APPENDIX H
HYDROLOGY/WATER QUALITY TECHNICAL REPORT

HYDROLOGY AND WATER QUALITY TECHNICAL REPORT

for the

2007 SDSU CAMPUS MASTER PLAN REVISION

SAN DIEGO, CALIFORNIA

Prepared for:

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1.0 INTRODUCTION

1.1 Project Description

The 2007 Campus Master Plan Revision (proposed project) is intended to improve, enhance, rehabilitate and provide new facilities for the San Diego State University (SDSU) campus. SDSU is located in San Diego County, California (see *Figure 1, Regional Map*), near the intersection of Interstate 8 and College Avenue (see *Figure 2, Vicinity Map*).This project will enable SDSU to meet the projected increases in student demand for higher education. To accommodate the projected student increase, the proposed project involves the development of classroom, housing and student support facilities on land located on the SDSU campus and immediately adjacent to it.

The following six project components are proposed. A majority of the six components are being analyzed at a project level while the remaining portions are being analyzed at a program level. *Table 1, Proposed Project Components*, summarizes the following:

TABLE 1
Proposed Project Components

Component Name	Existing Land Use	Existing Campus Master Plan Use
Adobe Falls Faculty/Staff Housing	Upper Village Undeveloped land	Not designated
	Lower Village Undeveloped land	Not designated
Alvarado Campus	D Parking Lot (SDSU-owned land)	East Campus Development Area
	Alvarado Core Site - Medical office park (SDSU Foundation-owned land)	None
Alvarado Hotel	C Lot	C Lot
Campus Conference Center	Undeveloped Land	Undeveloped Land
Student Union Addition	Aztec Center	Aztec Center
Student Housing	G Lot Residence Hall and Student and Residential Life Administration Building - G Parking Lot	G Lot
	Villa Alvarado Residence Hall Expansion - C Lot	C Lot
	Olmeca/Maya Reconstruction – Student housing	Student Housing
	U Lot Residence Hall - U Parking Lot	Parking Structure 7

Note: The eastern portion of the Alvarado Campus is situated on property owned by the SDSU Foundation. The Alvarado Campus land is designated "Redevelopment Project Area" on the College Area Community Plan Planned Land Use Map (City of San Diego 1989a).

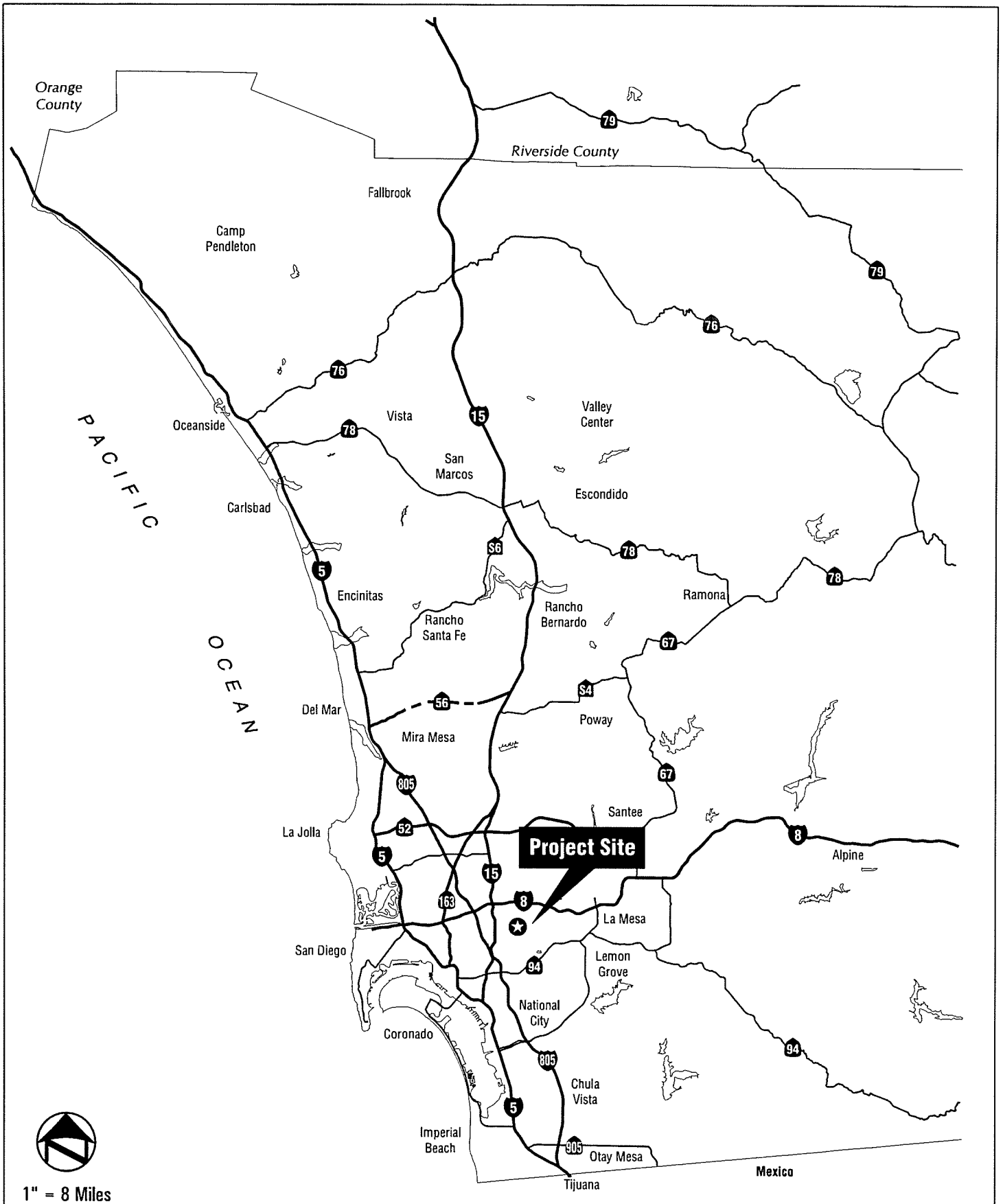

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Figure 1

Regional Map

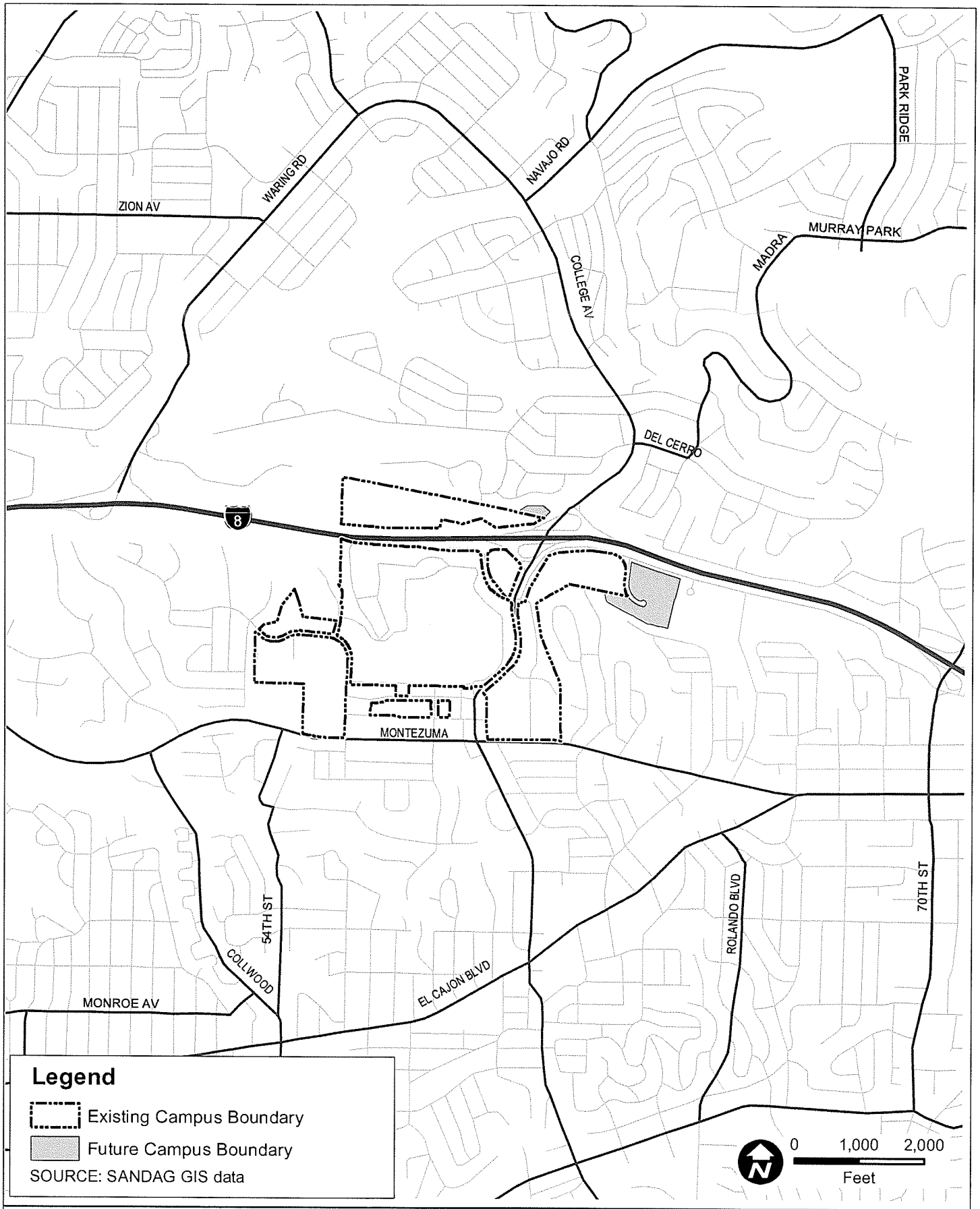

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Figure 2
Vicinity Map

- **Adobe Falls Faculty/Staff Housing** – This project component is proposed for the University's 33-acre undeveloped land located north of I-8. The site is bordered by Adobe Falls Drive/Del Cerro Boulevard to the north, I-8 to the south and residential communities to the north. This project component is proposed for the University's 33-acre undeveloped land located north of I-8. The site is bordered by Adobe Falls Drive/Del Cerro Boulevard to the north, I-8 to the south and residential communities to the north.

- **Alvarado Campus** – The Alvarado Campus component of the proposed project is located in the northeast portion of the SDSU campus, extending eastward onto property presently owned by the SDSU Research Foundation. The site is bordered by Alvarado Road to the north, an undeveloped slope and Alvarado Creek to the south. The northward trending bend in Alvarado Creek forms the western boundary, and the edge of the existing medical office facility property serves as the eastern boundary. The Alvarado Campus project component consists of two distinct areas: D Lot, which is an existing SDSU parking lot with 432 spaces, and the existing Alvarado Medical Center, a complex of medical offices and research facilities located east of D Lot, and owned by the SDSU Research Foundation. Under the proposed project, the two areas that make up the Alvarado Campus component would function as one contiguous campus region. The Alvarado Campus component ultimately will include a total of approximately 612,000 square feet of academic/research/medical space. A 1,840-car, multi-story parking structure is also planned for this project component. Access between the Alvarado Campus and central campus would occur through expansion of the Red and Black Shuttle Service. The proposed project also would entail the reconfiguration of Alvarado Court to allow for the development of a more unified campus node.

- **Alvarado Hotel** – This project component is proposed to be located on approximately 2.0 acres of existing Lot C, immediately north of Villa Alvarado Residence Hall, a coeducational apartment style residence hall, and south of Alvarado Road. The site abuts Alvarado Creek to the north and east, and campus parking lots to the west. The Alvarado Hotel would consist of an approximately 60,000 gross square foot six-story building, with up to 120 rooms and studio suites. The facilities will contain a small meeting room, exercise room, board room, business center, on-site restaurant and hospitality suite. The hotel would be developed by Aztec Shops and operated in cooperation with the SDSU School of Hospitality and Tourism Management. Site parking will be provided for 130-140 cars either on grade or in a subterranean garage. Trash enclosures, storage, and an entry canopy will be provided.

- **Campus Conference Center** – This component would consist of the development of a new 70,000 gross square foot 3-story building on approximately one half acre located east of Cox Arena for meeting/conference space. The new building would provide meeting/conference space, office space, food services, and retail services. This facility would be utilized by

student, faculty, and staff organizations, as well as off-campus groups. This facility would be located on the old tennis court site.

- **Student Union Expansion and Renovation** – The existing Student Union, referred to as "Aztec Center" is located immediately west of College Avenue, along the southern border of campus. This component would consist of renovations to the existing Aztec Center, including up to a 70,000 gross square foot expansion, to include social space, meeting space, recreation facilities, student organization offices, food services and retail services.

- **Student Housing** – This project component, which would be developed in multiple phases, includes the demolition of two existing student housing structures and the construction of five new housing structures, ultimately resulting in a net increase of 2,976 new student housing beds on campus. This component would occur in four distinct phases, impacting four areas of campus: G Lot, Olmeca/Maya Residence Halls/HARE, U Lot and C Lot.

  The G Lot project component would include construction of a 10-story 350,000 gross square foot Type-1 (reinforced concrete) structure to house 800 student beds and the reconfiguration of existing G Lot which would result in a 90% reduction in available surface parking spaces. G Lot is bordered on the northwest by College Avenue, the northeast by Zura Way (an internal campus street) and the south by the East Residence Hall complex, which includes Tepeyac, Cuicacalli and Tacuba Halls.

  The Olmeca/Maya/ Office of Housing Administration and Residential Education (HARE) component would consist of demolition of the existing Olmeca and Maya Residence Halls and HARE buildings. A new two-story, 15,000 gross square foot HARE building would be constructed immediately north of H Lot. Two new 10-story 350,000 square foot residence halls would be constructed on the site formerly supporting Olmeca and Maya Residence Halls. Each of these Type 1 structures would support 800 beds.

  The U Lot portion of this project component would consist of removing existing U Lot parking space uses for replacement with a 10-story 350,000 gross square foot, Type-1 structure to house 800 student beds. This structure would be constructed over the previously master-planned, but not yet built Parking Structure 7. The parking structure would contain spaces for 750 vehicles, 250 more than previously master-planned. The C Lot portion of this project component would result in the redevelopment of this existing parking lot into a 200 student bed residence hall. This component would consist of 50 two-bedroom apartments, housing 200 student beds, in 2-3 story structures. These structures would mirror the existing Villa Alvarado Residence Hall located immediately east of this project component.

It should be noted that this project component will be discussed in terms of the Villa Alvarado Residence Hall Expansion, Student Housing – G Lot and Olmeca/Maya, and U Lot Residence Hall in the remainder of the report.

2.0 METHODOLOGY

Data regarding hydrology and water quality for the site were obtained through a review of pertinent literature, proposed site plans and FEMA Flood Insurance Rate Maps (FIRM). Hydrologic data was evaluated to identify existing drainage basins and flow characteristics. The San Diego County Hydrology Manual procedure was used to determine peak flows on a conceptual level. The City of San Diego Storm Water Standards Manual (SWS Manual) in the San Diego Municipal Code for Land Development was utilized to comply with permanent and construction storm water quality requirements through Best Management Practices (BMPs).

2.1 Literature Review

Surface water and groundwater information was obtained from the San Diego County Water Authority (1997), San Diego Hydrology Manual (2003), and additional sources noted in the references section. Water quality information for the site was obtained through a literature review using the following sources: 2006 List of Water Quality Limited Segments (SWRCB, 2006), Water Quality Control Plan San Diego Basin (SDRWQCB, 1994 with amendments through February 2005), and NPDES Municipal and General Permits (No. CAS108758 and No. CAS000004). The Revised Draft Technical Report for Total Maximum Daily Loads for Indicator Bacteria Project I – Beaches and Creeks in the San Diego Region (SDRWQCB, 2007) was also used to assess potential impacts to the downstream impaired waterbodies. The recently released soil information was obtained from Southland Geotechnical Consultants.

2.2 Limitations

This report is based on review of pertinent literature as discussed above. Aquifer characteristics, stream flow, and channel characteristics were defined by other professionals and their data was interpreted by Dudek; however, a detailed field study was beyond the scope of this report. Runoff peak flow rates were estimated based on available information. Independent drainage analyses will be conducted following the preparation of detailed project design plans for each component.

3.0 EXISTING CONDITIONS

The proposed project site is within Section 14, 15, and 22 in Range 2 West, Township 16 South of the San Bernardino Base and Meridian, U.S. Geological Survey (USGS) 7.5 minute series La Mesa, California Quadrangle. The proposed project consists of six individual components totaling approximately 55 acres on and in the vicinity SDSU campus (*Figure 3*). The SDSU campus is located atop a mesa terrace intersected by canyon drainages on the north, east, and west sides, which drain into the San Diego River system. The surrounding area is coastal plain surrounded by foothills and mountains.

The climate of San Diego County is characterized by warm, dry summers and mild, wet winters. The average rainfall is about 10-13 inches per year, most of which falls between November and February. The average mean temperature for the area is approximately 65 degrees in the coastal zone and 57 degrees in the surrounding foothills (Basin Plan 2005).

3.1 Site Topography

The elevation of the area surrounding the site varies approximately between 100 and 400 feet above mean sea level (ft amsl). The four proposed project components on the main SDSU campus, Student Housing (U Lot Residence Hall, G Lot & Olmeca/Maya), Student Union Expansion, and Campus Conference Center, have elevations of approximately 400 ft amsl on the mesa terrace. The three proposed project components located east of the main SDSU campus, Alvarado Campus, Alvarado Hotel and Villa Alvarado Residence Hall Expansion have slightly lower elevations varying between approximately 333 and 351ft amsl. The Adobe Falls Faculty/Staff Housing proposed project component is located north of the main SDSU campus at a lower elevation varying between approximately 121 and 430 ft amsl. The topography generally undulates with higher elevations on mesa tops and lower elevations in the canyons.

3.2 Surface Water

The proposed project is within in the San Diego Hydrologic Unit (HU) (907.00), which is one of the eleven hydrologic units established within the San Diego Basin. The San Diego HU is divided into four Hydrologic Areas (HA) and the proposed project site is within the Lower San Diego HA (907.10). The Lower San Diego HA is divided into five Hydrologic Sub-Areas (HSA) and the proposed project site is within the Mission San Diego HSA (907.11) (*Figure 4*). The San Diego Watershed, as described by Project Clean Water, encompasses approximately 440 square miles and is the second largest hydrologic unit in San Diego County. It has the highest population of the County's watersheds and contains portions of the cities of San Diego, El Cajon, La Mesa, Poway, and Santee and several unincorporated jurisdictions. Important hydrologic

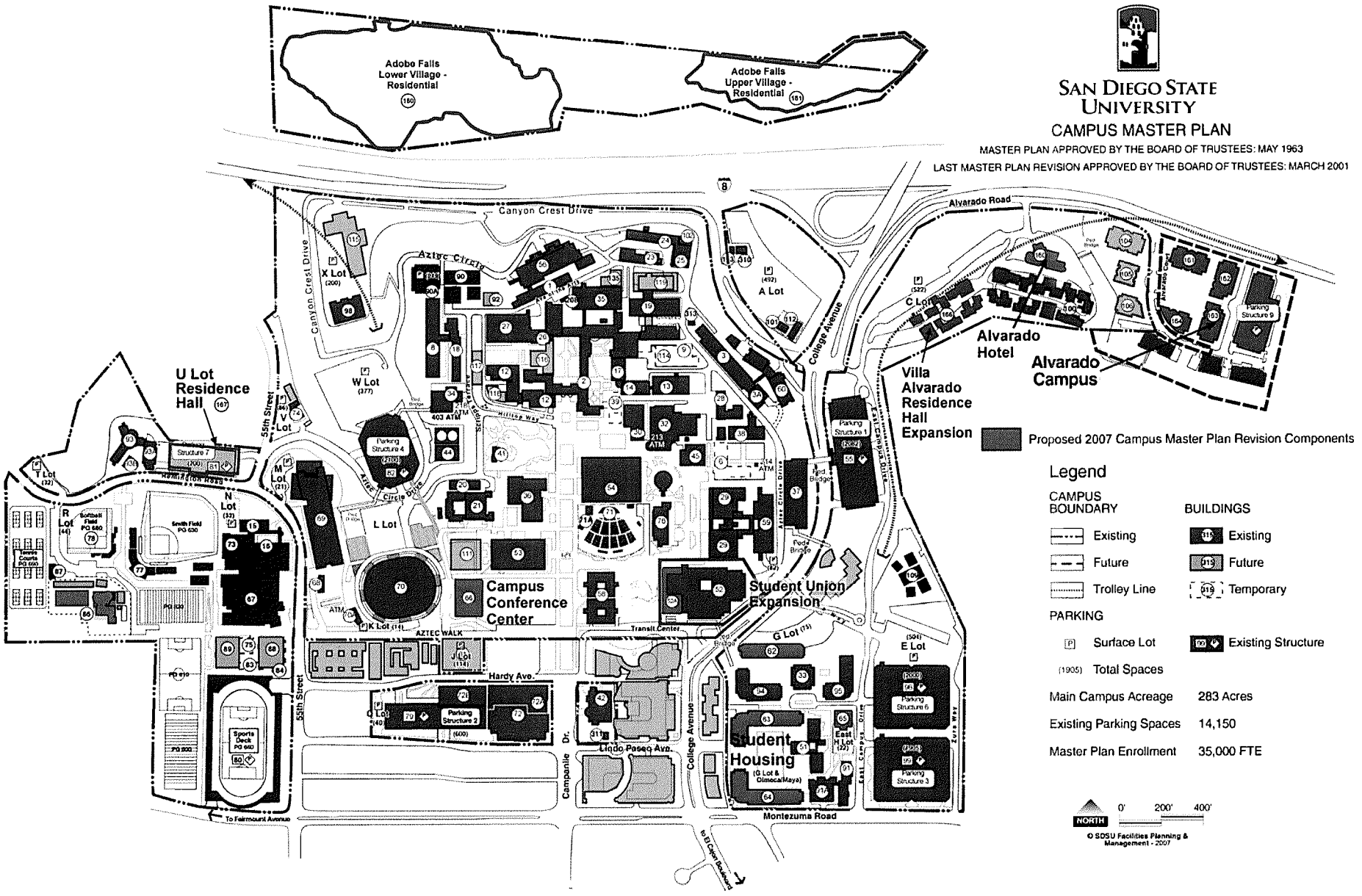

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Figure 3

Proposed Campus Master Plan

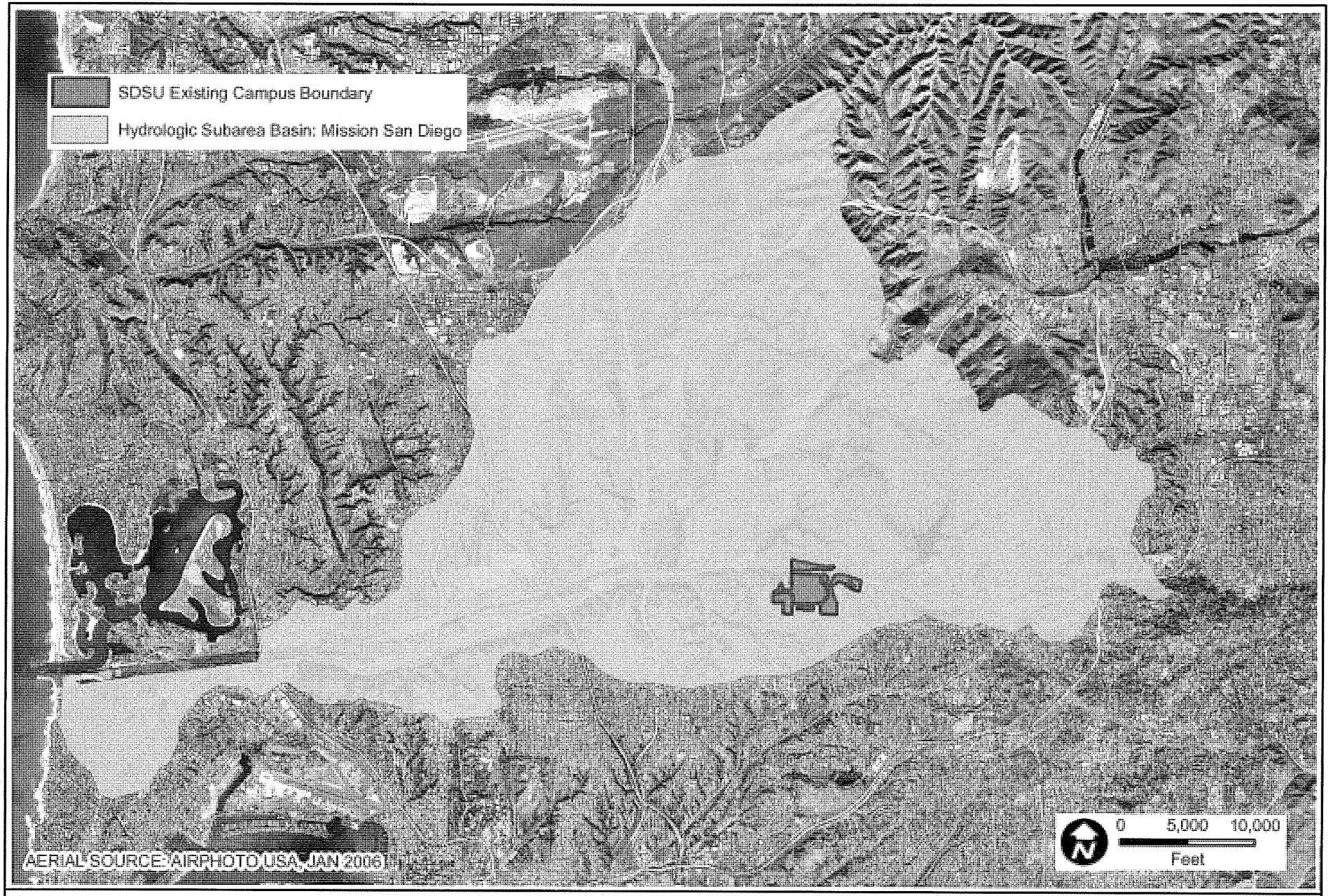

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Figure 4
San Diego Watershed Map

resources in the watershed include five water storage reservoirs, a large groundwater aquifer, extensive riparian habitat, coastal wetlands, and tidepools. Approximately 58.4% of the San Diego River watershed is currently undeveloped. The majority of this undeveloped land is in the upper, eastern portion of the watershed, while the lower reaches are more highly urbanized with residential (14.9%), freeways and roads (5.5%), and commercial/ industrial (4.2%) land uses predominating. (Project Clean Water 2007).

Lake Murray is the only reservoir in the San Diego River system that is within the project vicinity. It is located east of any proposed development and is not affected by any runoff from SDSU. All runoff from existing and proposed SDSU sites enter the San Diego River via Alvarado Creek or other unnamed tributaries (*Figure 4*).

3.3 Groundwater

A groundwater basin is defined as a hydrogeologic unit containing one large aquifer as well as several connected and interrelated aquifers. All major watersheds in the San Diego Region contain groundwater basins. The proposed project site is located in and adjacent to the 6.28 square mile Mission Valley Groundwater Basin (*Figure 5*). Drained by the San Diego River, this basin underlies an east-west trending valley and is bound by lower permeability San Diego, Poway and Lindavista Formations (California DWR 2003). The principal water bearing deposit is alluvium consisting of medium to coarse-grained sand and gravel. This alluvium has an average thickness of 80 feet and a maximum thickness of about 100 feet (San Diego County Water Authority Groundwater Report, June 1997). The Mission Valley Groundwater Aquifer is summarized below in *Table 2, Mission Valley Groundwater Aquifer.*

TABLE 2
Mission Valley Groundwater Aquifer

AQUIFER	Description	Thickness
Shallow Alluvium	Quaternary age medium to coarse-grained sand and gravel.	Approximately 80-100 feet.
San Diego Formation	Thick accumulation of older, semi-consolidated alluvial sediments.	Generally less than 100 feet.[1]

1. The San Diego Formation thickens westward across the Rose Canyon fault system, reaching a maximum thickness of about 1,000 feet (Huntley and others 1996).

Alluvium principally underlies the Alvarado Creek drainage course and groundwater is reported to occur within alluvium near the Adobe Falls Faculty/Staff Housing, Alvarado Campus, Alvarado Hotel and Villa Alvarado Residence Hall Expansion proposed project components

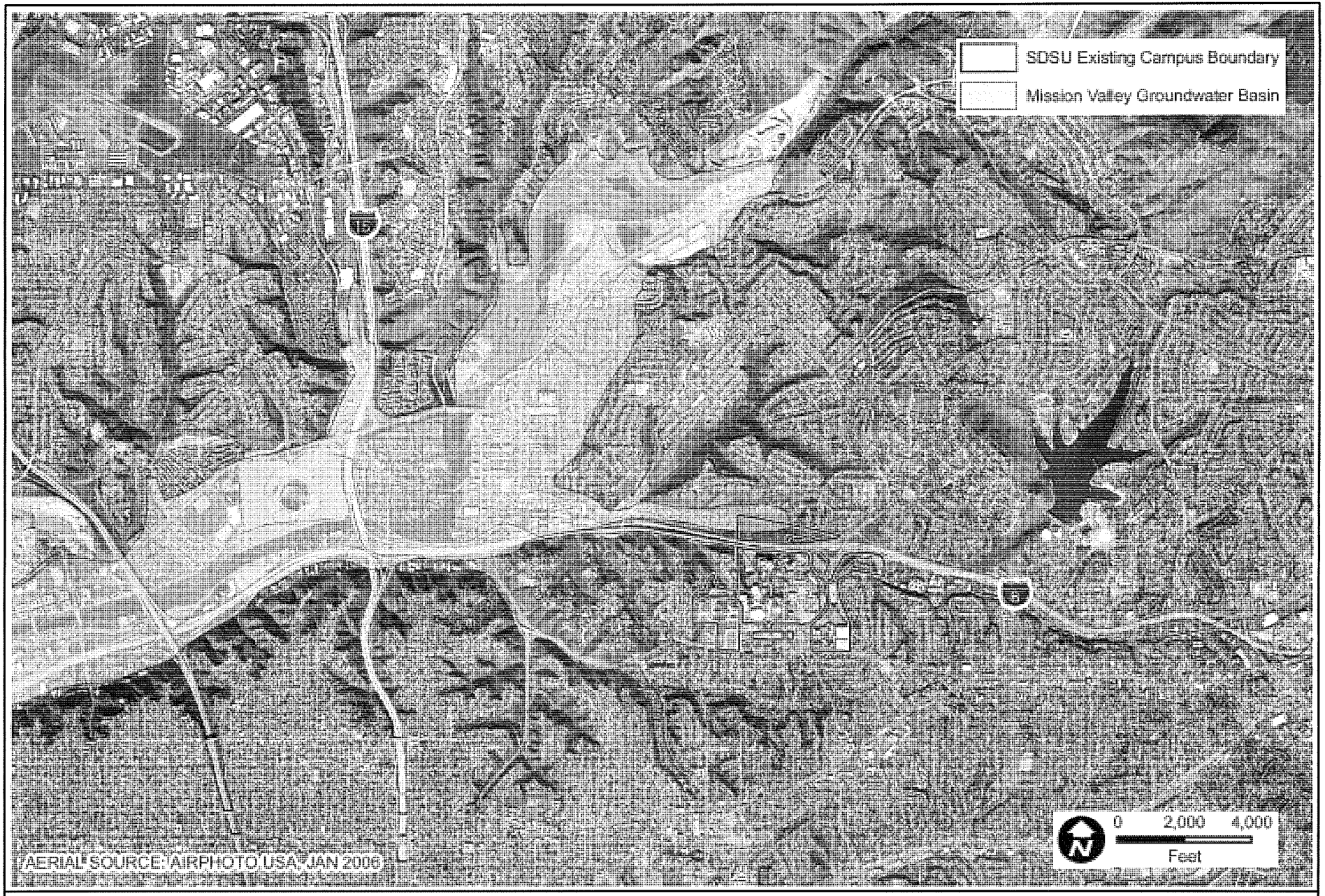

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Figure 5
Mission Valley Groundwater Basin Map

(*Figure 5*). The northern portions of the site, in the vicinity of Adobe Falls Faculty/Student housing and Alvarado components are also underlain by a hard metavolcanic unit, which allows for permeability and overall westward flow of groundwater toward the Mission Valley Basin. The project components located on the main campus (Camus Conference Center, Student Union Expansion, Student Housing) are underlain primarily by Stadium Conglomerate, Linda Vista Formation and the Mission Valley Formation. The regional groundwater table is anticipated to be several hundred feet deep in the metavolcanic unit and atop the mesas at the main campus (Law/Crandall 1997). That said, non-porous sand and clay materials are mixed amongst these volcanic layers and create groundwater "lenses," or isolated pockets of groundwater. Sporadic groundwater lenses may also be located in formations adjacent to the Alvarado Creek alluvium and slopewash (as discovered during San Diego Trolley Extension boring activity). Seasonal fluctuations of the onsite groundwater conditions are assumed. The most probable sources of groundwater within the project vicinity are infiltration of landscape irrigation water and precipitation (Southland Geotechnical, November 2004).

3.4 Floodplain

Federal Emergency Management Agency (FEMA) Fire Insurance Rate Maps (FIRMs) identify flood zones and areas that are susceptible to 100-year and 500-year floods. Four of the proposed project components are identified by FEMA as areas that are within or adjacent to the 100-year flood plain (*Figure 6*). Portions of the Alvarado Hotel, Alvarado Campus and Villa Alvarado Residence Hall Expansion are located within the 100-year flood zone. Portions of the Adobe Falls Faculty/Staff Housing abut the 100-year flood zone. All of these areas are in the Alvarado Creek drainage and are depicted in *Figure 6, Figure 7, and Figure 8.*

3.5 Water Quality Regulations

SDSU is considered a non-traditional Municipal Separate Storm Sewer System (MS4) subject to comply with permanent and construction storm water quality requirements in the City of San Diego's SWS Manual. The following section provides background for the water quality regulations relevant to SDSU.

3.5.1 Federal Water Pollution Control Act (Clean Water Act)

The Federal Water Pollution Control Act was amended in 1972 and is commonly referred to as the Clean Water Act (CWA). The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

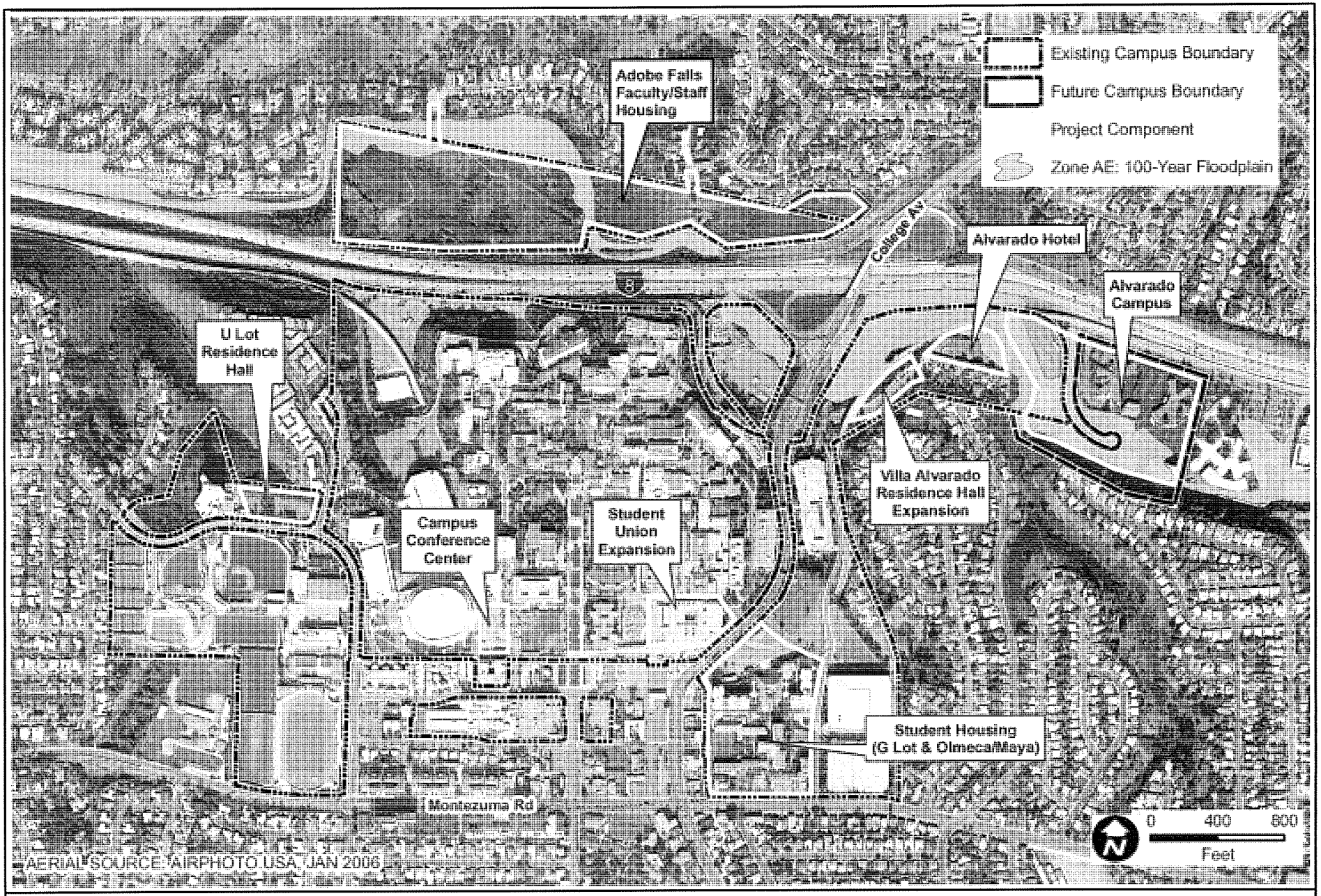

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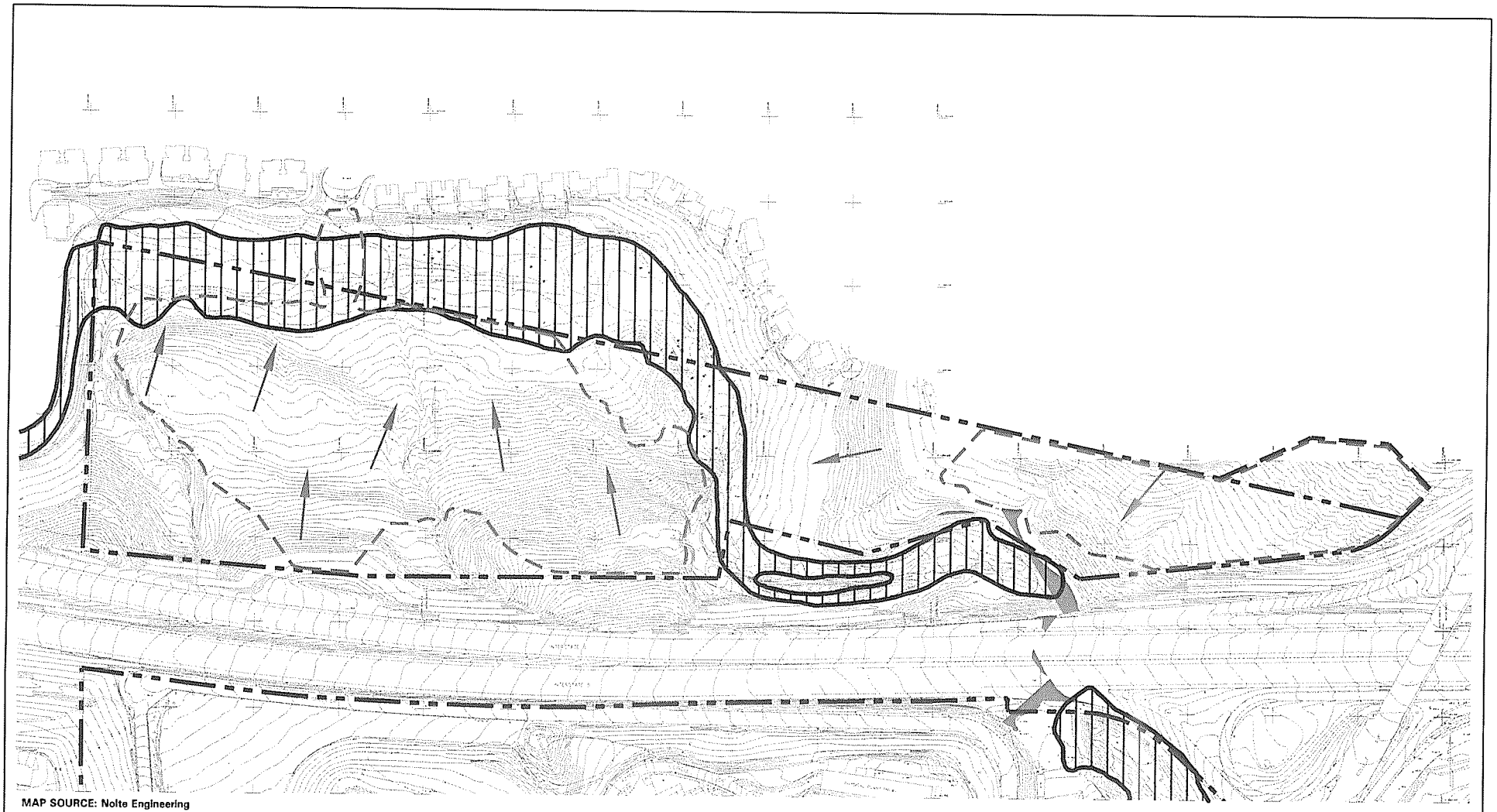
Figure 6
Hydrologic Features Map



MAP SOURCE: Nolte Engineering

ZONE AE
100-YEAR FLOOD PLAIN

EXISTING SDSU
CAMPUS BOUNDARY

PROPOSED
DEVELOPMENT AREA

DIRECTION
OF FLOW

PROPOSED SDSU
CAMPUS BOUNDARY

N

0 350
Feet

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Figure 7
Drainage Area Map
Adobe Falls Faculty/Staff Housing

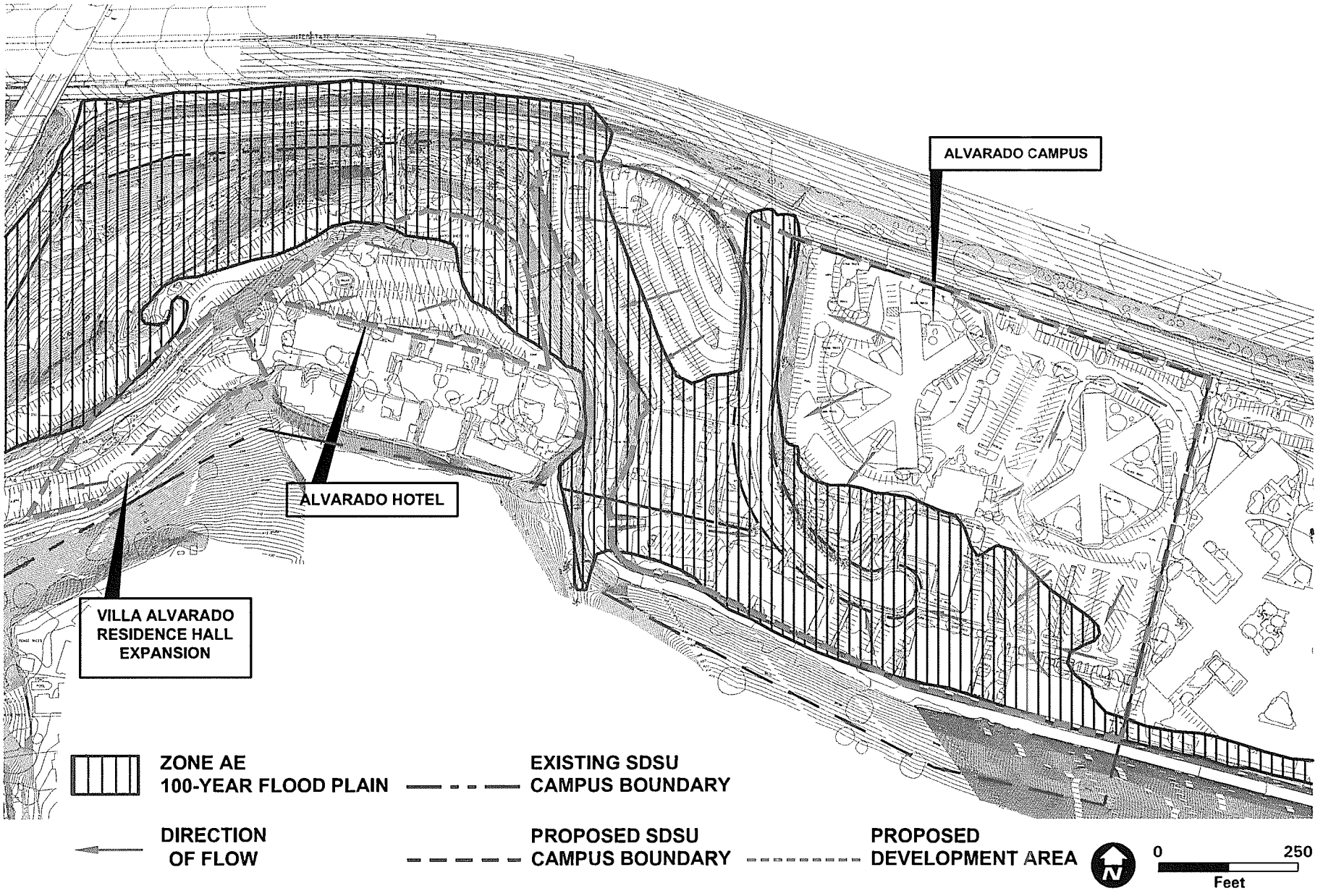

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Figure 8

Drainage Area Map - Alvarado Campus, Alvarado Hotel & Villa Alvarado Residence Hall Expansion

Section 303(d) of the CWA requires states to develop a list of waters that do not meet water quality standards. These waters are called water quality limited segments. States must address water quality limited segments by establishing priority rankings and developing Total Maximum Daily Loads (TMDLs) to improve water quality.

Section 402(p) of the CWA, added via the Water Quality Act (WQA) of 1987, established the National Pollutant Discharge Elimination System (NPDES) storm water permit program. In California, the State Water Resources Control Board (SWRCB), through nine Regional Boards, administers the NPDES storm water municipal permitting program to regulate discharges.

3.5.1.1 303(d) List of Water Quality Limited Segments

The 2006 CWA 303(d) List of Water Quality Limited Segments classifies the San Diego River (Lower) and the Pacific Shoreline, San Diego HU (San Diego River Mouth, aka Dog Beach) as impaired water bodies, which are located approximately 2 and 10 miles west of SDSU, respectively. The pollutant/stressors and potential sources for these impaired waterbodies are identified in the following table:

TABLE 3
Clean Water Act 303(d) List of Water Quality Limited Segments

Location	Pollutant/ Stressor	Potential Source	Proposed TMDL Completion	Estimated Size Affected
San Diego River (Lower)	Fecal Coliform	Urban Runoff/Storm Sewers, Wastewater, Nonpoint/Point Source	2005	16 Miles
	Low Dissolved Oxygen	Urban Runoff/Storm Sewers, Unknown Nonpoint Source, Unknown Point Source	2019	16 Miles
Pacific Shoreline, San Diego HU (San Diego River Mouth, aka Dog Beach)	Indicator Bacteria	Nonpoint/Point Source	2005	0.37 Miles

Source: State Water Resources Control Board, October 25, 2006.

Urban runoff/storm sewers are a potential source for both fecal coliform and low dissolved oxygen in the San Diego River (Lower). Nonpoint/point sources are a potential source for indicator bacteria at the Pacific Shoreline, San Diego HU (San Diego River Mouth, aka Dog Beach).

3.5.1.2 Total Maximum Daily Loads (TMDLs)

The purpose of a TMDL is to attain the water quality objectives (WQOs) and restore the beneficial uses for impaired waterbodies under Section 303(d) of the CWA. TMDLs represent a

strategy for meeting WQOs by allocating quantitative limits for point and non-point pollution sources. A TMDL is defined as the sum of individual waste load allocations (WLAs) for point sources and load allocations (LAs) for non-point sources and natural background such that the capacity of the waterbody to assimilate pollutant loading (i.e., the loading capacity) is not exceeded. Therefore, the TMDL is the maximum amount of pollutant of concern that the waterbody can receive and still attain WQOs.

The San Diego Regional Water Quality Control Board (Regional Board) released "Total Maximum Daily Loads for Indicator Bacteria, Project I – Beaches and Creeks in the San Diego Region, Revised Draft Technical Report" on March 9, 2007, as required by Section 303(d) of the CWA. The numeric targets for TMDLs that include the San Diego River and downstream beach (San Diego River Mouth, aka Dog Beach) are presented in *Tables 4 and 5* below, which are excerpted from the "Total Maximum Daily Loads for Indicator Bacteria, Project I – Beaches and Creeks in the San Diego Region, Revised Draft Technical Report." The TMDLs are calculated for fecal coliforms, total coliforms, and enteroccoci in wet and dry weather, and in interim and final phases. The Regional Board concluded that WQOs without any allowable exceedances are sufficient for use as dry weather TMDL targets. The Regional Board is considering a Basin Plan amendment to incorporate these TMDLs.

TABLE 4
Interim and Final Wet Weather Numeric Targets for San Juan Creek and Downstream Beach, Aliso Creek and Downstream Beach, the San Diego River and Downstream Beach, and Chollas and Forrester Creeks

Indicator Bacteria	Interim Targets		Final Targets	
	Numeric Target[1] (MPN/100mL)	Allowable Exceedance Frequency[2]	Numeric Target[3] (MPN/100mL)	Allowable Exceedance Frequency[4]
Fecal Coliforms	400	22%	400	NA
Total Coliforms	10,000	22%	230	NA
Enteroccoci	61	22%	61	NA

1. Targets based on contact recreation (REC1) single sample water quality objectives (WQOs).
2. Exceedance frequency based on reference condition observed in Los Angeles Region.
3. Targets based on REC1 single-sample WQOs for fecal coliform and enteroccoci and shellfish harvesting (SHELL) single-sample WQOs for total coliforms.
4. Not applicable because there is no authorization for a reference system approach in the Basin Plan.

TABLE 5
Interim and Final Numeric Dry Weather Targets for Beaches and Creeks

Indicator Bacteria	Interim Period (MPN/100mL)		Final Targets (MPN/100mL)	
	Beaches[1]	Creeks[1]	Beaches[2]	Creeks[2]
Fecal Coliforms	200	200	200	200
Total Coliforms	1,000	1,000	70	1,000
Enteroccoci	35	33	35	33

1. Targets based on REC-I WQOs
2. Targets based on REC-I WQOs; fecal coliform and enterococci; SHELL WQOs for total coliform.

Bacteria densities in the waters of beaches and creeks have chronically exceeded the numeric WQOs for total, fecal, and enterococci bacteria. Because bacteria loads within urbanized areas generally originate from urban runoff discharged from Municipal Separate Sewer Systems (MS4s), the primary mechanism for TMDL implementation will be increased regulation of these discharges through National Pollutant Discharge Elimination System (NPDES) regulations. For example, the Total Maximum Daily Loads for Indicator Bacteria, Project I – Beaches and Creeks in the San Diego Region, Revised Draft Technical Report reports the following percent reductions (expressed as an annual load) for Municipal MS4s for interim wet weather TMDLs for San Diego HU (907.11) at the San Diego River Mouth (aka Dog Beach): 53.3% fecal coliform, 38.2% total coliform, and 42.8% enterococci. The percent reduction (expressed as an annual load) for Municipal MS4s for final wet weather TMDLs for San Diego HU (907.11) at the San Diego River Mouth (aka Dog Beach) is 100% for all these bacteria. The Total Maximum Daily Loads for Indicator Bacteria, Project I – Beaches and Creeks in the San Diego Region, Revised Draft Technical Report also reports the following percent reductions (expressed as a monthly load) for Municipal MS4s for interim/final dry weather TMDSL for San Diego HU (907.11) at the San Diego River Mouth (aka Dog Beach): 69.4% for fecal coliform, 74% and then 98.2% for total coliform, and 93.9% for enterococci.

3.5.1.3 National Pollutant Discharge Elimination System (NPDES)

In 1990, EPA promulgated rules establishing Phase I of the NPDES stormwater program for categories of stormwater discharge including "medium" and "large" MS4s, which generally serve populations of 100,000 or greater. In 1999, EPA promulgated rules establishing Phase II of the NPDES stormwater program for categories of stormwater discharge not covered by Phase I including "small" MS4s, such as public campuses.

The Regional Board issued the municipal storm water National Pollutant Discharge Elimination System (NPDES) permit ("Municipal Permit") (Order No. 2001-01, NPDES No. CAS108758) to the County of San Diego, the City of San Diego, the Port of San Diego, and 17 other cities (called Copermittees or dischargers by owning or operating a MS4) on February 21, 2001. The Municipal Permit requires each Copermittee to adopt its own Local Standard Urban Storm Water Mitigation Plan (SUSMP) and ordinances consistent with the Regional Board-approved Model SUSMP. The City of San Diego implements its SUSMP through its SWS Manual, which provides information on how to comply with the construction and permanent storm water quality requirements for new development and redevelopment projects. The SWS Manual was effective as of December 2, 2002 and the Municipal Permit (Order No. R9-2007-0001, NPDES No. CAS0108758) was renewed on August 25, 2005.

As part of the Phase II of the Municipal Permit, the SWRCB adopted Order No. 2003-0005-DWR (General Permit No. CAS000004) for small MS4s, which requires these MS4s to develop and implement a Stormwater Management Plan (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent possible (MEP). The Regional Board requires the owners or operators of these MS4s in watersheds subject to TMDLs to submit Notices of Intent (NOI) to comply with this Order. The SWRCB and Regional Board designated SDSU as a Non-Traditional Small MS4. SDSU completed its SWMP in February 2005, but the Regional Board has not reviewed it. Each SWMP and NOI must be reviewed and approved, and in some cases considered in a public hearing, prior to the Small MS4 obtaining coverage under the General Permit.

Since the SDSU SWMP has not been reviewed, Dudek utilized the approved SWS Manual in assessing the project impacts and mitigation measures. However, while SDSU is physically located in the City of San Diego, SDSU is a state agency. Therefore, the SWS Manual serves as guidance in selecting, designing, and incorporating storm water BMPs into the SDSU project review and permitting process.

3.5.2 California Water Code (CWC)

The California Water Code (CWC) is comprised of 31 divisions that contain statutory provisions that regulate water in the State of California.

3.5.2.1 Porter-Cologne Act

The Porter-Cologne Water Quality Control Act (the Act) is Division 7 of the CWC and is directed primarily towards the control of water quality. The Act establishes the State Board and its nine regional boards as the principal state agencies responsible for control of water quality. As

such, each regional board is required to formulate and adopt a Water Quality Control Plan (Basin Plan), which designates beneficial uses and establishes WQOs to protect these beneficial uses.

3.5.2.2 San Diego Regional Board's Basin Plan

San Diego Regional Board's Basin Plan was approved by the SWRCB in 1994 and includes Triennial Reviews in 1998 and 2004 as well as amendments adopted by the Regional Board through February 2005. The Regional Board designates beneficial uses in the Basin Plan under CWC 13240. Beneficial uses are defined as the uses of water necessary for the survival or well-being of man, plants, and wildlife. Designated beneficial uses in inland surface waters and groundwaters near SDSU are defined below according to the Basin Plan. The designated beneficial uses for the inland surface waters and groundwaters near SDSU are summarized in Tables 6 and 7.

TABLE 6
Beneficial Uses of Inland Surface Water: San Diego River, Unnamed Tributary, and Alvarado Creek

Inland Surface Waters	Basin Number	Beneficial Uses								
		MUN	AGR	IND	REC 1	REC 2	WARM	COLD	WILD	RARE
San Diego River	907.11	+	X	X	X	X	X	X	X	X
Unnamed Tributary	907.11	+	X	X	X	X	X	X	X	X
Alvarado Creek	907.11	+	X	X	X	X	X	X	X	

\+ Excepted from MUN (State Board Resolution No. 88-63, *Sources of Drinking Water Policy*).

X Existing Beneficial Use

TABLE 7
Beneficial Uses of Groundwater: San Diego Hydrologic Unit (HU), Lower San Diego Hydrologic Area (HA), Mission San Diego Hydrologic Sub-Area (HSA)

Groundwater	Basin Number	Beneficial Uses			
		MUN	AGR	IND	PROC
San Diego HU	907.00				
Lower San Diego HA	907.10				
Mission San Diego HSA[1]	907.11	O	X	X	X

1. These beneficial uses do not apply westerly of the easterly boundary of the right-of-way of Intestate Highway 5 and this area is excepted from the sources of drinking water policy.

O Potential Beneficial Use

X Existing Beneficial Use

MUN - Municipal and Domestic Supply:

Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

AGR - Agricultural Supply:

Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

IND - Industrial Services Supply:

Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.

PROC - Industrial Process Supply

Uses of water for industrial activities that depend primarily on water quality.

REC I - Contact Water Recreation

Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water skiing, skin and scuba diving, surfing, whitewater activities, fishing, and use of natural hot springs.

REC II - Non-Contact Water Recreation

Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

WARM - Warm Freshwater Habitat

Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

COLD - Cold Freshwater Habitat

Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

WILD - Wildlife Habitat

Uses of water that support terrestrial ecosystems including, but not limited to, the preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

RARE - Threatened or Endangered Species

Uses if water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

SDSU runoff flows into the San Diego River via Alvarado Creek and an unnamed Tributary. The existing beneficial uses of all inland surface waters include agricultural supply, industrial service supply, contact water recreation, non-contact water recreation, warm freshwater habitat, cold freshwater habitat, wildlife habitat, and rare, threatened or endangered species (excluding Alvarado Creek). These inland surface waters are all excepted from municipal and domestic supply.

SDSU is located in the San Diego HU, which is sub-divided into the Lower San Diego HA and further sub-divided into the Mission San Diego HSA. *Table 7* is excerpted from the Basin Plan. There is no information available for the San Diego HU and Lower San Diego HA. The existing beneficial uses within the Mission San Diego HSA include agricultural supply, industrial services supply, and industrial process supply. The potential beneficial uses within the Mission San Diego HSA are municipal and domestic supply.

The San Diego County Water Authority and its member agencies have identified potential or planned groundwater projects throughout the region in order to reduce dependence on imported water. However, no existing, planned, or potential groundwater projects are located in the Lower San Diego Hydrologic Area (San Diego County Water Authority Groundwater Report, June 1997).

3.6 Project Components

The following descriptions regarding topography, hydrology, drainage, water quality, soil and geotechnical conditions, and groundwater are presented for each of the project component locations.

3.6.1 Adobe Falls Faculty/Staff Housing

The existing state of the Adobe Falls Faculty/Staff Housing is an undeveloped area situated near, or in some cases, at the bottom of a canyon area. The site is undulating in nature and was burned in a wildfire in 2003. Alvarado Creek flows through this project component; generally from east to west beginning where the creek flows beneath I-8 (*Figure 6 and Figure 7*). Alvarado Creek turns to the north approximately at the midpoint of the site and flows along the northern boundary of the site to the east. There are no additional water courses on the site, although, because Alvarado Creek lies in a canyon, there are adjacent gullies that feed the Creek during storm events. The eastern portion of the on-site runoff sheet flows southwesterly to Alvarado Creek, and the western portion of the on-site runoff sheet flows northerly to Alvarado Creek. The Creek enters the site via a culvert at the southeastern end, and leaves the site at the northwest end where it enters a manmade concrete channel. The slope throughout the site varies from less than 1% at some parts of the Alvarado Creek flow line to over 25% at some of the upland areas, with elevations ranging from 121 to 430 ft amsl.

A portion of the northern edge of the proposed project site is located within the Alvarado Creek 100-year flood plain (FEMA, Revised June 16, 1999, FIRM Panel 1637 of 2375, Map No. 06073C1637G, and Panel 1639 of 2375, Map No. 06073C1639G) (*Figure 6 and Figure 7*). Alvarado Creek is within the 100-year flood plain, as indicated on the FIRM for San Diego County, California.

3.6.2 Alvarado Campus

The proposed Alvarado Campus project component consists of two distinct areas: D Lot, which is an existing SDSU parking lot with 432 spaces, and the existing Alvarado Medical Center, a complex of medical offices and research facilities located east of D Lot (*Figure 6 and Figure 8*). The existing buildings are surrounded by surface parking spaces. Landscaped areas consist of parking lot islands, edge treatments and building entryways. The slope throughout the site varies from less than 1% at the parking lots around the medical offices at the eastern portion of the site, to over 25% at some slopes along Alvarado Court, with elevations ranging from 333 to 349 ft amsl.

Alvarado Creek runs along the south and west boundary of the site. The runoff from the western portion of the site (existing D Lot) sheet flows southwesterly to Alvarado Creek (*Figure 8*). The runoff from the eastern portion of the site is conveyed by valley gutters on the driveways of the surrounding parking lots prior to discharging to a curb inlet located at Alvarado Court. A portion of the site, which is located mainly around Alvarado Court and Alvarado Creek, is located within the 100-year flood plain (FEMA, Revised July 2, 2002, FIRM, San Diego County, California and incorporated area, Panel 1643 if 2375, Map. No. 06073C1643H) (*Figure 6 and Figure 8*). It should be noted that existing buildings presently on the site that are part of the Alvarado Medical Center are located within the 100-year flood plain.

3.6.3 Alvarado Hotel

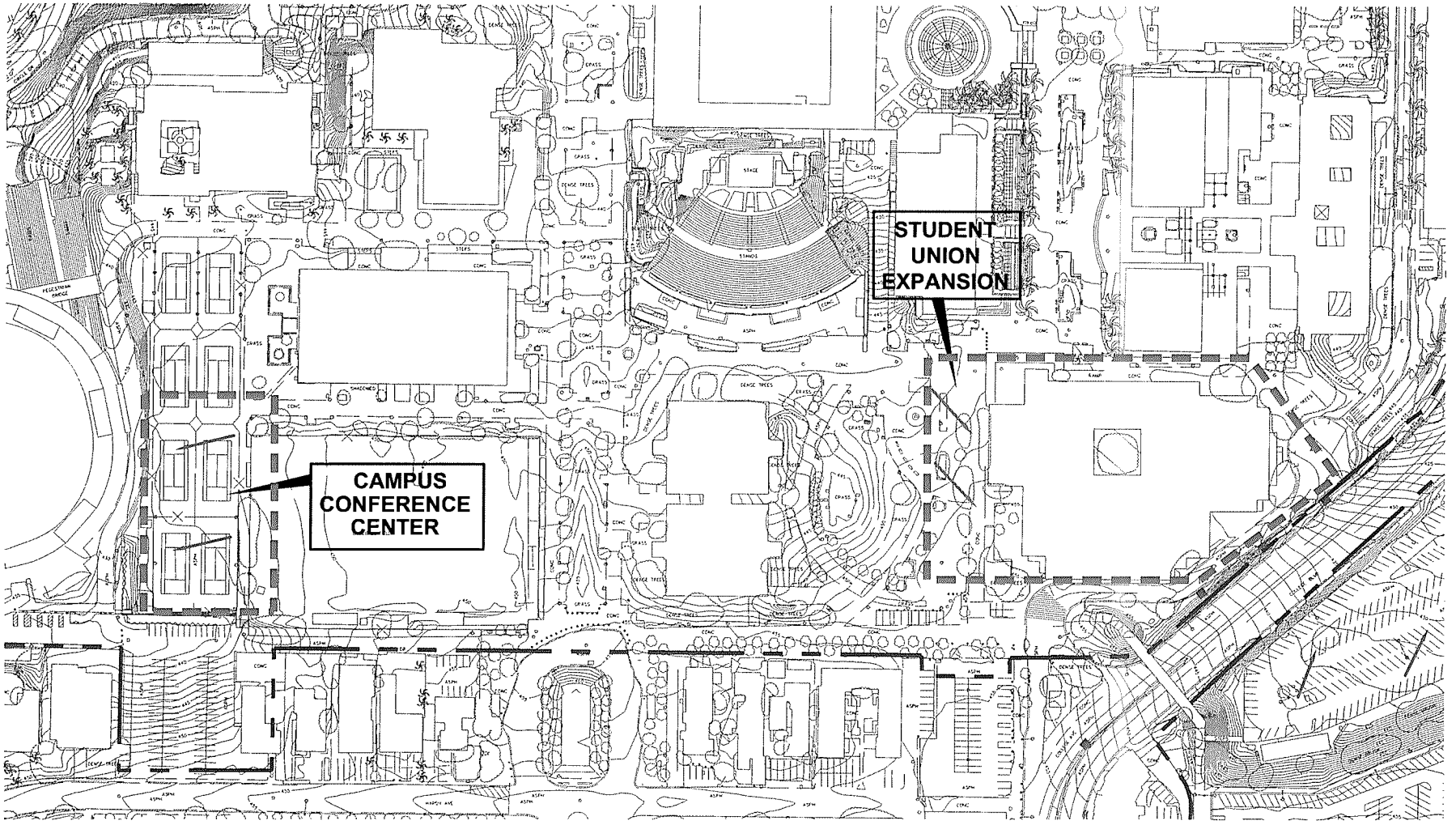
The site of the proposed Alvarado Hotel is existing C Lot (*Figure 8*). Alvarado Creek forms the eastern and northern boundaries of the site. Runoff from this site sheet generally flows northeasterly to Alvarado Creek. One grate inlet and one pipe drop inlet are found on the end of the central parking driveway. Two valley gutters convey storm water from southern and northern parking driveways to Alvarado Creek. The typical slope is approximately 5%, with elevations ranging from 333 to 351 ft amsl. The northeastern portion of the site is located in the 100-year flood plain (FEMA, Revised July 2, 2002, FIRM, San Diego County, California and incorporated area, Panel 1643 if 2375, Map. No. 06073C1643H, and FEMA, Revised June 16, 1999, FIRM Panel 1639 of 2375, Map No. 06073C1639G) (*Figure 6 and Figure 8*).

3.6.4 Campus Conference Center

The site of the proposed Campus Conference Center is the former tennis courts located just east of Cox Arena (*Figure 9*). The runoff from the site sheet flows westerly towards Cox Arena. The site has flat topography with elevations ranging from 445 to 447 ft amsl.

3.6.5 Student Union Expansion and Renovation

The site of the proposed Student Union Expansion and Renovation is the existing Student Union, commonly referred to as "Aztec Center," located just west of College Avenue along the southern border of campus (*Figure 9*). The runoff from the site sheet flows southeasterly towards College Avenue. The site has flat topography with elevations ranging from 447 to 455 ft amsl.



ZONE AE
100-YEAR FLOOD PLAIN

SDSU Campus
Boundary

DIRECTION
OF FLOW

PROPOSED
DEVELOPMENT AREA

N

0 150
Feet

2007 Campus Master Plan Revision

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Figure 9
Drainage Area Map - Student Union Expansion and Campus Conference Center

3.6.6 Villa Alvarado Residence Hall Expansion

The site of the proposed Villa Alvarado Residence Hall Expansion is existing C Lot located just south of Alvarado Road (*Figure 8*). The site use is predominantly existing paved parking areas. The runoff from the eastern portion of the site flows westerly towards East Campus Drive. The runoff from the western portion of the site flows northeasterly towards the proposed Alvarado Hotel. The site includes flat topography along C Lot with elevations ranging from 360 to 364 ft amsl, and steeper topography along the slope north of C Lot with elevations ranging from 429 to 360 ft amsl. The northern portion of the site is adjacent to the 100-year flood plain (FEMA, Revised July 2, 2002, FIRM, San Diego County, California and incorporated area, Panel 1643 if 2375, Map. No. 06073C1643H, and FEMA, Revised June 16, 1999, FIRM Panel 1639 of 2375, Map No. 06073C1639G).

3.6.7 Student Housing – G Lot & Olmeca/Maya

The site of the proposed Student Housing – G Lot & Olmeca/Maya is existing student housing bordered by College Avenue to the west, G Lot to the north, East Campus Drive to the east, and Montezuma Road to the south (*Figure 10*). The existing buildings are surrounded by landscaped courtyards and footpaths. The runoff from the site predominately sheet flows outward from the center of the site, northeasterly towards Zura Way. The site has flat topography with elevations ranging from 450 to 455 ft amsl.

3.6.8 U Lot Residence Hall

The site of the proposed U Lot Residence Hall is existing U Lot located just north of Remington Road. The site land use currently consists of a paved parking lot. The runoff from the site sheet flows northerly off campus into a canyon with vegetated steep slopes. The site has flat topography with elevations ranging from 423 to 425 ft amsl.

4.0 SIGNIFICANCE THRESHOLDS

Appendix G of the CEQA guidelines provides that a proposed project may have a significant impact on hydrology and water quality if it results in any of the following conditions:

a) Violates any water quality standards or waste discharge requirements?

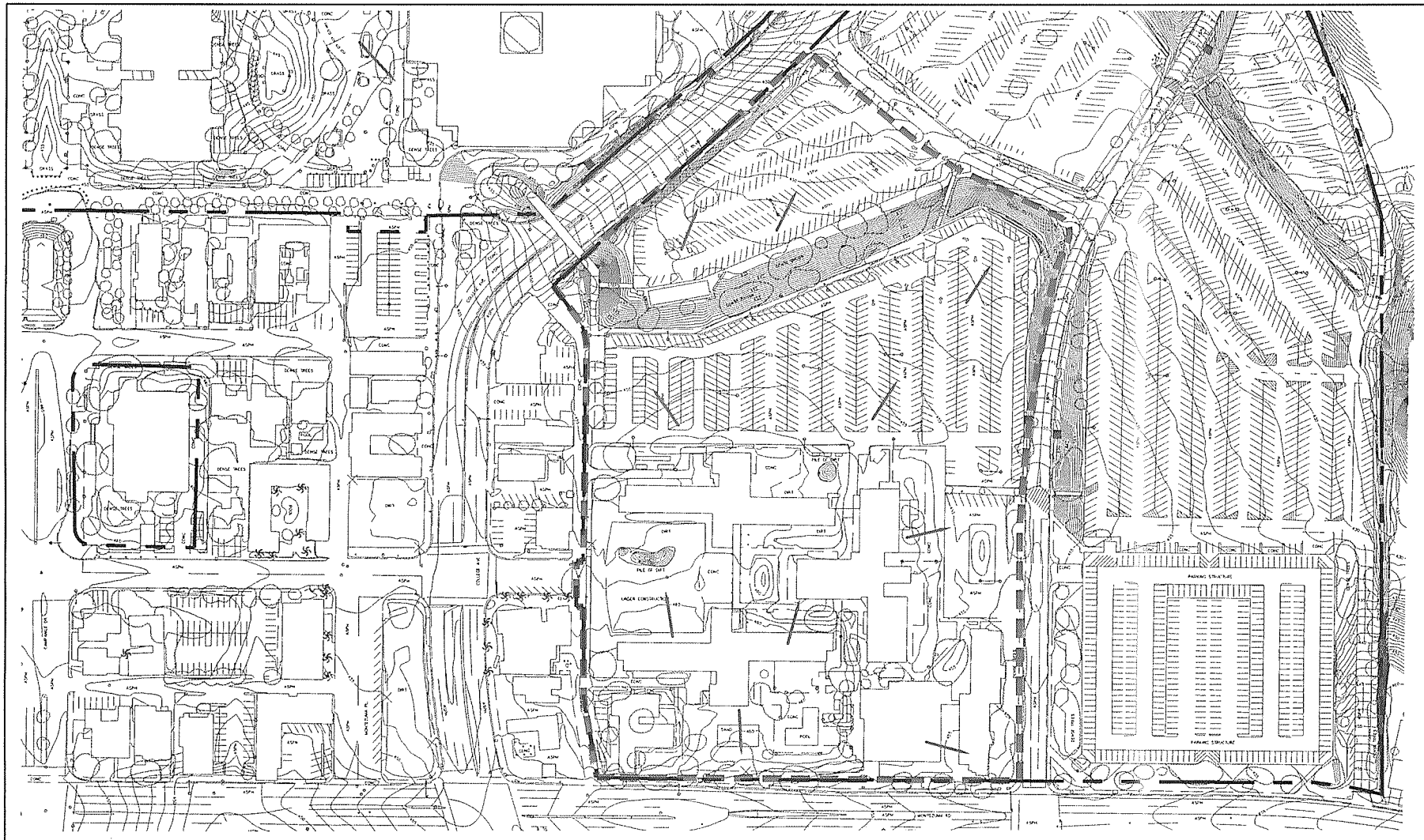

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Figure 10
Drainage Area Map
Student Housing (G Lot & Olmeca/Maya)

b) Substantially depletes the groundwater supplies or interferes substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

c) Substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or situation on- or off- site?

d) Substantially alters the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate of amount of surface runoff in a manner which would result in flooding on- or off-site?

e) Creates or contributes runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provides substantial additional sources of polluted runoff?

f) Otherwise substantially degrades water quality?

g) Places housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

h) Places within a 100-year flood hazard area structures which would impede or redirect flood flows?

i) Exposes people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of a failure of a levee or a dam?

j) Inundation by seiche, tsunami, or mudflow?

As discussed in Section 3.5.1.3, SDSU completed its SWMP in February 2005 to comply with EPA Phase II NPDES requirements. The SWPP includes a general discussion of BMPs under the following minimum control measures: 1) public education and outreach on storm water impacts, 2) public involvement / participation, 3) illicit discharge detection and elimination, 4) pollution prevention / good housekeeping for facilities operation and maintenance, 5) construction site storm water runoff control, and 6) post-construction storm water management in new development and redevelopment. However, since the Regional Board has neither reviewed nor approved the SWPP, Dudek assessed project impacts and mitigation measures according to the SWS Manual, which aims to effectively prohibit non-storm water discharges and reduce

discharge of pollutants from storm water conveyance systems to the maximum extent practicable both during construction and through the use of the developed site. The SWS Manual is further discussed in context of project impacts and mitigation measures in Sections 5 and 6, respectively.

5.0 PROJECT IMPACTS

Peak flow rates for surface runoff are calculated based on the rational method outlined in the County of San Diego Hydrology Manual. Given the conceptual nature of the site design, the estimated calculated flow rates should also be considered at a conceptual level. Impact discussions for each site are included below. In addition, impacts to groundwater, water quality, flooding and inundation are considered.

5.1 Adobe Falls Faculty/Staff Housing

The northern edge of the Adobe Falls Faculty/Staff Housing is located within the limits of the 100-year flood plain of Alvarado Creek according to the most recent FEMA FIRM Maps (*Figure 6 and Figure 7*). This area and other steep slope areas along the western and southern property boundary will be preserved as open space as indicated in the proposed conceptual plan. The proposed housing structures and associated development will be constructed outside the limits of the 100-year floodplain and would therefore not affect the base flood elevation.

The development will reduce infiltration as a result of an increase in impervious surfaces. The peak flow rates of Alvarado Creek at the point where the creek leaves the site will be increased by 2.5 cfs for an 85th percentile storm event (an 85th percentile storm event represents a "first flush" rain event), 4.38 cfs for 2-year storm event, 7.13 cfs for a 10-year storm event and 10.14 cfs for a 100-year storm event. This is a significant increase in runoff volumes for each storm event. In order to mitigate for impacts due to increase in site runoff, mitigation measures are discussed in Section 7.1. Section 5.6, Summary of Hydrologic Impacts, provides a summary table of hydrologic impacts at each proposed site.

It is anticipated that the proposed project will affect the base flood elevation of the 100-year flood plain of Alvarado Creek due to increased run-off as a result of increased impervious surfaces at this site. This impact could potentially be significant, therefore mitigation is provided in Section 7.1.

The project would add impervious surfaces to undeveloped areas that currently either drain to Alvarado Creek or naturally percolate into the soil. This area is comprised of a variety of subsurface material - clays and alluvium (impermeable and groundwater supporting) in the creek

bed area and metavolcanic rock (permeable and not likely groundwater supporting) in the eastern portion of the site. The drainage characteristics and steep nature of this canyon area result in most surface and groundwater flowing westward toward the main San Diego River aquifer beneath Mission Valley. The variety of subsurface material often forms small groundwater lenses in upstream areas such as the Adobe Falls/Alvarado Creek Canyon. While the project's introduction of impervious surface may prevent future percolation into lenses should they exist, these lenses don't form substantive components of the regional groundwater resource present in Mission Valley. Therefore impacts to groundwater quality and quantity would not be significant.

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Near-surface groundwater is typically encountered in low-lying areas such as the bottoms of canyons and tributary drainages such as Alvarado Creek. Alvarado Creek drainage crosses or is adjacent to the Adobe Falls/North Campus site. Due to creek proximity, this project component could potentially impact groundwater. Further, due to the mixture of subsurface material in this project component area, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a groundwater lens were to be impacted, in order to protect the structural integrity of each building and to ensure quality of groundwater, mitigation is provided in Section 7.1.

During construction of this project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water quality impacts would occur if this pumped groundwater is not disposed of appropriately. In order to ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 7.1.

5.2 Alvarado Campus

The Alvarado Campus project component is planned for location within an existing developed area (*Figure 8*). Infiltration, flow frequency, duration, and peak flow rates will not change as a result of the development.

A portion of this site is within the limits of the 100-year flood plain of Alvarado Creek (*Figure 6 and Figure 8*). Because the proposed project improvements would simply result in redevelopment of existing urban uses and not entail further encroachment into the floodplain, this existing floodplain impact would remain. That said, this impact is significant, therefore mitigation is provided in Section 7.2.

Due to intensification of uses, this project element may result in an increase in pollutant load (such as trash, pesticides and car pollutants) to stormwater run-off; therefore a potentially significant impact to water quality could occur. In order to compensate for this impact, mitigation is provided in Section 7.2.

Similar to the Adobe Falls/North Campus area, subsurface materials vary and therefore may contain groundwater (as in the case of Alvarado Creek alluvium aside this component) or isolated groundwater lenses (as in the case of the non-alluvium/slopewash portions of this project component.). Due to the redevelopment nature of this component, the amount of discharge into surface waters would remain relatively unchanged. Further, because this area currently blocks percolation of surface water into groundwater lenses, assuming they occur, percolation rates would remain unchanged because this project component would not increase the amount of impervious surface.

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Near-surface groundwater is typically encountered in low-lying areas such as the bottoms of canyons and tributary drainages such as Alvarado Creek. Alvarado Creek drainage is adjacent to the Adobe Falls/North Campus site. Due to creek proximity, this project component could potentially impact groundwater. Further, due to the mixture of subsurface material in all project component areas, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a groundwater lens were to be impacted, in order to protect the structural integrity of each building and to ensure quality of groundwater, mitigation is provided in Section 6.2.

During construction of this project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water quality impacts would occur if this pumped groundwater is not disposed of correctly. In order to ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 6.2.

5.3 Alvarado Hotel

This project component is located on an existing developed site (*Figure 8*). Therefore, an increase in impervious cover would not occur. The runoff coefficient and time of concentration, which determine rainfall intensity, will be unchanged from existing condition. Therefore, infiltration, flow frequencies, duration and peak flow rates will not change as a result of the proposed hotel development.

A portion of this site is within the limits of the 100-year flood plain of Alvarado Creek. Even though the runoff will not increase because the proposed project improvements would simply result in redevelopment of existing urban uses, the proposed building may impede flood flows. This impact is significant. Construction of the proposed hotel outside the flood plain is recommended. If building outside of the flood plan isn't feasible, mitigation is provided in Section 6.3.

Due to intensification, this project element may result in an increase in pollutant load (such as trash, pesticides and car pollutants) to storm water run-off; therefore a potentially significant impact to water quality would occur. In order to compensate for this impact, mitigation is provided in Section 6.3.

Similar to the Adobe Falls/North Campus area, subsurface materials vary and therefore may contain groundwater (as in the case of Alvarado Creek alluvium aside the Alvarado Hotel) component or isolated groundwater lenses (as in the case of the non-alluvium/slopewash portions of the Alvarado Hotel component). Due to the redevelopment nature of this component, the amount of discharge into surface waters would remain relatively unchanged. Further, because this area currently blocks percolation of surface water into groundwater lenses, assuming they occur, percolation rates would remain unchanged because this project component would not increase the amount of impervious surface. It should be noted that due to the absence of a major groundwater basin in the SDSU area, percolation, or lack thereof, into isolated lenses would not have an impact on regional groundwater resources.

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Near-surface groundwater is typically encountered in low-lying areas such as the bottoms of canyons and tributary drainages such as Alvarado Creek. Alvarado Creek drainage is adjacent to the Alvarado Hotel site. Due to creek proximity, this project component could potentially impact groundwater. Further, due to the mixture of subsurface material in all project component areas, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a groundwater lens were to be impacted, in order to protect the structural integrity of each building and to ensure quality of groundwater, mitigation is provided in Section 7.3.

During construction this project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water quality impacts would occur if this pumped groundwater is not disposed of correctly. In order to ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 6.3.

5.4 Campus Conference Center

The Campus Conference Center component would entail construction of a new building in a largely developed area (*Figure 9*). Extensive retaining walls will be expected to replace the existing vegetated steep slope. Infiltration would be reduced due to the increase of impervious cover, which would result in an increase in peak flow rates. The peak flow rates will increase by 0.29 cfs for an 85th percentile storm event, 0.51 cfs for a 2-year storm event, 0.83 cfs for a 10-year storm event and 1.19 cfs for a 100-year storm event. In order minimize the increased stormwater flows to the maximum extent practicable, mitigation is provided in Section 6.4.

This project component is not located within a floodplain area; therefore impacts related to flood hazards would not occur.

Due to intensification of uses, this project element may result in an increase in pollutant load (such as trash, pesticides and car pollutants) of storm water run-off; therefore a potentially significant impact to water quality could occur. In order to compensate for this impact, mitigation is provided in Section 6.4.

Similar to the other project components, subsurface materials vary and therefore may contain isolated groundwater lenses. Due to the redevelopment nature of this component, the amount of discharge into surface waters would remain relatively unchanged. That said, the Campus Conference Center site would have a slight increase, but it is anticipated to be minimal in the context of groundwater percolation. Further, because each of these areas currently block percolation of surface water into groundwater lenses, assuming they occur, percolation rates would remain unchanged because this project component would not increase the amount of impervious surface (again, the Campus Conference Center would have a slight increase, but it would be minimal in the context of this discussion).

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Due to the mixture of subsurface material in all project component areas, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a groundwater lens were to be impacted, in order to protect the structural integrity of each building and to ensure quality of groundwater, mitigation is provided in Section 6.4.

During construction of the project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water quality impacts would occur if this pumped groundwater is not disposed of correctly. In order to

ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 6.4.

5.5 Student Union Expansion

The Student Union Expansion is in a currently developed urban area (*Figure 9*). Runoff coefficients and time of concentration will not change; infiltration, flow frequencies, duration and peak flow rates will not change and therefore a significant impact would not occur. This project component is not located within a floodplain area; therefore impacts related to flooding would not occur.

This project component may result in an increase in pollutant load to storm water run-off; therefore a potentially significant impact to water quality would occur. In order to compensate for this impact, mitigation is provided in Section 6.5.

Similar to the other project components, subsurface materials vary and therefore may contain isolated groundwater lenses. Due to the redevelopment nature of this component, the amount of discharge into surface waters would remain relatively unchanged. In addition, because this project components blocks percolation of surface water into groundwater lenses, assuming they occur, percolation rates would remain unchanged because this project component would not increase the amount of impervious surface.

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Due to the mixture of subsurface material in this project component area, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a lens were to be impacted, in order to protect the structural integrity of the proposed buildings and to ensure quality of groundwater, mitigation is provided in Section 6.5.

During construction of this project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water quality impacts would occur if this pumped groundwater is not disposed of correctly. In order to ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 6.5.

5.6 Villa Alvarado Residence Hall Expansion

Similar to the project component above, this project component is located on an existing developed site (*Figure 8*). Therefore, an increase in impervious cover would not occur. The runoff coefficient and time of concentration, which determine rainfall intensity, will be

unchanged from the existing condition. Therefore, infiltration, flow frequencies, duration and peak flow rates will not change as a result of the proposed residence hall expansion.

A portion of this site is within the limits of the 100-year flood plain of Alvarado Creek. Even though the runoff will not increase because the proposed project improvements would simply result in redevelopment of existing urban uses, the proposed building may impede flood flows. This impact is significant. Construction of the proposed hotel outside the flood plain is recommended. If building outside of the flood plan isn't feasible, mitigation is provided in Section 6.6.

Due to intensification, this project element may result in an increase in pollutant load (such as trash, pesticides and car pollutants) to storm water run-off; therefore a potentially significant impact to water quality would occur. In order to compensate for this impact, mitigation is provided in Section 6.6.

Similar to the Adobe Falls/North Campus area, subsurface materials vary and therefore may contain groundwater (as in the case of Alvarado Creek alluvium aside the Alvarado Hotel) component or isolated groundwater lenses (as in the case of the non-alluvium/slopewash portions of the Alvarado Hotel component). Due to the redevelopment nature of this component, the amount of discharge into surface waters would remain relatively unchanged. Further, because this area currently blocks percolation of surface water into groundwater lenses, assuming they occur, percolation rates would remain unchanged because this project component would not increase the amount of impervious surface. It should be noted that due to the absence of a major groundwater basin in the SDSU area, percolation, or lack thereof, into isolated lenses would not have an impact on regional groundwater resources.

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Near-surface groundwater is typically encountered in low-lying areas such as the bottoms of canyons and tributary drainages such as Alvarado Creek. Alvarado Creek drainage is adjacent to the Alvarado Hotel site. Due to creek proximity, this project component could potentially impact groundwater. Further, due to the mixture of subsurface material in all project component areas, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a groundwater lens were to be impacted, in order to protect the structural integrity of each building and to ensure quality of groundwater, mitigation is provided in Section 6.6.

During construction this project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water

quality impacts would occur if this pumped groundwater is not disposed of correctly. In order to ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 6.6.

5.7 Student Housing – G Lot & Olmeca/Maya

This residential project is in a currently developed urban area (*Figure 10*). Runoff coefficients and time of concentration will not change; infiltration, flow frequencies, duration and peak flow rates will not change and therefore a significant impact would not occur. This project component is not located within a floodplain area; therefore impacts related to flooding would not occur.

This project element may result in an increase in pollutant load to storm water run-off; therefore a potentially significant impact to water quality would occur. In order to compensate for this impact, mitigation is provided in Section 6.7.

Similar to the other project components, subsurface materials vary and therefore may contain isolated groundwater lenses. Due to the redevelopment nature of this component, the amount of discharge into surface waters would remain relatively unchanged. In addition, because G Lot & Olmeca/Maya project components block percolation of surface water into groundwater lenses, assuming they occur, percolation rates would remain unchanged because this project component would not increase the amount of impervious surface.

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Due to the mixture of subsurface material in this project component area, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a groundwater lens were to be impacted, in order to protect the structural integrity of the proposed buildings and to ensure quality of groundwater, mitigation is provided in Section 6.7.

During construction of this project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water quality impacts would occur if this pumped groundwater is not disposed of correctly. In order to ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 6.7.

5.8 U Lot Residence Hall

This residential project is in a currently developed urban area (*Figure 11*). Runoff coefficients and time of concentration will not change; infiltration, flow frequencies, duration and peak flow rates will not change and therefore a significant impact would not occur. This project component is not located within a floodplain area; therefore impacts related to flooding would not occur.

This project element may result in an increase in pollutant load to storm water run-off; therefore a potentially significant impact to water quality would occur. In order to compensate for this impact, mitigation is provided in Section 6.8.

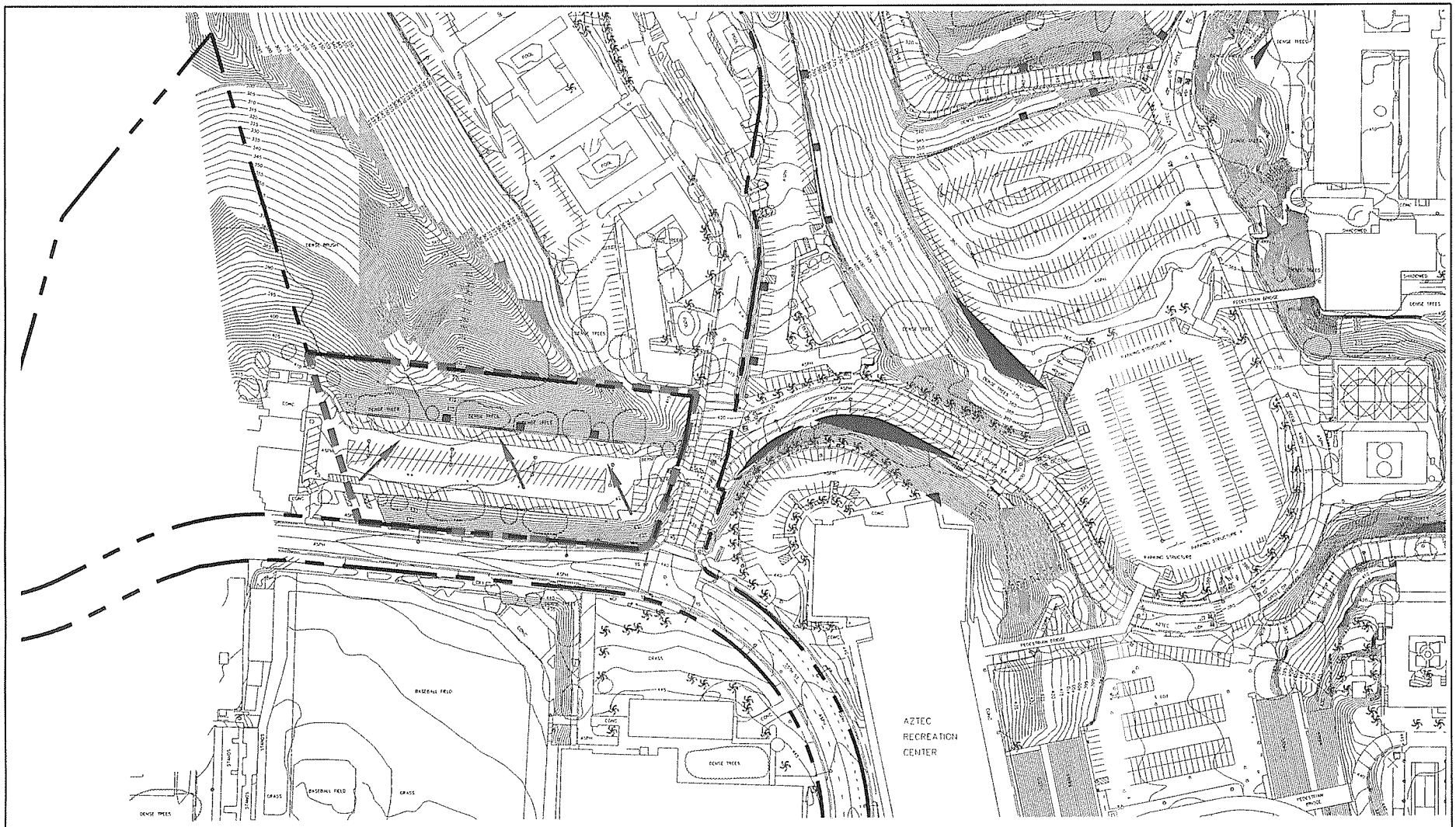
Similar to the other project components, subsurface materials vary and therefore may contain isolated groundwater lenses. Due to the redevelopment nature of this component, the amount of discharge into surface waters would remain relatively unchanged. In addition, because G Lot & Olmeca/Maya project components block percolation of surface water into groundwater lenses, assuming they occur, percolation rates would remain unchanged because this project component would not increase the amount of impervious surface.

The potential to encounter localized groundwater exists and therefore may be impacted by the proposed project component. Due to the mixture of subsurface material in this project component area, the potential to hit a groundwater lens in non-alluvial/slope wash material exists. Even if a boring program were to be instigated, small lenses may not be detected. If a groundwater lens were to be impacted, in order to protect the structural integrity of the proposed buildings and to ensure quality of groundwater, mitigation is provided in Section 6.8.

During construction of this project component, groundwater may be encountered. In order to allow for proper construction and site work, dewatering may be required. Potential water quality impacts would occur if this pumped groundwater is not disposed of correctly. In order to ensure that groundwater is disposed of in a safe and legal manner, mitigation is provided in Section 6.8.

5.9 Summary of Hydrologic Impacts

Potential impacts to the hydrologic regime of each site have been identified and discussed in the sections above. A common impact to the hydrologic regime from these developments is the increase in impervious surfaces creating a decrease in travel time and an increase in runoff volumes. *Figure 7* through *Figure 11* depict existing drainage patterns, the proposed development footprint and the 100-year floodplain for the proposed project components. Table 8 below provides a summary of the hydrologic impacts.



2007 Campus Master Plan Revision

Hydrology/Water Quality Technical Report

SAN DIEGO STATE UNIVERSITY

Figure 11

Drainage Area Map - U Lot Residence Hall

TABLE 8
Conceptual Peak Flow Summary[1]

	STORM EVENT	EXISTING Q (cfs)	PROPOSED Q (cfs)	CHANGE in Q (cfs)
Adobe Falls	85TH PERCENTILE	5.14	7.64	+2.5
Alvarado Campus		23.70	23.70	0.00
Alvarado Hotel		2.68	2.68	0.00
Campus Conference Center		2.21	1.55	-0.66
Student Union Expansion		4.23	4.23	0.00
Villa Alvarado Residence Hall Expansion		1.98	1.98	0.00
Student Housing – G Lot & Olmeca/Maya		19.33	19.33	0.00
U Lot Residence Hall		3.25	3.25	0.00
Adobe Falls	2-YEAR	9.02	13.40	+4.38
Alvarado Campus		41.57	41.57	0.00
Alvarado Hotel		4.70	4.70	0.00
Campus Conference Center		2.21	2.72	+0.51
Student Union Expansion		7.42	7.42	0.00
Villa Alvarado Residence Hall Expansion		3.46	3.46	0.00
Student Housing – G Lot & Olmeca/Maya		33.90	33.90	00.00
U Lot Residence Hall		5.69	5.69	0.00
Adobe Falls	10-YEAR	14.69	21.82	+7.13
Alvarado Campus		67.72	67.72	0.00
Alvarado Hotel		7.66	7.66	0.00
Campus Conference Center		3.60	4.43	+0.83
Student Union Expansion		12.09	12.09	0.00
Villa Alvarado Residence Hall Expansion		5.64	5.64	0.00
Student Housing – G Lot & Olmeca/Maya		55.23	55.23	0.00
U Lot Residence Hall		9.27	9.27	0.00

TABLE 8
Conceptual Peak Flow Summary[1]

	STORM EVENT	EXISTING Q (cfs)	PROPOSED Q (cfs)	CHANGE in Q (cfs)
Adobe Falls	100-YEAR	20.89	31.03	+10.14
Alvarado Campus		96.32	96.32	0.00
Alvarado Hotel		10.89	10.89	0.00
Campus Conference Center		5.12	6.31	+1.19
Student Union Expansion		17.20	17.20	0.00
Villa Alvarado Residence Hall Expansion		8.03	8.03	0.00
Student Housing – G Lot & Olmeca/Maya		78.54	78.54	0.00
U Lot Residence Hall		13.19	13.19	0.00

1. Refer to the Storm Water Runoff Flow Calculations in Appendix A for detailed calculations.

5.10 Summary of Water Quality Impacts for All Project Components

The proposed developments will not generate significant amounts of non-visible pollutants; however, the following constituents are commonly found on similar developments and could affect water quality. The City's SWS Manual identifies the following categories of pollutants that are anticipated and/or could potentially be generated from the proposed project:

- Sediments - Sediments are soils or other surficial materials eroded and then transported or deposited by the action of wind, water, ice, or gravity. Sediments can increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organisms survival rates, smother bottom dwelling organisms, and suppress aquatic vegetation growth.

- Nutrients - Nutrients are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or suspended in water. Primary sources of nutrients in urban runoff are fertilizers and eroded soils. Excessive discharge of nutrients to water bodies and streams can cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the water body, loss of oxygen in the water, release of toxins in sediment, and the eventual death of aquatic organisms.

- Metals - Metals are raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. Primary source of metal pollution in storm water are typically commercially available metals and metal products. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. At low concentrations naturally occurring in soil, metals are not toxic. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish. Environmental concerns, regarding the potential for release of metals to the environment, have already led to restricted metal usage in certain applications.

- Organic Compounds - Organic compounds are carbon-based. Commercially available or naturally occurring organic compounds are found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects, toxic levels of solvents and cleaning compounds can be discharged to storm drains. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life.

- Trash & Debris - Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are general waste products on the landscape. The presence of trash & debris may have a significant impact on the recreational value of a water body and aquatic habitat. Excess organic matter can create a high biochemical oxygen demand in a stream and thereby lower its water quality. Also, in areas where stagnant water exists, the presence of excess organic matter can promote septic conditions resulting in the growth of undesirable organisms and the release of odorous and hazardous compounds such as hydrogen sulfide.

- Oxygen-Demanding Substances - This category includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins, carbohydrates, and fats are examples of biodegradable organic compounds. Compounds such as ammonia and hydrogen sulfide are examples of oxygen-demanding compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a water body and possibly the development of septic conditions.

- Oil and Grease - Oil and grease are characterized as high-molecular weight organic compounds. Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Introduction of these pollutants to the water bodies are very possible due to the wide

uses and applications of some of these products in municipal, residential, commercial, industrial, and construction areas. Elevated oil and grease content can decrease the aesthetic value of the water body, as well as the water quality.

- Bacteria and Viruses - Bacteria and viruses are ubiquitous microorganisms that thrive under certain environmental conditions. Their proliferation is typically caused by the transport of animal or human fecal wastes from the watershed. Water, containing excessive bacteria and viruses can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Also, the decomposition of excess organic waste causes increased growth of undesirable organisms in the water.

- Pesticides - Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Excessive application of a pesticide may result in runoff containing toxic levels of its active component.

Table 9 below, summarizes the anticipated and potential pollutants for each project component.

TABLE 9
Anticipated and Potential Pollutants Summary

Project Component	General Pollutant Categories								
	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Adobe Falls Faculty/Staff Housing	X	X	X		X	P	X	P	X
Alvarado Campus	P	P	X		X	P	X		P
Alvarado Hotel	X	X	X		X	X	X	X	X
Campus Conference Center	P	P			X	X	X	X	P
Student Union Expansion	P	P			X	X	X	X	P
Alvarado Residence Hall Expansion	X	X	X		X	P	X	P	X
Student Housing (G Lot & Olmeca/Maya)	X	X	X		X	P	X	P	X
U Lot Residence	X	X	X		X	P	X	P	X

X Anticipated

P Potential

In order to mitigate for water quality impacts that would occur from all project elements, mitigation is provided in Section 6.9.

5.11 Cumulative Impacts

Due to the existing developed nature of the Alvarado Creek floodplain area proposed for development, in combination with the proposed mitigation measures, the proposed project will not contribute to a cumulative change in discharge rates of the Alvarado Creek drainage. With respect to water quality, the proposed project's adherence to applicable county/city BMPs for water quality management is consistent with the overall regional objective of improving water quality. All SDSU projects located within the Alvarado Creek drainage are or will be planned, constructed and managed in accordance with regional BMPs and discharge requirements. Adherence with regional standards would eliminate unlawful discharge quantities or poor water quality management practices from occurring on a cumulatively considerable scale. Therefore, the proposed project will not result in significant cumulative impacts to hydrology and water quality.

6.0 MITIGATION MEASURES

Dudek utilized the SWS Manual to guide the following discussion of mitigation measures. The SWS Manual directs project applicants to identify pollutants of concern from the project area and in receiving waters, and incorporate all applicable BMPs to mitigate project impacts.

6.1 Best Management Practices (BMPs)

Development projects are required to develop and implement stormwater BMPs both during construction and in the projects permanent design to reduce pollutants discharged from the project site, to the maximum extent practicable. Post-construction pollution prevention will be accomplished through the implementation of long-term BMPs as mandated by the City of San Diego's Storm Water Management and Discharge Control Ordinance (San Diego Municipal Code Section 43.03, et seq.), and expounded in the City of San Diego's SWS Manual. In general site design BMPs minimize the potential for degradation of water quality. Source control BMPs help prevent onsite contaminants from entering the drainage system and thereby creating a potential water quality issue. Finally, treatment control BMPs help to reduce or eliminate contaminants from entering the drainage system before water leaves the site. All three types of permanent design BMPs are outlined for each project component. In addition, BMPs during construction are also mandated and are discussed in the following section.

6.1.1 Construction Considerations

Dischargers whose projects disturb one or more acres of soil are required to obtain coverage under the General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit, 99-08-DWQ). Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling or excavation. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP must list BMPs the discharger will use to protect stormwater runoff and the placement of those BMPs in accordance with Caltrans Stormwater Quality Handbooks. Additionally, the SWPPP must contain a visual monitoring programs and a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs. It is worth noting that the SDSU SWMP also requires a SWPPP for construction projects of such scale as proposed by the 2007 Campus Master Plan Revision.

6.1.2 Permanent Design Consideration

There are two receiving waters listed in the 2006 CWA Section 303(d) List of Water Quality Limited Segments in the vicinity of the proposed project. The San Diego River (Lower) was listed as having fecal coliform and low dissolved oxygen as pollutants, and the Pacific Shoreline, San Diego HU (San Diego River Mouth, aka Dog Beach) are listed as having indicator bacteria as a pollutant. The following table is excerpted from the City of San Diego's SWS Manual and presents the probable pollutants causing CWA Section 303(d) Impairment Listing.

TABLE 10
Probable Pollutants Causing Clean Water Act Section 303(d) Impairment Listing

	303 (d) Impairment Listing				
Probable Pollutants	Eutrophic	Benthic Community Degradation	Sediment Toxicity	Toxicity (in Storm Water Runoff)	Low Dissolved Oxygen
Sediments					
Nutrients	X				X
Heavy Metals		X	X		
Organic Compounds		X	X		X
Trash & Debris					X
Oxygen Demanding Substances	X				X
Oil & Grease					
Bacteria & Viruses					
Pesticides				X	

Since the San Diego River (Lower) is impaired by low dissolved oxygen, the probable pollutants that cause the impairment should be managed by permanent storm water BMPs. These probable pollutants include nutrients, organic compounds, trash and debris, and oxygen demanding substances. Additionally, the general pollutants for each project component should also be considered when selecting appropriate BMPs.

6.1.3 Maintenance Activities

A maintenance plan assuring that all permanent BMPs will be maintained throughout the use of the project components should be developed per the City of San Diego's SWS Manual. Examples of maintenance include removal of accumulated sediment and trash, thinning of vegetative brush in biotreatment swales, and maintaining the appearance and general status of the vegetation.

The maintenance plan should include the following:

Operation & Maintenance (O&M) Plan:

Describes the designated responsible party to manage the storm water BMPs, employee's training program and duties, operating schedule, maintenance frequency, routine service schedule, specific maintenance activities (including maintenance of storm water conveyance stamps), copies of resource agency permits, and other necessary activities. At a minimum, maintenance agreements should require the applicant to provide inspection and servicing of all permanent treatment BMPs on an annual basis.

Access Easement/Agreement:

An access easement to the official maintenance entity that shall be binding on the land throughout the life of the project shall be executed, unless SDSU accepts all permanent maintenance responsibilities.

6.2 Mitigation

Applicable site design, source control and treatment control mitigation required to maintain pre-development rainfall runoff characteristics are presented for each project component in the following sections. Additionally, mitigation for water quality, flood plain impacts and groundwater impacts has been included for each project component, as appropriate.

6.2.1 Adobe Falls Faculty/Staff Housing

Site Design BMPs

- Preserve the Alvarado Creek and nearby steep slope areas as open space
- Construct community streets, sidewalks and parking lot aisles to the minimum widths necessary
- Incorporate landscape treatment for parking lot runoff
- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Preserve existing native trees to maximize canopy interception and water conservation
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior to discharging to the storm drain
- Vegetate slopes with native or drought tolerant vegetation
- Install energy dissipaters, at the outlets of new storm drains that enter the Alvarado Creek
- On-site detention will likely be required based on further hydrologic analysis. Any increase in run-off would be required to be mitigated by onsite source detention so that no increase in run-off quantities would occur. This would therefore prevent any increases in floodwater levels to downstream land uses.

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.

Efficient Irrigation:

- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.
- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventer/pressure regulators will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.
- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Preserved open spaces will act as biofilter buffer zone
- On-site detention (infiltration basin, infiltration trench)
- Biofilters (grass swale, grass strip, wetland vegetation swale, bioretention)

During site design and project planning, a detailed hydrologic report shall be prepared that determines effects of the project on the floodplain during site development. This report would also measure the groundwater depth and the site plan and construction method's ability to impact this resource.

Should dewatering be necessary during construction, all discharges should be in accordance with San Diego Regional Water Quality Control Board (RWQCB) requirements outlined in Order No. 2001-96, General Waste Discharge Requirements for Groundwater Extraction Wastes from Construction Projects to Surface Waters. A general NPDES dewatering permit will be required to be obtained from the San Diego RWQCB for projects whose extraction exceeds 100,000 gallons per day (GPD), and those less than 100,000 GPD that contain pollutants in order to discharge to surface water (i.e., Alvarado Creek). If less than 100,000 GPD is discharged, an exemption from the NPDES dewatering permit will be required to be issued by the San Diego RWQCB. Water extracted during construction dewatering could also be used onsite as dust control or tanked and hauled to a legal disposal site for treatment as alternatives to obtaining a NPDES dewatering permit.

Long-term water quality impacts as a result of construction should be minimized by complying with federal and state regulations for groundwater discharge into surface water bodies. These regulations include subsurface and surface drains in fill areas and behind retaining walls. These systems can reduce potential adverse impacts associated with seepage conditions. Appropriate shoring and possibly installing a periodic dewatering system below or near the groundwater table can reduce the potential for caving or excavations due to groundwater seeps.

6.2.2 Alvarado Campus

Site Design BMPs

- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Preserve existing native trees to maximize canopy interception and water conservation
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior discharging to the storm drain
- Install energy dissipaters at the outlets of new storm drains that enter Alvarado Creek

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.
- Efficient Irrigation:
- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.

- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventer/pressure regulators will be used.

Storm Water Conveyance System Stenciling and Signage:

- Stenciling will be done on all site inlets to educate students and faculties on storm water pollution prevention. Bilingual signage will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.
- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Projects are encouraged through design to attempt to mimic the natural hydrologic regime. Therefore, an existing wetland located downstream of Alvarado Campus/D Lot and Alvarado Hotel (C Lot) sites should be considered to treat runoff.
- Biofilters, pervious paving, drainage inserts and infiltration should also be considered.

During the design phase of the proposed Alvarado Campus buildings, SDSU shall, to the maximum extent feasible, locate all building footprints outside of the 100-year floodplain. If location within the floodplain is necessary, then SDSU will design the first habitable floor of the Alvarado Campus buildings within the 100-year floodplain of Alvarado Creek at least one foot above 100-year flood levels. This will ensure that the building remains safe from floodwaters. Further, SDSU will ensure that flood insurance for location in a flood plain, as required by law, will be obtained.

Should dewatering be necessary during construction, all discharges should be in accordance with San Diego Regional Water Quality Control Board (RWQCB) requirements outlined in Order No. 2001-96, General Waste Discharge Requirements for Groundwater Extraction Wastes from Construction Projects to Surface Waters. A general NPDES dewatering permit will be required to be obtained from the San Diego RWQCB for projects whose extraction exceeds 100,000 gallons per day (GPD), and those less than 100,000 GPD that contain pollutants in order to discharge to surface water (i.e., Alvarado Creek). If less than 100,000 GPD is discharged, an exemption from the NPDES dewatering permit will be required to be issued by the San Diego RWQCB. Water extracted during construction dewatering could also be used onsite as dust

control or tanked and hauled to a legal disposal site for treatment as alternatives to obtaining a NPDES dewatering permit.

Long-term water quality impacts as a result of construction should be minimized by complying with federal and state regulations for groundwater discharge into surface water bodies. These regulations include subsurface and surface drains in fill areas and behind retaining walls. These systems can reduce potential adverse impacts associated with seepage conditions. Appropriate shoring and possibly installing a periodic dewatering system below or near the groundwater table can reduce the potential for caving or excavations due to groundwater seeps.

6.2.3 Alvarado Hotel

Site Design BMPs

- Preserve existing native trees to maximize canopy interception and water conservation
- Construct sidewalks and parking lot aisles to the minimum widths necessary
- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior discharging to the storm drain
- Install energy dissipaters, such as riprap, at the outlets of new storm drains that enter the Alvarado Creek

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.

Efficient Irrigation:

- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.
- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventer/pressure regulators will be used.

Storm Water Conveyance System Stenciling and Signage:

- Stenciling will be done on all site inlets to educate students and faculties on storm water pollution prevention. Bilingual signage will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.
- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Projects are encouraged through design to attempt to mimic the natural hydrologic regime. Therefore, an existing wetland located downstream of Alvarado Campus/D Lot and Alvarado Hotel (C Lot) sites should be considered to treat runoff.
- Biofilters, pervious paving, drainage inserts and infiltration should also be considered.

During the design phase of the proposed Alvarado Hotel, SDSU shall, to the maximum extent feasible, locate all building footprints outside of the 100-year floodplain. If location within the floodplain is necessary, then SDSU will design the first habitable floor of the Alvarado Hotel within the 100-year flood-plain of Alvarado Creek at least one foot above 100-year flood levels. Further, SDSU will ensure that flood insurance for location in a flood plain, as required by law, will be obtained.

Should dewatering be necessary during construction, all discharges should be in accordance with San Diego Regional Water Quality Control Board (RWQCB) requirements outlined in Order No. 2001-96, General Waste Discharge Requirements for Groundwater Extraction Wastes from Construction Projects to Surface Waters. A general NPDES dewatering permit will be required to be obtained from the San Diego RWQCB for projects whose extraction exceeds 100,000 gallons per day (GPD), and those less than 100,000 GPD that contain pollutants in order to

discharge to surface water (i.e., Alvarado Creek). If less than 100,000 GPD is discharged, an exemption from the NPDES dewatering permit will be required to be issued by the San Diego RWQCB. Water extracted during construction dewatering could also be used onsite as dust control or tanked and hauled to a legal disposal site for treatment as alternatives to obtaining a NPDES dewatering permit.

Long-term water quality impacts as a result of construction should be minimized by complying with federal and state regulations for groundwater discharge into surface water bodies. These regulations include subsurface and surface drains in fill areas and behind retaining walls. These systems can reduce potential adverse impacts associated with seepage conditions. Appropriate shoring and possibly installing a periodic dewatering system below or near the groundwater table can reduce the potential for caving or excavations due to groundwater seeps.

6.2.4 Campus Conference Center

Site Design BMPs

- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior discharging to the storm drain

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.

Efficient Irrigation:

- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.

- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventer/pressure regulators will be used.

Storm Water Conveyance System Stenciling and Signage:

- Stenciling will be done on all site inlets to educate students and faculties on storm water pollution prevention. Bilingual signage will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.
- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Biofilters, pervious paving, drainage inserts and bioinfiltration should also be considered.

Should dewatering be necessary during construction, all discharges should be in accordance with San Diego Regional Water Quality Control Board (RWQCB) requirements outlined in Order No. 2001-96, General Waste Discharge Requirements for Groundwater Extraction Wastes from Construction Projects to Surface Waters. A general NPDES dewatering permit will be required to be obtained from the San Diego RWQCB for projects whose extraction exceeds 100,000 gallons per day (GPD), and those less than 100,000 GPD that contain pollutants in order to discharge to surface water (i.e., Alvarado Creek). If less than 100,000 GPD is discharged, an exemption from the NPDES dewatering permit will be required to be issued by the San Diego RWQCB. Water extracted during construction dewatering could also be used onsite as dust control or tanked and hauled to a legal disposal site for treatment as alternatives to obtaining a NPDES dewatering permit.

Long-term water quality impacts as a result of construction should be minimized by complying with federal and state regulations for groundwater discharge into surface water bodies. These regulations include subsurface and surface drains in fill areas and behind retaining walls. These systems can reduce potential adverse impacts associated with seepage conditions. Appropriate shoring and possibly installing a periodic dewatering system below or near the groundwater table can reduce the potential for caving or excavations due to groundwater seeps.

6.2.5 Student Union Expansion

Site Design BMPs

- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior discharging to the storm drain

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.

Efficient Irrigation:

- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.
- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventer/pressure regulators will be used.

Storm Water Conveyance System Stenciling and Signage:

- Stenciling will be done on all site inlets to educate students and faculties on storm water pollution prevention. Bilingual signage will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.

- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Biofilters, pervious paving, drainage inserts and bioinfiltration should also be considered.

Should dewatering be necessary during construction, all discharges should be in accordance with San Diego Regional Water Quality Control Board (RWQCB) requirements outlined in Order No. 2001-96, General Waste Discharge Requirements for Groundwater Extraction Wastes from Construction Projects to Surface Waters. A general NPDES dewatering permit will be required to be obtained from the San Diego RWQCB for projects whose extraction exceeds 100,000 gallons per day (GPD), and those less than 100,000 GPD that contain pollutants in order to discharge to surface water (i.e., Alvarado Creek). If less than 100,000 GPD is discharged, an exemption from the NPDES dewatering permit will be required to be issued by the San Diego RWQCB. Water extracted during construction dewatering could also be used onsite as dust control or tanked and hauled to a legal disposal site for treatment as alternatives to obtaining a NPDES dewatering permit.

Long-term water quality impacts as a result of construction should be minimized by complying with federal and state regulations for groundwater discharge into surface water bodies. These regulations include subsurface and surface drains in fill areas and behind retaining walls. These systems can reduce potential adverse impacts associated with seepage conditions. Appropriate shoring and possibly installing a periodic dewatering system below or near the groundwater table can reduce the potential for caving or excavations due to groundwater seeps.

6.2.6 Villa Alvarado Residence Hall Expansion

Site Design BMPs

- Preserve existing native trees to maximize canopy interception and water conservation
- Construct sidewalks and parking lot aisles to the minimum widths necessary
- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior discharging to the storm drain
- Install energy dissipaters, such as riprap, at the outlets of new storm drains that enter the Alvarado Creek

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.

Efficient Irrigation:

- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.
- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventer/pressure regulators will be used.

Storm Water Conveyance System Stenciling and Signage:

- Stenciling will be done on all site inlets to educate students and faculties on storm water pollution prevention. Bilingual signage will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.
- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Projects are encouraged through design to attempt to mimic the natural hydrologic regime. Therefore, an existing wetland located downstream of this project component should be considered to treat runoff.
- Biofilters, pervious paving, drainage inserts and infiltration should also be considered.

6.2.7 Student Housing (G Lot & Olmeca/Maya)

Site Design BMPs

- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior discharging to the storm drain

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.

Efficient Irrigation:

- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.
- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventers/pressure regulators will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.
- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Biofilters, pervious paving, drainage inserts and bioinfiltration should also be considered.

Should dewatering be necessary during construction, all discharges should be in accordance with San Diego Regional Water Quality Control Board (RWQCB) requirements outlined in Order No. 2001-96, General Waste Discharge Requirements for Groundwater Extraction Wastes from Construction Projects to Surface Waters. A general NPDES dewatering permit will be required to be obtained from the San Diego RWQCB for projects whose extraction exceeds 100,000 gallons per day (GPD), and those less than 100,000 GPD that contain pollutants in order to discharge to surface water (i.e., Alvarado Creek). If less than 100,000 GPD is discharged, an exemption from the NPDES dewatering permit will be required to be issued by the San Diego RWQCB. Water extracted during construction dewatering could also be used onsite as dust control or tanked and hauled to a legal disposal site for treatment as alternatives to obtaining a NPDES dewatering permit.

Long-term water quality impacts as a result of construction should be minimized by complying with federal and state regulations for groundwater discharge into surface water bodies. These regulations include subsurface and surface drains in fill areas and behind retaining walls. These systems can reduce potential adverse impacts associated with seepage conditions. Appropriate shoring and possibly installing a periodic dewatering system below or near the groundwater table can reduce the potential for caving or excavations due to groundwater seeps.

6.2.8 U Lot Residence Hall

Site Design BMPs

- Use unit pavers or other equivalent porous material to construct walkways, alleys and other low-traffic areas
- Plant native trees and maximize canopy interception and water conservation
- Drain rooftops into adjacent landscaping prior discharging to the storm drain

Source Control BMPs

Materials Storage:

- All hazardous materials stored on-site will be stored in enclosures, such as cabinets, sheds, or similar structures that prevent contact with rain, runoff or spillage into the storm drain. Where not covered by the aforementioned, polyethylene cover will be used.

Trash Storage:

- Lids will be attached on all trash containers to reduce pollution introduction into the drainage system.

Efficient Irrigation:

- Rainfall shutoff devices will be used to prevent irrigation during and after precipitation.
- Irrigation system will utilize dripping system to the maximum extend to eliminate nuisance runoff.
- Backflow preventers/pressure regulators will be used.

To limit contamination from pesticides:

- Proper use of pesticides as a last line of defense.
- Physical pest elimination techniques, such as weeding and trapping.

Treatment Control BMPs

- Biofilters, pervious paving, drainage inserts and bioinfiltration should also be considered.

Should dewatering be necessary during construction, all discharges should be in accordance with RWQCB requirements which mandate that dewatered groundwater be used onsite as dust control or tanked and hauled to a legal disposal site for treatment. Dewatering shall not occur in Alvarado Creek nor be directed toward the storm drain system or sewer system. In addition, it should be noted that a National Pollution Discharge Elimination System (NPDES) dewatering permit obtained from the Regional Water Quality Control Board will be required. Surface controls to mitigate potential pollutants from infiltrating into the groundwater include proper and legal storage of on-site hazardous materials, source control, treatment control and maintenance activities described herein.

Long-term water quality impacts as a result of construction should be minimized by complying with federal and state regulations for groundwater discharge into surface water bodies. These regulations include subsurface and surface drains in fill areas and behind retaining walls. These systems can reduce potential adverse impacts associated with seepage conditions. Appropriate shoring and possibly installing a periodic dewatering system below or near the groundwater table can reduce the potential for caving or excavations due to groundwater seeps.

7.0 SIGNIFICANCE OF IMPACT AFTER MITIGATION

7.1 Adobe Falls Faculty/Staff Housing

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

7.2 Alvarado Campus

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

7.3 Alvarado Hotel

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

7.4 Campus Conference Center

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

7.5 Student Union Expansion

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

7.6 Villa Alvarado Residence Hall Expansion

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

7.7 Student Housing (G Lot & Olmeca/Maya)

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

7.8 U Lot Residence Hall

After application of the proposed mitigation measures, the impact to this project component would be mitigated to a level below significance.

8.0 ACKNOWLEDGEMENTS

This report was prepared by Dudek hydrogeologists Trey Driscoll and Sarah Richmond under the supervision of Derek Reed, P.E., Senior Engineer.

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APPENDIX A

Storm Water Runoff Flow Calculations

Existing 85% Storm

85% Storm

P6	0.63	Inch
P24		Inch
P6/P24[1]		
Adjusted P6	0.63	Inch

Drainage Area	Area ACRE	C	Tc MIN	Intensity[2] IN/HR	Q[3] CFS
Adobe Falls/North Campus	20.00	0.35	17.70	0.73	5.14
Alvarado Campus Park / D Lot	16.80	0.85	5.00	1.66	23.70
Alvarado Hotel (C Lot)	1.90	0.85	5.00	1.66	2.68
Conference Center	1.10	0.69	5.00	1.66	1.26
Student Union	3.00	0.85	5.00	1.66	4.23
Villa Alvarado Residence - C Lot	Q	0.85	5.00	1.66	1.98
Student Housing - G Lot/Olmeca/Maya	13.70	0.85	5.00	1.66	19.33
U Lot	2.30	0.85	5.00	1.66	3.25

[1] P6/P24 SHALL WITH 45%-65%, NOT APPLICABLE TO DESERT

[2] I=7.44*P6*Tc^(-0.645)

[3] Q=CiA

Existing 2-Year Storm

2-Year Storm

P6	1.23	Inch
P24	1.70	Inch
P6/P24[1]	72.35%	
Adjusted P6	1.11	Inch

Drainage Area	Area ACRE	C	Tc MIN	Intensity[2] IN/HR	Q[3] CFS
Adobe Falls/North Campus	20.00	0.35	17.70	1.29	9.02
Alvarado Campus Park / D Lot	16.80	0.85	5.00	2.91	41.57
Alvarado Hotel (C Lot)	1.90	0.85	5.00	2.91	4.70
Conference Center	1.10	0.69	5.00	2.91	2.21
Student Union	3.00	0.85	5.00	2.91	7.42
Villa Alvarado Residence - C Lot	1.40	0.85	5.00	2.91	3.46
Student Housing - G Lot/Olmeca/Maya	13.70	0.85	5.00	2.91	33.90
U Lot	2.30	0.85	5.00	2.91	5.69

[1] P6/P24 SHALL WITH 45%-65%, NOT APPLICABLE TO DESERT

[2] I=7.44*P6*Tc^(-0.645)

[3] Q=CiA

Existing 10-Year Storm

10-Year Storm

P6	1.80	Inch
P24	3.17	Inch
P6/P24[1]	56.78%	
Adjusted P6	1.80	Inch

Drainage Area	Area ACRE	C	Tc MIN	Intensity[2] IN/HR	Q[3] CFS
Adobe Falls/North Campus	20.00	0.35	17.70	2.10	14.69
Alvarado Campus Park / D Lot	16.80	0.85	5.00	4.74	67.72
Alvarado Hotel (C Lot)	1.90	0.85	5.00	4.74	7.66
Conference Center	1.10	0.69	5.00	4.74	3.60
Student Union	3.00	0.85	5.00	4.74	12.09
Villa Alvarado Residence - C Lot	1.40	0.85	5.00	4.74	5.64
Student Housing - G Lot/Olmeca/Maya	13.70	0.85	5.00	4.74	55.23
U Lot	2.30	0.85	5.00	4.74	9.27

[1] P6/P24 SHALL WITH 45%-65%, NOT APPLICABLE TO DESERT

[2] I=7.44*P6*Tc^(-0.645)

[3] Q=CiA

Existing 100-Year Storm

100-Year Storm

P6	2.56	Inch
P24	4.75	Inch
P6/P24[1]	53.89%	
Adjusted P6	2.56	Inch

Drainage Area	Area ACRE	C	Tc MIN	Intensity[2] IN/HR	Q[3] CFS
Adobe Falls/North Campus	20.00	0.35	17.70	2.98	20.89
Alvarado Campus Park / D Lot	16.80	0.85	5.00	6.74	96.32
Alvarado Hotel (C Lot)	1.90	0.85	5.00	6.74	10.89
Conference Center	1.10	0.69	5.00	6.74	5.12
Student Union	3.00	0.85	5.00	6.74	17.20
Villa Alvarado Residence - C Lot	1.40	0.85	5.00	6.74	8.03
Student Housing - G Lot/Olmeca/Maya	13.70	0.85	5.00	6.74	78.54
U Lot	2.30	0.85	5.00	6.74	13.19

[1] P6/P24 SHALL WITH 45%-65%, NOT APPLICABLE TO DESERT

[2] I=7.44*P6*Tc^(-0.645)

[3] Q=CiA

Potential 85% Storm

85% Storm

P6	0.63	Inch
P24		Inch
P6/P24[1]		
Adjusted P6	0.63	Inch

Drainage Area	Area ACRE	C	Tc MIN	Intensity[2] IN/HR	Q[3] CFS
Adobe Falls/North Campus	20.00	0.52	17.70	0.73	7.64
Alvarado Campus Park / D Lot	16.80	0.85	5.00	1.66	23.70
Alvarado Hotel (C Lot)	1.90	0.85	5.00	1.66	2.68
Conference Center	1.10	0.85	5.00	1.66	1.55
Student Union	3.00	0.85	5.00	1.66	4.23
Villa Alvarado Residence - C Lot	1.40	0.85	5.00	1.66	1.98
Student Housing - G Lot/Olmeca/Maya	13.70	0.85	5.00	1.66	19.33
U Lot	2.30	0.85	5.00	1.66	3.25

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Potential 2-Year Storm

2-Year Storm

P6	1.23	Inch
P24	1.70	Inch
P6/P24[1]	72.35%	
Adjusted P6	1.11	Inch

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Villa Alvarado Residence - C Lot	1.40	0.85	5.00	2.91	3.46
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[1] P6/P24 SHALL WITH 45%-65%, NOT APPLICABLE TO DESERT

[2] I=7.44*P6*Tc^(-0.645)

[3] Q=CiA

Potential 10-Year Storm

10-Year Storm

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P24	3.17	Inch
P6/P24[1]	56.78%	
Adjusted P6	1.80	Inch

Drainage Area	Area ACRE	C	Tc MIN	Intensity[2] IN/HR	Q[3] CFS
Adobe Falls/North Campus	20.00	0.52	17.70	2.10	21.82
Alvarado Campus Park / D Lot	16.80	0.85	5.00	4.74	67.72
Alvarado Hotel (C Lot)	1.90	0.85	5.00	4.74	7.66
Conference Center	1.10	0.85	5.00	4.74	4.43
Student Union	3.00	0.85	5.00	4.74	12.09
Villa Alvarado Residence - C Lot	1.40	0.85	5.00	4.74	5.64
Student Housing - G Lot/Olmeca/Maya	13.70	0.85	5.00	4.74	55.23
U Lot	2.30	0.85	5.00	4.74	9.27

[1] P6/P24 SHALL WITH 45%-65%, NOT APPLICABLE TO DESERT

[2] I=7.44*P6*Tc^(-0.645)

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Potential 100-Year Storm

100-Year Storm

P6	2.56	Inch
P24	4.75	Inch
P6/P24[1]	53.89%	
Adjusted P6	2.56	Inch

Drainage Area	Area ACRE	C	Tc MIN	Intensity[2] IN/HR	Q[3] CFS
Adobe Falls/North Campus	20.00	0.52	17.70	2.98	31.03
Alvarado Campus Park / D Lot	16.80	0.85	5.00	6.74	96.32
Alvarado Hotel (C Lot)	1.90	0.85	5.00	6.74	10.89
Conference Center	1.10	0.85	5.00	6.74	6.31
Student Union	3.00	0.85	5.00	6.74	17.20
Villa Alvarado Residence - C Lot	1.40	0.85	5.00	6.74	8.03
Student Housing - G Lot/Olmeca/Maya	13.70	0.85	5.00	6.74	78.54
U Lot	2.30	0.85	5.00	6.74	13.19

[1] P6/P24 SHALL WITH 45%-65%, NOT APPLICABLE TO DESERT

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[3] Q=CiA