SECTION 3.9
MINERAL RESOURCES

3.9 MINERAL RESOURCES

3.9.1 INTRODUCTION

Mineral resources are naturally occurring, solid, crystalline substances that consist of chemical elements or compounds formed from inorganic processes and organic substances, and which are considered to be an economically viable commodity. The importance of mineral deposits is dependent upon their relative abundance and importance in commerce and industry.

This section is based on the Mineral Resources Report prepared for the proposed project by Dudek (May 2007). The technical report, and this section, describes existing mineral resources in the proposed project area, and analyzes the potential for the proposed project to result in the reduced availability of (i) a known mineral resource that would be of value to the region and the residents of the state, or (ii) a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. As will be discussed in greater detail below, due to the existing developed nature of the proposed project areas, as well as the presence of sensitive adjacent land uses, development of future mineral resource extraction activity is highly unlikely and, therefore, the potential impacts resulting from the proposed project's implementation are less than significant. A copy of the Dudek technical report is presented in its entirety in **Appendix J** of this EIR.

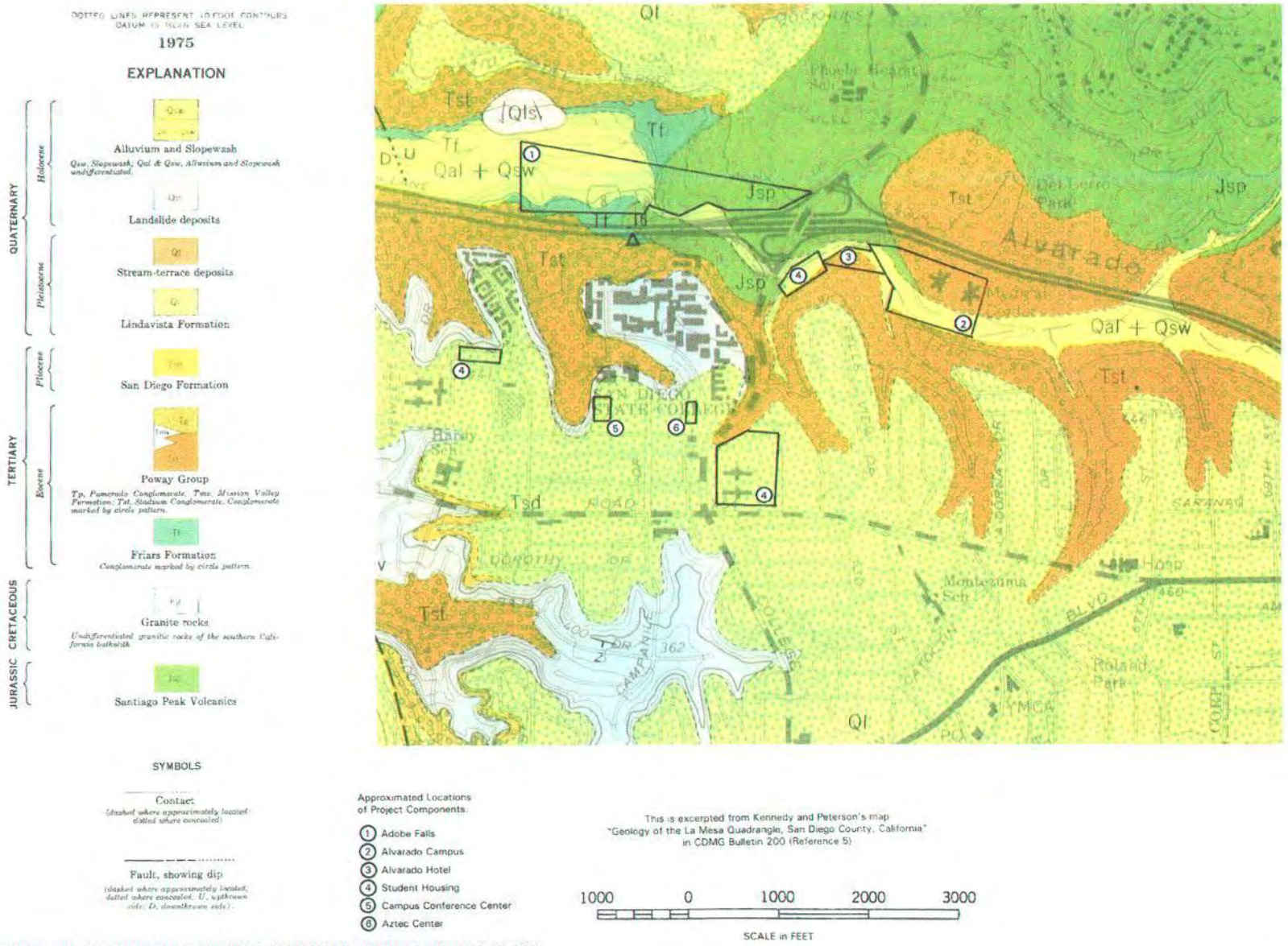
3.9.2 METHODOLOGY

The information presented in the Mineral Resources Report was obtained through a review of pertinent, readily available literature, the geotechnical (soils/geologic) study prepared for the 2007 SDSU Campus Master Plan Revision by Southland Geotechnical, proposed site plans, and local General Plans and ordinances.

3.9.3 EXISTING CONDITIONS

3.9.3.1 General Geologic Setting

The SDSU campus is located in the coastal section of the Peninsular Ranges geomorphic province. (*See* **Figure 3.9-1, Generalized Geologic Map.**) The northwesterly-trending mountain ranges of this province are generally underlain by basement rocks consisting of Jurassic metamorphic rocks intruded by Cretaceous igneous rocks of the Southern California batholith. During the past 54 million years, the western, costal flank of this mountainous area has experienced several episodes of marine inundation and subsequent regression. This trend resulted in deposition of a thick sequence of marine and nonmarine sediments (claystones, siltstones, sandstones, and conglomerates) on the basement rocks. Lower base levels, a result of



SOURCE: SOUTHLAND GEOTECHNICAL CONSULTANTS, GEOTECHNICAL INPUT FOR EIR, MAY 22, 2007

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Figure 3.9-1

Generalized Geologic Map

post-Pleistocene sea-level lowering, allowed stream erosion to create the relatively steep, deeply-incised canyons present in the area. During formation of the canyons, streams deposited alluvial sediments in canyon bottoms and slopes.

The underlying geologic conditions at the proposed project sites include the following attributes:

Existing Fill Soils. Development of the SDSU campus has included placement of fill in various locations and has included the infilling of previously existing canyons throughout the campus. Fill soils were also placed in various locations throughout campus during grading and construction of the Interstate-8 freeway corridor.

Fill soils in the project component areas generally appear to be primarily comprised of locally-derived materials. The fill soils generally range in composition from sandy clays to silty and clayey sands, commonly supporting abundant gravel/cobbles. Some fill areas may include boulder-sized rock fragments, concrete/asphalt chunks, and debris.

Natural Topsoil. Natural topsoil (not a mapped unit) is developed on and is typically gradational with the underlying geologic formations. Topsoil covers natural ground surfaces and has been encountered underlying fill soils at various locations on the SDSU campus.

Alluvium/Slopewash. Alluvium is the accumulation of soils deposited chiefly by running water in the bottoms of canyons and their tributaries. Alluvium exists within the Alvarado Creek drainage course. Slopewash is a term applied to the accumulation of soil on the face and along the base of a slope, and is chiefly deposited by the action of gravity and surface water flow. The slopewash deposits are generally derived from the other geologic units on and near the site. For the purposes of this study, alluvium and slopewash deposits are not differentiated.

Ancient Landslide Deposits. According to the American Geological Institute's *Glossary of Geology*, a "landslide" is defined as "a general term covering a wide variety of mass-movement landforms and processes involving the downslope transport, under gravitational influence, of soil and rock material en masse. Usually the displaced material moves over a relatively confined zone or surface of shear." As used locally, a "landslide" occurs upon the deep-seated movement of a mass of soil/rock over a fairly discrete basal failure surface or surfaces.

An ancient landslide was identified off site and northwest of the Adobe Falls Faculty/Staff Housing project area. The landslide appears to have occurred along a weak clay layer or bedding-plant shear within the Friars Formation. In addition, a slope failure is known to have occurred several years ago between Genoa Drive and Adobe Falls Road. Reconnaissance-level geologic observations of the project sites do not indicate the on-site presence of ancient landslides or deep-seated slope instability.

Lindavista Formation. The Pleistocene-aged Lindavista Formation underlies the majority of the mesa-top portions of the SDSU campus and the general vicinity. The Lindavista Formation is generally known to consist of orange-brown gravel/cobble conglomerate with a clayey to silty sandstone matrix. Well-cemented zones locally occur within the Lindavista Formation.

Mission Valley Formation. In the project area west of College Avenue, the Eocene-aged Mission Valley Formation is mapped as underlying the Lindavista Formation. The Mission Valley Formation is generally known to consist of gray silty fine sandstone and conglomerate.

Stadium Conglomerate. The Eocene-aged Stadium Conglomerate is mapped as underlying the Mission Valley and Lindavista Formations west of College Avenue and underlying the Lindavista Formation east of College Avenue. The Stadium Conglomerate is generally known to consist of yellow-brown to orange-brown gravel/cobble conglomerate with a silty to clayey sandstone matrix. Occasional boulders may also exist within this geologic unit. Occasional sandstone interbeds occur within this geologic unit, and the Stadium Conglomerate is locally well cemented.

Friars Formation. The Eocene-aged Friars Formation is mapped in the northern portion of the existing SDSU campus and in the area north of Interstate 8. The Friars Formation is generally known to consist of lagoonal and alluvial sediments that, more specifically, consist of claystone, thinly laminated siltstone/claystone, sandstone, and conglomerate. Landslides have been known to have occurred along weak clay layers and bedding-plane shears within the Friars Formation.

Santiago Peak Volcanics. The Jurassic-aged Santiago Peak Volcanics are the hard "bedrock" unit underlying the sedimentary rocks in the northern portions of the SDSU campus and project area. The Santiago Peak Volcanics are generally known to be comprised of hard, mildly metamorphosed volcanic, volcaniclastic, and sedimentary rocks of variable composition and color.

3.9.3.2 Geologic/Soil Resource Evaluation

3.9.3.2.1 U.S. Department of Agriculture Soil Survey

The U.S. Department of Agriculture ("USDA") Soil Survey has mapped the proposed project areas as being underlain by the following soil types: Diablo-Urban land complex ("DcF"); Friant rocky fine sandy loam ("FxE"); Olivenhain cobbly loam ("OhE"); Olivenhain-Urban land complex ("OkC"); Olivenhain-Urban land complex ("OkE"); riverwash ("Rm"); Redding-Urban land complex ("RhC"); and Tujunga sand ("TuB"). **Table 3.9-1, USDA Soil Survey Relevant Soil Characteristics** further describes the characteristics of these soil types as defined by the USDA.

Table 3.9-1
USDA Soil Survey Relevant Soil Characteristics

Soil Name (symbol)	Percent Slope	Potential for Erodability	Shrink/ Swell Potential	Suitability as a Source of...	Suitability for Road Fill
Diablo-Urban land complex (DcF)	15-50	---	High	Unsuitable	---
Friant rocky fine sandy loam (FxE)	9-30	Severe	Low	Unsuitable	Fair
Olivenhain cobbly loam (OhE)	9-30	Severe	Moderate	Gravel	Fair to Poor
Olivenhain-Urban land complex (OkC)	2-9	---	Moderate	Gravel	---
Olivenhain-Urban land complex (OkE)	9-30	---	Moderate	Gravel	---
Riverwash (Rm)	---	Severe	Low	Varying amounts of gravel and sand	---
Redding-Urban land complex (RhC)	2-9	---	High	Unsuitable	---
Tujunga sand (TuB)	0-5	Severe	Low	Sand	Good

Source: Southland Geotechnical Consultants, 2007.

3.9.3.2.2 Aggregate/Mineral Resources

Aggregate is construction-grade sand and gravel. The California Division of Mines and Geology's Special Report 153 classifies land in western San Diego County according to the presence or absence of construction-grade aggregate resources. Subsequently, the Open File Report 96.04 – Update of Mineral Land Classification: Aggregate Materials in the Western San Diego County Production – Consumption Region 1996, was published. The purpose of Special Report 153 and OFR 96-04 was to transmit data on the type, quantity, location, and distribution of aggregate resources as well as projections of future regional need to the State Mining and Geology Board, in compliance with the Surface Mining and Reclamation Act of 1975, which is set forth at Section 2710 *et seq.* of the California Public Resources Code. The project sites include

a number of soil types, identified and described above in **Table 3.9-1**. According to the USDA, the Olivenhain cobbly loam and Olivenhain-Urban land complex would be suitable sources of gravel, and the riverwash and Tujunga sand components would potentially be a suitable source of sand and/or gravel.

The SDSU project areas also lie within mapped Mineral Resource Zones ("MRZ"), with respect to construction aggregate resources. (*See* **Figure 3.9-2, Mineral Resource Zone Designation.**) Areas mapped as MRZ-2 are "areas where adequate information indicates that significant mineral deposits are present or where it is judged that there is a high likelihood for their presence." Areas mapped as MRZ-3 are "areas containing mineral deposits, the significance of which cannot be evaluated from available data." As indicated in **Figure 3.9-2**, each project component falls within an MRZ zone: (i) Adobe Falls Faculty/Staff Housing ties within MRZ.3; (ii) Alvarado Campus lies within MRZ-2; (iii) the Student Union lies within MRZ-2; (iv) the Campus Conference Center lies within MRZ-2; (v) the Alvarado Hotel lies within MRZ-2; (vi) Student Housing – Lot G and Olmeca/Maya lie within MRZ-2 and MRZ-3; (vii) Student Housing – Lot U lies within MRZ-3; and (viii) Student Housing-Villa Alvarado Residence Hall Expansion lies within MRZ-2.

3.9.3.3 Regulatory Framework

The California Geological Survey is the state agency responsible for inventorying and mapping mineral resources in California. Regulations adopted pursuant to the California Geological Survey's mineral resource determinations are generally linked with County Land Use Elements and other types of local/regional development directives or regulations. Accordingly, set forth below are the local - county and city - regulations that govern the mineral resources in the proposed project areas:

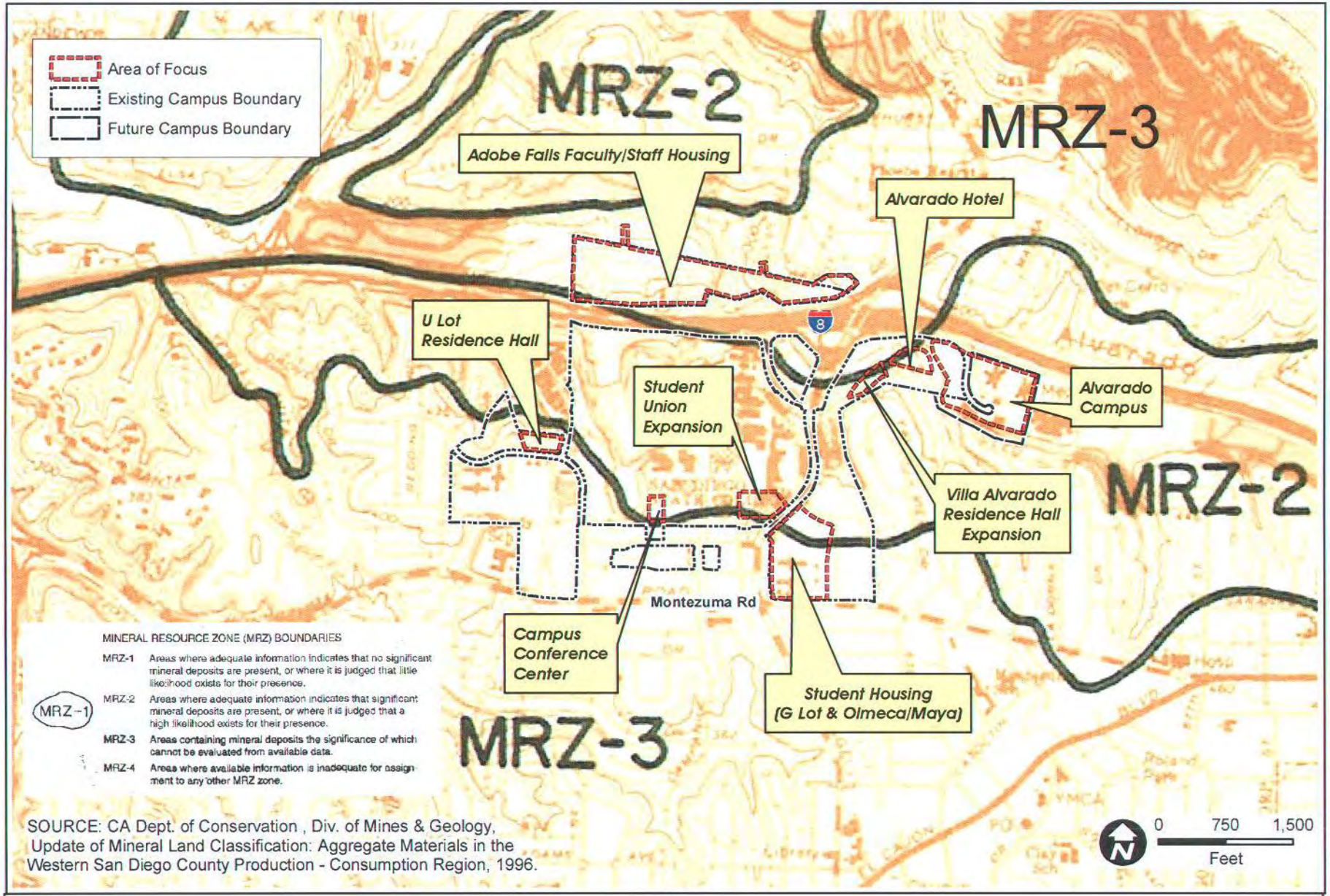

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Figure 3.9-2
Mineral Resource Zone Designations

City of San Diego Progress Guide and General Plan – Conservation Element. The *City of San Diego Progress Guide and General Plan,* adopted in 1989, contains a Conservation Element expressing the following goal: "Balance mineral production and conservation with habitat and topography protection." Additionally, this Element identifies existing extraction operations within the City, specifically within Mission Valley, Carroll Canyon, and Mission Gorge. The City has determined that the use of locally mined materials for San Diego's development is desirable as it reduces the need for trucking materials over long distances. The Conservation Element policies established to protect such mining with relevance to the SDSU campus/proposed project are:

> Protect major mineral deposits against encroachment by land use which would make their extraction undesirable or impossible.
>
> Produce sand and gravel with minimal harm and disturbance to adjacent persons and properties.

The City of San Diego's Conservation Element also includes an unnumbered figure titled "Sand and Gravel Resources, San Diego Metropolitan Area." This figure includes four categories of sand and gravel resources: alluvium, metavolcanic, Poway Conglomerate, and San Diego Formation. The Adobe Falls Faculty/Staff Housing parcel is located within an area that is delineated as metavolcanic or Poway Conglomerate. This indicates that the Adobe Falls Faculty/Staff Housing parcel may be located on a parcel that could support sand and gravel deposits of significance to the local/regional economy.

The *City of San Diego Progress Guide and General Plan* currently is being updated. The final draft document, dated October 2006, is available for public review *via* the City of San Diego Planning Department's website. The revised General Plan is generally referred to as the "General Plan 2020," due to its planning horizon year of 2020. The Conservation Element in the October 2006 draft is similar to the 1989 Conservation Element, in that it describes existing mineral extraction operations, general localities, and the overall relationship to the State of California Department of Mines and Geology Mineral Resource Zones. This revised element does not include a map identifying mineral extraction zones.

County of San Diego General Plan – Conservation Element. The County of San Diego's General Plan also includes a Conservation Element, which has established policies to conserve and protect mining operations throughout the County. These policies include:

Policy 1. The County will, to the extent practicable and appropriate, conserve construction aggregate resources in the entire County to ensure a minimum of fifty years supply.

Policy 3. The extractive overlay designation, as defined in Policy 2.6 of the Land Use Element, will be applied to appropriate areas throughout the County.

The Conservation Element of the General Plan does not include a map of mineral extraction zones.

3.9.4 THRESHOLDS OF SIGNIFICANCE

In accordance with Appendix G of the CEQA Guidelines, the proposed project would have a significant impact on mineral resources if it would result in any of the following:

- Loss of the availability of a known mineral resource that would be of value to the region and the residents of the state; and/or
- Loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

3.9.5 PROJECT IMPACTS

Impacts to Existing Mineral Resources. The proposed project areas are mapped as MRZ-2 and MRZ-3 (*see* **Figure 3.9-2, Mineral Resource Zone Designation**). All components of the project, except for the Adobe Falls Faculty/Staff Housing project components, are located within existing developed areas. (*See* **Figure 3.9-3, Areas of Focus.**) Because of the existing urban/developed nature of these areas, coupled with the surrounding urban nature of the area, even though known or potential mineral resources may exist beneath these sites, extraction of potential resources is not feasible. The probability that further urban development would occur in this area further eliminates the potential for mineral extraction operation on or nearby these project component areas. Therefore, impacts to potential mineral resources as a result of all project components, less the Adobe Falls Faculty/Staff Housing component, would be less than significant.

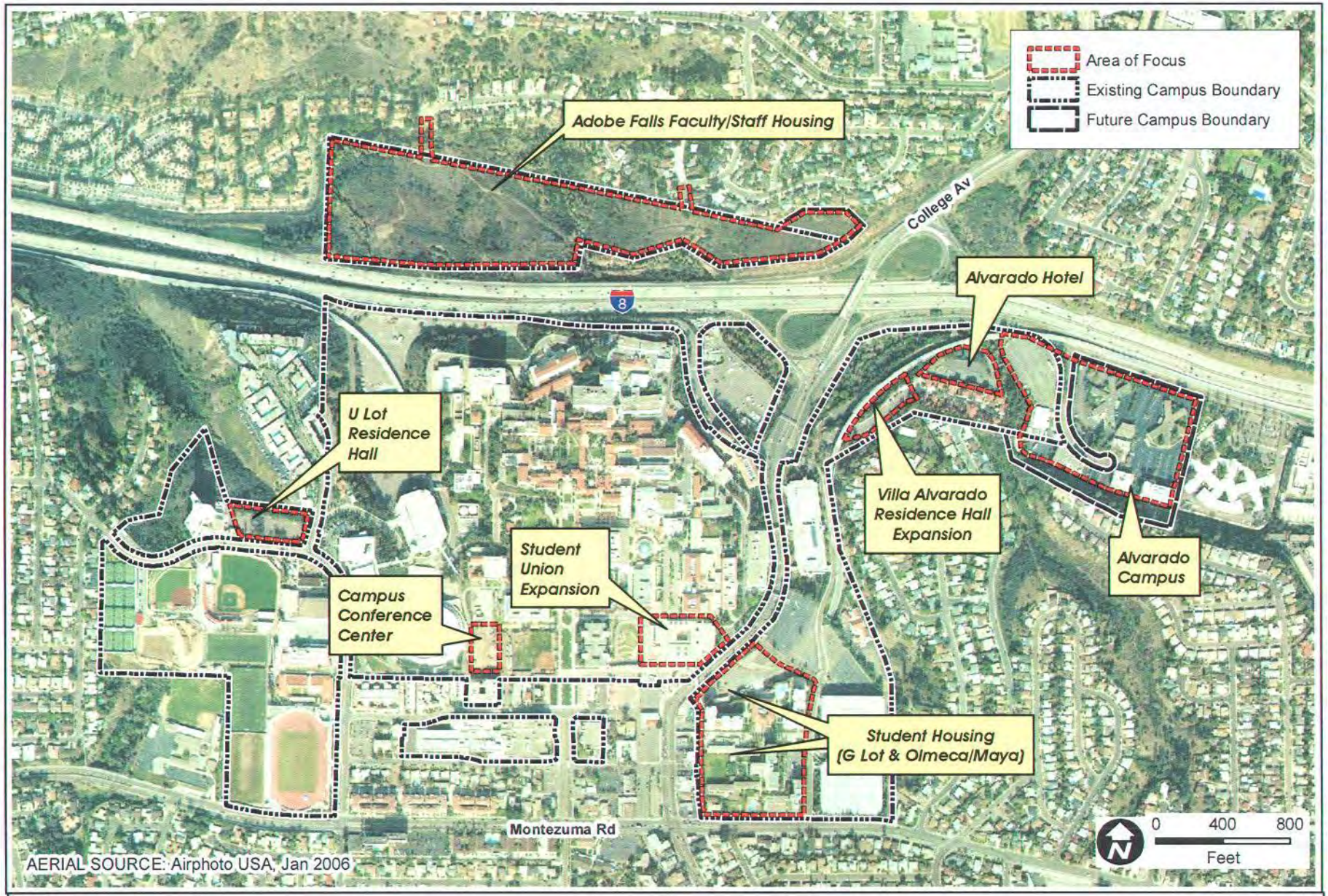

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Figure 3.9-3
Areas of Focus

The Adobe Falls area is mapped as MRZ-3, which is defined as "areas containing mineral deposits, the significance of which cannot be evaluated from available data." The underlying formations of this area consist of Santiago Peak Volcanics, Friars Formation, and alluvium and slopewash. These formations may be source formations for valuable mineral resource deposits.

While the project's underlying features may lend themselves to mining activities, there are several reasons that the site is not a suitable or realistic location for a mining operation:

- **Site Logistics Concerns**. Because of the number of facilities and equipment required to support a mining operation, the area of the Adobe Falls Faculty/Staff Housing parcel that is safely minable is limited by its narrow, elongated shape, as compared to a square site. (*See* **Figure 3.9-4, Proposed Adobe Falls Faculty/Staff Housing Plan**.) In addition to the mine pit, room for material stockpiles, stockpile overburden, aggregate processing and washing equipment, maintenance shops, parking for trucks, equipment, and possibly space for a small on-site office/shack must be provided, which would be a logistics challenge. Due to the lack of a rail spur on the property, trucks would be utilized as the main export vehicle; truck traffic would then flow through the existing residential neighborhood. Furthermore, mining often occurs during evening and nighttime hours, which would be of concern to nearby residents. Mining hours would be very limited given the proximity of nearby homes.

- **Mineral Yield Concerns**. The Santiago Peak Volcanics outcrop at the eastern edge of the Upper Village would need to be chemically tested for reactive characteristics - a condition that is often found in this formation, and which can be problematic when used for certain building functions. Furthermore, the alluvium covering the Lower Village is likely a derivative of the Santiago Peak volcanics, so chemical concerns may be applicable to sand/gravel resources near the base of the Alvarado Creek parcel.

- **Environmental Concerns**. It is likely that the site has high groundwater, due to the presence of Alvarado Creek. The presence of groundwater would limit or, at the very least, complicate pit mine design and the potential depth that can be reached. This limits the volume that can be extracted from the mine. Additionally, due to the dust created by mining operations, an on-site water source would need to be maintained. Finally, depending on the depth of a mining operation, blasting may be required, which would be of concern to nearby residents.

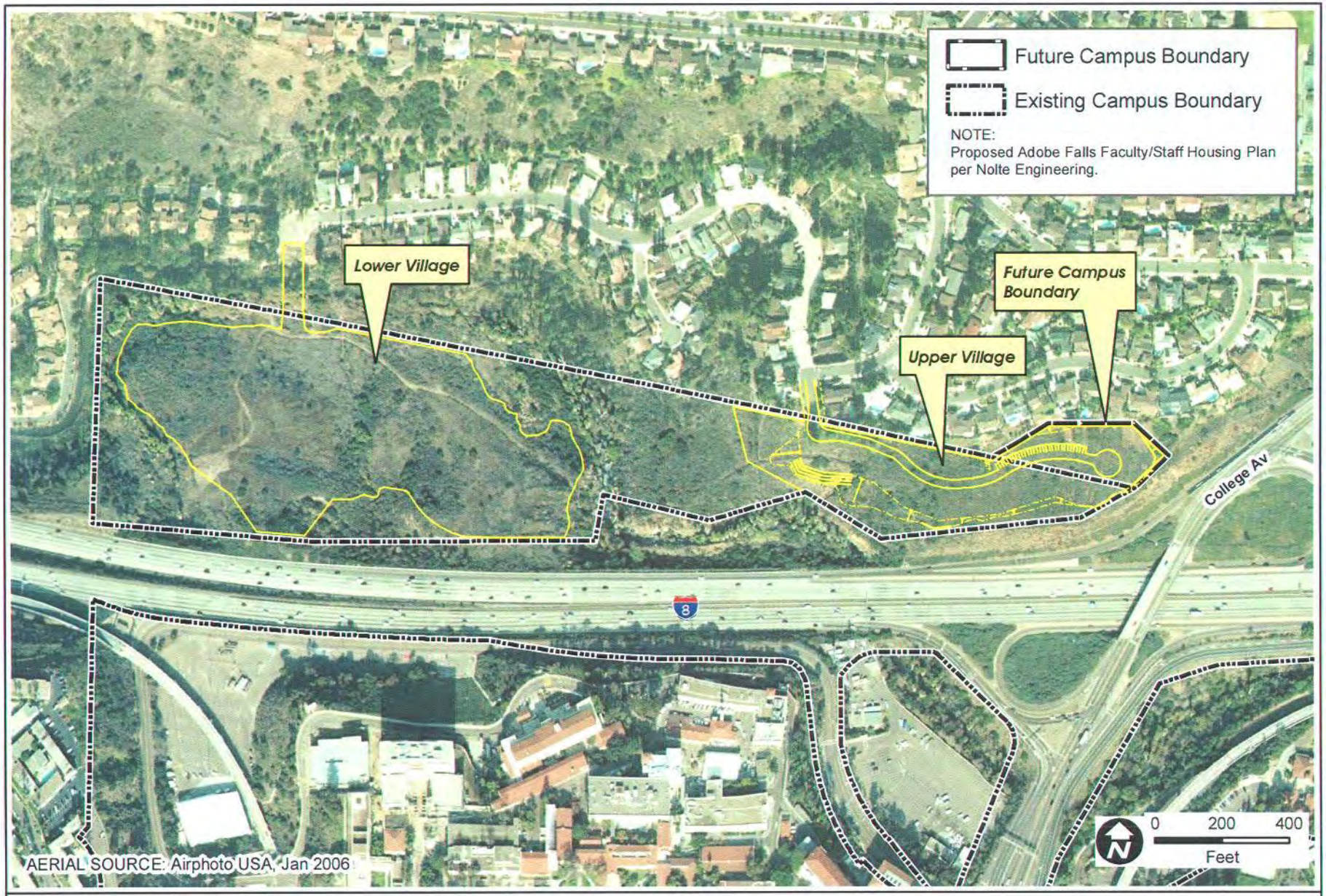

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Figure 3.9-4
Proposed Adobe Falls Faculty/Staff Housing Plan

- **Regulatory Concerns**. It is likely that the complex regulatory environment that must be navigated to permit new mining operations would result in a lengthy and cumbersome approval process.

Furthermore, considering the current land use at the project site and the land use of the surrounding areas, development of this project area as a commercial source of sand, commercial aggregates, gravel, or decomposed granitics is highly unlikely.

Relationship to Regulations. Although California State University-owned land is not subject to the planning/development restrictions enforced by the City of San Diego, the City's Conservation Element notes the Adobe Falls Faculty/Staff Housing parcel's location within the MRZ-3 zone. As indicated above, the MRZ-3 zone is defined as "areas containing mineral deposits, the significance of which cannot be evaluated from available data." Furthermore, the City of San Diego's Conservation Element includes goals to balance the need for mineral resource extraction and environmental conservation. Specifically, the City should work to facilitate sand and gravel extract with minimal harm and disturbance to adjacent persons and properties and regulate adjacent land uses so they do not spill over into mineral extraction areas resulting in potential land use conflicts. Due to the Adobe Falls site's location adjacent to single-family residences, the suitability of this parcel to house a mining operation is low.

The County of San Diego's General Plan includes several policies and action programs for the conservation of construction aggregate resources. However, the land use designations, as defined in the General Plan, do not apply to the project areas, which are within the City of San Diego's jurisdiction and not the County's jurisdiction.

In sum, the project will not result in the loss of availability of mineral resources due to the existing conditions present at the Adobe Falls proposed project site, which preclude the use of the land for mineral extraction. The potential impact to mineral resources under the proposed project would be less than significant.

3.9.6 CUMULATIVE IMPACTS

As described above, the proposed project will not have a direct significant impact on mineral resources in the Adobe Falls area because adjacent residential properties would likely preclude the development of a mining operation on the site. Similarly, the cumulative development surrounding the SDSU campus would additionally preclude mineral extraction work. The development of all project components would not result in placement of sensitive land uses

within an area rich in mineral resources, so as to preclude future mining activity or account of sensitive receptor presence. For the above reasons, a less than significant cumulative impact to mineral resources would occur.

3.9.7 MITIGATION MEASURES

The project would not have a potentially significant impact on mineral resources; therefore, no mitigation measures are required.

3.9.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Any potential impacts to mineral resources that might occur as a result of implementation of the proposed project would be less than significant.