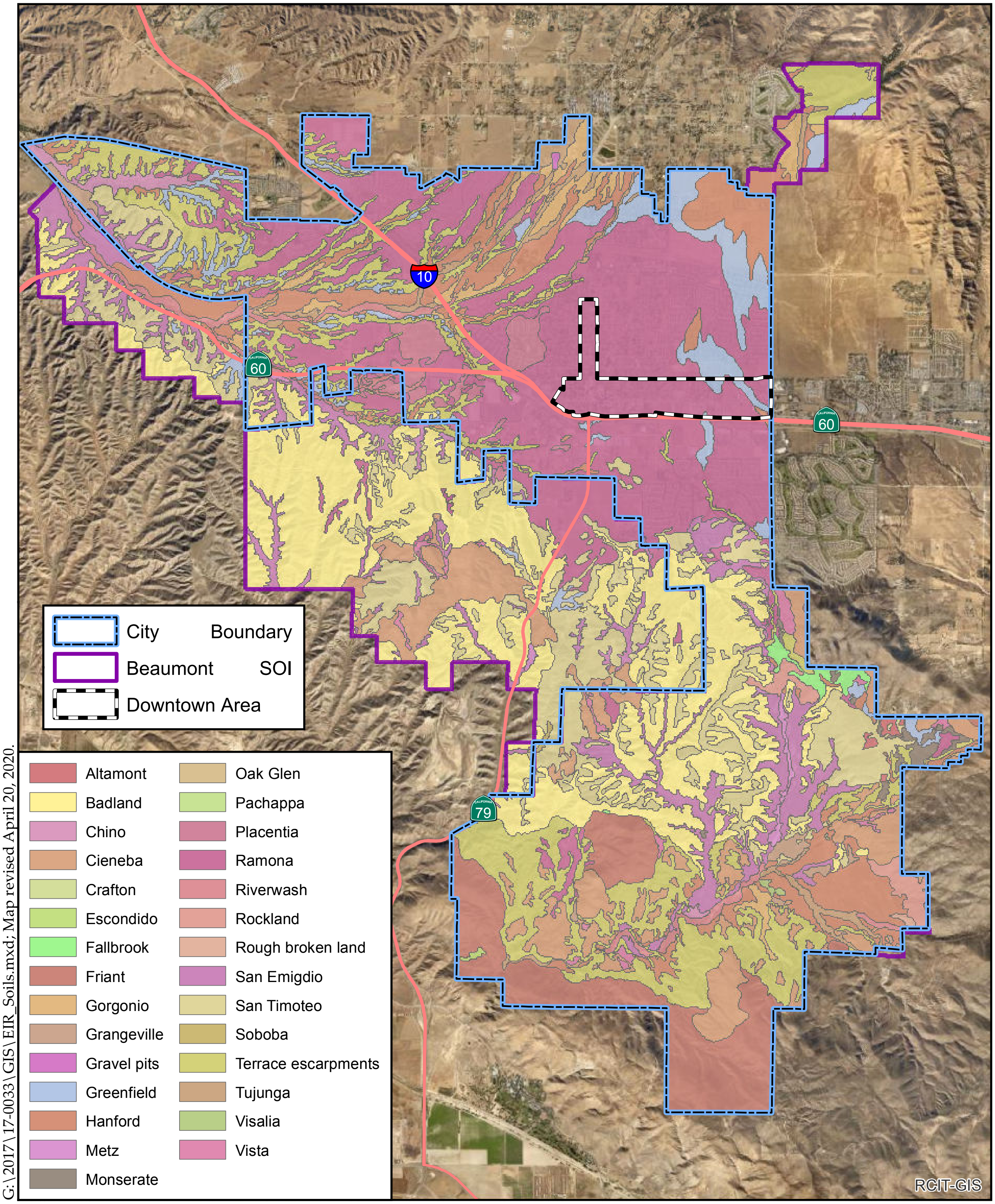

Sources: USDA NRCS SSURGO, 2013; Raimi+ Assoc., 2019; RCIT, 2016 (imagery)

0 1 2 3 Miles

Figure 5.6-3 Soil Series

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As discussed further in Section 5.8, Hazards and Hazardous Materials of the PEIR, high winds are known to occur in the Planning Area due to the topography of the San Gorgonio Pass and the direction of prevailing winds in certain times of the year. Soil erosion resulting from high winds is known to occur, and can become acute when soils are exposed during construction or agricultural tilling activities. (ECR, p. 107.) The primary factors that influence erosion include soil characteristics (i.e., particle size and gradation, organic matter content, soil structure, and soil permeability), vegetative cover, topography and climate. Mature trees and windbreaks act to reduce the adverse impacts of wind. (Beaumont 2040 Plan, p. 9-17.)

Soils with a high proportion of silt and very fine clays are generally the most erodible. The less permeable the soil, the higher the likelihood for erosion. Vegetation shields the soil from the impact of falling rain or blowing wind, while also slowing the speed of runoff and maintaining the soil's capacity to absorb water and holds soil particles in place.

Soils and On-Site Septic Systems

Soil characteristics also factor into the use of septic tanks for on-site wastewater disposal. Currently, there are an estimated 161 parcels with individual septic systems in use within the City limits. Soil characteristics and distance to groundwater or nearby streams will impact the success of an on-site septic system. The success of an on-site septic system is also dependent on adequate flow out of the tank and the permeability of the surrounding soil. Some subsurface geologic conditions are incapable of supporting on-site septic tank systems.

New development in the City is required to connect to the City's sanitary sewer system (BMC 16.40.050(D); however, the BMC allows for certain types of subdivisions (Schedule B, C, and D Subdivisions) (BMC 16.40.060(D) and 16.40.070(D)) the opportunity to prove soil conditions are appropriate for on-site septic tanks if the site cannot connect to the City's sewer system. The City requires soil percolation tests or other pertinent information to determine whether on-site sewage disposal is feasible. If the soil conditions are proven to be poor as determined by soil percolation tests in conformity with the standards of the "Ludwig Modification" and finding that the conditions and requirements of the health department and the Regional Water Quality Control Board cannot be met, a "package treatment plant and collector system" shall be required. (BMC.)

Faulting and Seismicity

The Planning Area is within a seismically-active region located at the junction of the Transverse Ranges and the Peninsular Ranges. These two physiographic provinces experience continual seismic activity associated with the lateral movement of the North American and Pacific tectonic plates. The San Andreas Fault system, located northeasterly of the Planning Area, is believed to form the boundary between these two plates, although some of the seismic motion is distributed to nearby, related faults. The 2015 Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) is the latest official earthquake rupture forecast for the state of California,[1] and is cited below for estimates of the likelihood and severity of potentially damaging earthquake ruptures. Faults that could affect the Planning Area in the future are identified on **Figure 5.6-4 – Faults and Fault Zones**, and include the following:

[1] UCERF3 was prepared by the Working Group on California Earthquake Probabilities (WGCEP), a collaboration between the U.S. Geological Survey (USGS), the California Geological Survey (CGS), and the Southern California Earthquake Center (SCEC).

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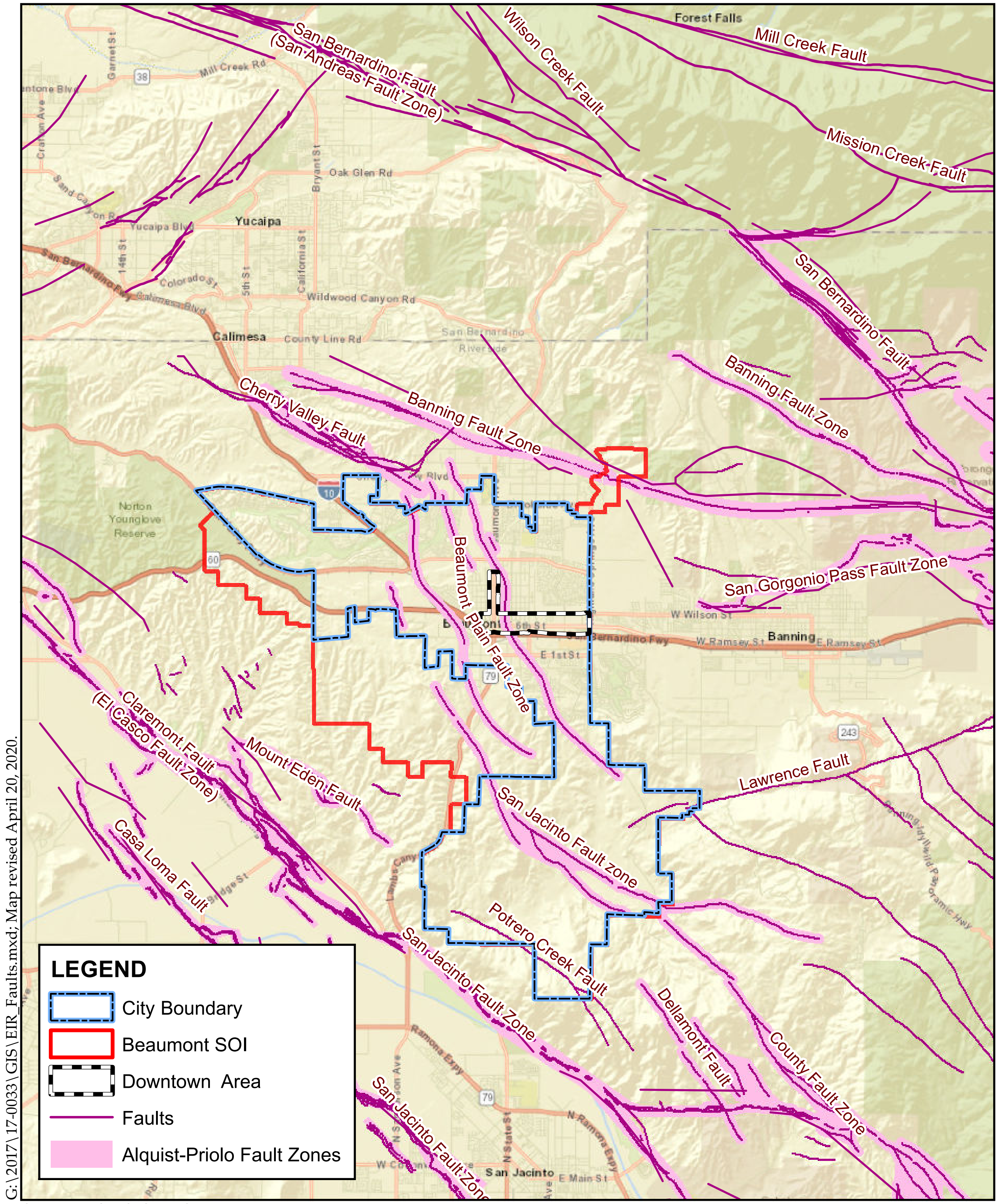

Sources: Calif. Geo. Survey, 2017; Riverside Co. GIS 2020 (from RCIP, 2003); San Bernardino Co. GIS, 2015; USGS, 2007.

Figure 5.6-4 Faults and Fault Zones

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0 2 4 6 Miles

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- **The San Jacinto Fault Zone –** This fault zone consists of many individual fault segments, and is considered to be one of the most active fault zones in southern California. It is a northwesterly to southeasterly trending fault zone located south of the Planning Area. The UCERF3 estimates a 9 percent average probability of a magnitude 6.7 or greater earthquake along the San Jacinto Fault within 30 years, with a maximum probability of 35 percent ([based on an aggregate of probabilities for eight segments of the fault], p. 525).

- **The San Andreas Fault Zone –** The section of this large fault zone that is located in the San Gorgonio Pass area is not readily evident on the ground surface. The San Bernardino strand of the San Andreas Fault can be traced confidently through the Oak Glen area, approximately six miles to the northeast of the City. The UCERF3 estimates a 53 percent average probability of a magnitude 6.7 or greater earthquake along the San Andreas Fault Zone (south) within 30 years, with a maximum probability of 93 percent ([based on an aggregate of probabilities for 11 fault sections], p. 525).

- **The Banning Fault** – This fault extends east from the Beaumont area for at least 25 miles and passes near the communities of Calimesa, Cherry Valley, Banning, Cabazon and Whitewater. The Banning Fault traverses the southeast City SOI area. The fault consists of western, central, and eastern segments, each of which is unique and records a distinctive tectonic history (USGS, p.15). The Southern California Earthquake Data Center (SCEDC) estimates that the Banning Fault's most recent rupture took place sometime during the past 10,000 years. The Banning Fault may interact with or may be considered part of the San Andreas Fault Zone and the San Gorgonio Pass Fault Zone.

- **San Gorgonio Pass Fault Zone –** This fault zone consists of a series of Quarternary reverse, thrust, and wrench faults that extend from the Whitewater area westward to the Calimesa Area. This system is associated spatially with the Banning fault, but the two evolved separately (SCAMP). The faults of the San Gorgonio Pass Fault Zone have produced many tectonic landforms, of which the Banning Bench is a classic example (USGS, p.15).

- **The Cherry Valley Fault** – This fault extends from Cherry Valley to Calimesa and is suggested to be a strand of the San Gorgonio Pass Fault Zone. The fault forms a discontinuous west-northwest-trending scarps and lineaments. In the Cherry Valley area, the fault is largely concealed beneath alluvium deposited by Noble and Little San Gorgonio Creeks (USGS, p.16).

- **The Beaumont Plain Fault Zone –** This fault zone consists of a series of northwest-trending fault scarps that traverse alluvial deposits through the north-central and central portion of the City limits as well as the central portion of the City's SOI. According to the *Fault Activity Map of California* published by the Department of Conservation (DOC), a majority of the faults within the Beaumont Plain Fault Zone have Late Quaternary fault displacement (movement during past 700,000 years), with some identified as Holocene fault displacement (movement during the past 11,700 years).

The effects of an earthquake may take many forms depending on a number of factors including distance from the epicenter, the characteristics of the underlying soils, the presence of groundwater, and topography. The primary effects of an earthquake include the following:

- **Surface Rupture** – Surface rupture refers to the actual "tearing apart" of the ground surface along a fault trace resulting from an earthquake. The effects of surface rupture may be mitigated by placing structures a specified distance from the known fault trace. The State of California has adopted regulations prohibiting the placement of structures over or in close proximity to known fault traces through the implementation of the Alquist-Priolo Fault Zoning Act (discussed below in State Regulations).

- **Ground Shaking** – The energy created from earthquakes moves out from the epicenter in waves that affect various rock and soil types differently. In some instances, ground shaking may cause unconsolidated soils to settle, which can result in significant damage to structures.

- **Liquefaction –** This effect results when seismically-induced ground-shaking causes water-laden, cohesionless soils to form a quicksand-like soil condition below the ground surface. Structural damage may ensue as building foundations lose ground support. Liquefaction may occur in areas where groundwater exists within 50 feet of the ground surface, and where poorly consolidated, cohesionless soils predominate.

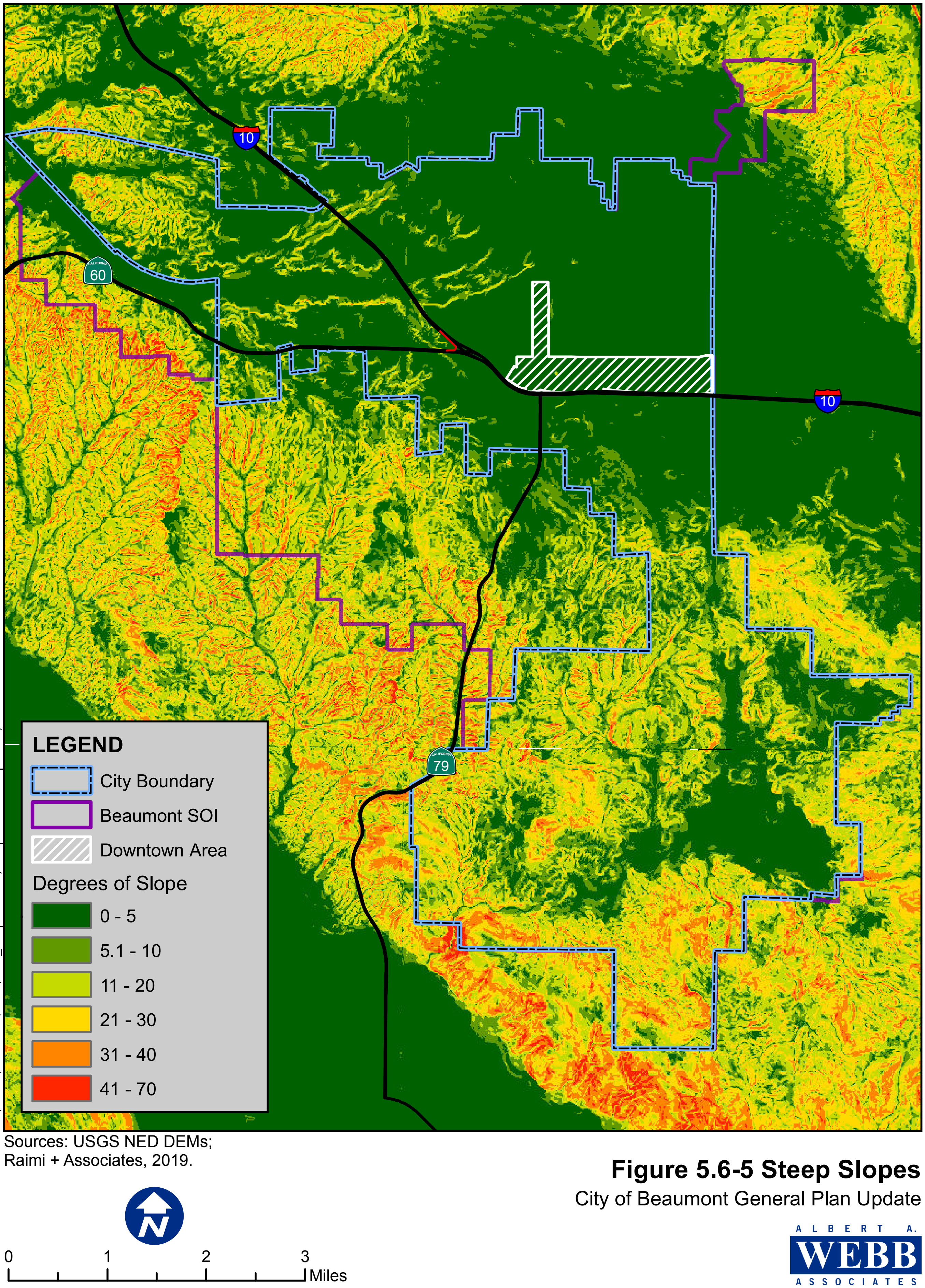
- **Landslides and Rock Falls –** Hillsides, generally speaking, can be unstable platforms for development. Unless a landslide is already occurring, a steep slope can generally be thought of as existing in a state of equilibrium. When this equilibrium is disturbed by development in hillside areas, the likelihood of slope failure, soil erosion, silting of lower slopes and downstream flooding increases. Those areas at greatest risk in the City include the steep slopes typically found within the "Badlands" area.

  Seismically induced landslides and rockfalls would be expected within the Planning Area in the event of a major earthquake. Factors contributing to the stability of slopes include slope height and steepness, engineering characteristics of the earth materials comprising the slope and intensity of ground shaking. It is estimated that a ground acceleration of at least 0.10 g in steep terrain is necessary to induce earthquake-related rockfall, although exceeding this value does not guarantee that rockfall will occur. Areas of steep slopes within the Planning Area are shown on **Figure 5.6-5 – Steep Slopes**.[2]

- **Tsunami** – A tsunami is created from offshore, underwater earthquakes that generate large and, often destructive wave fronts. The City's location away from the coastal areas precludes the effects of a tsunami from impacting the City.

- **Seiche –** A seiche can be the most clearly illustrated by imagining the "sloshing of water" in a large tub. The effects of ground motion often result in rhythmical, side-to-side movements of surface water bodies (lakes, streams, etc.), causing fluctuations of the water level. No major water bodies are located within or adjacent to the Planning Area.

[2] Steepness herein is provided in units of degrees. To convert to percent, follow this formula: Percentage = [tan (degrees)] x 100. For example, 5 degrees converts to 8.8 percent.



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Sources: USGS NED DEMs;
Raimi + Associates, 2019.

Figure 5.6-5 Steep Slopes

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Liquefaction and Lateral Spread

Liquefaction is a phenomenon in which loose, water saturated, granular soils temporarily behave similarly to a fluid when subjected to high intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater, 2) low-density silty or fine sandy soils, and 3) high intensity ground motion. The Planning Area has areas of very low, low and moderate liquefaction susceptibility as shown on **Figure 5.6-6 – Liquefaction Potential.** (Beaumont 2040 Plan, p. 9-11.)

Lateral spreading (or flow) is a landslide with fluid-like consistency that is caused by earthquake-induced liquefaction of saturated soil. For lateral spread to occur, three factors need to be present: adequate rainfall to saturate the soil, soils that are susceptible to liquefaction, and an earthquake to cause the liquefaction. Lateral spread can occur on mild to steep slopes.

Ground Subsidence

Ground subsidence refers to the sudden shrinking or gradual downward settling and compaction of the soil and other surface material with little or no horizontal movement. It may be caused by a variety of human and natural activities including groundwater withdrawal and ground shaking due to earthquakes. The Planning Area has been documented as having some areas susceptible to subsidence, as shown on **Figure 5.6-7 – Subsidence Potential**. (Beaumont 2040 Plan, p. 9-11.)

Expansive Soils

Expansive soils are widely dispersed as they can occur in both hillside areas as well as low-lying alluvial basins. Expansive soils typically have a significant amount of clay particles that can give up water (shrink) or take on water (swell), which can cause instability for overlying structures. Fine-grained soils, such as silts and clays, may contain variable amounts of expansive clay minerals. The change in soil volume exerts stress on buildings and other loads placed on these soils. This shrink/swell movement can adversely affect building Foundations, often causing them to crack or shift, with resulting damage to the buildings they support. However, expansive soils are not the only cause of structural distress in existing structures. Poor compaction and construction practices, settlement and landslides can cause similar damage, but require different remediation efforts. Once expansion has been verified as the source of the problem, mitigation can be achieved through reinforcement of the existing foundation or through the excavation and removal of the expansive soils in the affected area. The method for testing expansive soil, or “Soil Expansion Potential” is explained in Table 18-1-B of the 1994 Uniform Building Code (UBC). Table 18-1-B has been superseded by Chapter 18A of the California Building Code (CBC) which states, “…in areas likely to have expansive soils, the building official shall require soil tests to determine where such soils do exist.” (CBC 2016, Section 1803A.5.3; Beaumont 2040 Plan, p. 9-11.)

Paleontological Setting

The Planning Area is underlain by geological units (formations) exposed within the narrow, faulted plain of the San Gorgonio Pass, the San Timoteo Badlands, and the rocky highlands of the San Jacinto Mountains. Geologic units include Mesozoic and older granitic and metamorphic bedrock that have a very low paleontological resource potential due to the heat and pressure of their formation; paleontologically-sensitive deposits of the Mount Eden Formation, San Timoteo Formation, and Pleistocene alluvium; and, recent surficial alluvial fan and valley deposits, that have low paleontological sensitivity. Refer to **Figure 5.6-8 – Geologic Units**. (Æ(b), p. 3.)

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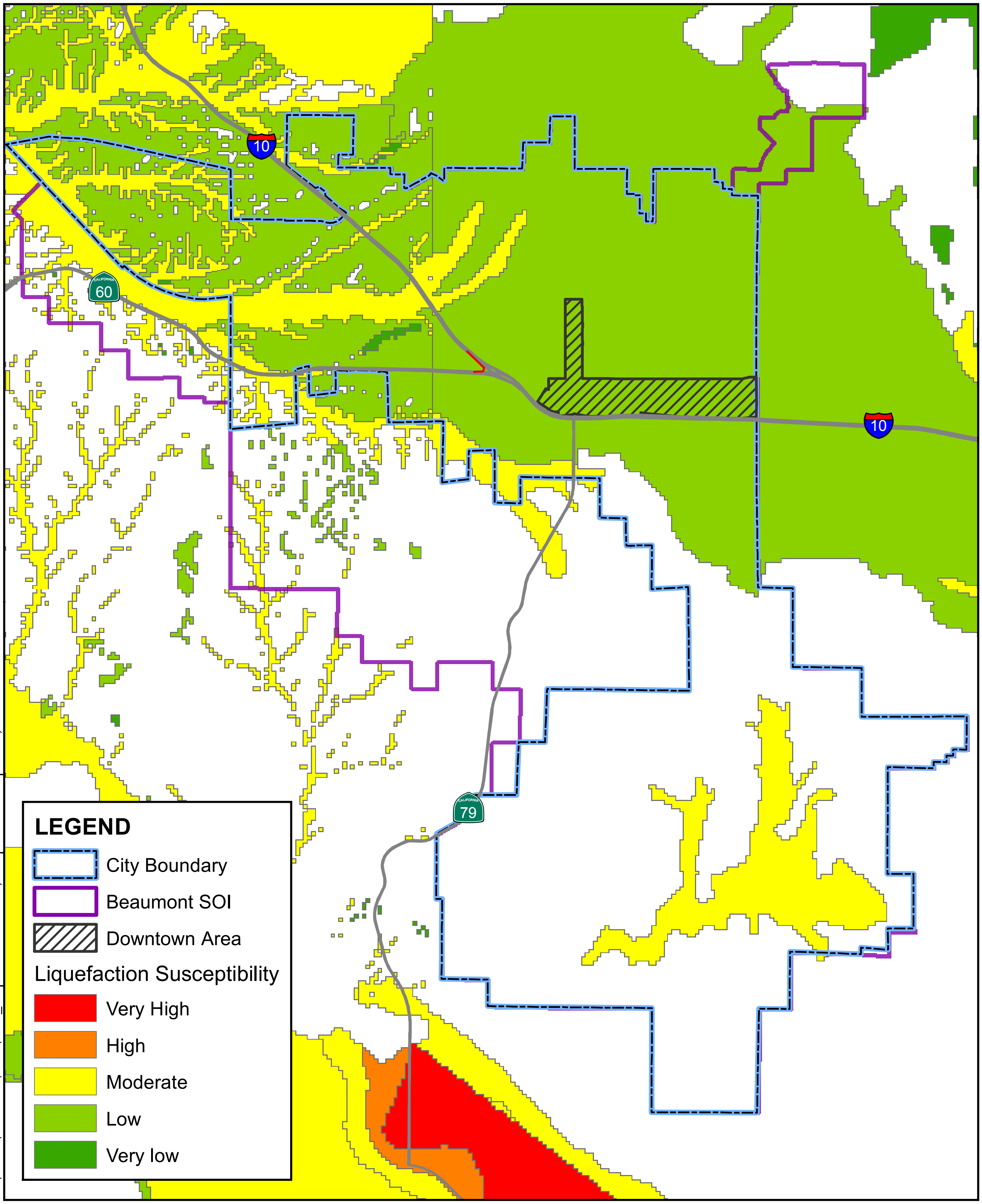

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Sources: Riverside Co. GIS 2020 (from RCIP, 2003); Raimi + Associates, 2020.

Figure 5.6-6 Liquefaction Potential

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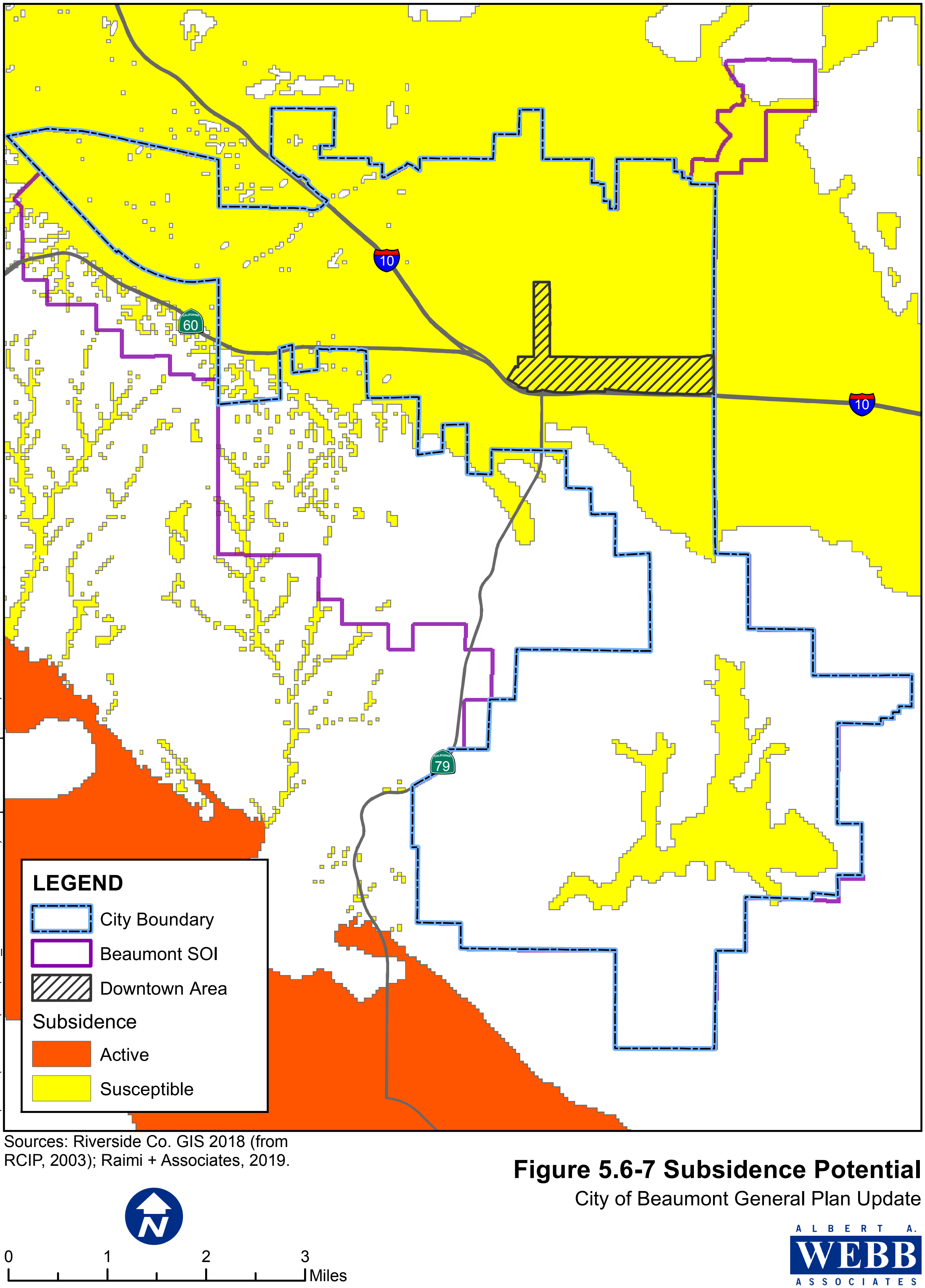

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Sources: Riverside Co. GIS 2018 (from RCIP, 2003); Raimi + Associates, 2019.

Figure 5.6-7 Subsidence Potential

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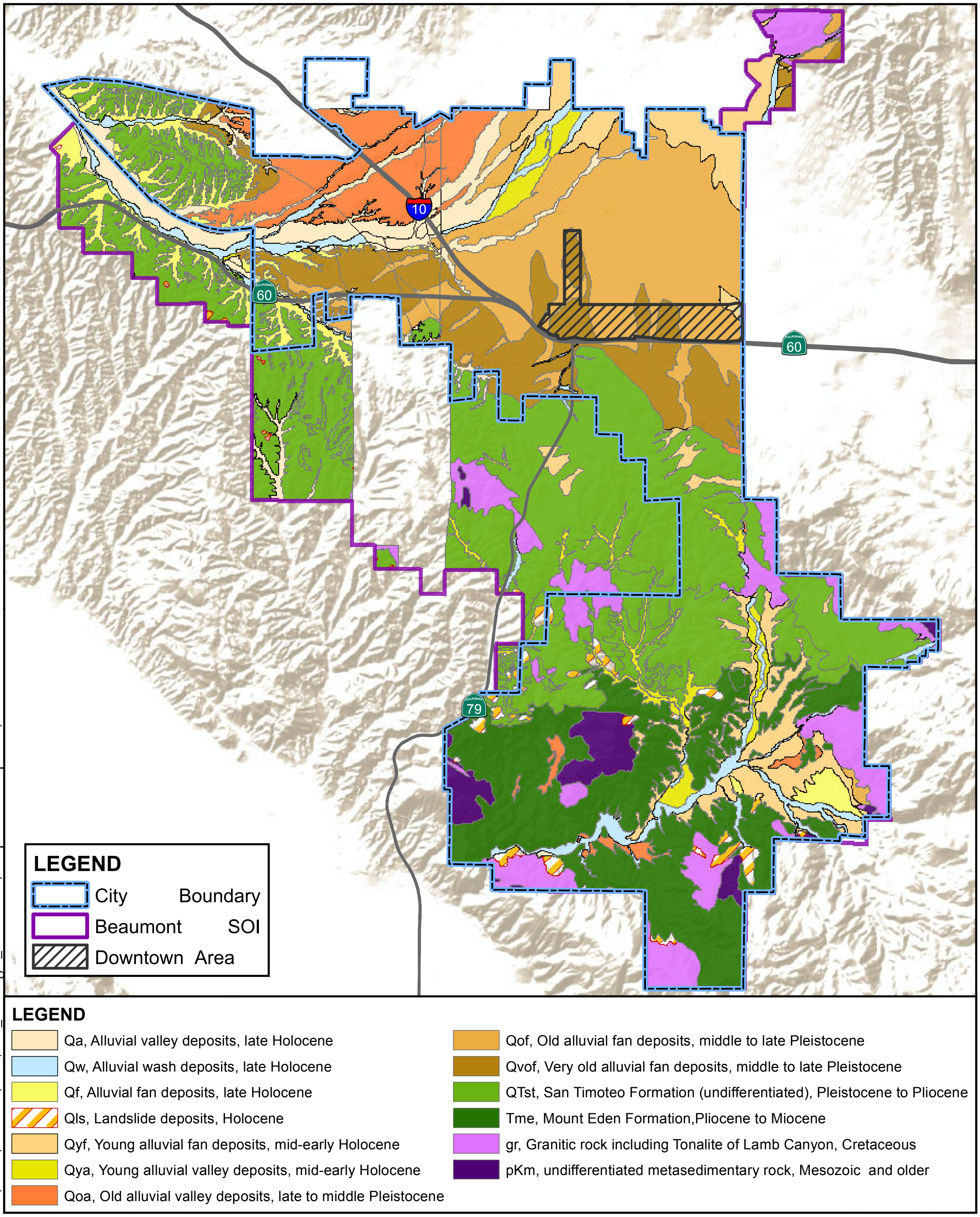

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Sources: Applied Earthworks, 2018;;Raimi + Associates, 2019; Riverside Co. GIS 2020.

Figure 5.6-8 Geologic Units

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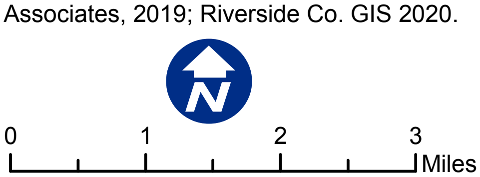

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San Timoteo and Mount Eden Formations

The paleontologically-sensitive San Timoteo Formation (QTst) and Mount Eden Formation (Tme) are exposed within the San Timoteo Badlands in the eastern and southern portions of the Planning Area. Refer to **Figure 5.6-9 – Paleontological Sensitivity**. The late Miocene to Pliocene Mount Eden Formation is composed of a reddish brown, massive to indistinctly bedded pebbly sandstone and basal conglomerate with decomposed clasts locally derived from Peninsular Ranges basement rocks; thick and indistinctly bedded, moderately to well-indurated, pale tan to reddish brown or gray coarse-grained arkose; local interbeds of fine-grained sandstone and siltstone, including grayish calcareous siltstone; and rare shale laminae. Below the Mount Eden Formation, the Pliocene to middle Pleistocene San Timoteo Formation is composed of a basal dark gray-green, fissile mudrock; well bedded, fine-to coarse-grained, moderately to poorly indurated and sorted, tan-brown to gray-yellow lithic arkose; and subordinate pebble and cobble conglomerate deposits composed of subangular to subrounded lithics. The San Timoteo Formation and Mount Eden Formations together are up to 6,000 feet thick in the San Timoteo badlands and is exposed for approximately 20 miles along the San Jacinto fault. (Æ(b), pp. 3-4.)

The Mount Eden and San Timoteo Formations have yielded an abundant and diverse fauna that includes at least 30 mammalian and reptilian species and hundreds of fossil specimens. Three local faunas have been described from within these deposits, including the Mount Eden Local Fauna [LF] (late Hemphillian North American Land Mammal Age [NALMA]), El Casco LF (Late Blancan/Irvingtonian NALMA) and Shutt Ranch LF (Irvingtonian NALMA), which consists of approximately 15 taxa including, cottontail rabbit, pack rat, kangaroo rat, deer mouse, pocket mouse, vole, lemming, dog, rhinoceros, numerous artiodactyls, lizards, and snake, and the latter which includes rodent taxa. The fossils recovered from within the Mount Eden and San Timoteo Formations are important because they not only provide a more complete fossil record for a tectonically active California during the Late Cenozoic, they constrain dates and assist with magnetostratigraphy, paleogeography, paleoclimate reconstructions, and timing of pre-historic faunal specimens from more than 20 mammal species have been recovered from numerous localities within these deposits in the San Timoteo badlands, including taxa of horse, rabbit, rodent, mammoth, deer, camel, ground slot, horse, and turtle. (Æ(b), p. 4.)

Quaternary (Pleistocene to Holocene) Surficial Deposits

A large portion of the central Planning Area is immediately underlain by Pleistocene alluvial fan (Qof, Qvof) and valley (Qoa) deposits. These deposits, referred to as Quaternary older and very old alluvium discomformably overlie Cretaceous granitic bedrock (gr) and Mesozoic metamorphic intrusive rocks (pKm) at an unknown but likely relatively shallow depth (plutonic igneous rocks and high- to medium-grained metamorphic do not contain fossils due to the high heat and pressure of their formation deep below the surface of the Earth). In general, the alluvial sediments are composed of tan to reddish-brown sandstone and siltstone that was deposited in alluvial fan and local channel environments during the Pleistocene. The deposits are moderately consolidated and poorly indurated, with angular to subangular clasts, local pebble conglomerate lenses, moderate soil formation, and abundant dissection. (Æ(a), p. 4.)

Pleistocene age alluvial, fluvial, and lacustrine deposits have proven to yield scientifically significant paleontological resources throughout Southern California from the coastal areas to the inland valleys. South of the Planning Area, in the vicinity of Lakeview, a diverse assemblage of fossil resources has been recovered including mammoth, sabre-toothed cat, horse, bison, and numerous small mammals, reptiles, invertebrates, and plant remains. Further south of the Planning Area, the largest known open-environment non-asphaltic late Pleistocene fossil assemblage has been documented in Diamond and Domenigoni valleys. Discovered during excavations of the Diamond Valley Lake, this locality has yielded nearly 100,000 identifiable fossils representing over 105 vertebrate, invertebrate, and plant taxa.

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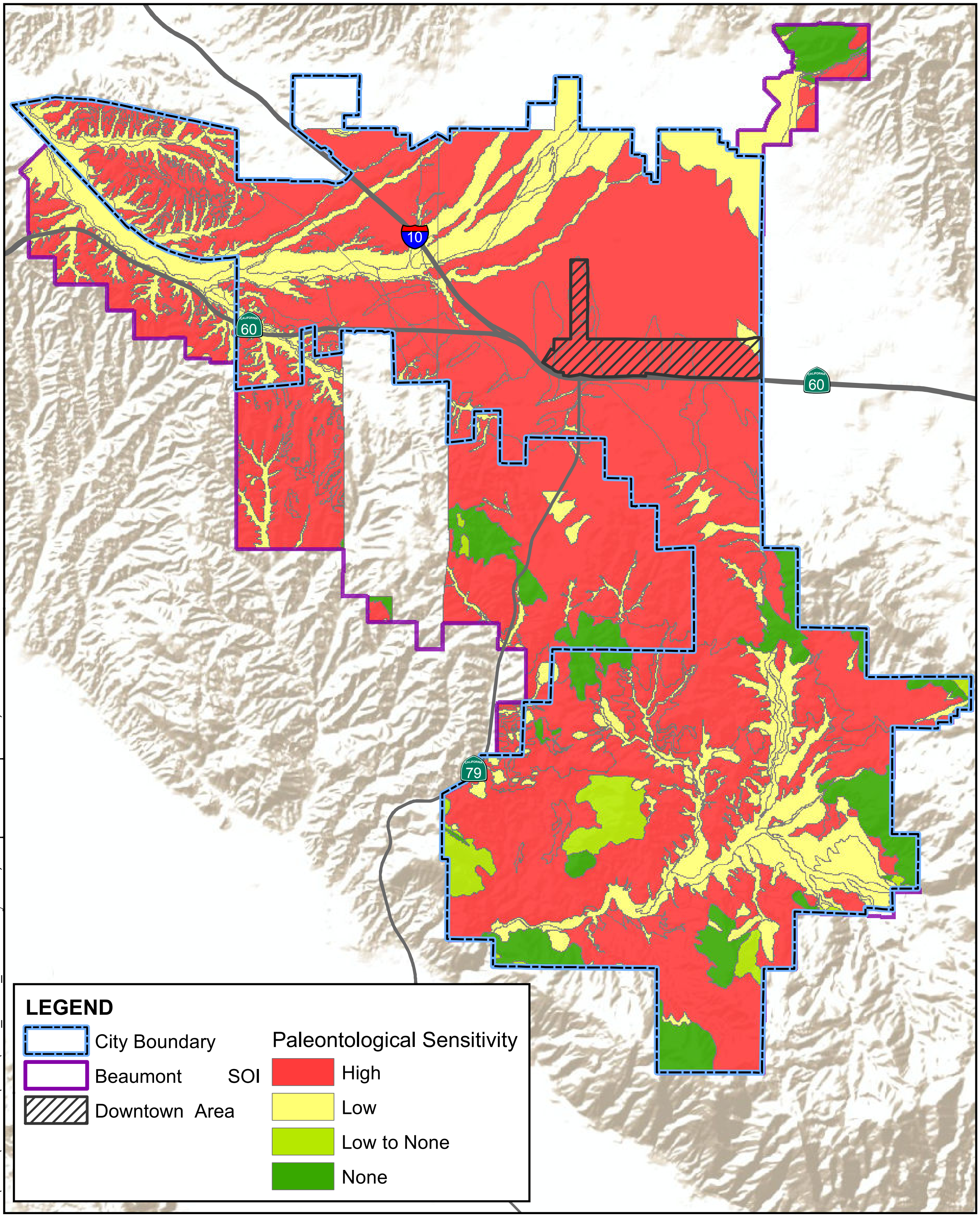

G:\2017\17-0033\GIS\EIR_Paleo_Sensitivity.mxd; Map revised April 20, 2020.

Sources: Applied Earthworks, 2018;;Raimi + Associates, 2019; ESRI..

Figure 5.6-9 Paleontological Sensitivity

City of Beaumont General Plan Update

0 1 2 3 Miles

ALBERT A. WEBB ASSOCIATES

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The vertebrate taxa recovered includes reptiles such as frogs, turtles, and lizards; birds such as robins, swallows, jays, ravens, hawks, and ducks; small mammals such as rabbit, squirrel, mice, and weasels; and large mammals such as fox, bear, coyote, deer, bison, mammoths, mastodons, and ground sloths. The invertebrate taxa recovered includes ostracodes, snails, termites, slugs, beetles, and bivalves and the plant taxa recovered includes well preserved diatoms, pollen, and wood debris. (Æ(a), pp. 4-5.)

Recent alluvial fan (Qf, Qyf), valley (Qa, Qya), wash (Qw), and landslide (Qls) deposits are common throughout the Planning Area. The younger Quaternary alluvium generally consists of gravel, sand, and clay deposited during the Holocene restricted to valley, gully, wash, and landslide areas. Holocene-age alluvial deposits, particularly those younger than 5,000 years old, are generally too young to contain fossilized material, but they may overlie sensitive older deposits at an unknown depth. (Æ(b), p. 5.)

The Project's *Paleontological Resource Assessment* was prepared by Æ in accordance with the guidelines set forth by the Society of Vertebrate Paleontology. The *Paleontological Resource Assessment* included a museum records search at the Los Angeles County Museum of Natural History (LACM) on April 6, 2017 and a literature and geologic map review. LACM collection records contain two previously recorded localities (LACM 6596 and 65235) directly within the Planning Area boundary from within the San Timoteo Formation. At least 15 additional vertebrate localities (LACM 4540, 5168, 6059, 7618-7622, 1118-1119, 5377, 1120, (CIT) 132-133, and (CIT) 515, have been previously recorded in the vicinity of the Planning Area from within the Mount Eden Formation, San Timoteo Formation, and Pleistocene alluvial deposits. These localities yielded vertebrate fossil specimens of horse, camel, mastodon, deer, rhinoceros, and fish, depth of recovery unreported. In addition, localities LACM 1014 and 1016, recovered within the western Project area, produced two type specimens of fossil cones of the pine (*Pinus pretuberculata* and *P. hazeni*) and fir tree (*Pseudotsuga premacrocarpa*), as well as apricot tree (*Prunus prefremontii*) and algae plant fossils. The LACM did not provide specific geographic coordinates for the localities within the General Plan area or vicinity. (Æ (b), pp. 5–6.) The results of the LACM records search are summarized below in **Table 5.6-B – Vertebrate Localities within the Planning Area**.

Table 5.6-B – Vertebrate Localities within the Planning Area

Locality No.	Geologic Unit	Age	Taxa
LACM 1118-1119, 5377	Mount Eden Formation	Miocene-Pliocene	Camelidae (camel), Cervidae (deer), Equidae (horse), and *Teleoceras hicksis* (rhinoceros)
LACM 1120	Mount Eden Formation	Miocene-Pliocene	*Pliauchenia merriami* and *Titanotylopus sp.* (camels)
LACM 7618-7622; LACM (CIT) 132-133-515	San Timoteo Formation	Plio-Pleistocene	*Equus* (horse) and Camelidae
LACM 6596	San Timoteo Formation	Plio-Pleistocene	*Pliomastodon sp.* (mastodon)

Table 5.6-B – Vertebrate Localities within the Planning Area

Locality No.	Geologic Unit	Age	Taxa
LACM 65235	San Timoteo Formation	Plio-Pleistocene	fish
LACM 4540, 5168, 6059	Pleistocene Alluvium	Pleistocene	*Equus* (horse)

Source: Æ(b), *Paleontological Resource Assessment for the City of Beaumont General Plan Update Project, City of Beaumont, Riverside, County, California, April 2017.*

5.6.2 Related Regulations

Federal Regulations

Antiquities Act of 1906

The only federal law protecting fossil resources on public lands is the Antiquities Act of 1906 (16 United States Code [USC] 431–433). Enacted when Theodore Roosevelt was president, the Antiquities Act was designed to protect nonrenewable fossil and cultural resources from indiscriminate collecting. Specific paleontological sites can be protected under the National Registry of Natural Landmarks (16 USC 461-467), and at least three paleontological Landmarks are known in California. NEPA (42 USC 4321) directs Federal agencies to use all practicable means to "…preserve important historic, cultural, and natural aspects of our national heritage…" Section 106 of the National Historic Preservation Act does not apply to paleontological resources unless they are found in culturally related contexts.

Paleontological Resources Preservation Act

The federal Paleontological Resources Preservation Act of 2002 (PRPA) was specifically intended to codify the generally accepted practice of limiting collection on public (federal) land of vertebrate fossils and other rare and scientifically significant fossils to qualified researchers who obtain a permit from the appropriate state or federal agency and agree to donate any materials recovered to recognized public institutions where they will remain accessible to the public and to other researchers.

State Regulations

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Special Studies Zones Act of 1972 was signed into law in 1972 and renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994. The primary purpose of this act is to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy across the extent of an active fault. The Alquist-Priolo Act requires the State Geologist to delineate "Earthquake Fault Zones" along faults that are "sufficiently active" and "well defined." Sufficiently active faults show evidence of Holocene surface displacement (movement within the past 11,000 years) along one or more of their segments. The boundary of an "Earthquake Fault Zone" is generally about 500 feet from major active faults, and 200 to 300 feet from well-defined minor faults. Within the Planning Area, the location of active faults are mapped and/or readily identifiable, as shown on **Figure 5.6-4 – Faults and Fault Zones**. In this sense, surface rupture is the most easily avoided seismic hazard.

The Alquist-Priolo Zone mapping has been completed by the State Geologist for the 45 quadrangles in Riverside County. The maps are available to all affected cities, counties, and State agencies for their use in developing planning policies and controlling renovation or new construction. Local agencies must regulate most development projects within Alquist-Priolo Zones. Projects include all land divisions and most structures constructed for human occupancy. Before a project can be permitted within an identified Earthquake Fault Zone, cities and counties must, through geologic investigation and documentation, demonstrate that proposed buildings will not be constructed across active faults. In this regard, a site-specific evaluation and written report site must be prepared by a licensed geologist. If an active fault is identified, a structure intended for human occupancy cannot be placed over the trace of the fault, and any such structure and must be set back from the fault, generally no closer than 50 feet.

Seismic Hazards Mapping Act

Passed in 1990, the Seismic Hazards Mapping Act (SHMA) addresses non-surface fault rupture earthquake hazards, including strong ground shaking, liquefaction, and seismically induced landslides. The California Geological Survey (CGS) is the principal state agency charged with implementing the SHMA. The law directs the CGS to provide local governments with seismic hazard zone maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides and other ground failures. The CGS-delineated seismic hazard zones are referred to as “zones of required investigation” and per the SHMA require site-specific geotechnical hazard investigations when construction projects fall within these areas. SHMA’s goal is to minimize loss of life and property by identifying and mitigating seismic hazards.

Natural Hazards Disclosure Act

Effective June 1, 1998, the Natural Hazards Disclosure Act requires that sellers of real property and their agents provide prospective buyers with a “Natural Hazard Disclosure Statement” when the property being sold lies within one or more State-mapped hazard areas. If a property is located in a Seismic Hazard Zone as shown on a map issued by the State Geologist, the seller or the seller’s agent must disclose this fact to potential buyers.

The Building Earthquake Safety Act of 1986

This Act requires all local governments to identify all potentially hazardous buildings within their jurisdictions and to establish a program for mitigation of identified hazards. It is the legislative basis for the inventory of hazardous unreinforced masonry buildings and Unreinforced Masonry Ordinances adopted by most counties and cities in California.

The Recovery (and) Reconstruction Act of 1986

Under the Recovery and Reconstruction Act of 1986, local governments are authorized to prepare for expeditious and orderly recovery before a disaster, and to provide for reconstruction afterward. It enables localities to prepare pre-disaster plans and ordinances that may include: an evaluation of the vulnerability of specific areas to damage from a potential disaster; streamlined procedures for appropriate modification of existing General Plans or zoning ordinances affecting vulnerable areas; a contingency plan of action; organization for post-disaster conditions; short-term and long-term recovery and reconstruction; and a pre-disaster ordinance to provide adequate local authorization for post-disaster activities.

Uniform Building Code

The Uniform Building Code (UBC) is published by the International Conference of Building Officials. It forms the basis of approximately half the state building codes in the United States, including California's, and has been adopted by the state legislature together with additions, amendments, and repeals to address the specific building conditions and structural requirements in California.

California Building Code

The California Building Standards Code (CBC), Title 24 serves as the basis for the design and construction of buildings in California. The 2016 CBC went into effect on January 1, 2017. The CBC provides minimum standards for building design in the state, consistent with or more stringent than UBC requirements. Local codes are permitted to be more restrictive than Title 24, but are required to be no less restrictive. Chapter 16 of the CBC deals with General Design Requirements, including regulations governing seismically resistant construction (Chapter 16, Division IV) and construction to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapter 18 and Chapter 33 deal with site demolition, excavations, foundations, retaining walls, and grading, including requirements for seismically resistant design, foundation investigations, stable cut and fill slopes, and drainage and erosion control.

California Civil Code Section 1103-1103.4

California Civil Code Section 1103-1103.4 applies to the transfers of real property between private parties, as defined therein, and requires notification upon transfer if the property is affected by one or more natural hazards. The following potential hazards must be disclosed, if known: Federal Emergency Management Agency (FEMA) flood hazard areas, dam failure inundation areas, very high fire hazard severity zone, wildland area with forest fire risks, earthquake fault zone, and seismic hazard zones including landslide and liquefaction on a standardized "Natural Hazard Disclosure Statement" (Section 1103.2).

Public Resources Code Section 5097 (Related to Paleontological Resources)

Several sections of the California PRC protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury and defacement of any paleontological feature on public lands (lands under state, county, city, district or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation for impacts on paleontological resources that occur as a result of development on public lands. The California Administrative Code Sections 4307-4309, 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 for state park purposes and in the interest of the state park system.

General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities

A Stormwater Pollution Prevention Plan (SWPPP) prepared in compliance with a National Pollutant Discharge Elimination System (NPDES) permit under the authority of the local Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board (SWRCB) describes the project area, erosion and sediment controls, runoff water quality monitoring, means of waste disposal, implementation of approved local plans, control of post construction sediment and erosion control measures and maintenance responsibilities, and non-stormwater management controls. Dischargers are also required to inspect construction sites before and after storms to identify stormwater discharge from construction activity, and to identify and implement controls where necessary.

Municipal Separate Storm Sewer System Permit

In 2010, the Santa Ana RWQCB issued a municipal separate storm sewer system (MS4) permit and waste discharge requirements (R8-2010-0033 and NPDES No. CAS 618033) to the Riverside County Permittees, which includes the City. Under this Permit, the City is required to enforce and comply with storm water discharge requirements pursuant to the Clean Water Act, the Porter-Cologne Water Quality Control Act, applicable state and federal regulations (including policies of the SWRCB), the Santa Ana River Basin Water Quality Control Plan (Basin Plan), and the California Toxics Rule Implementation Plan.

The MS4 Permittees and Principal Permittee (Riverside County Flood Control & Water Conservation District) are required to develop several items that generally reduce pollutants in urban runoff to the maximum extent practicable (MEP).[3] This includes “Local Implementation Plans” describing the enforceable elements of an agency’s urban runoff compliance program, as well as a “Watershed Action Plan” and “Hydromodification Management Plan” to address impacts from urbanization. Likewise, a “Drainage Area Management Plan” is periodically updated by the principal permittee to document MS4 permit compliance programs and to provide guidance to co-permittees for Local Implementation Plans. In addition, the “Consolidated Monitoring Program” defines the monitoring locations and methods to evaluate best management practices (BMP) effectiveness. Lastly, the MS4 permit requires a “Water Quality Management Plan” (WQMP) for most new development and certain redevelopment projects. Like the construction SWPPP, the WQMP identifies how site design elements, source control methods and treatment control BMPs in the post-construction phase will minimize pollutant loads to the municipal storm drain in the long-term.

Eligible projects submitted to the City are required to provide a project-specific WQMP prior to the first discretionary project approval or permit. Project applicants may submit a preliminary project-specific WQMP for discretionary project approval (land use permit); however, a final version would be submitted for review and approval prior to the issuance of any grading or building permits.

Regional Regulations

County of Riverside Ordinance No. 547 – Implementation of the Alquist-Priolo Earthquake Fault Zoning Act

County of Riverside Ordinance No. 547 establishes the policies and procedures used by the County to implement the Alquist-Priolo Act by requiring all projects proposed within an “earthquake fault zone” as shown on the maps prepared by the State Geologist to comply with the provisions of the Alquist-Priolo

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[3] The term, Maximum Extent Practicable (or MEP) comes from the federal Clean Water Act, §402(p)(3)(B). The MEP standard involves applying BMPs that are effective in reducing the discharge of pollutants in storm water runoff. In discussing the MEP standard, the State Board has said the following: "There must be a serious attempt to comply, and practical solutions may not be lightly rejected. If, from the list of BMPs, a permittee chooses only a few of the least expensive methods, it is likely that MEP has not been met. On the other hand, if a permittee employs all applicable BMPs except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit to be derived, it would have met the standard. MEP requires permittees to choose effective BMPs, and to reject applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive." (Order WQ 00-11, p.20.)

Act. It establishes regulations for construction, including for grading, slopes and compaction, erosion control, retaining wall design and earthquake fault zone setbacks.

Local Regulations

Beaumont Municipal Code

Title 13 of the City of Beaumont Municipal Code (BMC) regulates ownership, connections, charges, design and use of sewers within the City.

Title 15 of the BMC states that the City shall adopt the California Building Code for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area and maintenance of all buildings or structures in the City.

Title 16 of the BMC requires compliance with Riverside County Ordinance No. 547, which states: "Within the earthquake fault zones shown on the maps prepared by the State Geologist pursuant to the Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code, Section 2621, et seq.), all applicants for a permit for a project shall comply with all of the provisions of the Act, the adopted Policies and Criteria of the State Mining and Geology Board and this ordinance."

Title 16 of the BMC also requires a written statement to accompany any tentative parcel map stating the type of sewage disposal that will be used. If on-site sewage disposal is proposed, the public works director shall require soil percolation tests or other pertinent information (p. 19). The regulation goes on to state that a package treatment plant and collector system shall be required in the event that an existing collection system is not available and if it is determined that satisfactory individual disposal systems cannot be proved because of soil conditions, determined by percolation tests in conformity with the standards of the "Ludwig Modification," and finding that the conditions and requirements of the health department and RWQCB cannot be met.

Building Codes

The City of Beaumont has adopted the California Building Code, Title 24, California Code of Regulations, Part 2, Volumes 1 and 2, including, Appendix C, Group U-"Agricultural Buildings", Appendix F "Rodent Proofing", Appendix I "Patio Covers", and Appendix J "Grading", (except as otherwise provided in the BMC) for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area and maintenance of all buildings or structures in the City. The BMC also states any and all amendments to such Building Code as may hereafter be adopted by the State of California shall be made a part of the BMC without further action by the City Council (BMC, Chapter 15.04.)

Chapters 18 of the CBC describe the "Soils and Foundations" requirements, particularly when geotechnical investigations and geohazard reports shall be conducted, and what is required to be included as part of their analyses.[4] Notably, the CBC currently has just one exception for when a geotechnical investigation is not required: for one-story, wood-frame and light-steel-frame buildings of Type II or Type V construction and 4,000 square feet or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones (CBC 1803.2).

[4] Chapter 18A applies to structures regulated by the Division of the State Architect (i.e. public schools, community colleges, state owned buildings, hospitals, nursing facilities, intermediate care facilities, and correction treatment centers). All others are regulated by Chapter 18.

Plan Check Submittal

The Beaumont Public Works Department is responsible for construction, maintenance, and operation of public facilities and infrastructure within the City. The Department is also responsible for the review and approval of all engineering for land development projects and design, and construction of all capital improvement projects. The following documents are required for review with submittal of development plans to the Public Works Department:

- Transmittal signed by Engineer of Work
- All applicable fees
- Complete set of Public Improvement Plans
- Complete set of Grading Plan Set
- Final/Parcel Map
- Engineer's Cost Estimate
- Hydrology & Hydraulics Report
- Geotechnical Report & Recommendations
- Approved Tentative Map
- Original Conditions of Approval
- Water Quality Management Plan (WQMP)
- Storm Water Pollution Prevention Plan (SWPPP)
- All previous redlines

5.6.3 Beaumont 2040 Plan

This section presents those features of the proposed Project that reduce potential impacts to paleontological, geologic and soil resources.

The Beaumont 2040 goals, policies, and implementation actions that reduce potential impacts to cultural resources include:

General Plan Chapter 3 – Land Use and Design

Goal 3.12: A City that minimizes the extent of urban development in the hillsides, and mitigates any significant adverse consequences associated with urbanization.

Policy 3.12.1 Develop policies for hillside development in order to protect the natural environment.

Policy 3.12.2 Limit the extent and intensity of uses and development in areas of unstable terrain, steep terrain, scenic vistas, and other critical environmental areas.

Policy 3.12.3 Control the grading of land, pursuant to the City's Municipal Code, to minimize the potential for erosion, landslides, and other forms of land failure, as well as to limit the potential negative aesthetic impact of excessive modification of natural landforms.

General Plan Chapter 8 – Conservation and Open Space

Goal 8.9: A City where the extent of urban development in the hillsides is minimized and mitigated.

Policy 8.9.1 Continue to require hillside development to be consistent with the provisions of the Hillside Ordinance Policies.

Policy 8.9.2 Limit the extent and intensity of uses and development in areas of unstable terrain, steep terrain, scenic vistas, and other critical environmental areas.

Policy 8.9.3 Control land grading to minimize the potential for erosion, landsliding, and other forms of land failure, as well as to limit the potential negative aesthetic impact of excessive modification of natural landforms.

Policy 8.9.4 Recognize the value of ridgelines and hillsides as significant natural and visual resources and strengthen their role as features which define the character of the City and its individual neighborhood.

Goal 8.11: A City where cultural resources and historical places are identified, recognized, and preserved.

Policy 8.11.1 Avoid or when avoidance is not feasible, minimize impacts to sites with significant archaeological, paleontological, cultural and tribal cultural resources, to the extent feasible.

General Plan Chapter 9 - Safety

Goal 9.6: A City that protects human life, land, and property from the effects of wildland fire hazards.

Policy 9.6.10 Evaluate soils and waterways for risks from flooding, water quality, and erosion to ensure that they are suitable to support redevelopment following a large fire.

Goal 9.7: A City that protects safety of human life, land, and property from the effects of earthquakes and geotechnical hazards.

Policy 9.7.1 As new versions of the California Building Code (CCR Title 24, published triennially) are released, adopt and enforce the most recent codes that contain the most recent seismic requirements for structural design of new development and redevelopment to minimize damage from earthquakes and other geologic activity.

Policy 9.7.2 Require that all development projects within designated Alquist-Priolo Earthquake Fault Zones are accompanied by appropriate geotechnical analysis.

Policy 9.7.3 Coordinate with the National Earthquake Hazard Reduction Program of the Federal Emergency Management Agency (FEMA) to identify earthquake risks and available mitigation techniques.

Policy 9.7.4 Proactively seek compliance with the Alquist-Priolo Earthquake Fault Zoning Act by coordinating with the California Geological Survey and the United States Geological Survey (USGS) to establish and maintain maps establishing affected parcels within the City boundaries and the Sphere of Influence.

Policy 9.7.5 Ensure that Building and Safety agencies include thorough plan checks and inspections of structures vulnerable to seismic activity, fire risk, and flood hazards. Additionally, recommend the periodic observation of construction by design professionals.

Policy 9.7.6 Promote greater public awareness of existing state incentive programs for earthquake retrofit, such as *Earthquake Brace and Bolt*, to help property owners make their homes more earthquake safe.

Implementation LUCD 25 Hillside Development Ordinance. Adopt and enforce compliance with the Hillside Development Ordinance. Review every 5 years for potential updates.

Implementation C19 Hillside Ordinance. Support and implement the existing hillside ordinance.

Implementation S9 Safety Information Campaign. Develop an information program to familiarize citizens with seismic risk and to develop seismic awareness. Develop an educational campaign for residents and business owners to learn what to do during an earthquake and how to better prepare for an earthquake.

Implementation S10 Community Preparedness Toolkit. Adopt a local Community Preparedness Toolkit that can be used to prepare for disasters, including fires, earthquakes, and extreme heat events.

Implementation S17 California Building Codes. Adopt the latest version of the California Building Code (CCR Title 24, published triennially) when released.

Implementation S18 Earthquake Hazard Reduction Ordinance. Update municipal code to require strengthening of existing wood-frame buildings with soft, weak, or open-front wall lines in housing constructed before 1980.

Implementation S19 Code Enforcement. Continue the code enforcement program, including identification of pre-1933 structures of large scale or occupied by large numbers of people, and require correction or demolition of structures found to be dangerous.

Implementation S20 Seismic Retrofit Incentive Program. Develop a retrofit incentive program to help reduce earthquake hazards, focused on existing public facilities as well as existing multifamily housing constructed prior to 1980.

Implementation S21 Geologic Instability Mitigation. Update municipal code to adopt regulatory techniques to mitigate public safety hazards, and if necessary, prohibit development where geologic instability is identified.

5.6.4 Thresholds of Significance

The City has not established local CEQA significance thresholds as described in Section 15064.7 of the *CEQA Guidelines*. Therefore, significance determinations utilized in this section are from Appendix G of the *CEQA Guidelines*. A significant impact will occur if implementation of the proposed Project will:

- (Threshold A) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
    i. Rupture of 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.

ii. Strong seismic ground shaking.

iii. Seismic-related ground failure, including liquefaction.

iv. Landslides.

- (Threshold B) Result in substantial soil erosion or the loss of topsoil;
- (Threshold C) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
- (Threshold D) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
- (Threshold E) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water; and/or
- (Threshold F) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

5.6.5 Environmental Impacts before Mitigation

At the programmatic level addressed in this EIR, a variety of regulatory measures, including compliance with and implementation of Federal, State, Regional, and Local regulations as well as compliance with the proposed Beaumont 2040 goals, policies, implementation, and the proposed revisions to the Zoning Ordinance, are intended to reduce potential impacts associated with geology, soils, and paleontological resources to less than significant. See full discussion on environmental impacts below. In addition, all future implementing projects would be subject to further CEQA review focusing on the specifics of the proposed project, which cannot be foreseen at this time since no specific development proposals are included as part of the Beaumont 2040 Plan.

For purposes of the analyses herein, the discussion includes the City limits as well as the City's SOI (collectively referred to as "Planning Area"). Future development of properties within the City's SOI that are annexed to the City would be subject to the City's entitlement process while future development within the City's SOI that is under the County's land use control would be subject to the County's entitlement requirements.

Threshold A: ***Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:***

i. Rupture of 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.

ii. Strong seismic ground shaking.

iii. Seismic-related ground failure, including liquefaction.

iv. Landslides.

i) Fault Rupture

Unlike damage from ground shaking, which can occur at great distances from the fault, impacts from fault rupture are limited to the immediate area of the fault zone where the fault breaks along the surface. Many earthquake faults, as well as many designated Alquist-Priolo Fault Zones, are known to occur within the Planning Area, as shown on **Figure 5.6-4 – Faults and Fault Zones**. Many of these faults are expected to be seismically active and have the potential to rupture. Some of the proposed land uses changes with implementation of the Beaumont 2040 Plan and revised Zoning Map would either occur within the Beaumont Plain Fault Zone or San Jacinto Fault Zone or within proximity to the Alquist-Priolo Fault Zones. Thus, future development on these lands may result in the construction and occupation of structures and associated infrastructure along these earthquake fault zones. Such development would increase the number of people and the amount of developed property to fault rupture hazards.

In order to lessen the potential for property loss, injury or death that could result from rupture of faults during earthquake events, the State of California has provided strict regulations that the City must follow to ensure impacts from fault rupture are reduced to less than significant levels. Development in the City's SOI, under County land use control, would be subject to Ordinance No. 547 which requires all applicants for a project located within an earthquake fault zone, as shown on the maps prepared by the State Geologist, be in compliance with all the provisions of the Alquist-Priolo Act and the adopted policies and criteria of this ordinance. Ordinance No. 547 would ensure that all structures and facilities are designed with the appropriate level of seismic safety warranted by the geology of their location. Additionally, future development that is under the County's land use control would be subject to the County's entitlement requirements.

Development within the City limits or properties and developments annexed into the City would be required to comply with the building design standards of the CBC Chapter 33 for construction of new buildings and/or structures related to seismicity and specific engineering design and construction measures would be implemented to anticipate and avoid potential impacts from seismic activity. Additionally, goals, policies and implementation in the Beaumont 2040 Plan will also ensure that adverse effects caused by seismic and geologic hazards are minimized by limiting the densities and intensity of uses in this area. Thus, compliance with CBC regulations and Beaumont 2040 Plan goals, policies, and implementation actions will reduce impacts related to earthquake faults to **less than significant** and no mitigation is necessary**.**

ii) Strong Seismic Ground Shaking

Seismic activity is to be expected in southern California. Many earthquake faults, as well as many designated Alquist-Priolo Fault Zones, are known to occur within the Planning Area, as shown on **Figure 5.6-4**. Many of these faults are expected to be seismically active and have the potential to rupture, which would result in ground shaking, depending on the underlying soil/geologic conditions at the time of rupture. Some of the proposed land uses changes with implementation of the Beaumont 2040 Plan and revised Zoning Map would either occur within the Beaumont Plain Fault Zone or San Jacinto Fault Zone or within proximity to the Alquist-Priolo Fault Zones. Thus, future development on these lands may result in the construction and occupation of structures and associated infrastructure along these earthquake fault zones. Such development would increase the number of people and the amount of developed property to strong seismic ground shaking.

The expected ground motion characteristics of future earthquakes in the region would depend on the characteristics of the generating fault, the distance to the epicenter, the magnitude of the earthquake, and the site-specific geological conditions. In order to lessen the potential for property loss, injury or death that could result from rupture of faults during earthquake events, the State of California has provided strict regulations that the City must follow to ensure impacts from fault rupture are reduced to less than significant levels. Development in the City's SOI, under County land use control, would be subject to Ordinance No. 547 which requires all applicants for a project located within an earthquake fault zone, as shown on the maps prepared by the State Geologist, be in compliance with all the provisions of the Alquist-Priolo Act and the adopted policies and criteria of this ordinance. Ordinance No. 547 would ensure that all structures and facilities are designed with the appropriate level of seismic safety warranted by the geology of their location. Additionally, future development that is under the County's land use control would be subject to the County's entitlement requirements.

Development within the City limits or properties and developments annexed into the City would be required to comply with the building design standards of the CBC Chapter 33 for construction of new buildings and/or structures related to seismicity and specific engineering design and construction measures would be implemented to anticipate and avoid potential impacts from seismic activity. Additionally, goals, policies, and implementation in the Beaumont 2040l Plan would also ensure that adverse effects caused by seismic and geologic hazards are minimized by limiting the densities and intensity of uses in this area. Therefore, compliance with CBC regulations and Beaumont 2040 Plan goals, policies, and implementation actions will reduce impacts resulting from strong seismic ground shaking to **less than significant** and no mitigation is necessary**.**

iii) Seismic-Related Ground Failure, Including Liquefaction

Strong ground shaking can result in liquefaction. The Planning Area is underlain by areas susceptible to varying degrees of liquefaction, ranging from very low to moderate (see **Figure 5.6-6 – Liquefaction Potential**). Liquefaction potential does not necessarily limit development potential, as site-specific geotechnical studies conducted by a licensed geotechnical engineering professional would be required to determine the soil properties, specific potential for liquefaction in specific areas, and recommended design features prior to individual development. Those recommended design features are provided to ensure the proposed development has a geotechnically sound foundation and is structurally capable pursuant to current state guidelines. Additionally, project plans will be reviewed during the plan check process, which will ensure that seismic safety measures are incorporated. Therefore, potential impacts associated with seismic ground failure, including liquefaction, will be reduced to **less than significant** through compliance with existing regulations and Beaumont 2040 Plan goals, policies, and implementation; no mitigation is necessary**.**

iv) Landslides

Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes. The susceptibility of a geologic unit to landslides is dependent upon various factors, primarily: 1) the presence and orientation of weak structures, such as fractures, faults, and joints; 2) the height and steepness of the pertinent natural or cut slope; 3) the presence and quantity of groundwater; and 4) the occurrence of strong seismic shaking. The Planning Area contains various steepness of slopes ranging from 0 to 5 degrees to 41 to 70 degrees; thus, some areas could be susceptible to seismically induced landslides (see **Figure 5.6-5 – Steep Slopes**). Compliance with the standards in the current CBC would require an assessment of hazards related to and the incorporation of design measures into structures to mitigate this hazard if development were considered feasible. The BMC requires provisions to grading and development on or near hillsides. As identified above in Section 5.6.3, the City has included goals, policies, and implementation in the Beaumont 2040 Plan to minimize the risk of injury, loss of life, and property damage caused by earthquake hazards or geologic disturbances. Thus, compliance with CBC regulations and Beaumont 2040 Plan goals, policies, and implementation actions will reduce impacts related to landslides are **less than significant** and no mitigation is necessary**.**

Threshold B: ***Would the project result in substantial soil erosion or the loss of topsoil?***

With implementation of the Beaumont 2040 Plan, soil erosion and/or the loss of topsoil would be likely to occur when soil is exposed during construction activities. Wind and water are the two main methods of erosion, and human activities that remove vegetation or otherwise disturb soil are the biggest influence to erosion potential. The degree to which erosion and topsoil loss occurs is limited by measures specifically incorporated during construction to reduce wind-blown dust and/or stormwater erosion, often called “best management practices” (BMPs) or erosion control plans.

The City and County are co-permittees to the Riverside County MS4 Permit issued by the Santa Ana River RWQCB. This permit places stormwater pollution prevention requirements on planned developments, construction sites, commercial and industrial businesses, municipal facilities and activities, and residential communities within the Planning Area. As such, developments under County land use control and developments under the City’s land use control would require submittal of a SWPPP and a WQMP for review and approval by County/City staff prior to issuing building permits. The SWPPP describes the erosion and sediment control BMPs to be used during the construction phase and the WQMP describes the post-construction treatment methods for the expected pollutants of concern.

Although implementation of the Beaumont 2040 Plan and revised Zoning Map will introduce development that will have the potential to cause erosion and loss of topsoil, compliance with the NPDES and revised *Hillside Ordinance Policies* will reduce impacts to **less than significant** and no mitigation is necessary**.**

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

Unstable geologic units and soils are known to occur throughout the Planning Area. Liquefaction, lateral spread, and/or subsidence may occur depending where a project is constructed within the Planning Area, as shown on **Figure 5.6-6 – Liquefaction Potential** and **Figure 5.6-7 – Subsidence Potential**, respectively. Additionally, both natural and human activities have the potential to cause geologic instability. If improperly engineered or constructed, some types of development, particularly those with heavy loads, have an increased potential to cause ground or soil failures. These types of failures are in addition to those triggered by seismic events, as described previously in Threshold A.

Lateral spread can occur on mild to steep slopes, and soils susceptible to liquefaction may occur within the Planning Area (see **Figure 5.6-6**); therefore, lateral spread could potentially occur if all conditions are met. Although landslides in the State Route 60 (SR-60) corridor through the San Timoteo “Badlands” have been recorded and analyzed (CGS, 2002), there is no development slated for the Badlands area per the Land Use Plan. With the City’s existing requirement for geotechnical investigations to accompany each new development proposal, future development will be conditioned with appropriate geotechnical and engineering considerations so that the underlying geologic unit or soil will not become unstable, or that the overlying structure will not collapse. Adherence to the goals, policies, and implementation in the Beaumont 2040 Plan along with compliance with the most current building codes will reduce impacts from landslide, lateral spread, subsidence, liquefaction, or collapse to **less than significant** and no mitigation is necessary**.**

Threshold D: ***Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?***

Expansive soils can be widely dispersed and can occur in hillside areas, as well as low-lying alluvial basins thus, portions of the Planning Area may be subject to expansive soils. Although expansive soils are now routinely alleviated by following the CBC, problems related to past inadequate grading or site preparation practices constantly appear (Beaumont 2040 Plan, p. 9-11.) All development in the Planning Area is required to be compliant with the CBC Code in Title 24, as related to the construction of structures and facilities on expansive soils. Prior to any construction in areas on expansive soils, a geotechnical assessment of the site is required by a certified geologist. This report must make recommendations as to the stability of the site and the requirements for grading, site preparation, and building foundations.

The CBC approaches the issue of building on expansive soils in a project-by-project way. Geotechnical investigations by a licensed geotechnical professional are required with each project proposed in order to determine whether expansive soils exist and if so, whether the project is geotechnically feasible and what design considerations will be needed to construct. As a condition of approval, prior to the issuance of any grading permit, the City requires grading plans to satisfactorily address the geotechnical investigation's recommendations. With implementation of the Beaumont 2040 Plan and revisions to the Zoning Map, new structures within the Planning Area may be proposed on expansive soils; however, the degree of risk to life or property from the effects of expansive soils is considered **less than significant** with through compliance with existing regulations and goals, policies, and implementation contained in the Beaumont 2040 Plan; no mitigation is necessary.

Threshold E: ***Does the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?***

The City currently estimates 161 parcels are served by individual septic tank systems for wastewater disposal directly into the ground. Because of varying soil characteristics and depths to groundwater throughout the Planning Area, some areas may have moderate to severe limitations on the use of septic tanks or alternative wastewater disposal systems. To the extent the Beaumont 2040 Plan accommodates development in such areas, there is the potential for effects to soils that cannot adequately support the use of septic tanks or alternative wastewater disposal systems. All septic-using development within the Planning Area has to comply with the provisions of the CBC (CCR Title 24, Part 2), Chapters 18, which address soils and foundations; and Chapters 16 and 17, which address structural design, structural test and inspections. The provisions of Chapter 18 apply to all building and foundation systems. All construction, including that of septic tanks is required to have an appropriate geotechnical investigated conducted pursuant to CBC standards. Such investigation includes an assessment as to whether or not the site's soils are suitable for on-site wastewater disposal system. Pursuant to CBC, no development utilizing on-site septic disposal shall be approved unless the geotechnical study for the site determines that on-site soil conditions are suitable for septic disposal. Developments proposing septic systems must also comply with the RWQCB Basin Plan and the Riverside County Department of Environmental Health's Technical Guidance Manual. The City allows for certain types of subdivisions

(Schedule B, C, and D Subdivisions) (BMC 16.40.060(D) and 16.40.070(D)) the opportunity to prove soil conditions are appropriate for on-site septic tanks if the site cannot connect to the City's sewer system.

If connection to the City sewer system is not possible, City and State regulations establish criteria that must be met to determine feasibility of using an on-site septic tank system. Therefore, where sewers are not available for the disposal of wastewater within the Planning Area, there are methods in place to ensure adequate support of septic systems. Through compliance with existing regulations and Beaumont 2040 Plan goals, policies, and implementation, impacts will be reduced to **less than significant** and no mitigation is necessary.

Threshold F: ***Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?***

As discussed in Section 5.1.1 and identified in **Table 5.6-B – Vertebrate Localities within the Planning Area,** very few paleontological sites have been documented in the Planning Area). The areas that will probably yield a greater potential of paleontological findings in the Planning Area are those that have been less disturbed by agriculture cultivations or other human disturbance, and because there is and was more native vegetation, natural stream waters, and animal life which encouraged settlement, food gathering, and hunting. In addition, given the types of geologic formations throughout the City, prehistoric fossils may also be present. (Beaumont 2006 GP EIR, p. 119.)

Based on the mapped geological formations that have been known to produce fossils, the Planning Area contains areas with none, low, and high paleontological sensitivity, which are shown on **Figure 5.6-9 – Paleontological Sensitivity**. A variety of ground-disturbing activities such as mass grading, excavation, trenching, and auguring are expected to occur during future project developments under the Beaumont 2040 Plan which have the potential to damage or destroy paleontological resources.

Paleontological resources are protected under Federal, State, regional, and local regulations as described in Section 5.6.2 – Related Regulations that would prevent adverse impacts to paleontological resources with implementation of the Beaumont 2040 Plan. Specifically, Beaumont 2040 Plan policy 8.11.1 requires development to avoid paleontological resources, whenever possible. If complete avoidance is not possible Policy 8.11.1 requires development to minimize and fully mitigate impacts to paleontological resources. Since future development project will be subject to subsequent CEQA review, the specific mitigation for future projects shall be determined by the City as part of the entitlement approval process. The types of project-specific mitigation that may be imposed includes: requiring field personnel training and outlining certain procedures to be followed in the event of fossil discovery; requiring specific studies to document the extent and potential significance of paleontological resources within future development sites; and requiring paleontological monitoring during ground disturbing activities if information indicates that a site proposed for development may contain paleontological resources. As such, with compliance with applicable Federal, State, regional, and local regulations, as well as implementation of Policy 8.11.1, impacts related to paleontological resources are considered to be **less than significant** and no mitigation is necessary.

5.6.6 Proposed Mitigation Measures

An EIR is required to describe feasible mitigation measures which could minimize significant adverse impacts (*CEQA Guidelines*, Section 15126.4). Because adoption and implementation of the Beaumont 2040 Plan, proposed revisions to the Zoning Ordinance and Zoning Map will not result in significant adverse impacts with regards to **geology and soils**, no mitigation measures are necessary.

5.6.7 Level of Significance after Mitigation

With adherence to and compliance with the proposed Beaumont 2040 Plan goals, policies, in addition to adherence to standard Federal, State, regional, and local regulations, impacts with regard to geology and soils are considered less than significant and no mitigation is necessary. The significance of impacts to geology and soils resulting from specific future development projects will be evaluated on a project-by-project basis and Beaumont 2040 Plan, as well as City standards and practices will be applied, individually or jointly, as necessary and appropriate. If future project-level impacts are identified, specific mitigation measures may be required by CEQA.

5.6.8 References

The following references were used in the preparation of this section of the Draft PEIR:

Æ(a) Cultural Resource Assessment for the City of Beaumont General Plan Update, City of Beaumont, Riverside County, California. September 2017. (Appendix D.1)

Æ(b) Paleontological Resource Assessment for the City of Beaumont General Plan Update Project, City of Beaumont, Riverside County, California. April 7, 2017. (Appendix D.2)

Applied Planning, Inc., 2006 Revised Draft Environmental Impact Report City of Beaumont General Plan Update. December 2006. (Available at the City of Beaumont Planning Division.)

Beaumont 2006 GP EIR City of Beaumont, Revised Draft Environmental Impact Report City of Beaumont General Plan Update. December 2006. (Available at City of Beaumont Planning Department, 550 E. 6th Street, Beaumont, CA 92223

CGS, 2002 California Department of Conservation, California Geological Survey. Special Report 186, Landslides in the Highway 60 Corridor, San Timoteo Badlands, Riverside County, California. 2002. (Available at https://www.conservation.ca.gov/cgs/Documents/Landslides/Caltrans/SR_186/CT60riv.pdf Accessed August 31, 2020.)

County of Riverside County of Riverside Environmental Impact Report No. 521 Public Review Draft Section 4.9, Cultural and Paleontological Resources. (Available at https://planning.rctlma.org/Portals/14/genplan/general_plan_2015/DEIR%20521/04-09_CulturalAndPaleoResrcs.pdf, accessed August 31, 2020.)

DOC California Department of Conservation Web site, Fault Activity Map of California (2010). (Available at http://maps.conservation.ca.gov/cgs/fam/, accessed December 28,2017.)

ECR City of Beaumont, City of Beaumont General Plan Update Existing Conditions Report. 2016 (Included as Appendix B.)

SCAMP	Southern California Areal Mapping Project Web site, *San Andreas Fault System in the Inland Empire and Salton Trough*. Last Update September 3, 2004. (Available at https://geomaps.wr.usgs.gov/archive/scamp/html/scg_flt_ieZ.html, accessed December 28, 2017).
Special Publication 42	California Department of Conservation, California Geological Survey. *Special Publication 42, Fault-Rupture Hazard Zones in California.* Interim Revision 2007. (Available at ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf). Accessed April 13, 2007.
UCERF3	Field, E.H., and 2014 Working Group on California Earthquake Probabilities, 2015, *UCERF3: A new earthquake forecast for California's complex fault system*: U.S. Geological Survey 2015–3009, 6 p., https://dx.doi.org/10.3133/fs20153009. (Available at http://www.wgcep.org/UCERF3, accessed December 20, 2017).
USGS	Rewis, D.L., Christensen, A.H., Matti, J.C., Hevesi, J.A., Nishikawa, Tracy, and Martin, Peter, 2006, *Geology, ground-water hydrology, geochemistry, and ground-water simulation of the Beaumont and Banning storage units, San Gorgonio Pass area, Riverside County, California*: U.S. Geological Survey Scientific Investigations Report 2006–5026, 173 p. (Available at https://pubs.usgs.gov/sir/2006/5026/pdf/sir_2006-5026.pdf, accessed December 28, 2017)