2.0 SETTING

2.1 WATERSHED

The Newport Banning Ranch Project site lies within the larger Talbert Watershed which covers 21.4 square miles adjacent to the mouth of the Santa Ana River. It includes portions of the cities of Costa Mesa, Fountain Valley, Huntington Beach, Newport Beach, and Santa Ana. The Greenville-Banning Channel, which drains into the Santa Ana River, is one of two main tributaries that drain this watershed. On the western side of the Santa Ana River, the Talbert and Huntington Beach Channels drain through the Talbert Marsh before emptying into the Pacific Ocean. The Greenville-Banning Channel is located north of the project site, runs parallel to and ultimately discharges to the Santa Ana River channel.

The Santa Ana River Watershed is the largest in Orange County, covering 153.2 square miles. The river begins almost 75 miles away in the San Bernardino Mountains, crossing central Orange County before emptying into the Pacific Ocean. The Orange County portion of the watershed includes portions of the cities of Anaheim, Brea, Huntington Beach, Orange, Placentia, Santa Ana, Villa Park, and Yorba Linda. The river serves as the main tributary to the watershed.

Regionally, the Newport Banning Ranch project site is located within the Talbert Watershed. Storm water runoff from the site generally ponds in the Oxbow Loop and Lowland areas, and does not discharge off-site to the Greenville-Banning Channel. Therefore, the Project watershed is hydrologically independent of the Greenville-Banning Channel. For the purposes of the hydrology analyses presented in this report, the Project watershed studied includes all upstream areas that drain onto the project site and into the Lowlands basin, but does not include areas further downstream of the Lowlands basin.

2.2 RECEIVING WATER BENEFICIAL USES

The Water Quality Control Plan for the Santa Ana River Basin (or "Basin Plan") developed by the Santa Ana RWQCB designates beneficial uses and water quality objectives for surface waters and groundwaters within the Santa Ana Region.[1] According to the Basin Plan, the Newport Banning Ranch project site is located within the Lower Santa Ana River Hydrologic Area and the East Coast Plain Hydrologic Sub-Area (HSA 801.11). The beneficial uses of the downstream receiving water bodies of the Newport Banning Ranch Project, as outlined in the Basin Plan, are summarized in the following table.

[1] Santa Ana Regional Water Quality Control Board (RWQCB). Water Quality Control Plan for the Santa Ana River Basin (8). January 24, 1995. Updated February 2008.

SURFACE WATER BENEFICIAL USES																				
Receiving Water	MUN	AGR	IND	PROC	GWR	NAV	POW	REC1	REC2	COMM	WARM	LWRM	COLD	BIOL	WILD	RARE	SPWN	MAR	SHEL	EST
Tidal Prism of Santa Ana River	+							X	X	X					X	X		X		

X Present or Potential Beneficial Use
+ Excepted from MUN

BIOL	–	biological significance	RARE	–	rare, threatened, or endangered species
COMM	–	commercial and sport fishing	REC1	–	contact water recreation
EST	–	estuarine habitat	REC2	–	non-contact water recreation
MAR	–	marine habitat	SHEL	–	shellfish harvesting
MUN	–	municipal and domestic supply	SPWN	–	spawning, reproduction, and development
NAV	–	navigation	WILD	–	wildlife habitat

Table 2.1 Beneficial uses for downstream receiving waters.

Though there are no specific water quality objectives for the Santa Ana River Tidal Prism to maintain these beneficial uses, general water quality objectives have been prescribed in the Basin Plan for all enclosed bays and estuaries in the Santa Ana Region. Brief summaries of the applicable objectives are provided below.

Algae	Waste discharges shall not contribute to excessive algal growth in receiving waters.
Bacteria, Coliform	In waters designated for REC for fecal coliform: log mean less than 200 organisms/100 mL based on five or more samples/30 day period, and not more than 10% of the samples exceed 400 organisms/100 mL for any 30-day period.
Chlorine, Total Residual	The chlorine residual in wastewater discharged to enclosed bays and estuaries shall not exceed 0.1 mg/L.
Color	Waste discharges shall not result in coloration of the receiving waters which causes a nuisance or adversely affects beneficial uses. The natural color of fish, shellfish or other bay and estuarine water resources used for human consumption shall not be impaired.
Floating Materials	Waste discharges shall not contain floating materials, including solids, liquids, foam or scum, which cause a nuisance or adversely affect beneficial uses.
Oil and Grease	Waste discharges shall not result in deposition of oil, grease, wax or other materials in concentrations which result in a visible film or in coating objects in the water, or which cause a nuisance or adversely affect beneficial uses.
Oxygen, Dissolved	The dissolved oxygen content of enclosed bays and estuaries shall not be depressed to levels that adversely affect beneficial uses as a result of controllable water quality factors.
pH	The pH of bay or estuary waters shall not be raised above 8.6 or depressed below 7.0 as a result of controllable water quality factors; ambient pH levels shall not be changed more than 0.2 units.
Radioactivity	Radioactive materials shall not be present in the bay or estuarine waters of the region in concentrations which are deleterious to human, plant or animal life.

Solids, Suspended and Settleable	Enclosed bays and estuaries shall not contain suspended or settleable solids in amounts which cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors.
Sulfides	The dissolved sulfide content of enclosed bays and estuaries shall not be increased as a result of controllable water quality factors.
Surfactants	Waste discharges shall not contain concentrations of surfactants which result in foam in the course of flow or use of the receiving water, or which adversely affect aquatic life.
Taste and Odor	The enclosed bays and estuaries of the region shall not contain, as a result of controllable water quality factors, taste- or odor-producing substances at concentrations which cause a nuisance or adversely affect beneficial uses. The natural taste and odor of fish, shellfish or other enclosed bay and estuarine water resources used for human consumption shall not be impaired.
Temperature	The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F. Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point. No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.
Toxicity	Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health. The concentrations of toxic substances in the water column, sediments or biota shall not adversely affect beneficial uses.
Turbidity	All enclosed bay and estuaries of the region shall be free of changes in turbidity which adversely affect beneficial uses. Increases in turbidity shall not exceed natural levels by more than 20 percent where natural turbidity is between 0-50 NTU, and shall not exceed natural levels by more than 10% where natural turbidity is greater than 100 NTU.

Table 2.2 Water quality objectives for Santa Ana Region enclosed bays and estuaries.

Geographically, the project site is also located within the Orange County Groundwater Management Zone, which consists primarily of three intra-connected confined aquifers: the Lower, Middle, and Upper Aquifers. The main aquifer located within the Middle Aquifer is the primary source of groundwater supply for Orange County. The elevation of the groundwater table within the vicinity of the Newport Banning Ranch project site is generally at mean sea level (MSL), and is subject to tidal influences due to the proximity to the Pacific Ocean. As a result, this area is excepted from the sources of drinking water policy, and no specific water quality objectives for groundwater are applicable for the Project.[2]

Within the vicinity of the project site, three general soil units are present: San Pedro Formation bedrock, marine terrace deposits, and river alluvium. The San Pedro Formation bedrock generally consists of gray and dark gray to reddish yellow-stained siltstone and clayey siltstone, with sandstone interbeds. The marine terrace deposits generally consist of rounded cobbles,

[2] Santa Ana Regional Water Quality Control Board (RWQCB). Water Quality Control Plan for the Santa Ana River Basin (8). January 24, 1995. Updated February 2008.

shells, and angular rocks similar to materials found in tidal zones. Both the bedrock and marine terrace deposits occur beneath the mesa and elevated portions of the project site. Soils within the Lowland areas of the site are primarily alluvium, which consist of relatively young sediments of gravel, sand, and clay deposits. In addition, artificial fill is located throughout the site, mainly associated with the construction of the on-site oil facilities.[3]

2.3 EXISTING WATER QUALITY CONDITIONS

Under Section 303(d) of the Clean Water Act (CWA), States are required to identify water bodies that do not meet their water quality standards. Once a water body has been listed as impaired, a Total Maximum Daily Load (TMDL) for the constituent of concern (pollutant) must be developed for that water body. A TMDL is an estimate of the daily load of pollutants that a water body may receive from point sources, non-point sources, and natural background conditions (including an appropriate margin of safety), without exceeding its water quality standard. Those facilities and activities that are discharging into the water body, collectively, must not exceed the TMDL.

Storm water runoff from the project site ultimately discharges into the Lowlands basin area and into the Tidal Prism of the Santa Ana River. The Tidal Prism and Reach 1 of the Santa Ana River are not listed as impaired according to the 2006 303(d) list published by the Santa Ana RWQCB, and do not have any TMDLs in place.[4]

2.4 EXISTING DRAINAGE CONDITIONS

In general, the Project's natural drainage flows from the higher elevations in the east toward lower elevations to the west. Off-site drainage from the existing urban areas of the Cities of Costa Mesa and Newport Beach enter the project site through storm drain culverts at the upstream ends of the larger Arroyos. Within the project boundary, the Northern and Southern Arroyos and Oxbow Loop convey runoff towards the Salt Marsh and Lowland basin. There are no major storm drain facilities under existing condition within the project boundary. In the southern portion of the site, an existing underground concrete box (RCB) storm drain along West Coast Highway (WCH) also collects runoff from the site, discharging to the Oxbow Loop channel. The existing RCB storm drain at WCH is owned and operated by the California Department of Transportation (Caltrans). There are several tidal gates and control pipes that regulate tidal flows between the Santa Ana River and the Oxbow Loop and Lowland areas of the project site. The default position of the gates is open to allow tidal flows to circulate through the Marsh areas. The water surface elevation of the Santa Ana River controls the gates, and determines whether local storm water runoff can be discharged into the river. Refer to Figure 4 for the Project watershed under existing conditions.

[3] GMU Geotechnical, Inc. Report of Geotechnical Studies. Proposed Newport Banning Ranch Development, City of Newport Beach/County of Orange. March 2008.

[4] Santa Ana Regional Water Quality Control Board (RWQCB). 2006 Clean Water Act Section 303(d) List of Limited Water Quality Segments. October 25, 2006.

2.5 PROPOSED DRAINAGE PLAN

The objective of the proposed drainage plan is to design the on-site storm drain system and other drainage features in a manner to neutralize any adverse effects induced by the Project in storm runoff quantify and quality. In general, no major changes in the drainage patterns are proposed as compared to the existing conditions of the Project watershed, however some minor adjustments in the sub-watershed boundaries are considered necessary for better overall storm runoff management (see Figure 5). In addition, this proposed drainage plan integrates LID features as well as aesthetic features with traditional local drainage design. The proposed drainage facilities are described in detail in the following sections, and refer to Figure 6 for the locations and layout.

2.5.1 PROPOSED STORM DRAINS

Under proposed conditions, there are six primary proposed on-site storm drain systems, labeled from A to F, that will drain Project flows to downstream receiving water bodies. In addition, there is a proposed upstream basin to control off-site runoff prior to discharging into the Southern Arroyo.

- Storm Drain A – discharges to the existing Caltrans box culvert under the WCH. Storm Drain A is designed to reduce the tributary drainage area of this storm drain system as compared to the existing condition to account for the increase in Project runoff in the proposed condition.
- Storm Drains B and C – collect flows from the development areas adjacent to the Southern Arroyo and deliver these flows to a diffuser basin located downstream of the Arroyo adjacent to the Oxbow Loop. The design of this system serves three primary functions: 1) to minimize the discharge of storm water flows directly to the Arroyo channel to protect the long-term channel stability, 2) dissipate erosive energy before flows enter the Oxbow Loop, and 3) control sediment contributions to the Oxbow Loop.
- Storm Drains D and E – collect flows from the larger development areas of the Project and deliver storm flows to the Lowland basin. Under the existing condition, a portion of drainage from Storm Drain D is tributary to the Southern Arroyo and Oxbow Loop. This proposed drainage diversion is specifically designed to maximize the amount of flows to be directed towards the Lowland in order to reduce the flood loading of the Oxbow Loop. A second diffuser basin will be installed downstream of Storm Drains D and E to reduce the momentum of the flows from the pipes and to spread the distribution of runoff to the Lowland in a manner that will enable future habitat restoration efforts.
- Storm Drain F: collects flows from the northernmost development area. The tributary drainage area has been kept as small as possible to minimize impacts to the Northern Arroyo. An energy dissipater will be installed at this storm drain outlet to transition and deliver non-erosive flows to the natural channel.

2.5.2 LOWLAND BASIN

While the proposed land use of the Lowland area is designated as habitat, there is an opportunity to increase the flood storage capacity in the area to accommodate more local runoff during the high tide condition when the tidal gates of the Santa Ana River are closed. The Lowland is located adjacent to the Salt Marsh habitat area. Currently, the Lowland is not subject to the tidal water circulation based on its surface elevations being higher than the tidal flux. Therefore, the Lowland area is likely to be graded lower in the future to create sub-tidal channels for tidal circulation and annexed into the existing Salt Marsh habitat. Thus, the provided flood storage capacity will accordingly increase. Increasing the Lowland's storm runoff retention capacity during the high tide condition can effectively lower the flood depth and alleviate the existing flooding problem in the Oxbow Loop (further discussed in Section 3.2.2). By directing more flow to the Lowland basin, the Southern Arroyo and Oxbow Loop also receive less available flows to transport sediment from the eroding tributaries into the Oxbow Loop. As part of the proposed drainage plan, these eroding tributaries will be stabilized to prevent the primary sources of sediment from entering the Arroyos.

2.5.3 OFF-SITE RUNOFF WATER QUALITY / DETENTION BASIN

Under the existing condition, approximately 48 acres of off-site flows from the 16th Street drainage area of Costa Mesa enter the property (via a 48" RCP) from the east and discharge into the Southern Arroyo. In general, these flows contain urban runoff pollutants and also convey sediment from the eroding tributaries of the Arroyo to the downstream end, ultimately discharging into the Oxbow Loop during severe storms. Thus, a water quality/detention basin, functioning as both as a water quality treatment control BMP and discharge regulation, will be implemented to intercept these off-site flows. As shown in Figure 6, the basin is proposed within the property boundary at the southeast corner of the proposed 16th Street entrance. The required basin capacity is estimated to be approximately 3 acre-feet, which can treat all dry-weather and a portion of first flush runoff from off-site and reduce the 100-year peak discharge by 30 cubic feet per second. In addition to hydrology and water quality benefits, the basin can also alleviate flood loading for the downstream channel, such as the Oxbow Loop, when the reduced flood peak propagates toward downstream from the basin. The reduction in peak discharges combined with the stabilization of the eroding tributaries of the Arroyo will serve to control the current sediment loads into the Oxbow Loop.

SEE FIGURES 4, 5 & 6 FOR CHAPTER 02

PDFs 55, 56 & 57

2.6 FEMA SPECIAL FLOOD HAZARD AREAS

The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for flood plain management and is designed to minimize flood damage within Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) is the agency that administrates the National Flood Insurance Program. Special Flood Hazard Areas (SFHA) are defined as areas that have a 1% chance of flooding within a given year, also referred to as the 100-year flood. Flood Insurance Rate Maps (FIRMs) were developed to identify areas of flood hazards within a community.

According to the Flood Insurance Rate Map (FIRM) catalog, there is a FIRM produced by FEMA for the Newport Banning Ranch project site:

MAP Number: 06059C026H

MAP Revised: February 18, 2004

A FEMA Map showing the flood zones designated for the Newport Banning Ranch project site is provided in Appendix A. The northwest portion of the site (the Lowland area) and the southwest corner of the site are located within the 0.2% annual chance flood (500-year flood plain), The balance of the project site is in the area defined to be outside the 0.2% chance (500-year floodplain).

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