III. CORRECTIONS AND ADDITIONS TO THE DRAFT EIR
B. REVISIONS TO DRAFT EIR

REVISIONS TO THE DRAFT EIR

Minor Universal Changes Throughout the DEIR:

- Total Wellness Center Units: The total number of Wellness Center units has been reduced from 70 units to 57 units. This change is considered minor, as the occupancy of the Wellness Center has not changed and remains at 50 developmentally disabled adults and 20 staff persons.

- Community Center: All references and descriptions of the "Community Center" should be changed to "Fitness Center," which will be for the use of Wellness Center residents, guests, and staff and Office Park employees only (not open to the general public).

- Wellness Center Buildings: References to Wellness Center Buildings 1 through 7 should be replaced with Buildings A and B.

- Wellness Center Parking Lot: The 73-space parking lot has been changed to provide 50 parking spaces, due to the elimination of the Community Center and the associated need for parking for it.

- Wellness Center Wetlands Trail: This trail has been eliminated.

- Public Storage Building: The size of the public storage building has been reduced from 20,000 sq. ft. to 10,000 sq. ft. Also, the public storage building on the Wellness Center parcel is no longer a separate building, as it is attached to Building A.

- Drainfields/Infiltration Ponds and Rain Gardens: Delete references to drainfields or infiltration ponds and rain gardens, as these proposals have been eliminated from the project.

- Natural Gas Generator: The purpose of the natural gas generator has changed from peak-shaving to backup uses.

- El Granada Mobile Home Park: All references to the El Granada Mobile Home Park are changed to Pillar Ridge Manufactured Home Community.

Text Changes to the DEIR (excludes Project Description[1]):

TABLE OF CONTENTS

There are no changes to this section.

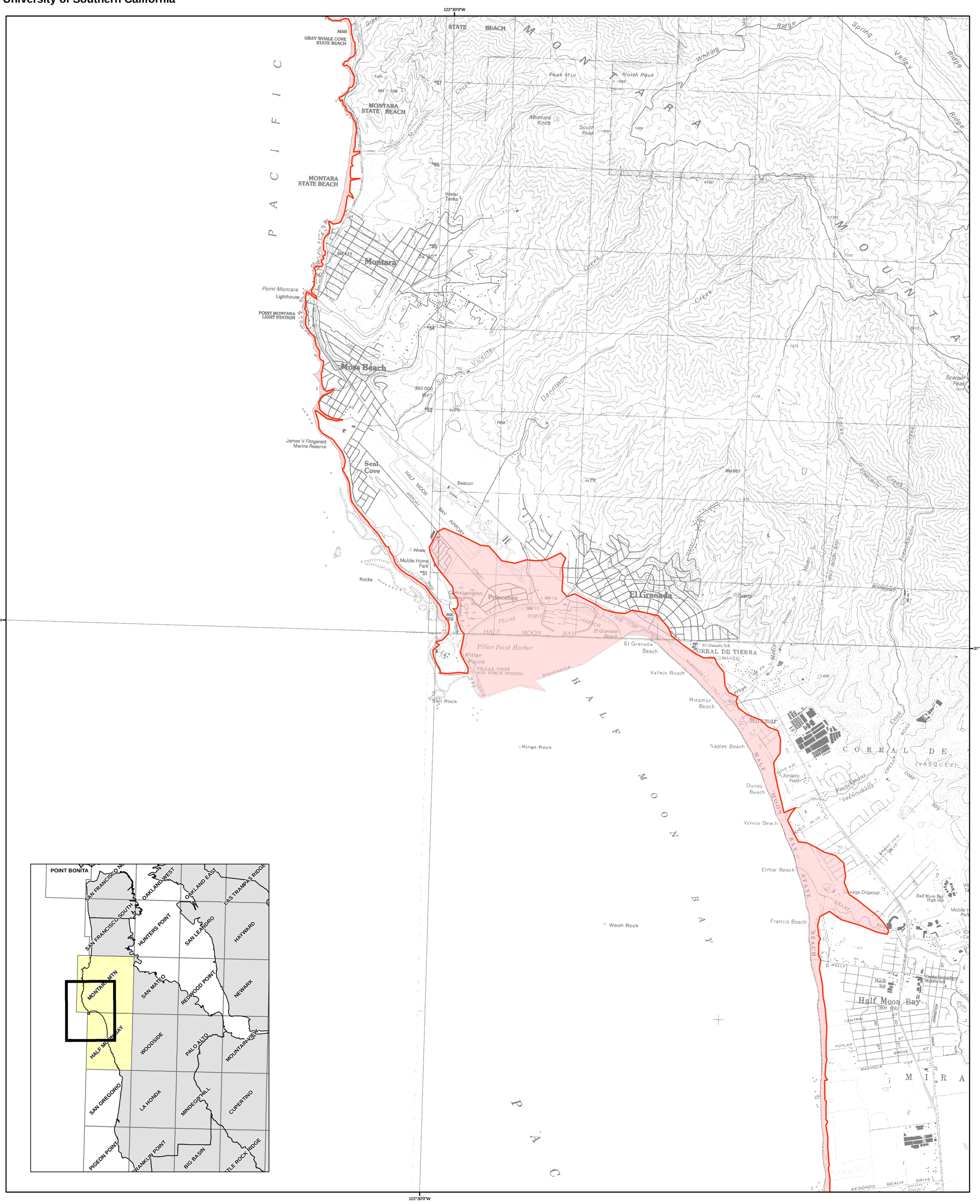
FIGURES[2]

Revised Figure

- Figure IV.H-7: The Tsunami Inundation Map (1989) is replaced with the updated 2009 map version.

[1] *For changes to the Project Description, refer to Section III.A of the FEIR.*

[2] *Revisions to tables are indicated below, by page number of the DEIR.*



METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

References:

Intermap Technologies, Inc., 2003, Intermap product handbook and quick start guide: Intermap NEXTmap document on 5-meter resolution data, 112 p.

Lander, J.F., Lockridge, P.A., and Kozuch, M.J., 1993, Tsunamis Affecting the West Coast of the United States 1806-1992: National Geophysical Data Center Key to Geophysical Record Documentation No. 29, NOAA, NESDIS, NGDC, 242 p.

National Atmospheric and Oceanic Administration (NOAA), 2004, Interferometric Synthetic Aperture Radar (IfSAR) Digital Elevation Models from GeoSAR platform (EarthData): 3-meter resolution data.

Titov, V.V., and Gonzalez, F.I., 1997, Implementation and Testing of the Method of Tsunami Splitting (MOST): NOAA Technical Memorandum ERL PMEL – 112, 11 p.

Titov, V.V., and Synolakis, C.E., 1998, Numerical modeling of tidal wave runup: Journal of Waterways, Port, Coastal and Ocean Engineering, ASCE, 124 (4), pp 157-171.

U.S. Geological Survey, 1993, Digital Elevation Models: National Mapping Program, Technical Instructions, Data Users Guide 5, 48 p.

TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of San Mateo

HALF MOON BAY QUADRANGLE
MONTARA MOUNTAIN QUADRANGLE

June 15, 2009

SCALE 1:24,000

0.5 0.25 0 0.5 1 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 Feet

0.5 0.25 0 0.5 1 Kilometers

Table 1: Tsunami sources modeled for the San Mateo County coastline.

Sources (M = moment magnitude used in modeled event)		Areas of Inundation Map Coverage and Sources Used	
		San Francisco Bay	Pescadero
Local Sources	Point Reyes Thrust Fault	X	
	Rodgers Creek-Hayward Faults	X	
	San Gregorio Fault	X	
Distant Sources	Cascadia Subduction Zone-full rupture (M9.0)	X	
	Central Aleutians Subduction Zone #1 (M8.9)	X	X
	Central Aleutians Subduction Zone #2 (M8.9)	X	
	Central Aleutians Subduction Zone #3 (M9.2)	X	X
	Chile North Subduction Zone (M9.4)	X	
	1960 Chile Earthquake (M9.3)	X	
	1964 Alaska Earthquake (M9.2)	X	X
	Japan Subduction Zone #2 (M8.8)	X	
	Kuril Islands Subduction Zone #2 (M8.8)	X	
	Kuril Islands Subduction Zone #3 (M8.8)	X	
	Kuril Islands Subduction Zone #4 (M8.8)	X	
	Marianas Subduction Zone (M8.6)	X	X

MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to assist cities and counties in identifying their tsunami hazard. It is intended for local jurisdictional, coastal evacuation planning uses only. This map, and the information presented herein, is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose.

The inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami runup from a number of extreme, yet realistic, tsunami sources. Tsunamis are rare events; due to a lack of known occurrences in the historical record, this map includes no information about the probability of any tsunami affecting any area within a specific period of time.

Please refer to the following websites for additional information on the construction and/or intended use of the tsunami inundation map:

State of California Emergency Management Agency, Earthquake and Tsunami Program:
http://www.oes.ca.gov/WebPage/oeswebsite.nsf/Content/B1EC51BA215931768825741F005E8D80?OpenDocument

University of Southern California – Tsunami Research Center:
http://www.usc.edu/dept/tsunamis/2005/index.php

State of California Geological Survey Tsunami Information:
http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/index.htm

National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model):
http://nctr.pmel.noaa.gov/time/background/models.html

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the State of California nor USC shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.

Clarification/Correction to Figures

- Figures IV.M-7 though IV.M-14: These figures should show that Airport Street connects to Harvard Avenue, however the line showing the connection of is interrupted by the labeling on the map for Harvard Avenue. This is consistent with Figure III-3 (Aerial Photograph of the Project Site) of the DEIR, which shows the existing street network.

I. INTRODUCTION

There are no changes to this section.

II. SUMMARY

Page II-1 (Summary of the Proposed Project)

The description of the Wellness Center property is revised to reflect the reduction in the number of residential units from 70 units to 57 units, the public storage building is no longer separate, and the parking lot was reduced from 73 spaces to 50 spaces, as follows:

The Wellness Center property (southern parcel) would be subdivided into three separate lots (Lots 1-3). Lot 1 would include a ~~separate~~ storage building (Building 4). Lot 2 would include the Wellness Center with a maximum of ~~70~~ 57 units for approximately 50 DD adults and 20 live-in staff members, other on-site living and recreation facilities (Buildings A and B~~1-3, 5-7~~), and associated fencing.

Lot 3 would include a ~~73~~ 50-space parking lot.

Pages II-1 and 2 (Summary of Project Components)

The following paragraph is revised to add additional clarification and information as follows:

In addition to these above primary components, the proposed project includes: development of an on-site trail system; restoration of wetland habitat; use of sustainable organic/non-organic, on-site/off-site farming for supplemental food sources; a native plant nursery for revegetation/landscaping efforts; recycling and composting; dog walking and grooming services; and development of bus stops and shuttle services.

Proposed utilities and service systems include: solar cells for heating/energy; carbonate fuel cells; backup natural gas generators; wind turbines and generators; geothermal cooling systems; ~~rain garden~~ infiltration of stormwater through the pervious pavement parking lot~~/treatment ponds~~; options for water systems such as: (1) domestic hookups and one fire system hookup, and (2) use of well water/treatment systems and on-site water storage for fire protection (e.g., pool or below-ground storage tank); options for wastewater systems such as: (1) use of an on-site wastewater treatment plant with disposal through a combination of municipal hookup and on-site recycled water usage ~~irrigation and infiltration~~, and/or (2) municipal hookups; and a Communications Building with two microwave dishes.

Pages II-5 and 31 (Table II-1)

Mitigation Measures in Table II-1 (Summary of Environmental Impacts and Mitigation Measures) are revised and replaced with the mitigation measures as shown in the Mitigation Monitoring and Reporting Program provided in Section IV of this FEIR.

III. PROJECT DESCRIPTION

Refer to Section III.A (Changes to the Project Description) of the FEIR.

IV. ENVIRONMENTAL IMPACT ANALYSIS

IV.A Aesthetics

Page IV.A-3 (Off-site Visual Character)

The last sentence of the Off-site Visual Character paragraph on page IV.A-3 (Aesthetics) of the DEIR is revised, as follows:

The land to the north of the manufactured home park is currently undeveloped ~~and in agricultural production~~**.**

Page IV.A-14 (Structural and Community Features – Rural)

All policies listed under "Structural and Community Features – Rural" have been deleted as they only apply to rural sites.

Page IV.A-19 (Proposed Project)

This section is revised as follows to reflect changes in the size and location of the communications use (separate Communications Building has been eliminated):

As described in detail in Section III (Project Description) of this DEIR, the project consists of an office park and residential health center to be developed on two adjacent parcels (approximately 20 acres) that are separated by a natural drainage swale. The Office Park would be developed on the northern parcel and would consist of four three-story buildings totaling 225,000 sq. ft. of area, plus associated common areas, a communications building, and a 640-space parking lot. Building heights would not exceed 45 feet 6 inches, with the four building footprints totaling 78,000 sq. ft. Setbacks are proposed at 153 feet from the eastern project site boundary and 40 feet from the western project site boundary. ~~The proposed Communications Building would be two-stories in height (maximum height of 32 feet) and have a footprint of 2,000 sq. ft., bringing the total building footprint for the northern parcel to 80,000 sq. ft. The Communications Building would be located on the southeast corner of the proposed parking lot. Two 36-inch microwave dishes would be mounted on the east face of this building.~~

The Wellness Center would be developed on the southern parcel, and would include a maximum of ~~70~~ 57 apartment style and single-story style residential units for use by up to 50 DD residents and 20 staff

members. The Wellness Center includes a ~~73~~ 50-space parking lot. A 100-foot setback is proposed from the sensitive habitats associated with the drainage swale and marsh. The proposed ~~20,000~~ 10,000 sq. ft. storage facility associated with the Wellness Center would be located within the Half Moon Bay Airport Overlay (AO) along the north side of the property. The Wellness Center buildings would also house 4,300 sq. ft. of compost and private storage uses, as well as 4,000 sq. ft. of communications equipment use.

IV.B Agricultural Resources

There are no changes to this section.

IV.C Air Quality

Page IV.C-20 (Operational Emissions)

Page IV.C-20 of the DEIR erroneously describes the on-site membrane bioreactor (MBR) and the ultraviolet (UV)-disinfected tertiary wastewater treatment plant as "internal combustion equipment." These are non-combustion systems that do not generate emissions regulated by the BAAQMD. The correction has been made in Section III of the FEIR. The "Operational Emissions" section is revised as follows:

Operational emissions associated with the proposed project would result primarily from increased vehicular trips to and from the project site, the internal combustion equipment associated with the ~~on-site membrane bioreactor (MBR), ultraviolet (UV) disinfected tertiary wastewater treatment plant, and the~~ 600 kW emergency natural gas engine generator. Other sources of emissions associated with the project would include area source emissions, such as the use of natural gas for water heaters and cooking appliances. However, the proposed project would supply a majority of energy for heating, cooling and electrical demand with renewable energy, through a combination of off-site and on-site power generation.

The potential on-site power systems include solar heat, photovoltaic panels, wind generation, a backup ~~and cogeneration with a~~ natural gas generator ~~for peak shaving~~ and geothermal cooling. Passive heating and cooling is also a focus of the proposed development architectural design. Additionally, the electrical equipment cooling process would be a source of building heating. Natural gas fuel cells would be utilized for the backup communications power.

IV.D Biological Resources

Page IV.D-15 (Regulatory Setting)

The "Regulatory Setting" section has been revised to add a description of applicable policies of the Resource Management-Coastal Zone District, as follows. Discussion of project conformance with local policies and ordinances is contained in Impact BIO-5 on page IV.D-99 of the DEIR (which remains unchanged).

Resource Management-Coastal Zone District Zoning Regulations

Section 6912.1. Environmental Quality Criteria

(i) No use or development shall have a significant adverse environmental impact upon primary wildlife or marine resources. Development shall clearly demonstrate a high degree of compatibility with, and minimal adverse impact on, wildlife habitat areas.

Section 6912.2. Site Design Criteria

(d) No use, development or alteration shall: (1) create uniform, geometrically terraced building sites which are contrary to the natural land forms; (2) substantially detract from the scenic and visual quality of the County; or (3) substantially detract from the natural characteristics of existing major water courses, established and mature trees and other woody vegetation, dominant vegetative communities or primary wildlife habitats.

(i) Wherever possible, vegetation removed during construction shall be replaced. Vegetation for the stabilization of graded areas or for replacement of existing vegetation shall be selected and located to be compatible with surrounding vegetation, and should recognize climatic, soil and ecological characteristics of the region.

(j) Removal of living trees with trunk circumference of more than 55 inches measured 4-1/2 feet above the average surface of the ground is prohibited, except as may be required for development permitted under this ordinance, or permitted under the timber harvesting ordinance, or for reason of actual or potential danger to life or property.

(k) With the exception of trails and paths, and related appurtenances, no structural development shall be permitted where such development will adversely affect a perennial stream and associated riparian habitat.

Section 6913.2. Primary Fish and Wildlife Habitat Areas Criteria

The following criteria shall apply within Primary Fish and Wildlife Areas as defined or designated in the Open Space and Conservation Element of the San Mateo County General Plan:

(a) Significant reduction of primary habitat areas shall be prohibited.

(b) Ecological characteristics, including the food chain, of primary wildlife habitat areas shall not be changed in a manner that would have substantial adverse impact on the quantity or quality of marine and other wildlife.

(c) The direct removal of primary habitat areas shall be avoided by clustering uses on other portions of the property.

(d) Spawning and nesting areas shall not be subject to development, including intensive public recreational use.

(e) The filling or dredging of tidal marshes, estuaries or marine waters is not permitted.

(f) Watersheds whose streams are used for fish spawning grounds and fish nurseries shall be managed to maintain the flow of fresh water necessary for those purposes.

(g) Public access to primary wildlife habitat areas shall be controlled to allow for compatible recreational use, without over-utilization and disturbance to wildlife populations or over-collection of species.

Section 6913.7. Primary Natural Vegetative Areas Criteria

The following criteria shall apply within Primary Natural Vegetation Areas as defined or designated in the Open Space and Conservation Element of the San Mateo County General Plan.

(a) Significant reduction of vegetation shall be prohibited.

(b) The direct removal of vegetation shall be avoided by clustering uses on other portions of the property.

(c) Public access to vegetation areas shall be controlled to allow for compatible recreational use, without over-utilization and disturbance to vegetation or over-collection of species.

Page IV.D-63 (Table IV.D-2)

The potential for occurrence in Table IV.D-2 for the California Red-Legged Frog has been changed from "Likely" to "Moderate" to be consistent with the potential for occurrence discussed on page IV.D-89 of the DEIR. This clarification does not change the analysis of the DEIR and reports in Appendix E. The "Moderate" potential of occurrence is consistent with the DEIR and reports in Appendix E which state that the site does not contain aquatic habitat capable of supporting breeding CRLF and the lack of landscape features capable of holding ponded water. As stated on page IV.D-19 of the DEIR, a "likely" potential of occurrence describes a site where "habitat components are available on the site, but no record of the species utilizing the project site exists." For reference, a "moderate" potential of occurrence describes a site where "there are known records of occurrence in the vicinity of the site; and/or some of the required habitat components are available on the site, but the site lacks some critical components required by the species."

IV.E Cultural Resources

There are no changes to this section.

IV.F Geology and Soils

There are no changes to this section.

IV.G Hazards and Hazardous Materials

Page IV.G-26 (Mitigation Measure HAZ-3)

Mitigation Measure HAZ-3 (Hazards Associated with Airport Operations) is revised as follows:

Prior to approval of final development plans, an ~~n~~avigation~~al~~ easement shall be ~~established~~ prepared for the project site, ~~to the satisfaction of~~in a form satisfactory to the County Director of Public Works. The ~~n~~avigation~~al~~ easement shall be recorded and shown on the vesting tentative map. With approval of the Wellness Center, it is understood that the Wellness Center property owner(s) and tenants, and their successor's in interest in perpetuity, acknowledge the project's location adjacent to an airport and the noise level inherent in the use. The following statement shall be included in the details of the avigation easement on the recorded Final Map, prior to the issuance of the Certificate of Occupancy for any residential unit at the subject property:

"This parcel is adjacent to the Half Moon Bay Airport. Residents on this parcel may be subject to inconvenience or discomfort arising from airport operations, including but not limited to noise associated with aircraft landings, take-offs, in air maneuvers and fly-overs, and on-the-ground engine start-ups and taxiing. San Mateo County recognizes the value of the Half Moon Bay Airport to the residents of this County and seeks to protect airport operations, existing and future, from significant interference and disruption. With approval of the Wellness Center, it is understood on the part of both the Wellness Center property owner(s) and the Half Moon Bay Airport that airport operations shall take precedence and priority over potential noise complaints received from property owners, residents, staff, guests, and others from the Wellness Center. In the event that the Wellness Center resident(s) or property owner(s) express an inability or unwillingness to accept such noise conditions authorized under the terms of the avigation easement and/or remain unsatisfied with the noise reduction measures being implemented by the airport, the affected resident(s) shall be relocated, with assistance provided by the property owner, to the satisfaction of the Planning and Building Department and/or the Department of Housing. This condition shall be included in all contracts between residents of the Wellness Center and with property owners.

Page IV.G-26 (Impact HAZ-4)

As noted in Comment 225-9, Marine Boulevard is interrupted at the Half Moon Bay Airport and does not provide access to Highway 1. The following sentence in Impact HAZ-4 has been edited to reflect this change:

The project site can be directly accessed from the surrounding streets, including: Cypress Avenue~~, Marine Boulevard~~; Capistrano Road, Prospect Way; and California and Cornell Avenues, located west, east and south of the site, respectively.

IV.H Hydrology and Water Quality

Page IV.H-37 (Regulatory Setting)

The "Regulatory Setting" section has been revised to add a description of applicable policies of the Resource Management-Coastal Zone District, as follows. Discussion of project conformance with water quality standards or waste discharge requirements is contained in Impact HYDRO-1 on page IV.H-47 of the DEIR (which remains unchanged). The addition of policies applicable to groundwater withdrawal and flood and tsunami hazard does not result in change to the analysis of impacts related to these issues.

Section 6912.2. Site Design Criteria

(k) With the exception of trails and paths, and related appurtenances, no structural development shall be permitted where such development will adversely affect a perennial stream and associated riparian habitat.

Section 6912.4. Water Resources Criteria

(a) Solid and liquid waste discharge and disposal shall not be permitted to contaminate water resources or otherwise adversely affect a marine, aquatic or riparian environment. All discharges which might affect a water body shall comply with discharge requirements as established by the Regional Water Quality Control Board.

(b) Discharge of water containing organic nutrients shall be shifted from the aquatic environment to land environments whenever possible when such shift will produce less detrimental effects.

(c) To ensure minimal impact on hydrologic processes, grading and other landscape alteration shall be kept to a minimum and the present configuration of landforms shall be maintained to the maximum extent practicable.

(d) Site preparation procedures and construction phasing shall be carefully controlled to reduce erosion and exposure of soils to the maximum extent possible.

(e) Projects shall utilize methods to maintain surface water runoff at or near existing levels.

(f) Development, with the exception of agricultural uses and public works and public safety projects, which might cause significant adverse impacts upon the natural course or riparian habitat of any stream, shall not be permitted. All developments shall be required to perform all feasible measures to mitigate possible impacts upon such areas.

(g) Excessive inter-basin transfers of water resources which may result in adverse impacts on water regimen stability and water quality shall not be permitted.

(h) Projects shall clearly demonstrate methods to be employed for management of vegetative cover, surface water runoff, groundwater recharge, and erosion and sedimentation processes to assure stability of downstream aquatic environments.

Section 6913.4. Primary Water Resources Area Criteria

The following criteria shall apply within Primary Water Resources Areas as defined or designated in the Open Space and Conservation Element of the San Mateo County General Plan:

(a) It shall be demonstrated that withdrawals from groundwater basins will not be in such quantity that a continued supply would be jeopardized or would result in salt water intrusion.

(b) Construction, including placement of impermeable surfacing or compaction, shall not significantly disrupt or diminish natural patterns of groundwater recharge.

(c) Watersheds whose streams are used for spawning grounds and fish nurseries shall be managed to maintain the flow of fresh water necessary to their maintenance for these purposes.

(d) No use, development or alteration shall be undertaken unless the applicant demonstrates that such use, development or alteration will not interfere with the existing capacity of any water body, will not substantially increase erosion, will not increase the amounts of silt or chemical nutrient pollutants, or do anything else that will contribute to the deterioration of the quality of water in any water body.

(e) All development and associated access roads near existing and future lakes and reservoirs whose maximum design water surface area exceeds 5 acres shall be constructed at least 50 feet from the high water line. Development may not deny reasonable access to the shoreline.

Section 6914.1. Floor Plain Area Criteria

The following criteria shall apply within designated floodways:

(a) No land shall be developed which is held unsuitable for its proposed use by reason of flooding, or other feature harmful to the health, safety or welfare of the future residents or property owners of the proposed development or the community at large. In determining the suitability of the site for its intended use, the following shall be considered: the danger to life and property due to the increased flood heights or velocities caused by excavation, fill, roads, and intended uses; the requirements of the development for a waterfront location; the safety of access to the property for emergency vehicles in times of flood; the expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters expected at the site; and the costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, and streets and bridges.

(b) No development shall be permitted unless it is demonstrated that such development will not:

(1) Interfere with the existing capacity, substantially increase the erosion, siltation, or chemical nutrients, or anything else that might contribute to the deterioration, of any watercourse or the quality of water in any water body included in this district;

(2) Require storage of material, construction of any substantial flood or erosion control works, or substantial grading or placement of fill, within this area; or

(3) Cause adverse disturbance to any dunes or beaches.

(c) The following uses which have low flood damage potential and do not threaten other lands during times of flood shall be permitted within this area provided they are not prohibited by any other ordinance: agricultural uses such as general farming, pasture, grazing, outdoor plant nurseries, horticulture, viticulture, truck farming, forestry, sod farming, and wild crop harvesting; uses such as loading or parking areas; private and public recreational uses such as beaches, beach cabanas not suitable for use as dwellings, boardwalks and steps to permit access across dunes, beaches, and other fragile resources, pavilions and other similar small platforms, lifeguard stations, golf courses,

tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, fish hatcheries, shooting preserves, target ranges, trap and skeet ranges, hunting and fishing areas, hiking and horseback riding trails, temporary structures for sale of food and refreshments, arts and crafts; residential uses such as lawns, gardens, parking areas and play areas.

(d) The following shall be permitted provided that they are not otherwise prohibited or do not threaten other lands during the times of flood: extraction of sand, gravel, oyster shells and other materials; marinas, yacht clubs, boat rentals, lighthouses, docks, piers, wharves, groins, bulkheads, seawalls, jetties, harbor works, and erosion control devices; railroads, streets, bridges, utility transmission lines and pipelines.

(e) Buildings (temporary or permanent) shall not be designed or used for human habitation; shall be designed with low flood damage potential; shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters; and shall be firmly anchored to prevent flotation which may result in damage to other structures.

(f) Service facilities such as electrical and heating equipment shall be flood-proofed or constructed at or above the 100-year flood elevation for the particular area.

(g) Storm drainage facilities shall be designed to store and convey the flow of surface waters without damage to persons or property using the following criteria: (1) Major channels or creeks (a watershed area of four or more square miles) with a 50-year average recurrence interval; (2) Secondary channels (a watershed area of one through four square miles) with 30-year average recurrence interval; and (3) Minor channels or storm drain systems (a watershed area of less than one square mile) with a 10-year average recurrence interval. The system shall insure drainage at all points along streets, and provide positive drainage away from buildings and on-site waste disposal sites.

(h) Installation of sewage disposal facilities requiring soil absorption systems shall be prohibited where such systems might not function due to high groundwater, flooding or unsuitable soil characteristics.

(i) All water systems including individual wells located in this area, whether public or private, shall be flood-proofed to a point at or above the flood protection elevation.

(j) Flood-proofing systems plans must be adequate and may include: anchorage to resist flotation and lateral movement; installation of watertight doors, bulkheads, and shutters, or similar methods of closure; reinforcement of walls to resist water pressures; use of paints, membranes or mortars to reduce seepage of water through walls, addition of mass or weight to structures to resist flotation; installation of pumps to lower water levels in structures; construction of water supply and waste treatment systems so as to prevent the entrance of floodwaters; building design and construction to resist rupture or collapse caused by water pressure or floating debris; installation of valves or controls on sanitary and storm drains which permit the drains to be closed to prevent backup of seepage and stormwaters into building or structures; location and installation of all electrical equipment, circuits and electrical appliances so that they are protected from inundation by a 100-year flood; location of storage facilities for chemicals, explosives, buoyant materials, flammable

liquids or other toxic materials which could be hazardous to public health, safety and welfare at elevations above the 100-year flood elevation; or design of such facilities to prevent flotation of storage containers, or damage to storage containers which could result in the escape of toxic materials.

Section 6914.2. Tsunami Inundation Area Criteria

The following criteria shall apply within all areas defined as Tsunami Inundation Hazard Areas:

(a) The following uses, structures, and development shall not be permitted: publicly-owned buildings intended for human occupancy other than park and recreational facilities; schools, hospitals, nursing homes, or other buildings or development used primarily by children or physically or mentally infirm persons.

(b) Residential structures and resort developments designed for transient or other residential use may be permitted under the following circumstances:

(1) The applicant submits a report prepared by a competent and recognized authority estimating the probable maximum wave height, wave force, run-up angle, and level of inundation in connection with the parcel or lot upon which the proposed development is to be located.

(2) No structure covered by this section shall be allowed within that portion of the lot or parcel where the projected wave height and force is fifty percent (50%) or more of the projected maximum, unless: (a) the highest projected wave height above ground level at the location of the structure is less than six (6) feet, (b) no residential floor level is less than two (2) feet above that wave height, and (c) the structural support is sufficient to withstand the projected wave force.

(3) No structure covered by this section shall be allowed within that portion of the lot or parcel where the projected wave height and force is less than fifty percent (50%) of the projected maximum unless the requirements of subsection (b)(2), (a), and (c) are satisfied and the residential flood level is at least one (1) foot above the highest projected level of inundation.

(4) Permission under this subsection shall not be granted if the Planning Commission determines that sufficient data, upon which the report required by subsection (1) must be based, is unavailable and cannot feasibly be developed by the applicant.

Pages IV.H-41 and 42 (Grading and Drainage)

The "Grading and Drainage" section is revised as follows:

The existing site parcels drain either into the drainage swale between the parcels or to the Pillar Point marsh. Previous studies of the project site have indicated that the agricultural furrows on-site generally run perpendicular to the topographic contours, thus in line with the natural drainage of the parcels. The project grading plans (refer to Figures III-25 and III-26) indicate some alteration of existing topography,

including reshaping of some low contours outside the main areas of development, as well as placement of structures, parking lots, and walkways that can alter local drainage patterns.

The current project design focuses construction of new impervious and pervious areas on the relatively flat areas of the site. Figures III-25 and III-26 show that the majority of grading would occur as fill at the edges of the developed areas. ~~Figure III-25 indicates 21,875~~ 21,075 cubic yards (cy) of cut and ~~15,780~~ 14,980 cy of fill are necessary for the Office Park property, mostly for building pads and parking lots. Since some of the net cut from the Office Park property will be transferred as fill to the Wellness Center property, only ~~4,105~~ 3,605 cy of imported fill is projected to be needed. Figure III-26 indicates 870 cy of cut for landscaping rain gardens and 11,070 cy of fill for building pads, the perimeter fire trail, and parking lot within the Wellness Center property.

Newly created impervious area would cover a moderate (13 to 22%) part of the entire project site. Also, the proposed project includes various elements to minimize surface water runoff, including the use of porous pavements for parking lots and walkways and draining roof leaders to these pervious areas ~~infiltrating rain gardens~~.

The Office Park and Wellness Center properties will continue to drain to separate locations. Both properties would include storm drainage systems that collect water from the parking lots and rooftops and terminate in landscaped areas in pervious paved parking areas to allow for infiltration. S~~everal outfalls are shown on Figures III-25 and III-26. The Wellness Center property has four outfalls along its western edge, all of which enter graded low areas that then drain towards Pillar Point Marsh. The Office Park property has three outfalls, two of which are anticipated to lead to localized depressions on site. The other outfall leads to a depressed rainwater garden at the southern edge of the parcel.~~

Except for the buildings, all new pavements (parking lots, walking paths, basketball court/game area) are proposed to be made of permeable materials and are not considered to increase the imperviousness of the site. The parking lot includes 6 inches of concrete, underlain by 12 inches of open graded baserock, which then sits on clayey ~~silt~~ sandy soils. Both the concrete and baserock have permeabilities of 3 inches per hour, with the underlying soil having a permeability of one-half inch to 1 inch per hour.

~~As proposed, on-site infiltration drainfields (or drainfields) will be used, with the Wellness Center property drainfields located on the inside edge of the fire trail that runs along the outside of the developed area and the Office Park property drainfields located just around Building B and next to Buildings A and C on their respective sides facing Building B. All of these proposed drainfields are located upstream of the wetland areas and the Pillar Point Marsh.~~

Page IV.H-43 (Groundwater Recharge System)

The "Groundwater Recharge System" section is revised as follows, as the applicant no longer proposes to infiltrate recycled water using drainfields:

The proposed groundwater recharge system is designed to infiltrate ~~an average of 12,000~~ 20,000 gpd of stormwater ~~and 20,000 gpd of recycled wastewater~~. Key stormwater infiltration components of the system are the planned permeable concrete parking lots and walkways and roof drains that will direct runoff to infiltration areas located under the parking lots. ~~and rainwater gardens.~~ Recycled wastewater

that is not used for toilet flushing will recharge groundwater through agricultural use and sub-surface drip irrigation for the landscaping. ~~and three infiltration drainfields. Final design of the drainfields would be based on certified percolation tests.~~

The groundwater recharge system will double as a stormwater control system, with plans to capture and treat 80% of the surface water runoff. ~~To maximize the ability to recharge groundwater from recycled water, on-site stormwater runoff needs to be minimized. Minimizing stormwater runoff also helps meet stormwater runoff water quality criteria.~~

Page IV.H-45 (Wastewater Pollutant Discharge)

The "Wastewater Pollutant Discharge" section is revised as follows to eliminate the 'drainfield' references:

Other than stormwater runoff, the proposed project could contribute pollutants to the environment via discharge of wastewater, which generally can have various contaminants when untreated, including human bodily waste, detergents, abrasives, and other household chemicals. Even recycled wastewater can contain relatively high levels of certain contaminants, including salts. The project includes the development of an on-site membrane bioreactor (MBR) wastewater treatment plant (MBR plant) for treatment and recycling of wastewater produced on-site. The project is anticipated to generate approximately 26,000 gpd of domestic wastewater. The wastewater influent to the MBR plant will include both black wastewater from toilets and grey wastewater from other fixtures. The MBR plant will be used to treat and recycle 16,000 gpd of the wastewater for reuse in toilets on-site, with the remainder of the treated wastewater applied as landscape/agricultural irrigation ~~and infiltrated via three drainfields~~. For these uses, the MBR plant will need and is planned to meet Title 22 Standards for tertiary treated wastewater and reuse.

Page IV.H-46 (Site Coverage)

The "Site Coverage" section is revised as follows:

The total project would have approximately 3 acres of impervious surface area and 9.5 acres of pervious parking lots and walkways that are designed for groundwater infiltration. The remaining 9 acres would be restored wetlands, organic gardens, and native plant landscaped areas that is also considered pervious surface. Only ~~10~~ 15% of the total site coverage is impervious surface. Tables IV.H-4 and IV.H-5 provide a breakdown of the impervious and pervious surfaces associated with the proposed development within the Office Park and the Wellness Center properties, respectively.

Page IV.H-46 (Tables IV.H-4 and IV.H-5)

Revised Table IV.H-4 Office Park Property Site Coverage	
Impervious Surfaces	
Buildings A-D ~~and Communication Building~~	~~80,000~~ 78,000
Total Improved Impervious Surfaces	**~~80,000~~ 78,000**
Pervious Surfaces	
Porous Parking Lot	243,925
Walkways	~~13,052~~ 17,000
Islands/Sidewalks	18,065
Subtotal Improved Pervious Surfaces	***~~275,042~~*** *278,990*
Total Improved (Pervious and Impervious) Surfaces (not including Wetlands)	**~~355,042~~ 356,990**
Total Wetlands Restoration (Pervious)	226,038
Total Pervious Surface	~~501,080~~ 505,028
Total Parcel Area	**620,841**
Total Percent Pervious	**~~87.1~~ 81.3%**
Percent Wetlands Restoration	**36.4%**

Revised Table IV.H-5 Wellness Center Property Site Coverage	
Surfaces	**Area (sf)**
Impervious Surfaces	
Buildings A and B ~~1—7~~	46,999
~~Pool Building~~	~~3,464~~
~~Water Recycling Plant~~	~~600~~
Total Improved Impervious Surfaces	**~~51,063~~ 46,999**
Pervious Surfaces	
Porous Parking Lot	30,721
Basketball Court, Game Space[1]	12,601
Walkways/Multipurpose Trails	9,211
Subtotal Improved Pervious Surfaces	*52,533*
Total Improved Surfaces (not including Wetlands)	**~~103,596~~ 99,532**
Total Wetlands Restoration	122,749
Total Pervious Surfaces	**175,282**
Total Parcel Area	**229,779**
Total Percent Pervious	**76%**
Percent Wetlands Restoration	**53%**
[1]While applicant currently proposes an indoor basketball court, impervious surface calculations includes an outdoor basketball court, in the event that the basketball court is relocated outside.	

Page IV.H-53 (Mitigation Measure HYDRO-3)

The first sentence of the second paragraph of Mitigation Measure HYDRO-3 has been corrected to require the submittal of a SWPPP to San Mateo County at the building permit application stage, instead of at the Final Map stage. At the final map stage, the construction plans are not finalized to the level of detail required for the preparation of a SWPPP.

Submittal of a project erosion control plan and SWPPP to San Mateo County for review shall be required as part of the ~~Final Map~~ building permit application. The erosion control plan shall include components for erosion control, such as phasing of grading, limiting areas of disturbance, designation of restricted-entry zones, diversion of runoff away from disturbed areas, protective measures for sensitive areas, outlet protection, and provision for revegetation or mulching. The plan shall also prescribe treatment measures to trap sediment once it has been mobilized, at a scale and density appropriate to the size and slope of the catchment. These measures typically include inlet protection, straw bale barriers, straw mulching, straw wattles, silt fencing, check dams, terracing, and siltation or sediment ponds. Other aspects of the SWPPP, especially those related to water quality, are discussed below for other mitigation measures.

Page IV.H-54 (Impact HYDRO-5)

Impacts discussed in the DEIR related to wastewater disposal in leachfields and surface runoff drainage to wetlands via rain gardens, including potential groundwater and surface water contamination, have been further reduced. Instead of flowing to rain gardens located within the restored wetland areas, rainwater from surfaces and roof gutters will be directed to underground storage systems below the parking lot. On page IV.H-55, Table IV.H-7, the hydrology analyses of the DEIR concluded that the project would result in an 80% increase in storm water discharge from existing site conditions. This conclusion is based on analysis contained in the Technical Memorandum #1 provided in Appendix H of the DEIR. The increase in imperviousness, and hence the 80% increase in runoff described in the DEIR, is based solely on building roof runoff.

Project drainage is revised to direct all of the roof runoff through a piped storage system below the parking lot that is sized for a 10-year storm. Likewise, all surface water in the parking lot would be absorbed into the permeable pavers and directed into the same system.

There will be no sub-surface disposal of wastewater, with the exception of minimal runoff of treated wastewater used for surface and solar panel washing, as allowed by CDPH and RWQCB. All excess treated recycled water not used by toilet flushing, irrigation, and washing uses will be directed to the GSD system, using already sewer capacity (8 EDUs) which has already been assessed to the property by GSD. Based on the foregoing, project impacts to hydrology and water quality, which are less than significant with mitigation, are likely to be further reduced. The section is revised, as follows:

Quantity of Surface Water Runoff

A drainage report was not provided by the applicant. Table IV.H-6 summarizes the relevant parameters given by the applicant and used to estimate the existing (pre-project) and post-project stormwater discharges onsite for various size storms, as applicable to a scenario in which all rooftop runoff is directed to rain gardens in the wetlands. Table IV.H-7 presents the results of the runoff analysis under this

scenario. As detailed in the *Technical Memorandum #1 (TM #1): Hydrologic Analysis of the Big Wave Project*, prepared by Schaaf & Wheeler, May 15, 2009 provided in Appendix H of this DEIR, the rational method, combined with parameters from the Santa Clara County Drainage Manual (SCCDM), were used to estimate site runoff during a 2-year, 10- year, and 100-year storm event.

These estimates were based on the soil types described earlier, considering them Hydrologic Group C soils with moderately slow permeability. The high groundwater table can also lead to significant stormwater runoff, especially during large storm events. ~~However, effects of the high groundwater table are not incorporated in the following estimates.~~

Table IV.H-7 indicates that the stormwater discharges would increase by 80 percent for all three analyzed events, under this worst-case scenario. The 80% increase in surface flow is attributed to the creation of impervious area from building construction on the project sites and direction of roof runoff to a detention system that will eventually discharge to the wetlands in metered flows not to exceed existing flow rates. Table 4 of TM#1 shows that the Wellness Center proposal would result in an increase in impervious developed area of 1.2 acres (the roof area of the proposed buildings per Table IV.H-5). Table 4 shows that the Office Park proposal would result in an increase in impervious developed area of 1.8 acres (the roof area of the office buildings per Table IV.H-4). Therefore, the increase in imperviousness, and hence the 80% increase in runoff described in the DEIR, is based solely on building roof runoff. The proposed runoff from the site will enter~~s~~ into a ~~some~~ storm water detention system ~~drains and then rain gardens and other retention basins~~ and then be released to the existing wetlands in metered flow rates not to exceed existing rates. ~~Any further runoff proceeds to Pillar Point Marsh, for which no new development or storm drainage facilities are planned or ever likely to be planned. Therefore, there are no existing or planned stormwater drainage systems whose capacities could be exceeded by the increased stormwater runoff from the site.~~

Table IV.H-6
Existing (Pre-) and Post-Project Discharge Parameters (Without Parking Lot Storage & Infiltration System) [3]

(table contents are unchanged)

Table IV.H-7
Existing (Pre-) and Post-Project Peak Storm Discharges for the 2-Year, 10-Year, and 100-Year Event (Without Parking Lot Storage & Infiltration System)[3]
(table contents are unchanged)

Furthermore, the project under the worst-case scenario, ~~without any onsite mitigation, would~~ will not increase the total watershed peak flows to Pillar Point Marsh. ~~by an estimated 3 percent; project site flows would go from representing 2.9 percent to 5.8 percent of the marsh watershed's peak flows. With the planned detention, the percentage increase should be even smaller.~~ The *Hydrologic Analysis of the Big Wave Project*, prepared by Schaaf & Wheeler, May 15, 2009 (TM#1) provided in Appendix H of this DEIR presents details of the estimate for the entire watershed drainage.

Overall, impacts of increasing quantities of stormwater runoff would be ***less than significant***, and no

[3] *The Post-Project analyses in this table is based on a worst-case scenario, discharge of building roof drainage as surface water into the restored wetlands, that does not consider the proposed parking lot storage & infiltration system.*

mitigation measures are required.

Page IV.H-57 (Mitigation Measure HYDRO-5)

Mitigation Measure HYDRO-5 (Surface Water Runoff Quality) is revised to add an additional paragraph, per Technical Memorandum #1 (TM #1), dated May 15, 2009, prepared by Schaaf and Wheeler (included in Appendix H of the DEIR):

Per Technical Memorandum #1 (TM #1), dated May 15, 2009, prepared by Schaaf and Wheeler (included in Appendix H of the DEIR), Stormwater Best Management Practices should serve several hydrologic and water quality functions, including maximizing groundwater recharge, minimizing quantities of stormwater runoff, and reducing pollutant loadings in stormwater runoff.

IV.I Land Use and Planning

Page IV.I-3 (County of San Mateo Zoning Regulations)

The description of the zoning designations of the project site is revised as follows to reflect limited portions of the wetland areas and buffer zones in the area of the drainage swale that are zoned Resource Management (RM):

Office Park Property (Northern Parcel)

- Light Industrial/Design Review/Coastal Development District (M-1/DR/CD)
- Light Industrial/Airport Overlay/Design Review/Coastal Development District (M-1/AO/DR/CD)
- Resource Management-Coastal Zone/Design Review/Coastal Development District (RM-CZ/DR/CD)

Wellness Center Property (Southern Parcel)

- Waterfront/Design Review/Coastal Development District (W/DR/CD)
- Waterfront/Airport Overlay/Design Review/Coastal Development District (W/AO/DR/CD)
- Resource Management-Coastal Zone/Design Review/Coastal Development District (RM-CZ/DR/CD)

Page IV.I-10 (Land Use Designation and Zoning)

The "Land Use Designation and Zoning" section has been revised to include applicable regulations of the Resource Management-Coastal Zone District, as follows:

On the southern parcel (Wellness Center site), portions of the property within the delineated wetlands and 100-foot buffer zone area are within the Resource Management-Coastal Zone District, as shown in Figure A of the FEIR. On the northern parcel (Office Park site), a small portion of the property within the delineated wetlands is within the Resource Management-Coastal Zone District, as shown in Figure A of the FEIR. Wetlands restoration is the only type of development activity proposed within these areas. The following regulations apply to the proposed wetlands restoration:

For purposes of Chapters 20A, 20A.2, 23 and 36, but excluding those uses defined below, "development" shall mean the construction of any significant structure on land, or in or under water; the discharge or disposal of any significant dredged material or any gaseous, liquid, solid or thermal waste; the division or subdivision of land into two or more parcels; reconstruction or substantial alteration of any significant structure, including any facility of a private, public or quasi-public utility; and any major removal of vegetation.

Section 6905 (Permitted Uses):

(a) Agricultural uses and accessory structures, temporary road stands for seasonal sale of produce grown in San Mateo County, providing that 1) sales activities are limited to less than a nine-month operating period per year, 2) all structures are of portable construction and shall be removed from the site within 10 days of the seasonal closure of the stand, 3) road stand size shall be limited to 200 sq. ft. and appearance, including signs, color and materials, is consistent with the policies of the certified LCP and meets the satisfaction of the Planning Director; and 4) access and parking requirements meet the satisfaction of the Director of Public Works, however, no impervious paving shall be required.

Section 6906.1. Conservation Open Space Easement

Require, after any land divisions, that the applicant grant to the County (and the County to accept) a conservation easement containing a covenant, running with the land in perpetuity, which limits the use of the land covered by the easement to uses consistent with open space (as defined in the California Open Space Lands Act of 1972 on January 1, 1980).

Page IV.I-12 (New Section: California Coastal Act)

A Coastal Development Permit from the California Coastal Commission (CCC), in addition to the CDP required from the County of San Mateo, is required for any development that extends into portions of the site that are within the original permit jurisdiction of the CCC. The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. Development activities, which are broadly defined by the Coastal Act to include (among other things) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the CCC or the local government.

The Coastal Act includes specific policies (see Division 20 of the Public Resources Code) that address issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, development design,

power plants, ports, and public works. The policies of the Coastal Act constitute the statutory standards applied to planning and regulatory decisions made by the CCC and by local governments, pursuant to the Coastal Act. [4]

Page IV.I-29 (Discretionary Actions)

The "Discretionary Actions" section has been revised to add the California Coastal Commission as a state agency:

California Coastal Commission

A Coastal Development Permit from the California Coastal Commission, in addition to the CDP required from the County of San Mateo, is required for any development that may extend into portions of the site that are within the original permit jurisdiction of the CCC.

Page IV.I-30 (San Mateo Local Agency Formation Commission (LAFCO))

Amendment of the County of San Mateo and Half Moon Bay LCPs is not required for project implementation. The section is revised as follows:

As discussed previously, the project applicant proposes to connect to the CCWD. This proposed annexation to CCWD would require review and approval by LAFCO and approval of amendments to the Coastal Development Permits for the El Granada Pipeline replacement project. Any temporary or permanent extension of water services outside of the service boundary as defined on January 1, 2003 would require amendments to Coastal Development Permits A-1-HMB-99-20 and A-2-SMC-99-63~~ as well as amendment(s) to the County of San Mateo and Half Moon Bay Local Coastal Plans~~. LAFCO annexation would require:

(The rest of the section is unchanged)

Page IV.I-32 (New Section: Coastal Act under Impact LU-2)

Add a section titled "California Coastal Act," as follows:

California Coastal Commission (CCC) staff has suggested that a portion of the project site may be within the original permit jurisdiction of the CCC. The standard of review applied by the CCC to any development that extends into the CCC's original permit jurisdiction is the California Coastal Act. Project consistency with the policies of the County's LCP, which is the standard of review for development within the County's permit jurisdiction, is evaluated in Table IV.I-1 (County of San Mateo General Plan Consistency Analysis) of the DEIR. Development within the portion of the site that is within the County's permit jurisdiction must also conform to the public access and recreation policies of the Coastal Act because the site is seaward of the nearest public through road to the coast. The County has added the recommended Mitigation Measure LU-2 to require the property owner to work with the Coastal Commission to identify and delineate the possible existence and extent of any CCC original permit jurisdiction over the project site and obtain all necessary approvals from the Coastal Commission prior to

[4] *Source: http://www.coastal.ca.gov/whoweare.html (Coastal Commission website)*

the initiation of any development within areas of CCC jurisdiction. The project will be required to conform to the applicable policies of the LCP and Coastal Act through the necessary coastal development permit review and approval procedures. Therefore, impacts would be less than significant.

Page IV.I-35 (County of San Mateo Zoning Regulations)

The "County of San Mateo Zoning Regulations" are revised as follows to add the Resource Management (RM) District as an applicable zoning district:

The project site is zoned Light Industrial/Design Review/Coastal Development District (M-1/DR/CD) and Light Industrial/Airport Overlay/Design Review/Coastal Development District (M-1/AO/DR/CD) and Resource Management-Coastal Zone/Design Review District/Coastal Development District (RM-CZ/DR/CD) (northern parcel), and Waterfront/Design Review/Coastal Development District (W/DR/CD) and Waterfront/Airport Overlay/Design Review/Coastal Development District (W/AO/DR/CD) and Resource Management-Coastal Zone/Design Review/Coastal Development District (RM-CZ/DR/CD) (southern parcel). The proposed project would be designed and constructed in conformance with all applicable development regulations of the Zoning Regulations and would be subject to Design Review by the County's Coastside Design Review Committee. Additionally, the project would comply with all provisions of the Zoning Regulations, which regulate parking, fences, and accessory structures. Therefore, impacts would be less than significant and no mitigation measures are required.

Page IV.I-36 (San Mateo Local Coastal Program under Impact LU-2)

The following replaces the analysis in Section Impact LU-2 with regard to project consistency with the County of San Mateo Local Coastal Program:

County of San Mateo Local Coastal Program (LCP)

In a comment letter dated December 24, 2009, the Coastal Commission states that the project appears to contain historic tidelands that CCC staff suggests may lie within the Coastal Commission's original permit jurisdiction. Per the Public Resources Code 30519(a) and (b), the local government has the development review authority for any new development proposed within the area to which the certified local coastal program has been locally approved and certified by the California Coastal Commission (CCC), with the exception of any development proposed or undertaken on any tidelands, submerged lands, or on public trust lands, whether filled or unfilled, lying within the coastal zone. The CCC has the development review authority for development on the above listed lands, in which development would be subject to the regulations of the Coastal Act.

The County of San Mateo is working with the CCC and the applicant to determine the possible existence and extent of historic tidelands that affect the proposed development. As to all parts of the project site that are outside of the jurisdictional boundaries of the CCC and within the jurisdictional boundaries of the County of San Mateo, development in those areas would be subject to the Local Coastal Program (LCP) and Coastal Act access and recreation policies. Project consistency with individual LCP policies is evaluated in Table IV.I-1 (County of San Mateo General Plan Consistency Analysis) in the DEIR.

The proposed project would be designed and constructed in conformance with all applicable development regulations of the LCP and the Coastal Act. Therefore, impacts would be less than significant and no mitigation measures are required. However, the County has added the following recommended mitigation measure to require the property owner to work with the Coastal Commission to identify and delineate the possible existence and extent of CCC original permit jurisdiction over the project site and obtain all necessary approvals from the Coastal Commission prior to the initiation of any development within areas of CCC original permit jurisdiction.

New Recommended Mitigation Measure LU-2

The property owner shall work with the California Coastal Commission (CCC) to identify and delineate the CCC's jurisdiction over the project site, subject to CCC review and approval. The property owner shall obtain all necessary approvals from the Coastal Commission prior to the initiation of any development within areas of CCC jurisdiction.

Page IV.I-36 (Half Moon Bay Airport Land Use Plan under Impact LU-2)

The analysis in Section Impact LU-2, with regard to project consistency with the Half Moon Bay Airport Land Use Plan, is revised as follows:

The proposed project is subject to the provisions of the Half Moon Bay Airport Land Use Plan. The proposed project would be designed and constructed in conformance with all applicable development regulations of the Half Moon Bay Airport Land Use Plan. Therefore, impacts would be less than significant and no mitigation measures are required. However, in order to capture State Department of Transportation, Division of Aeronautics, recommendations, the following recommended mitigation measure has been added:

New Recommended Mitigation Measure LU-3

The applicant shall comply with the following recommendations of the State Department of Transportation, Division of Aeronautics: 1) Federal Aviation Administration (FAA) Advisory Circular 150 /5370-2E "Operational Safety on Airports during Construction" shall be incorporated into the project design specifications 2) in accordance with Federal Aviation Regulation, Part 77 "Objects Affecting Navigable Airspace" a Notice of Proposed Construction or Alteration (Form 7460-1) shall be provided if required by the FAA, and 3) the location and type of landscape trees shall be selected carefully so they do not become a hazard to aircraft around the airport.

Page IV.I-36 (County of San Mateo Community Design Manual under Impact LU-2)

Apply the following revisions to the analysis in Section Impact LU-2 with regard to project consistency with the County of San Mateo Community Design Manual:

County of San Mateo Community Design Manual

As previously discussed, the Community Design Manual was created to provide guidelines by which individual building permits are evaluated. The Community Design Manual does not set forth rigid rules

for designing structures but rather establishes general guidelines in which consideration latitude remains, so as not to stifle individual initiative. The project would be designed to be consistent with individual Community Design Manual guidelines. The proposed project would be designed and constructed in conformance with all applicable development regulations of the Community Design Manual and would be subject to Design Review by the County's Coastside Design Review Officer~~Committee~~. Therefore, impacts would be less than significant and no mitigation measures are required. However, the following recommended mitigation measure has been added to improve compliance with the design review requirement:

New Recommended Mitigation Measure LU-4

The applicant shall comply with the recommendations of the County's Coastside Design Review Officer to implement changes to the Office Park buildings that improve consistency with applicable policies of the LCP and the Community Design Manual, prior to the project approval by the Planning Commission.

Page IV.I-37 (San Mateo Local Agency Formation Commission (LAFCO))

Amendment of the County of San Mateo and Half Moon Bay LCPs is not required for project implementation. The section is revised as follows:

As noted in Section III (Project Description) of the DEIR, the project applicant proposes to connect to the Coastside County Water District (CCWD). This proposed annexation to CCWD would require review and approval by LAFCO and approval of amendments to the Coastal Development Permits for the El Granada Pipeline replacement project. Any temporary or permanent extension of water services outside of the service boundary as defined on January 1, 2003 would require amendments to Coastal Development Permits A-1-HMB-99-20 and A-2-SMC-99-63~~ as well as amendment(s) to the County of San Mateo and Half Moon Bay Local Coastal Plans~~. LAFCO annexation would require:

(The rest of the section is unchanged)

Page IV.I-62 (Table IV.I-1)

In Table IV.I-1, discussion of LCP Policies 8.16, 8.19, 8.20, and 8.21 has been deleted as these policies only apply to rural sites.

IV.J Noise

Pages IV.J-21 and 22 (Mechanical Equipment Noise levels)

This section has been revised to add additional detail regarding the noise levels produced by the proposed wind turbines:

As part of the proposed project, new rooftop mechanical equipment and heating, ventilation, and air conditioning (HVAC) units and exhaust fans may be installed on the proposed buildings. Large HVAC systems can result in noise levels that average between 50 and 65 dBA Leq at 50 feet from the equipment.

Standard building parapets typically reduce these noise levels by around 10 to 15 dBA (or approximately 35 to 50 dBA after noise reduction from building parapets) and this type of equipment is generally not audible from nearby uses.

The project will utilize slow speed turbines that are enclosed within a housing. Wind turbines would be located on the roof of the Office Park and the Wellness Center. Wind turbine housing will provide noise insulation as well as reduce hazards to birds. With housing, the wind turbines would produce noise levels of approximately 35 dB at 50 feet from the turbines.

The noise levels from these~~is~~ equipment would be less than the ambient noise levels associated with automobile and aircraft traffic and would not exceed the 'Normally Acceptable' noise level standard of 60 dBA CNEL for residential uses or the County of San Mateo Ordinance Code noise threshold of 55 dBA (Category 1: cumulative 30 minute noise level increase in a 1 hour period). Therefore, the potential impacts to residents of the Wellness Center or the mobile home park would be ***less than significant***.

IV.K Population and Housing

There are no changes to this section.

IV.L Public Services

There are no changes to this section.

IV.M Transportation/Traffic

Page IV.M-24 (Community Center)

This section has been deleted, as the Community Center has been eliminated. Fitness Center would be available for use by Wellness Center residents, guests, and staff and Office Park employees only.

Page IV.M-27 (Table IV.M-6)

As discussed in the Transportation/Traffic Chapter of the DEIR, the proposed project would add approximately 2,123 daily trips to roads in the vicinity of the project site. The Wellness Center has been reduced in size and scope in order to avoid development within the area determined to be an archeological site in compliance with Mitigation Measure CULT-2. As stated previously, the Community Center aspect has been removed, thereby restricting pool, fitness center, and locker facilities for use by Wellness Center residents, staff and their guests and Office Park employees only. Initially, these facilities were available to the Coastside public. In closing these facilities to the public, traffic trips attributed to this function in the DEIR have been removed. Also, the public storage use at the Wellness Center site has been reduced from 20,000 sq. ft. to 10,000 sq. ft. The traffic trips estimated for the Wellness Center have been reduced by 215 trips, from 384 to 169 trips. Therefore, total project trips have been reduced from 2,123 trips to 1,908 trips. The reduction in trips is local and does not impact the intersections at Highway 1 and 92. Table IV.M-6 is revised as follows to delete traffic associated with the Community Center (which has been eliminated):

Revised Table IV.M-6 Project Trip Generation Estimates (Modified Wellness Center and 225,000 sf Office)											
		Daily		**AM Peak Hour**				**PM Peak Hour**			
Use	**Size (sf)**	**Rate**	**Trips**	**Rate**	**In**	**Out**	**Total**	**Rate**	**In**	**Out**	**Total**
Office Park											
General Office	90,000	11.01	991	1.55	123	17	140	1.49	23	111	134
Research and Development	56,250	8.11	456	1.22	57	12	69	1.07	9	51	**60**
Storage	33,750	3.56	120	0.30	8	2	10	0.32	3	8	11
Light Manufacturing	45,000	3.82	172	0.73	23	7	33	0.73	12	21	33
	225,000		**1739**				252		47	191	238
Wellness Center											
Residential (Units)	~~42~~ 37	0	0		0	0					
~~Breezeway~~ Staff	20 units	6.65	133	0.51	2	8	10	0.62	8	4	12
Storage	~~20,000~~ **10,000**	**3.56**	~~71~~ **36**	**0.30**	~~5~~ **3**	**1**	~~6~~ **4**	**0.32**	~~2~~ **1**	~~5~~ **3**	~~6~~ **4**
~~Community Center~~	~~5,325~~	~~33.80~~	~~180~~	~~4.57~~	~~22~~	~~2~~	~~24~~	~~2.19~~	~~7~~	~~5~~	~~12~~
Trips			~~2,123~~ **1908**		~~243~~ **216**	~~49~~ **47**	~~292~~ **266**		~~63~~ **56**	~~206~~ **198**	~~268~~ **254**

Page IV.M-28 (Mitigation Measure TRANS-1)

Mitigation Measure TRANS-1 is deleted and replaced with the following. The revised mitigation measure incorporates and increases the requirements of the original mitigation measure. In the DEIR, the mitigation measure required a bi-annual traffic report following full project occupancy, which studies only the Cypress Avenue and SR 1 intersection. The revised mitigation measure requires a traffic report for potentially impacted intersections to be submitted to the Community Development Director, at occupancy of every 60,000 sq. ft. of office space up until full project occupancy and bi-annually after full project occupancy.

Revised Mitigation Measure TRANS-1 of the FEIR: The property owner shall submit a traffic report to the Community Development Director, at full occupancy of every 60,000 sq. ft. of office space, until full project occupancy, and submit traffic reports bi-annually after full project occupancy. The report shall be signed and stamped by a Professional Transportation Engineer in the State of California and identify the Level of Service (LOS) at the intersection of Cypress Avenue and SR 1, Airport Street & Stanford/Cornell (Study Intersection 3 of DEIR), Broadway & Prospect Way (Study Intersection 2), Prospect Way & Capistrano (Study Intersection 1) and State Route 1 & Capistrano (Study Intersection 8) to evaluate if they maintain a LOS C or better. If Levels of Service fall below existing levels for the intersection of Cypress Avenue and SR1 (LOS C in the AM and LOS D in the PM), the applicant shall

coordinate with Caltrans to pay a fair share for the installation of a signal as necessary to ensure that the signal will be installed within 1 year of the date of that report. If traffic reports reveal that the LOS of any of the other intersections listed above fall below LOS C, it shall identify methods for reducing vehicle trips to and from the project site, as well as other roadway or intersection improvements that would result in LOS C or better. The applicant shall implement the measures required by the Department of Public Works and the Planning and Building Department, subject to all necessary permitting and environmental review requirements, within 1 year of the date of that report. In the event that permits required for roadway or intersection improvements are not obtained, the methods for maintaining LOS C or better shall be achieved by reducing vehicle trips to and from the project site.

Page IV.M-38 (Impact Trans-5)

This section is revised to clarify County parking requirements for permitted uses in the M-1 District, as follows:

As part of the approval process, the proposed project will be required to provide adequate parking in proportion with and sufficient to accommodate the potential demand created by the project. No off-site parking spaces are proposed for this project; all parking spaces would be provided on-site. As discussed previously, the County parking ordinance requires one space for every 200 sq. ft. of office space~~, and does not specify parking requirements for lower density uses~~. The project proposes low-density office use and the applicant is requesting a parking space exception from the County, if one is needed. ~~to provide one parking space for every 250 sq. ft. of office space~~. The project proposes to provide 640 parking spaces for the mixed-use Office Park development on the northern parcel, 12 of which would be ADA handicap accessible. Table IV.M-9 illustrates the method for calculating required parking spaces for the proposed Office Park uses and compares to the parking space exception requested by the applicant.

According to the current County requirement for office space use, 737 parking spaces would be required if the building constructed at the Office Park are used entirely for professional offices. ~~If the County approves a parking space exception for low-density office use, the requirement would be reduced to 635 parking spaces.~~ Other types of uses proposed for the office site have lesser parking requirements, and depending on the actual extent of non-office uses, could reduce the amount of required parking to 518 spaces. The County may agree to accept the proposed 640 parking spaces as conforming to the 628 required parking spaces, which represents an average of the "lower limit" of 518 parking spaces (calculated based on parking requirements for all uses which are permitted in "M" Districts, but not specifically enumerated in the parking regulations) and the "upper limit" of 737 required parking spaces. Furthermore, if needed, the applicant would implement the following parking options to reduce any potential impacts from the proposed parking exception:

- Implement parking procedures that result in office workers utilizing ride sharing, shuttle service to park and ride lots, and public transportation.

- Work with the County and Transit Authority to increase the San Mateo County Transit Authority Bus Service along Airport Street.

- Provide Shuttle Bus Service to the Office Park location from the Park and Ride located in Pacifica, Princeton and Half Moon Bay.

- Extend multi-purpose bike and walking trails connecting the project to parks and services. These trails may include the trail to the Post Ridge property and the multipurpose trail along Airport Street and Princeton.

Revised Table IV.M-9
Office Park Required Parking Spaces

Proposed Use	**Area (sf)**	**Average Trip Rate**	**Office Trip Equivalency Ratio**	**~~Equivalent Office Space (sf)~~**	**Parking Spaces Required under M-1 District[1]**	**Parking Spaces Required (200 sf/ office space)**	**~~Parking Exception (250 sf/space)~~**
General Office	90,000	11.01	1.0	~~90,000~~	450.00	450	~~360~~
Research and Development	56,250	8.11	.74	~~41,625~~	28.26	208	~~167~~
Light Manufacturing	45,000	3.56	.33	~~11,138~~	22.50	0	~~45~~
Storage uses	33,750	3.82	.35	~~15,750~~	16.88	79	~~63~~
	225,000	-	-	~~**158,513**~~	517.64	737	~~635~~
Lower Limit of Required Parking Spaces (County):							**518**
Upper Limit of Required Parking Spaces (DEIR)							**737**
Average of Above:							**628**
Total Proposed Parking Spaces							**640**

[1]The Parking Regulations require "1 space for each 2 employees on largest shift; in no case less than 1 space for each 2,000 sq. ft. of floor area" for all uses which are permitted in "M" Districts, but not specifically enumerated in the regulations.

Table IV.M-10 illustrates the parking spaces proposed for the Wellness Center (southern parcel), which includes ~~73~~ 50 parking spaces to accommodate the live-in staff (caregivers and employees), guests, and service areas (i.e., pick-up/drop-off services). It was assumed for the Wellness Center's parking requirements that all Wellness Center employees (special needs individuals and staff) would live at the Center, and that the special needs residents would not drive or require parking accommodations. It is expected that approximately 10 handicap parking spaces would be available within this parking lot and would be in compliance with ADA requirements. Given the use of the site, an additional 5 handicap spaces may be added.

Revised Table IV.M-10 Wellness Center Proposed Parking Spaces		
Proposed Use	**Type of Use**	**Parking Spaces**
Residential		
50 units	50 special needs individuals do not drive	0
20 units	20 live-in staff (caregivers and employees)	20
Storage	Pick-up/drop-off services	10
~~Community Center (pool and fitness center)~~	~~Guests~~	~~33~~
Services (laundry, dog grooming, maintenance/janitorial)	Pick-up/drop-off services	10
	Total of Parking Spaces Above	40
	Total Proposed Parking Spaces	~~73~~ 50

All project-associated parking would be provided on-site, would follow appropriate County parking requirements, and the parking exception request would be subject to County approval; therefore, the project would not result in inadequate parking capacity and impacts would be less than significant and no mitigation measures are required.

V.N Utilities

Page IV.N-3 (Granada Sanitary District)

The section is revised to refer to pump stations using naming conventions used by GSD (overall content and analysis does not change).

Granada Sanitary District

The project site lies within the boundaries of Granada Sanitary District, which provides sewer and solid waste services to the communities of El Granada, Princeton, Miramar, and the northern portion of Half Moon Bay (Frenchman's Creek north). The Granada Sanitary District sewer system currently extends to the corner of Airport Street and Stanford Avenue, where there is a manhole that would be the probable point of connection for the project. From this manhole there is an 8-inch diameter line that runs west on Stanford Avenue, connecting to a 15-inch line on West Point Avenue, which then connects to the Princeton Pump Station located on West Point Avenue, north of Stanford Avenue. The Princeton Pump Station collects sewage from Princeton, North El Granada and Clipper Ridge. It discharges via a 6-inch force main which ties into the SAM force main located across State Route 1 (SR 1) near the intersection of Alcatraz Avenue and Sonora Avenue. This section of the SAM force main ties into an 18-inch gravity line that runs along Alhambra Avenue to the ~~El Granada~~ Portola Pump Station. This pump station serves the southern part of El Granada and Miramar. A ~~new~~ ~~Miramar~~ Naples Beach Pump Station is being designed to pump sewage from Miramar directly to the SAM gravity main that runs to the treatment plant.

When implemented, this will ~~reduce the pumping demand on the El Granada Pump Station and~~ provide improved capacity for wet weather flows.

Page IV.N-5 (On-site Sewage Disposal Systems)

The section is deleted, as there will be no on-site discharge or disposal of sewage.

Page IV.N-11 (Proposed Project)

The "Proposed Project" section is revised as follows to eliminate the drainfields and include connection to the Granada Sanitary District for the discharge of excess treated wastewater:

The proposed project would recycle all wastewater, through on-site treatment/water recycling and for use in toilet flushing, surface and solar panel washing, and agricultural irrigation. All excess treated wastewater not recycled for irrigation or toilet flushing would be ~~infiltrated through three drainfields and~~ discharged into ~~the on-site wastewater infiltration system~~ the Granada Sanitary District sewer system. During drought periods the project proposes to ration water by reducing agricultural irrigation ~~and would send the majority of the recycled water to the infiltration drainfields for groundwater recharge~~. The wastewater system and treatment alternative includes connection to the Granada Sanitary District for the discharge and treatment of all project sewage.

Page IV.N-11 (Wastewater Treatment Plant)

The proposed wastewater treatment system for the project would consist of four primary components (refer to Figures III-25 through III-27):

- Sewage collection system consisting of pipes;
- Treatment system consisting of an MBR, ultraviolet (UV)-disinfected tertiary wastewater treatment plant (with 24-hour storage tanks) and sludge treatment/handling facilities, designed to satisfy, at a minimum, state Title 22 standards for application of treated wastewater;
- Recycled water distribution for toilet flushing and irrigation;
- ~~Treated wastewater d~~Distribution system and a storage tank for operational and wet weather storage of treated wastewater; and
- Treated wastewater disposal to GSD municipal collection system. ~~through a combination of toilet flushing uses, via a subsurface drip emitter infiltration system for agricultural and landscaping irrigation uses, as well as through infiltration via three drainfields~~.

Page IV.N-12 (Treatment System)

The DEIR has been revised to clarify that any future expansion of the wastewater treatment plan would not be covered under this CEQA document, as follows:

The proposed MBR plant proposed for the project would be constructed by Enviroquip, using processes and equipment recognized by CDPH as compliant with Title 22 requirements for tertiary recycled water. The MBR is designed to utilize a single complete mix reactor in which all the steps of the conventional activated sludge process occur with a membrane filter system submerged in the reactor. The membrane filter system filters the water continuously from the reactor by the suction of a pump. For the proposed project, the system will include initial screening of influent, an anoxic basin, and a pre-aeration basin ahead of the MBR basin. The filtered water from the MBR will then pass through an ultra-violet (UV) light disinfection system as the final step in the production of recycled water. The applicant proposes to build a treatment plant sized to handle double the required capacity for redundancy and to allow potential future expansion of service (any future expansion of the wastewater treatment plant would not be covered under this CEQA document). Initially, only the equipment required for the project would be installed and the additional concrete tanks for expansion would be used as the clear well for irrigation storage and dosing the infiltration field. The proposed effluent quality for the MBR plant is listed in Table IV.N-1, along with relevant standards for tertiary recycled water (i.e., Title 22).

Page IV.N-13 (Treated Wastewater Storage)

The MBR plant would include a 30,000-gallon storage tank for treated wastewater. The tank would serve to store and regulate the flow of recycled water for irrigation and toilet recycling. It would also be used for flow equalization ~~and for dosing the infiltration (leachfield) system~~. Separate submersible pumps would be provided for the toilet flushing and irrigation dosing systems. As the storage tank reaches capacity, the water would be pumped to the Granada Sanitary District system ~~infiltration system~~. This tank would also be covered with the aluminum plate system.

Page IV.N-13 (Water Recycling)

The recycled water produced by the MBR plant is proposed to be used on-site for toilet flushing within project buildings, and for irrigation of landscaping, crops and wetlands restoration areas. During the dry season the project proposes to recycle all of the treated wastewater. During the wet season, excess water would either be recycled or discharged to the Granada Sanitary District system ~~or dispersed on-site via subsurface disposal fields (leachfield)~~. Areas proposed for irrigation with recycled water include: (1) native plants used for ornamental landscaping; (2) wetlands restoration areas (initial three years only); (3) and row crops. Subsurface drip irrigation methods would be used.

Page IV.N-13 (Drainfield System)

This entire section has been deleted due to the elimination of the drainfield proposal.

Page IV.N-14 (Wastewater Recycling Flows)

The applicant estimates that approximately 16,000 gpd (out of the 26,000 gpd total) will be recycled for toilet flushing in the Office Park and the Wellness Center buildings. This is based on the assumption that the amount of water use for toilet flushing will be 70% in the Office Park (14,000 gpd) and 30% in the Wellness Center (approximately 2,000 gpd). The remaining flow of approximately 10,000 gpd of recycled water would be available for surface and solar panel washdown uses, as well as landscape and

crop irrigation~~, or for percolation via the on-site infiltration (drainfield) systems~~. Excess unused recycled water will be disposed of through the Granada Sanitary District system.

Pages IV.N-14 and 15 (System Operation and Management)

The wastewater system for the project is planned to serve the Wellness Center and Office Park properties, which will be under separate ownership. As a consequence of serving multiple discharges under separate ownership, the wastewater system will be classified a community system. However, due to the elimination of on-site discharge and disposal of sewage, the system is no longer considered a "discrete sewerage system" as defined by the RWQCB. Based on the foregoing, this section is revised as follows:

The applicant proposes to fully automate and fully alarm the MBR plant to comply with Title 22 requirements. The applicant proposes monitoring of the MBR system, including 24-hour composite sampling. Operation of the system would require a State-Certified Wastewater Treatment Plant Operator, Grade 4. It is also proposed that residents of the proposed project would provide labor and staff support for treatment plant operations, with the plan to eventually become certified operators.

The wastewater system for the project is planned to serve the Wellness Center and Office Park properties, which will be under separate ownership. As a consequence of serving multiple discharges under separate ownership, the wastewater system will be classified a community system. ~~Per the provisions of the RWQCB's "Policy on Discrete Sewerage Systems," this will require that a public entity assume legal and financial responsibility for the wastewater facilities. To comply with this requirement, the applicant proposes to either: (a) secure an agreement with Granada Sanitary District to own and operate the project wastewater facilities; (b) modify the project plans to bring all property under single ownership; or (c) obtain an exemption from the RWQCB to their requirement for a public entity for discrete sewerage systems.~~

Page IV.N-15 (Mitigation Measure UTIL-2)

Mitigation Measure UTIL-2 (Wastewater Collection System Capacity) is revised to add the last sentence as shown below:

The applicant shall either: (a) revise the project design to limit the maximum amount of sewage flow to the Granada Sanitary District sewer system to that which can be accommodated by the existing 8-inch sewer line in Stanford Avenue and the Princeton Pump Station; or (b) provide necessary expansion of the capacity of the sewer system to accommodate the addition of the expected maximum sewage flow of 26,000 gpd from the project. Any implementation of Mitigation Measure UTIL-2b would require separate CEQA review and permit review.

Pages IV.N-16 through 18 (Drainfield System)

This entire section has been deleted due to the elimination of the drainfield proposal. There are no changes to Mitigation Measure UTIL-4 on page IV.N-18, which remains relevant to the project.

Page IV.N-19 (Impact UTIL-5)

As discussed under Water Supply Impact UTIL-8, the projected volume of wastewater recycling for toilet flushing appears to have been overestimated by the project applicant. The applicant estimates that approximately 16,000 gpd of recycled water will be used for toilet flushing at the Office Park and Wellness Center. Per the discussion under UTIL-8, the corrected estimate of water for toilet flushing could be two-thirds this amount. The estimates of toilet flushing flows have been used by the applicant to estimate~~: (a)~~ the amount of recycled water available for irrigation uses~~; and (b) the total amount of wastewater flow to be disposed of by other means (i.e., leachfield beds) during the winter non-irrigation period~~. As a consequence of overestimating the toilet flushing flows, further analysis is needed to determine whether or not there are sufficient irrigation areas ~~and necessary capacity in the drainfields~~ for the corrected (larger) amount of wastewater flow. This is a ***potentially significant*** impact.

Page IV.N-19 (Mitigation Measure UTIL-5)

Mitigation Measure UTIL-5 is revised as follows:

The applicant shall revise the project plans and water budget analysis to correct the inconsistencies in the water recycling assumptions and calculations, and shall use this information to verify: (a) the adequacy of plans for irrigation uses of recycled water; and (b) the sufficiency of the ~~proposed leachfields~~ proposed landscape areas for winter season dispersal of all wastewater flow not distributed for toilet flushing. ~~This information shall be provided for review and approval by the RWQCB.~~ The project's use of treated wastewater for irrigation shall be managed and controlled to prevent changes in existing drainage and hydrology that could adversely impact the biology or hydrology of wetland habitats or result in ponding that could result in health, circulation, or structural stability problems. Prior to Planning approval of any grading permit, the applicant shall submit a report, prepared by a biologist/hydrologist to determine appropriate recycled watering levels for all seasons that is consistent with the above requirement and the revised water budget analysis. The report shall be submitted for review by the Environmental Health Division, RWQCB, and the County Planning Department. Use of recycled water for irrigation shall be monitored for two years by a biologist/hydrologist to adjust water levels as necessary based on actual site conditions.

Page IV.N-22 (Municipal Water Service)

The "Municipal Water Service" section is revised as follows, to provide additional information regarding CCWD capacity:

The main supplier of municipal water service in the project area is the CCWD, which serves approximately 18,000 people, including the unincorporated communities of Princeton by the Sea, El Granada, and Miramar, as well as the City of Half Moon Bay. CCWD obtains its water from four sources: (1) Pilarcitos Lake; (2) Crystal Springs Reservoir; (3) Pilarcitos well field; and (4) the Denniston Project. The first two sources are owned and operated by the San Francisco Water Department (SFWD); the latter two are owned and operated by CCWD. Approximately 35% of CCWD's water supply is produced locally through stream diversions and wells along Pilarcitos and Denniston Creeks, while the remaining 65% is purchased from the City of San Francisco. CCWD operates two water treatment plants, the Denniston Plant near the Half Moon Bay Airport, and the Nunes Plant in the City of Half Moon Bay.

Water from SFWD is conveyed through the Pilarcitos pipeline to the Nunes Plant, which has a capacity of 4.5 mgd, from there it is stored in ten storage tanks with a total capacity of 8.1 million gallons. Within the district there are three pressure zones, five pump stations, 500 hydrants and 52 miles of water mains. The majority of the water use in the district is for residential use, with residential customers accounting for 91% of the connections and 59% of the total water demand.

In addition to the 4.5 mgd capacity of the Nunes Plant, CCWD has approved water rights to the Pilarcitos Creek Well Field of 0.32 mgd, the Dennison Creek Diversion of 0.27 mgd and the Dennison Creek Well Field of 0.21 mgd. The total treatment capacity for CCWD is 5.3 mgd (CCWD District Map and Water Information). The current flow averages approximately 2.4 mgd. The Big Wave Project is not within the CCWD Water District Boundaries but is within the LAFCo identified sphere of influence.

Page IV.N-30 (San Mateo County Local Agency Formation Commission)

The "San Mateo County Local Agency Formation Commission" section is amended as follows, in order to analyze the option of a full water connection to CCWD for domestic and fire flow, consistent with the Project Description in the DEIR:

The project site is not within the district boundaries of a domestic water supplier, which would require annexation via Local Agency Formation Commission (LAFCo) if the project was to receive backup services. The project applicant proposes to connect to the CCWD for emergency water supply and fire flow. The project applicant also proposes to connect to CCWD for domestic water supply once the Project is annexed into the District and is the necessary coastal development permit amendments required to allow for such service have been issued. This proposed annexation to CCWD would require review and approval by LAFCo and Coastal Commission approval of amendments to the Coastal Development Permits for the El Granada Pipeline replacement project~~. Any temporary or permanent extension of water services outside of the service boundary as defined on January 1, 2003 would require amendments to~~ (Coastal Development Permits A-1-HMB-99-20 and A-2-SMC-99-63)~~ as well as amendment(s) to the County of San Mateo and Half Moon Bay Local Coastal Plans~~. LAFCO annexation would require:

(The rest of the section is unchanged)

Page IV.N-31 (On-site Well Water)

The "On-site Well Water" section is revised as follows, in order to delete the originally proposed RO well waster treatment and to provide additional information regarding the treatment of well water:

~~T~~Unless and until the project can obtain water from CCWD, the primary source of domestic water supply would be the existing on-site agricultural well. It would be converted to provide potable water for the project, and would also continue to be used to supply a portion of the irrigation needs for wetlands restoration, native plant nursery, and start-up ornamental nursery. ~~The water used for the domestic supply would be treated with membrane micro-filtration (two 10,000 gallons per day (gpd) AMPAC Reverse Osmosis (RO) systems), followed by ultra-violet (UV) light disinfection (Trojan). One treatment unit would be located in the Storage Mechanical room on the first floor of the Wellness Center (Building 1), and the other would be located in the Communications Building at the Office Park property. For redundancy the two systems would be interconnected with a 4-inch pipe. The RO system would be fully~~

~~automatic with continuous turbidity readings and alarmed shutdown. The water treatment system would remove salt, minerals, organic pollutants and pathogens. The applicant proposes water treatment to assure the quality of domestic water supply in the event that future testing reveals contaminants in the well water.~~

The on-site domestic water system includes a well permitted and installed in 1987 with a sustained capacity of 34 gallons per minute (49,000 gallons per day).[5] The well water will be treated with ozone for iron and manganese removal and disinfection. The peak average demand for the project is 10,000 gallons per day (11 acre feet per year) requiring the well to operate about 20% of the time. The well will be operated with a backup pump and emergency power. Water at the well after treatment will meet the standards of the Safe Water Drinking Act in Accordance with Title 22. The treated water will be distributed to each building. The building hookups will be 1 inch with a 5/8-inch meter. The buildings will include 6,000-gallon storage tanks to provide backup supply with booster pumps to meet peak flow capacity. Each storage and booster pump system will circulate through a filtration system and UV disinfection to maintain water quality. The filtration system will be designed to provide potable water meeting the specific quality requirements of the user.

Page IV.N-32 (Recycled Wastewater)

The "Recycled Wastewater" section is revised as follows, in order to provide additional information regarding the on-site wastewater treatment and recycling system:

Recycling water within the building reduces the total water demand for building use within a range of 9,000 to 16,000 gallons per day. The water recycling system is designed to recycle and utilize all of the potable water extracted from the well. The water recycling system is not an on-site sewage disposal system. The connection to Granada Sanitary District is the on-site sewer system.

The water recycling system is comprised of a Membrane Bioreactor (MBR) with Ultraviolet Disinfection, 24 hours of influent and effluent storage provided for each building. Recycled water will comply with Title 22 for unrestricted use. The design for MBR system is attached to this FEIR as an addition to Appendix K of the DEIR. The design prepared by Enviroquip based on a 0.1 and 0.25 mgd plant. The MBR is scalable, where each plant is designed to accommodate 15,000 gallon per day. One plant of this size would be required for the Wellness Center and two plants of this size would be required for the Office Park.

~~The proposed project would recycle all wastewater for toilet flushing and irrigation.~~ The water system is designed to provide recycled water for building toilet flushing, solar panel washing and surface cleaning. Recycled water will also be used for landscape irrigation, wetlands restoration and organic farming. All recycled water for irrigation will be applied as subsurface drip irrigation.

For toilet flushing the recycled water would be supplied in a separate system of water pipes (dual plumbing) in accordance with State requirements for water recycling (refer to Sewer sub-discussion). All

[5] *Pump test performed in 2009 and signed by the County Environmental Health Division, demonstrated well capacity of 49,000 gallons per day.*

areas receiving recycled water for irrigation would also require a piping system separate from any domestic water supply system or raw well water piping. Recycled water is expected to fulfill the bulk of irrigation needs, but could be supplemented with well water. ~~Excess recycled water not used for toilet flushing or irrigation would be percolated into the ground via three drainfields (leach fields) on the site for groundwater recharge.~~

The water recycling system will be comprised of a pressurized 6-inch pipe as shown on the tentative subdivision drawing. The storage capacity of the on-site recycled water storage tank provides additional flexibility for the use and storage of excess treated wastewater. At peak development, there will be approximately 40,000 gallons of recycled water storage on site in interconnected 6000 gallon buried tanks. Water storage capacity is divided among the following uses:

- The lower 10,000 gallons (first priority) of storage is reserved for toilet flushing and surface and building wash down. Pumps and valves for the toilet flushing will open at the bottom level of the storage system and shut off when there is no demand.

- The next 10,000 gallons per day (second priority) will be reserved for organic farming during the summer only. Pumps and valves open at the 10,000-gallon level and shut off in the rainy season or when there is no demand.

- The remaining 20,000 gallons of storage will be reserved for wetlands and uplands restoration. Pumps and valves open when the storage tank exceeds 20,000 gallons.

When the recycled water volume exceeds 40,000 gallons, it will spill over into the GSD system. It should be noted that the influent storage before the recycled system will be 24,000 gallons. The influent storage tanks will be operated normally empty with all sewage flowing to the recycling systems.

Any excess recycled water or water not meeting Title 22 standards will be discharged into the GSD sewer system. All flow to the GSD system will be metered and recorded continuously. It is estimated that a connection providing a total of 8 EDUs will be purchased for emergency and excess discharge into the GSD system. The size of the connection is 8 inches.

Page IV.N-32 (Annexation to CCWD)

The "Annexation to CCWD" section is revised as follows, in order to analyze the option of a full water connection to CCWD for domestic and fire flow, consistent with the Project Description in the DEIR:

The project proposes to annex to the CCWD for provision of water to meet fire flow requirements and as emergency backup supply for domestic needs. Annexation to CCWD for domestic water service is also proposed, pending approval by LAFCo and Coastal Commission approval of amendments to the Coastal Development Permits for the El Granada Pipeline replacement project (as described on page IV.N-30). The project is not presently within the CCWD service area, and would require annexation approval by San Mateo County LAFCo. The nearest CCWD main is located at Stanford Avenue and Airport Street. The proposed Wellness Center indoor swimming pool would provide supplemental, backup storage for fire service water.

Page IV.N-32 (Facilities)

The "Facilities" section is amended as follows, in order to analyze the option of a full water connection to CCWD for domestic and fire flow, consistent with the Project Description in the DEIR:

An on-site water distribution system would also be provided under the project (refer to Figures III-24 and III-25). The potable water supply would include a 6-inch waterline distribution system. This system would distribute water from the CCWD or treated groundwater for potable use. Recycled water would be distributed in a separate 6-inch waterline for irrigation and/or toilet flushing. Reduced pressure backflow preventers would be provided for all potable and CCWD connections. The potable water system for each building in the Office Park and Wellness Center would be fed by 5/8-inch diameter metered waterlines to ~~six 1~~ one 6,000-gallon hydro-pneumatic tanks. The hydro-pneumatic tanks would minimize potable flow requirements to reduce the meter sizes or reduce the size of the water treatment facilities.

As mentioned previously, CCWD would provide fire service water, and ultimately domestic service, with the proposed Wellness Center indoor swimming pool or storage tank ~~storage~~ serving as backup fire service water. The fire water suppression system would be designed by a licensed Fire Suppression Engineer. The on-site fire distribution system would most likely be an 8-inch to 12-inch main at 150 pounds per square inch (psi), capable of delivering 2,000 gallons per minute (gpm) at a minimum pressure of 30 psi for 30 minutes. Booster pumps in a pump well located in the parking lot and directly powered from an emergency generator would be designed to provide supplemental fire flow. This system would provide either primary or secondary fire flow.

Page IV.N-33 (Landscape Irrigation Water Demand)

The "Landscape Irrigation Water Demand" section is revised as follows, to add approximately 4000 trees and about 6000 shrubs, to provide additional uplands restoration, which acts as a visual and noise buffer.

Landscape Irrigation Water Demand

~~The proposed project documents (Facilities Plan24) discuss plans for irrigated landscaping; however, no estimate is provided regarding the amount of landscaping and the associated irrigation water demand. The EIR analysis assumes that landscaping would be matched to the amount of available recycled water.~~ Table III-6 of the DEIR shows approximately 44% of the site in restored wetlands. On-site wetlands restoration and habitat created by landscaping is described in Figure 6 (Planting Plan) of the DEIR and the "90% Basis of Design - Riparian and Water/Wetlands Ecosystem Restoration" added to Appendix E of the DEIR. Approximately 39,000 plants to be installed over both of the project sites. Of this number, approximately 9,500 are wetlands trees. These numbers include additional landscaping over the uplands of the properties proposed by the applicant after the release of the DEIR, consisting of approximately 4,000 trees and about 6,000 shrubs, to provide additional wetlands habitat and uplands restoration, to act as a visual and noise buffer.

The uplands restoration will be planted primarily with wetlands trees and shrubs in accordance with the Palustrine Scrub Shrub I and II Palustrine Forest I, as described in the "90% Basis of Design" report. Uplands are defined as greater than 2 feet above the wet season water table. This tree selection maximizes the biological benefits of the restoration and will be contribute to visual and sound screening.

Proposed planting has been sized and designed to utilize all the recycled water produced by the project that is not used for toilet flushing, approximately 5,000 to 17,000 gallons per day. The wetlands plants require saturated soil conditions all year long. To saturate the soil during the summer, about 0.2 gallons per day is required per shrub and about 0.5 gallons per day is required per tree (refer to Appendix K of the DEIR, as revised in the FEIR). Based on this estimate, the restoration will take approximately 16,000 gallons of water per day for a successful restoration. The drip irrigation system is designed to provide water in circuits to saturate the soil but not flood the soil. The wetlands restoration will be watered with a minimum of 6 circuits, allowing watering for each circuit once every 6 days to allow the soil to drain. The wetlands restoration will receive irrigation during the dry months for approximately 10 years.

New Table IV.N-3
Approximate[1] Plant Recycled Water Demand (Dry & Wet Season)

Landscaping	Total No.	Approximate Recycled Water Needs per Plant (gpd)	Approximate Total Recycled Water Demand (Dry Season) (gpd)	Approximate Total Recycled Water Demand (Wet Season) (gpd)
Wetlands				
Trees	5,500	0.5	2,750	--
Shrubs	13,500	0.2	2,700	--
			5,450	
Uplands				
Trees (wetlands)	4,000	1.0 - 2.0	4,000	8,000
Shrubs (wetlands)	6,000	0.25 - 0.5	1,500	3,000
			5,500	*11,000*
Organic Garden/Native Plant Nursery				
Plants	10,000	0.5	5,000	5,000
Total Wetlands Trees	**9,500**			
TOTAL	**39,000**	--	**16,000**	**16,000**

[1] The table represents approximate recycled water demand. Actual use of recycled water may be higher or lower, varying with the amount of recycled water used for toilet flushing. No potable water would be used for plant watering.

GPD = Gallons per day

Source: Appendix K of the DEIR, as revised in the FEIR

Page IV.N-33 (Impact UTIL-7)

Impact UTIL-7 (New Water Facilities or Expansion of Existing Facilities) is revised as follows, in order to analyze the option of a full water connection to CCWD for domestic and fire flow, consistent with the Project Description in the DEIR:

As part of the building permit process, the project will be required to have a fire safety engineer calculate the fire flow requirements for the project. If the tested flow is determined to be inadequate, the project would be required to increase the building fire proof rating and/or provide storage and booster pumps. The project proposes to obtain its main supply of water via an existing on-site well and annexation and connection to the CCWD as a backup emergency domestic supply and for fire flow water service. Annexation to CCWD for domestic water service is proposed pending approval by LAFCo and Coastal Commission approval of amendments to the Coastal Development Permits for the El Granada Pipeline replacement project.

The San Mateo County General Plan anticipates that the CCWD could serve a population of roughly double the current customer base, which would allow sufficient supply for the proposed development without requiring the CCWD to expand existing facilities or construct new facilities. According to an October 12, 2010 phone conversation with Joe Guistino, Superintendent, ~~T~~the existing CCWD 10-inch water main near the project site (Stanford Avenue and Airport Street) is estimated to have the capacity to ~~deliver the necessary fire flow to~~ meet the domestic water and fire flow demands of the project~~, based on preliminary estimates of fire flow needs~~. While the project has yet to apply for and gain LAFCo approval for annexation to CCWD, if annexation is approved, the impacts on existing water treatment facilities by the proposed project would be a less than significant impact; therefore, no mitigation measures are required.

Page IV.N-34 (Fire Flow)

The "Fire Flow" section is revised as follows, in order to reflect the clarification of fire flow options listed in Section III.A of the FEIR:

Fire Flow

The quantity of water necessary for fire protection varies with the type of development, occupancy, and the degree of fire hazard. The adequacy of fire flow for a given area is based on required fire flow, response distance from the existing fire station, and the Fire Marshal's judgment of needs in the area. Required fire flow is directly related to land use. The preliminary estimate of fire flow requirements for the project is 2,000 gpm, at a minimum pressure of 30 psi for 30 minutes (60,000 gallons or more). The CCWD main located at Stanford Avenue and Airport Street is capable of delivering this flow. On-site facilities to distribute the water for fire protection are estimated to include an 8-inch diameter main. If the on-site swimming pool or below-ground storage tank will be used as a source of fire flow water, and will accommodate a storage capacity of 60,000 to 90,000 gallons and require a booster pump with capacity to deliver the above mentioned flow of 2,000 gpm through the distribution system.

Water supply for fire protection will be rely one of the following sources as approved by the Coastside County Fire District.

1. On-site water storage for fire protection: On-site water storage would involve the Wellness Center swimming pool, with submersible pump well, and/or a below-ground water storage tank (capacity up to 180,000 gallons or as otherwise required by Coastside County Fire Protection District at the building permit stage).

2. Combination of On-site Water Storage and Water Connection for Fire Service only: The system includes an emergency connection to CCWD that can be energized through a valve with a reduced pressure backflow preventer and meter if the on-site fire system has problems or is inadequate.

3. Water Connection for Domestic and Emergency Service: This option would rely entirely upon a municipal water connection, if and when a connection is available and has been approved, for both domestic and fire suppression purposes.

Swimming Pool or Below-Ground Storage Tank For Fire Flow

The pool size will be determined by the fire flow and the required duration of flow. A sixty-minute flow will require approximately 120,000 gallons. The pool will be a minimum of four lanes, zero entry operated with a mild salt solution similar in concentration to the body salt levels (0.9%). The pool will be designed to continuously circulate through a sand or diatomaceous filter. The filtered water will be treated with UV light for disinfection. The pool will have a large grated intake trough for circulation connected to a submersible pump well located within the parking lot. The grated intake will be sized to maintain velocities of less than 1 ft per second during fire flow to maintain safety for swimmers. The submersible pump well will also have four fire pumps designed to deliver the required flow and pressure. Two smaller pumps will maintain the fire system under pressure. The larger pumps will turn on if the system pressure drops. The pumps will be powered by a backup natural gas generator. The main fire line will be twelve inches and provide connections to the building sprinkler systems and hydrants required by the fire system design as reviewed by the third party system design engineer approved by the Coastside County Fire Protection District (Fire District).

The pool will consist of a reinforced concrete tank six feet deep that will be constructed partially below the water table. The pool will require a slab that is tied down to drilled piers. The pool cannot be drained due to outside water pressure. Pressure relief valves will let outside ground into the pool if the pool level drops. Continuous treatment will insure the water meets the County Health department standards. If someone is sick or defecates in the pool, the pool will be closed until the pool treatment system returns the pool to its required water quality standards. The pool is a dedicated fire system maintained in a manner that allows safe swimming.

If the Fire District determines that the pool with its pressurization system cannot be used for fire protection, a separate concrete tank will be provided or the pool will be closed and covered and swimming will not be allowed. If a separate tank is required, it will be located under the first floor of the Wellness Center or under the pool area concrete deck. All tanks will be located within the building footprint.

Pages IV.N-36 and 37 (Impact UTIL-9)

Impact UTIL-9 (Adequacy of On-site Water Well) is revised as follows, as the County Environmental Health Division has stated that extension of the existing 20-foot well seal to 50 feet is not required to meet requirements for a community water well:

The applicant proposes to meet the Safe Drinking Water Act by proposing a water treatment system that meets the San Mateo Department of Health Standards ~~extend the existing 20-foot well seal to 50 feet to meet requirements~~ for a community water well.~~, which will alter the hydraulic characteristics of the well. Specifically, half of the existing well screen (from 20 to 50 feet) will be sealed off, leaving the screened sections only between 50 to 60 feet, and from 80 to 100 feet. This will materially alter the production capacity of the well, such that the results of the recently completed pumping test are no longer valid. The production capacity of the existing on-site well would be expected to decline. Consequently, the EIR assumes that a repeat pumping test will be required by the County for the modified well to document its adequacy to meet project water demands. It is not possible to determine whether or not the modified well will have sufficient production capacity to meet project demands. However, if the modified well is found to be insufficient, the capacity could be supplemented with an additional well to meet the project demands. Review of the well log indicates suitable aquifer conditions to support the water demands for the project. The water quality for the existing on-site well is satisfactory and would not be expected to change with the proposed modification of the well seal. Provision of potable water from the on-site well represents a less than significant impact.~~ Provision of potable water from the on-site well and treatment system represents a less than significant impact.

Page IV.N-37 (Impact UTIL-10)

The project includes treatment to improve well water quality that includes microfiltration and UV disinfection. The RO treatment discussed in the DEIR is no longer part of the treatment process. As stated on page IV.N-37 of the DEIR, based on the June 2009 testing of the existing well water, the water quality is suitable for domestic-community water supply, without the need for RO treatment. The observed high levels of color, iron and manganese could be addressed with conventional water treatment methods. Based on the foregoing, Impact UTIL-10 (Water Treatment System) is revised as follows:

The project proposes to employ an ~~RO treatment~~ aeration-system, slow sand filter and UV disinfection to treat well water for the potable water supply. The treatment system has been proposed to meet the requirements of the Safe Drinking Water Act and ~~in order~~ to assure high quality water for the project facilities, residents, employees and guests. Based on the June 2009 testing of the existing well water, the water quality is suitable for domestic-community water supply, without the need for RO treatment. The observed high levels of color, iron and manganese could be addressed with conventional water treatment methods. The proposed ~~RO~~ system exceeds the treatment needs for the project. Therefore, water treatment is a less than significant impact and no mitigation measures are needed.

Page IV.N-37 (Cumulative Impacts)

The "Cumulative Impacts" section is revised as follows, in order to analyze the option of a full water connection to CCWD for domestic and fire flow, consistent with the Project Description in the DEIR:

Under the primary option, ~~T~~the proposed project would obtain its domestic water supply entirely from an on-site well rather than from the CCWD (or District) public water supply. Under this scenario, ~~T~~the project proposes on-site water supply for fire protection (e.g., Wellness Center swimming pool or below-groundwater tank), and, if necessary, to connect to the CCWD solely for the purposes of providing fire protection, which would not amount to a significant annual water demand. Under a secondary option, the applicant proposes to apply to LAFCo to annex the project site to CCWD consistent with the District's LAFCo adopted sphere of influence for domestic water and fire supply, and to work with the CCWD to apply to the Coastal Commission for the amendments to the Coastal Development Permits for the El Granada Pipeline replacement project necessary to allow the project to be served by CCWD. Under this scenario, the property owner would either abandon the on-site water treatment facilities consistent with County standards, or provide CCWD with the on-site water facilities to increase CCWD's domestic water supply, if desired by CCWD and allowed by the amendments to the CDPs for the pipeline replacement project. Therefore, the project would not have a cumulative effect that would diminish the availability of water supply for other projects in CCWD service area. Cumulative water supply impacts would be less than significant.

Pages IV.N-56 and 57 (Proposed Project)

As described in detail in Section III (Project Description), the proposed project would supply a majority of energy for heating, cooling and electrical demand with renewable energy, through a combination of off-site and on-site power generation. The potential on-site power systems include solar heat, photovoltaic panels, wind generation, backup ~~and cogeneration~~ with a natural gas generator ~~for peak shaving~~ and geothermal cooling. Passive heating and cooling would also focus on the proposed development architectural design. Buildings would be heated by ~~either natural gas or~~ solar power. Additionally, the electrical equipment cooling process would be a source of building heating. Natural gas fuel cells would be utilized for the backup of communications power. All buildings and development would be designed to meet Platinum-level Leadership in Energy and Environmental Design (LEED) certified construction.

The proposed project would include up to 600 kilowatts (kW) of solar voltaic, one to three million British thermal units (BTU) per hour of solar heating, one million BTU per hour of geothermal/evaporative cooling, and up to 100 kW of wind power. The project would also own and operate up to a 600 kW natural gas engine generator used for backup power ~~designed for peak shaving~~ and 5 kW of natural gas fuel cells for backup communications.

Page IV.N-59 (Natural Gas)

Revise the "Natural Gas" section under Cumulative Impacts as follows:

Under a worst-case scenario, which does not account for proposed energy conservation measures, i~~I~~mplementation of the proposed project in combination with the 37 related projects and other future cumulative growth in unincorporated San Mateo County would increase the consumption of natural gas.

As shown in Table IV.N-7 the projected cumulative increase in natural gas consumption would be approximately 78,891,34 cubic feet per month (cfm), or 78.89 million cfm under this scenario.

V. GENERAL IMPACT CATEGORIES

Page V-2 (Growth Inducing Impacts of the Proposed Project)

The second full paragraph on this page is revised, as follows, to be consistent with the Project Description of the DEIR, which states that one of the project options for domestic water supply is a connection to CCWD:

Surrounding land uses include the Half Moon Bay Airport and County of San Mateo open space across Airport Street to the east, the El Granada Mobile Home Park adjacent to and north of the project site, the Pillar Point Marsh to the west, and the Princeton/Pillar Point Harbor industrial/commercial area adjacent to and south of the project site. The project site is served by existing roadways and an on-site well that has been used for agricultural purposes.~~, utility infrastructure, and service systems.~~ The proposed project would recycle all wastewater through on-site treatment/water recycling and for use in toilet flushing and landscaping and agricultural irrigation. All excess wastewater not recycled for irrigation or toilet flushing would be disposed of through the Granada Sanitary District system, within the existing wastewater disposal allocation of 8 EDUs. ~~infiltrated through three drainfields and discharged into the on-site wastewater infiltration system~~. Proposed domestic water supply for the project would be obtained through one of the following options:

1) The generation of treated domestic water on-site via existing groundwater wells, with on-site water supply storage for fire protection,

2) On-site treated domestic water via existing groundwater wells, with ~~, as well as through the~~ a connection to CCWD to provide water supply for fire flow ~~as an emergency backup.~~ ,~~-~~or,

3) Full connection to CCWD for domestic and fire water supply.

~~Additionally, the proposed project would not require new or expanded water entitlements.~~ The first and second options would require Coastal Development Permit approval for the use of the existing agricultural well for domestic purposes. The second and third options that include domestic and/or fire water supply will require LAFCo approval for annexation of the project sites to CCWD consistent with the District's LAFCo adopted sphere of influence. These options would also require CCWD to amend Coastal Development Permits, subject to approval of the Coastal Commission, to serve the project.

The use of the on-site well would not be growth inducing as it is consistent with the County's current proactive to allow on-site wells in urban areas where municipal connection are not available and County Environmental Health Division requirements are met.

Amendment of service district boundaries is not growth inducing, as the project site is in the CCWD sphere of within the LCP Urban Service Line. The provision of municipal water to sites that are currently eligible for domestic connections is not growth inducing.

Ox Mountain Landfill has sufficient capacity to meet the solid waste service demands of the proposed project. The project proposes to recycle a minimum of 50% of its solid waste, with a goal to recycle 95% of its solid waste. The proposed project would have sorting/recycling centers for plastic, paper, glass, cans and metal, which could be collected by Seacoast Disposal. The proposed project would not require the expansion of landfill capacity. Therefore, the proposed project would not foster population growth by removing an obstacle to growth.

VI. ALTERNATIVES TO THE PROPOSED PROJECT

Pages VI-16 through 20 (Alternative C)

Alternative C has been modified to further reduce environmental impacts, which were considered less than significant. The 225,000 sq. ft., two-story, four-building Office Park alternative has been revised to maintain the total size over 8 buildings, with four two-story buildings in the front row (along Airport Street) and four three-story buildings in the back row (directly behind the front row). Also, a traffic option has been added to the alternative which would prohibit Office Park traffic (construction-related and operational) in residential areas north of the project site along Airport Street and Cypress Avenue. The section is revised as follows:

Alternative C of the FEIR includes 8 closely clustered buildings and maintains the size of the proposed offices at 225,000 sq. ft. Compared to the four-building proposal, the alternative includes a greater number of smaller buildings to be more consistent with nearby buildings in Princeton. The layout allows for pedestrian walkways and small plazas between structures as well as loading bays on the perimeter of the buildings.

Alternative C reduces the building height of the Office Park from four three-story~~ies~~ buildings to four two-story~~ies~~ buildings in the front row (along Airport Street) and four three-story buildings in the back row (directly behind the front row). ~~but maintains the size of the proposed offices at 225,000 sq. ft.~~ Each building footprint and floor has an area of 11,250 sq. ft., with a building floor area of 22,500 sq. ft. for the two-story buildings and 33,750 sq. ft. for the three-story buildings. ~~As a result, t~~The building footprint for the Office Park would increase from 80,000 sq. ft. under the proposal to approximately ~~113,000~~ 90,000 sq. ft. under this alternative. These changes to the project under Alternative C would also result in a reduction of the wetlands restoration from 226,038 sq. ft. to approximately ~~192,000~~ 216,000 sq. ft. However, the same amount of parking spaces as the project would be provided under Alternative C. This alternative also includes an Office Park traffic circulation option that prohibits project operational or construction-related traffic on Cypress Avenue. This option includes the installation of on and off-site signage and physical improvements in the right-of-way, subject to County Department of Public Works approval, that would prohibit right turns into the site from south-bound Airport Street and left turns onto Airport Street for traffic leaving the project site. A discussion of potential environmental impacts of modifications to Alternative C is included in Section III.C (Environmental Analysis).

No changes are proposed to the Wellness Center as a part of this alternative.

Except as described above, other project characteristics are assumed to be generally similar to those of the proposed project, for the purpose of analyzing Alternative C. These characteristics include but are not limited to the general location, design and building materials and colors; the specific land uses and tenant types; Platinum level LEED certification, utilities and on-site power generation; on-site farming~~;~~ and grading~~; and phasing~~. Construction of the Office Park would continue to be phased based on economic demand for mixed office space, however, the smaller size of the buildings would allow for smaller increments of construction than the proposed project.

The potential environmental impacts associated with this alternative are described below and are compared to the significant environmental impacts associated with the proposed project. All applicable mitigation measures recommended for the proposed project are incorporated into Alternative C.

AESTHETICS

While the lot coverage for the Office Park parcel would increase under Alternative C by 13%, the building heights for the four office buildings would be reduced from four, three-story~~ies~~ buildings to four two-story~~ies~~ buildings in the front row (along Airport Street) and four three-story buildings in the back row (directly behind the front row). Breaking up the mass of the four larger buildings into eight smaller buildings separated by common areas reduces the appearance of mass and scale and allows for clustering and variation in roof lines. Therefore, the project would more closely resemble nearby buildings in Princeton and project conformance to the County Design Review (DR) Zoning District Regulations for the Coastside would be improved. Under this Alternative, Office Park building facades would also be re-designed to improve project conformance to the County Design Review (DR) Zoning District Regulations for the Coastside. Renderings of the new design overlays are provided in Figure E of the FEIR.

Due to the lower height of the four buildings in the front row, three-story buildings in the back row would be almost entirely screened by the proposed landscaping and the front row of two-story buildings. Where the proposed project would have been visible from Airport Street/Stanford Avenue and Highway 1 with mature landscaping, under this scenario, the buildings would be less visible from these locations. As a result, there would be fewer impacts to scenic views, scenic resources, and visual character than the project under Alternative C, all of which were found to be less than significant with implementation of the proposed project. Like the project, light and glare impacts associated with Alternative C would be less than significant after mitigation.

AGRICULTURE RESOURCES

Given that the same amount of square footage and units would be developed under both Alternative C and the project, the majority of the existing farming on-site would be replaced by this alternative and the project. The project site is depicted as Urban and Built-up Land and Other Land on the Important Farmland Map for San Mateo County. Therefore, the project site has not been designated as important farmland and development of the site would not involve conversion of important farmland. Thus, Alternative C would result in similar impacts to agriculture resources as the proposed project, which was found to be less than significant.

AIR QUALITY

Alternative C would result in similar air emissions compared to the project because Alternative C involves the same square footage and units as well as vehicle trips. Similar to the project, Alternative C would result in significant but mitigatable impacts related to construction emissions and objectionable odors. Also similar to the proposed project, Alternative C would result in less than significant air quality impacts related to: consistency with Air Quality Plan, operational emissions, cumulative regional operational emissions, ~~sensitive receptors,~~ and greenhouse gas emissions. Implementation of the Office Park traffic circulation option, which would prohibit Office Park traffic in residential areas north of the project site along Airport Street and Cypress Avenue, would reduce vehicle-related emissions to sensitive receptors in these residential areas.

BIOLOGICAL RESOURCES

Under Alternative C the building footprint for the Office Park would increase from 80,000 sq. ft. to approximately ~~113,000~~ 90,000 sq. ft., resulting in a reduction of the wetlands restoration from 226,038 sq. ft. to approximately ~~192,000~~ 216,000 sq. ft.. Therefore, Alternative C would result in decreased benefits to wetlands than the proposed project. However, similar to the project, Alternative C would result in less than significant impacts related to: special-status plant species, sensitive natural communities, wildlife movement and habitat connectivity, and conformance with policies and ordinances related to the protection of biological resources. Likewise, Alternative C would also result in significant but mitigatable impacts related to special-status wildlife species.

CULTURAL RESOURCES

Approximately the same amount of grading would occur under Alternative C compared to the project. As a result, cultural resources impacts associated with Alternative C would be similar to those associated with the project. Such impacts include less than significant historical resources impacts, and significant but mitigatable impacts related to archaeological resources, paleontological resources, and human remains.

GEOLOGY AND SOILS

Geology and soils impacts associated with Alternative C would be similar to slightly less compared to the project because both Alternative C and the project would result in grading and development of most of the site. The slight difference in impacts is attributed to Alternative C involving one fewer building story for each of the four buildings in the front row, and thereby fewer occupants exposed to geology and soils hazards at the Office Park. Overall and similar to the project however, Alternative C would result in less than significant impacts related to exposure of Office Park and Wellness Center occupants to fault rupture and seismic ground shaking, and significant but mitigatable impacts related to other soil/geologic instabilities (i.e., seismic-related ground failure, total and differential settlement, soil erosion, expansive soil, and surface weakness associated with pervious pavements).

HAZARDS AND HAZARDOUS MATERIALS

Implementation of Alternative C would result in less than significant impacts related to the routine use, transport and disposal of hazardous materials, similar to the project. Alternative C would also result in less than significant impacts related to interference with emergency plans, and the project's less than

significant impacts related to wildfires. Also, Alternative C would result in significant but mitigatable impacts related to accidental release of hazardous materials and airport operations, which is also similar to the impacts associated with the project.

HYDROLOGY AND WATER QUALITY

Increased building footprints and a loss of restored wetlands at the Office Park under Alternative C would result in a greater amount of impermeable surfaces on the site compared to the project. As a result, hydrology and water quality impacts associated with Alternative C would greater than those associated with the project. However, both Alternative C and the project would result in less than significant impacts related to violation of water quality standards, depletion of groundwater supply and recharge, surface water runoff quantity, and flood hazards. Alternative C and the project would also result in significant but mitigatable impacts related to the alteration of drainage patterns, surface water runoff quality, and tsunami and seiche.

LAND USE AND PLANNING

Land use and planning impacts associated with Alternative C would be similar to the proposed project because both scenarios involve the same amount of square footage and development as well as the same land uses and discretionary actions. Both Alternative C and the project would result in less than significant impacts related to the division of an established community and conflict with plans and policies.

NOISE

Alternative C would result in ~~increased~~ similar impacts related to construction noise and operational traffic noise to sensitive receptors at the Mobile Home Park to the north because it involves the location of buildings and therefore construction in ~~closer~~ similar proximity to adjacent residential uses.~~, due to increased building footprints.~~ This alternative would result in significant but mitigatable impacts related to construction noise and ground-borne vibration, similar to the project. Like the project, Alternative C would also result in less than significant operational noise impacts.

POPULATION AND HOUSING

Under Alternative C, the Wellness Center would include the same amount of DD residents and staff and the Office Park would include the same amount of employees. As such, Alternative C would result in similar population and housing impacts as the proposed project. Specifically, Alternative C would also result in less than significant impacts related to inducing substantial population growth and related to the displacement of substantial amount of population.

PUBLIC SERVICES

Police

Because there would not be a change in population as a result of Alternative C compared to the project, demands for police protection services under this alternative would be similar to the proposed project, which were found to be less than significant.

Fire Protection

Because there would not be a change in population as a result of Alternative C compared to the project, demands for fire protection services under this alternative would be similar to the proposed project, which were found to be less than significant with mitigation.

Schools

Because there would not be a change in population as a result of Alternative C compared to the project, demands for schools services under this alternative would be similar to the proposed project, which were found to be less than significant.

Parks and Recreation

Because there would not be a change in population as a result of Alternative C compared to the project, demands for parks and recreation services under this alternative would be similar to the proposed project, which were found to be less than significant.

Libraries

Because there would not be a change in population as a result of Alternative C compared to the project, demands for library services under this alternative would be similar to the proposed project, which were found to be less than significant.

TRANSPORTATION/TRAFFIC

Section IV.M (Transportation/Traffic) of the DEIR found that the proposed project would result in less than significant impacts related to traffic hazards, access and on-site circulation, emergency access, parking, transit service, and pedestrian and bicycle facilities. <u>However, due to concerns regarding the potential impacts of construction and Office Park traffic on Cypress Avenue, the off-site traffic circulation for the project has been revised to offer an option to prohibit project operational or construction-related traffic on Cypress Avenue. Under this option, both project traffic and construction traffic would be prohibited from accessing the site from Airport Street north of the project site. Therefore, for project traffic, the site would be accessed using North or South Capistrano Road to and from Cabrillo Highway. Construction trucks would access the site using North Capistrano Road to and from Cabrillo Highway. Revisions to the traffic site plan associated with this option include on-site signs prohibiting traffic from making a right turn when entering the site and a left turn when exiting the site, as well as modifications within the public right-of-way to prevent such turns.</u>

<u>This traffic circulation option would re-route Office Park employees who live (or need to travel) north of the project site (Moss Beach, Montara, Pacifica, etc.). Instead of utilizing the Cabrillo Highway to Cypress Avenue to Airport Street route, Office Park employees coming from the north would utilize the</u>

Cabrillo Highway to North Capistrano Road to Prospect Way to Broadway to Cornell Avenue/Yale Avenue/Harvard Avenue to Airport Street route and the same route in reverse when returning home. The optional traffic route includes only non-residential streets.

As shown in Figure D of the FEIR and described in detail in Appendix G, this traffic circulation option would result in reduced project impacts to local intersections which are largely residential, these being Cypress Avenue at Cabrillo Highway (Study Intersection 6), Airport Street at Los Banos Avenue (Study Intersection 5), and Airport Street at La Granada Avenue (Study Intersection 4), but may increase potential project impacts (under cumulative and non-cumulative scenarios) to non-residential intersections. Non-residential intersections potentially impacted by the optional traffic circulation are Cabrillo Highway at North Capistrano Road (Study Intersection 8), Prospect Way at Capistrano Road (Study Intersection 1), Prospect Way at Broadway/Cornell Avenue (Study Intersection 2), and Airport Street at Stanford Avenue/Cornell Avenue (Study Intersection 3).

However, as stated in Section III (Corrections and Additions to the Draft EIR) of this FEIR, the applicant proposes Traffic Demand Management (TDM) measures to include an off-site parking agreement and shuttle service to the Office Park to accommodate a minimum of 50 cars and their drivers, in order to minimize traffic on roads in Princeton. In addition, as stated in Section III of this FEIR, Mitigation Measures TRANS-1 has been revised to require a traffic report for potentially impacted intersections to be submitted to the Community Development Director, at occupancy of every 60,000 sq. ft. of office space up until full project occupancy. The mitigation measure also requires the property owner to implement recommendations of the reports within one year such that intersection LOS for the above potentially impacted intersections would be maintained at a level of "C" or better.

Section IV.M (Transportation/Traffic) of the DEIR ~~also~~ concluded that the proposed project would result in significant but mitigatable impacts related to intersection LOS and capacity, and cumulative LOS. Given Alternative C includes the same building square footage and units associated with the project, the proposed shuttle service and revised Mitigation Measure TRANS-1, this alternative would also result in less than significant impacts related to traffic hazards, access and on-site circulation, emergency access, parking, transit service, and pedestrian and bicycle facilities. Likewise, Alternative C would also result in significant but mitigatable impacts related to intersection LOS and capacity, and cumulative LOS.

UTILITIES AND SERVICE SYSTEMS

Sewer

Alternative C would result in the generation of a similar amount sewage compared to the project because it involves the same amount of square footage and units as the project. Similar to the project, Alternative C would result in less than significant impacts related to wastewater treatment and capacity and sanitary district regulations. Like the project, Alternative C would also result in significant but mitigatable impacts related to wastewater collection capacity, wastewater recycling and disposal, water flow estimates, and creek crossing by sewage pipeline.

Water

Alternative C would result in the consumption of a similar amount of water compared to the project because it involves the same amount of square footage and units as the project. Similar to the project, Alternative C would result in less than significant impacts related to new or expanded water facilities, potable water demands, adequacy of on-site water well, and water treatment system.

Solid Waste

Alternative C would result in the generation of a similar amount of solid waste compared to the proposed project because it involves the same amount of square footage and units as the project. Impacts related to solid waste would be less than significant under Alternative C, which is similar to the project.

Energy

Alternative C would require a similar amount of energy compared to the proposed project because it involves the same amount of square footage and units as the project. Impacts related to energy would be less than significant under Alternative C, which is similar to the project.

RELATIONSHIP OF THE ALTERNATIVE TO THE PROJECT OBJECTIVES

Alternative C meets the project objectives.

Page VI-25 (Environmentally Superior Alternative)

In the DEIR, Alternative B was considered superior to the proposed project and other alternatives primarily due to fewer impacts to visual resources (due to the 2-story building heights) and avoidance of the cultural site on the southern (Wellness Center) site. As described in Section III of this FEIR, the Wellness Center proposal has been revised to avoid the cultural site. Therefore, with all things being equal on the Wellness Center parcel, Alternative B involves a 20% increase in building footprint compared to the proposed project and the construction of 4 large buildings. Modified Alternative C would involve a smaller increase of the project footprint (15%) and area of land disturbance compared to a 20% increase of the project footprint under Alternative B. These reductions in building footprint and land disturbance would result in reduced impacts to biological resources and hydrology than would occur under Alternative B. Regarding aesthetics, the 8 smaller buildings under Modified Alternative C would reduce the appearance of mass and allow for building clustering and variation in roof lines, bringing the project into closer conformance with the County Design Review (DR) Zoning District Regulations for the Coastside and making the scale and mass of the Office Park buildings more consistent with nearby buildings in Princeton.

While the total square footage of the Office Park under Modified Alternative C is 39,000 sq. ft. larger than Alternative B and would result in proportionally greater project operation traffic, consumption of water, utilities, and public services, the aesthetic benefits of the smaller scale buildings and biological/hydrological benefits of a smaller building footprint and area of disturbance would outweigh these impacts, which, like the project, would be mitigated to a less than significant level.

Based on the foregoing, this section is revised as follows:

In addition to the discussion and comparison of impacts of the proposed project and the alternatives, Section 15126.6 of the CEQA Guidelines requires that an "environmentally superior" alternative be selected and the reasons for such a selection disclosed. In general, the environmentally superior alternative is the alternative that would be expected to generate the least amount of significant impacts. In this case, Alternative A (No Project) would result in the least amount of significant environmental impacts (see Table VI-1). However, Section 15126.6 of the CEQA Guidelines requires that an environmentally superior alternative be selected other than the "No Project Alternative." Based on the analysis above and Table VI-1 on the following pages, ~~Alternative B (Reduced Density/Height for Office Park and Reduced Size for Wellness Center Alternative)~~ Alternative C (Modified Office Park Site Plan Alternative 1) has been selected as the environmentally superior alternative to the proposed project. Alternative C~~B~~ is superior to the proposed project and other alternatives primarily due to fewer impacts to visual resources (due to the 2 and 3-story building heights), decreased lot coverage and increased wetlands restoration compared to Alternative B and avoidance of the cultural site on the southern (Wellness Center) site.

VII. PREPARERS OF THE EIR AND PERSONS CONSULTED

There are no Changes to this section. Please note that preparers and persons consulted in the preparation of the FEIR are listed in Section V of the FEIR.

VIII. BIBLIOGRAPHY

There are no changes to this section. Please note that references used in the preparation of the FEIR are listed in Section VI of the FEIR.

TECHNICAL APPENDICES *(Additions to Technical Appendices of the DEIR follow this section)*

Appendix E: Addition of 1) "90% Basis of Design - Riparian and Water/Wetlands Ecosystem Restoration," WSP, August 4, 2008 and 2) Army Corps of Engineers (ACOE) map is titled "Pillar Point Marsh, Half Moon Bay, CA., San Mateo County, Request for Sec. 404 Jurisdictional (File No. 20375S20)," dated June 20, 1994.[6]

Appendix J: Addition of *Big Wave Office Park and Wellness Center Traffic Report*, prepared by Hexagon Transportation Consultants, Inc. (Hexagon), June 24, 2009. The report was listed in the introduction of Section IV.M (Transportation/Traffic) of the DEIR and was available at the County's Planning and Building Department, but was inadvertently left out of Appendix J of the DEIR.

Appendix H: Addition of A) Hydrologic Calculations, B) The 2005 FEMA Letter of Map Amendment Determination Document, C) Concrete Grid Pavers-Fireline, Driveway and Intermittent Parking, and D) Permeable Pavement with Full Exfiltration to Soil Subgrade.

[6] *See Figure C of the Final EIR.*

Appendix I: Addition of "Noise Measurement" email from Dan Hooper to Jennie Anderson (CAJA), dated June 5, 2009.

Appendix K: Membrane Bioreactor Equipment, Enviroquip and other documents related to wastewater treatment plant design.

Addition to Appendix E of DEIR:

1) "90% Basis of Design - Riparian and Water/Wetlands Ecosystem Restoration," WSP, August 4, 2008

Draft (90%) Basis of Design Report

Riparian & Waters/Wetlands Ecosystem Restoration for Big Wave Wellness Center and Office Park San Mateo County, California

August 4, 2008

Prepared for:

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DISCLAIMER

WSP Environment & Energy has prepared this basis of design report for use by Big Wave LLC. Waters of the U.S., including wetlands (waters/wetlands) boundaries presented in this report are described in a previous report by WSP (2008a). These waters/wetlands boundaries have been approved by the U.S. Army Corps of Engineers, San Francisco District (File No. 2008-001025; Regulatory Division, U.S. Army Corps of Engineers, San Francisco District, June 5, 2008). Wetland boundaries under California Coastal Commission jurisdiction have not received formal approval.

Lyndon C. Lee **August 4, 2008**

Lyndon C. Lee, Ph.D. Date
Principal Ecologist & Vice President
Ecosystem Science and Natural Resources Management Services
WSP Environment and Energy

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EXECUTIVE SUMMARY

The Big Wave Wellness Center and Office Park Project (hereafter, "Project") consists of the construction of a residential village and an adjacent commercial property/office park complex. The residential village is designed to provide affordable housing and independent living for a developmentally disabled community, and the office park is designed similarly to provide a state-of-the-art "green", LEED-certified working environment. The primary objective of the project is to construct innovative living and work environments that foster independent and meaningful living/work experiences for disabled young adults. The proposed Project also includes restoration of the waters of the U.S., including wetlands (*i.e.*, waters/wetlands) and California Coastal Commission (state) wetlands on the property that are currently used in agricultural production.

This basis of design report outlines a restoration plan for the riparian/wetland ecosystem that encompasses the federal and state waters/wetlands and their buffer that lie within the project area. This 90% restoration design describes a suite of activities that would increase waters/wetlands ecosystem functions, and to develop a native, diverse, and aesthetically pleasing landscape. Best management practices for stormwater treatment are designed to incorporate retention/detention microdepressions (rain gardens) and swales planted with native species.

The riparian/wetland ecosystem restoration plan includes five elements:

1. Earthwork, including mass and fine grading,
2. Installation of large wood,
3. Planting and irrigation,
4. Weed management, and
5. Monitoring and adaptive management.

The riparian/wetland ecosystem restoration design integrates the built environment with natural communities through utilization of native species for landscaping, locally adapted plant stock, and when possible, use of propagules obtained from the Project Site and adjacent landscape. Additionally, the Project design encourages community involvement by offering educational opportunities for village residents in the restoration process as well as via an informal foot path within the restored buffer. If implemented as designed, the riparian/wetland ecosystem will result an increase in the hydrologic, biogeochemical, native plant community, and faunal support/habitat functions of the currently farmed wetlands. A monitoring and adaptive management program will be implemented to ensure success of the restoration efforts.

I. INTRODUCTION

The Big Wave Wellness Center and Office Park Project (hereafter, "Project") consists of the construction of a residential village and an adjacent commercial property/office park complex. The residential village is designed to provide affordable housing and independent living for a developmentally disabled community, and the office park is designed similarly to provide a state-of-the-art "green", LEED-certified working environment. The primary objective of the project is to construct innovative living and work environments that foster independent and meaningful living/work experiences for disabled young adults.

The proposed Project also incorporates a restoration plan for the riparian/wetland ecosystem which for the purposes of this project includes (a) the waters of the U.S., including wetlands (hereafter, waters/wetlands), (b) California Coastal Commission (state) wetlands, and (c) a 100 foot wide buffer around these waters/wetlands. The majority of all three areas is currently are used in agricultural production. For the purposes of this Project, a "riparian/wetland ecosystem" is defined as upland, transitional, and waters/wetland habitats, all of which will be restored in a complex mosaic within a 100 ft buffer adjacent to existing federal and state waters/wetlands. Restoration of the buffer will provide significant benefits to waters/wetlands ecosystem functions, relative to existing conditions, particularly with respect to the native plant and animal communities. Of particular importance is the restoration of potential breeding habitat for the California red-legged frog (*Rana aurora draytonii*) and potential foraging habitat for the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*). The restoration design integrates the built environment with natural communities through utilization of native species for landscaping, locally adapted plant stock, and when possible, use of propagules obtained from the Project Site and adjacent landscape. Additionally, the Project design encourages community involvement by offering educational opportunities for village residents in the restoration process as well as via an informal foot path within the restored buffer.

A. Project Site

The Big Wave Project Site (hereafter, "Project Site") is located in unincorporated San Mateo County, adjacent to Princeton-by-the-Sea, California (Figure 1). The Project Site consists of two agricultural fields totaling 19.5 ac. These fields are separated by a small, county-owned, unnamed intermittent stream that is an extension of San Mateo County's Pillar Point Marsh. As such, it drains directly to the Pacific Ocean, entering the Pacific Ocean via Pillar Point Harbor immediately north of the mouth of Denniston Creek.

The Project Site is bordered to the northeast by the Half Moon Bay Municipal Airport (Figure 2) and to the south by Pillar Point Marsh, a nature reserve that is part of the County of San Mateo Fitzgerald Marine Reserve complex managed by the County's Parks and Recreation Division. A public trailer park is immediately north of the Project Site along Airport Road. Elevations at the Project Site range from 9.0 to 27.7 feet NGVD, although the agricultural fields are generally flat but slope gently to the south and west.

B. Existing Conditions at the Big Wave Project Site

1. Soils and Geomorphic Context

The Project Site is situated on the uplifted Half Moon Bay marine terrace formation within a partially filled coastal basin. The coastal basin consists of Pleistocene coarse-grained, alluvial fan and stream terrace deposits. Underlying sediments include poorly consolidated sand, gravel, and silt comprising the headward-most extent of old alluvial fans (Brabb and Pampeyan 1983). Montara Mountain, a northern spur of the Santa Cruz Mountain sequence of the Outer Coast Ranges, separates this low-lying coastal area from San Francisco Bay to the north and east.

Soils within the Project Site are mapped by the Natural Resources Conservation Service (NRCS, formerly U.S. Department of Agriculture Soil Conservation Service) as Denison clay loam on nearly level slopes (DcA) and Denison clay loam on nearly level slopes that are imperfectly drained (DdA) (NRCS 1961). These soils are derived from granitic alluvium, and have formed on low coastal terraces under the influence of herbaceous vegetation (grass). Denison clay loam soils occur on 0 to 2 percent slopes and the mapping unit has approximately 1 percent hydric inclusions, which typically are found in depressions across the mapping unit. Denison clay loam soils are generally highly fertile. Overall, Denison soils are classified as fine, smectitic (*i.e.*, clay derived from the alteration of the minute glass in volcanic ash, formerly known as bentonite), isomesic (*i.e.*, summer and winter temperatures differ by less than 6˚C at 50 cm depth) pachic argixerolls (see Soil Survey Staff 2006).

2. Climate

The Project Site has a mild Mediterranean type climate maintained by persistent sea breezes. Temperatures rarely exceed 90°F and seldom drop below 32°F. Average daily temperatures (by month) range from 51°F to 59°F (NRCS 2007). Cloud coverage and fog are common during the evening and early morning hours, but typically dissipate during mid-day. Total average annual precipitation is 28 inches (NRCS 2007).

3. Hydrology

Hydrologic inputs to the project site are dominated by precipitation and surface runoff. The majority of surface runoff comes to the Project Site via the Half Moon Bay Airport storm water runoff collection system. Within the airport property, runoff is consolidated in a series of channels, culverts, and pipes leading to a pair of concrete culverts (44” diameter) that run southwest under Airport Street. The 44” culverts form the headward-most extent of a stream reach of an unnamed intermittent tributary that bisects the Project Site. This tributary passes through two culverts under West Point Avenue and connects with the tidally influenced Pillar Point Marsh, eventually flowing into Pillar Point Harbor (WSP 2008a).

4. Plant Communities

The Project Site, consisting of two more or less adjacent agricultural fields, currently is under active cultivation. The site is annually plowed, disked, and planted in one or more rotations; therefore, little to no adventive (uncultivated) vegetation persists or has the opportunity to

colonize across the great majority of the Project Site. In those areas where agricultural clearing had not occurred recently (*e.g.*, along Airport Street verge and in very small, scattered patches within agricultural fields), non-native annual grasses and forbs occur. Dominant species along the main verge include wild oats (*Avena* spp.), bristly oxtongue (*Picris echioides*), and common vetch (*Vicia sativa*).

Along the unnamed intermittent tributary that bisects the property and the southern perimeter of the property adjacent to Pillar Point Marsh, riparian (palustrine scrub shrub) and seasonal freshwater wetland plant communities persist (palustrine persistent and non-persistent emergent) (Cowardin *et al.* 1979). Dominant species within the unnamed drainage include willows (*Salix lasiolepis, S. scouleriana, S. sitchensis*), California blackberry (*Rubus ursinus*), and poison hemlock (*Conium maculatum*). Dominant species along the southern edge of the property included slough sedge (*Carex obnupta*), soft rush (*Juncus effusus*), silverweed (*Potentilla anserina* var. *pacifica*), field mint (*Mentha arvensis*), arroyo willow (*Salix lasiolepis*), and California blackberry. Overall, the vegetation on the proposed project site has been significantly altered and reflects a long history of regular disturbance and agricultural cultivation.

5. Protected Species

No rare plants of conservation concern have been observed on the project site (WSP 2008b). Four rare plant species have been documented by the California Natural Diversity Database (CNDDB) within two miles of the Project Site, but they are unlikely to occur on the Project Site due to lack of suitable habitat.

No rare, threatened or endangered animal species have been observed on the Project Site (WSP 2008b). The WSP field team observed 29 wildlife species on the property during a field survey in early Spring 2008. One species on the watch list of the California Department of Fish and Game, the sharp-shinned hawk, was observed flying above the property. Two special status animal species, *Rana aurora draytonii* (California red legged frog) and *Geothlypis trichas sinuosa* (saltmarsh common yellowthroat) have been recorded in the past on adjacent property (CNDDB 2008). The California red legged frog, including one adult and one sub-adult, were observed in a wetland near the Project Site near West Point Road on May 7, 1999 (CNDDB 2008). The saltmarsh common yellowthroat has been observed near the site in the past; specifically, observations of individuals or breeding pairs were recorded in 1985, 1988, 1989, and 1990, but have not been document since then (CNDDB 2008). During the 2008 field effort, the WSP team observed one common yellowthroat perched in willows in the wetlands adjacent to and to the southwest of the Project Site. These protected species are not expected to occur on the Project Site as no suitable breeding or foraging habitat currently exists.

6. Extent of Jurisdictional Waters/Wetlands and their Buffers

Approximately 0.45 acres of wetlands of "other waters" (Type 3 waters of the U.S.), 0.74 acres (32,180 ft^2) of California Coastal Commission waters/wetlands, and 4.26 acres of buffer are delineated at the Big Wave Project Site (WSP 2008a, Figure 3). The great majority of these waters/wetlands are found along the southern margin of the property. The proposed development will avoid all direct impacts to waters/wetlands and the 100 foot buffer set back.

II. OBJECTIVES

WSP Environment & Energy (WSP) was retained by Big Wave LLC to assist in the restoration of the native coastal ecosystems at the Project Site. The purpose of the restoration effort is to increase the functioning of the native coastal ecosystems at the Project Site. Specifically, in this report, WSP was asked to assist with the following tasks:

1. Prepare a restoration plan for riparian waters/wetland ecosystem within the buffer area of the Project Site.
2. Design a natural landscaping plan of native species for the residential and commercial areas.
3. Assist in the design of natural storm water management/rain garden system using native plant species genetically adapted to the central coast of California.

Sections III, IV and V of this report describe designs developed for the riparian buffer restoration, native landscaping, and natural storm water management, respectively.

III. DRAFT (90%) RIVERINE WETLAND ECOSYSTEM DESIGN

A. Guiding Principles

WSP used the following set of principles to guide design of the riverine/riparian waters/wetland ecosystem restoration:

1. Give due diligence to federal, state and local regulatory requirements.
2. Target no net loss of waters/wetlands area and/or ecosystem functioning.
3. Base the restoration design on attainable regional reference conditions.
4. Aim to restore the native hydrological, biogeochemical, plant community, and faunal support/habitat functioning.
5. Target restoration of riverine ecosystem functions (*e.g.*, through maintaining hydrological connectivity within the landscape and restoring microtopography).
6. Integrate the form and function of the natural and the constructed landscapes.

B. U.S. Army Corps and EPA Guidance on Wetlands Compensatory Mitigation

In April 2008, the U.S. Army Corps of Engineers along with the U.S. Environmental Protection Agency issued new standards to improve wetland restoration and protection policies (Federal Register 2008). The new "wetlands compensatory mitigation standards" were offered to promote the use of best available science, promote innovative approaches to the "no net loss of area and/or function" national policy, and to focus on the results of restoration and protection.

Relevant to the Big Wave Wellness Center and Office Park Project, these new Corps/EPA mitigation standards reaffirm the mitigation sequence of avoid, minimize, and mitigate (compensate). The Big Wave Project is avoiding all impacts to existing waters/wetlands (including both waters of the U.S. and Coastal Commission wetlands) and therefore is in line with the new guidance on mitigation sequencing. As described in this basis of design, the proposed restoration of riparian areas adjacent to waters/wetlands will likely result in expansion of at minimum 5.3 acres of state wetlands.

C. General Description and Design Rationale

The riparian waters/wetlands ecosystem buffer design includes ten plant community types that support approximately 75 native California taxa (Figures 4-10). The community types are based upon the U.S. Fish & Wildlife Service's hierachical classification system (Cowardin *et al*. 1979) of five wetland systems – marine, estuarine, riverine, lacustrine, and palustrine. Only wetlands within the palustrine system are appropriate to the Project Site. As such, three palustrine forest communities, two palustrine scrub-shrub communities, three palustrine (persistent) emergent communities are proposed. Additionally, an upland community that supports native coastal scrub species and similarly a plan for the storm water swales also is included.

A total of 54 polygons at the Wellness Center and Office Park (inclusive) will be restored, representing a total 5.3 acres of riparian and waters/wetlands within the buffer and across the built landscape. Specifically, a total of 1.89 acres of palustrine forest, 2.47 acres of palustrine scrub shrub, 0.51 acres of palustrine emergent wetlands will be restored, in addition to 0.26 acres of upland coastal scrub and 0.18 acres of stormwater wetland swales (Figures 4-10).

In the design process of the riparian buffer along the adjacent waters/wetlands of Wellness Center and Office Park, WSP focused on achieving the highest level of ecosystem functioning possible. Design elements relative to ecosystem function were developed based on site history and landscape context and will be monitored over a minimum of ten years post restoration. Importantly, an increased level of function has to be achieved while also achieving a natural, unbroken, visually attractive transition between the restored ecosystem and the residential/commercial landscape. To achieve this target, WSP relied upon:

1. A reference database and draft hydrogeomorphic guidebook for 3rd and 4th order riverine waters/wetlands of the central California coast (NWSTC 1996) developed to assist in the design, permitting and monitoring of riverine restorations within this reference domain (biogeographic province),
2. Relevant literature, reports, flora documentation, and
3. Cumulative 60+ years of professional experience of the lead WSP scientists working in waters/wetlands ecosystems along the central coast of California.

This 90% restoration design is based upon a suite of activities that would increase waters/wetlands ecosystem functions and develop a native, diverse, and aesthetically pleasing landscape. Elements of the restoration design are focused around five phases of work, including earthwork, (mass and fine grading), installation of large wood, planting and irrigation, weed management, and monitoring and adaptive management.

Our rationale for implementation of each technique is described in the following text.

1. Earthwork

Natural transitions within the landscape will need to be restored as a result of historic land uses and the integration of wild and urban environments. Mass grading can restore landscape hydrologic connectivity creating smooth transitions within and between wetland and upland habitat. In addition, mass grading is extremely effective at removing weeds through eliminating standing biomass and elimination of a viable seed bank in the upper soil horizon(s). Earthwork also decreases competition from well-established weeds and, with standard grading techniques such as ripping and/or disking, helps loft soil, blend top and sub-soil horizons, and prepare a successful planting environment.

Fine grading involves the use of directed time to grade microtopographic features within the riverine and riparian environments. Finish grading also involves the placement of large wood structures, and will thus provide an essential element of an ecosystem (detritus). These wood structures will mimic dead and decomposing features of a woody riparian ecosystem, including

snags (standing dead), decadent/decaying logs, and log jam features of floodplains and fluvial systems, as described in the following paragraph.

2. Installation of large wood and log structures

Prior to agriculture, grazing, clearing, industrial uses, and intense water management in California, large wood was a part of natural ecosystems. Log structures can be placed above and/or below ground. Large wood provides numerous ecosystem functions, for example log structures create roughness (*i.e.*, increase Manning's *n*) that slows water flow and spreads it out to promote maximum contact of water with the floodplain surface. Log structures can be strategically placed in order to deflect flood waters away from civil structures including roadways, bridges, *etc*. Large wood creates hydraulic complexity within a reach through dissipation, focusing, and/or adding complexity to the riverine ecosystem and thereby provide habitat for aquatic invertebrates and vertebrates, including fish. Placement of large wood and log structures creates microtopographic variation with abrupt gradients in site water balance which allows for increased plant diversity and variety of habitat microsites.

3. Planting and Irrigation

Planting will be conducted to maintain fidelity to native plant community structure, function, and composition for the Project Site. A native plant nursery will be established on site for the project to provide nursery stock, to hold for planting, and to generate replacement stock should replacement planting become necessary after the project is completed. Collection of seed will be conducted as close to the project site as possible to ensure reestablishment of a suite of locally adapted native plants. An irrigation system will be installed to increase likelihood for planting success. Restoring native plants also will increase the detrital pool (in this case, primarily quickly decomposing carbon sources) that has been removed due to intensive farming. Native plant community restoration improves hydrologic and biogeochemical functioning on the site and provides habitat for native fauna by offering hiding, resting, escape, breeding, and foraging habitats. Establishment of native plants will lead to relative exclusion of non-native and invasive weeds and will provide vertical and horizontal structure within the landscape.

4. Weed Management Strategy

Several aggressive, non-native plant species are present at or near the Project Site, including Himalayan blackberry (*Rubus discolor*) and German ivy (*Delairea odorata*). Invasive weed species not only degrade the plant community functions, but also threaten the success of a restoration project. Therefore, an integrated weed/pest management strategy should be developed and implemented in tandem with the restoration project. The weed management strategy begins with control of existing weeds adjacent to the restoration area through hand pulling, approved localized chemical application, and/or mowing. Installing native plants species with rapid growth rates and/or at high densities will help to quickly develop a canopy which excludes weed recruitment. Continued maintenance including hand weeding and replanting of plants which suffer mortality should be conducted following restoration.

5. Maintenance, Monitoring and Adaptive Management

To ensure that restoration is a success and that appropriate adaptive management/contingency measures are used, the Project Site will be monitored following restoration for a minimum of 5 years. Project targets and standards articulated in the monitoring plan will be established at the beginning of the restoration project and based on the assessment of the path that will achieve stated goals. The monitoring design will include methods to quantify and document each project target and standard and will identify criteria for success. Monitoring protocols will include some combination of photo points, topographic surveys, soil profiles, invertebrate surveys, and/or assessment of vegetation cover and composition. In case project standards and/or success criteria are not met, an adaptive management strategy with contingency measures will be included as part of the monitoring plan. In the event of failure to achieve a project standard, recommended contingency measure(s) will be outlined (*e.g.*, weeding, grading, planting) and implemented as soon as possible.

D. Construction Sequencing

The various tasks associated with the Project Site restoration plan are described in general terms in the following text, which will be used to guide the development of construction plans and specifications.

1. Earthwork (mass and finish grading)

a) Grade to create a smooth transition to the surrounding landscape
b) Grade surrounding landscape to increase rugosity in the surrounding landscape. Rugosity is a measure of small-scale variations and complexity or surface roughness. Increased rugosity offers a relatively more diverse array of sites for planting.
c) Using directed time, construct and link microtopographic depressions and small scale swales, rain gardens, and storm water features.

2. Log Structures

Large wood on and within the active channel and on the adjacent floodplain and associated stream terraces is an integral structural variable of fluvial systems, and an equally important link for plant and animal support ecosystem functions. As such, large wood structures will be constructed across the wetland/riparian buffer.

a) Using directed time, install large wood structures as articulated in the planting plan and other construction documents. These structures shall consist of single logs or piles of log on and beneath final grade (Figure 11).

3. Planting and Irrigation

a) Through mass grading remove all existing weeds and where possible, seed source in the upper 6 inches of soil.
b) Lay out (*i.e.*, stake) planting plan as designed (see Figure 4, 5, 8-10)

c) Install native nursery stock according to planting plan using a suite of plant community types suited to microsite conditions and with fidelity to reference system conditions (Figure 6).
d) Mulch entire planted and seeded areas with minimum 4" lift of sterile (weed-free) straw
e) Install temporary irrigation system. Following grading activities, install a temporary irrigation system to provide irrigation water to all planted areas across the wetland and riparian buffer. A temporary irrigation plan will be designed prior to project implementation.

4. Weed Control

After initial establishment of restored riparian/wetland ecosystem area and functioning, management of weeds/invasive species will become a high priority. Implementation of weed management must address (i) re-emergence of weeds from onsite seed banks, (ii) establishment of existing populations of weeds that were not removed in the initial clearing effort, and (iii) colonization of restored area from offsite exotic seeds sources. Weed control efforts should be adapted with an integrated program which includes mowing, hand weeding, and re-planting or interplanting additional plants as necessary. Weed control will be required as part of the monitoring, maintenance and adaptive management activities.

5. Monitoring Maintenance and Adaptive Management

a) Assume a ten year monitoring interval with monitoring reports completed at Year 0 (baseline), 1, 2, 5, and 10.
b) Conduct two site visits per monitoring year, wet and dry season. During each visit, characterize the site through the collection of site data referencing project standards including hydrologic, biogeochemical, plant community and faunal support/habitat functions.
c) Prepare annual monitoring report due by December 15 each monitoring year. Based on observations, recommend any necessary maintenance and/or adaptive management measures.
d) Implement maintenance and adaptive management measures, including weeding, as necessary.

E. Sediment and Erosion Control

Restoration construction should be initiated and completed during the dry season (May to November). All construction activities must adhere to the project-specific Storm Water Pollution and Prevention Plan (SWPPP) and associated Temporary Erosion and Sediment Control (TESC) plan, both of which must be prepared and submitted by the Big Wave LLC or its consultants to the regulatory community prior to project implementation.

The first step will be to install sediment and erosion control measures according to the SWPPP and TESC. Upon completion of earthwork and log structure installation (*e.g.*, creating

microdepressions, creating windthrow mounds, installing log jams, *etc*.), temporary irrigation must be installed to ensure successful post-construction planting. In addition, Big Wave Group or its consultants may be required to prepare and submit a water quality monitoring plan to regulatory agencies, as part of the monitoring agreement with regulatory agencies.

F. Proposed Design Success Criteria

Specific project standards and associated success criteria (*i.e*., field indicators/measurements) have been developed for this riparian/wetland ecosystem restoration project. The proposed restoration design places emphasis on the following four project targets.

Project Target 1: ***Increase waters/wetlands habitat patch size for native wetland and riparian animal species typical of the central California coast.***

Project Standard: Success Criteria

1. Increase Patch Size: One hundred percent coverage by native plant communities in the 100 foot buffer.

Project Target 2: ***Establish and maintain diverse native plant communities, with nursery stock genetically adapted to the restored wetland and riparian ecosystem restoration project site.***

Project Standard: Success Criteria

1. Percent cover of native tree species in riparian forest communities: Greater than or equal to 95%.
2. Percent cover of native shrub species in riparian forest and scrub-shrub communities: Greater than or equal to 40% and less than or equal to 75%.
3. Percent cover of native shrub species in riparian scrub-shrub communities: Greater than or equal to 95%.
4. Percent cover of native forbs, graminoids, ferns, and fern allies in palustrine persistent and non-persistent emergent community types: Greater than or equal to 80%.
5. Percent cover of native forbs, graminoids, ferns, and fern allies in forest and scrub shrub communities: Greater than or equal to 20% and less than or equal to 75%.
6. Percent of native species cover in each stratum: Greater than or equal to 85%.
7. Vigor of planted stock: Greater than or equal to 80% survival.

Project Target 3: ***Increase microtopographic complexity (i.e., microdepressions, windthrow mounds) within the restored riparian and waters/wetlands ecosystem restoration project site***

Project Standard: Success Criteria

1. Structural features: Large wood (windthrow mounds) remain structurally stable.
2. Microtopographic roughness: Constructed microtopotraphic features remain intact.

Project Target 4: ***Increase the faunal support/habitat function for native species within the restored riparian and waters/wetlands ecosystem restoration project site***

Project Standard: Success Criteria

1. *Vegetative strata*: Forest communities- three or more strata (*i.e*., trees, shrubs, herbs, with sapling/seedling and/or vines as additional stratum); Scrub-shrub communities - greater than or equal to two strata (*i.e*., shrubs, herbs, with sapling/seedling and/or vines as additional stratum)
2. *Faunal diversity*: Restoration site continues to attract a diversity of native wildlife
3. *Canopy cover*: Greater than 80% cover by two or three strata in forest and scrub-shrub communities.

G. Expected Changes in Ecosystem Functions Following Restoration

The proposed riparian/wetland ecosystem restoration plan is expected to result in the increase in ecosystem functioning as considered by four types of wetland functions: (1) hydrologic, (2) biogeochemical, (3) plant community, and (4) faunal support/habitat functions. Comparisons between current (existing) conditions on the site and wetland conditions expected five years after restoration were assessed using best professional judgment. It should be noted that the riparian restoration will result in an increase of approximately 5.3 acres of wetlands under jurisdiction of the California Coastal Commission, but is not expected to add any increase in federal jurisdiction.

Factors affecting the ability of the wetlands at the Project Site to perform ecosystem functions include, but are not limited to (1) degradation from historical land use, (2) intensity of cropping practices, (3) historic modifications to hydrologic features of the site, (4) non-native species, and (5) urbanization in surrounding landscape.

1. Hydrologic Functions

Energy Dissipation. Energy dissipation is defined as *the transformation and/or reduction of the kinetic energy of water as a function of the roughness of the landscape and channel morphology, and vegetation.*

Existing conditions at the Project Site do not allow for significant energy dissipation because the site is cleared and farmed. However, installation of large wood, establishment of complex microtopography, and a diverse plant community including trees will promote an increase in this function.

Surface & Subsurface Storage of Water. Surface & Subsurface Storage of Water is defined as *the presence of soil and/or geologic materials within the creek ecosystem, including the hyporheic zone, that have physical characteristics suitable for detention, retention, and transmission of water.*

The Project Site currently is leveled and degraded by agricultural activities. However, this wetland function is recoverable with the proposed restoration through establishment of sinuous storm water swales hydrologically linked to microtopographic depressions, installation of large wood above and below ground, and development of a native plant community with complex vertical structure.

Landscape Hydrologic Connections. Landscape Hydrologic Connections is defined as *the maintenance of the natural hydraulic connectivity among source areas of surface and subsurface flow to riverine waters/wetlands and other downgradient waters/wetlands.*

This hydrologic function at the Project Site is degraded due to ditching associated with road construction both upstream and downstream and the agricultural activities on the property. The down gradient connection is culverted under and interrupted by West Point Avenue. This function is only modestly recoverable with the proposed wetland and riparian ecosystem restoration.

2. Biogeochemical Functions

Cycling of Elements & Compounds. Cycling of Elements & Compounds is defined as *the short- and long-term transformation of elements and compounds through abiotic and biotic processes that convert chemical species (e.g., nutrients and metals) from one form, or valence, to another.*

The Project Site is not functioning at a high level in its existing conditions because the original slope wetlands and associated hyporheic zone have been filled, drained, and degraded by agricultural activities. However, this function is recoverable with the proposed restoration due to increased microtopographic variation, installation of large wood, and establishment of a diverse native plant community.

Removal of Imported Elements & Compounds. Removal of Imported Elements & Compounds is defined as *the removal of imported nutrients, contaminants, and other elements and compounds in surface and groundwater.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled and degraded as a result of agriculture and road building activities. This function is recoverable with the proposed restoration.

Retention and Detention of Particulates. Retention and Detention of Particulates is defined as *the deposition and retention of inorganic and organic particulates (>0.45μm) from the water column, primarily through physical processes.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration.

Organic Matter Export. Organic Matter Export is defined as *the export of dissolved and particulate organic carbon from a wetland.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled and degraded as a result of agriculture and road building activities. This function is recoverable with the proposed restoration.

3. Plant Functions

Characteristic Native Plant Communities. Characteristic Plant Communities is defined as *the physical characteristics and ecological processes that maintain the indigenous living plant biomass*.

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration. The Project Site should be expected to achieve a reference condition after a period of time that exceeds the expected five-year monitoring program.

Characteristic Detrital Biomass. Characteristic Detrital Biomass is defined as *the process of production, accumulation, and dispersal of dead plant biomass of all sizes.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration and will likely achieve reference standard functioning after ten years or more, i.e., after the conclusion of the anticipated five-year monitoring program.

4. Faunal Support Habitat Functions

Spatial Structure of Habitat. Spatial Structure of Habitat is defined as *the capacity of waters/ wetlands to support animal populations and guilds through the heterogeneity of structure of vegetative communities.*

The Project Site currently is functioning at a low level because the original riparian zone has been leveled, degraded, and invaded by a large number of non-native species as a result of agriculture and road building activities. This function is recoverable with the proposed restoration and will likely achieve reference standard functioning after ten years or more, *i.e.*, after the conclusion of the anticipated five-year monitoring program.

Habitat Interspersion & Connectivity. Habitat Interspersion & Connectivity is defined as *the capacity of waters/wetlands to permit aquatic, semi-aquatic, and terrestrial organisms to enter and leave a riverine ecosystem via large, contiguous plant communities to meet life history requirements.*

The Project Site currently is functioning at a low level because the original characteristic physical complexity of an associated riparian community is not present nor is it juxtaposed in a mosaic of coastal scrub, sage scrub, perennial grasslands, vernal swales, and depressions characteristic of the central Coast Ranges. This function is recoverable with the proposed restoration, and possible reference standard functioning after ten years or more, largely through the restoration of the riverine vegetative structure and adjacent plant communities.

Distribution & Abundance of Vertebrates. Distribution & Abundance of Vertebrates is defined as *the capacity of waters/wetlands to maintain characteristic density and spatial distribution of vertebrates (aquatic, semi-aquatic and terrestrial).*

The Project Site currently is functioning at a low level because the original characteristic physical complexity of an associated riparian community is not present nor is it juxtaposed in a mosaic of perennial grasslands, vernal swales and depressions characteristic of the central Coast Ranges. This function is recoverable with the proposed restoration, and possible reference standard functioning after ten years or more, largely through the restoration of the wetland and riparian vegetative structure and adjacent plant communities.

Distribution & Abundance of Invertebrates. Distribution & Abundance of Invertebrates is defined as *the capacity of waters/ wetlands to maintain the density and spatial distribution of invertebrates (aquatic, semi-aquatic and terrestrial).*

The Project Site currently is functioning at a low level because the original characteristic physical complexity of an associated riparian community is not present nor is it juxtaposed in a mosaic of coastal scrub, sage scrub, perennial grasslands, vernal swales and depressions characteristic of the central Coast Ranges. This function is recoverable with the proposed restoration, and possible reference standard functioning after ten years or more, largely through the restoration of the wetland and riparian vegetative structure and adjacent plant communities.

VII. BEST MANAGEMENT PRACTICES FOR STORMWATER TREATMENT

San Mateo County (County) has established best management procedures for the treatment of storm water because federal and state laws require municipalities to reduce pollution to waters of the United States by storm waters. According to the San Mateo County's website (http://www.flowstobay.org/p2business/bestmanagementpractices.html), cities within the County are governed under the *San Mateo Countywide Water Pollution Prevent Program* as part of the City/County Associate of Governments of San Mateo County. As such, the County has published procedures, guidelines, *etc*. to reduce and prevent pollution to the adjacent waters. The storm water treatment system proposed for the Big Wave Project incorporates the County's overall approach and practices for storm water management.

Design features for storm water pollution prevention by the Project include separate storm water retention and detention ponds for relatively dirty storm water (*e.g.*, water from parking lots) and relatively clean water (*e.g.*, roof water runoff). Separate water delivery systems for clean and dirty storm water will be constructed at each of the developments (*i.e.*, office park and wellness center). Comparatively dirty storm water will be filtered through a series of grit removal, oil/water separators, and then directed to a retention/detention "rain gardens" (Figures 8 and 9) within the riparian restoration zone. Stormwater will flow through a swale prior to overland flow into the existing wetlands. Similarly, clean storm water will be directed to a separate series of retention/detention microdepressions (rain gardens) via a similar storm water swales (Figure 10). A portion of the clean storm water will be directed to an infiltration basin (one at each development) to recharge ground water. In short, the bioswale/microdepression system will serve to improve water quality in the adjacent existing waters/wetlands ecosystems by treating storm water in a series of treatments as described above.

VIII. CONCLUSIONS

As presented in this *90% Design Report*, the Big Wave Wellness Center and Office Park Project consists of the construction of a residential village and an adjacent commercial property/office park complex. The proposed wetland and riparian ecosystem restoration project also includes restoration of the waters of the U.S., including wetlands, California Coastal Commission wetlands that currently exist as agricultural land. Specifically the Project will restore a complex mosaic within a 100 ft buffer adjacent to existing federal and state waters/wetlands to provide significant benefits to waters/wetlands ecosystem functions, particularly the native plant and animal communities relative to existing conditions. A total of ten plant community types, primarily native forest, scrub shrub, and perennial sedge/rush meadows, composed over approximately 75 native plant species arrayed in 54 planting polygons represent the riparian/wetland ecosystem restoration design. Of particular importance is the restoration of potential breeding habitat for the California red-legged frog, and potential foraging habitat for the San Francisco garter snake, two native vertebrates not known to utilize the Project Site, but which may be able to establish viable populations as a result of the restoration effort.

If implemented as designed, the riparian/wetland ecosystem will result an increase in the hydrologic, biogeochemical, native plant community, and faunal support/habitat functions of the currently farmed wetlands. Equally importantly, the project represents a state-of-the art integration of the natural and built environments through the restoration of the immediate landscape immediately surrounding the Office Park and Wellness Center, and through the utilization of native species for landscaping, locally adapted plant stock, and propagules obtained from the Project Site and adjacent landscape.

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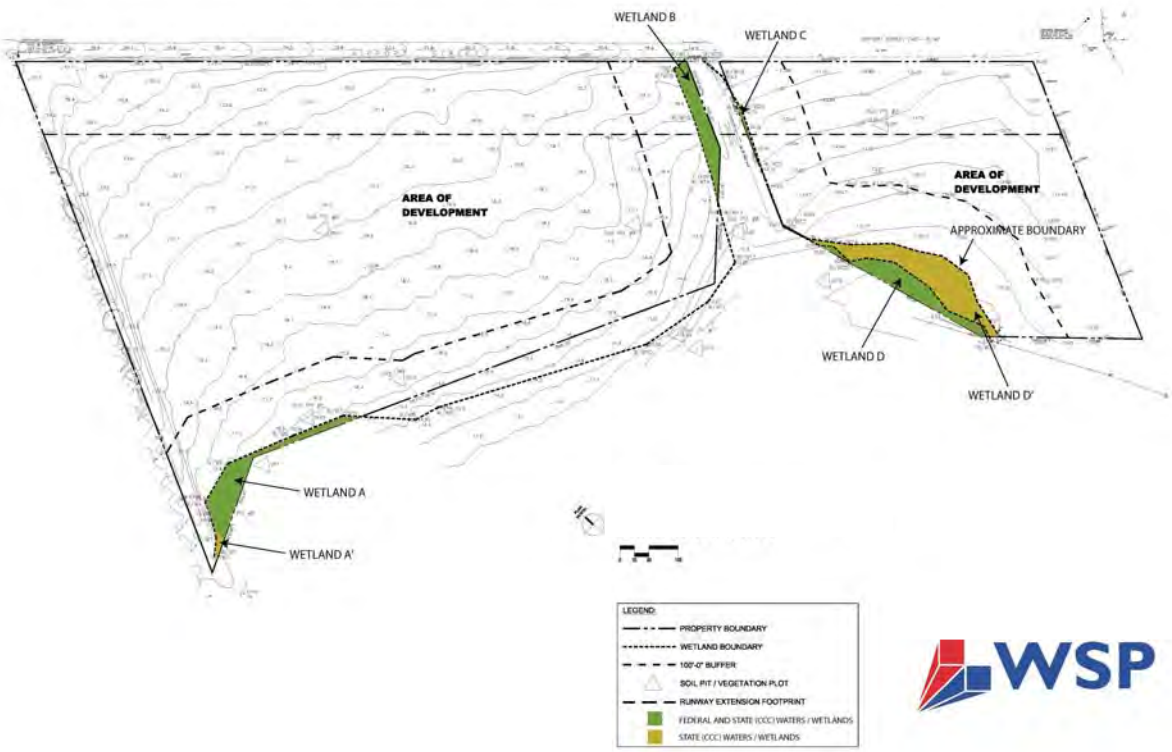
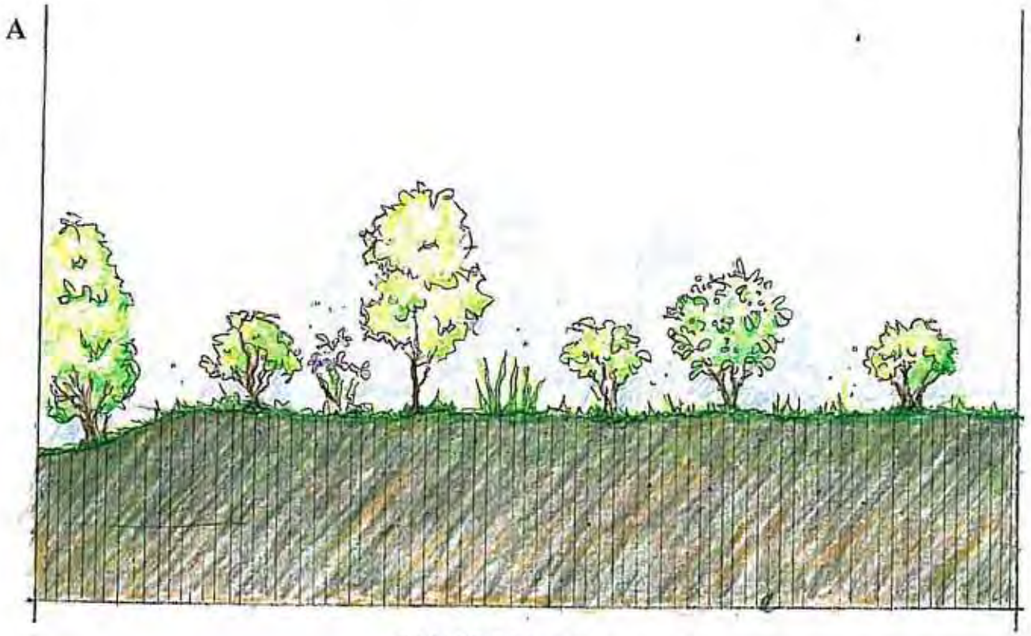
X. FIGURES

Figure 1. The Project Site is located along the central coast of California south of San Francisco and east of the city of Santa Cruz (Map Reference: http://cwp.resources.ca.gov)

Figure 2. Approximate location of the Big Wave Project Site in unincorporated San Mateo County, California.

Figure 3. Geographic extent of waters of the U.S., including wetlands consistent with definitions provided at 33 CFR 328.3(a)(1-8), and of wetlands as defined by the California Coastal Act (Public Resources Code Division 20 California Coastal Act Section 30121).





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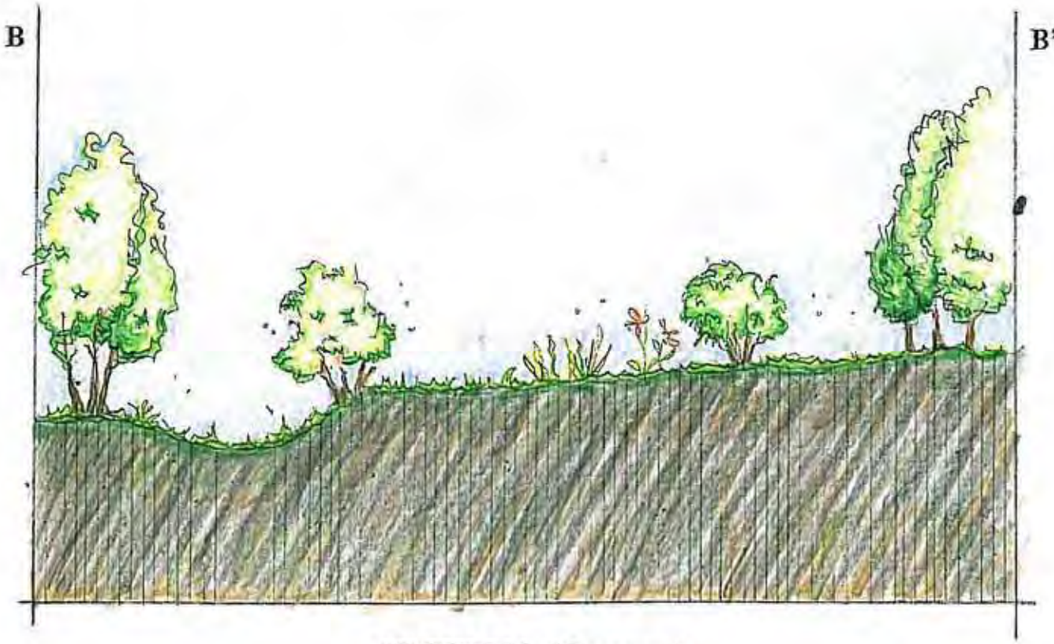

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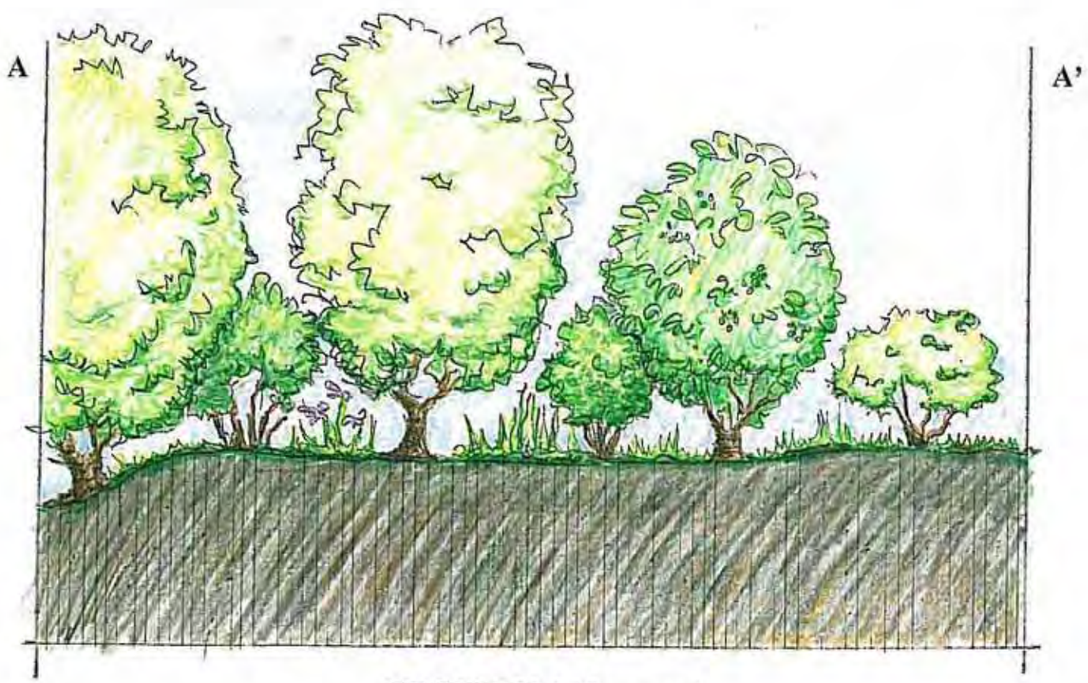

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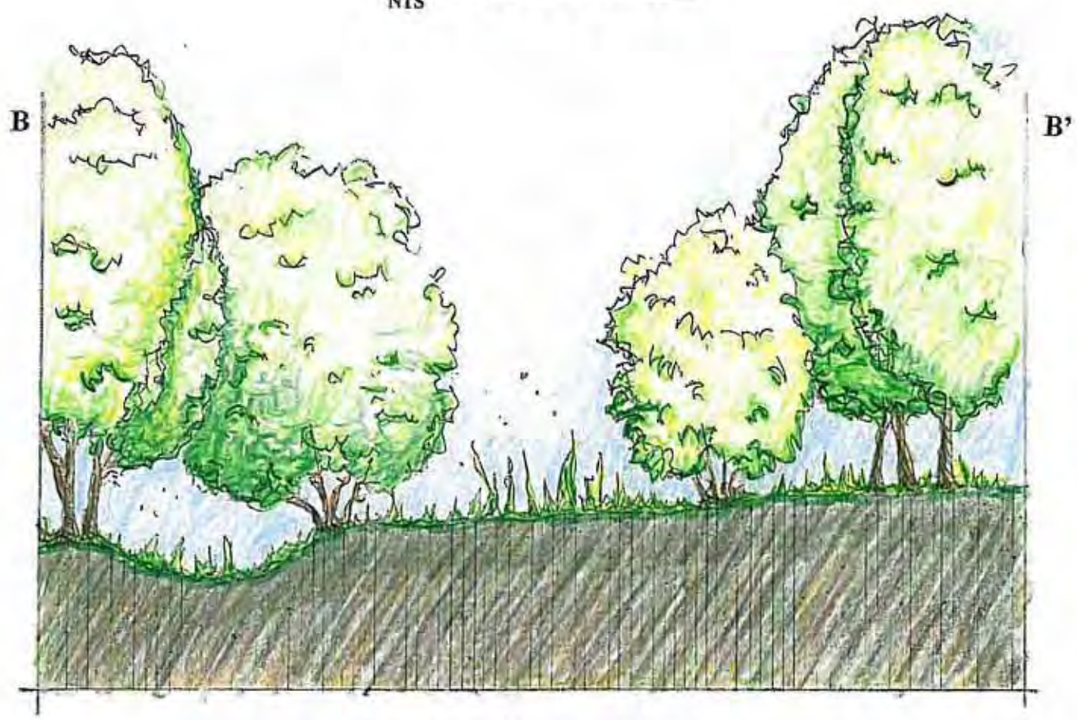

SECTION (10 years)
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BIG WAVE

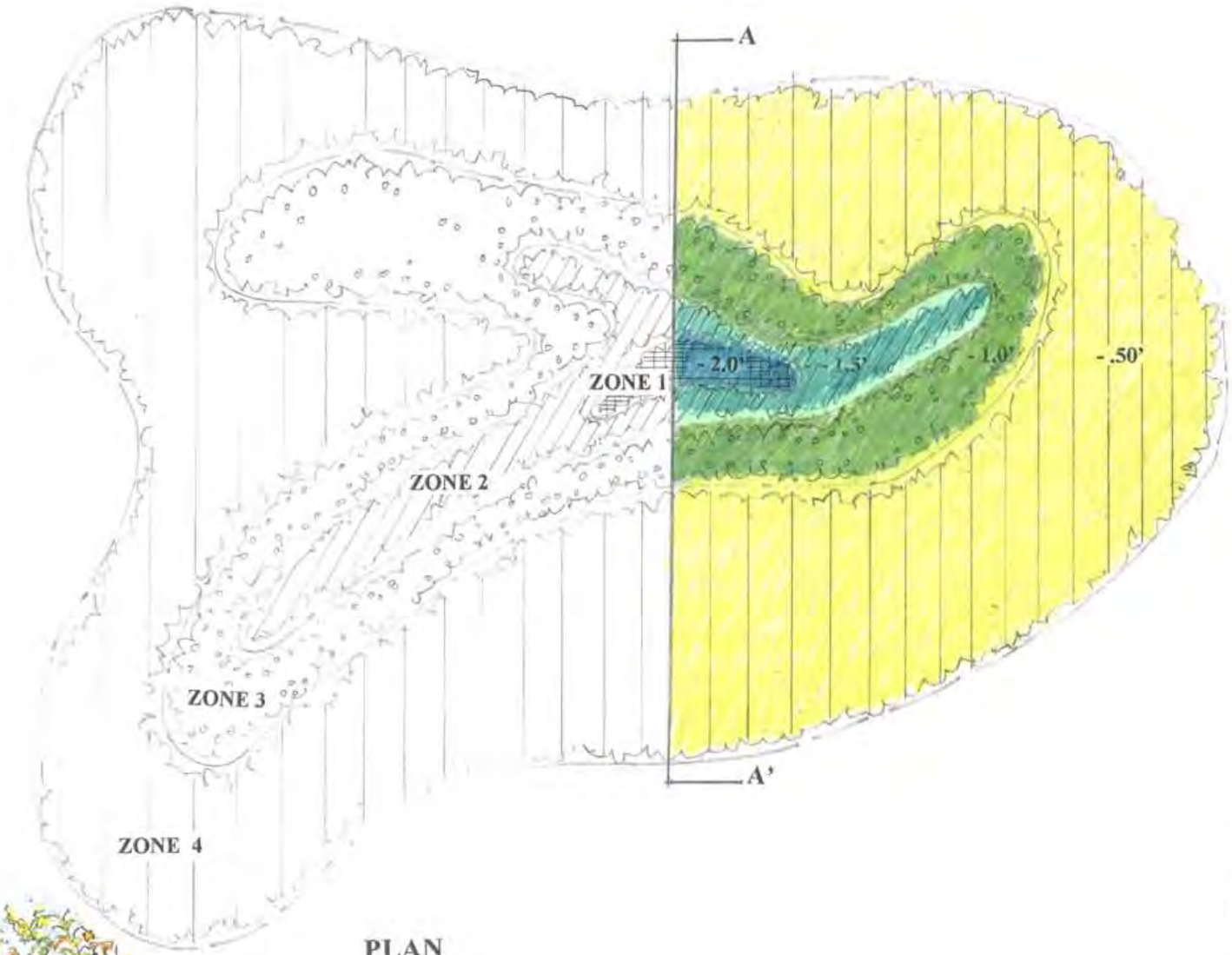
PROJECT TITLE:
Big Wave

SHEET TITLE:
Buffer Restoration:
Wellness Center Section

REVISIONS:

Date:
Designer:
Drawn By: FMD
Checked:
Scale:

SHEET:
FIGURE 7



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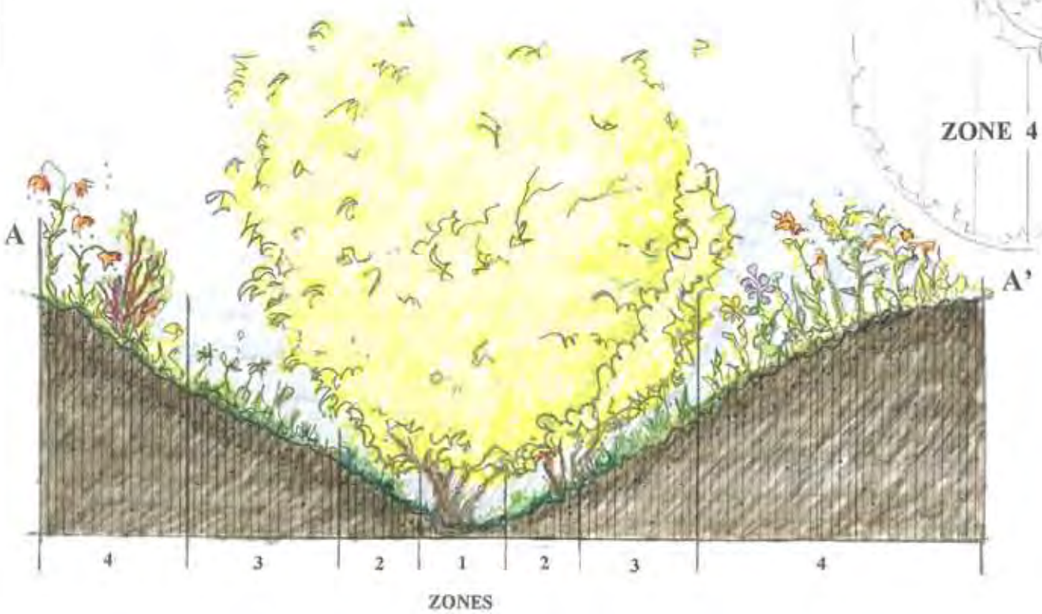
NTS



SECTION
NTS

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BIG WAVE

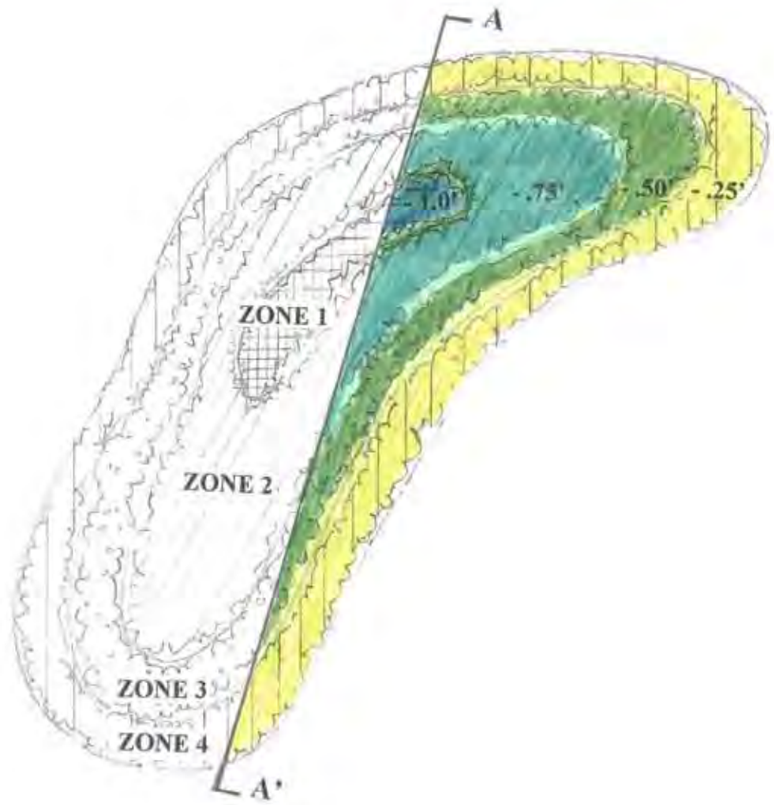
PROJECT TITLE:
Big Wave Office Park

SHEET TITLE:
Stormwater R/D Basin- Large

REVISIONS:
3 / 18 / 08

Date: 3 / 14 / 08
Designer:
Drawn By: FMD
Checked:

SHEET:
FIGURE 8



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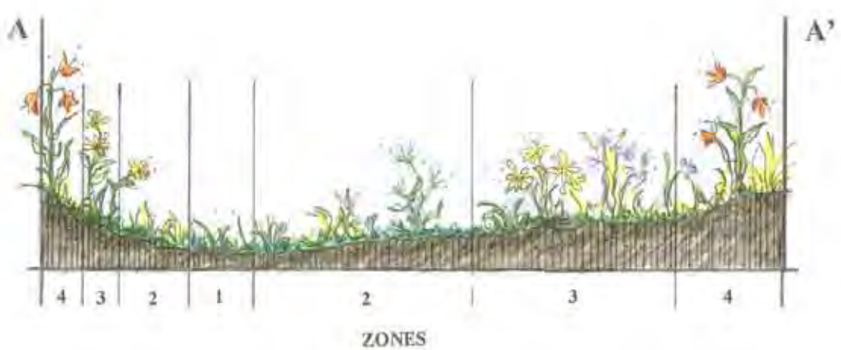

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BIG WAVE

PROJECT TITLE:
Big Wave Office Park

SHEET TITLE:
Stormwater R/D Basin- Small

REVISIONS: 3 / 18 / 08

Date: 3 / 14 / 08
Designer:
Drawn By: FMD
Checked:

SHEET:
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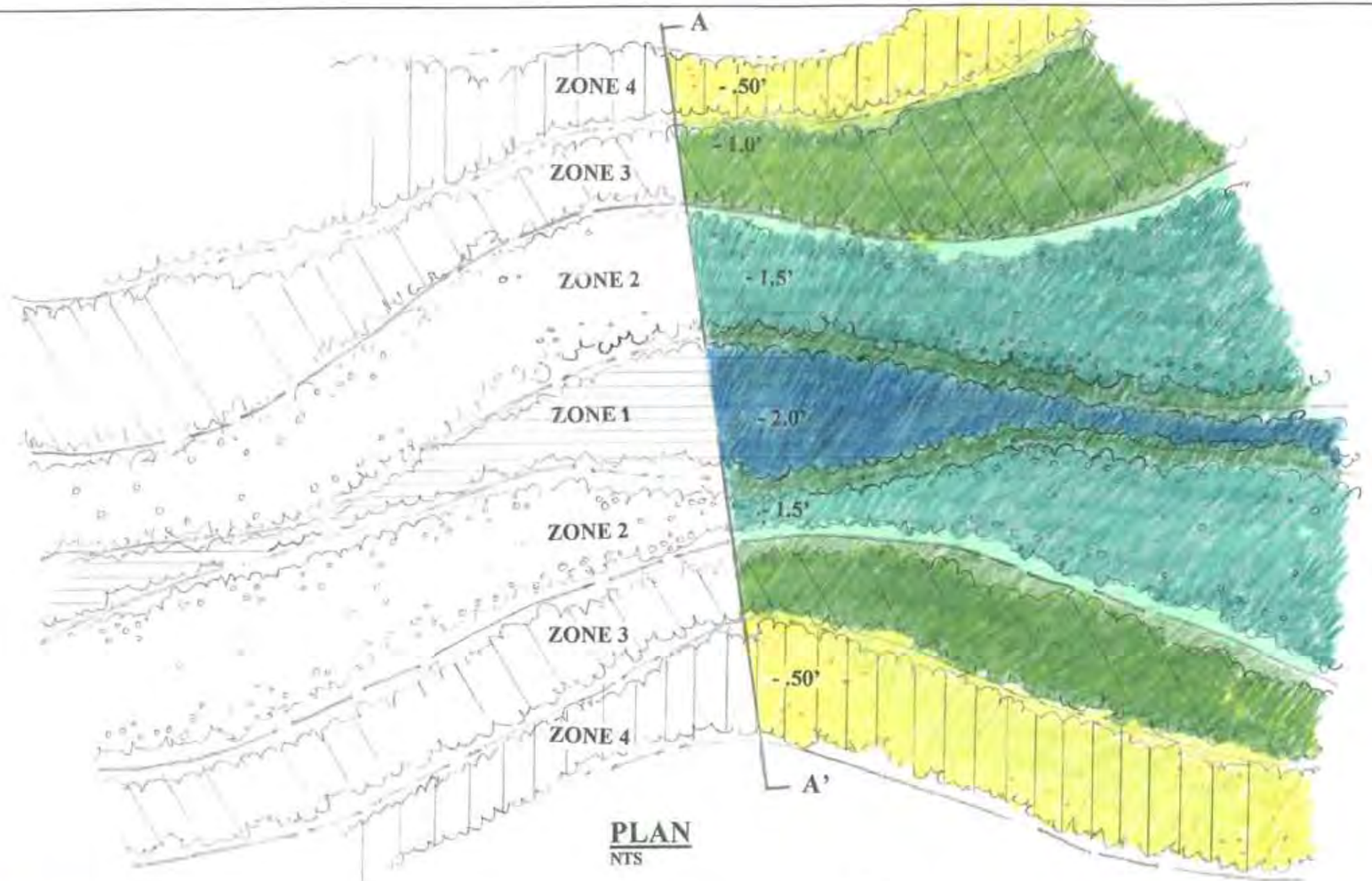

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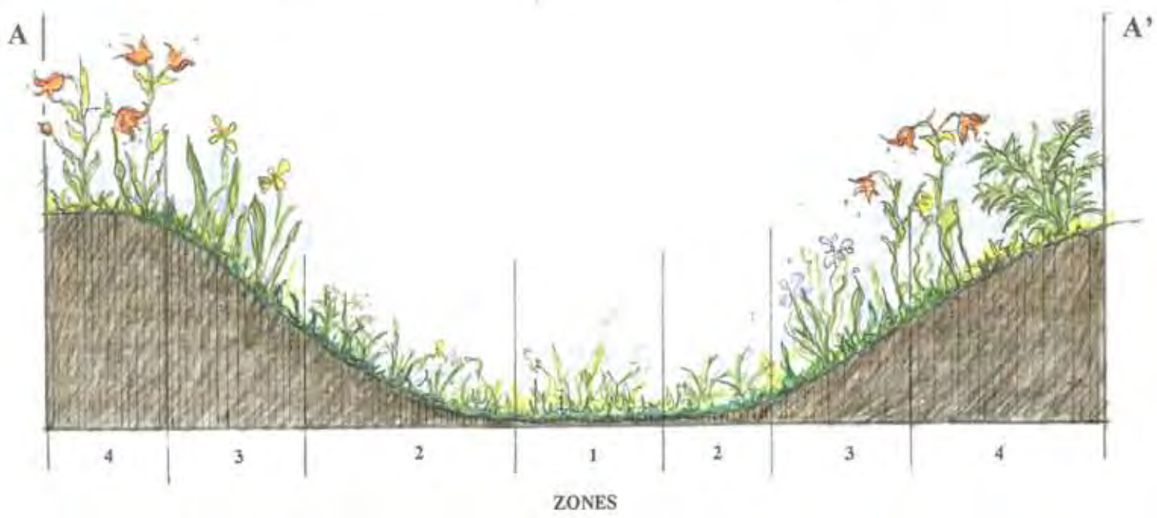

SECTION
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PROJECT TITLE:
Big Wave Office Park

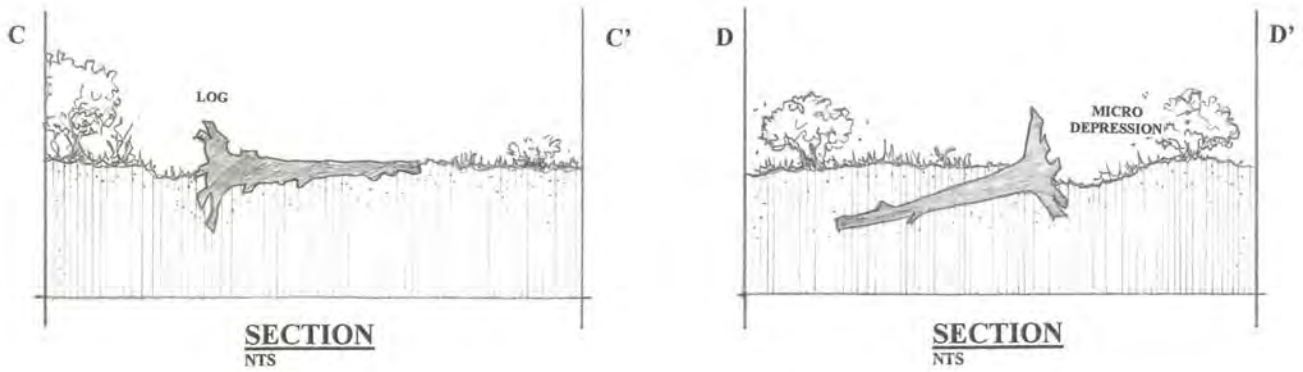
SHEET TITLE:
Stormwater Swales

REVISIONS:
3 / 18 / 08

Date:
Designer:
Drawn By: FMD
Checked:

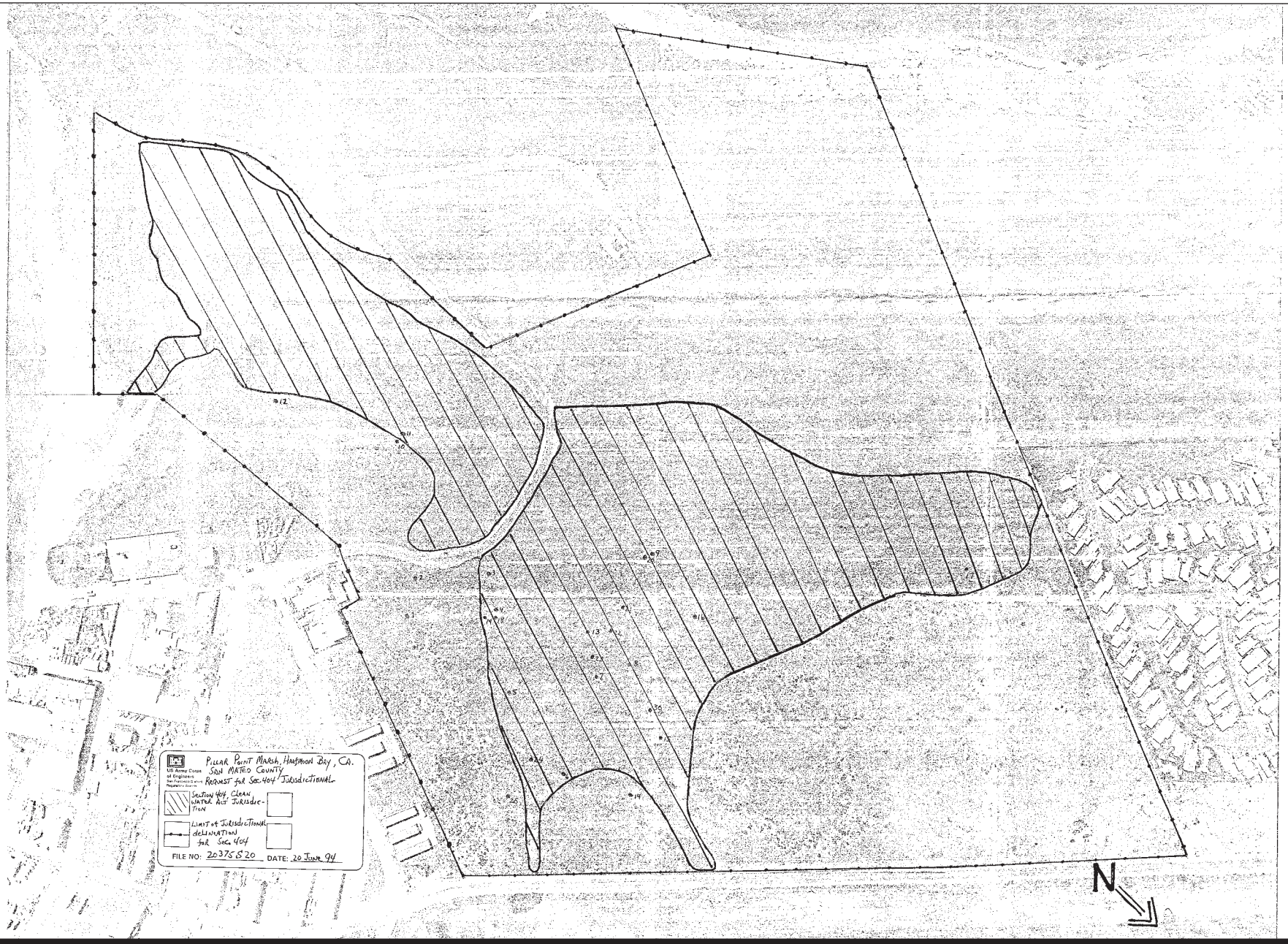
SHEET:
FIGURE 10

Figure 11. Typicals for installation of above and below ground wood.



Addition to Appendix E of DEIR:

2) Army Corps of Engineers (ACOE) map is titled “Pillar Point Marsh, Half Moon Bay, CA., San Mateo County, Request for Sec. 404 Jurisdictional (File No. 20375S20),” dated June 20, 1994.



San Mateo County - Big Wave Final EIR

FIGURE: C

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Addition to Appendix J of DEIR:

Big Wave Office Park and Wellness Center Traffic Report, prepared by Hexagon Transportation Consultants, Inc. (Hexagon), June 24, 2009.

Big Wave Office Park and Wellness Center

Traffic Report

Prepared for:

Christopher A. Joseph and Associates

Prepared by:

Hexagon Transportation Consultants, Inc.

Updated June 24, 2009

06GB56

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Executive Summary

This report presents the results of the traffic impact analysis conducted for the Big Wave Office Park and Wellness Center. The project site is located on Airport Street, north of the Princeton/Pillar Point Harbor area in unincorporated San Mateo County. The project includes a Wellness Center with the following components:

- 43 one-bedroom units for developmentally disabled adults
- 7 two-bedroom units for developmentally disabled adults
- 5 breezeway units with 4 bedrooms each which can house up to 20 residents/staff aides
- 20,000 s.f. of storage space
- 5,326 s.f. of community center (Pool/Fitness Center)

In addition to the Wellness Center, the proposed project would include 90,000 s.f. of general office, 56,250 s.f. of research and development, 33,750 s.f. of storage and 45,000 s.f. of light manufacturing. The project would have five full-access driveways on Airport Street. Parking for the project would be provided on site. Currently the site is vacant.

The potential impacts of the project were evaluated in accordance with the standards set forth by the County of San Mateo. The study included an analysis of AM and PM peak-hour traffic conditions at one signalized intersection and seven unsignalized intersections.

Project Trip Generation

Application of ITE standard trip generation rates to the proposed development shows that the project is estimated to generate 2,123 daily trips, including 292 trips (243 inbound and 49 outbound) during the AM peak hour, and 268 trips (63 inbound and 206 outbound) during the PM peak hour.

Project Traffic Impacts and Mitigation Measures

The analysis showed that the project would not cause any significant impacts, either alone or cumulatively, on traffic conditions at the signalized and unsignalized study intersections. The intersection level of service results are summarized in Table ES-1.

Recommended Improvements

The following measure is recommended in conjunction with the proposed project:

Highway 1 at Cypress Avenue. Based on project and cumulative with and without project conditions, the peak hour signal warrant is met at the intersection of Highway 1 at Cypress Avenue. With this improvement, the Highway 1/Cypress Avenue intersection would operate at LOS A during both the AM and PM peak hours. Under signalized conditions, the existing roadway geometry would be adequate to handle the anticipated traffic demand.

Site Access and Circulation

The site review is based on the site plan dated 2008 by Macleod and Associates. The site access was evaluated in accordance with generally accepted traffic engineering standards. Access to the site would be provided by five two-way driveways on Airport Street – two driveways to access the Wellness Center (the southern portion of the project site) and three to the Office Park site (the larger portion of the project site located to the north). Two of the Office Park driveways have an island separating ingress and egress. Any landscaping and signage should be located in such a way as to ensure an unobstructed view for drivers exiting the site.

On-Site Circulation

The onsite circulation was reviewed in accordance with generally accepted traffic engineering standards. Generally, the proposed plan would provide adequate connectivity through the parking areas for vehicles. The drive aisles proposed are approximately 24 feet in width. This aisle dimension is satisfactory for two-way vehicle flow with 90-degree parking. There are no proposed dead-end aisles.

Table ES 1
Intersection Level of Service Summary

# Intersection	Peak Hour	Existing				Background				Project				Cumulative w/o Project				Cumulative w/ Project			
		Average		Worst		Average		Worst		Average		Worst		Average		Worst		Average		Worst	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1 Prospect & Capistrano	AM	7.0	A	9.1	A	6.9	A	9.1	A	7.4	A	9.4	A	7.1	A	9.3	A	7.5	A	9.6	A
	PM	7.4	A	10.1	B	7.3	A	10.3	B	8.1	A	11.0	B	7.7	A	11.1	B	8.5	A	11.9	B
2 Broadway & Prospect	AM	8.1	A	9.5	A	8.1	A	9.6	A	10.1	A	11.8	B	8.3	A	9.9	A	10.7	A	12.8	B
	PM	8.2	A	10.1	B	8.3	A	10.3	B	10.9	A	13.8	B	8.6	A	11.0	B	12.1	A	16.0	C
3 Airport & Stanford/Cornell	AM	2.0	A	9.6	A	2.1	A	9.5	A	5.1	A	10.7	B	2.1	A	9.7	A	4.8	A	11.0	B
	PM	2.6	A	9.7	A	2.6	A	11.5	B	4.7	A	11.9	B	2.7	A	10.0	A	4.6	A	11.9	B
4 Airport & La Granada	AM	6.8	A	9.1	A	6.6	A	9.1	A	4.6	A	9.9	A	6.7	A	9.3	A	5.0	A	10.2	B
	PM	5.1	A	9.5	A	5.0	A	9.5	A	3.7	A	10.0	B	5.1	A	9.9	A	4.0	A	10.4	B
5 Airport & Los Banos	AM	3.0	A	8.9	A	3.1	A	8.9	A	2.2	A	8.9	A	3.1	A	9.0	A	2.4	A	9.6	A
	PM	1.5	A	9.2	A	1.6	A	9.2	A	1.4	A	9.7	A	1.7	A	9.4	A	1.5	A	9.9	A
6 Hwy 1 & Cypress	AM	2.1	A	22.4	C	2.1	A	22.4	C	3.1	A	28.7	D	3.1	A	34.6	D	5.1	A	52.7	F
	PM	2.0	A	26.3	D	2.0	A	26.3	D	6.9	A	59.8	F	3.2	A	46.0	E	18.2	C	177.7	F
7 Hwy 1 & Capistrano (South)*	AM	24.0	C	-	-	25.4	C	-	-	26.1	C	-	-	26.0	C	-	-	26.9	C	-	-
	PM	23.0	C	-	-	24.9	C	-	-	25.4	C	-	-	25.5	C	-	-	26.3	C	-	-
8 Hwy 1 & Capistrano (North)	AM	0.2	A	13.5	B	0.2	A	15.1	C	0.2	A	15.1	C	0.2	A	17.3	C	0.2	A	17.3	C
	PM	0.4	A	16.3	C	0.6	A	18.5	C	0.6	A	18.5	C	0.7	A	23.2	C	0.7	A	23.2	C

*Signalized Intersection

1. Introduction

This report presents the results of the traffic impact analysis conducted for the Big Wave Office Park and Wellness Center. The project site is located on Airport Street, north of the Princeton/Pillar Point Harbor area in unincorporated San Mateo County. The project includes a Wellness Center with the following components:

- 43 one-bedroom units for developmentally disabled adults
- 7 two-bedroom units for developmentally disabled adults
- 5 breezeway units with 4 bedrooms each which can house up to 20 residents/staff aides
- 20,000 s.f. of storage space
- 5,326 s.f. of community center (Pool/Fitness Center)

In addition to the Wellness Center, the proposed project would include 90,000 s.f. of general office, 56,250 s.f. of research and development, 33,750 s.f. of storage and 45,000 s.f. of light manufacturing. The project would have five full-access driveways on Airport Street. Parking for the project would be provided on site. Currently the site is vacant. The project site and the surrounding study area are shown on Figure 1. The project site plan is shown on Figure 2.

Scope of Study

This study was conducted for the purpose of identifying the potential traffic impacts related to the proposed development. The impacts of the project were evaluated following the standards and methodologies set forth by the County of San Mateo.

The traffic analysis is based on peak-hour levels of service for 1 signalized and 7 unsignalized intersections. The study intersections are identified below.

Study Intersections

Prospect Way and Capistrano Road
Broadway Avenue and Prospect Way
Airport Street and Stanford/Cornell Avenue
Airport Street and La Granada Avenue
Airport Street and Los Banos Avenue
State Route 1 (Cabrillo Highway) and Cypress Avenue
State Route 1 and Capistrano Road (South)*
State Route 1 and Capistrano Road (North)

*signalized intersection

Traffic conditions at the intersections were analyzed for the weekday AM and PM peak hours of traffic. Locally, the AM peak hour of traffic is usually between 7:00 and 9:00 AM. The PM peak hour is typically between 4:00 and 6:00 PM. It is during these periods that the most congested traffic conditions occur on an average day.

Traffic conditions were evaluated for the following scenarios:

Scenario 1: *Existing Conditions.* Existing conditions are represented by existing traffic volumes on the existing roadway network. Existing traffic volumes were obtained from recent traffic counts.

Scenario 2: *Background Conditions.* Background traffic conditions are represented by background traffic volumes on the existing roadway network. Background traffic volumes were estimated by adding to existing traffic counts the additional traffic generated by approved developments in the area.

Scenario 3: *Project Conditions.* Project traffic conditions are represented by Background plus Project traffic volumes on the existing roadway network. Background plus Project traffic volumes (hereafter called *project traffic volumes*) were estimated by adding to background traffic volumes the additional traffic generated by the project. Project conditions were evaluated relative to background conditions in order to determine potential project impacts.

Scenario 4: *Cumulative (Future) Conditions.* Cumulative (20-year horizon) conditions were evaluated with and without the proposed project. Traffic volumes under cumulative conditions were estimated by applying a growth factor to existing volumes and adding trips from approved developments. Project trips were then added in the cumulative with project scenario.

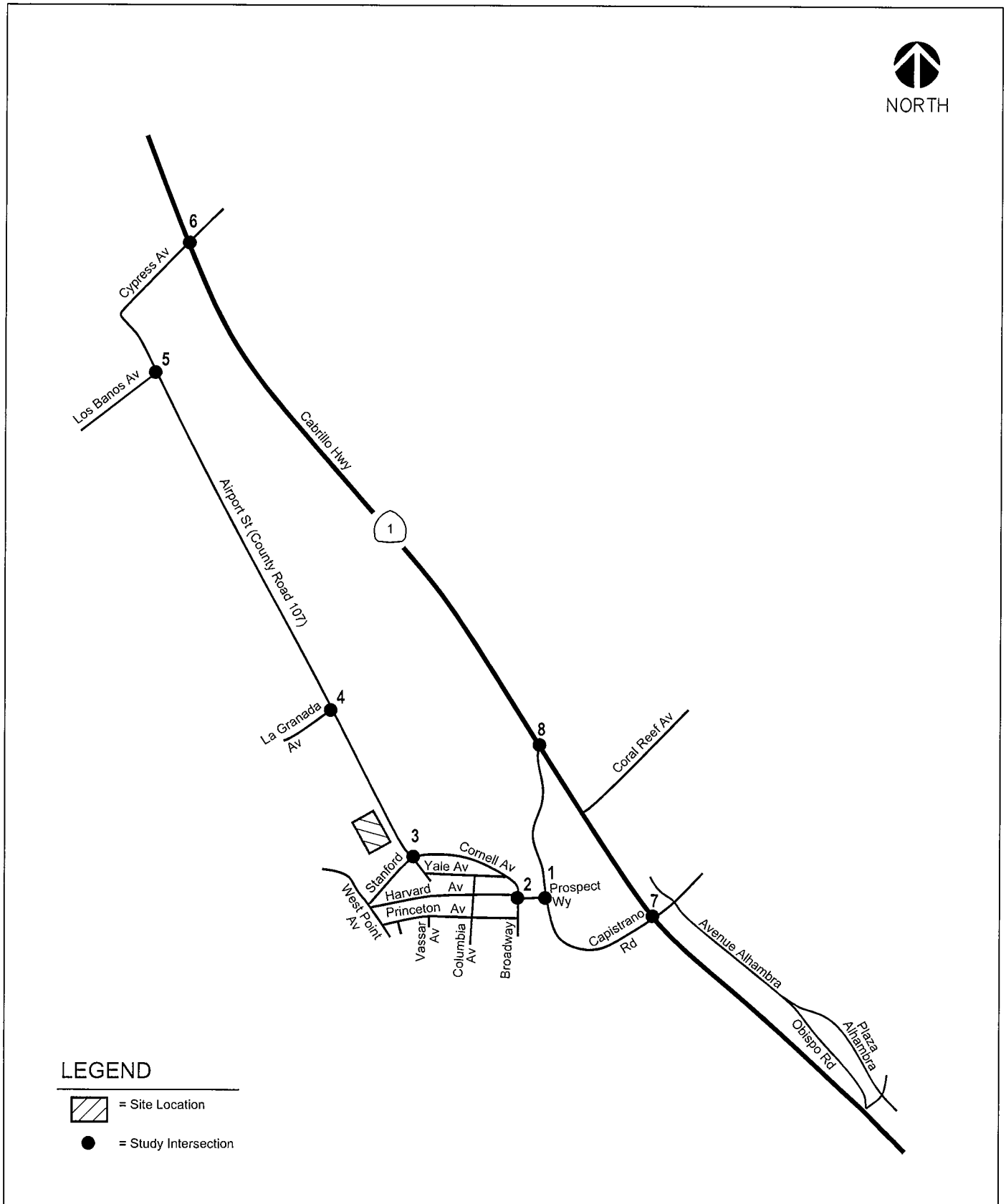

Figure 1

SITE LOCATION AND STUDY INTERSECTIONS

Hexagon Transportation Consultants, Inc.

Big Wave Office Park and Wellness Center

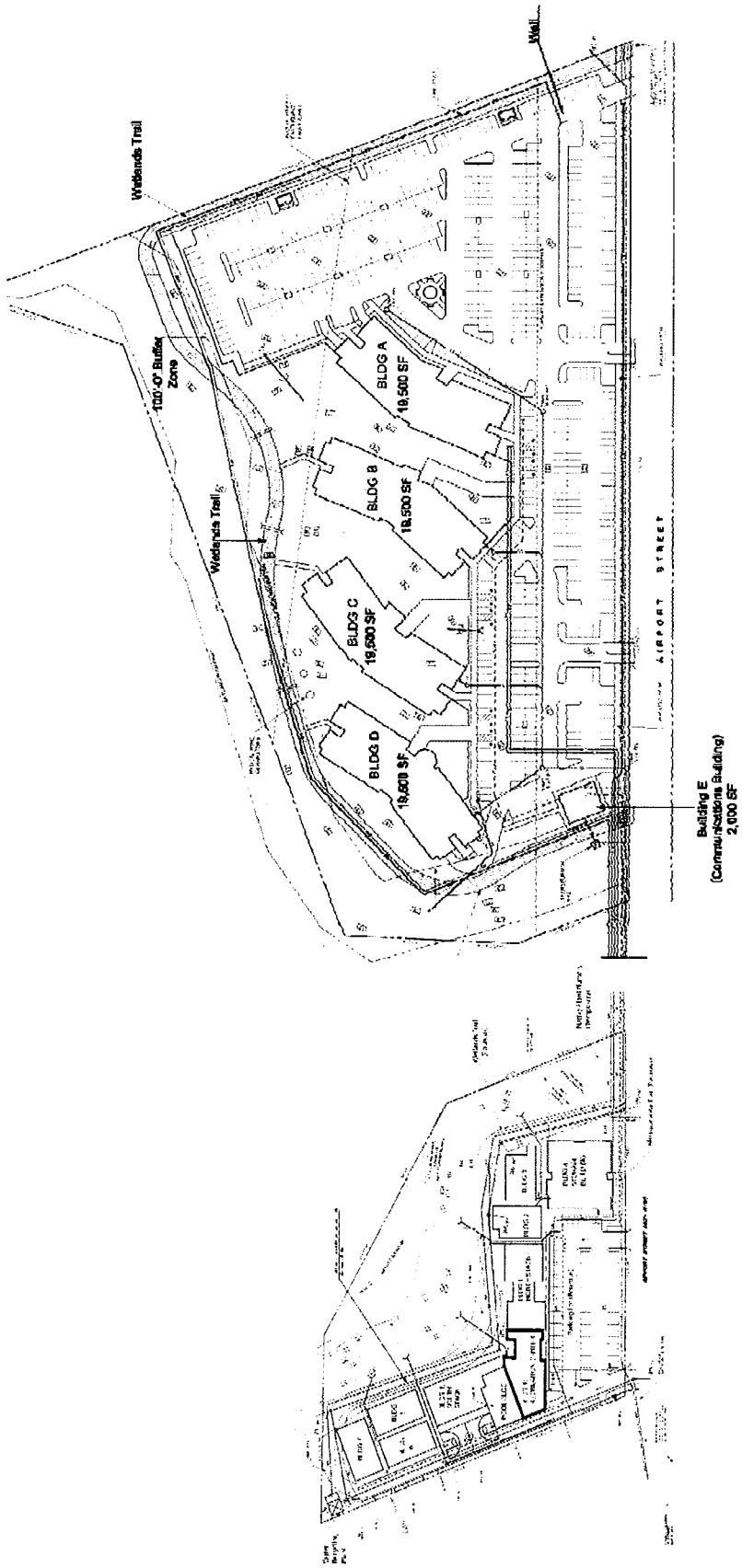

Figure 2

SITE PLAN

Big Wave Office Park and Wellness Center

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Methodology

This section presents the methods used to determine the traffic conditions for each scenario described above. It includes descriptions of the data requirements, the analysis methodologies, and the applicable level of service standards.

Data Requirements

The data required for the analysis were obtained from new traffic counts, the County of San Mateo, and field observations and reconnaissance. The following data were collected from these sources:

- existing traffic volumes
- intersection lane configurations
- signal timing and phasing
- previous traffic studies
- approved trips

Analysis Methodologies and Level of Service Standards

Traffic conditions at the study locations were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The analysis method is described below.

This study utilizes TRAFFIX software to determine level of service. TRAFFIX methodology is based on the *2000 Highway Capacity Manual* (HCM) method for intersections, and evaluates intersection operations on the basis of average delay for all vehicles at the intersection. This average delay can then be correlated to a level of service as shown in Table 1 for signalized intersections. The level of service correlation for unsignalized intersections is shown in Table 2. For two-way stop controlled intersections, the level of service reported is the average delay of all the intersection movements.

In addition to the level of service evaluation an assessment is made of the need for signalization of unsignalized intersections. This assessment is made on the basis of the Peak-hour Volume Signal Warrant as described in the Manual on Uniform Traffic Control Devices (MUTCD), 2003. This method makes no evaluation of intersection level of service, but simply provides an indication whether peak-hour traffic volumes are, or would be, sufficient to justify installation of a traffic signal.

Significant Impact Criteria

Significance criteria are used to establish what constitutes an impact. For this analysis the relevant criteria for impacts at intersections are based on the County of San Mateo intersection Level of Service standards.

County of San Mateo Definitions of Significant Intersection LOS Impacts

According to the County of San Mateo level of service guidelines, a development is said to create a significant adverse impact on traffic conditions at a signalized intersection if for either peak hour:

1. The level of service at the intersection degrades from an acceptable LOS D or better (for CMP

intersections the minimum acceptable level of service is LOS E) under baseline conditions to an unacceptable LOS E or F under project conditions, or

2. The level of service at the intersection is an unacceptable LOS E or LOS F under baseline conditions and the addition of project trips causes the critical-movement volume-to-capacity ratio (V/C) to increase by .02 or more.

A significant impact at a signalized intersection is said to be satisfactorily mitigated when measures are implemented that would restore intersection operations back to background (without the project) conditions or better.

Table 1
Signalized Intersection Level of Service Definitions Based on Delay

Level of Service	Description	Average Control Delay Per Vehicle (seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	10.0 or less
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	Greater than 80.0

Source: Transportation Research Board, *Highway Capacity Manual 2000,* Exhibit 16-2.

Report Organization

The remainder of this report is divided into five chapters. Chapter 2 describes existing conditions on the existing roadway network. Chapter 3 discusses background conditions. Chapter 4 describes the method used to estimate project traffic, and documents project impacts. Chapter 5 presents cumulative conditions with and without the project. Chapter 6 contains the conclusions of the analysis.

Table 2
Unsignalized Intersection Level of Service Definitions Based on Delay

Level of Service	Description	Average Stopped Delay Per Vehicle (Sec.)
A	Operations with very low delay occurring with favorable progression .	10.0 or less
B	Operations with low delay occurring with good progression.	10.1 to 15.0
C	Operations with average delays resulting from fair progression.	15.1 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression or high V/C ratios.	25.1 to 35.0
E	Operations with high delay values indicating poor progression and high V/C ratios. This is considered to be the limit of acceptable delay.	35.1 to 50.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation and poor progression.	Greater than 50.0

Source: Transportation Research Board, *Highway Capacity Manual 2000*.

2.
Existing Conditions

This chapter describes the existing conditions on the roadway network in the vicinity of the site.

Existing Roadway Network

Access to the project site is provided via State Route 1, Capistrano Road and Airport Street. These facilities are described below.

State Route 1 is a two- to four-lane highway that runs in a north-south direction. Route 1 extends from San Francisco to southern California along the Pacific Ocean coast.

Capistrano Road is a two-lane roadway that runs primarily in a north-south direction. This local roadway extends from Alhambra Avenue in the south (just west of State Route 1) to its terminus at State Route 1 in the north.

Airport Street is a two-lane north-south collector street that provides access to the project site. Airport Street extends from its intersection with Stanford Avenue/Cornell Avenue in the south where it operates as Vassar Street to its terminus at Cypress Avenue in the north.

Other local roadways in the project vicinity include: *Cypress Avenue, Prospect Way, Coral Reef Avenue, Los Banos Avenue, La Granada Avenue, Broadway Avenue, Stanford Avenue and Cornell Avenue* which are two-lane residential roadways.

Existing Bicycle and Pedestrian Facilities

According to the Bicycle Transportation Map of the San Francisco Peninsula for San Mateo County, there are the following designated bike routes within the vicinity of the project site:

- State Route 1 within the vicinity of the project site

- Airport Street within the vicinity of the project site
- Cypress Avenue between Airport Street and State Route 1
- Capistrano Road between State Route 1 and Prospect Way
- Prospect Way
- California Avenue
- Cornell Avenue

Bicycle facilities are shown on Figure 3.

There are generally no sidewalks in the project vicinity. The Princeton area of Half Moon Bay is somewhat rural. Airport Street has and minimal fronting development, thus no existing need for sidewalks.

Existing Transit Service

Existing transit service to the study area is provided by the San Mateo County Transit District (SamTrans). The existing SamTrans service is described below and shown on Figure 4.

The 17 *line* provides service between the Seton Medical Center Coastside and the Miramontes Point Road area with 1- to 2-hour headways (according to SamTrans staff) and operates along Airport Street in the vicinity of the project. Route 17 bus stops in the project vicinity are as follows:

- Capistrano Road at Pillar Point Harbor
- Capistrano Road at Prospect Way
- Airport Street at La Granada*
- Airport Street at Los Banos Avenue

*closest to project site

Existing Intersection Lane Configurations

The existing lane configurations at the study intersections were determined by field reconnaissance. The existing intersection lane configurations are shown on Figure 5.

Existing Traffic Volumes

Existing peak-hour traffic volumes were obtained from new manual turning-movement counts at all of the study intersections. The existing peak-hour volumes are shown on Figure 6 and included in Appendix A.

Existing Intersection Levels of Service

The results of the level of service analysis under existing conditions show that all of the study intersections currently operate at an acceptable LOS D or better (see Table 3). For the unsignalized intersections, the table reports the average delay and level of service for the intersection overall as well as the worst turning movement delay and level of service. The level of service calculation sheets are included in Appendix B.

Existing Signal Warrants

The peak-hour signal warrant (*MUTCD 2003*, Urban Warrant) was checked for the seven unsignalized intersections to determine whether signalization would be justified on the basis of existing peak-hour volumes. The analysis showed that none of the study intersections would meet the signal warrant under existing conditions. The signal warrant analysis sheets are included in Appendix E.

Observed Existing Traffic Conditions

Traffic conditions in the field were observed in order to identify existing operational deficiencies and to confirm the accuracy of calculated levels of service. The purpose of this effort was (1) to identify any existing traffic problems that may not be directly related to intersection level of service, and (2) to identify any locations where the level of service calculation does not accurately reflect level of service in the field.

Overall the study intersections operated adequately during both the AM and PM peak hours of traffic, and the level of service analysis appears to accurately reflect actual existing traffic conditions.

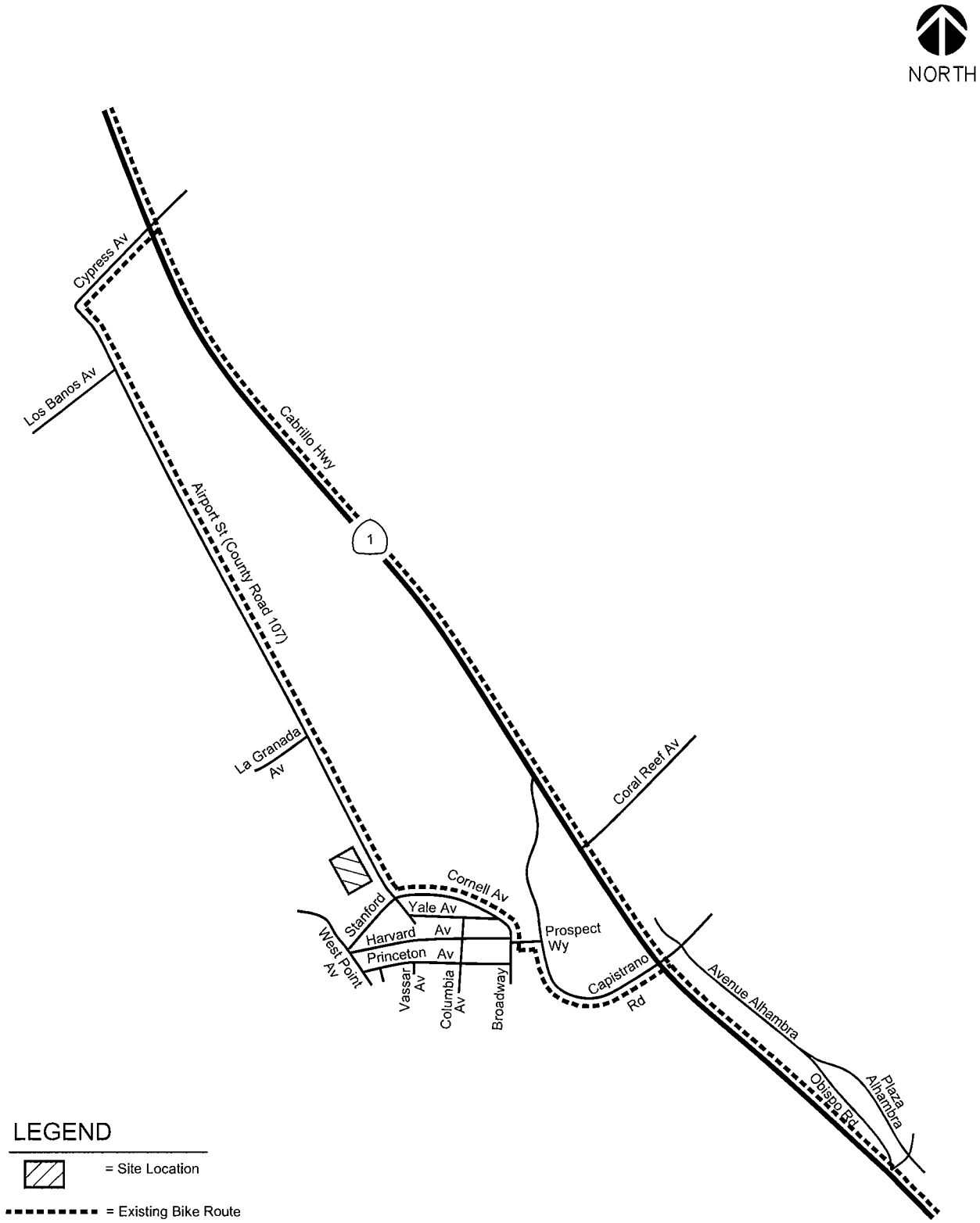

Figure 3

EXISTING BICYCLE FACILITIES

Big Wave Office Park and Wellness Center

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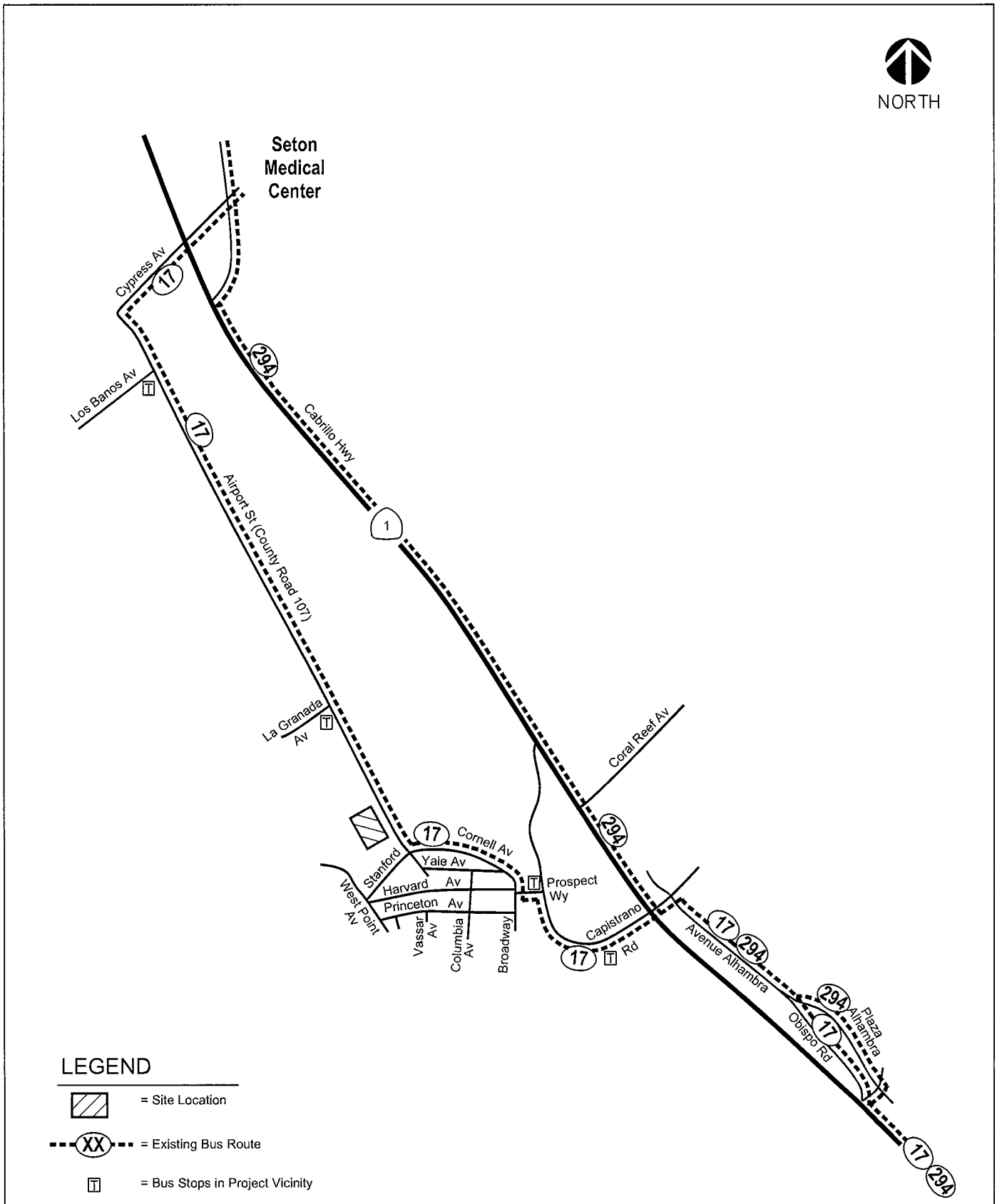

Figure 4

EXISTING TRANSIT FACILITIES

Big Wave Office Park and Wellness Center

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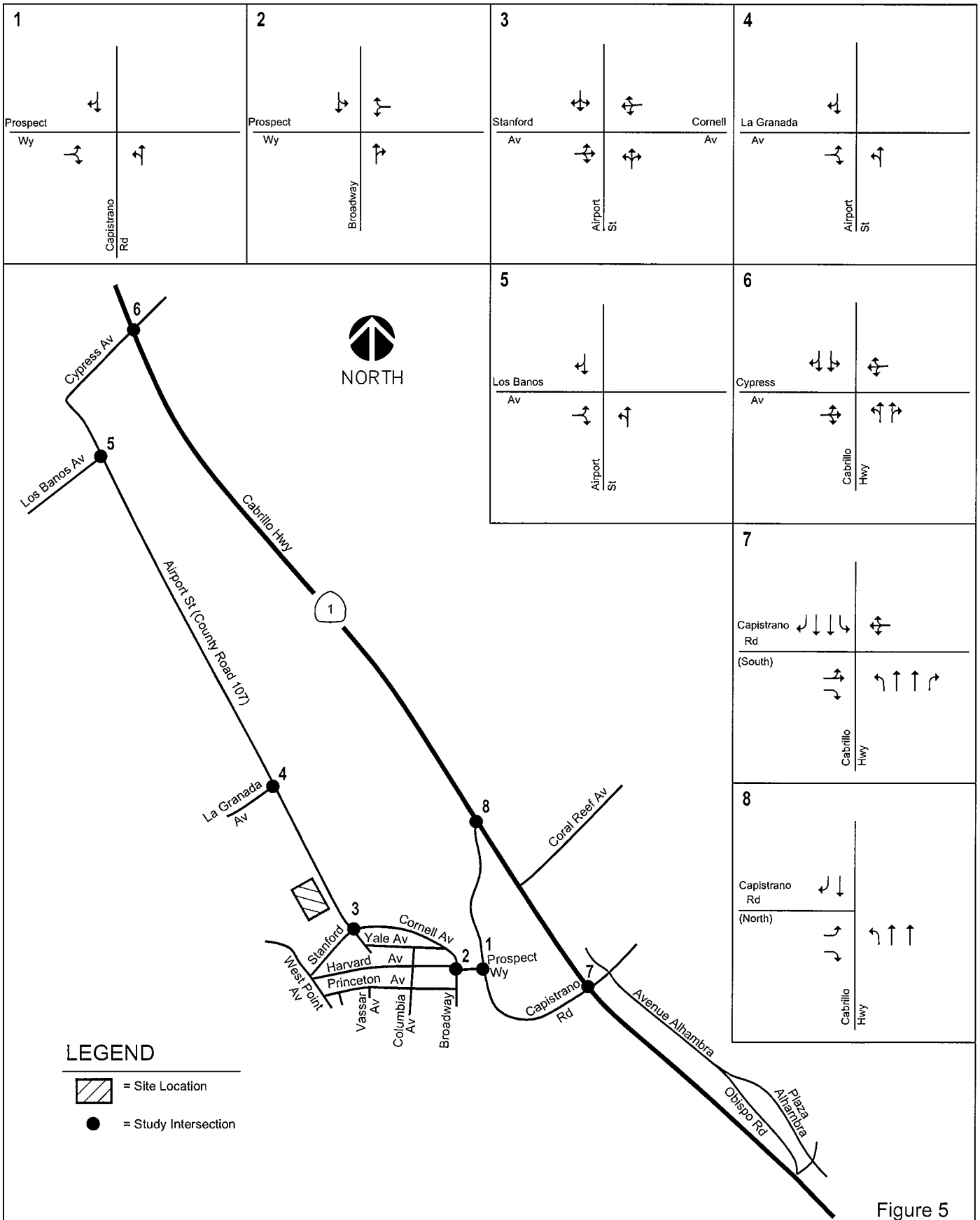


Figure 5

EXISTING LANE CONFIGURATIONS

Big Wave Office Park and Wellness Center

Hexagon Transportation Consultants, Inc.

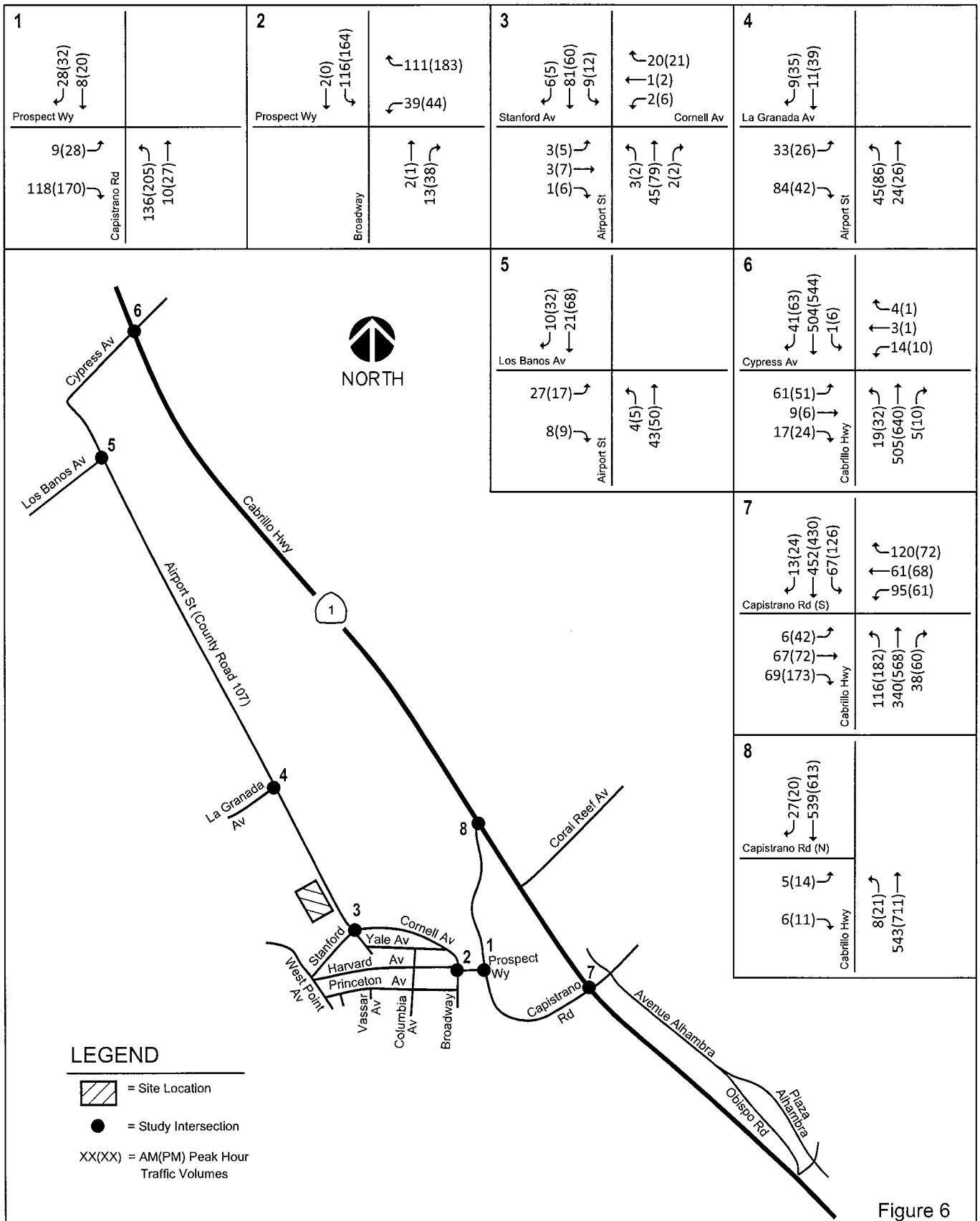


Figure 6

EXISTING TRAFFIC VOLUMES

Big Wave Office Park and Wellness Center

Hexagon Transportation Consultants, Inc.

Table 3
Existing Intersection Levels of Service

# Intersection	Peak Hour	Count Date	Average Delay	Average LOS	Worst Delay	Worst LOS
1 Prospect & Capistrano	AM	01/18/07	7.0	A	9.1	A
	PM	01/18/07	7.4	A	10.1	B
2 Broadway & Prospect	AM	01/18/07	8.1	A	9.5	A
	PM	01/18/07	8.2	A	10.1	B
3 Airport & Stanford/Cornell	AM	01/17/07	2.0	A	9.6	A
	PM	01/17/07	2.6	A	9.7	A
4 Airport & La Granada	AM	01/17/07	6.8	A	9.1	A
	PM	01/17/07	5.1	A	9.5	A
5 Airport & Los Banos	AM	01/17/07	3.0	A	8.9	A
	PM	01/17/07	1.5	A	9.2	A
6 Hwy 1 & Cypress	AM	01/16/07	2.1	A	22.4	C
	PM	01/16/07	2.0	A	26.3	D
7 Hwy 1 & Capistrano (South)*	AM	01/18/07	24.0	C	-	-
	PM	01/18/07	23.0	C	-	-
8 Hwy 1 & Capistrano (North)	AM	01/16/07	0.2	A	13.5	B
	PM	01/16/07	0.4	A	16.3	C

*Signalized Intersection

3.
Background Conditions

This chapter describes background traffic conditions. Background conditions are defined as conditions just prior to completion of the proposed development. Traffic volumes for background conditions comprise volumes from existing traffic counts plus traffic generated by other approved developments in the vicinity of the site.

Background Roadway Network

It is assumed in this analysis that the transportation network under background conditions would be the same as the existing transportation network.

Approved Developments

Table 4 lists the approved but not-yet-completed developments in the project vicinity, which would add traffic to the roadway network under background conditions. The first seven approved developments on the list were obtained from the County of San Mateo for the initial iteration of the study in 2007. The county requested that the approved developments list be updated for this revision. As a result, the last five approved developments on the list were obtained from the County and added to the Background Condition scenario in June 2009. The traffic associated with these developments is discussed below.

Background Traffic Volumes

Background peak-hour traffic volumes were calculated by adding to existing volumes the estimated traffic from approved but not yet constructed developments. The latter are called approved trips, and were obtained or derived from information provided by the County of San Mateo. The traffic added to the study intersections from approved but not yet constructed developments was estimated by distributing and assigning trips generated by these developments to the roadway network. The process of trip generation,

Table 4
Approved Developments

Land Use	Size	Location
Restaurant Addition	1,600 s.f.	214 Princeton Ave.
Boat and Machine Storage	3,163 s.f.	179 Harvard Ave.
Warehouse/office	3,625 s.f.	175 Harvard Ave.
Warehouse	4,346 s.f.	141 California Ave.
Warehouse/office	4,346 s.f.	121 California Ave.
Hotel/meeting/extended stay	84 short stay rooms & 11 extended stay rooms, meeting rooms	240 Capistrano Rd.
Restaurant and retail	8,697 s.f. restaurant, 40,000 s.f. retail	240 Capistrano Rd.
Marine Sales	3,450 s.f.	W. Point Avenue
Storage/office/vacation rental	3,425 s.f.	Princeton Ave. at Columbia Ave.
Indoor Storage/marine usage	3,155 s.f.	151 Vassar St.
Mixed-Use	2,374 s.f.	358 Princeton Ave.
Warehouse/office	1,982 s.f.	102 California Ave.

Source: San Mateo County Planning & Building Division
Trip generation rates from ITE Trip Generation Manual, 7th or 8th Edition.

distribution, and assignment is described further in the following chapter. Background traffic volumes are shown on Figure 7. The approved trip assignments are included in Appendix C.

Background Intersection Levels of Service

The results of the level of service analysis under background conditions show that all of the study intersections would operate at an acceptable LOS C or better (see Table 5). The level of service calculation sheets are included in Appendix B.

Background Signal Warrants

The peak-hour signal warrant (*MUTCD 2003*, Urban Warrant) was checked for the seven unsignalized intersections to determine whether signalization would be justified on the basis of background peak-hour volumes. The analysis showed that none of the study intersections would meet the signal warrant under background conditions. The signal warrant analysis sheets are included in Appendix E.

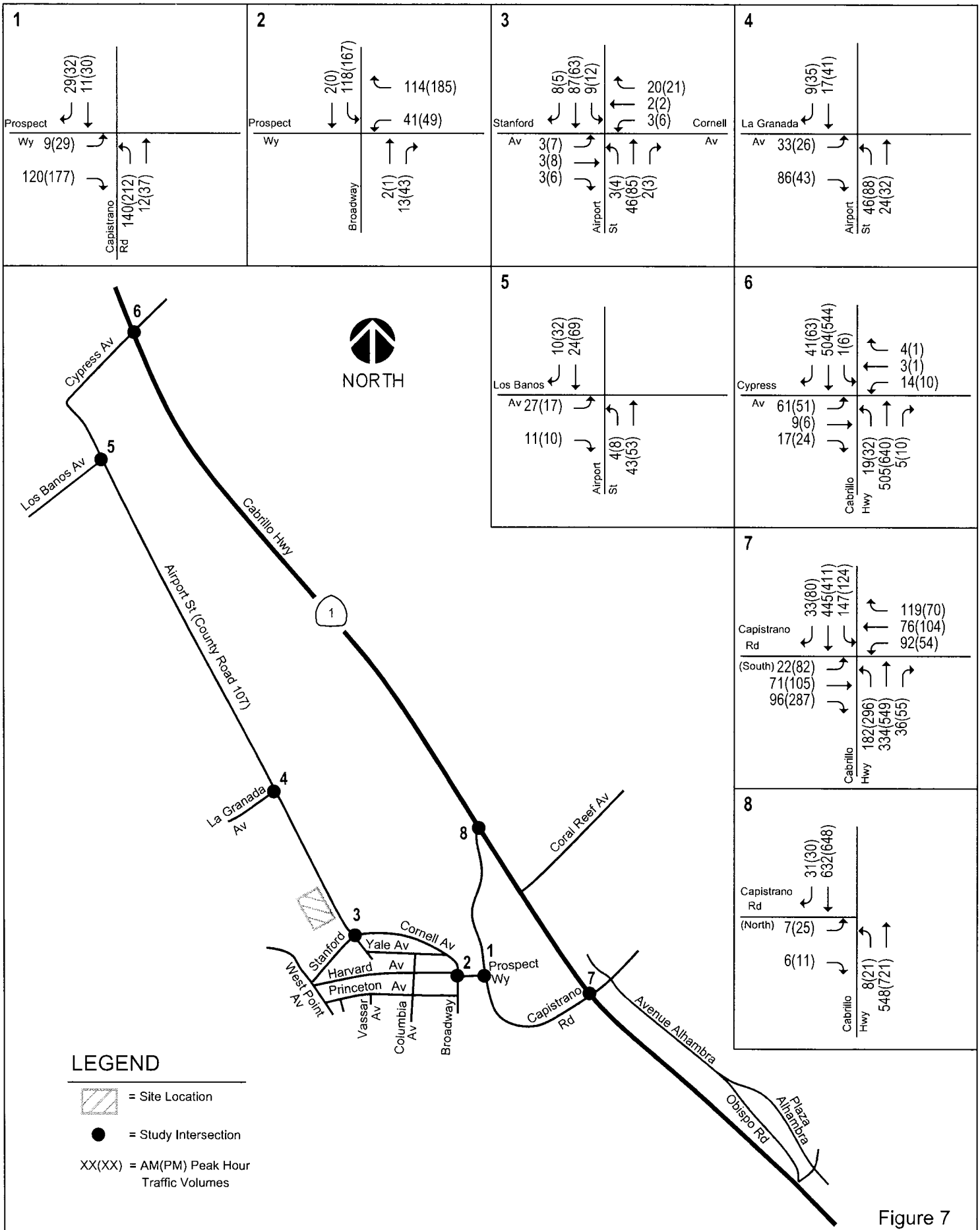


Figure 7

BACKGROUND TRAFFIC VOLUMES

Big Wave Office Park and Wellness Center

Hexagon Transportation Consultants, Inc.

Table 5
Background Intersection Levels of Service

# Intersection	Peak Hour	Existing Average Delay	Existing Average LOS	Existing Worst Delay	Existing Worst LOS	Background Average Delay	Background Average LOS	Background Worst Delay	Background Worst LOS
1 Prospect & Capistrano	AM	7.0	A	9.1	A	6.9	A	9.1	A
	PM	7.4	A	10.1	B	7.3	A	10.3	B
2 Broadway & Prospect	AM	8.1	A	9.5	A	8.1	A	9.6	A
	PM	8.2	A	10.1	B	8.3	A	10.3	B
3 Airport & Stanford/Cornell	AM	2.0	A	9.6	A	2.1	A	9.5	A
	PM	2.6	A	9.7	A	2.6	A	11.5	B
4 Airport & La Granada	AM	6.8	A	9.1	A	6.6	A	9.1	A
	PM	5.1	A	9.5	A	5.0	A	9.5	A
5 Airport & Los Banos	AM	3.0	A	8.9	A	3.1	A	8.9	A
	PM	1.5	A	9.2	A	1.6	A	9.2	A
6 Hwy 1 & Cypress	AM	2.1	A	22.4	C	2.1	A	22.4	C
	PM	2.0	A	26.3	D	2.0	A	26.3	D
7 Hwy 1 & Capistrano (South)*	AM	24.0	C	-	-	25.4	C	-	-
	PM	23.0	C	-	-	24.9	C	-	-
8 Hwy 1 & Capistrano (North)	AM	0.2	A	13.5	B	0.2	A	15.1	C
	PM	0.4	A	16.3	C	0.6	A	18.5	C

*Signalized Intersection

4.
Project Impacts and Mitigation Measures

This chapter describes project-generated traffic, project traffic conditions, significant project impacts, and measures that are recommended to mitigate project impacts. Project conditions are defined as background traffic conditions with the addition of traffic generated by the project.

Project Conditions Roadway Network

It is assumed in this analysis that the transportation network under project conditions would be the same as the existing network.

Project Trip Estimates

The magnitude of traffic produced by a new development and the locations where that traffic would appear are estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In determining project trip generation, the magnitude of traffic entering and exiting the site is estimated for the peak hours. As part of the project trip distribution, an estimate is made of the directions to and from which the project trips would travel. In the project trip assignment, the project trips are assigned to specific streets and intersections. These procedures are described further in the following sections.

Trip Generation

Through empirical research, data have been collected that correlate to common land uses their propensity for producing traffic. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development.

The magnitude of traffic added to the roadway system by a particular development is estimated by multiplying the applicable trip generation rates to the size of the development. Standard trip generation

rates are published in the Institute of Transportation Engineers (ITE) manual entitled *Trip Generation, Eighth Edition,* 2008. The project includes a Wellness Center with the following components:

- 36 one-bedroom units for developmentally disabled adults
- 7 two-bedroom units for developmentally disabled adults
- 5 breezeway units with 4 bedrooms each which can house up to 20 residents/staff aides
- 20,000 s.f. of storage space
- 37,103 s.f. of community center

In addition to the Wellness Center, the proposed project would include 90,000 s.f. of general office, 56,250 s.f. of research and development, 33,750 s.f. of storage and 45,000 s.f. of light manufacturing.

The trip generation estimates for each of these components are described below.

Apartments

One and Two Bedroom Apartment Units – Since it has not yet been determined where the residents versus staff will reside, it is assumed for purposes of this analysis that these apartment units will house developmentally disabled residents. There would be a common recreation area provided for use by all apartment residents. This common area would include a basketball court, an indoor pool and fitness center. As shown in Table 6, these units would not generate any trips as the residents would not drive. The residents would have care-givers residing on the project site that would drive them to and from activities, appointments, errands, etc. The care-giver trips would be included in the breezeway unit trip generation numbers.

Breezeway Units – For purposes of analysis, it is assumed the proposed breezeway apartment units would be for staff members. The breezeway units would be one story in height. They are fourplexes (with single bed/bath units sharing a common living area and kitchen). There are five breezeway fourplexes so the total number of breezeway residential units proposed is 20. According to the project applicant, an option for these units is the addition of a common area that could be opened to the outside and would function as a living room, recreation room or dining room.

Community Center

The community center would provide services for local area residents as well as residents living on the project site. The community center might provide such services as classes, exercise facilities, a location for special events, public meetings, private social functions, etc. Community Center is not a land use for which the ITE manual can be used for trip generation estimates. The estimated trip generation for this portion of the project was based on a survey conducted by Hexagon at the Almaden Community Center located in San Jose, California.

Storage

Storage is proposed as a small portion of the project. This storage would most likely be utilized by project residents or Princeton area residents and would likely not generate any trips outside the study area. The ITE warehousing land use category was utilized to estimate trips for this portion of the project.

Office/Industrial Park

The northernmost and largest section of the proposed project would be an office/industrial park. Hexagon used the ITE general office building category for the 90,000 s.f. general office portion of the project. The research and development component of the project is proposed as being 56,250 s.f. in size. There is a proposed 33,750 s.f. storage component and a 45,000 s.f. light manufacturing component to the office park. This park could draw potential employees from the surrounding residential areas such as Moss Beach, Montara, El Granada and Miramar and other outlying regions.

The estimated peak-hour and daily trip generation totals for the project are shown in Table 6. The table shows that the project is estimated to generate 2,123 daily trips, including 292 trips (243 inbound and 49 outbound) during the AM peak hour, and 268 trips (63 inbound and 206 outbound) during the PM peak hour.

Table 6
Project Trip Generation Estimates

		Daily		AM Peak Hour				PM Peak Hour			
Use	Size	rate[1]	trips	rate[1]	in	out	total	rate[1]	in	out	total
Proposed											
Office Park											
General Office[2]	90,000 s.f.	11.01	991	1.55	123	17	140	1.49	23	111	134
Research & Development[3]	56,250 s.f.	8.11	456	1.22	57	12	69	1.07	9	51	60
Storage[4]	33,750 s.f.	3.56	120	0.30	8	2	10	0.32	3	8	11
Light Manufacturing[5]	45,000 s.f.	3.82	172	0.73	26	7	33	0.73	12	21	33
Wellness Center											
Apartments											
one-bedroom[6]	43 units	n/a	0	n/a	0	0	0	n/a	0	0	0
two-bedroom[6]	7 units	n/a	0	n/a	0	0	0	n/a	0	0	0
breezeway[7]	20 units	6.65	133	0.51	2	8	10	0.62	8	4	12
Storage[4]	20,000 s.f.	3.56	71	0.30	5	1	6	0.32	2	5	6
Community Center[8]	5,326 s.f.	33.80	180	4.57	22	2	24	2.19	7	5	12
	TOTAL		**2,123**		**243**	**49**	**292**		**63**	**206**	**268**

[1]Rates based on ITE Trip Generation Manual, 8th edition average rates - numbers may not add due to rounding.
[2]ITE Code 710, General Office Building
[3]ITE Code 760, Research and Development Center
[4]ITE Code 150, Warehousing.
[5]ITE Code 140, Manufacturing
[6]These units are for the developmentally disabled and will not generate any vehicular trips.
[7]A breezeway unit is a one-story unit that can house up to 4 residents/staff aides. The project is proposing 5 breezeway units (5x4=20). ITE Code 220, Apartment.
[8]Community Center rates based on trip generation survey conducted at the Almaden Community Center located in San Jose, California.

Project Trip Distribution and Assignment

The trip distribution pattern for the proposed project was estimated based on existing travel patterns on the surrounding roadway system and the locations of complementary land uses. Separate trip distribution patterns were developed for each land use component of the proposed project. In determining the trip distribution patterns for vehicles traveling from the project site to northbound Highway 1, Hexagon conducted travel time runs from the proposed project site to northbound Highway 1 using two different routes as per the applicant's request.

The first route included northbound Airport Street and eastbound Cypress Avenue to northbound Highway 1. The second route included southbound Airport Street to eastbound Cornell Avenue to eastbound Prospect Way to northbound Capistrano Road to northbound Highway 1. The travel time runs showed that the northbound Airport Street route took half the time of the southbound Airport Street route (two minutes as opposed to four minutes). As a result, Hexagon assumed that vehicular traffic traveling from the project site to northbound Highway 1 would proceed north on Airport Street to Cypress Avenue and turn left onto Highway 1.

The peak-hour trips generated by the project were assigned to the roadway system using the TRAFFIX software and in accordance with the trip distribution pattern shown. The trip distribution patterns are shown graphically on Figures 8, 9, 10 and 11. Hexagon conducted travel time runs on Wednesday, April 2, 2008. Figure 12 shows the assignment of project trips at each study intersection.

Project Traffic Volumes

Project traffic volumes were estimated by adding to background traffic volumes the project trips. Background plus project traffic volumes are typically referred to simply as *project traffic volumes*; this is contrasted with the term *project trips*, which is used to signify the traffic that is produced specifically by the project. The project traffic volumes are shown graphically on Figure 13. Traffic volumes for all components of traffic are tabulated in Appendix D.

Project Intersection Level of Service Analysis

The results of the level of service analysis under Project Conditions show that all of the study intersections would operate at an acceptable LOS C or better (see Table 7). The eastbound left-turn movement at the intersection of Highway 1 and Cypress Avenue is shown to operate at LOS F with a delay of 59.8 seconds under Project Conditions. Hexagon found that there are no improvements possible at this intersection to improve this LOS F other than signalization as described in the signal warrant analysis section below. The level of service calculation sheets are included in Appendix B.

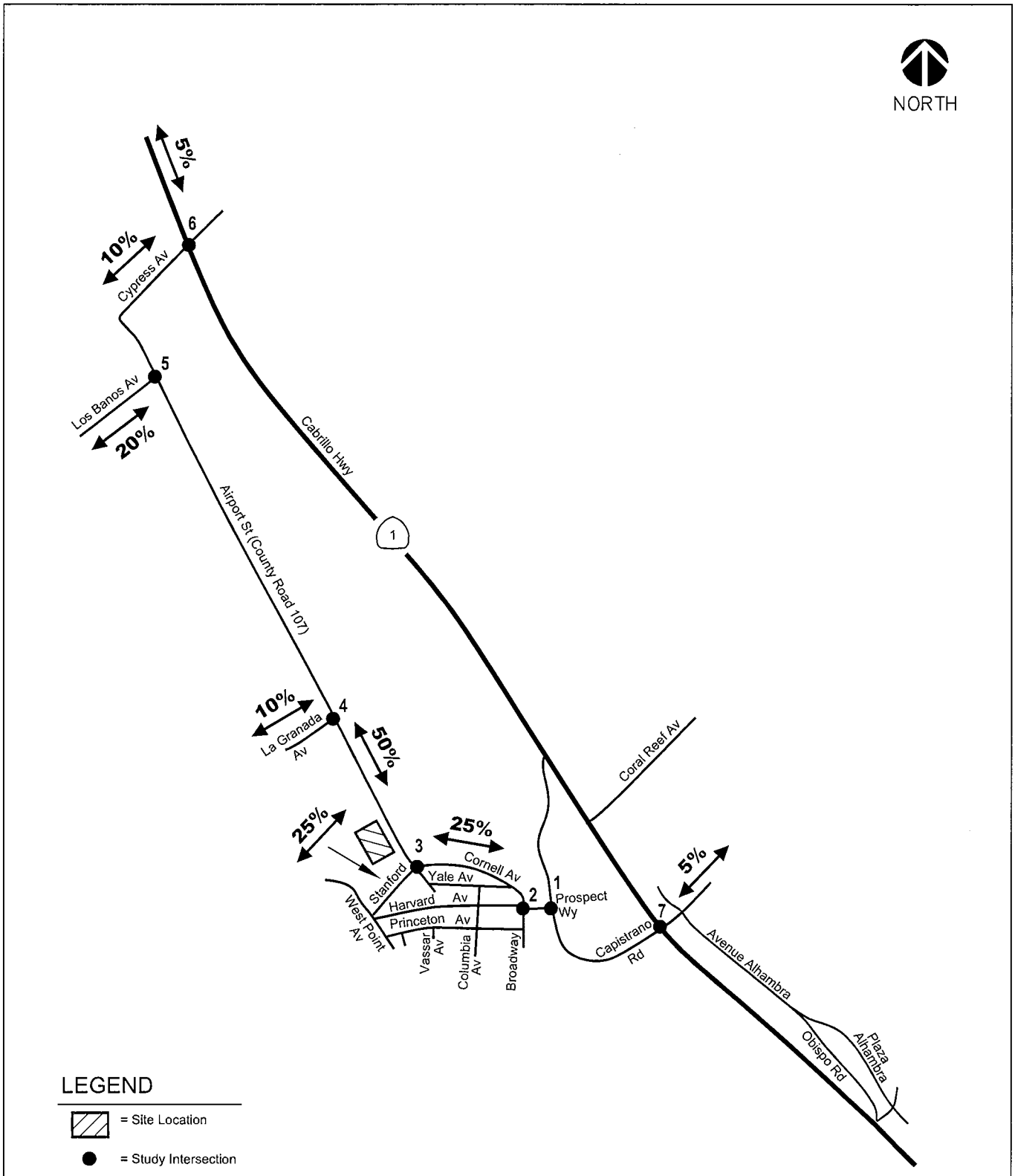


Figure 8

PROJECT TRIP DISTRIBUTION - COMMUNITY CENTER

Big Wave Office Park and Wellness Center

Hexagon
Transportation Consultants, Inc.

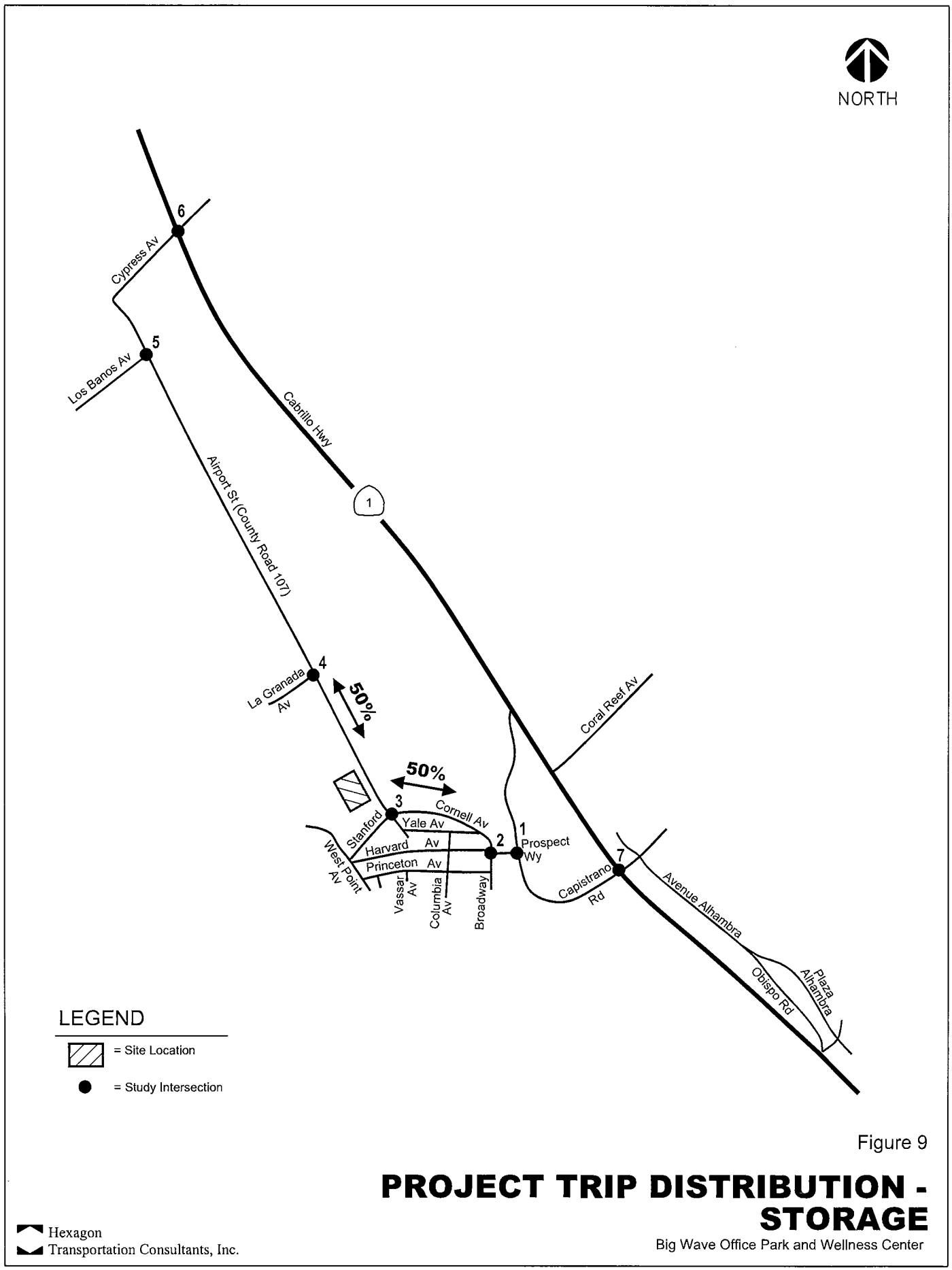


Figure 9

PROJECT TRIP DISTRIBUTION - STORAGE

Big Wave Office Park and Wellness Center

Hexagon
Transportation Consultants, Inc.

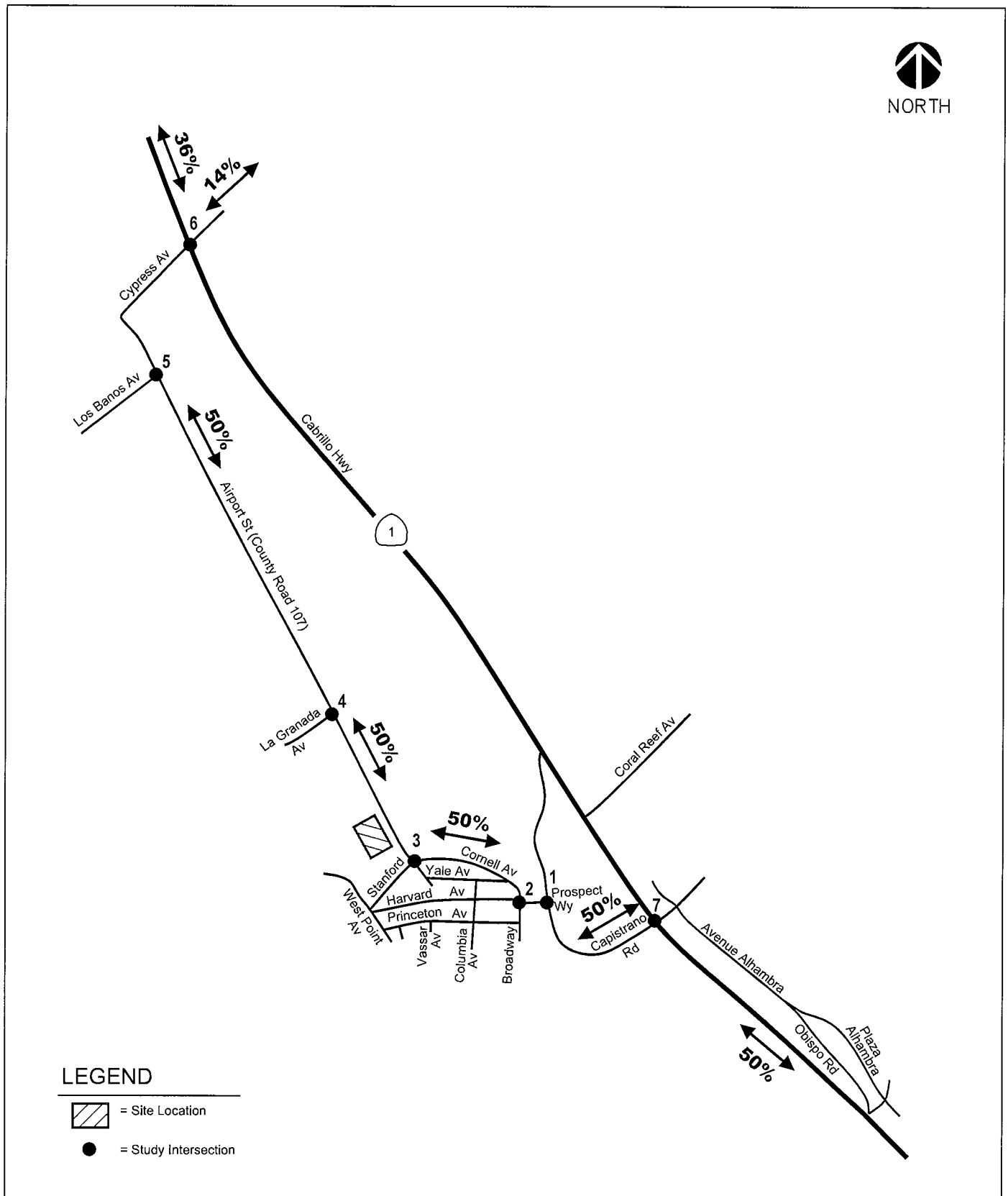


Figure 10

PROJECT TRIP DISTRIBUTION - APARTMENTS

Big Wave Office Park and Wellness Center

Hexagon
Transportation Consultants, Inc.

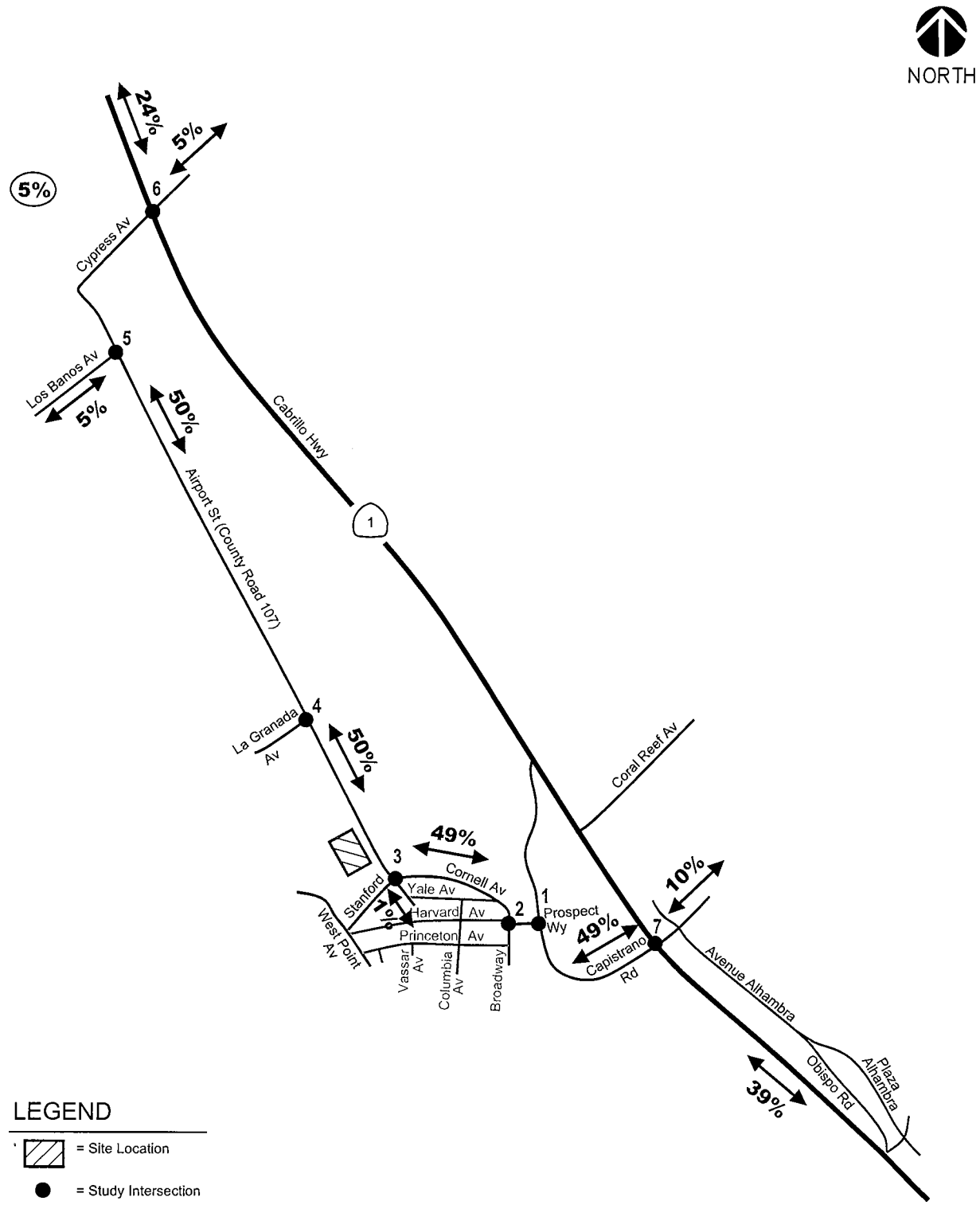


Figure 11

PROJECT TRIP DISTRIBUTION - OFFICE, RESEARCH AND DEVELOPMENT, AND LIGHT MANUFACTURING

Big Wave Office Park and Wellness Center

Hexagon
Transportation Consultants, Inc.

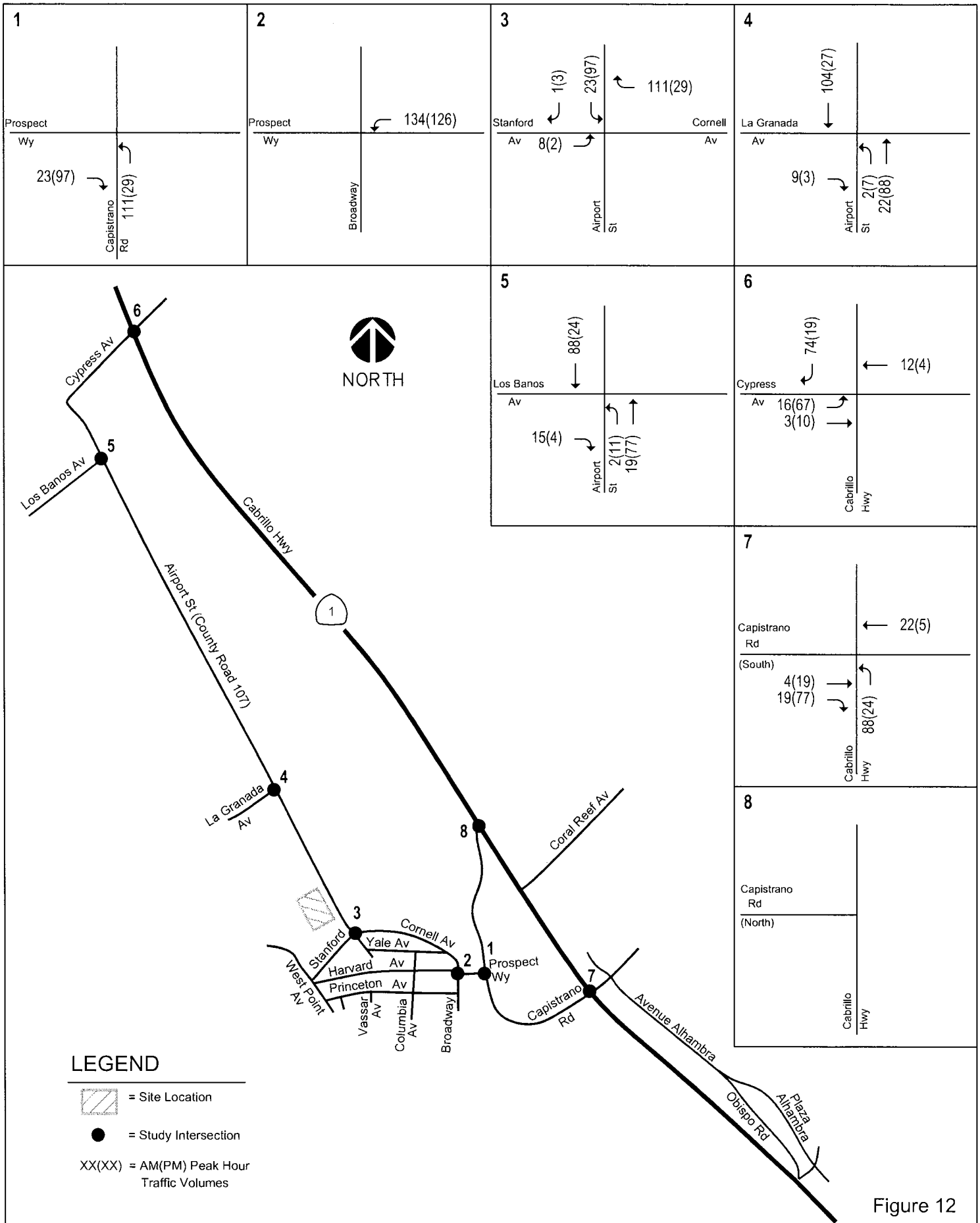


Figure 12

PROJECT TRIP ASSIGNMENT

Big Wave Office Park and Wellness Center

Hexagon Transportation Consultants, Inc.

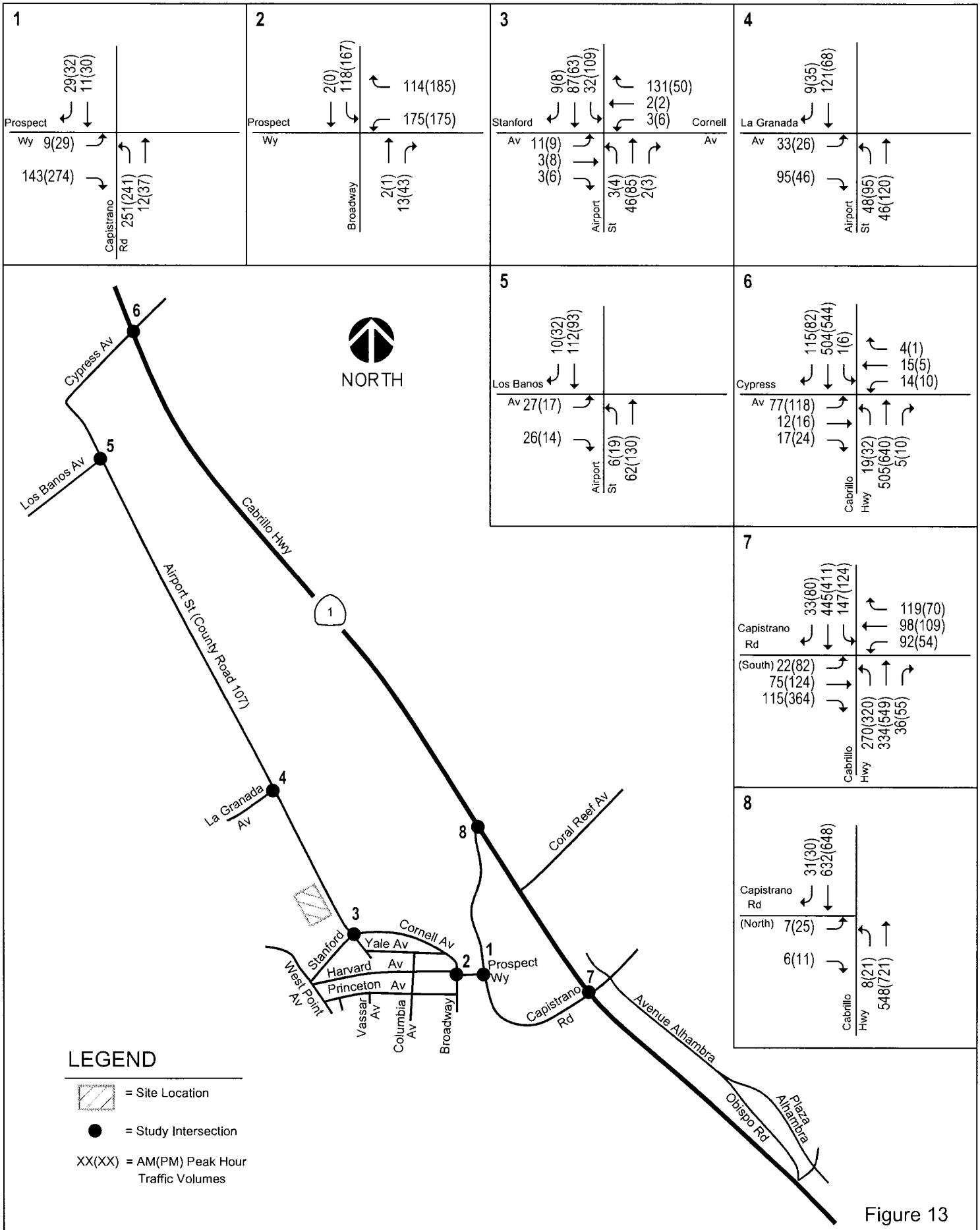


Figure 13

PROJECT TRAFFIC VOLUMES

Big Wave Office Park and Wellness Center

Hexagon Transportation Consultants, Inc.

Table 7
Project Intersection Levels of Service

# Intersection	Peak Hour	Background Average Delay	Background Average LOS	Background Worst Delay	Background Worst LOS	Project Average Delay	Project Average LOS	Project Worst Delay	Project Worst LOS
1 Prospect & Capistrano	AM	6.9	A	9.1	A	7.4	A	9.4	A
	PM	7.3	A	10.3	B	8.1	A	11.0	B
2 Broadway & Prospect	AM	8.1	A	9.6	A	10.1	A	11.8	B
	PM	8.3	A	10.3	B	10.9	A	13.8	B
3 Airport & Stanford/Cornell	AM	2.1	A	9.5	A	5.1	A	10.7	B
	PM	2.6	A	11.5	B	4.7	A	11.9	B
4 Airport & La Granada	AM	6.6	A	9.1	A	4.6	A	9.9	A
	PM	5.0	A	9.5	A	3.7	A	10.0	B
5 Airport & Los Banos	AM	3.1	A	8.9	A	2.2	A	8.9	A
	PM	1.6	A	9.2	A	1.4	A	9.7	A
6 Hwy 1 & Cypress	AM	2.1	A	22.4	C	3.1	A	28.7	D
	PM	2.0	A	26.3	D	6.9	A	59.8	F
7 Hwy 1 & Capistrano (South)*	AM	25.4	C	-	-	26.1	C	-	-
	PM	24.9	C	-	-	25.4	C	-	-
8 Hwy 1 & Capistrano (North)	AM	0.2	A	15.1	C	0.2	A	15.1	C
	PM	0.6	A	18.5	C	0.6	A	18.5	C

*Signalized Intersection

Project Signal Warrant Analysis

With the project, the peak hour signal warrant would be met at the intersection of Highway 1 at Cypress Avenue. With signalization, this intersection would operate at LOS A under the AM and PM peak hours for both project scenarios. The signal warrant analysis sheets are included in Appendix E.

Project Impacts on Bicycle and Pedestrian Facilities

It is reasonable to assume that bicycle trips will comprise no more than 5 percent of the travel mode share to the site during the peak commute periods. This would equate to 22 and 17 new bicycle trips during the AM and PM peak hours, respectively. These volumes of bicycle trips are not expected to exceed the bicycle-carrying capacity of streets surrounding the site, and the increase in bicycle trips is not expected to require new off-site bicycle facilities.

The proposed project would add a pedestrian path along the project frontage. There are currently no sidewalks provided in either of these neighborhoods. It is recommended that the applicant extend a sidewalk from the project frontage to the transit stop located on Airport Street near the La Granada Avenue intersection to facilitate and encourage transit usage by both residents and visitors.

Project Impacts on Transit Service

The transit service in the project vicinity is minimal. As mentioned in Chapter 2, this area is serviced by only one route which provides 1-2 hour headways. However, the project would not generate a need for additional transit service. Assuming a transit mode share of 5 percent, the new development would add 15 and 13 potential new transit trips during the AM and PM peak hours, respectively. It is expected that these additional riders could be accommodated by the existing transit service.

Site Access

The site review is based on the site plan dated 2008 by Macleod and Associates. The site access was evaluated in accordance with generally accepted traffic engineering standards. Access to the site would be provided by five two-way driveways on Airport Street – two driveways to access the Wellness Center (the southern portion of the project site) and three to the Office Park site (the larger portion of the project site located to the north). Two of the Office Park driveways have an island separating ingress and egress. Any landscaping and signage should be located in such a way as to ensure an unobstructed view for drivers exiting the site. Typically, the installation of left turn pockets would be considered for this type of new development. Analysis shows that left turn pockets are not warranted for this project for the following reasons. First, the peak hour southbound through traffic volumes are low on Airport Street at the proposed driveway locations for the project (103 AM trips and 84 PM trips). Under proposed conditions, only 119 project trips would make a left turn during the AM peak hour and 31 trips during the PM peak hour. These volumes do not warrant the installation of a left turn pocket. Second, Airport Street is not wide enough for a new lane. Finally, there are no left turn pockets on Airport Street in the project vicinity. Thus, the installation of left turn pockets is not warranted as part of this project.

On-Site Circulation

The onsite circulation was reviewed in accordance with generally accepted traffic engineering standards. Generally, the proposed plan would provide adequate connectivity through the parking areas for vehicles. The drive aisles proposed are approximately 24 feet in width. This aisle dimension is satisfactory for two-way vehicle flow with 90-degree parking. There are no proposed dead-end aisles.

5.
Cumulative Conditions

This chapter presents a summary of the traffic conditions that would occur under cumulative conditions with and without the project. Cumulative conditions represent conditions 20 years into the future.

Roadway Network under Cumulative Conditions

The intersection lane configurations under cumulative conditions were assumed to be the same as described under project conditions.

Cumulative Traffic Volumes

Traffic volumes under cumulative conditions were estimated by applying to the existing volumes an annual growth rate of one percent for twenty years, then adding the trips from approved developments and the project. In addition, there are two approved developments on the approved development list received from the County of San Mateo with a 'proposed' status (see Table 8). As these projects had not yet been approved at the time of this report, they are included in the cumulative scenario but not the background scenario. The 1% growth rate factor was based upon C/CAG model forecasts. The growth was based on a 20-year projection. Cumulative traffic volumes without the project trips are shown on Figure 14. Cumulative traffic volumes with project trips are shown on Figure 15.

Intersection Levels of Service under Cumulative Conditions

The results of the level of service analysis under Cumulative Conditions both with and without the Project show that all the intersections would operate at LOS C or better (see Table 9). As mentioned previously,

Table 8
Approved Developments-Cumulative Scenario

Land Use	Size	Location
Commercial	17,147 s.f.	264, 268, 272, 276 & 280 Princeton Ave.
Mixed-Use	1,622 s.f.	Princeton Ave. at Broadway

Source: San Mateo County Planning & Building Division
Trip generation rates from ITE Trip Generation Manual, 7th and 8th Editions.

Hexagon performed travel time runs using two different routes to determine the trip distribution patterns for vehicles traveling from the project site to northbound Highway 1.

The first route included northbound Airport Street and eastbound Cypress Avenue to northbound Highway 1. The second route included southbound Airport Street to eastbound Cornell Avenue to eastbound Prospect Way to northbound Capistrano Road to northbound Highway 1. The travel time runs showed that the northbound Airport Street route took half the time of the southbound Airport Street route (two minutes as opposed to four minutes). As a result, Hexagon assumed that vehicular traffic traveling from the project site to northbound Highway 1 would proceed north on Airport Street to Cypress Avenue and turn left onto Highway 1.

Under cumulative with no project PM peak hour conditions there would be a 46.0 second delay for the worst movement (eastbound left) of the Cypress Avenue at Highway 1 intersection. This delay would continue to increase under the project condition scenario. The worst-case delay for this movement would be 131.7 seconds more than without the project during the PM peak hour. As a result, some of the project trips might take the southbound Airport Street route to equalize this delay. However, Hexagon found that even if 25 percent of the project traffic took the southbound route as opposed to the northbound route, the delay at the intersection would continue to operate at LOS F for the left turn from Cypress Avenue onto Highway 1 and the signal warrant would be met. The level of service calculation sheets are included in Appendix B.

Cumulative Signal Warrant Analysis

The peak-hour signal warrant (*MUTCD 2003*, Urban Warrant) was checked for the seven currently unsignalized intersections to determine whether signalization would be justified on the basis of cumulative peak-hour volumes. The analysis showed that the study intersection of Highway 1 at Cypress Avenue would meet the peak hour signal warrant under cumulative conditions both with and without the project. The signal warrant analysis sheets are included in Appendix E.

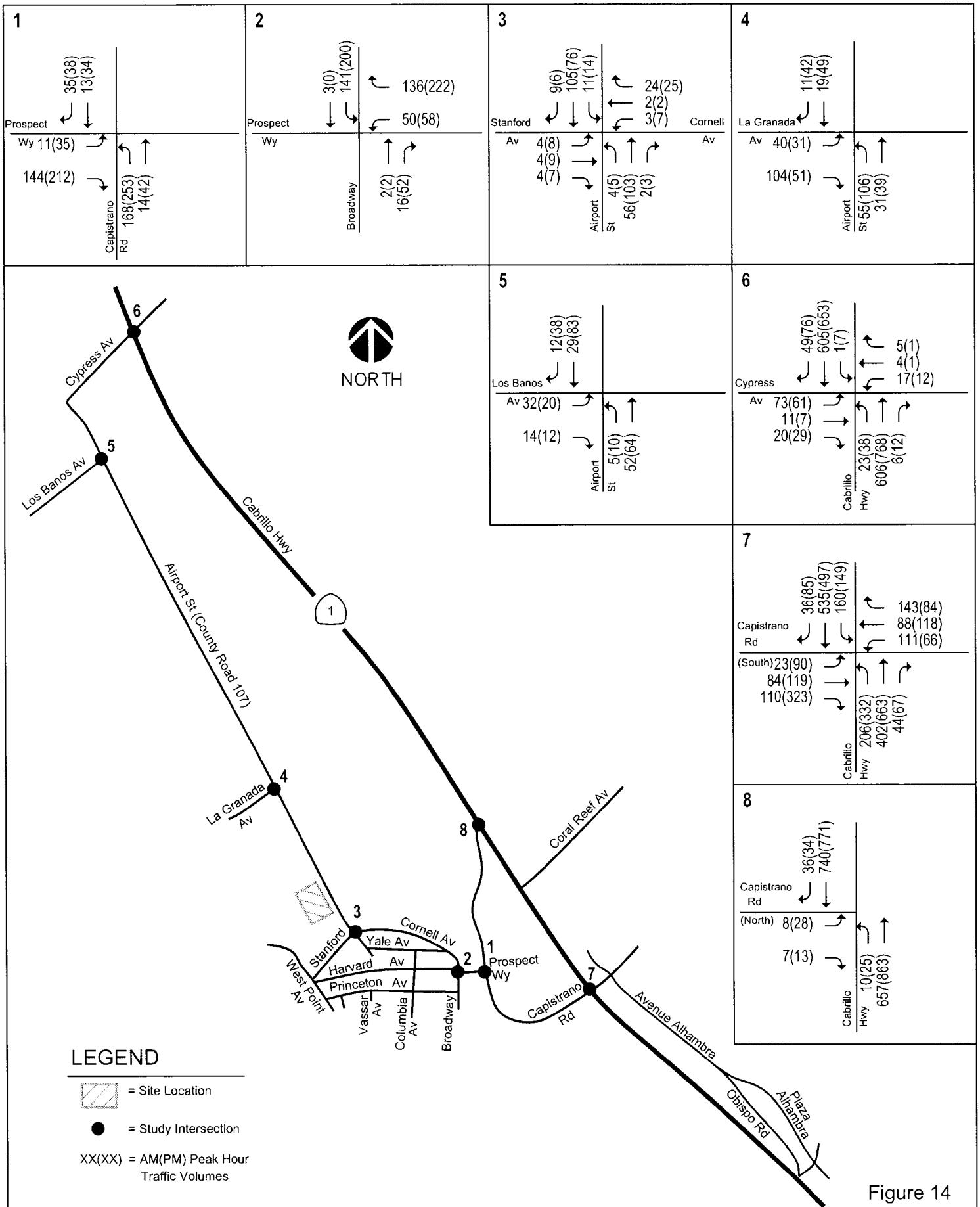


Figure 14

CUMULATIVE TRAFFIC VOLUMES WITHOUT PROJECT

Big Wave Office Park and Wellness Center

Hexagon Transportation Consultants, Inc.

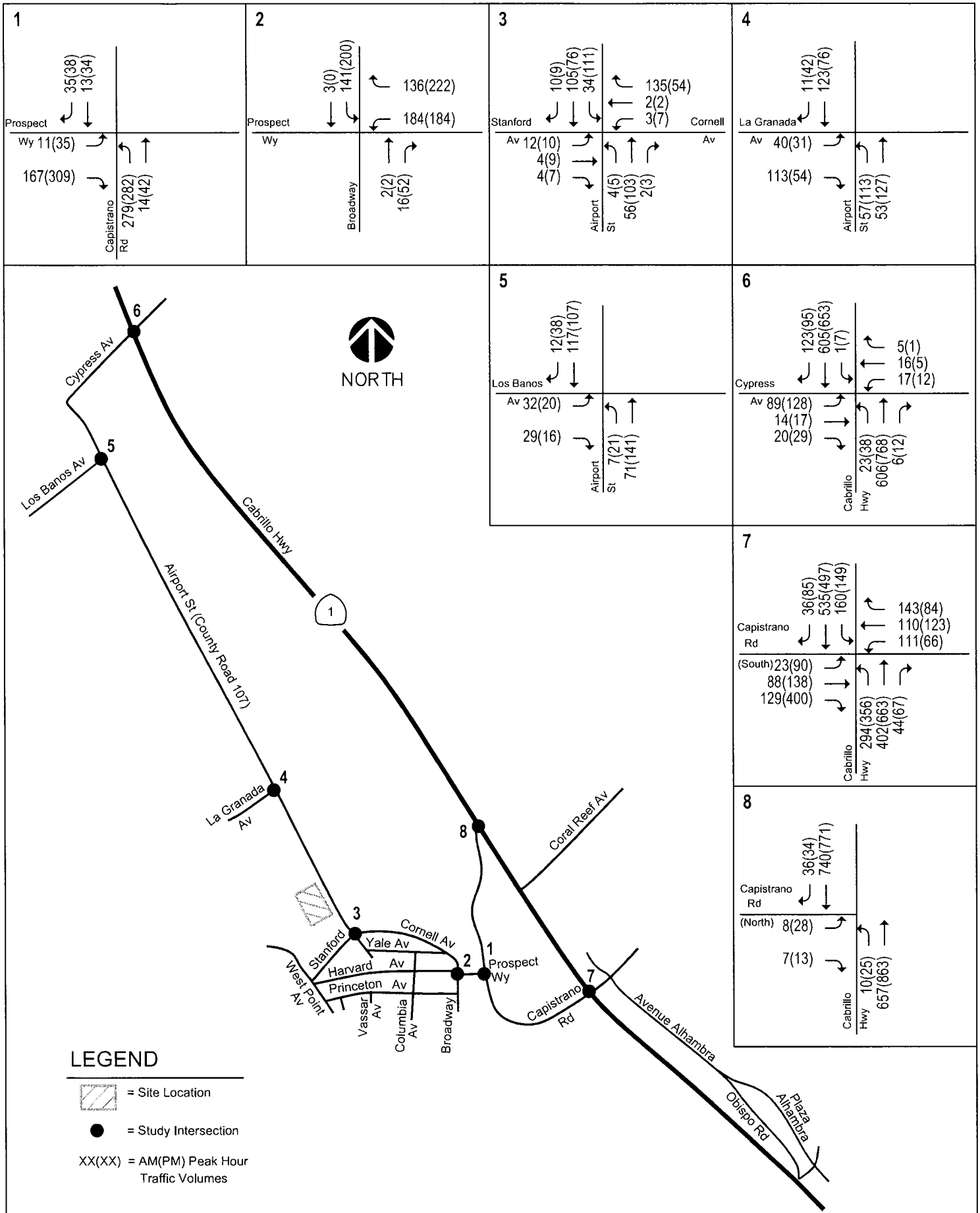


Figure 15

CUMULATIVE TRAFFIC VOLUMES

Big Wave Office Park and Wellness Center

Hexagon Transportation Consultants, Inc.

Table 9
Cumulative Intersection Levels of Service

# Intersection	Peak Hour	Cumulative w/o Project Average Delay	Cumulative w/o Project Average LOS	Cumulative w/o Project Worst Delay	Cumulative w/o Project Worst LOS	Cumulative w/ Project Average Delay	Cumulative w/ Project Average LOS	Cumulative w/ Project Worst Delay	Cumulative w/ Project Worst LOS
1 Prospect & Capistrano	AM	7.1	A	9.3	A	7.5	A	9.6	A
	PM	7.7	A	11.1	B	8.5	A	11.9	B
2 Broadway & Prospect	AM	8.3	A	9.9	A	10.7	A	12.8	B
	PM	8.6	A	11.0	B	12.1	A	16.0	C
3 Airport & Stanford/Cornell	AM	2.1	A	9.7	A	4.8	A	11.0	B
	PM	2.7	A	10.0	A	4.6	A	11.9	B
4 Airport & La Granada	AM	6.7	A	9.3	A	5.0	A	10.2	B
	PM	5.1	A	9.9	A	4.0	A	10.4	B
5 Airport & Los Banos	AM	3.1	A	9.0	A	2.4	A	9.6	A
	PM	1.7	A	9.4	A	1.5	A	9.9	A
6 Hwy 1 & Cypress	AM	3.1	A	34.6	D	5.1	A	52.7	F
	PM	3.2	A	46.0	E	18.2	C	177.7	F
7 Hwy 1 & Capistrano (South)*	AM	26.0	C	-	-	26.9	C	-	-
	PM	25.5	C	-	-	26.3	C	-	-
8 Hwy 1 & Capistrano (North)	AM	0.2	A	17.3	C	0.2	A	17.3	C
	PM	0.7	A	23.2	C	0.7	A	23.2	C

*Signalized Intersection

6. Conclusions

This report presents the results of the traffic impact analysis conducted for the Big Wave Office Park and Wellness Center. The project site is located on Airport Street, north of the Princeton/Pillar Point Harbor area in unincorporated San Mateo County. The project includes a Wellness Center with the following components:

- 43 one-bedroom units for developmentally disabled adults
- 7 two-bedroom units for developmentally disabled adults
- 5 breezeway units with 4 bedrooms each which can house up to 20 residents/staff aides
- 20,000 s.f. of storage space
- 5,326 s.f. of community center (Pool/Fitness Center)

In addition to the Wellness Center, the proposed project would include 90,000 s.f. of general office, 56,250 s.f. of research and development, 33,750 s.f. of storage and 45,000 s.f. of light manufacturing. The project would have five full-access driveways on Airport Street. Parking for the project would be provided on site. Currently the site is vacant.

The potential impacts of the project were evaluated in accordance with the standards set forth by the County of San Mateo. The study included an analysis of AM and PM peak-hour traffic conditions at one signalized intersection and seven unsignalized intersections.

Project Trip Generation

Application of ITE standard trip generation rates to the proposed development shows that the project is estimated to generate 2,123 daily trips, including 292 trips (243 inbound and 49 outbound) during the AM peak hour, and 268 trips (63 inbound and 206 outbound) during the PM peak hour.

Recommended Improvements

The following measure is recommended in conjunction with the proposed project:

Highway 1 at Cypress Avenue. Based on project and cumulative with and without project conditions, the peak hour signal warrant is met at the intersection of Highway 1 at Cypress Avenue. With this improvement, the Highway 1/Cypress Avenue intersection would operate at LOS A during both the AM and PM peak hours. Under signalized conditions, the existing roadway geometry would be adequate to handle the anticipated traffic demand. It is recommended that following project occupancy, the applicant fund a yearly monitoring system at this intersection which would entail a traffic count and level of service analysis as well as a signal warrant analysis to determine if/when signalization is warranted.

Site Access and Circulation

The site review is based on the site plan dated 2008 by Macleod and Associates. The site access was evaluated in accordance with generally accepted traffic engineering standards. Access to the site would be provided by five two-way driveways on Airport Street – two driveways to access the Wellness Center (the southern portion of the project site) and three to the Office Park site (the larger portion of the project site located to the north). Two of the Office Park driveways have an island separating ingress and egress. Any landscaping and signage should be located in such a way as to ensure an unobstructed view for drivers exiting the site.

On-Site Circulation

The onsite circulation was reviewed in accordance with generally accepted traffic engineering standards. Generally, the proposed plan would provide adequate connectivity through the parking areas for vehicles. The drive aisles proposed are approximately 24 feet in width. This aisle dimension is satisfactory for two-way vehicle flow with 90-degree parking. There are no proposed dead-end aisles.

Addition to Appendix H of the DEIR:

A) Hydrologic Calculations

Big Wave Wellness Center
Storm Water Design Flow Calculations, 2/9/10 SH

Watershed	Description	Area (sq ft)	S	C	Runoff Distance	Tc (min)	10 year (in/hr)	100 year (in/hr)	10 year Q (cfs)	100 year Q (cfs)	Storage (cf) C.3 Required	Storage (cf) 10 year Q Req	C.3 Drain Rock (35% void: cy	10 year Rock (35% void: cy	C.3 C.3 (hr) (Perm 0.6 in/hr)	10 y draw dwn (hr) (Perm 0.6 in/hr)
Wellness Center:																
Wetlands	Forested Wetlands w/ depression storage and roughness	125,000	0.015	0.1	120	11.6	2.0	3.0	0.6	0.9	2083	20833				
Organic Garden	No till cross furrows	45,000	0.015	0.1	220	12.5	1.9	2.9	0.2	0.3	750	7125				
Permeable Pavers (with storage and draw down)	Concrete Pavers with #8 space annually vacuumed	25,000	0.015	0.15	320	13.3	1.8	2.8	0.2	0.2	417	3750				
Roof Area (with storage and draw down)	Underdrain system under parking lot	35,000	0.015	0.15	320	13.3	1.8	2.8	0.2	0.3	583	5250				
	Composite Runoff Coeficient and Parking lot Storage			0.113							1750	16125	185	1706	1.4	12.9
Total: New Development	Flow and Drain Rock Depth (inches)	230,000							1.2	1.8			2	22		
Total: Existing Farm	Tilled and sloped for winter drainage	230,000	0.015	0.3	200	12.3	1.9	2.9	3.0	4.6						
Office Park:																
Wetlands	Forested Wetlands w/depression storage and roughness	226,000	0.015	0.1	120	11.6	2.0	3.0	1.0	1.6	3767	37667				
Permeable Pavers (with storage and draw down)	Concrete Pavers with #8 space annually vacuumed	315,000	0.015	0.15	400	14.0	1.5	2.6	1.6	2.8	5250	39375				
Roof Area (with storage and draw down)	Underdrain system under parking lot	80,000	0.015	0.15	350	13.6	1.7	2.7	0.5	0.8	1333	11333				
	Composit Runoff Coeficient and Parking Lot Storage			0.132							10350	88375	1095	9352	0.7	5.6
Total: New Development									3.2	5.2			1	10		
Total: Existing Farm	Tilled and sloped for winter drainage	621,000	0.015	0.3	320	13.3	1.8	2.8	7.8	12.1						

Notes:

1. Existing Farming plowed in Winter for Drainage, Impermeable Clay. Proposed development, infiltration parking lot with roof draining into parking lot, forested wetlands, organic farming
2. Runoff Flow Rate for South Parcel, Farmed: 3.0 cfs for 10 year storm and 4.6 cfs for 100 year storm
3. Runoff Flow Rate for Wellness Center on South Parcel as Proposed: 1.2 cfs for 10 year storm and 1.8 cfs for 100 year Storm.
4. Wellness Center Flow Reduction: (10 year storm) 60% reduction, (100 year storm) 61% reduction
5. Runoff Rate for North Parcel, farmed: 7.8 cfs for 10 year and 12. 1 for 100 year storm
6. Runoff Rate for Office Park on North Parcel: 3.2 cfs for 10 year and 5.2 for 100 year
7. Office Park Flow Reduction: (10 year storm) 59% Reduction, (100 year storm) 57% reduction
8. To store the C.3 required flow in the gravel below the parking lot only 1 to 2 inches of gravel is needed.
9. To store the 10 year flow 12 inches of gravel in needed under the office park parking lot and 22 inches in needed in the wellness center site.
10. Since surface flow is needed in the Wellness Center, 12 inches of gravel (6 times more than the c.3 requirement) will be provided in the Wellness Center Parking lot
11. With a low permiabliltiy soil (.6 inches/hour) it takes 1.5 hours to drain the C.3 storm and 12 hours to drain the 10 yr storm for the Wellness Center.
13. To drain the Office Park parking lot takes 1 hour for c.3 storage and 6 hours for a 10 year storm.
14. The parking lots will be designed to store and drain the 10 year storm.

Addition to Appendix H of the DEIR:

B) The 2005 FEMA Letter of Map Amendment Determination Document

Federal Emergency Management Agency

Washington, D.C. 20472

November 1, 2005

MR. JOHN C. BERRY
BERRY & ASSOCIATES CIVIL ENGINEER
1733 WOODSIDE ROAD, SUITE 335
REDWOOD CITY, CA 94061

CASE NO.: 06-09-0050A
COMMUNITY: SAN MATEO COUNTY, CALIFORNIA
(UNINCORPORATED AREAS)
COMMUNITY NO.: 060311

DEAR MR. BERRY:

This is in reference to a request that the Federal Emergency Management Agency (FEMA) determine if the property described in the enclosed document is located within an identified Special Flood Hazard Area, the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood), on the effective National Flood Insurance Program (NFIP) map. Using the information submitted and the effective NFIP map, our determination is shown on the attached Letter of Map Amendment (LOMA) Determination Document. This determination document provides additional information regarding the effective NFIP map, the legal description of the property and our determination.

Additional documents are enclosed which provide information regarding the subject property and LOMAs. Please see the List of Enclosures below to determine which documents are enclosed. Other attachments specific to this request may be included as referenced in the Determination/Comment document. If you have any questions about this letter or any of the enclosures, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 3601 Eisenhower Avenue, Suite 130, Alexandria, VA 22304-6439.

Sincerely,

Doug Bellomo, P.E., Chief
Hazard Identification Section, Mitigation Division
Emergency Preparedness and Response Directorate

LIST OF ENCLOSURES:
LOMA DETERMINATION DOCUMENT (REMOVAL)

cc: State/Commonwealth NFIP Coordinator
Community Map Repository
Region

COUNTY OF SAN MATEO
Department of Public Works

INTER-DEPARTMENTAL CORRESPONDENCE

Date: July 22, 2005

TO: William Cameron, Building Inspection Manager

FROM: Neil R. Cullen, Director of Public Works

SUBJECT: **FEMA Map LOMA**

My staff has been in discussion with Mr. John Berry concerning his request, on behalf of his client, to have his FIRM map amendment request for parcels APN 047-311-060 and 047-312-040 "acknowledged" by San Mateo County and forwarded to FEMA's offices in Alexandria, Virginia for consideration.

Staff has found that there is insufficient data available to confirm or dispute the map amendment request. However, I believe that Mr. Berry's request that the final line in Section B of the Community Acknowledgement Form be stricken and initialed and that the document be forwarded to FEMA for consideration is reasonable, as I believe that this is the reference on the form that makes a judgment concerning the validity of the map amendment request.

I am forwarding Mr. Berry's application to you and have tagged the Community Acknowledgement to which I refer. I have also stricken and initialed the final line in Section B on an extra copy, as noted above.

Should you have any questions concerning this matter, you may contact Joe LoCoco of my staff at extension 1454. Please advise Mr. Berry if you concur with my recommendation and if you will be executing and forwarding his application.

F:\USERS\JOEL\WORD\MISC\Firmamendmentrqstjuly2005memotobuilding.DOC

Berry & Associates
1733 Woodside Road, Ste 335
Redwood City, CA 94061
Phone 650 368-0750 *Fax 650 368-1810

November 9, 2004

MEMORANDUM:

SUBJECT: Airport Street, El Granada Job # 2364
Flood Plain Issues (Flood Zone A)
APN 047-311-061

TO: Gary Fitzer
San Mateo County

FROM: John C. Berry

Gary, as previously discussed, we have superimposed the flood plain limits from the FEMA Flood Insurance Rate Map onto an area-wide Topo Map (USGS-NDVG DATUM) which includes APN 047-311-061. (Copy attached) there is little or no correlation between the flood limit and the shape of the contours in this area.

I have followed the FEMA Guide for determining BFE's in Zone A areas, however, in a "coastal" area the guide suggests that flood elevations be obtained from local agency records, if possible.

Given that the perimeter elevations for the superimposed flood area vary from 9.7 to 55.0, it is reasonable to suggest that a letter of map revision (LOMA) is appropriate.

I have attempted to apply the "CHAMPS" Program from the FEMA, Zone A Program for coastal lands; however, a "back-bay" situation (for APN 047-311-061) does not lend itself to these computations.

My only option is to consult flooding records in the Princeton Area and if possible, derive a reasonable 100-year base flood elevation from this data.

Based on my conversation with Henry Chau at FEMA in Oakland, the next step would be for me and an agent of San Mateo County to contact him with a suggested BFE along with proposed map revisions to obtain preliminary concurrence before the application is submitted to revise the FIRM.

Thank you,

John C. Berry, RCE 18720

 | Date: November 1, 2005 | Case No.: 06-09-0050A | LOMA

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	SAN MATEO COUNTY, CALIFORNIA (Unincorporated Areas)	A parcel of land in San Mateo County, as described in the Grant Deed recorded as Document No. 2002-214504; A parcel of land in San Mateo County, as described in the Individual Grant Deed recorded as Document No. 2000-083107, all in the Office of the Recorder, San Mateo County, California (APN 047-311-060 and 047-312-040)
	COMMUNITY NO.: 060311	
AFFECTED MAP PANEL	NUMBER: 0603110113B	
	NAME: SAN MATEO COUNTY, CALIFORNIA (UNINCORPORATED AREAS)	
	DATE: 7/5/1984	
FLOODING SOURCE: HALF MOON BAY		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 37.504, -122.496 SOURCE OF LAT & LONG: PRECISION MAPPING STREETS 7.0 DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
—	—	—	Airport Street	Property	C	8.5 feet	—	9.5 feet

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

ZONE A

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Amendment for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document amends the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 3601 Eisenhower Avenue, Suite 130, Alexandria, VA 22304-6439.

Doug Bellomo, P.E., Chief
Hazard Identification Section, Mitigation Division
Emergency Preparedness and Response Directorate

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP AMENDMENT
DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

ZONE A (This Additional Consideration applies to the preceding 1 Property.)

The National Flood Insurance Program map affecting this property depicts a Special Flood Hazard Area that was determined using the best flood hazard data available to FEMA, but without performing a detailed engineering analysis. The flood elevation used to make this determination is based on approximate methods and has not been formalized through the standard process for establishing base flood elevations published in the Flood Insurance Study. This flood elevation is subject to change.

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 3601 Eisenhower Avenue, Suite 130, Alexandria, VA 22304-6439.

Doug Bellomo, P.E., Chief
Hazard Identification Section, Mitigation Division
Emergency Preparedness and Response Directorate

EXHIBIT A

APN [illegible]

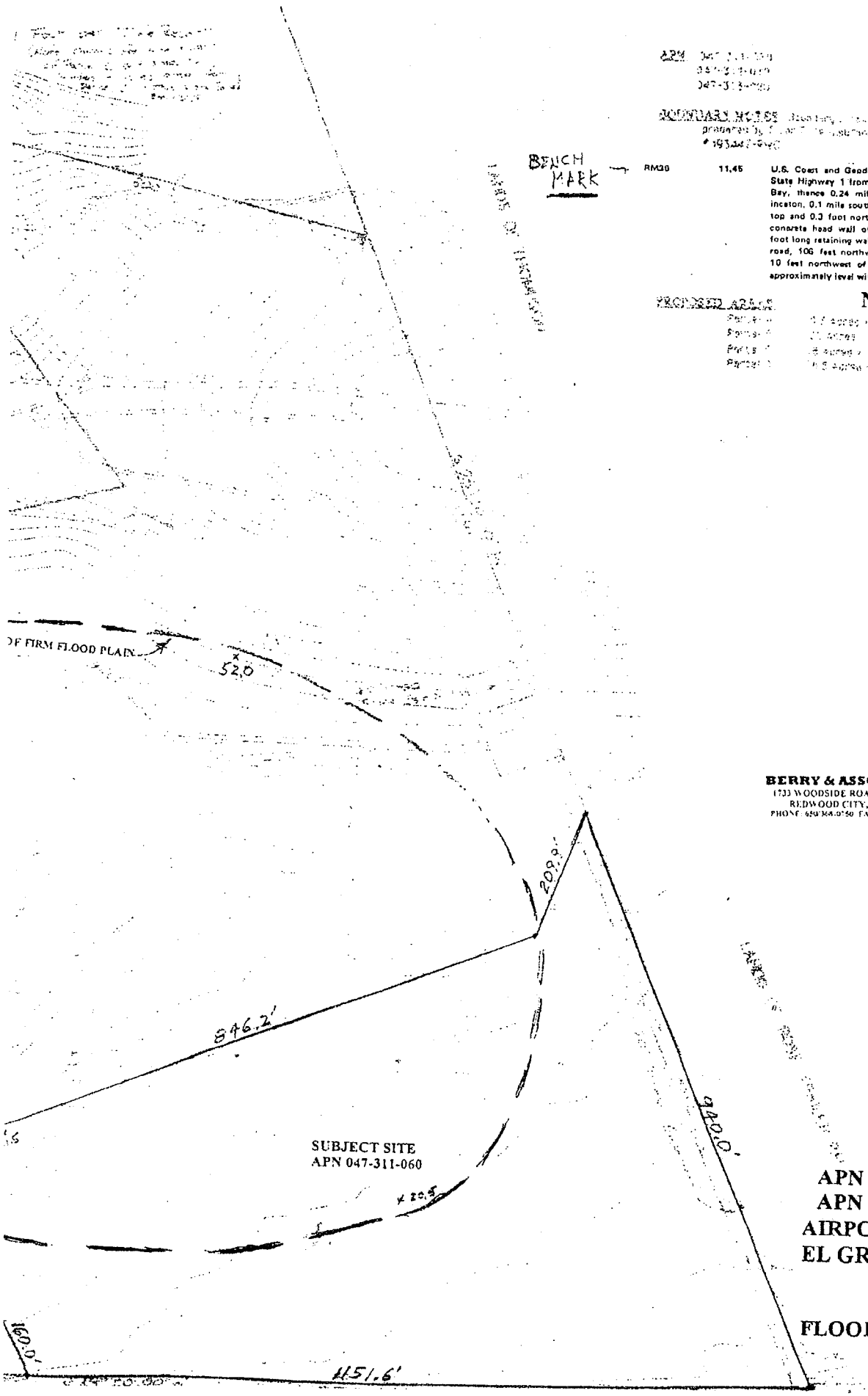
BOUNDARY NOTES [illegible]

BENCH MARK → RM38 11.45 U.S. Coast and Geodetic Survey disk 4.15 miles northwest along State Highway 1 from the junction of Kelly Avenue at Half Moon Bay, thence 0.24 mile southwest along Capistrano Road, at Princeton, 0.1 mile southeast of the junction of Prospect Way, in the top and 0.3 foot northwest of the southeast end of the southwest concrete head wall of a 36-inch concrete pipe culvert and a 73-foot long retaining wall, 19 feet southwest of the centerline of the road, 106 feet northwest of the north corner of a cafe building, 10 feet northwest of the southeast end of a steel guardrail, and approximately level with the road.

PROPOSED AREAS [illegible]

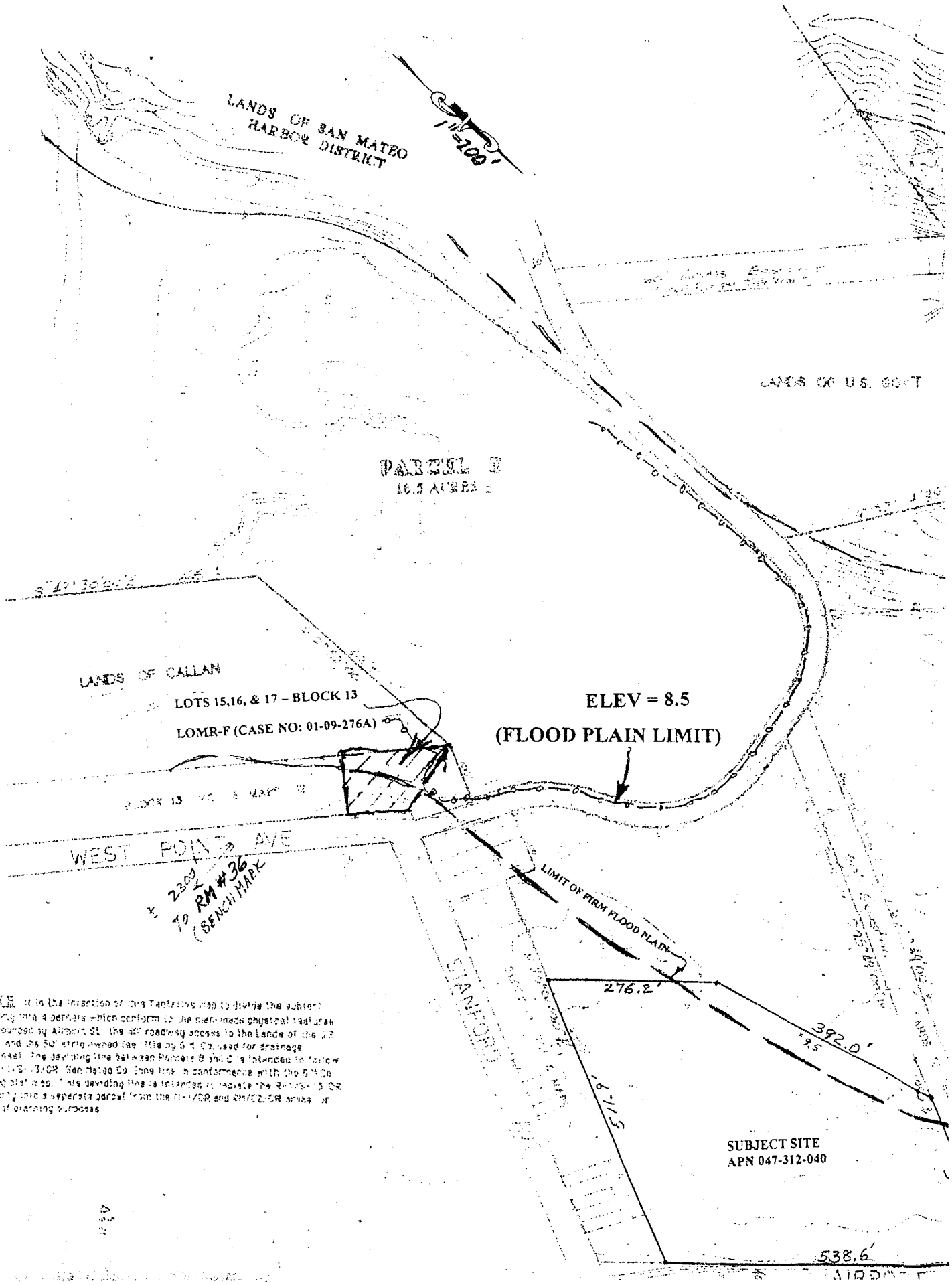
NGVD-29 DATUM

BERRY & ASSOCIATES
1733 WOODSIDE ROAD, SUITE 335
REDWOOD CITY, CA 94061
PHONE 650/364-0750 FAX 650/368-1810



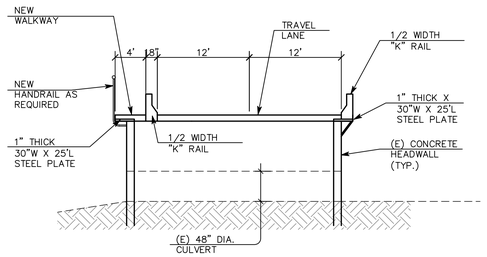
APN 047-311-060
APN 047-312-040
AIRPORT STREET
EL GRANADA,CA

FLOOD PLAIN EVALUAT


LANDS OF SAN MATEO HARBOR DISTRICT
1"=200'
LANDS OF U.S. GOVT
PARCEL I
LANDS OF CALLAN
LOTS 15,16, & 17 – BLOCK 13
LOMR-F (CASE NO: 01-09-276A)
ELEV = 8.5
(FLOOD PLAIN LIMIT)
WEST POINT AVE
RM #36
(BENCH MARK)
LIMIT OF FIRM FLOOD PLAIN
276.2'
392.0'
517.9'
538.6'
SUBJECT SITE
APN 047-312-040

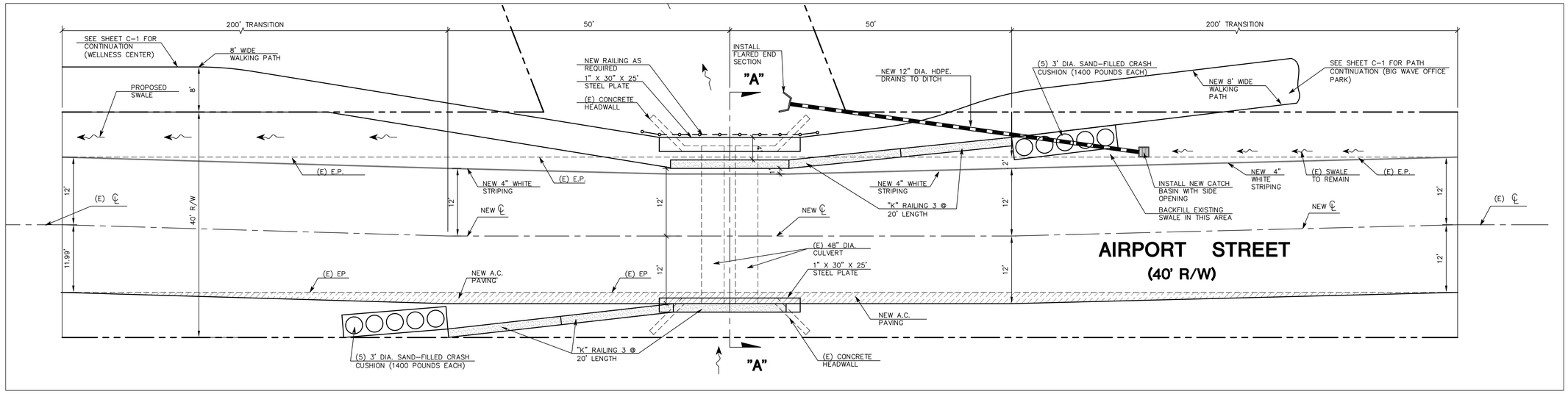
Addition to Appendix H of the DEIR:

C) Concrete Grid Pavers-Fireline, Driveway and Intermittent Parking



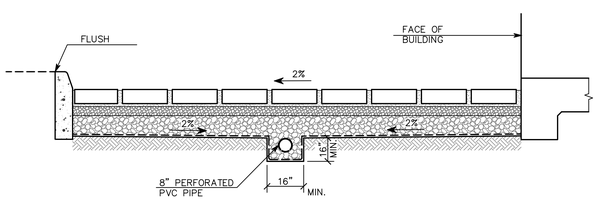
SECTION A-A

NO SCALE



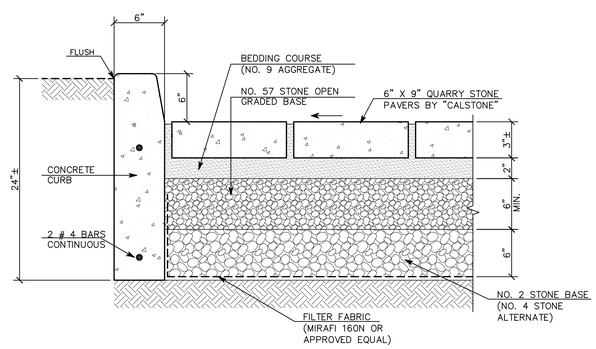
A ENLARGE AREA

NO SCALE



B TYPICAL SECTION

SCALE: NOT TO SCALE



C CURB AND PAVEMENT DETAIL

SCALE: NOT TO SCALE

REC.	DESCRIPTION	BY:	DATE:

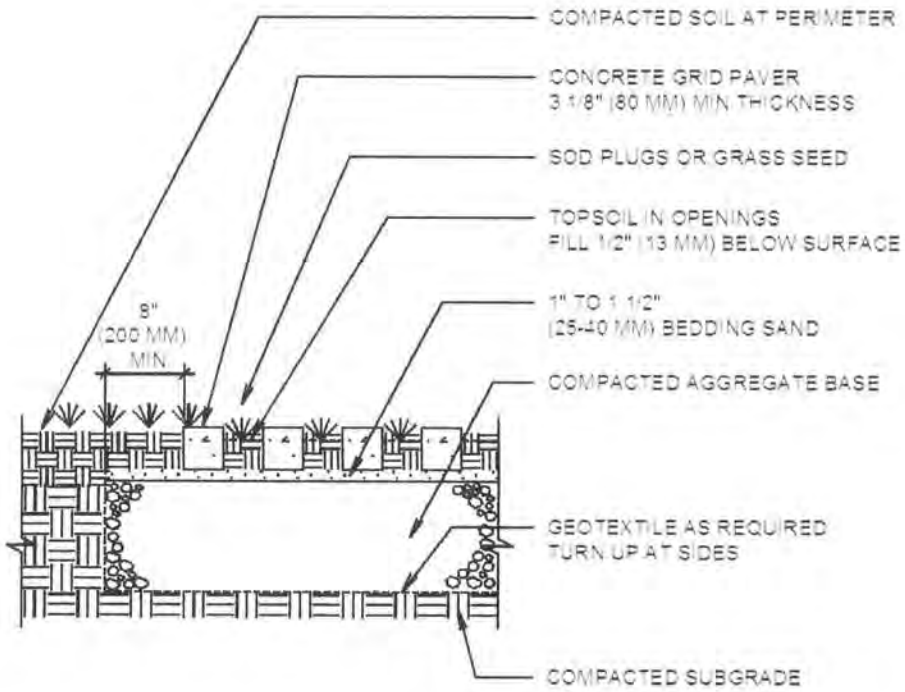
REGISTERED PROFESSIONAL ENGINEER DANIEL G. MACLEOD No. 35048 CIVIL STATE OF CALIFORNIA

MacLEOD AND ASSOCIATES
CIVIL ENGINEERING · LAND SURVEYING
965 CENTER STREET · SAN CARLOS · CA 94070 · (650) 593-8580

PREPARED FOR:
BIG WAVE LLC

DETAIL SHEET
BIG WAVE OFFICE PARK
AIRPORT STREET
SAN MATEO COUNTY
CALIFORNIA
PRINCETON BY THE SEA

DRAWN BY:	AAP
DESIGNED BY:	VPG
CHECKED BY:	DGM
SCALE:	NONE
DATE:	05/17/10
DRAWING NO.	1608-00
SHEET	C-4



NOTES:

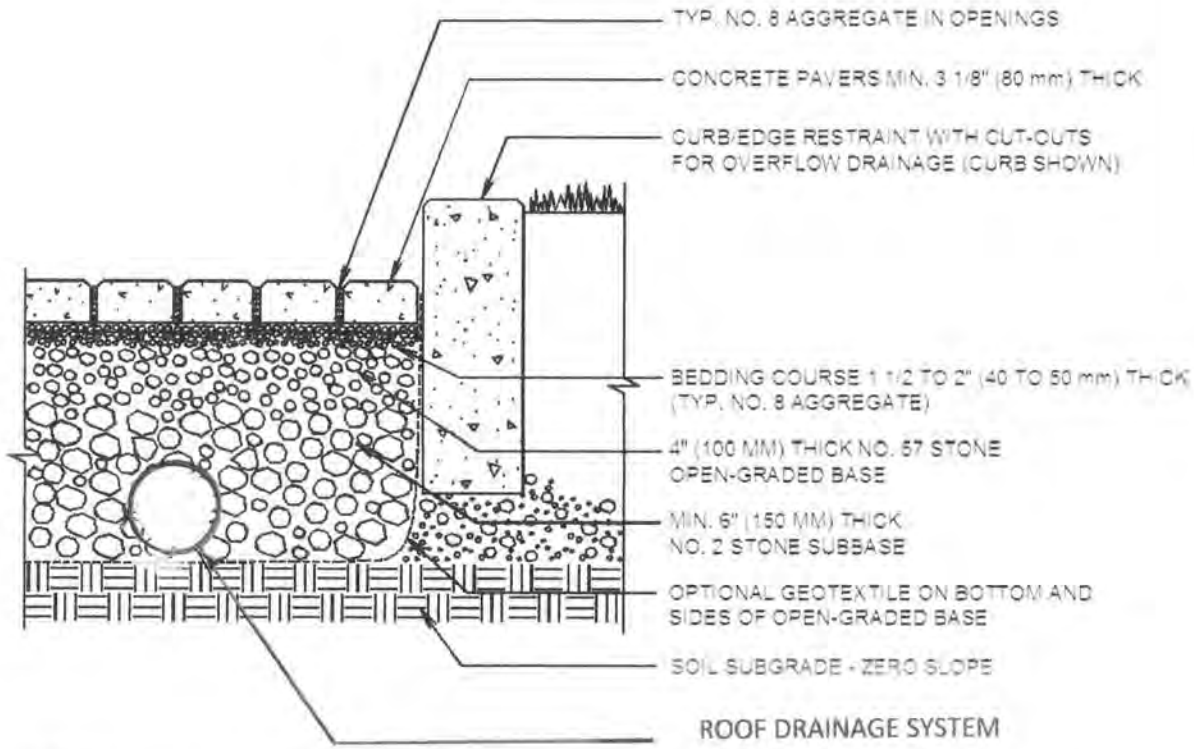
1. BASE THICKNESS VARIES WITH TRAFFIC, CLIMATE, AND SUBGRADE.
2. MINIMUM BASE THICKNESS: 6" (150 MM) RESIDENTIAL DRIVEWAYS, 8" FIRELANES & PARKING LOTS.

CONCRETE GRID PAVERS-FIRELANE, DRIVEWAY & INTERMITTENT PARKING

DRAWING NO.	ICPI-08
SCALE	F.S.

Addition to Appendix H of the DEIR:

D) Permeable Pavement with Full Exfiltration to Soil Subgrade.



NOTES:

1. 2 3/8" (60 MM) THICK PAVERS MAY BE USED IN PEDESTRIAN APPLICATIONS.
2. NO. 2 STONE SUBBASE THICKNESS VARIES WITH DESIGN. CONSULT ICPI PERMEABLE INTERLOCKING CONCRETE PAVEMENT MANUAL.

PERMEABLE PAVEMENT WITH FULL EXFILTRATION TO SOIL SUBGRADE

DRAWING NO	ICPI-68
SCALE	NO SCALE

Addition to Appendix I of the DEIR:

"Noise Measurement" email from Dan Hooper to Jennie Anderson (CAJA), dated June 5, 2009.

From: "Jennie Anderson" <jennie.anderson@cajaeir.com>
To: CLeung@co.sanmateo.ca.us
CC: dan.hooper@cajaeir.com; geoff.reilly@cajaeir.com
Date: 6/5/2009 1:56 PM
Subject: FW: Fwd: Noise Measurements
Attachments: noise monitoring locations.pdf; HMB Airport noise contours.pdf; RE: Background Noise Study

Hi Camille,

Based on the comments outlined in this email chain, as well as our phone discussion, here are some updates/thoughts from our Noise Specialist regarding noise measurements for the project. Please let me know if you have comments.

Best regards,

Jennie Anderson
Project Manager
Christopher A. Joseph & Associates
Direct: (707) 676-1902

-----Original Message-----
From: Dan Hooper
Sent: Friday, June 05, 2009 12:30 PM
To: Jennie Anderson
Subject: RE: Fwd: Noise Measurements

Jennie,

Thanks for forwarding me the information below. I wanted to lay out for you what I did at the site as well as address everyone's suggestions/concerns below.

I went to the Big Wave site on Tuesday, between the hours of 11:30 am and 2:30 pm. It is typical to go take noise measurements at a site Tuesday through Thursday, during non-rush hour times. This is because traffic patterns on Monday, Friday, and the weekends can vary significantly and are not representative of typical traffic. Rush hour measurements are also typically avoided as cars going slower usually produce less noise.

The weather at the Site on Tuesday was sunny with clear skies. During noise studies it is best to avoid taking measurements in the rain, when it is overcast, or foggy. I took noise measurements at 5 locations, as shown on the attached file (noise monitoring locations). The majority of the existing noise sources would come from the airport and the existing commercial buildings, therefore I made sure to take 3 measurements along Airport Road. Also, I took two measurements in the existing mobile home neighborhood to establish a baseline in order to see how much construction and operation of the project would affect current levels.

I understand that it was suggested that we monitor on a Saturday to capture noise from airplanes landing and taking off from the airport. I do not feel it is necessary for the following reasons:

1). The traffic noise will not be representative on a Saturday, which is a big noise contributor

2). Since the air traffic at HMB is not consistent, there is no guarantee that there would be significantly more planes on a Saturday and that they would be flying overhead during the noise monitoring times.

3). While I was taking the noise measurements (15 minute intervals) on Tuesday, I noted how many planes were overhead. For example, at two of the three noise locations along Airport Road, approximately 2-3 airplanes flew overhead during the 15 minute recording period. This resulted in a noise level of 65 dBA. These levels are consistent with the noise contours outlined in the HMB Airport land use plan (attached). Moreover, at the third location with no airplanes flying overhead, the noise level was approximately 61 dBA. This shows that the noise contributed by airplanes was captured in the noise monitoring.

4). It is also not necessary to conduct noise monitoring at both air strips, as we are only concerned with noise at the project site, not at the airport.

Please let me know if you have any questions or require any further clarification. Thanks

Dan

Dan Hooper, P.E.
Senior Environmental Scientist
Dan.Hooper@cajaeir.com
Christopher A. Joseph & Associates
Environmental Planning and Research
www.cajaeir.com

Oakland Office
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Oakland, CA 94612
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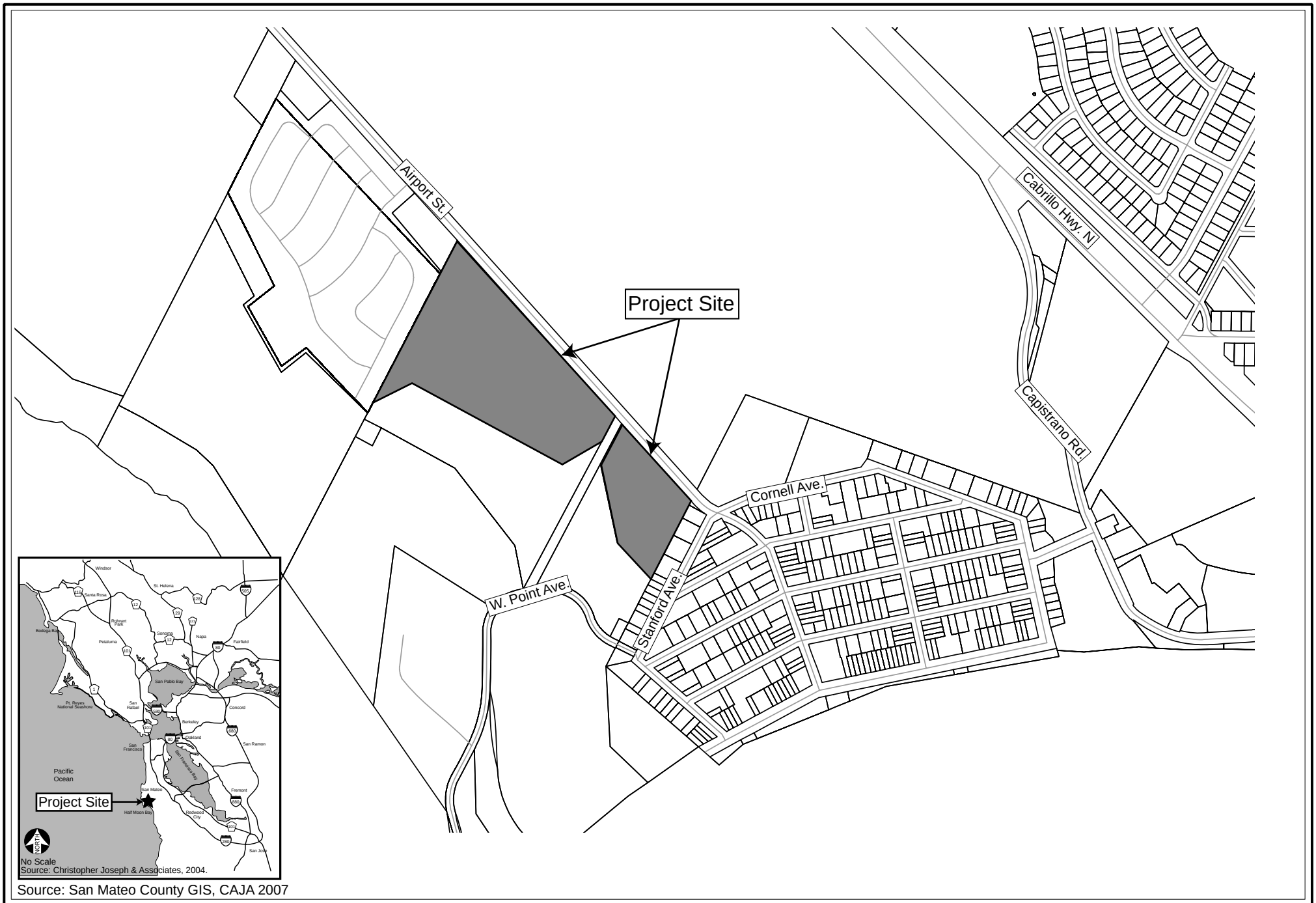
Fax: (510) 452-5202
Mobile: (415) 205-8985

Los Angeles * Santa Clarita * Agoura Hills * Petaluma * Oakland * Mammoth Lakes

Confidentiality Statement

This transmittal is intended to be transmitted to the person named. Should it be received by another person, its contents are to be treated as strictly confidential. It is privileged communications between the firm and the person(s) named. Any use, distribution or reproduction of the information by anyone other than that person is prohibited.



Source: San Mateo County GIS, CAJA 2007

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

NORTH

0 250 500 750 1000
Scale (Feet)

Figure 1
Regional Vicinity Map

Noise contour lines are usually generated by using the FAA's Integrated Noise Model (INM), a computer program that simulates actual aircraft noise measurements. However, other computer modeling techniques can be used. Noise contour maps identify existing and projected areas that are and will be affected by aircraft noise as defined by the contours. The noise contours shown on the maps do not represent absolute noise levels. Variations in flight activity and locational characteristics (e.g. microclimate, vegetation, buildings, etc.) can extend or reduce the noise affected areas.

The noise metric used in defining aircraft noise contours in California is the Community Noise Equivalent Level metric, referred to as CNEL. The CNEL value represents a 24-hr. weighted annual average noise level. It is a measure of the overall noise experienced during an entire day. The time-weighting accounts for the fact that the noise levels that occur during certain sensitive time periods are penalized for occurring at these times. In the CNEL scale, those aircraft noise events that take place during the evening hours (7 p.m. to 10 p.m.) are penalized by an additional 5 decibels (dB) and those events that occur during the nighttime hours (10 p.m. to 7 a.m.) are penalized additional 10 dB. These penalties were selected by the State of California to attempt to account for increased human sensitivity to noise during the quieter periods of the day, where home activities and sleeping are the most probable activities.

b. Half Moon Bay Airport 1995 Projected Aircraft Noise Contours

The Half Moon Bay Airport noise contours contained in this Plan were developed in 1975 and are computer-projections for 1995. The projected noise contours include the 55 dB CNEL, 60 dB CNEL, and 65 dB CNEL noise contours. The 1975 computer projections included the following assumptions:

* An Instrument Landing System (ILS) will have been installed on Runway 30.
* There would be no changes in the runway configuration.
* Planned annual operations - 240,000 (PANCAP).
* Daily operations, peak day - 1,060.
* Mix of aircraft - 10 jets, 40 twin engine piston, remainder are single engine.
* Daily operations data: 7 a.m. to 7 p.m. - 88 percent; 7 p.m. to 10 p.m. - 9 percent; after 10 p.m. - 3 percent.

* Runway 30 usage - 85 percent; Runway 12 - 15 percent.

* Large aircraft make left turnout.

* "Racetrack pattern" indicates light aircraft traffic in local pattern operations.

Source: San Mateo County Airports Plan, July 1975; Page 123.

The projected 1995 aircraft noise contours for Half Moon Bay Airport are shown on Map HMB-7 on page III.-18.

5. Airport Noise/Land Use Compatibility Criteria For Half Moon Bay Airport

Considerable study has been done by medical researchers regarding the effects of noise on people. There is general agreement that certain types of land uses are not compatible in high noise areas. Interference with speech, sleep disturbance, and nervousness are some of the human health effects of exposure to excessive noise.

Recommendations from the FAA and the Association of Bay Area Government's Regional Airports System Study (RASS) were used to establish airport/land use compatibility criteria for airports located in San Mateo County. The compatibility criteria contained in this Plan for Half Moon Bay Airport are based upon the following:

* Case histories of noise complaints near airports

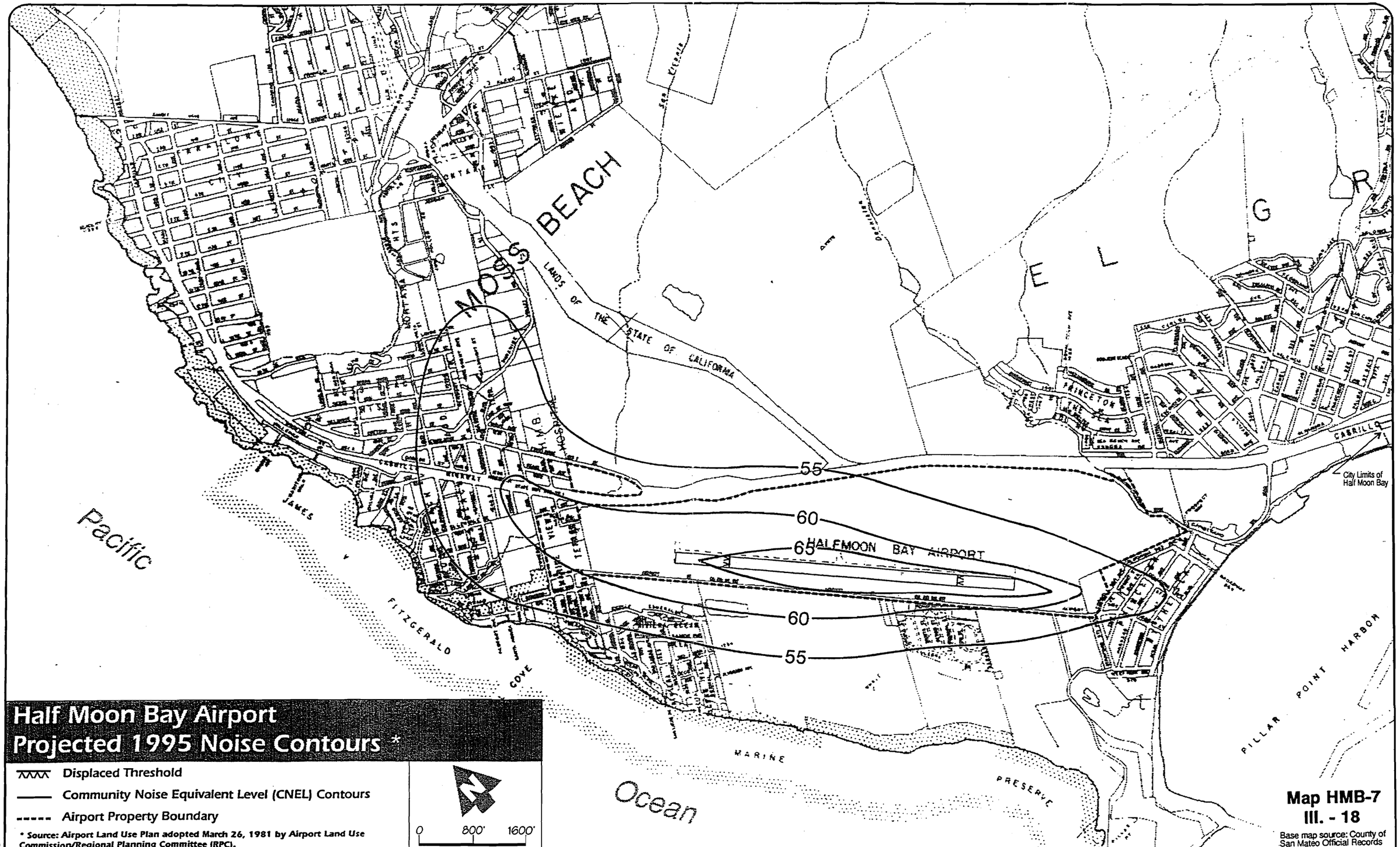
* How well speech can be understood at various noise levels

* Subjective tests of how much noise people judge as acceptable

* Need for freedom from noise

* Typical noise insulation provided by common types of building construction

The aircraft noise/land use compatibility criteria were developed for housing built with ordinary construction. The airport noise/land use compatibility criteria for the Half Moon Bay Airport Land Use Plan Area are shown in Table III.-2 on pages III.-19,20,21. The criteria indicate the compatibility of the proposed land uses listed, based on the relative CNEL range as shown. The Airport Land Use Commission (C/CAG) recognizes the 55 dB CNEL aircraft noise contour at Half Moon Bay Airport as the noise level threshold for reviewing and evaluating proposed land use policy actions.



San Mateo County Comprehensive Airport Land Use Plan

San Mateo County Airport Land Use Commission · December 1995

Half Moon Bay Airport Land Use Plan

cdr5\aluphmb8.cdr rovds 10-12-95

Addition to Appendix K of the DEIR:

Membrane Bioreactor Equipment, Enviroquip and other documents related to wastewater treatment plant design

Big Wave Water System

Description

The Big Wave Water System is comprised of the following elements:

- Storm Water Infiltration
- Onsite Potable Water System
- Water Recycling
- Onsite Fire System

Big Wave will form a Mutual Water Company pursuant to the Public Utilities Code Section 2725. The water system will be permitted by the Environmental Health Department and the Department of Public Works of the County of San Mateo. Detailed plans and specifications will be submitted for review and approval during the building permit phase. The operation will be governed by the Environmental Health Department of the County of San Mateo in compliance with the requirements of the State Department of Public Health. Water Recycling shall comply with the requirements of the Regional Water Quality Control Board. The water system will be operated by the Wellness Center or other licensed contractor. The Mutual Water Company will also providing maintenance for the wastewater collection system and the in-building plumbing for both water and wastewater. The Mutual Water Company will provide invoicing for water used and water disposed.

Storm Water Infiltration System

The project site receives approximately 26 inches of rain per year. The ground water infiltration system is designed to infiltrate between 14 and 20 acre feet of rainwater per year from the roof and parking systems. The existing site is covered by a dense layer of clay that is 18 to 36 inches thick that allows virtually no infiltration. The system is designed to store storm water runoff with gradual infiltration providing biological treatment. The infiltration system will be approved and permitted by the County Department of Public Works and comply the County NPDES storm water permit, specifically specification c.3. This infiltration system has the following environmental benefits as opposed to conventional municipal water supply:

- The system replenishes the limited ground water supply.
- The system eliminates storm water runoff, site erosion and sediment transport into the surface water and surrounding habitat.
- The system is designed to slowly infiltrate through the aerobic soil bacteria zone to adsorb and treat organic compounds associated with vehicle parking.
- Storm water is infiltrated in the shallow water aquifer between the marsh/ocean protecting all domestic supply wells. The flow and direction of the flow is towards the ocean at an average of 500 acre feet per year. Given its location and volume, the infiltration system will not impact the quality of the domestic supply but will guarantee high quality water will continue to flow to the marsh and habitat.
- Operation of this system generates career jobs for Developmentally Disabled adults.

Onsite Potable Water System

The onsite domestic water system includes a well permitted and installed in 1987 and tested and approved by the County in 2009 with a sustained capacity of 34 gallons per minute (49,000 gallons per day) The well water will be treated with ozone for iron and manganese removal and disinfection. The peak average demand for the project is 10,000 gallons per day (11 acre feet per year) requiring the well to operate about 20% of the time. The well will be operated with a backup pump and emergency power. Water at the well after treatment will meet the standards of the Safe Water Drinking Act in Accordance with Title 22. The treated water will be distributed to each building. The building hookups will be 1 inch with a 5/8 inch meter. The buildings will include 6000 gallon storage tanks to provide backup supply with booster pumps to meet peak flow capacity. Each storage and booster pump system will circulate through a filtration system and UV disinfection to maintain the water pure. The filtration system will be designed to provide potable water meeting the specific quality requirements of the user. The system has the following environmental benefits as opposed to conventional municipal water supply:

- The water extracted by the well is less than the water that is recharged into the groundwater by the infiltration system. It is part of the sustainable local water system that has no negative impact to the ground water basin capacity. Water is a critical resource in the State and preserving and conserving this resource has a number of environmental benefits.
- The water system is sustainable and local thus eliminating the need to import water. Reducing the import of water reduces the impacts to the Tuolumne and Merced River systems in Yosemite. It protects the migration of fish through the Delta and clean water flows through the San Francisco Bay.
- The potable water system reduces green house gas production associated with water transport.
- The potable water system is based on small supply and low flows and protects the emergency capacity of the municipal water supplies.
- Operation of this system generates career jobs for Developmentally Disabled adults.

Water Recycling

The water system is designed to provide recycled water for the buildings, the landscaping, the sound and visual barriers and the wetlands restoration. The water recycling system is not an onsite sewage disposal system. The connection to Granada Sanitary District is the onsite sewer system. The water recycling system is comprised of a Membrane Bioreactor (MBR) with Ultraviolet Disinfection, 24 hours of influent and effluent storage provided for each building. Recycled water will comply with Title 22 for unrestricted use. The design for MBR system is attached. The design prepared by Enviroquip based on a 0.1 and 0.25 mgd plant. The MBR is scalable and also attached is the design for a 15,000 gallon per day plant. One plant of this size would be required for the Wellness Center and two plants of this size would be required for the Office Park to meet the criteria for complying Cult - 3. Recycled water will be used for in building toilet flushing, solar panel washing and parking lot cleaning. Recycled water will be used for landscape irrigation, wetlands restoration and organic farming. All recycled water for irrigation will be applied as subsurface drip irrigation. The water recycling system is designed to recycle and utilize all of the potable water extracted with the well. Any excess recycled water or water not meeting Title 22 will be discharged into the GSD sewer system. All flow to the GSD system will be metered and recorded continuously. It is estimated that a total of 8 EDUs will be purchased for emergency and excess discharge into the GSD system. It should be noted that 8

EDU is the estimated cost of the connection and the estimated maximum flow. The size of the connection is 8 inches.

The water recycling system will be comprised of a pressurized 4 inch pipe as shown on the tentative subdivision drawing. At peak development there will be approximately 40,000 gallons of recycled water storage on site in interconnect 6000 gallon buried tanks. The lower 10,000 gallons (first priority) of storage is reserved for toilet flushing and building wash down. This means that the pumps and valves for the toilet flushing will open at the bottom level of the storage system and shut off when there is no demand. The second priority recycled water use is for organic farming. The next 10,000 gallons per day will be reserved for this use (during the summer only). This means that the organic farm pumps and valves open at the 10,000 gallon level and shut off in the rainy season or when there is no demand. The remaining 20,000 gallons of storage will be reserved for wetlands and uplands restoration. This means that the wetlands restoration pumps and valves open when the storage tank exceeds 20,000 gallons. When the recycled water volume exceeds 40,000 gallons, it will spill over into the GSD system. It should be noted that the influent storage before the recycled system will be 24,000 gallons. The influent storage tanks will be operated normally empty with all sewage flowing to the recycling systems.

As stated on page IV.N-35 and 36, recycling water within the building reduces the total water demand for building use by 9000 to 16,000 gallons per day. As stated on page IV.N-33 the existing agricultural use is approximately 10,000 gallons per day. Table III-6 shows approximately 47% of the site in restored wetlands. Attached to the FEIR is the Wetlands Design Report. Figure 6, Planting Plan lists approximately 30,000 plants to be installed. Of this number approximately 15,000 are wetlands and uplands trees. The wetlands plants require saturated soil conditions all year long. The drip irrigation system is designed to provide water in circuits to saturate the soil but not flood the soil. The wetlands restoration will receive irrigation during the dry months for approximately 10 years. To saturate the soil during the summer will take about .5 gallons per day per shrub and about 2 gallons per day per tree. Based on this estimate, the restoration will take a minimum of 15,000 gallons of water per day during the summer for a successful restoration. A maturing willow tree can take up to 50 gallons per day. A mature willow or red alder can take up to 400 gallons per day. The wetlands restoration will be water with a minimum of 6 circuits, allowing watering for each circuit once every 6 days to allow the soil to drain.

The uplands restoration will be planted primarily with wetlands trees and shrubs in accordance with the Palustrine Scrub Shrub I and II Palustrine Forest I. Uplands are defined as greater than 2 feet above the wet season water table. This tree selection maximizes the biological benefits of the restoration and will be used visual and sound screening. Approximately 4000 upland trees and about 6000 upland shrubs form the visual and noise barrier and uplands restoration. The location of the trees and schubs will be placed on relatively permeable soil. The trees and shrubs will be watered with a minimum of 6 circuits for a water cycle once every 6 days to allow drainage. The primary watering for the uplands and sound barriers will occur in the first phase of construction. After the wetlands restoration is completed (5 to 15 years) and the farming is established (5 years), the majority of the watering of the uplands will occur during the wet season to add nutrients to the soil, stimulate root growth and provide for foliage for perennials. The uplands, sound barrier and visual screening will be planted in a manner to require a minimum of 11,000 gallons per day.

The recycling system has the following environmental benefits opposed to conventional municipal water supply and wastewater treatment.

- The use of recycled water in the buildings will reduce the potable water usage in the buildings by 45% to 60% thus reducing the ground water consumption and maintaining ground water recharge in excess of ground water extraction. Recycling water will reduce the landscape and farming use of potable water by 100%.
- The use of recycled water protects the ground water flow to the marsh and surrounding habitat.
- The use of recycled water for wetlands restoration insures an adequate water supply to the restoration even during drought restrictions or economic limitations due to the cost of using potable water.
- A dependable and adequate recycled water supply to the wetlands restoration will insure that the edge development impacts will be minimized and the habitat function of the existing marsh will be improved.
- A dependable and adequate recycled water supply to landscaping will insure that the visual and sound barriers for the project will be effective.
- A dependable and adequate recycled water supply to uplands landscaping will provide additional bird habitat.
- A dependable and adequate recycled water supply to the organic farm will provide food resources for the Developmentally Disabled Population on the Coast reducing the need for imported resources.
- Recycling Water is an approved method to reduce sewage flows.
- The water recycling system can store up to two days of recycled water and thus eliminate any discharge of sewage during wet weather flows.
- Contributing to the reduction of wet weather flows on the Coastside reduces the environmental hazard of raw sewage overflows that occur during the rainy season.
- Recycling water eliminates the projects fresh water discharge into the marine environment. Fresh water discharge into the marine environment is discouraged by the Coastal Act because of its negative environmental impacts.
- Recycling water reduces the flow to the SAM regional sewage treatment plant. SAM currently discharges partially disinfected wastewater within 2000 feet of Francis State Beach posing a public health risk for the heavily used beach for surfing and beach activities.
- SAM disinfects with chlorine that has known impacts to the marine environment resulting in tumors and reproductive malfunctions in marine animals.
- Operation of this system generates career jobs for Developmentally Disabled adults.

Fire Supply

The fire supply will be reviewed and approved by a third party contractor recommended by the Coastside Fire Protection District. The Fire Protection District will approve the issuance of the Building permits. The fire supply will be distributed to a hydrant system through a 12 inch ductile iron pipe to the hydrant and sprinkler system. The Wellness Center Swimming Pool will be sized to provide the recommended storage volume. A booster pump system powered by an emergency power system will provide the required flow and pressure. Until detailed review by the Fire Protection District, the proposed fire water system will deliver 2000 gallons per minute for up to 120 minutes at a minimum pressure of 35 psi. The fire system has the following benefits to conventional municipal water supply.

- The proposed system does not have the environmental impacts associated with expanding the existing municipal water supply lines.
- The proposed system does not have the impacts that include unacceptable pressure drop, line failure, inadequate flow and sediment being transmitted to residential during high flow that are associated with fire fighting utilizing older water systems.
- The system will not be chlorinated and the environmental impacts are reduced from the discharge of water during a fire.
- The proposed Fire System protects the existing municipal water supplies.
- Operation of this system generates career jobs for Developmentally Disabled adults.

Big Wave Water Treatment Plant

Project Objective

The water treatment plant will provide treatment for the well in a shallow ground water environment. The aeration tank is designed to remove iron and manganese and potential organic compounds with aeration. Precipitates and sediment will be removed in slow sand filters. The filters will be operated in a biological mode to remove nitrate and carbon. The treatment plant will include 6000 gallon aeration tanks, two 6000 gallon slow sand filter tanks and two 6000 gallon buried storage tanks. The plant will be constructed from the tanks that are currently onsite and adjacent to the well. The control equipment along with the well head will be located in a 4 ft x 4 ft x 4 ft fiberglass cabinet located as shown in the DEIR Figure 111-9. The tanks will be buried and surrounded by landscaping within the parking lot. Disinfection will be ultraviolet light with an option for Ozone, if additional taste and color removal is required. The system is designed with redundant tanks and pumps. Any tank or pump can be removed from service. The filters are designed to overflow into the aeration tanks. The well will be emergency power. The attached drawings show the plan and profile of the treatment plant.

Design Criteria

Well Pump Flow: 35 gpm
- Well Pump Cycle: 115 minutes on, 300 minutes off.

Well Pump Control: Low float in aeration tank: on, High Float: off

Aeration Tanks: 2 @ 6000 gallons:
- Aeration Equipment: 9 membrane diffusers per tanks, 1-4 to 8 cfm blower per tank
- O_2 Transfer Rate: 1 to 2 kg/hr.
- O_2 Demand (500 mg/l iron): 0.3 kg/hr- 0_2
- O_2 Demand (400 mg/l mang.): 0.36 kg/hr- 0_2

Slow Sand Filter:
- Average Flow Rate: 10 gpm (14,400 gpd)
- Peak Flow Rate: 20 gpm
- Average Filtration Rate: 5.5 mgad (on filter in operation), 2.75 mgad (two filters)
- Peak Filtration Rate: 11.0 mgad (one filter), 5,5 mgad (2 filters)
- Depth of Bed: 12 inches of clean gravel, 42 inches of Sand
- Sand Size: 0.3 to 0.35 mm, coefficient of non uniformity of 2.5
- Head Loss: 0.2 feet (initial clean) to 3 feet final (dirty)
- Distribution Piping: 2 inch pvc with ½ inch holes every 12 inches
- Underdrains: 4 inch pvc with ½ inch holes every 4 inches
- Solids Penetration: 3 inches
- Cleaning: 1) Rake Sand Daily, 2) Replace top 2 inches bi-monthly

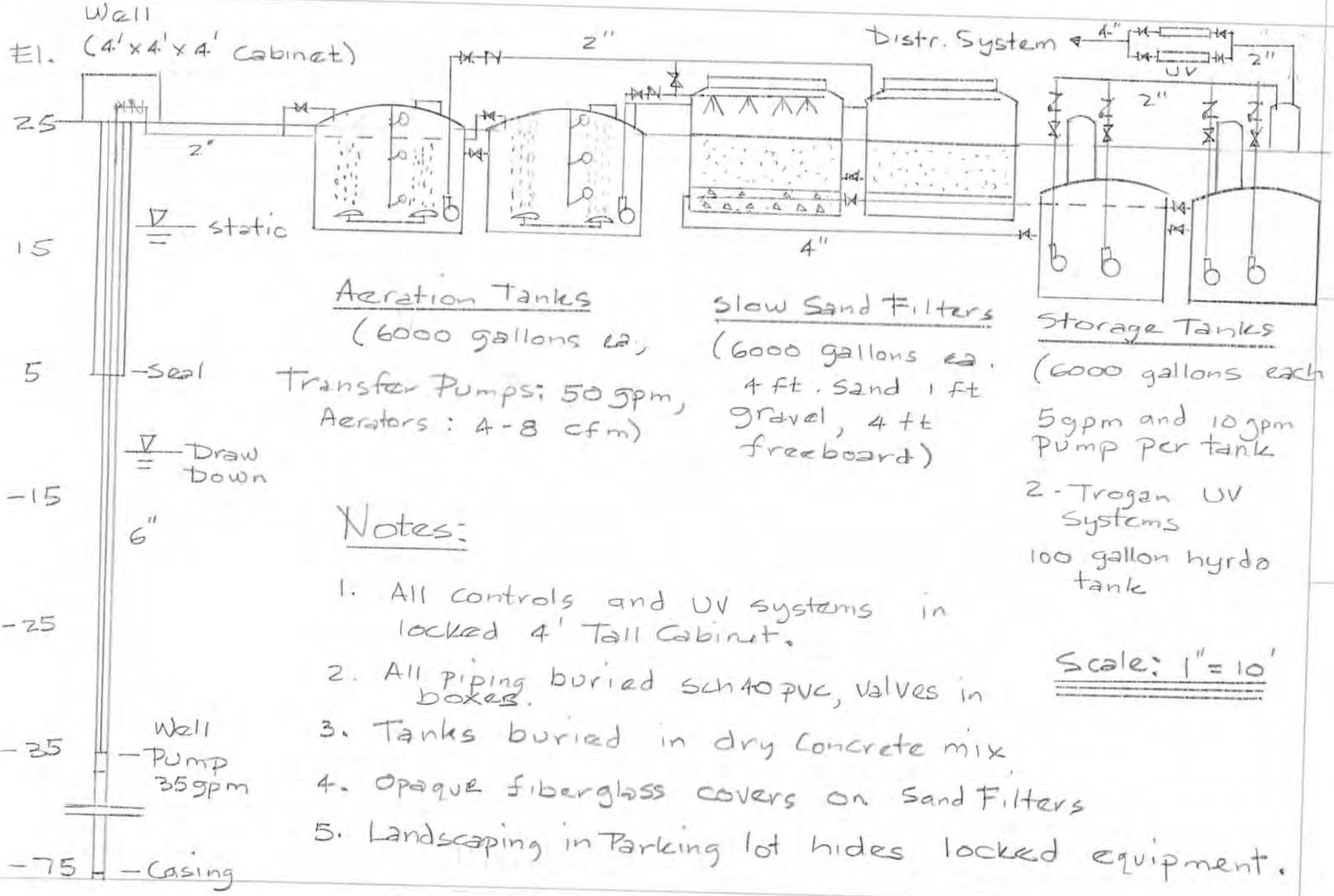
UV Disinfection:
- Intensity: 40mJ/cm^2 (EPA Requirment), 5.4 M^3/HR
- Maximum Flow Rate: 2 at 30 gpm per lamp (Trojan Viqua SC 740)
- Aeration Tank Transfer Pumps: 50 gpm (one per tank)

Aeration Transfer Pump Cycle: 4000 gallons (2000 per tank), on 80 minutes, off 300 minutes

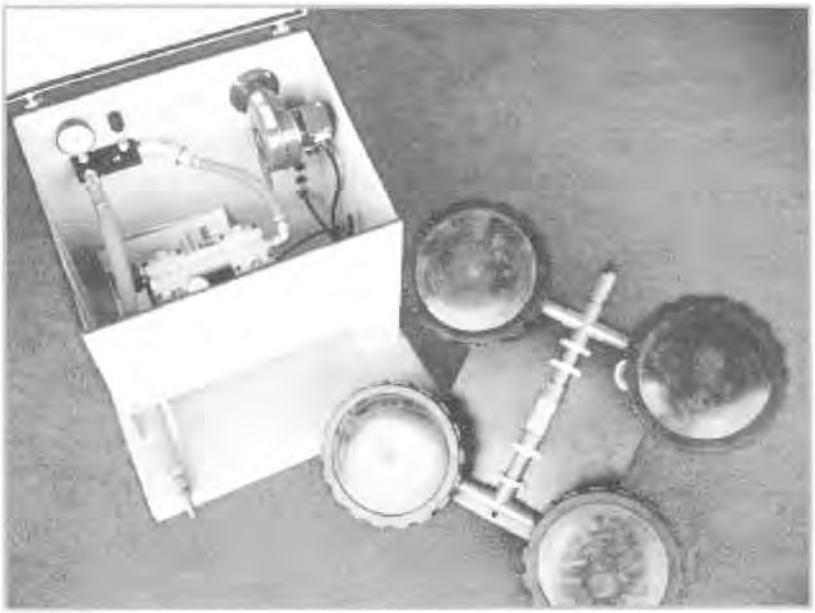
Aeration Transfer Pump Control: Low Storage Tank: on, High Storage Tank: Off

Storage Tank Pressure Pumps: Start: 5 gpm (35 psi), 5 gpm (32) psi, 10 gpm (29 psi), 10 gpm (26 psi). Off (40 psi)

STAEDTLER® No. 937 811E
Engineer's Computation Pad



Water Treatment Plant Profile



larger image

airBOOST-1dw [MEGA-LIFT] (115v) Aeration

- Model: airBOOST-1dw™ [MEGA-LIFT] (115v)
- Shipping Weight: 100lbs

Description Specs **Additional Images**

Specs

COMPRESSOR:
Compressor Type: High Pressure Rocking Piston
Horsepower: 1/3 horsepower
Volts: 115v
Amps: 5.3
Phase: Single
Maximum Depth: 30'
CFM Air @ 0': 4.4 CFM
CFM Air @ 30': 4.1 CFM
Estimated Operating Cost Per Month $28.00 (24/7)

CABINET:
12-Gauge Aluminum with Baked Powder Coated Finish
22" x 15.5" x 18" Mounted On Polyethylene Pad
Easy Flow Built-In Cooling Grill
Pre-Installed 115v Thermal Removal 60CFM Cooling Fan
Pre-Installed 20amp GFCI Dual Plug Receptacle For Fan And Compressor
2 Water Resistant Built-In Outdoor Locking Clasps
Manufacturer Limited Lifetime Warranty

airBASE™ DIFFUSER:
Tubular Membrane Diffuser
Aquatic Lifting Capacity (6,900 gpm per airBASE™)
Design Flow 1.0 - 3.5 CFM Per airBASE™
Built-In Backflow Preventer
Produces Millions Of 500 To 3,000 Micron Bubbles
HDPE High Impact Black Diffuser Mounting Platform
Rugged HDPE Design Easy Sink Ballast Basin
All Schedule 80 PVC Connections
Manufacturer 5-Year Limited Warranty

Optional Accessories :

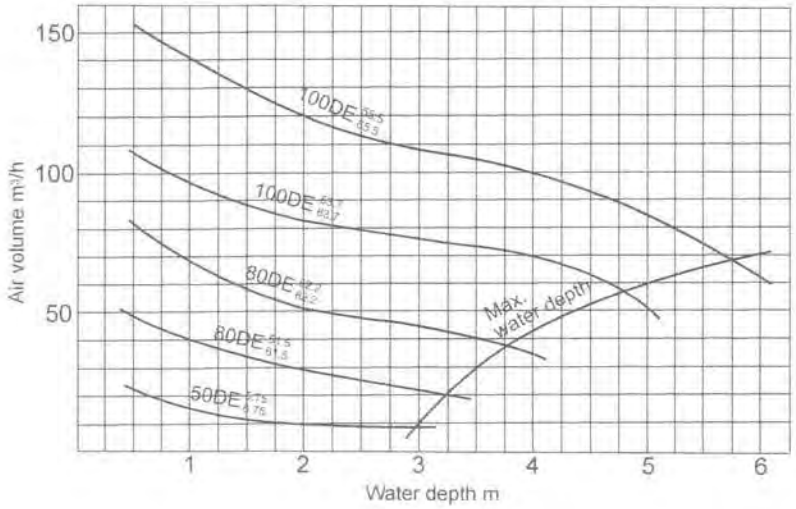
aquaLINE™ 100' x 5/8" Weighted Air-Supply Tubing (Non-Kinking)
$130.00

25 Pounds (1) Bucket "All-Season" Aerobic Pellets Harvest
$299.00

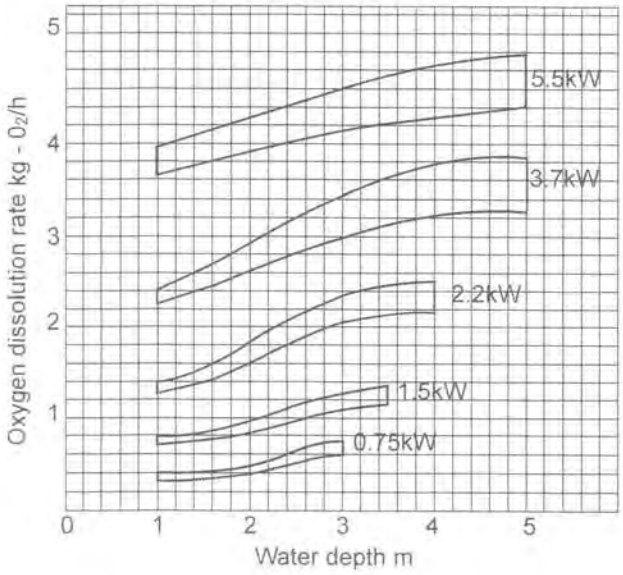
aquaLINE™ 300' x 5/8" Weighted Air-Tubing Reel (Non-Kinking)
$390.00

SELECTION CHART

AIR FLOW RATE CHARACTERISTICS



OXYGEN DISSOLUTION RATE CHARACTERISTICS



SYMBOLS

100 DE 5 3.7

- 3.7 — Motor output : kW : 3.7
- 5 — Frequency : 5 : 50Hz
- DE — Model
- 100 — Pump bore (mm)

larger image

airBOOST-3dw (230v) Aeration System Surface Acres

- Model: airBOOST-3dw™ (230v)
- Shipping Weight: 87lbs

Description Specs **Additional Images**

Specs

COMPRESSOR:
Compressor Type: High Pressure Rocking Piston
Horsepower: 2/3-hp
Volts: 230v
Amps: 5.4
Phase: Single
Maximum Depth: 30'
CFM Air @ 0': 8.2 CFM
CFM Air @ 30': 7.4 CFM

CABINET:

Trojan UV System

		SC-200	SC-320	SC-600	SC-340
Flow Rate (95% UVT eol)	US Public Health (16mJ/cm²)	56.8 lpm (15.0 gpm) (3.4 m³/Hr)	94.6 lpm (25.0 gpm) (5.7 m³/Hr)	227.1 lpm (60.0 gpm) (13.6 m³/Hr)	227.1 lpm (60.0 gpm) (13.6 m³/Hr)
	VIQUA Standard (30mJ/cm²)	30.3 lpm (8.0 gpm) (1.8 m³/Hr)	49.2 lpm (13.0 gpm) (3.0 m³/Hr)	121.1 lpm (32.0 gpm) (7.3 m³/Hr)	151.4 lpm (40.0 gpm) (9.1 m³/Hr)
	NSF/EPA (40mJ/cm²)	22.7 lpm (6.0 gpm) (1.4 m³/Hr)	37.8 lpm (10.0 gpm) (2.3 m³/Hr)	90.8 lpm (24.0 gpm) (5.4 m³/Hr)	113.6 lpm (30.0 gpm) (6.8 m³/Hr)
Dimensions	Length	45.2 cm (17.8 ")	57.9 cm (22.8 ")	78.0 cm (30.7 ")	100.1 cm (39.4 ")
	Diameter	8.9 cm (3.5 ")	8.9 cm (3.5 ")	8.9 cm (3.5 ")	8.9 cm (3.5 ")
	Controller	24.1 x 8.1 x 6.4 cm (9.4" x 3.2" x 2.5")	24.1 x 8.1 x 6.4 cm (9.4" x 3.2" x 2.5")	24.1 x 8.1 x 6.4 cm (9.4" x 3.2" x 2.5")	24.1 x 8.1 x 6.4 cm (9.4" x 3.2" x 2.5")
Inlet/Outlet Port Size		Combo 3/4" FNPT, 1" MNPT	1" MNPT	1" MNPT	1" MNPT
Shipping Weight		5.4 kg (11.9 lbs)	6.8 kg (15.0 lbs)	8.6 kg (19.0 lbs)	10.9 kg (24.0 lbs)
Electrical	Volts	100-240V 50-60Hz	100-240V 50-60Hz	100-240V 50-60Hz	100-240V 50-60Hz
	Power Consumption	35 W	42 W	73 W	88 W
	Lamp Power	30 W	36 W	65 W	80 W
Operating Parameters	Maximum Operating Pressure	8.62 bar (125 PSI)	8.62 bar (125 PSI)	8.62 bar (125 PSI)	8.62 bar (125 PSI)
	Ambient Temperature	2-40 °C (36-104 °F)	2-40 °C (36-104 °F)	2-40 °C (36-104 °F)	2-40 °C (36-104 °F)
Audible Lamp Failure		Yes	Yes	Yes	Yes
Visual "Power On"		Yes	Yes	Yes	Yes
Reactor Chamber Material		304 S.S.	304 S.S.	304 S.S.	304 S.S.
Lamp Replacement Indicator		Yes	Yes	Yes	Yes
Lamp Type		Sterilume™-HO (high-output)	Sterilume™-HO (high-output)	Sterilume™-HO (high-output)	Sterilume™-HO (high-output)
Visual Lamp Life Remaining		Yes	Yes	Yes	Yes
Total Running Time		Yes	Yes	Yes	Yes

MBR BASINS #1 & 2
SWD: 8'-6"
9,000 gallons each

Notes:

1. The 15,000 gallon per day water recycling allows for 100% redundancy and/or 100% backup storage for the Wellness Center.
2. Two 15,000 per day systems allow for 100% backup storage and redundancy for the Office Park.

REVISION	EN	BY	CHECKD	DATE
INITIAL RELEASE				

Enviroquip
a division of Ecosco Water Technologies

A COMPANY

B

DATE
DRAWN
CHECKD

HALF MOON BAY WWTP
HALF MOON BAY, CA
MBR BASIN LAYOUT
15,000 GPD

DRAWING SCALE
JOB NUMBER
SHEET OF
FILE NAME
REV A

Enviroquip
a division of Eimco Water Technologies

2404 Rutland Drive, Suite 200
Austin, Texas 78758
Phone: 512.834.6000
Fax: 512.834.6039

Membrane Group
www.enviroquip.com

Membrane Bioreactor Equipment

For

Half Moon Bay WWTP (0.25 MGD)
California

Budgetary Proposal #
100107-1-KZ-R1

Proposal Date:
March 24, 2009

Prepared For:

Scott Holmes

Order information is available from our local sales representative:

Phil Pfeiffer
P&H Representatives, Inc.
Phone #: **707.425.0468**
Fax #: **707.426.5237**

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Enviroquip
a division of Eimco Water Technologies

March 24, 2009

Scott Holmes, PE
Half Moon Bay, CA

RE: Half Moon Bay WWTP – Preliminary Proposal, Membrane Bioreactor System

Mr. Holmes:

Thank you very much for your interest in the ENVIROQUIP Membrane Bioreactor (MBR) system. Enclosed you will find a Preliminary Cost, Design Summary, Scope of Supply, Process Flow Diagram, P&IDs, and Basin Layout.

The ENVIROQUIP MBR system, utilizing Kubota submerged membrane units, was designed to be the simplest, easiest-to-operate, most operator-friendly membrane technology available. As a result, there are more Kubota MBR systems in operation worldwide than all other MBR manufacturers combined, and many of these Kubota systems have been in continuous operation for nearly 2 decades. At last count, there were over 2,500 wastewater treatment plants worldwide utilizing the Kubota flat plate membrane, including over 130 Enviroquip installations in the United States.

The benefits that the ENVIROQUIP MBR system offers include:

- Simple, reliable, consistent operation with minimal maintenance.
- The ability to operate in a high solids environment (up to 55,000 mg/l in a thickening application.).
- The best base warranty in the industry.
- In-situ maintenance cleaning eliminates the need for "dip tanks", excessive off-line time for recovery cleaning, backwashing, and complex cleaning equipment.
- Excellent structural design of the membrane resulting in only one replacement of membranes in twenty years.
- Incorporation of a biofilm on the surface of the flat-plate membrane to maximize the treatment capability.
- Low trans-membrane pressure allowing for either pumped or gravity flow through the membrane.

Pricing for the attached proposal is **$716,000**. This Preliminary Proposal constitutes a non-binding estimate of price for certain goods and/or services.

As part of the EIMCO Water Technology family of companies, ENVIROQUIP has access to an organization that has been involved in the construction of numerous biological wastewater treatment systems in North America. We look forward to working with you on this project. Please do not hesitate to contact me if you have any questions.

Sincerely,

Kimberly Mathis
Senior Regional Sales Manager
Membrane Bioreactors
ENVIROQUIP, a division of Eimco Water Technologies
Phone: 512.834.6035 Cell: 512.484.7600
Fax: 512.834.6039
www.enviroquip.com www.glv.com

Cc: Phil Pfeiffer, P&H

Enclosure

Enviroquip
a division of Eimco Water Technologies

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Austin, Texas 78758
Phone: 512.834.6000
Fax: 512.834.6039
MBR Group
www.enviroquip.com

Half Moon Bay WWTP (0.25 MGD MMF)
California
Proposal # 100107-1-KZ-R1

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Phasing Strategy

The proposed Half Moon Bay WWTP offers great flexibility for future expansion. Two identical trains, 0.125 MGD (MMF) each, are proposed for the full build out capacity of 0.25 MGD (MMF). The phasing plan for the Half Moon Bay WWTP is summarized as follows:

Phase	Maximum Monthly Flow (MGD)	Number of Trains Required to Handle Flows and Loads	Number of SMUs per MBR	Number of Diffuser Cases with no Membrane Cassettes per MBR
1	0.10	1	4	1
2	0.25	2	5	0

Phase 1: Basins proposed for the full capacity (0.25 MGD MMF) will be constructed. The equipment for one train will be installed. Four (4) submerged membrane units will be installed in the MBR basin for filtration. One (1) empty diffuser case (with no membrane cassettes) will also be installed to ensure complete mixing in the MBR basin.

Phase 2: Two trains will be required to operate in Phase for the higher flows. Additional equipment for the second Anoxic basin, Pre-Aeration basin, and MBR basin will be installed in Phase 2. Additional membrane cassettes will be installed on top of the empty diffuser case in the first membrane basin. Five (5) SMUs will be installed in the second MBR basin, so that there will be a total of 10 SMUs at full buildout.

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Design Summary

Half Moon Bay WWTP (Phase 1) (MMF 0.10 MGD)

Basis of Design				
Parameter	Flow	Temperature	Typical Event Duration	Design Durations
Average Annual Flow (AAF)	0.08 MGD *	20 °C *	9 consecutive months	9.0 months *
Max Month Flow (MMF)	0.10 MGD *	15 °C *	3 consecutive months	3.0 months *
Peak Week Flow (PWF) **	0.12 MGD *	15 °C *	3 non-consecutive weeks	3.0 weeks *
Peak Day Flow (PDF) **	0.20 MGD *	15 °C *	8 non-consecutive days	8.0 days *
Peak Hourly Flow (PHF) **	0.20 MGD *	15 °C *	4 hrs with 24 hrs between PHF	4.0 hours *

Parameter	Influent	Effluent Limits
BOD	300 mg/L *	< 5 mg/L *
TSS	300 mg/L *	< 5 mg/L *
TKN	40 mg/L *	< 3 mg/L *
NH_3	28 mg/L *	< 1 mg/L *
TP	8 mg/L *	< 1 mg/L *
TN	40 mg/L *	< 10 mg/L *
Alkalinity	300 mg/L *	< 75 mg/L *
Maximum Wastewater Temperature	25 °C *	
Elevation	69 ft *	

* Value assumed by Enviroquip, to be verified by consulting engineer.

** Peak values assumed to occur during MMF, to be verified by consulting engineer.

MBR Zone (Membrane) Design		
Parameter	Value	Notes
No. of Membrane Basins	1	
No. of Membrane Units per Basin	4	4 complete units with 1 diffuser case
No. of Diffuser Cases per Basin	1	1 diff. cases total
Membrane Unit Type	ES-200	cartridge: 510
No. of Cartridges per Unit	200	800 membrane cartridges total
Surface Area per Cartridge	8.60 ft2/cartridge	
Flux @ 0.08 MGD (AAF)	11.20 gal/(ft2 x day)	
Flux @ 0.10 MGD (MMF)	14.60 gal/(ft2 x day)	
Flux @ 0.12 MGD (PWF)	17.50 gal/(ft2 x day)	
Flux @ 0.20 MGD (PDF)	29.10 gal/(ft2 x day)	
Flux @ 0.20 MGD (PHF)	29.10 gal/(ft2 x day)	
Membrane Basin Volume	16,467 gal/basin	14ft x 18.5ft x 8.5ft SWD
Membrane Air Scour	61 scfm/unit	@ 3.9 PSIG discharge
AOR Supplied by Air Scour	136 lb O2/day	TMP Ranges from .5 - 3.0 PSI
MBR Basin MLSS	10,000 mg/L	

Anoxic Zone Design		
Parameter	Value	Notes
Basin Volume	7,265 gal/basin	7,265 gal total
Basin Dimensions	7ft x 18.5ft x 7.5ft SWD	
Anoxic MLSS	8,334 mg/L	
Recycle Rate	5 Q	From MBR to Anoxic Basin

Pre-Aeration Zone Design		
Parameter	Value	Notes
Basin Volume	17,091 gal/basin	17,091 gal total
Basin Dimensions	13ft x 18.5ft x 9.5ft SWD	
Pre-Aeration MLSS	8,334 mg/L	
Fine Bubble Diffuser AOR	224 lb O2/day	

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Design Summary

Half Moon Bay WWTP (Phase 1) (MMF 0.10 MGD)

System Design Parameters		
Parameter	**Value**	**Notes**
Plant HRT	9.6 hrs	
Design Plant SRT	13 days	
F:M ratio	0.08	

FEED FORWARD Pump Design		
Parameter	**Value**	**Notes**
FEED FORWARD Pumps	2	1 Duty, 1 Stdby
Type	SUBMERSIBLE	
Unit Capacity	521 GPM	Sized for 0.125MGD MMF
TDH	7.0 ft	

Permeate Pump Design		
Parameter	**Value**	**Notes**
Permeate Pumps	1	1 Duty, 0 Stdby
Type	CENTRIFUGAL	Pump-Assisted Gravity Design
Permeate Capacity @ MMF	77 GPM	Flow = 0.10 MGD * Capacity Incld Relax, pump sized for 0.125 MGD
Permeate Capacity @ PDF	154 GPM	Flow = 0.20 MGD * Capacity Incld Relax, pump sized for 0.125 MGD
TDH	10.0 ft	

Blower Design		
Parameter	**Value**	**Notes**
MBR Blowers	2	1 duty, 1 standby
Type	POSITIVE DISPLACEMENT	
Unit MBR Blower Capacity	770 SCFM	Blower sized for 0.25MGD MMF (Phase 2)
MBR Blower Discharge Pressure	3.93 PSIG discharge	
Pre-Aeration (PA) Blowers	2	1 duty, 1 standby
Type	POSITIVE DISPLACEMENT	
Unit PA Blower Capacity	247 SCFM	Blower sized for 0.25MGD MMF (Phase 2)
PA Blower Discharge Pressure	4.66 PSIG discharge	

Chemical Cleaning Design		
Parameter	**Value**	**Notes**
Cleaning chemical (organic fouling)	Sodium Hypochlorite	2 times/yr
Typical Cleaning Schedule	1-2	cleanings/basin/yr
Volume per Membrane	0.8 gal/cartridge	
Volume of Cleaning Solution	640 gal/basin	
Cleaning Solution Concentration	0.3%	
Volume of 12.5% Stock solution	13 gal/basin/cleaning	
Cleaning chemical (inorganic fouling)	Oxalic Acid	2 times/yr
Typical Cleaning Schedule	1-2	cleanings/basin/yr
Volume per Membrane	0.8 gal/cartridge	
Volume of Cleaning Solution	640 gal/basin	
Cleaning Solution Concentration	1.0%	
Volume of 100.0% Stock solution	6 gal/basin/cleaning	

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Design Summary

Half Moon Bay WWTP (Phase 2) (MMF 0.25 MGD)

Basis of Design				
Parameter	**Flow**	**Temperature**	**Typical Event Duration**	**Design Durations**
Average Annual Flow (AAF)	0.19 MGD *	20 °C *	9 consecutive months	9.0 months *
Max Month Flow (MMF)	0.25 MGD *	15 °C *	3 consecutive months	3.0 months *
Peak Week Flow (PWF) **	0.30 MGD *	15 °C *	3 non-consecutive weeks	3.0 weeks *
Peak Day Flow (PDF) **	0.50 MGD *	15 °C *	8 non-consecutive days	8.0 days *
Peak Hourly Flow (PHF) **	0.50 MGD *	15 °C *	4 hrs with 24 hrs between PHF	4.0 hours *

Parameter	Influent	Effluent Limits
BOD	300 mg/L *	< 5 mg/L *
TSS	300 mg/L *	< 5 mg/L *
TKN	40 mg/L *	< 3 mg/L *
NH_3	28 mg/L *	< 1 mg/L *
TP	8 mg/L *	< 1 mg/L *
TN	40 mg/L *	< 10 mg/L *
Alkalinity	300 mg/L *	< 75 mg/L *
Maximum Wastewater Temperature	25 °C *	
Elevation	69 ft *	

* Value assumed by Enviroquip, to be verified by consulting engineer.

** Peak values assumed to occur during MMF, to be verified by consulting engineer.

MBR Zone (Membrane) Design		
Parameter	**Value**	**Notes**
No. of Membrane Basins	2	
No. of Membrane Units per Basin	5	10 units total
Membrane Unit Type	ES-200	cartridge: 510
No. of Cartridges per Unit	200	2,000 membrane cartridges total
Surface Area per Cartridge	8.60 ft2/cartridge	
Flux @ 0.19 MGD (AAF)	11.20 gal/(ft2 x day)	
Flux @ 0.25 MGD (MMF)	14.60 gal/(ft2 x day)	
Flux @ 0.30 MGD (PWF)	17.50 gal/(ft2 x day)	
Flux @ 0.50 MGD (PDF)	29.10 gal/(ft2 x day)	
Flux @ 0.50 MGD (PHF)	29.10 gal/(ft2 x day)	
Membrane Basin Volume	16,467 gal/basin	14ft x 18.5ft x 8.5ft SWD
Membrane Air Scour	61 scfm/unit	@ 3.9 PSIG discharge
AOR Supplied by Air Scour	271 lb O2/day	TMP Ranges from .5 - 3.0 PSI
MBR Basin MLSS	10,000 mg/L	

Anoxic Zone Design		
Parameter	**Value**	**Notes**
Basin Volume	7,265 gal/basin	14,530 gal total
Basin Dimensions	7ft x 18.5ft x 7.5ft SWD	
Anoxic MLSS	8,334 mg/L	
Recycle Rate	5 Q	From MBR to Anoxic Basin

Pre-Aeration Zone Design		
Parameter	**Value**	**Notes**
Basin Volume	17,091 gal/basin	34,182 gal total
Basin Dimensions	13ft x 18.5ft x 9.5ft SWD	
Pre-Aeration MLSS	8,334 mg/L	
Fine Bubble Diffuser AOR	571 lb O2/day	

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Design Summary

Half Moon Bay WWTP (Phase 2) (MMF 0.25 MGD)

System Design Parameters		
Parameter	**Value**	**Notes**
Plant HRT	7.7 hrs	
Design Plant SRT	13 days	
F:M ratio	0.10	

FEED FORWARD Pump Design		
Parameter	**Value**	**Notes**
FEED FORWARD Pumps	4	2 Duty, 2 Stdby
Type	SUBMERSIBLE	
Unit Capacity	521 GPM	
TDH	7.0 ft	

Permeate Pump Design		
Parameter	**Value**	**Notes**
Permeate Pumps	2	2 Duty, 0 Stdby
Type	CENTRIFUGAL	Pump-Assisted Gravity Design
Permeate Capacity @ MMF	193 GPM	Flow = 0.25 MGD * (Capacity Includes Relax)
Permeate Capacity @ PDF	386 GPM	Flow = 0.50 MGD * (Capacity Includes Relax)
TDH	10.0 ft	

Blower Design		
Parameter	**Value**	**Notes**
MBR Blowers	2	1 duty, 1 standby
Type	POSITIVE DISPLACEMENT	
Unit MBR Blower Capacity	770 SCFM	
MBR Blower Discharge Pressure	3.93 PSIG discharge	
Pre-Aeration (PA) Blowers	2	1 duty, 1 standby
Type	POSITIVE DISPLACEMENT	
Unit PA Blower Capacity	247 SCFM	
PA Blower Discharge Pressure	4.66 PSIG discharge	

Chemical Cleaning Design		
Parameter	**Value**	**Notes**
Cleaning chemical (organic fouling)	Sodium Hypochlorite	2 times/yr
Typical Cleaning Schedule	1-2	cleanings/basin/yr
Volume per Membrane	0.8 gal/cartridge	
Volume of Cleaning Solution	800 gal/basin	
Cleaning Solution Concentration	0.3%	
Volume of 12.5% Stock solution	16 gal/basin/cleaning	
Cleaning chemical (inorganic fouling)	Oxalic Acid	2 times/yr
Typical Cleaning Schedule	1-2	cleanings/basin/yr
Volume per Membrane	0.8 gal/cartridge	
Volume of Cleaning Solution	800 gal/basin	
Cleaning Solution Concentration	1.0%	
Volume of 100.0% Stock solution	8 gal/basin/cleaning	

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Scope of Supply
Half Moon Bay WWTP (Phase 1) (MMF 0.10 MGD)

	HEADWORKS GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
2	SCREENING	FINE SCREEN	BAR SCREEN	300	gpm	ENVIROQUIP	0.25
1	SCREEN CONTAINER	SCREEN BOX	TRIPLE	FS-800S	N/A	ENVIROQUIP	N/A
1	INFLUENT FLOW MEASUREMENT	FLOW METER	ELECTROMAGNETIC	4.0	Inch	ENDRESS & HAUSER	N/A
1	PLANT WATER ISOLATION	AUTOMATED VALVE	SOLENOID (WITH CWC)	1.0	Inch	N/A	N/A
1	PLANT WATER ISOLATION	VALVE	BALL	2.0	Inch	ASAHI	N/A
1	SOLIDS HANDLING	CONVEYOR WASHER COMPACTOR	SCREW	350	gpm	ENVIROQUIP	N/A
2	LEVEL MEASUREMENT	LEVEL SWITCH	FLOAT	N/A	N/A	CONERY	N/A
	ANOXIC ZONE GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	BASIN MIXING	MIXER	SUBMERSIBLE	7,265	gallons	ABS	2.10
1	MIXER SUPPORT	MIXER SUPPORT HARDWARE & GUIDE RAIL	RAIL MOUNT	SS	N/A	N/A	N/A
1	LEVEL MEASUREMENT	LEVEL TRANSMITTER	HYDROSTATIC	N/A	N/A	BLUE RIBBON	N/A
2	LEVEL MEASUREMENT	LEVEL SWITCH	FLOAT	N/A	N/A	CONERY	N/A
	INTERNAL RECYCLE GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
2	FEED FORWARD	PUMP	SUBMERSIBLE	521	gpm	ABS	2.00
2	PUMP ISOLATION	VALVE	PLUG	6.0	Inch	PRATT	N/A
2	FLOW DIRECTION	VALVE	CHECK	6.0	Inch	KEYSTONE	N/A
1	FEED FORWARD FLOW METER	FLOW METER	ELECTROMAGNETIC	6.0	Inch	ENDRESS & HAUSER	N/A
1	PRE-AIR BYPASS	VALVE	PLUG	6.0	Inch	PRATT	N/A
1	PRE-AIR ISOLATION	VALVE	PLUG	6.0	Inch	PRATT	N/A
1	WAS ISOLATION	VALVE	BALL	2.0	Inch	ASAHI	N/A
1	WAS TRANSFER FLOW METER	FLOW METER	ELECTROMAGNETIC	2.0	Inch	ENDRESS & HAUSER	N/A
1	MBR BASIN ISOLATION	VALVE	PLUG	6.0	Inch	PRATT	N/A

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Scope of Supply
Half Moon Bay WWTP (Phase 1) (MMF 0.10 MGD)

	PRE-AERATION ZONE GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	BASIN MIXING	MIXER	SUBMERSIBLE	17,091	gallons	ABS	2.30
1	MIXER SUPPORT	MIXER SUPPORT HARDWARE & GUIDE RAIL	RAIL MOUNT	SS	N/A	N/A	N/A
1	AERATION	DIFFUSER	FINE BUBBLE	125	SCFM	EDI	N/A
1	DISSOLVED OXYGEN MEASURMENT	DO PROBE	LDO	0-10	mg/L DO	HACH	N/A
1	DO TRANSMITTER	ANALOG TRANSMITTER	SC100	N/A	N/A	HACH	N/A
	MBR ZONE GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
4	MEMBRANE FILTRATION	SUBMERGED MEMBRANE UNIT	FLAT PLATE	N/A	N/A	KUBOTA	N/A
1	AERATION	DIFFUSER CASE	FLAT PLATE	N/A	N/A	KUBOTA	N/A
10	VIBRATION ISOLATION	DIFFUSER EXPANSION JOINT	BULB	3.0	Inch	API	N/A
5	DIFFUSER INLET ISOLATION	VALVE	BUTTERFLY	3.0	Inch	KEYSTONE	N/A
5	DIFFUSER OUTLET ISOLATION	VALVE	PLUG	3.0	Inch	PRATT	N/A
5	VIBRATION ISOLATION	PERMEATE BRANCH EXPANSION JOINT	BULB	2.5	Inch	API	N/A
5	PERMEATE BRANCH ISOLATION	VALVE	BALL	2.5	Inch	ASAHI	N/A
2	LEVEL MEASUREMENT	LEVEL SWITCH	FLOAT	N/A	N/A	CONERY	N/A
1	DIFFUSER CLEANING	AUTOMATED VALVE	2 POSITION PLUG	6.0	Inch	PRATT / BETTIS	N/A
1	CHEMICAL CLEANING ISOLATION	VALVE	BALL	2.0	Inch	ASAHI	N/A
1	SLUDGE RETURN	TELESCOPING VALVE	SLIP TUBE	7.0	Inch	ENVIROQUIP	N/A
1	SLUDGE RETURN	TELESCOPING VALVE	RECEIVING TUBE	8.0	Inch	ENVIROQUIP	N/A
1	SLUDGE RETURN	TELESCOPING VALVE	HAND WHEEL ASSEMBLY	N/A	Inch	ENVIROQUIP	N/A
1	PERMEATE HEADER ISOLATION	VALVE	BUTTERFLY	6.0	Inch	ASAHI	N/A
5	FABRICATION	STRUCTURAL GUIDES & STABILIZER PIPES	N/A	N/A	N/A	ENVIROQUIP	N/A
5	FABRICATION	IN-BASIN PIPING & SUPPORTS	N/A	N/A	N/A	ENVIROQUIP	N/A

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Scope of Supply
Half Moon Bay WWTP (Phase 1) (MMF 0.10 MGD)

	PERMEATE CONTROL GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	TMP MEASUREMENT	PRESSURE TRANSMITTER	DIAPHRAGM	-15-+15	PSI	ENDRESS & HAUSER	N/A
1	PERMEATE PUMP	PUMP	CENTRIFUGAL	193	gpm	GORMAN RUPP	2.00
2	VIBRATION ISOLATION	EXPANSION JOINT	BULB	4.0	Inch	API	N/A
2	PUMP ISOLATION	VALVE	BALL	4.0	Inch	ASAHI	N/A
1	VENT	VALVE	SOLENOID	1.0	Inch	APCO	N/A
1	PUMP INLET PRESSURE	GAUGE	COMPOUND	-30-+15	Inch Hg/PSI	MCDANIEL	N/A
1	PUMP OUTLET PRESSURE	GAUGE	PRESSURE	0-15	PSI	MCDANIEL	N/A
1	FLOW DIRECTION (PUMPED)	VALVE	CHECK	4.0	Inch	ASAHI	N/A
1	FLOW DIRECTION (GRAVITY)	VALVE	CHECK	4.0	Inch	ASAHI	N/A
1	ON/OFF	VALVE	NEEDLE	0.25	Inch	ASAHI	N/A
1	FLOW MEASUREMENT	FLOW METER	ELECTROMAGNETIC	4.0	Inch	ENDRESS & HAUSER	N/A
1	FLOW CONTROL	AUTOMATED VALVE	MODULATING BALL	4.0	Inch	ASAHI / BETTIS	N/A
1	TURBIDITY MEASUREMENT	TURBIDITY METER	OPTICAL	0-100	NTU	HACH	N/A
1	TURBIDITY / PH TRANSMITTER	ANALOG TRANSMITTER	SC100	N/A	N/A	HACH	N/A
	MBR AERATION GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
2	MBR BLOWER	BLOWER	POSITIVE DISPLACEMENT	770	SCFM	KAESER	40.00
2	MBR NOISE SUPPRESSION	SOUND ENCLOSURE	WITH BLOWER	N/A	N/A	KAESER	N/A
2	MBR BLOWER TEMP	TEMPERATURE GAUGE	WITH BLOWER	N/A	N/A	KAESER	N/A
2	MBR BLOWER PRESSURE	PRESSURE GAUGE	WITH BLOWER	N/A	N/A	KAESER	N/A
2	MBR BLOWER TEMP SWITCH	TEMPERATURE SWITCH	WITH BLOWER	N/A	N/A	KAESER	N/A
3	MBR BLOWER FLOW CONTROL	VALVE	CHECK (WITH BLOWER)	N/A	N/A	KAESER	N/A
2	MBR BLOWER PRESSURE RELIEF	VALVE	PRESSURE RELIEF (WITH BLOWER)	N/A	N/A	KAESER	N/A
4	MBR AIR ISOLATION	VALVE	BUTTERFLY	8.0	Inch	KEYSTONE	N/A
1	MBR BLOWER FLOW CONTROL	AUTOMATED VALVE	MODULATING BUTTERFLY	6.0	N/A	KEYSTONE / BETTIS	N/A
1	MBR AIR FLOW MEASUREMENT	FLOW METER	MASS AIR FLOW	6.0	Inch	SIERRA	N/A

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Scope of Supply
Half Moon Bay WWTP (Phase 1) (MMF 0.10 MGD)

	PA AIR SUPPLY GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
2	PA BLOWER	BLOWER	POSITIVE DISPLACEMENT	247	SCFM	KAESER	15.00
2	PA NOISE SUPPRESSION	SOUND ENCLOSURE	WITH BLOWER	N/A	N/A	KAESER	N/A
2	PA BLOWER TEMP	TEMPERATURE GAUGE	WITH BLOWER	N/A	N/A	KAESER	N/A
2	PA BLOWER PRESSURE	PRESSURE GAUGE	WITH BLOWER	N/A	N/A	KAESER	N/A
2	PA BLOWER TEMP SWITCH	TEMPERATURE SWITCH	WITH BLOWER	N/A	N/A	KAESER	N/A
2	PA BLOWER FLOW CONTROL	VALVE	CHECK (WITH BLOWER)	N/A	N/A	KAESER	N/A
2	PA BLOWER PRESSURE RELIEF	VALVE	PRESSURE RELIEF (WITH BLOWER)	N/A	N/A	KAESER	N/A
1	PA BLOWER FLOW CONTROL	AUTOMATED VALVE	MODULATING BUTTERFLY	4.0	N/A	KEYSTONE / BETTIS	N/A
2	PA AIR ISOLATION	VALVE	BUTTERFLY	4.0	Inch	KEYSTONE	N/A
1	MBR AIR FLOW MEASUREMENT	FLOW METER	MASS AIR FLOW	4.0	Inch	SIERRA	N/A
	COAGULANT DOSING GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
2	ALUM METERING PUMP	PUMP	DIAPHRAGM	17	gpd	WALCHEM	N/A
2	PUMP SKID	SKID	N/A	N/A	N/A	N/A	N/A
1	MIXER	MIXER	SUBMERSIBLE	N/A	N/A	ABS	1
1	LEVEL MEASUREMENT	LEVEL TRANSMITTER	HYDROSTATIC	N/A	N/A	BLUE RIBBON	N/A
1	VALVE	PUMP ISOLATION	BALL	1	inch	ASAHI	N/A
	SMU CIP GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	MAZZIE INJECTOR	INJECTOR	VENTURI	2.0	Inch	MAZZEI INJECTOR CORP	N/A
1	WATER SUPPLY VALVE	AUTOMATED VALVE	MODULATING BALL	2.0	Inch	ASAHI / BETTIS	N/A
2	CIP THROTTLING	VALVE	GLOBE	2.0	Inch	N/A	N/A
2	INJECTOR PRESSURE	GAUGE	PRESSURE	0-15	PSI	MCDANIEL	N/A
2	GAUGE ISOLATION	VALVE	BALL	0.5	Inch	ASAHI	N/A
1	FLOW DIRECTION	VALVE	CHECK	2.0	Inch	ASAHI	N/A
1	CHEMICAL ISOLATION	VALVE	BALL	2.0	Inch	ASAHI	N/A
1	PRESSURE CONTROL	VALVE	PRESSURE REGULATOR VALVE	2.0	Inch	WILKINS	N/A
1	CHEMICAL FLOW	FLOW METER	ROTOMETER	8-80	gpm	BLUE WHITE	N/A
1	FLOW MEASUREMENT	FLOW METER	ELECTROMAGNETIC	2.0	Inch	ENDRESS & HAUSER	N/A
1	INJECTOR ASSEMBLY	PIPE SPOOL	SUCTION	N/A	N/A	ENVIROQUIP	N/A

1	CHEMICAL TRANSFER TO MBR	HOSE	SUCTION	1.0	Inch	TIGERFLEX	N/A

	CONTROLS GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	PLANT CONTROL	SCADA	SOFTWARE	N/A	N/A	WONDERWARE	N/A
1	PLANT CONTROL	HMI	PANEL MOUNT PC	N/A	N/A	N/A	N/A
1	PLANT CONTROL	PLC PANEL	N/A	N/A	N/A	N/A	N/A
	MISCELLANEOUS GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	ENGINEERING DESIGN	N/A	N/A	N/A	N/A	N/A	N/A
5	INSTALLATION SERVICES	N/A	N/A	N/A	N/A	N/A	N/A
5	START-UP	N/A	N/A	N/A	N/A	N/A	N/A
5	PERFORMANCE TESTING	N/A	N/A	N/A	N/A	N/A	N/A
5	TRAINING	N/A	N/A	N/A	N/A	N/A	N/A
5	OPERATION & MAINTENANCE MANUALS	N/A	N/A	N/A	N/A	N/A	N/A
1	SMU FREIGHT	N/A	N/A	N/A	N/A	N/A	N/A
1	EQUIPMENT FREIGHT	N/A	N/A	N/A	N/A	N/A	N/A

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Scope of Supply
Half Moon Bay WWTP (Phase 2, 0.10 - 0.25 MGD Adder)

	HEADWORKS GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	SCREENING	FINE SCREEN	BAR SCREEN	300	gpm	ENVIROQUIP	0.25
	ANOXIC ZONE GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	BASIN MIXING	MIXER	SUBMERSIBLE	7,265	gallons	ABS	2.10
1	MIXER SUPPORT	MIXER SUPPORT HARDWARE & GUIDE RAIL	RAIL MOUNT	SS	N/A	N/A	N/A
1	LEVEL MEASUREMENT	LEVEL TRANSMITTER	HYDROSTATIC	N/A	N/A	BLUE RIBBON	N/A
2	LEVEL MEASUREMENT	LEVEL SWITCH	FLOAT	N/A	N/A	CONERY	N/A
	INTERNAL RECYCLE GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
2	FEED FORWARD	PUMP	SUBMERSIBLE	521	gpm	ABS	2.00
2	PUMP ISOLATION	VALVE	PLUG	6.0	Inch	PRATT	N/A
2	FLOW DIRECTION	VALVE	CHECK	6.0	Inch	KEYSTONE	N/A
1	FEED FORWARD FLOW METER	FLOW METER	ELECTROMAGNETIC	6.0	Inch	ENDRESS & HAUSER	N/A
1	PRE-AIR BYPASS	VALVE	PLUG	6.0	Inch	PRATT	N/A
1	PRE-AIR ISOLATION	VALVE	PLUG	6.0	Inch	PRATT	N/A
1	WAS ISOLATION	VALVE	BALL	2.0	Inch	ASAHI	N/A
1	WAS TRANSFER FLOW METER	FLOW METER	ELECTROMAGNETIC	2.0	Inch	ENDRESS & HAUSER	N/A
1	MBR BASIN ISOLATION	VALVE	PLUG	6.0	Inch	PRATT	N/A
	PRE-AERATION ZONE GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	BASIN MIXING	MIXER	SUBMERSIBLE	17,091	gallons	ABS	2.30
1	MIXER SUPPORT	MIXER SUPPORT HARDWARE & GUIDE RAIL	RAIL MOUNT	SS	N/A	N/A	N/A
1	AERATION	DIFFUSER	FINE BUBBLE	125	SCFM	EDI	N/A
1	DISSOLVED OXYGEN MEASURMENT	DO PROBE	LDO	0-10	mg/L DO	HACH	N/A
1	DO TRANSMITTER	ANALOG TRANSMITTER	SC100	N/A	N/A	HACH	N/A

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Scope of Supply
Half Moon Bay WWTP (Phase 2, 0.10 - 0.25 MGD Adder)

MBR ZONE GENERAL EQUIPMENT INFORMATION							
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
6	MEMBRANE FILTRATION	SUBMERGED MEMBRANE UNIT	FLAT PLATE	N/A	N/A	KUBOTA	N/A
10	VIBRATION ISOLATION	DIFFUSER EXPANSION JOINT	BULB	3.0	Inch	API	N/A
5	DIFFUSER INLET ISOLATION	VALVE	BUTTERFLY	3.0	Inch	KEYSTONE	N/A
5	DIFFUSER OUTLET ISOLATION	VALVE	PLUG	3.0	Inch	PRATT	N/A
5	VIBRATION ISOLATION	PERMEATE BRANCH EXPANSION JOINT	BULB	2.5	Inch	API	N/A
5	PERMEATE BRANCH ISOLATION	VALVE	BALL	2.5	Inch	ASAHI	N/A
2	LEVEL MEASUREMENT	LEVEL SWITCH	FLOAT	N/A	N/A	CONERY	N/A
1	DIFFUSER CLEANING	AUTOMATED VALVE	2 POSITION PLUG	6.0	Inch	PRATT / BETTIS	N/A
1	CHEMICAL CLEANING ISOLATION	VALVE	BALL	2.0	Inch	ASAHI	N/A
1	SLUDGE RETURN	TELESCOPING VALVE	SLIP TUBE	7.0	Inch	ENVIROQUIP	N/A
1	SLUDGE RETURN	TELESCOPING VALVE	RECEIVING TUBE	8.0	Inch	ENVIROQUIP	N/A
1	SLUDGE RETURN	TELESCOPING VALVE	HAND WHEEL ASSEMBLY	N/A	Inch	ENVIROQUIP	N/A
1	PERMEATE HEADER ISOLATION	VALVE	BUTTERFLY	6.0	Inch	ASAHI	N/A
5	FABRICATION	STRUCTURAL GUIDES & STABILIZER PIPES	N/A	N/A	N/A	ENVIROQUIP	N/A
5	FABRICATION	IN-BASIN PIPING & SUPPORTS	N/A	N/A	N/A	ENVIROQUIP	N/A
PERMEATE CONTROL GENERAL EQUIPMENT INFORMATION							
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	TMP MEASUREMENT	PRESSURE TRANSMITTER	DIAPHRAGM	-15-+15	PSI	ENDRESS & HAUSER	N/A
1	PERMEATE PUMP	PUMP	CENTRIFUGAL	193	gpm	GORMAN RUPP	2.00
2	VIBRATION ISOLATION	EXPANSION JOINT	BULB	4.0	Inch	API	N/A
2	PUMP ISOLATION	VALVE	BALL	4.0	Inch	ASAHI	N/A
1	VENT	VALVE	SOLENOID	1.0	Inch	APCO	N/A
1	PUMP INLET PRESSURE	GAUGE	COMPOUND	-30-+15	Inch Hg/PSI	MCDANIEL	N/A
1	PUMP OUTLET PRESSURE	GAUGE	PRESSURE	0-15	PSI	MCDANIEL	N/A
1	FLOW DIRECTION (PUMPED)	VALVE	CHECK	4.0	Inch	ASAHI	N/A
1	FLOW DIRECTION (GRAVITY)	VALVE	CHECK	4.0	Inch	ASAHI	N/A
1	FLOW MEASUREMENT	FLOW METER	ELECTROMAGNETIC	4.0	Inch	ENDRESS & HAUSER	N/A
1	FLOW CONTROL	AUTOMATED VALVE	MODULATING BALL	4.0	Inch	ASAHI / BETTIS	N/A

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Scope of Supply
Half Moon Bay WWTP (Phase 2, 0.10 - 0.25 MGD Adder)

	MBR AERATION GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	MBR BLOWER FLOW CONTROL	AUTOMATED VALVE	MODULATING BUTTERFLY	6.0	N/A	KEYSTONE / BETTIS	N/A
1	MBR AIR FLOW MEASUREMENT	FLOW METER	MASS AIR FLOW	6.0	Inch	SIERRA	N/A
	PA AIR SUPPLY GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	PA BLOWER FLOW CONTROL	AUTOMATED VALVE	MODULATING BUTTERFLY	4.0	N/A	KEYSTONE / BETTIS	N/A
1	MBR AIR FLOW MEASUREMENT	FLOW METER	MASS AIR FLOW	4.0	Inch	SIERRA	N/A
	COAGULANT DOSING GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
4	VALVE	PUMP ISOLATION	BALL	1	inch	ASAHI	N/A
	CONTROLS GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
1	PLANT CONTROL	PROGRAMMING	SOFTWARE	N/A	N/A	N/A	N/A
	MISCELLANEOUS GENERAL EQUIPMENT INFORMATION						
QTY	Function	Name	Type	Size or Unit Capacity	Value	Manufacturer	Motor HP
5	INSTALLATION SERVICES	N/A	N/A	N/A	N/A	N/A	N/A
5	START-UP	N/A	N/A	N/A	N/A	N/A	N/A
5	PERFORMANCE TESTING	N/A	N/A	N/A	N/A	N/A	N/A
5	TRAINING	N/A	N/A	N/A	N/A	N/A	N/A
1	SMU FREIGHT	N/A	N/A	N/A	N/A	N/A	N/A
1	EQUIPMENT FREIGHT	N/A	N/A	N/A	N/A	N/A	N/A

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The following items will be the scope of work and responsibilities by others. These items include, but are not limited to:

Overall Plant Design

- Responsible for the overall plant design and execution of that design.
- Review and approve ENVIROQUIP biological process design.
- Since no seismic requirements were given, it is assumed that none of the equipment, anchoring systems, etc. needs to meet specific seismic requirements. ENVIROQUIP assumes that assessment of seismic requirements is by others.
- Since no area classifications were given, it is assumed no area classifications are present. ENVIROQUIP assumes that assessment of area classifications is by others.

Equipment Drawings and Specifications

- Design parameters related to membrane separation.
    - Review and approve.
- ENVIROQUIP supplied equipment specifications and drawings.
    - Review and approve.
- Detail drawings of all termination points.
    - Show locations where equipment and materials supplied by others tie into ENVIROQUIP equipment and/or materials.

Civil Works

Provisioning to include, but not limited to:

- Buildings, plant tank structures, equipment foundations and mounting pads, various process piping and connections.
- Building floor drains and below slab piping.
- Fall protection: equipment accesses platforms, walkways, stairs, covers, handrails, etc.
- HVAC equipment design and installation (where applicable).
- Emergency power supply, UPS, power conditioner (where applicable).

Equipment Supply

Provisioning to include, but not limited to:

- Motor control center for all equipment.
- All pipe supports, link seals, pipe sleeves, or any other wall penetration system.
- Freeze protection: heat tracing, insulation, or related controls and appurtenances (as required).
- Wiring or conduit for all equipment (by ENVIROQUIP and by Others).
- Any equipment, piping, valves, or fittings not expressly indicated in ENVIROQUIP's scope of supply.

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- Variable frequency drives, motor starters, or controls for equipment not expressly indicated in ENVIROQUIP's scope of supply.
- Anchoring, bolts, brackets, and fasteners for all equipment and appurtenances.
- Any other equipment or services not supplied by ENVIROQUIP, but necessary for an operational plant.

Receiving and Storage

Receive, unload, and provide safe storage of equipment, materials and parts at site until ready to install.

System and Equipment Installation

Install equipment supplied by ENVIROQUIP and by others to include, but not limited to:

- Membrane units, in accordance with ENVIROQUIP's installation instructions.
- Pumps, blowers, mixers, aeration systems, gates, headworks equipment, instrumentation, controls, etc. in accordance with manufacturer's installation instructions.

Piping Installation

Install interconnecting piping to include, but not limited to;

- Piping, pipe supports, hangers, and valves between ENVIROQUIP supplied equipment and components.
- Piping, pipe supports, hangers, and valves between ENVIROQUIP supplied equipment/components and equipment/components supplied by others.
- Process tank aeration system air piping, equalization tank system piping, etc.
- Install all required anchoring, bolts, brackets and fasteners.

Electrical Installation

Install electrical to include, but not limited to;

- Electrical wiring, conduit and other components required to provide power connections to ENVIROQUIP supplied equipment and components.
- Install motor control center and required connections to control panels
- Install control panels and required connections to any electrical equipment (motors, instruments, etc.) external to the panel.

Miscellaneous

- Painting. Any on-site painting or touch-up painting of equipment.
- Provide as necessary, wrapping tape or cathodic protection for any pipe penetrations.

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- Provide any plastic coding pipe markers, legend markers, or directional arrows. Any piping supplied by Enviroquip will be piece-marked for erection purposes.
- Bulk chemical storage.
- Supply chemical storage facilities.
- Raw materials, including, but not limited to seed sludge, clean water for performance testing, chemicals and utilities during start-up and operation.
- Laboratory services, operating and maintenance personnel during equipment checkout, start-up operations.
- Disposal of initial start-up wastewater and chemicals.

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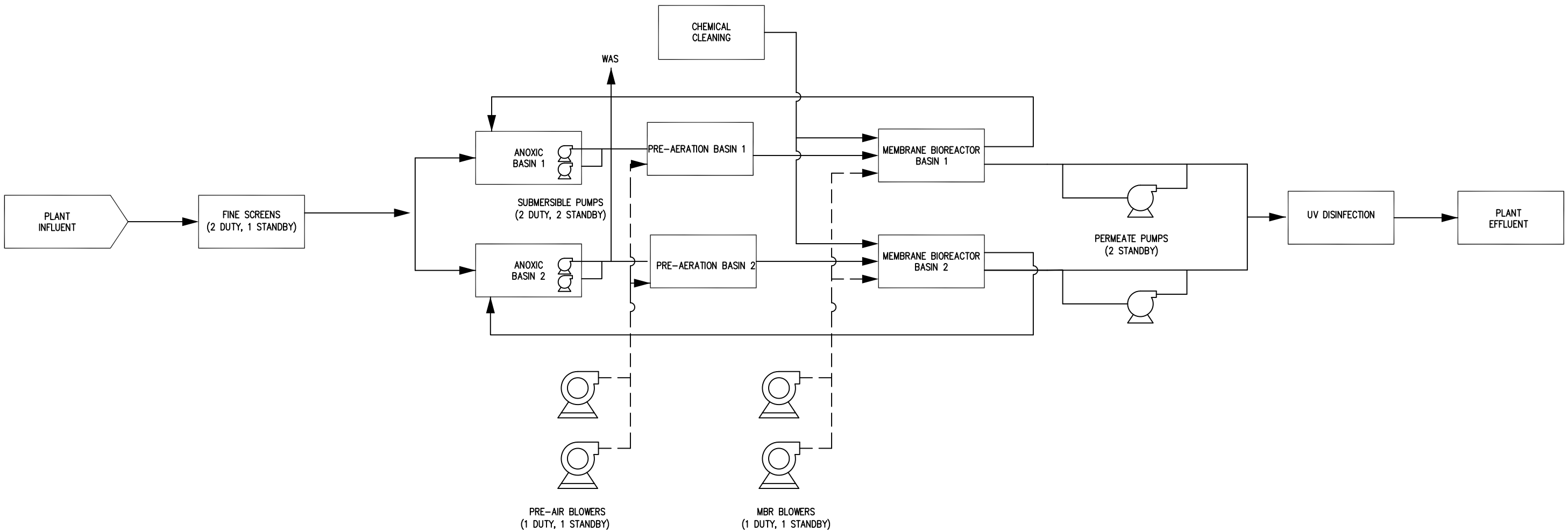

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DATE	03-16-2009	DRAWING SCALE	NTS
DRAWN	EVM/KZ	JOB NUMBER	NONE
CHECK'D		SHEET G-1.1 OF 1	
		FILE NAME	REV

HALF MOON BAY WWTP

HALF MOON BAY, CA

PROCESS FLOW DIAGRAM
0.25 MGD MMF (BUILD OUT)

NOTE:
1) During Phase I (0.10 MGD AAF), one of the two trains will be operated. Four (4) ES-200 SMUs and one (1) diffuser case will be installed for Phase I;

2) During Phase II (0.25 MGD AAF), both trains will be operated. Each MBR basin will have five (5) ES-200 SMUs installed.

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HALF MOON BAY WWTP
HALF MOON BAY, CA
MBR BASIN LAYOUT
0.25 MGD (BUILD OUT)

DRAWING SCALE	
JOB NUMBER	-
SHEET	OF
FILE NAME	
REV	A

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Austin, Texas 78758
phone: (512) 834-6000 | fax: (512) 834-6039

HALF MOON BAY 0.25 MGD WWTP
HALF MOON BAY, CA.

Sheet Index

I-1.1	FINE SCREENS
I-1.2	ANOXIC BASIN 01
I-1.3	ANOXIC BASIN 02
I-1.4	PRE-AERATION BASIN 01
I-1.5	PRE-AERATION BASIN 02
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HALF MOON BAY 0.25 MGD WWTP
HALF MOON BAY, CA.
P&ID
COVER SHEET

A COMPANY

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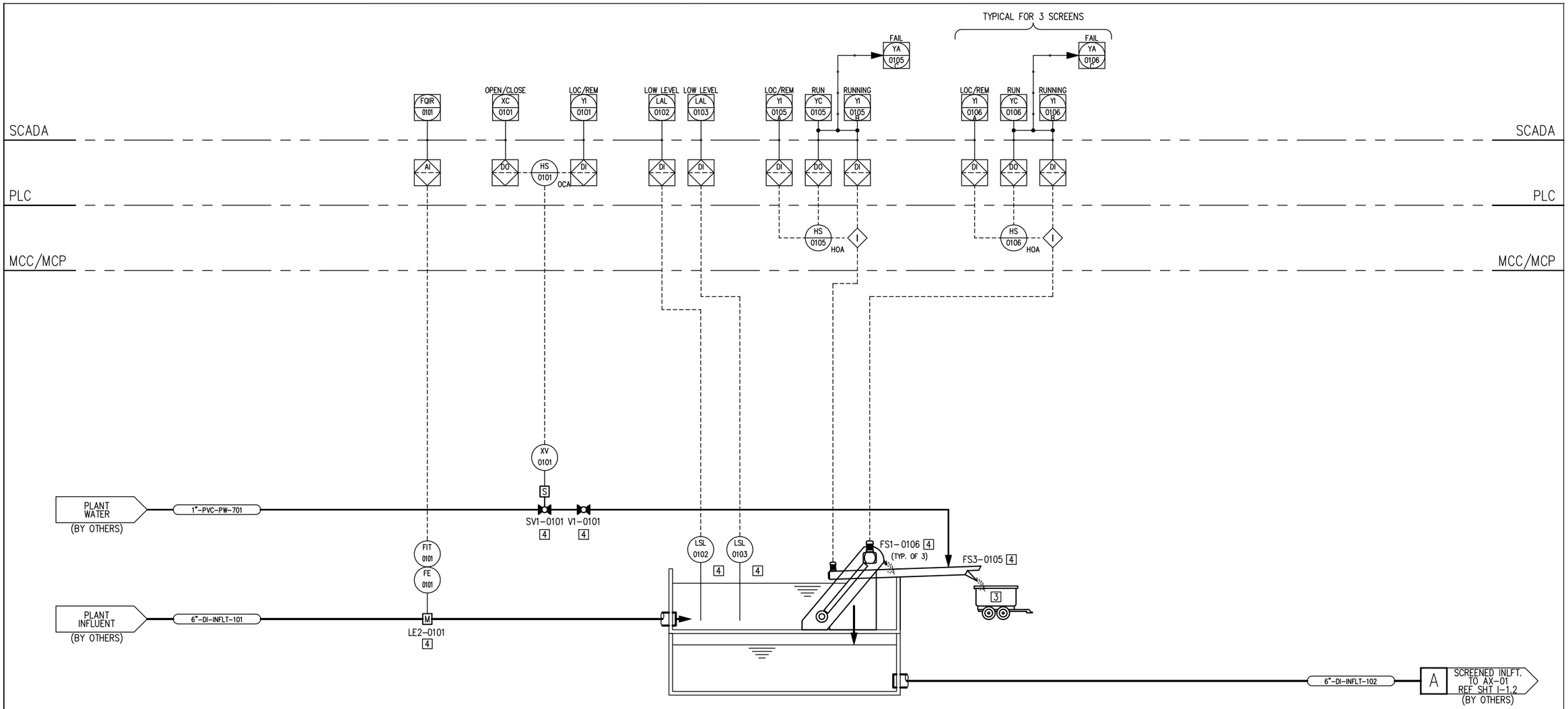

FS-01
FINE SCREEN
T3-0101

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HALF MOON BAY 0.25 MGD WWTP
HALF MOON BAY, CA.
P&I D
FINE SCREENS

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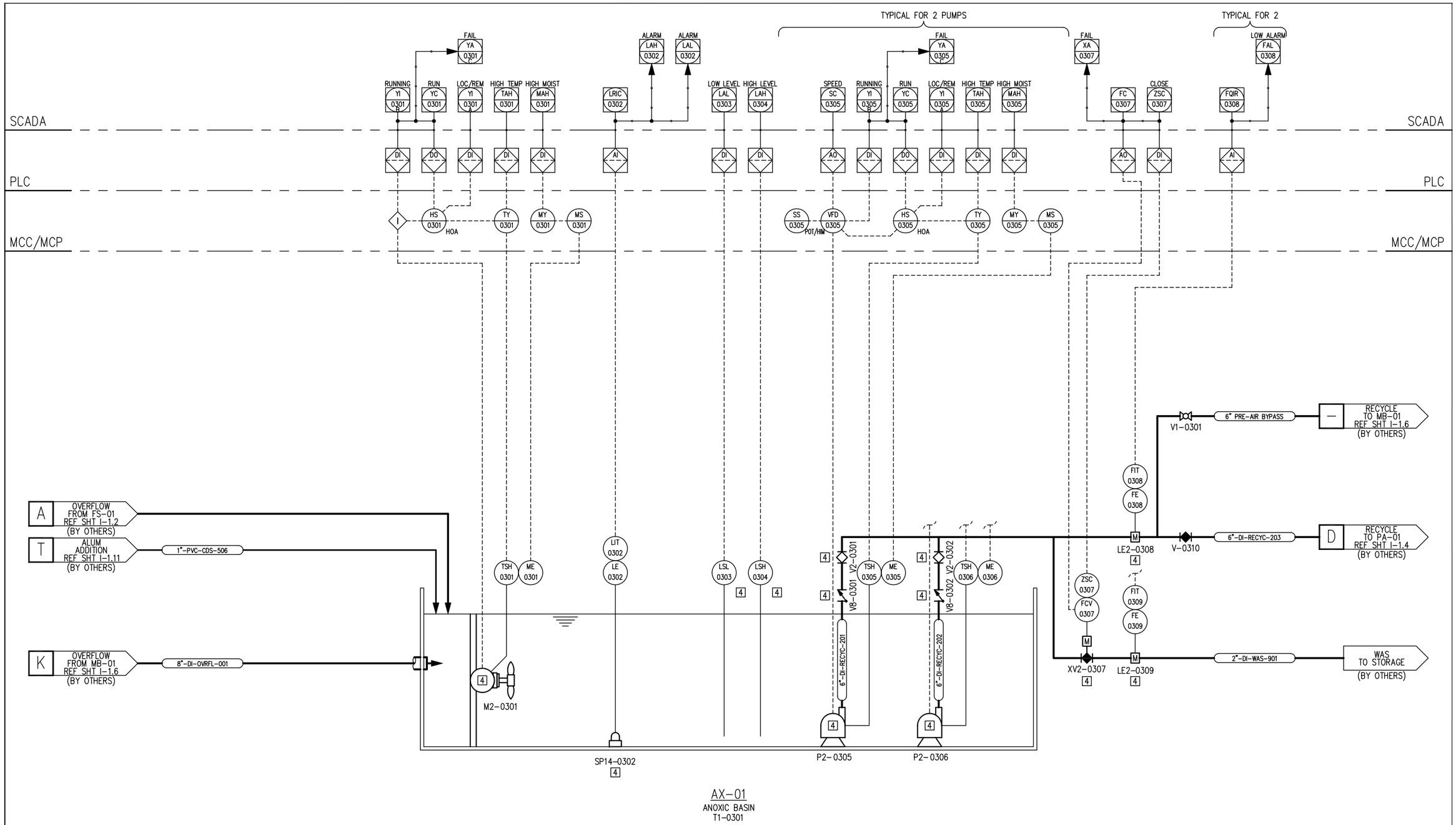

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HALF MOON BAY 0.25 MGD WWTP

HALF MOON BAY, CA.

P&ID

ANOXIC BASIN 01

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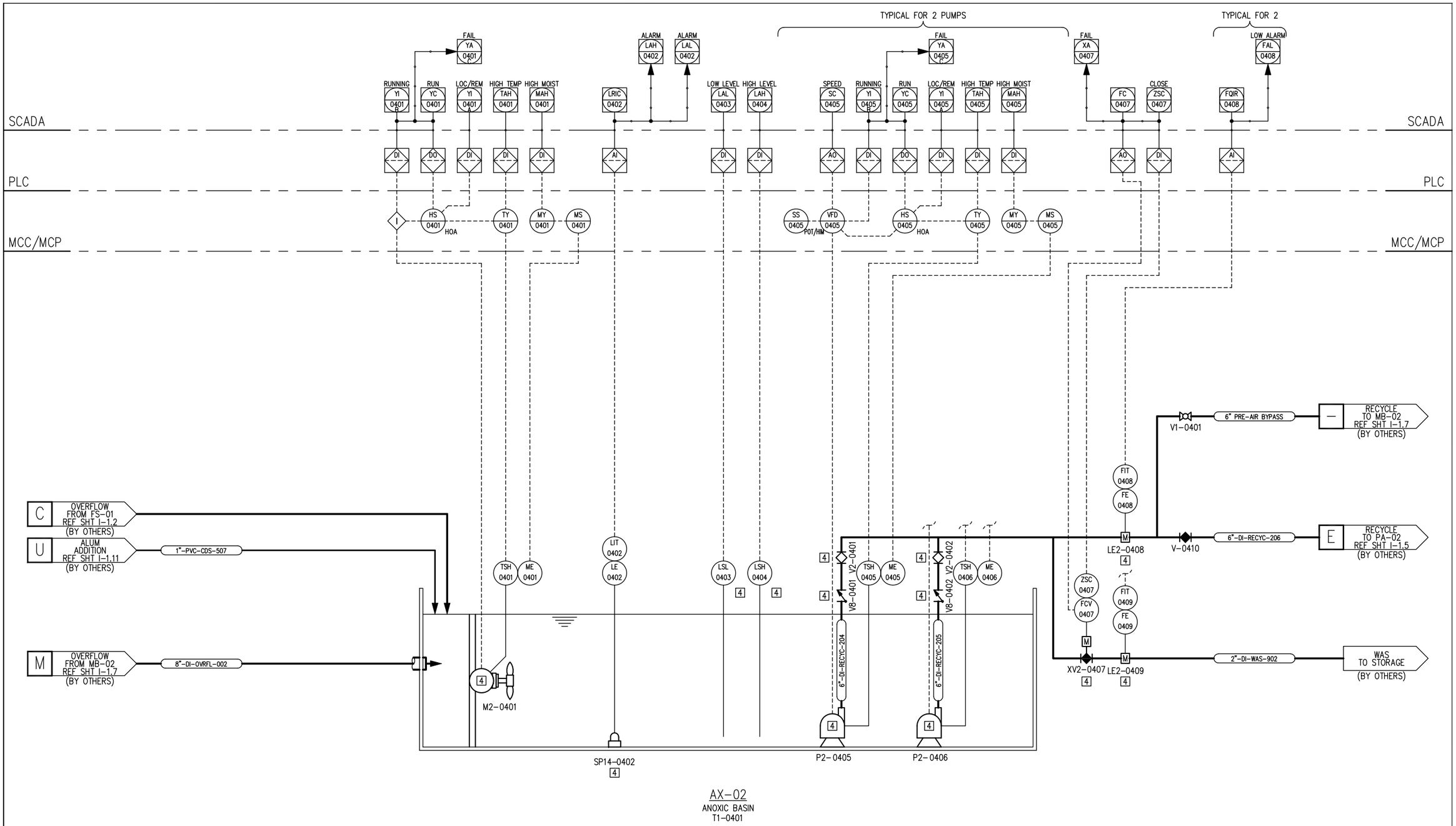

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HALF MOON BAY, CA.

P&ID

ANOXIC BASIN 02

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JOB NUMBER	NONE
SHEET	I-1.3 OF 13
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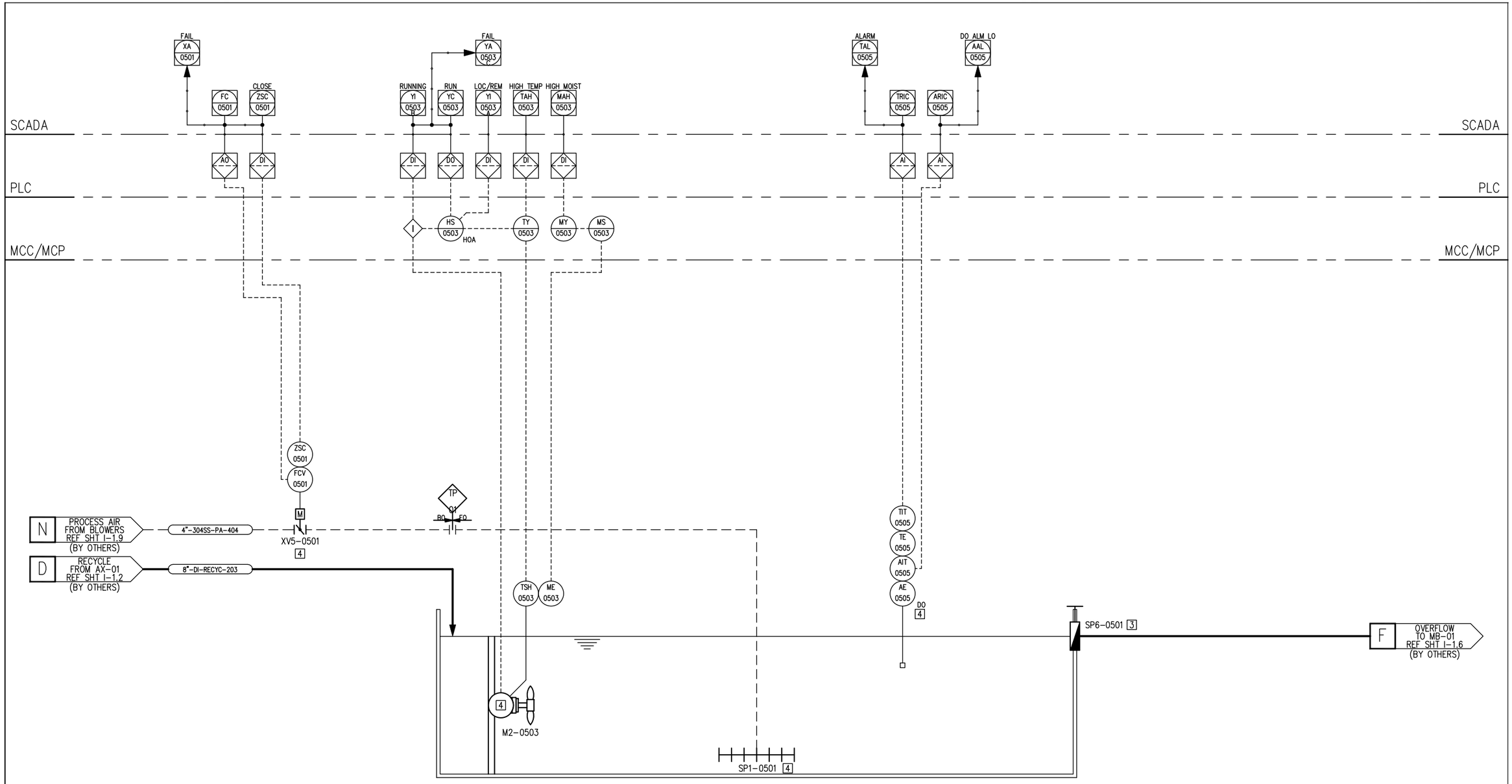

PA-01
PRE-AERATION BASIN
T1-0501

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HALF MOON BAY 0.25 MGD WWTP
HALF MOON BAY, CA.
P&ID
PRE-AERATION BASIN 01

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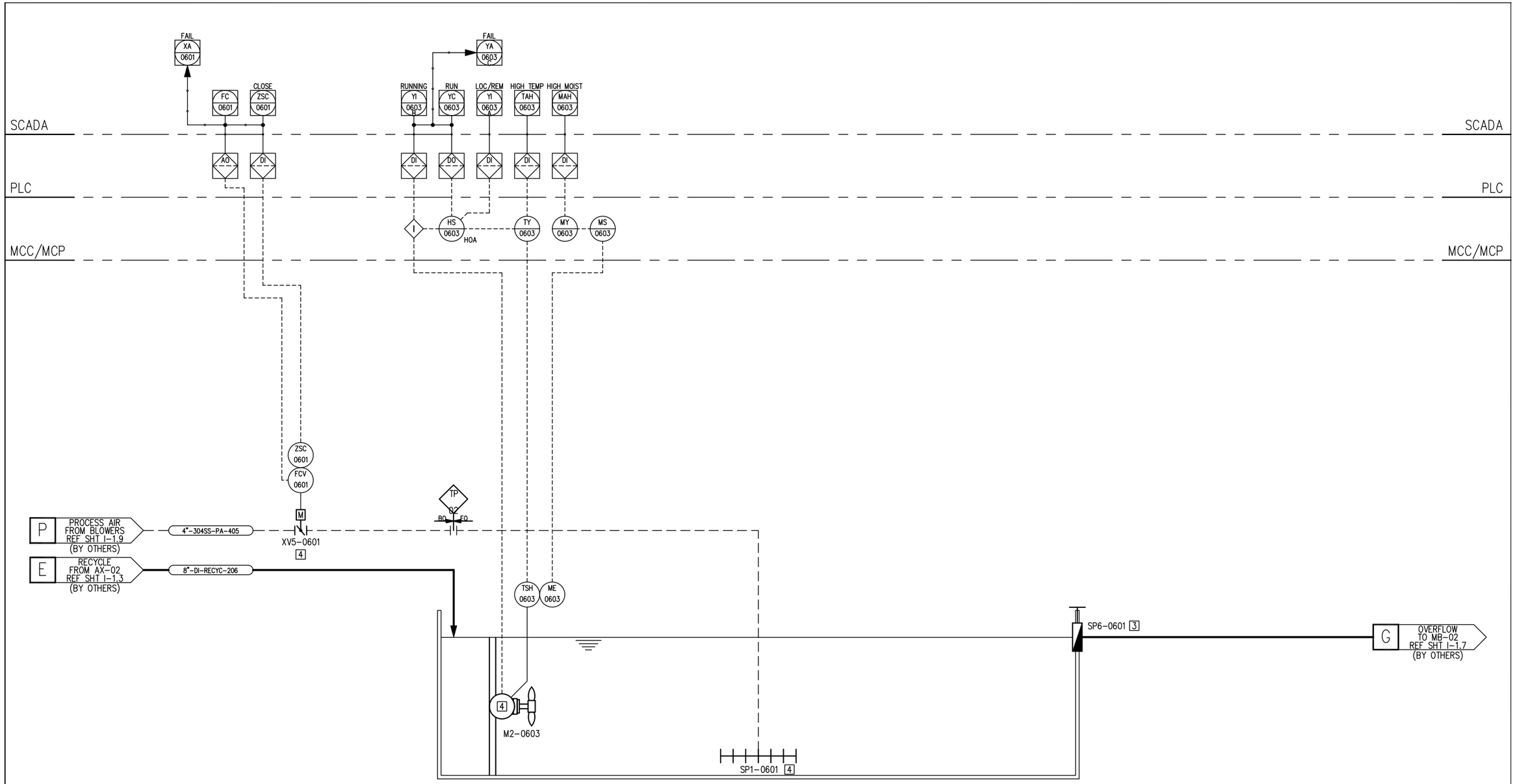

PA-02
PRE-AERATION BASIN
T1-0601

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HALF MOON BAY, CA.
P&ID
PRE-AERATION BASIN 02

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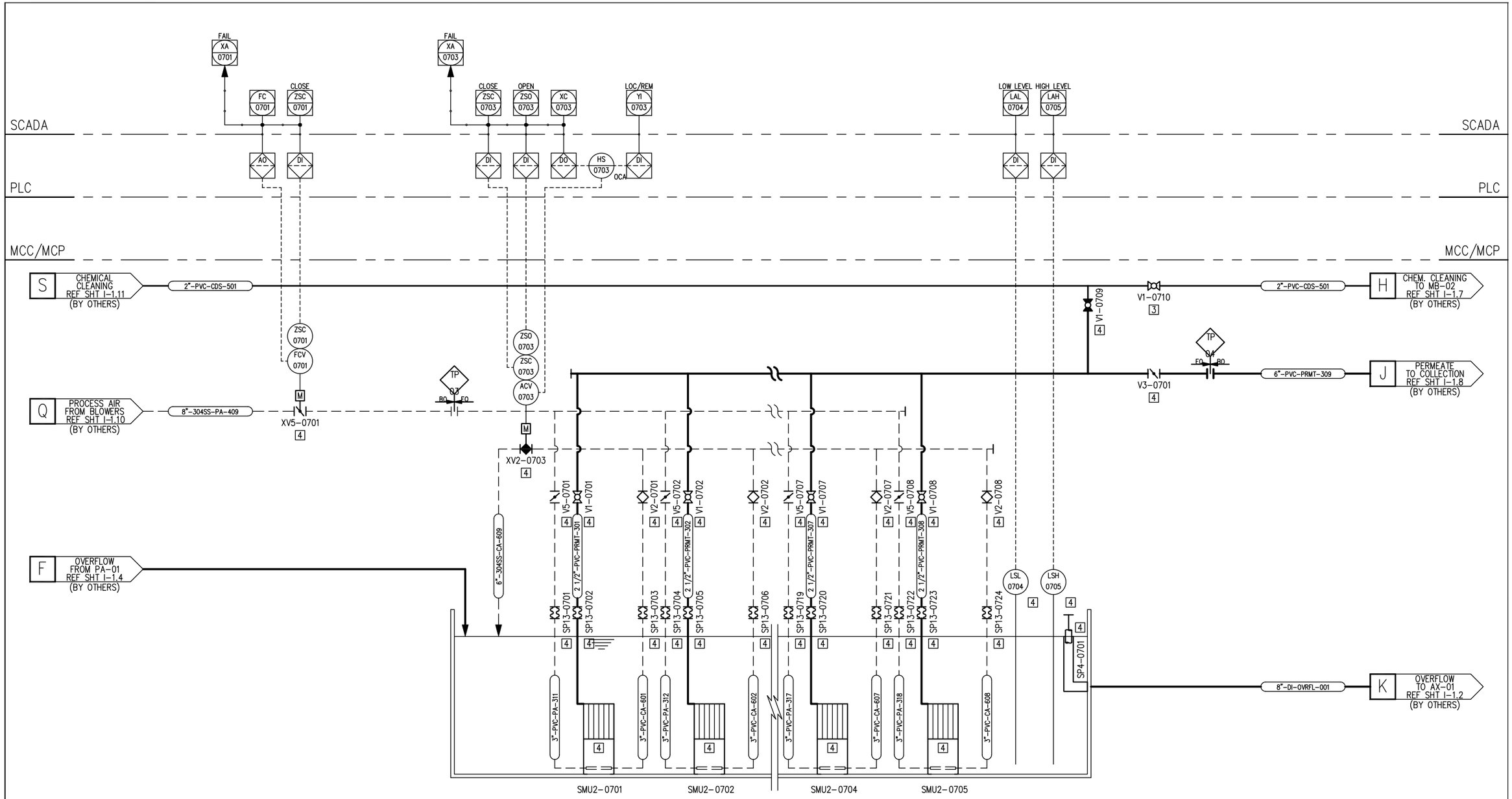

MB-01
MEMBRANE BIOREACTOR BASIN
T1-0701

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HALF MOON BAY, CA.
P&ID
MEMBRANE BIOREACTOR BASIN 01

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JOB NUMBER	NONE
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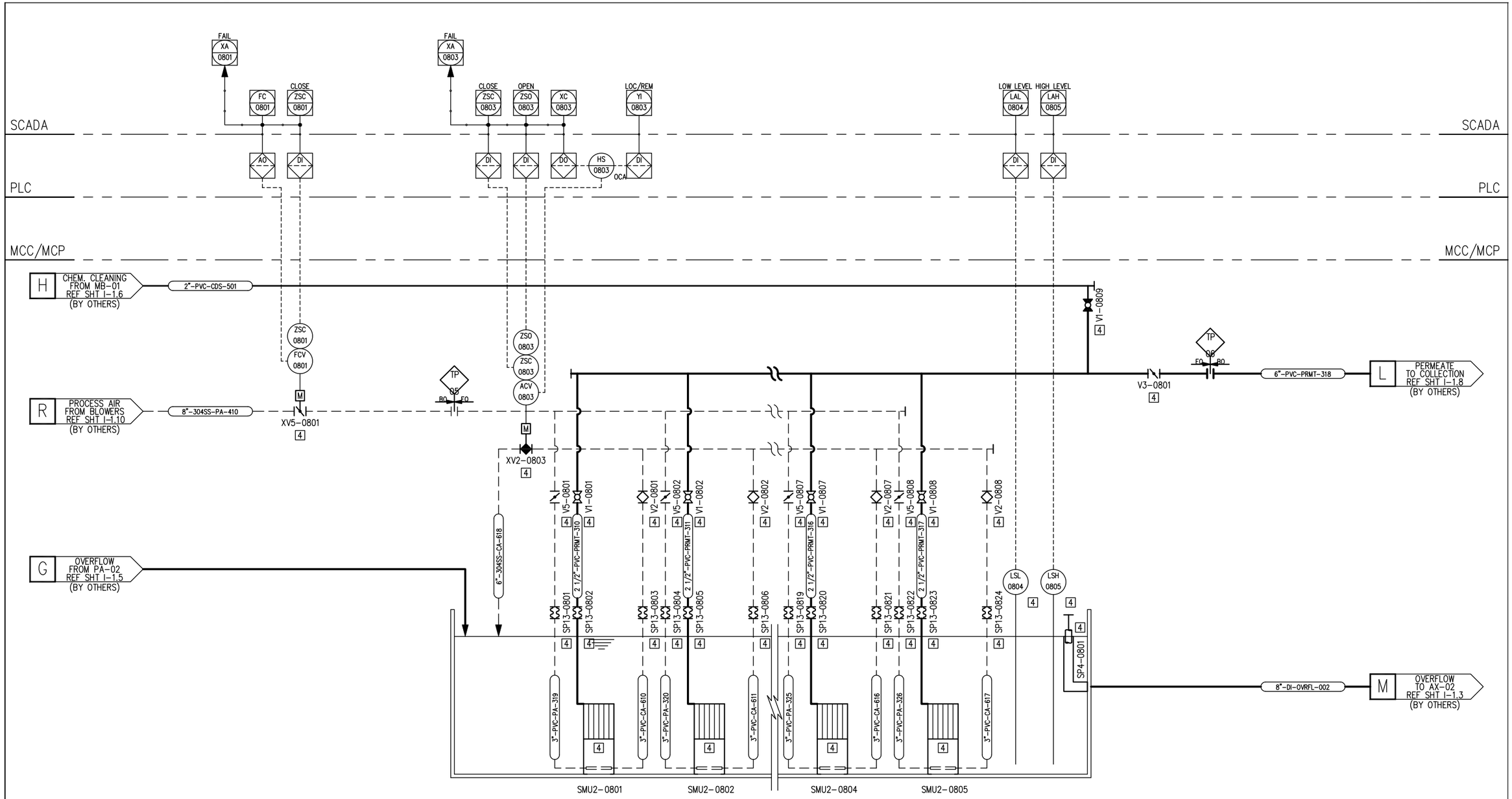

MB-02
MEMBRANE BIOREACTOR BASIN
T1-0601

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HALF MOON BAY, CA.
P&ID
MEMBRANE BIOREACTOR BASIN 02

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JOB NUMBER	NONE
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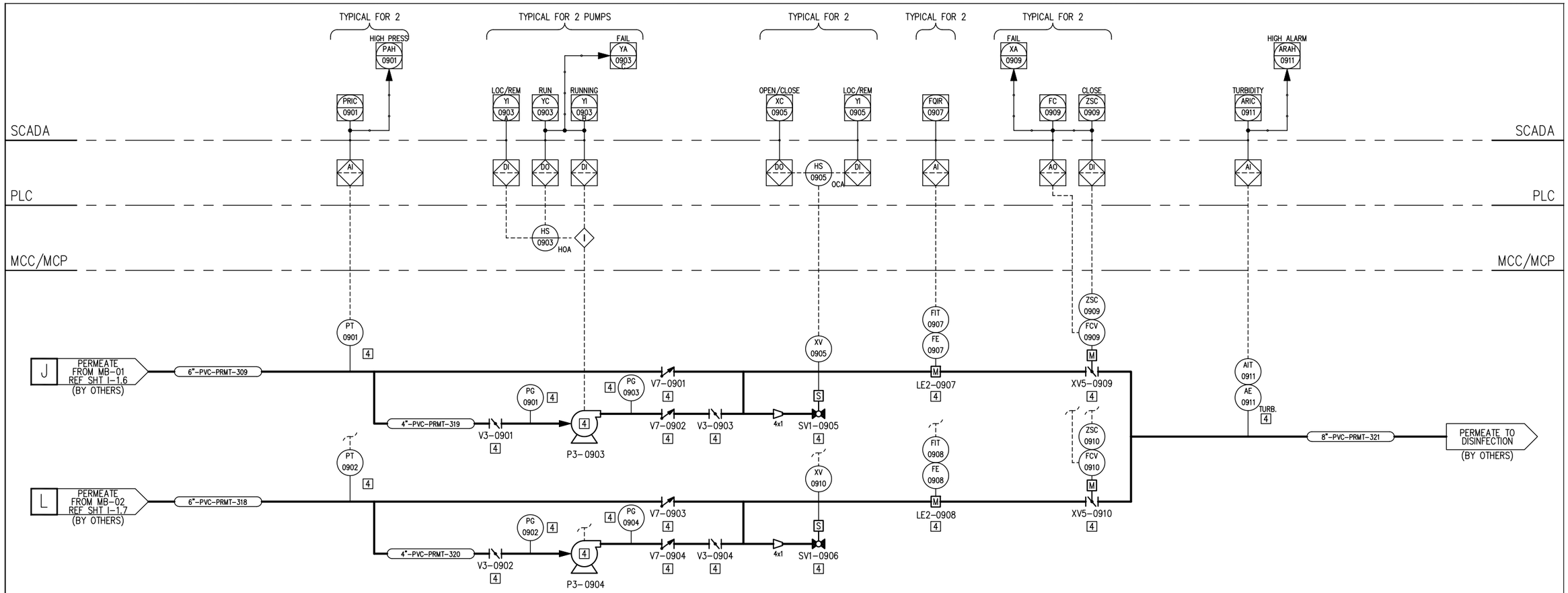

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HALF MOON BAY 0.25 MGD WWTP

HALF MOON BAY, CA.

P&I D

PERMEATE COLLECTION

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JOB NUMBER	NONE
SHEET	I-1.8 OF 13
FILE NAME	HMCAUS
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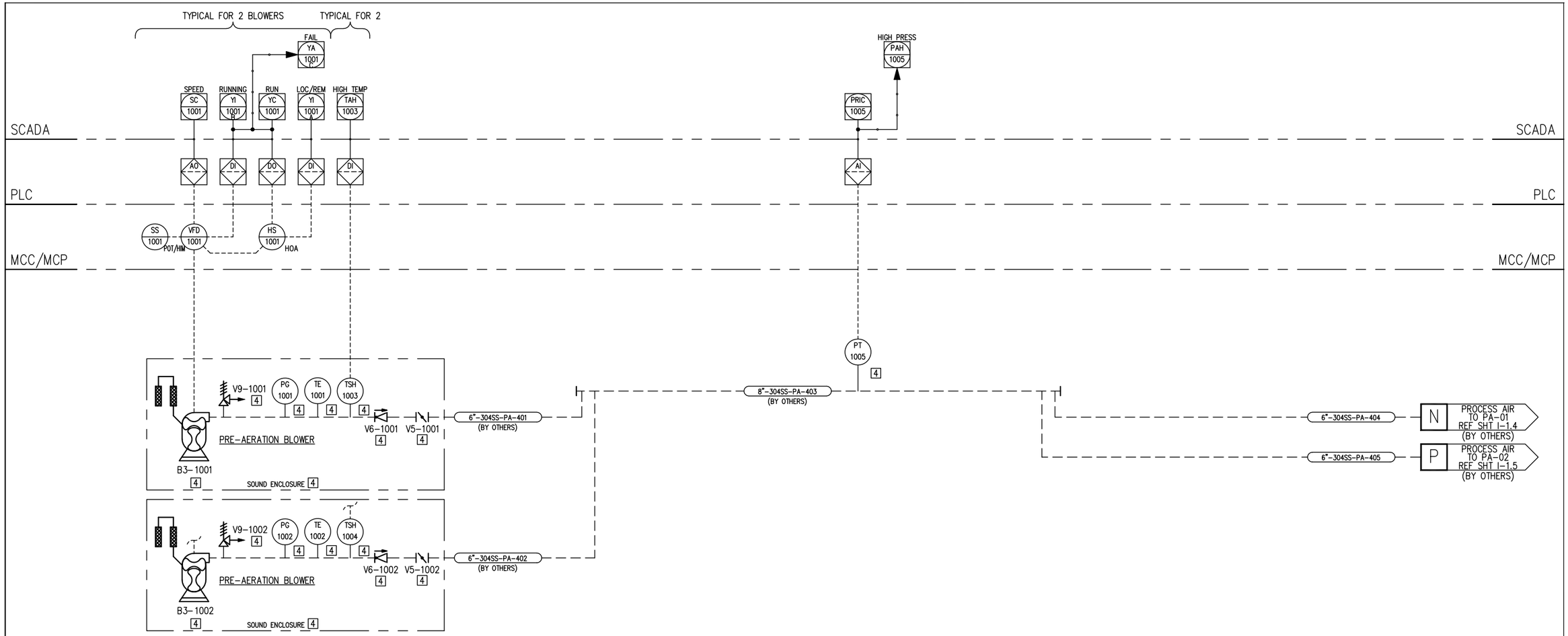

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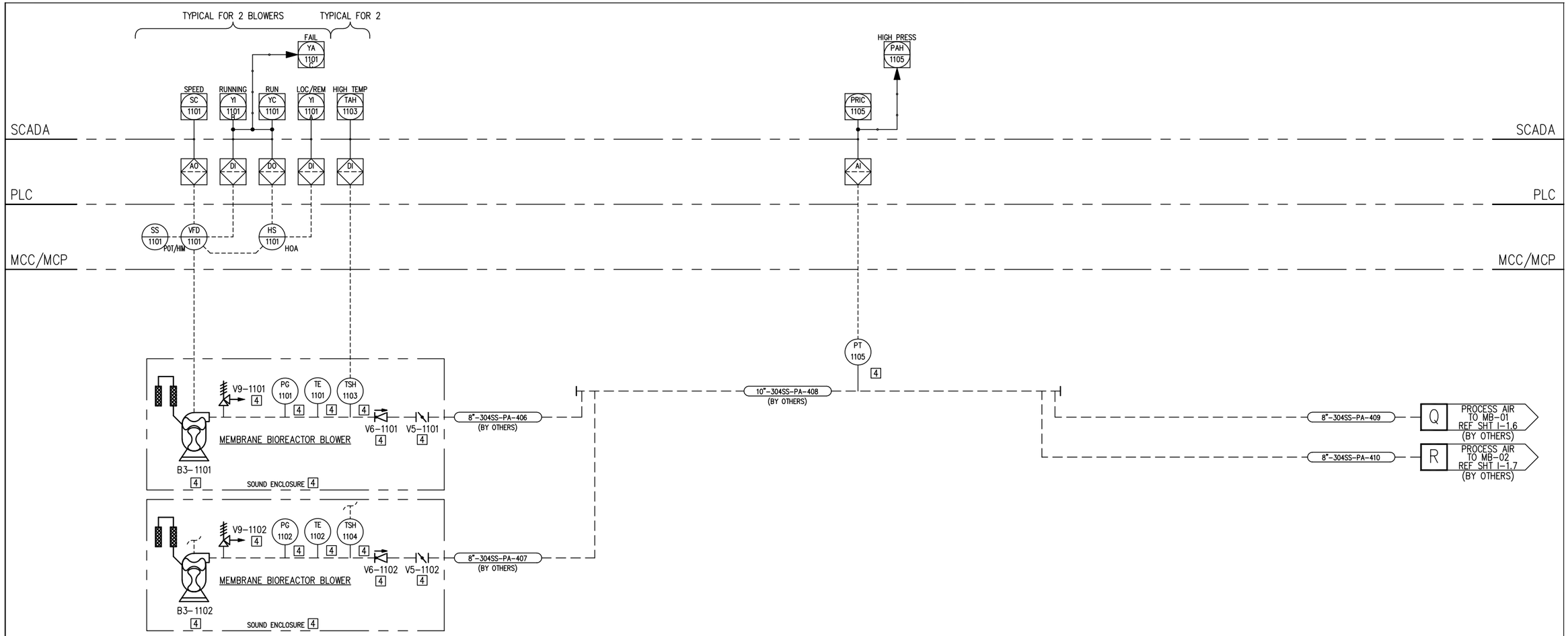
HALF MOON BAY 0.25 MGD WWTP

HALF MOON BAY, CA.

P&ID

PRE-AERATION BLOWERS

DRAWING SCALE	NONE
JOB NUMBER	NONE
SHEET	I-1.9 OF 13
FILE NAME	HMCAUS
REV	B



NOTES:

1. PIPING, FITTINGS AND ASSOCIATED HARDWARE SUPPLIED BY OTHERS UNLESS OTHERWISE NOTED.
2. ALL MANUAL VALVES AND ASSOCIATED FITTINGS SUPPLIED BY OTHERS UNLESS OTHERWISE NOTED.
3. SUPPLIED BY OTHERS.
4. SUPPLIED BY ENVIROQUIP.
5. FUTURE.

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a division of Eimco Water Technologies

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REV A

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DATE	3/20/09	
DRAWN	DEG	
CHECK'D	KZ	

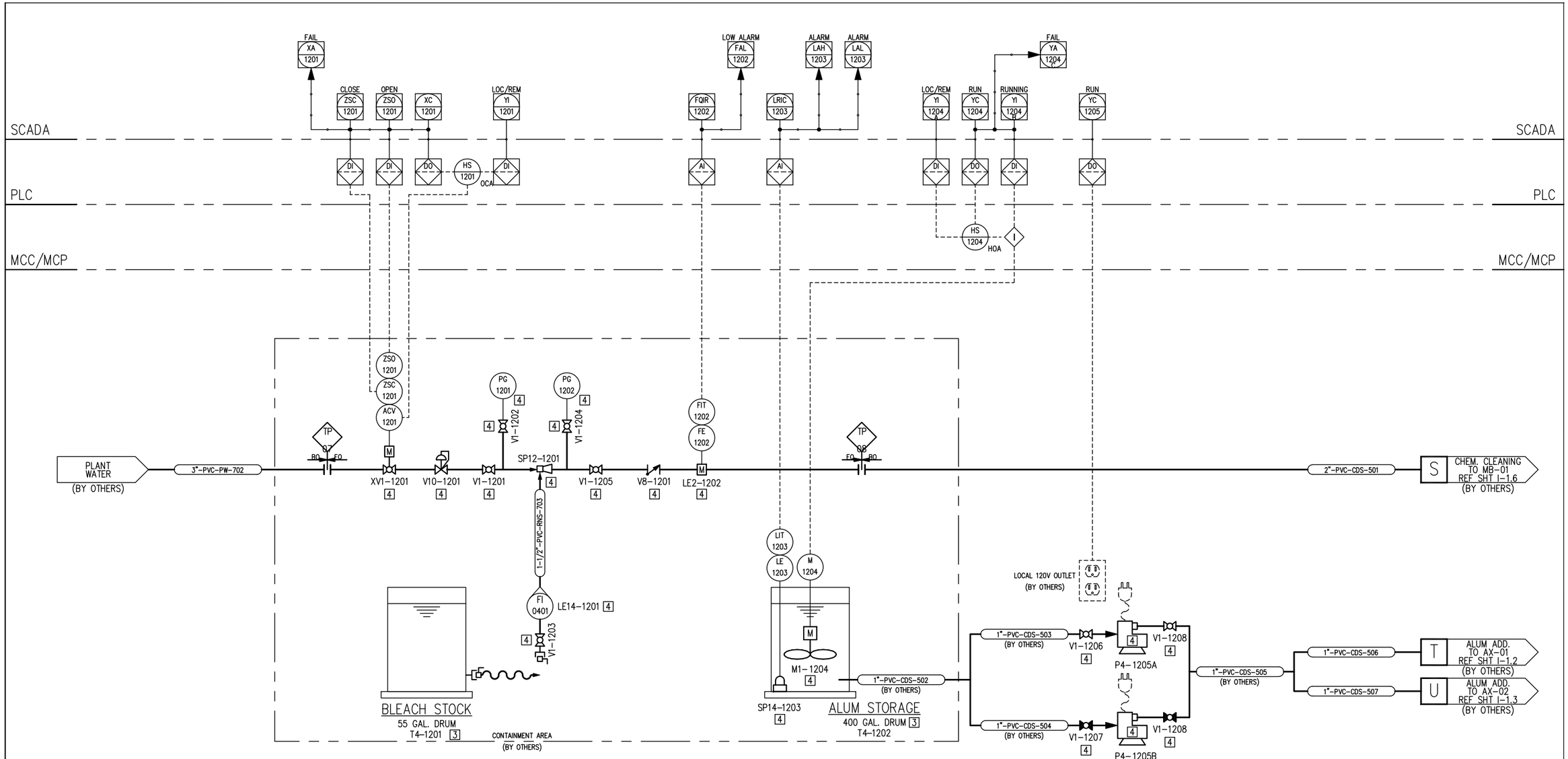
HALF MOON BAY 0.25 MGD WWTP

HALF MOON BAY, CA.

P&ID

MEMBRANE BIOREACTOR BLOWERS

DRAWING SCALE	NONE
JOB NUMBER	NONE
SHEET	I-1.10 OF 13
FILE NAME	HMCAUS
REV	B



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DATE	3/20/09
DRAWN	DEG
CHECK'D	KZ

HALF MOON BAY 0.25 MGD WWTP

HALF MOON BAY, CA.

P&ID
CHEMICAL CLEANING & ADDITION

DRAWING SCALE	NONE
JOB NUMBER	NONE
SHEET	I-1.11 OF 13
FILE NAME	HMCAUS
REV	B

TYPICAL VARIABLE LETTER COMBINATIONS

FIRST LETTERS	INITIATING OR MEASURED VARIABLE	CONTROLLERS: RECORDING	CONTROLLERS: INDICATING	CONTROLLERS: BLIND	CONTROLLERS: SELF-ACTUATED CONTROL VALVES	READOUT DEVICES: RECORDING	READOUT DEVICES: INDICATING	SWITCHES AND ALARM DEVICES: HIGH	SWITCHES AND ALARM DEVICES: LOW	SWITCHES AND ALARM DEVICES: COMB	TRANSMITTERS: RECORDING	TRANSMITTERS: INDICATING	TRANSMITTERS: BLIND	SOLENOIDS, RELAYS, COMPUTING DEVICES	PRIMARY ELEMENT	TEST POINT	WELL OR PROBE	VIEWING DEVICE, GLASS	SAFETY DEVICE	FINAL ELEMENT
A	Analysis	ARC	AIC	AC	–	AR	AI	ASH	ASL	ASHL	ART	AIT	AT	AY	AE	AP	AW	–	–	AZ
B	Burner/Combustion	BRC	BIC	BC	–	BR	BI	BSH	BSL	BSHL	BRT	BIT	BT	BY	BE	–	BW	BG	–	BZ
C	User's Choice	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
D	User's Choice	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
E	Voltage	ERC	EIC	EC	–	ER	EI	ESH	ESL	ESHL	ERT	EIT	ET	EY	EE	–	–	–	–	EZ
F	Flow Rate	FRC	FIC	FC	FCV	FR	FI	FSH	FSL	FSHL	FRT	FIT	FT	FY	FE	FP	–	FG	–	FZ
FQ	Flow Quantity	FQRC	FQIC	–	–	FQR	FQI	FQSH	FQSL	FQSHL	–	FQIT	FQT	FQY	FQE	–	–	–	–	FQZ
FF	Flow Ratio	FFRC	FFIC	FFC	–	FFR	FFI	FFSH	FFSL	FFSHL	–	–	–	–	–	–	–	–	–	FFZ
G	User's Choice	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H	Hand	–	HIC	HC	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
I	Current	IRC	IIC	–	–	IR	II	ISH	ISL	ISHL	IRT	IIT	IT	IY	IE	–	–	–	–	IZ
J	Power	JRC	JIC	–	–	JR	JI	JSH	JSL	JSHL	JRT	JIT	JT	JY	JE	–	–	–	–	JZ
K	Time	KRC	KIC	KC	KCV	KR	KI	KSH	KSL	KSHL	KRT	KIT	KT	KY	KE	–	–	–	–	KZ
L	Level	LRC	LIC	LC	LCV	LR	LI	LSH	LSL	LSHL	LRT	LIT	LT	LY	LE	–	LW	LG	–	LZ
M	User's Choice	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
N	User's Choice	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
O	User's Choice	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
P	Pressure/Vacuum	PRC	PIC	PC	PCV	PR	PI	PSH	PSL	PSHL	PRT	PIT	PT	PY	PE	PP	–	–	PSE	PZ
PD	Pressure Differential	PDRC	PDIC	PDC	PDCV	PDR	PDI	PDSH	PDSL	PDSHL	PDRT	PDIT	PDT	PDY	PDE	PDP	–	–	–	PDZ
Q	Quantity	QRC	QIC	–	–	QR	QI	QSH	QSL	QSHL	QRT	QIT	QT	QY	QE	–	RW	–	–	QZ
R	Radiation	RRC	RIC	RC	–	RR	RI	RSH	RSL	RSHL	RRT	RIT	RT	RY	RE	–	–	–	–	RZ
S	Speed/Frequency	SRC	SIC	SC	SCV	SR	SI	SSH	SSL	SSHL	SRT	SIT	ST	SY	SE	–	–	–	–	SZ
T	Temperature	TRC	TIC	TC	TCV	TR	TI	TSH	TSL	TSHL	TRT	TIT	TT	TY	TE	TP	TPW	–	TSE	TZ
TD	Temperature Differential	TDRC	TDIC	TDC	TDCV	TDR	TDI	TDSH	TDSL	TDSHL	TDRT	TDIT	TDT	TDY	TDE	TDP	TDPW	–	–	TDZ
U	Multivariable	–	–	–	–	UR	UI	–	–	–	–	–	–	–	–	–	–	–	–	–
V	Vibration/Machinery Analysis	–	–	–	–	VR	VI	VSH	VSL	VSHL	VRT	VIT	VT	VY	VE	–	–	–	–	VZ
W	Weight/Force	WRC	WIC	WC	WCV	WR	WI	WSH	WSL	WSHL	WRT	WIT	WT	WY	WE	–	–	–	–	WZ
WD	Weight/Force Differential	WDRC	WDIC	WDC	WDCV	WDR	WDI	WDSH	WDSL	WDSHL	WDRT	WDIT	WDT	WDY	WDE	–	–	–	–	WDZ
X	Unclassified	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Y	Event/State/Presence	–	YIC	YC	–	YR	YI	YSH	YSL	YSHL	YRT	YIT	YT	YY	YE	–	–	–	–	YZ
Z	Position/Dimension	ZRC	ZIC	ZC	ZCV	ZR	ZI	ZSH	ZSL	ZSHL	ZRT	ZIT	ZT	ZY	ZE	–	–	–	–	ZZ
ZD	Gauging/Deviation	ZDRC	ZDIC	ZDC	ZDCV	ZDR	ZDI	ZDSH	ZDSL	ZDSHL	ZDRT	ZDIT	ZDT	ZDY	ZDE	–	–	–	–	ZDZ

NOTE: This table is not all-inclusive.

SUCEEDING LETTERS: VALUE	DESCRIPTION
A	ALARM
B	–
C	CLOSED
D	–
E	–
F	–
–	–
–	–
G	–
H	HIGH
HH	HIGH HIGH
I	–
J	–
K	–
L	LOW
LL	LOW LOW
M	MIDDLE
N	–
O	OPEN
P	–
Q	–
R	–
S	–
T	–
U	–
V	–
W	–
–	–
X	–
Y	–
Z	–
–	–

LINE CODES

- MAJOR PROCESS LINE
- MINOR PROCESS LINE
- PROCESS/CLEANING AIR
- ELECTRICAL
- PLC TO SCADA COMMUNICATION
- DESCRIPTION 1 / DESCRIPTION 2 / REF SHT I-X.X — PROCESS CONTINUATION WITHIN SCOPE
- DESCRIPTION 1 / DESCRIPTION 2 / REF SHT I-X.X — PROCESS CONTINUATION WITHIN SCOPE WITH BACKFLOW
- DESCRIPTION 1 / DESCRIPTION 2 — PROCESS CONTINUATION OUT OF SCOPE
- DESCRIPTION 1 / DESCRIPTION 2 — PROCESS CONTINUATION OUT OF SCOPE WITH BACKFLOW
- 00"-XXXXX-XXX-000 — LINE NUMBER

LINE NUMBERING

00" – DI – INFLT – 001 (EXAMPLE)

- 001 — SEQUENTIAL LINE NO.
- INFLT — FLUID CODE
- DI — PIPE MATERIAL
- 00" — NOMINAL LINE SIZE

PIPE MATERIAL ABBRIVIATION

304SS	304 STAINLESS STEEL
DI	DUCTILE IRON
HDGCS	HOT DIPPED GALVANIZED CARBON STEEL
PVC	POLYVINYL CHLORIDE
FLEX	FLEXIBLE HOSE

FLUID CODE ABBREVIATION

CA	CLEANING AIR
CDS	CHEMICAL DOSING
INFLT	INFLUENT
OVRFL	OVERFLOW
PA	PLANT AIR
PRMT	PERMEATE
PW	PLANT WATER
RAS	RETURN ACTIVATED SLUDGE
RECYC	RECYCLE
RNS	RINSE
WAS	WASTE ACTIVATED SLUDGE

LINE NUMBER GROUPS

000	OVERFLOW
100	INFLUENT
200	RECYCLE
300	PERMEATE
400	PROCESS AIR
500	CHECMICAL DOSING
600	CLEANING AIR
700	PLANT WATER
800	RETURN ACTIVATED SLUDGE
900	WASTE ACTIVATED SLUDGE

INSTRUMENT NUMBERING

0000 (EXAMPLE)

- 00 — SHEET NO.
- 00 — SEQUENTIAL INSTRUMENT NO.

EQUIPMENT NUMBERING

XXX0 – 0000 (EXAMPLE)

- 0000 — SEQUENTIAL NUMBER
- 0000 — P&ID PAGE NUMBER
- XXX0 — EQUIPMENT TYPE

BLOWER TYPES

B1	REGENERATIVE (RT BORA)
B2	REGENERATIVE (FPZ)
B3	PD (KAESER)
B4	PD (ROOTS)
B5	PD (TUTHILL)
B6	CENTRIFUGAL (CONTINENTIAL)
B7	CENTRIFUGAL (LAMSON)

SCREEN TYPES

FS1	AUTOMATIC FINE SCREEN
FS2	MANUAL FINE SCREEN
FS3	SCREENING CONVEYOR
FS4	GRIT CLASSIFIER

MIXER TYPES

M1	MIXER
M2	WALL MOUNTED MIXER

INLINE INSTRUMENT TYPES

LE1	NOZZLE
LE2	MAGNETIC ELEMENT
LE3	ORIFICE
LE4	VENTURI
LE5	PITOT
LE6	AVERAGING PITOT
LE7	VORTEX SHEDING
LE8	TURBINE
LE9	POSITIVE DISPLACEMENT
LE10	SONIC
LE11	TARGET
LE12	ROTAMETER
LE13	RESISTANCE TEMPERATURE DIFFERENTIAL
LE14	VARIABLE

MEMBRANE UNIT TYPES

SMU1	FS TYPE (SINGLE DECK) UNIT
SMU2	ES TYPE (SINGLE DECK) UNIT
SMU3	EM TYPE (SINGLE DECK) UNIT
SMU4	EK TYPE (DOUBLE DECK) UNIT
SMU5	EW TYPE (DOUBLE DECK) UNIT

TANK TYPES

T1	PRE-CAST CONCRETE
T2	BOLTED STEEL
T3	WELDED STEEL
T4	FIBERGLASS DRUM

SPECIALTY ITEMS

SP1	FINE BUBBLE
SP2	AIR DROP-TRANSMAX
SP3	AIR DROP-MS
SP4	TELESCOPING VALVE
SP5	WEIR
SP6	WEIR GATE
SP7	ULTRA SONIC LEVEL TRANSMITTER
SP8	SLOTTED PIPE SKIMMER
SP9	BASIN COVER
SP10	EQUIPMENT SKID
SP11	SPECTACLE BLIND
SP12	EDUCTOR
SP13	EXPANSION JOINT
SP14	SUBMERSIBLE PRESSURE SENSOR
SP15	DRAFT TUBE
SP16	MULTI-EDUCTOR DRAFT TUBE
SP17	TABLET CHLORINATOR

PUMP TYPES

P1	AIR LIFT PIMP
P2	SUBMERSIBLE PUMP
P3	CENTRIFUGAL PUMP
P4	METERING PUMP

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HALF MOON BAY 0.25 MGD WWTP

HALF MOON BAY, CA.

P&ID

CODES LEGEND

DRAWING SCALE	NONE
JOB NUMBER	NONE
SHEET	I-1.12 OF 13
FILE NAME	HMCAUS
REV	B

INLINE INSTRUMENTS

- NOZZLE
- MAGNETIC ELEMENT
- VORTEX SHEDDING
- TURBINE
- ORIFICE
- VENTURI
- POSITIVE DISPLACEMENT
- SONIC
- PITOT
- AVERAGING PITOT
- TARGET
- ROTOMETER
- RESISTANCE TEMPERATURE DIFFERENTIAL
- VARIABLE AREA

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

	FIELD MOUNTED	PRIMARY LOCATION ACCESSIBLE TO OPERATOR	PRIMARY LOCATION INACCESSIBLE TO OPERATOR	AUXILIARY LOCATION ACCESSIBLE TO OPERATOR	HARDWARE INTERLOCK
DISCRETE INSTRUMENTS					
SHARED DISPLAY SHARED CONTROL					DCS "SOFT" INTERLOCK
COMPUTER FUNCTION					
PROGRAMMABLE LOGIC CONTROL					

VALVE SYMBOLS

NC NO

- GATE VALVE
- GATE VALVE
- BALL VALVE
- DIAPHRAGM VALVE
- PLUG VALVE
- 3-WAY BALL VALVE
- LUGGED BUTTERFLY VALVE
- WAFERED BUTTERFLY VALVE
- CHECK VALVE
- DOUBLE LEAF CHECK VALVE

RELIEF DEVICES

- PRESSURE RELIEF
- RUPTURE DISK FOR PRESSURE RELIEF
- VACUUM RELIEF
- RUPTURE DISK FOR VACUUM RELIEF

VALVE ACTUATORS

- DIAPHRAGM ACTUATOR
- LEVER
- MOTOR ACTUATOR
- HAND WHEEL
- SOLENOID ACTUATOR
- CHAIN WHEEL
- CYLINDER ACTUATOR

SELF-ACTING REGULATORS

- PRESSURE REDUCING
- REGULATOR WITH EXTERNAL PILOT
- BACK PRESSURE
- DIFFERENTIAL PRESSURE

MECHANICAL EQUIPMENT

- AIRLIFT PUMP
- SUBMERSIBLE PUMP
- CENTRIFUGAL PUMP
- METERING PUMP
- CENTRIFUGAL BLOWER
- ROTARY BLOWER
- BLOWER AIR FILTER
- MIXER
- WALL MOUNTED MIXER
- WEIR
- WEIR GATE
- ULTRA SONIC LEVEL TRANSMITTER
- SUBMERSIBLE PRESSURE SENSOR
- TABLET CHLORINATOR
- SINGLE DECK MEMBRANE
- MANUAL FINE SCREEN
- AUTOMATIC FINE SCREEN
- AIR DROP
- FINE BUBBLE
- TELESCOPING VALVE
- WASTE BASKET
- DOUBLE DECK MEMBRANE
- CONVEYOR
- SHEAR TUBE
- WASTE CONTAINER
- DRAFT TUBE
- MULTI-EDUCTOR DRAFT TUBE

PIPING SYMBOLS

- Y STRAINER
- BLIND FLANGE
- FUNNEL
- ECCENTRIC REDUCER
- CONCENTRIC REDUCER
- EDUCTOR
- WELDED CAP
- WELDED PIPE END
- SCREWED CAP
- UNION
- CAMLOCK FITTING
- FLEXIBLE LINE
- SPECTACLE BLIND
- EXPANSION JOINT
- TIE-IN POINT

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HALF MOON BAY 0.25 MGD WWTP
HALF MOON BAY, CA.
P&ID
SYMBOLS LEGEND

DRAWING SCALE	NONE
JOB NUMBER	NONE
SHEET	I-1.13 OF 13
FILE NAME	HMCAUS
REV	B

1. Price

Please refer to the cover letter for pricing of the attached scope of supply.

2. Payment Terms

Prices and estimated shipping dates are based upon the receipt of a purchase order within sixty (60) days from the date of this proposal. Prices quoted are firm for delivery within the time frame cited below. Prices and approval submittals/equipment shipping dates are subject to adjustment if a purchase order is not received within 60 days from the date of this proposal. Pricing is based on the following terms of payment:

Municipal

Invoice Date	Amount of Invoice
Upon Receipt of Approved Submittal:	10% of Total Price
Upon Receipt Equipment:	90% of Total Price
Before Startup of Equipment:	95% of Total Price
One month after Startup of Equipment:	100% of Total Price

All invoices are due and payable within thirty (30) days of the invoice date except 10% with Purchase order. Progress payments are required for partial shipments.

3. Price Escalation

The prices submitted are based upon Purchaser's acceptance of this proposal by May 24, 2009.

If the above indicated order date is exceed, prices and shipping dates are subject to review and adjustment. Should shipment dates be exceeded because of customer action, escalation of the selling prices at the rate of 1.5% per month for each month or partial month of delay will be applied. This escalation will be applied only if shipment is delayed by the customer.

In addition, due to fluctuating material costs, the prices quoted in this proposal may be adjusted at the time of delivery. **Only additional unit material costs will be transferred to the purchaser.**

4.Taxes

Federal, State or local sales, use or other taxes applicable to this transaction shall be added to the sales price for BUYER's account.

5. Backcharges

In no event shall Purchaser/Owner do or cause to be done any work, purchase any services or material or incur any expense for the account of ENVIROQUIP, nor shall ENVIROQUIP be responsible for such work or expense until after Purchaser/Owner has provided ENVIROQUIP's PROJECT MANAGER full details (including estimate of material cost and amount and rate of labor required) of the work, services, material or expenses and ENVIROQUIP has approved the same in writing. ENVIROQUIP will not accept Products returned by Purchaser/Owner unless ENVIROQUIP has previously accepted the return in writing and provided Purchaser/Owner with shipping instructions.

6. Freight

All prices are quoted with freight allowed to readily accessible location nearest to jobsite.

7. Warranty

Warranty and service policies are limited to equipment supplied by ENVIROQUIP Equipment that is not integral to ENVIROQUIP equipment will be subject to warranty and service policies of the respective manufacturer.

8. Ordering

All purchase orders tendered on the basis of this proposal shall be issued with statements clearly indicating what line items are being purchased, the cost of each line item to be purchased, and the total sell price of all items being purchased. In addition, any special instructions including shipping address, special or partial shipments, and shipment dates shall be clearly identified. All purchase orders shall be sent to:

Attention: Kimberly Mathis
ENVIROQUIP
2404 Rutland Drive, Suite 200
Austin, Texas 78758
Phone: (512) 834-6000 Fax: (512) 834-6039

All correspondence dealing with this project and all payments made for equipment based on this offering should be mailed to the same address. In the event that a purchase order is issued to ENVIROQUIP, this proposal including the "*Terms and Conditions*," "*General Terms and Conditions of Sale*," and "*Clarifications*" shall be made essential parts of the purchase order. Any order submitted to ENVIROQUIP shall be subject to acknowledgement and acceptance by ENVIROQUIP

9. Liability and Ownership

Transfer of liability from ENVIROQUIP to OWNER occurs upon delivery to shipping address. Transfer of ownership occurs after the full purchase price has been paid. ENVIROQUIP retains title and right of repossession to the equipment until the full purchase price has been paid. OWNER or BUYER shall not encumber nor permit others to encumber said equipment by any liens or security instruments until the full purchase price has been paid.

10. Past Due Accounts

Payment of invoices shall be in compliance with the "*Pricing Terms and Conditions*" of this proposal. Amounts past due are subject to a service charge of 2.0 percent per month.

11. Approval of Equipment and Drawing Submittal

Detailed equipment and drawing submittals shall be shipped six (6) to eight (8) weeks after ENVIROQUIP acceptance of purchase order.

ENVIROQUIP shall use reasonable efforts to meet the dates specified above for shipment of Approval Submittals, but such dates are estimates provided only to serve as a guide to the OWNER, and not guaranteed. No liability, direct or indirect, is assumed by ENVIROQUIP for failure to ship on such dates.

12. Shipment

Shipment will be made eighteen (18) weeks to twenty (20) weeks after ENVIROQUIP receives a copy of OWNER-approved approval submittals. Erection drawings and

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operating and maintenance instructions shall be forwarded at time of shipment of equipment.

ENVIROQUIP shall use reasonable efforts to meet the dates specified above for shipment of Equipment, but such dates are estimates provided only to serve as a guide to the OWNER, and not guaranteed. No liability, direct or indirect, is assumed by ENVIROQUIP for failure to ship on such dates.

13. Acceptance

Should shipment of equipment be delayed because of unreasonable delays in approval of submittals or at the request of the OWNER beyond nine (9) months after date of purchase order, the selling price shall escalate at the rate of 1.0 percent per month.

OWNER shall pay for acceptance of partial shipments and proper billings of ENVIROQUIP even if the OWNER does not pay the BUYER, provided the reason for such non-payment by the OWNER is unrelated to the performance of ENVIROQUIP Unauthorized retention of payments by the BUYER for any reason shall be subject to a service charge of 2% per month.

Upon receiving equipment, OWNER shall thoroughly inspect and properly store each shipping item in accordance with submittal requirements. Any items marked as shipped on the Bill of Material that are missing or damaged shall be brought to the attention of ENVIROQUIP within fourteen (14) days.

The OWNER shall notify the freight company of any crates, boxes, or equipment damaged in transit. ENVIROQUIP shall not be responsible for any damaged or missing items not confirmed in writing by the OWNER within fourteen (14) days from the shipping date. Any replacement of equipment and material after this time shall be invoiced.

14. Field Service

ENVIROQUIP shall provide the service of our Field Service Representative to inspect the installed equipment and to instruct the OWNER's personnel in its operation. A specific number of man-days are shown in our proposal. No reimbursement to the contractor shall be allowed for unused man-days or trips. Warranty of equipment may be affected or voided if the contractor does not allow time necessary to provide field service by ENVIROQUIP's Field Service Representative.

The BUYER shall have all of the equipment ready for operation prior to requesting service by our Field Service Representative. If the equipment is not ready for operation and field checkout when ENVIROQUIP's Field Service Representative arrives at the jobsite, ENVIROQUIP shall bill any delays beyond the scheduled amount indicated above. Billing shall be at the current field service rates plus incurred travel and living expenses.

Adequate notice, generally two (2) weeks, shall be given when scheduling our Field Service Representative. ENVIROQUIP's field service and startup of the equipment shall not commence until all subsequent conditions have been met in accordance with the "*Pricing Terms & Conditions*" of this proposal.

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a division of Eimco Water Technologies

Terms & Conditions of Sale

1. ACCEPTANCE. The proposal of the **Enviroquip division of EIMCO WATER TECHNOLOGIES, LLC** ("SELLER"), as well as these terms and conditions of sale (collectively the "Agreement"), constitutes SELLER's contractual offer of goods and associated services, and PURCHASER's acceptance of this offer is expressly limited to the terms of the Agreement. The scope and terms and conditions of the Agreement represent the entire offer by SELLER and supersede all prior solicitations, discussions, agreements, understandings and representations between the parties. Any scope or terms and conditions included in PURCHASER's acceptance/purchase order that are in addition to or different from the Agreement are hereby rejected.

2. DELIVERY. Any statements relating to the date of shipment of the Products (as defined below) represent SELLER'S best estimate, but is not guaranteed, and SELLER shall not be liable for any damages due to late delivery. The Products shall be delivered to the delivery point or points in accordance with the delivery terms stated in SELLER's proposal. If such delivery is prevented or postponed by reason of Force Majeure (as defined below), SELLER shall be entitled at its option to tender delivery to PURCHASER at the point or points of manufacture, and in default of PURCHASER's acceptance of delivery to cause the Products to be stored at such a point or points of manufacture at PURCHASER'S expense. Such tender, if accepted, or such storage, shall constitute delivery for all purposes of this agreement. If shipment is postponed at request of PURCHASER, or due to delay in receipt of shipping instructions, payment of the purchase price shall be due on notice from SELLER that the Products are ready for shipment. Handling, moving, storage, insurance and other charges thereafter incurred by SELLER with respect to the Products shall be for the account of PURCHASER and shall be paid by PURCHASER when invoiced.

3. TITLE AND RISK OF LOSS. SELLER shall retain the fullest right, title, and interest in the Products to the extent permitted by applicable law, including a security interest in the Products, until the full purchase price has been paid to SELLER. The giving and accepting of drafts, notes and/or trade acceptances to evidence the payments due shall not constitute or be construed as payment so as to pass SELLER's interests until said drafts, notes and/or trade acceptances are paid in full. Risk of loss shall pass to PURCHASER at the delivery point.

4. PAYMENT TERMS. SELLER reserves the right to ship the Products and be paid for such on a pro rata basis, as shipped. If payments are not made by the due date, interest at a rate of two percent (2%) per month, calculated daily, shall apply from the due date for payment. PURCHASER is liable to pay SELLER'S legal fees and all other expenses in respect of enforcing or attempting to enforce any of SELLER'S rights relating to a breach or threatened breach of the payment terms by PURCHASER. .

5. TAXES. Unless otherwise specifically provided in SELLER's quotation/proposal; PURCHASER shall pay and/or reimburse SELLER, in addition to the price, for all sales, use and other taxes, excises and charges which SELLER may pay or be required to pay to any government directly or indirectly in connection with the production, sale, transportation, and/or use by SELLER or PURCHASER, of any of the Products or services dealt with herein (whether the same maybe regarded as personal or real property). PURCHASER agrees to pay all property and other taxes which may be levied, assessed or charged against or upon any of the Products on or after the date of actual shipment, or placing into storage for PURCHASER'S account.

6. MECHANICAL WARRANTY. Solely for the benefit of PURCHASER, SELLER warrants that new equipment and parts manufactured by it and provided to PURCHASER (collectively, "Products") shall be free from defects in material and workmanship. The warranty period shall be twelve (12) months from startup of the equipment not to exceed eighteen (18) months from shipment. If any of SELLER'S Products fail to comply with the foregoing warranty, SELLER shall repair or replace free of charge to PURCHASER, EX WORKS SELLER'S FACTORIES or other location that SELLER designates, any Product or parts thereof returned to SELLER, which examination shall show to have failed under normal use and service operation by PURCHASER within the Warranty Period; provided, that if it would be impracticable for the Product or part thereof to be returned to SELLER, SELLER will send a representative to PURCHASER's job site to inspect the Product. If it is determined after inspection that SELLER is liable under this warranty to repair or replace the Product or part thereof, SELLER shall bear the transportation costs of (a) returning the Product to SELLER for inspection or sending its representative to the job site and (b) returning the repaired or replaced Products to PURCHASER; however, if it is determined after inspection that SELLER is not liable under this warranty, PURCHASER shall pay those costs. For SELLER to be liable with respect to this warranty, PURCHASER must make its claims to SELLER with respect to this warranty in writing no later than thirty (30) days after the date PURCHASER discovers the basis for its warranty claim and in no event more than thirty (30) days after the expiration of the Warranty Period. In addition to any other limitation or disclaimer with respect to this warranty, SELLER shall have no liability with respect to any of the following: (i) failure of the Products, or damages to them, due to PURCHASER's negligence or willful misconduct, abuse or improper storage, installation, application or maintenance (as specified in any manuals or written instructions that SELLER provides to the PURCHASER); (ii) any Products that have been altered or repaired in any way without SELLER'S prior written authorization; (iii) The costs of dismantling and reinstallation of the Products; (iv) any Products damaged while in transit or otherwise by accident; (v) decomposition of Products by chemical action, erosion or corrosion or wear to Products or due to conditions of temperature, moisture and dirt; or (vi) claims with respect to parts that are consumable and normally replaced during maintenance such as filter media, filter drainage belts and the like, except where such parts are not performing to SELLER'S estimate of normal service life, in which case, SELLER shall only be liable for the pro rata cost of replacement of those parts based on SELLER'S estimate of what the remaining service life of those parts should have been; provided, that failure of those parts did not result from any of the matters listed in clauses (i) through (v) above. With regard to third-party parts, equipment, accessories or components not of SELLER's design, SELLER'S liability shall be limited solely to the assignment of available third-party warranties. **THE PARTIES AGREE THAT ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, WHETHER WRITTEN, ORAL OR STATUTORY, ARE EXCLUDED TO THE FULLEST EXTENT PERMISSIBLE BY LAW.** All warranties and obligations of SELLER shall terminate if PURCHASER fails to perform its obligations under this Agreement including but not limited to any failure to pay any charges due to SELLER. SELLER'S quoted price for the Products is based upon this warranty. Any increase in warranty obligation may be subject to an increase in price.

7. CONFIDENTIAL INFORMATION. All nonpublic information and data furnished to PURCHASER hereunder, including but not limited to price, size, type and design of the Products is the sole property of SELLER and submitted for PURCHASER'S own confidential use solely in connection with this Agreement and is not to be made known or available to any third party without SELLER'S prior written consent.

8. PAINTING. The Products shall be painted in accordance with SELLER'S standard practice, and purchased items such as motors, controls, speed reducers, pumps, etc., will be painted in accordance with manufacturers' standard practices, unless otherwise agreed in writing.

9. DRAWINGS AND TECHNICAL DOCUMENTATION. When PURCHASER requests approval of drawings before commencement of manufacture, shipment may be delayed if approved drawings are not returned to SELLER within fourteen (14) days of receipt by PURCHASER of such drawings for approval. SELLER will furnish only general arrangement, general assembly, and if required, wiring diagrams, erection drawings, installation and operation-maintenance manuals for SELLER'S equipment (in English language). SELLER will supply six (6) complete sets of drawings and operating instructions. Additional sets will be paid for by PURCHASER. Electronic files, if requested from SELLER, will be provided in *pdf, jpg or tif* format only.

10. SET OFF. This agreement shall be completely independent of all other contracts between the parties and all payments due to SELLER hereunder shall be paid when due and shall not be setoff or applied against any money due or claimed to be due from SELLER to PURCHASER on account of any other transaction or claim.

11. SOFTWARE. PURCHASER shall have a nonexclusive and nontransferable license to use any information processing program supplied by SELLER with the Products. PURCHASER acknowledges that such programs and the information contained therein is Confidential Information and agrees: a) not to copy or duplicate the program except for archival or security purposes; b) not to use the program on any computer other than the computer with which it is supplied; and c) to limit access to the program to those of its employees who are necessary to permit authorized use of the program. PURCHASER agrees to execute and be bound by the terms of any software license applicable to the Products supplied.

12. PATENT INDEMNITY. SELLER will defend at its own expense any suit instituted against PURCHASER based upon claims that SELLER's Product hereunder in and of itself constitutes an infringement of any valid apparatus claims of any United States patent issued and existing as of the date of this Agreement, if notified promptly in writing and given all information, assistance, and sole authority to defend and settle the same, and SELLER shall indemnify the PURCHASER against such claims of infringement. Furthermore, in case the use of the Products is enjoined in such suit or in case SELLER otherwise deems it advisable, SELLER shall, at its own expense and discretion, (a) procure for the PURCHASER the right to continue using the Products, (b) replace the same with non-infringing Products, (c) modify the Product so it becomes non-infringing, or (d) remove the Products and refund the purchase price less freight charges and depreciation. SELLER shall not be liable for, and PURCHASER shall indemnify SELLER for, any claim of infringement related to (a) the use of the Products for any purpose other than that for which it was furnished by SELLER, (b) compliance with equipment designs not furnished by SELLER or (c) use of the Products in combination with any other equipment. The foregoing states the sole liability of SELLER for patent infringement with respect to the Products

13. GENERAL INDEMNITY. Subject to the rights, obligations and limitations of liabilities of the parties set forth in this Agreement, PURCHASER shall protect and indemnify SELLER, its ultimate parent, its ultimate parent's subsidiaries and each of their respective officers, directors, employees and agents, from and against all claims, demands and causes of action asserted by any entity to the extent of PURCHASER's negligence or willful misconduct in connection with this Agreement.

14. DEFAULT, TERMINATION. In the event that PURCHASER becomes insolvent, commits an act of bankruptcy or defaults in the performance of any term or condition of this Agreement, the entire unpaid portion of the purchase price shall, without notice or demand, become immediately due and payable. SELLER at its option, without notice or demand, shall be entitled to sue for said balance and for reasonable legal fees, plus out-of-pocket expenses and interest; and/or to enter any place where the Products are located and to take immediate possession of and remove the Products, with or without legal process; and/or retain all payments made as compensation for the use of the Products: and/or resell the Products, without notice or demand, for and on behalf of the PURCHASER, and to apply the net proceeds from such sale (after deduction from the sale price of all expenses of such sale and all expenses of retaking possession, repairs necessary to put the Products in saleable condition, storage charges, taxes, liens, collection and legal fees and all other expenses in connection therewith) to the balance then due to SELLER for the Products and to receive from the PURCHASER the deficiency between such net proceeds of sale and such balance. PURCHASER hereby waives all trespass, damage and claims resulting from any such entry, repossession, removal, retention, repair, alteration and sale. The remedies provided in this paragraph are in addition to and not limitations of any other rights of SELLER.

15. CANCELLATION. PURCHASER may terminate this Agreement for convenience upon giving SELLER (30) days prior written notice of such fact and paying SELLER for all costs and expenses (including overhead) incurred by it in performing its work and closing out the same plus a reasonable profit thereon. All such costs and expenses shall be paid to SELLER within ten (10) days of the termination of the Agreement, or be subject to an additional late payment penalty of five percent (5%) of the total amount of costs and expenses owed.

16. REMEDIES. The rights and remedies of the PURCHASER in connection with the goods and services provided by SELLER hereunder are exclusive and limited to the rights and remedies expressly stated in this Agreement.

17. INSPECTION. PURCHASER is entitled to make reasonable inspection of Products at SELLER's facility. SELLER reserves the right to determine the reasonableness of the request and to select an appropriate time for such inspection. All costs of inspections not expressly included as an itemized part of the quoted price of the Products in the Agreement shall be paid by PURCHASER.

18. WAIVER. Any failure by SELLER to enforce PURCHASER's strict performance of any provision of this Agreement will not constitute a waiver of its right to subsequently enforce such provision or any other provision of this Agreement.

19. COMPLIANCE WITH LAWS. If applicable laws, ordinances, regulations or conditions require anything different from, or in addition to, that called for by this Agreement, SELLER will satisfy such requirements at PURCHASER'S written request and expense.

20. FORCE MAJEURE. If SELLER is rendered unable, wholly or in material part, by reason of Force Majeure to carry out any of its obligations hereunder, then on SELLER's notice in writing to PURCHASER within a reasonable time after the occurrence of the cause relied upon, such obligations shall be suspended. "Force Majeure" shall include, but not be limited to, acts of God, laws and regulations, strikes, civil disobedience or unrest, lightning, fire, flood, washout, storm, communication lines failure, delays of the PURCHASER or PURCHASER's subcontractors, breakage or accident to equipment or machinery, wars, police actions, terrorism, embargos, and any other causes that are not reasonably within the control of the SELLER. If the delay is the result of PURCHASER's action or inaction, then in addition to an adjustment in time, SELLER shall be entitled to reimbursement of costs incurred to maintain its schedule.

21. INDEPENDENT CONTRACTOR. It is expressly understood that SELLER is an independent contractor, and that neither SELLER nor its principals, partners, parents, subsidiaries, affiliates, employees or subcontractors are servants, agents, partners, joint ventures or employees of PURCHASER in any way whatsoever.

22. SEVERABILITY. Should any portion of this Agreement, be held to be invalid or unenforceable under applicable law then the validity of the remaining portions thereof shall not be affected by such invalidity or unenforceability and shall remain in full force and effect. Furthermore, any invalid or unenforceable provision shall be modified accordingly within the confines of applicable law, giving maximum permissible effect to the parties' intentions expressed herein.

23. CHOICE OF LAW, CHOICE OF VENUE. This Agreement shall be governed and construed in accordance with the laws of the State of Utah, without regard to its rules regarding conflicts or choice of law. The parties submit to the jurisdiction and venue of the state and federal courts located in Salt Lake City, Utah.

24. ASSIGNMENT. PURCHASER shall not assign or transfer this agreement without the prior written consent of the SELLER. Any attempt to make such an assignment or transfer shall be null and void. SELLER shall have the authority to assign, or otherwise transfer, its rights and obligations in connection with this Agreement, in whole or in part, upon prior written notice to PURCHASER.

25. LIMITATION ON LIABILITY. TO THE EXTENT PERMISSIBLE BY LAW, SELLER SHALL HAVE NO FURTHER LIABILITY IN CONNECTION WITH THIS AGREEMENT IN EXCESS OF THE COST OF CORRECTING ANY DEFECTS, OR IN THE ABSENCE OF ANY DEFECT, IN EXCESS OF THE VALUE OF THE PRODUCTS SOLD HEREUNDER. NOTWITHSTANDING ANY LIABILITIES OR RESPONSIBILITIES ASSUMED BY SELLER HEREUNDER, SELLER SHALL IN NO EVENT BE RESPONSIBLE TO PURCHASER OR ANY THIRD PARTY, WHETHER ARISING UNDER CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR OTHERWISE, FOR LOSS OF ANTICIPATED PROFITS, LOSS BY REASON OF PLANT SHUTDOWN, NON-OPERATION OR INCREASED EXPENSE OF OPERATION, SERVICE INTERRUPTIONS, COST OF PURCHASED OR REPLACEMENT POWER, COST OF MONEY, LOSS OF USE OF CAPITAL OR REVENUE OR ANY OTHER INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL LOSS OR DAMAGE, WHETHER ARISING FROM DEFECTS, DELAY, OR FROM ANY OTHER CAUSE WHATSOEVER.