City of Stanton

12282 Beach Boulevard Mixed-Use Project

Draft Initial Study-Mitigated Negative Declaration

March 2016

rincon

Environmental Scientists Planners Engineers

Draft
Initial Study -
Mitigated Negative Declaration

12282 Beach Boulevard Mixed-Use Project

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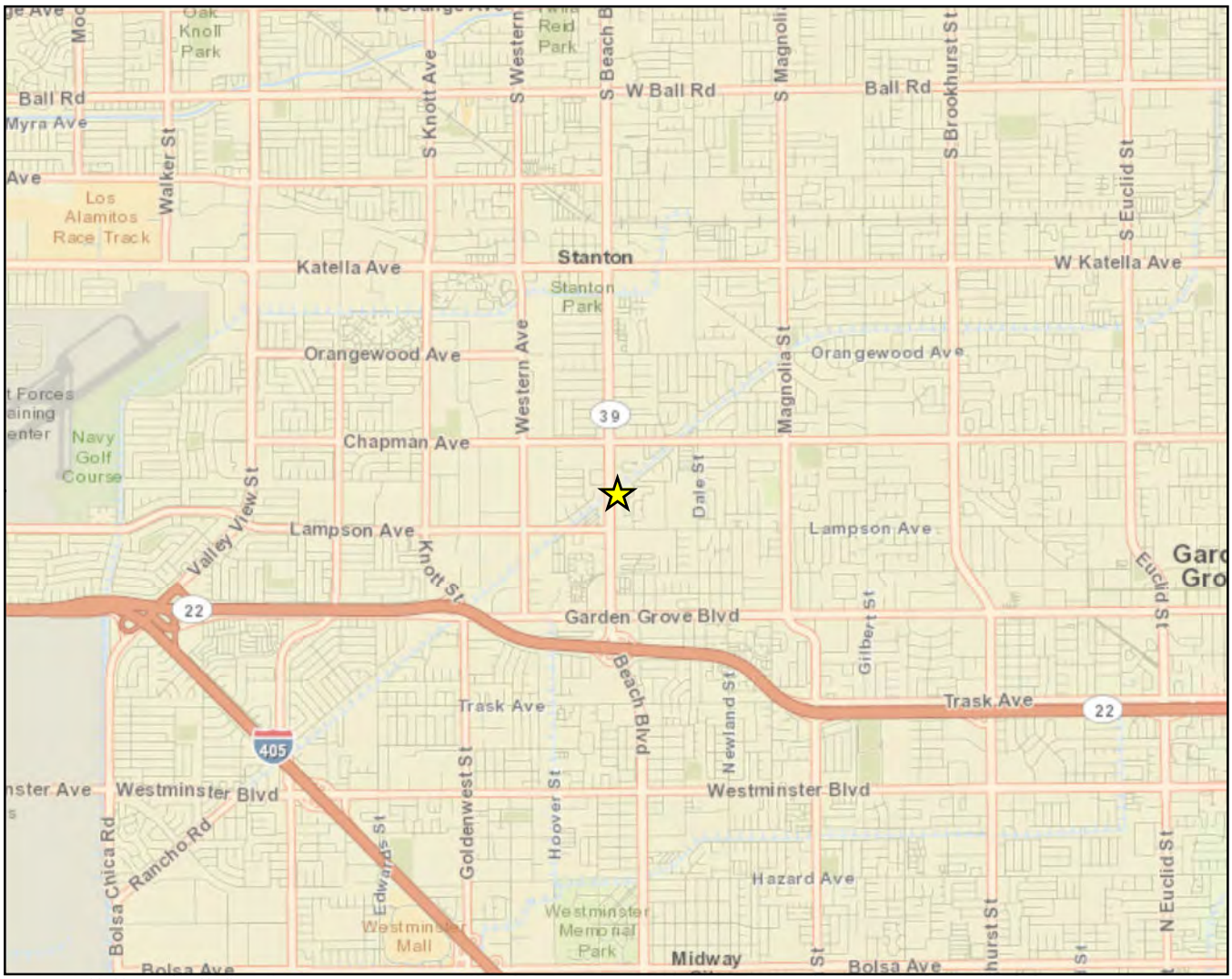
INITIAL STUDY

Project Title	12282 Beach Boulevard Mixed-Use Project
Lead Agency	City of Stanton 7800 Katella Avenue Stanton, California 90680
Contact Person	Kelly Hart, Interim Community Development Director (714) 890-4228
Project Location	The project site is comprised of three contiguous parcels (APN 131-483-01, -02, and -03) located at 12282 Beach Boulevard, in the City of Stanton. Figure 1 shows the regional location and Figure 2 shows the project site location.
Project Sponsor Name and Address	Manju Pai 420 Goddard, Ste 200 Irvine, CA 92618
General Plan Designations	South Gateway Mixed-Use District
Zoning	Commercial General Zone South Gateway Mixed-Use Overlay
Project Description	The proposed development (the project) would involve development of a five-story (63-foot-high) mixed-use building that would include commercial space, parking, and a residential care facility on a 1.12-acre site located in the City of Stanton. The residential care facility would include assisted living units with meal service, social programs, activity rooms, and offices for support staff. Off-street parking would be provided on the first and second floors of the building. Figure 3 shows the proposed site plan. The first floor would contain a 1,153 square foot (SF) public restaurant, a 3,143 SF kitchen, a 1,471 SF outpatient medical clinic, 5,036 SF administrative and reception areas for the assisted living facility, and 38 garage parking spaces. The second floor would be dedicated to parking and would contain 34 spaces. The assisted living facility would occupy the third through fifth floors, and would include exterior balconies and emergency exit walkways. The assisted living facility would have a total of 66 rooms and 120 beds and would include three dining rooms, six activity rooms, one laundry room, one hair salon, nine nursing stations, nine medical dispensaries, one spa and jacuzzi, three tenant lounges, and one staff lounge. The project would require an amendment to the zoning code to



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Project Location

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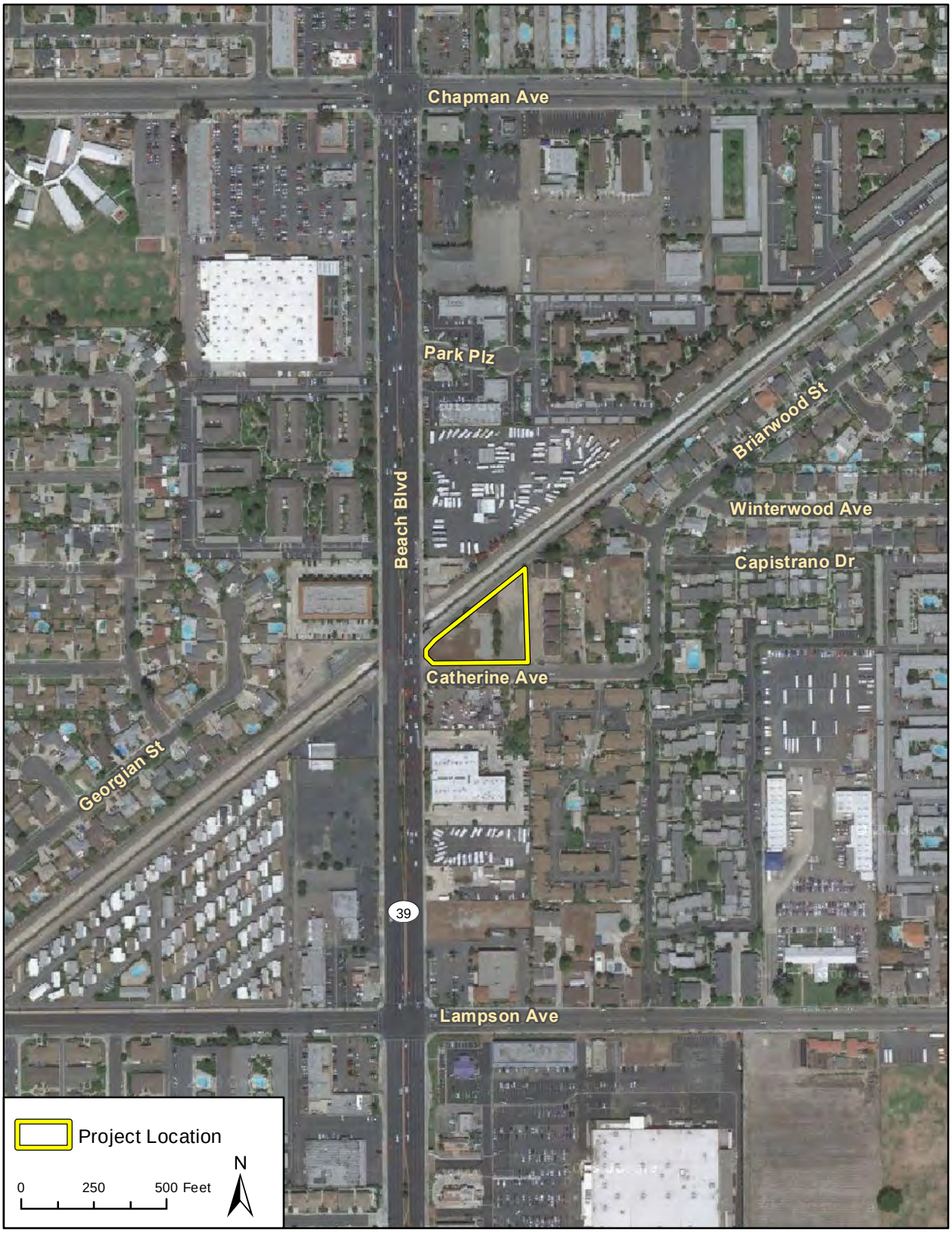
Regional Location

Figure 1



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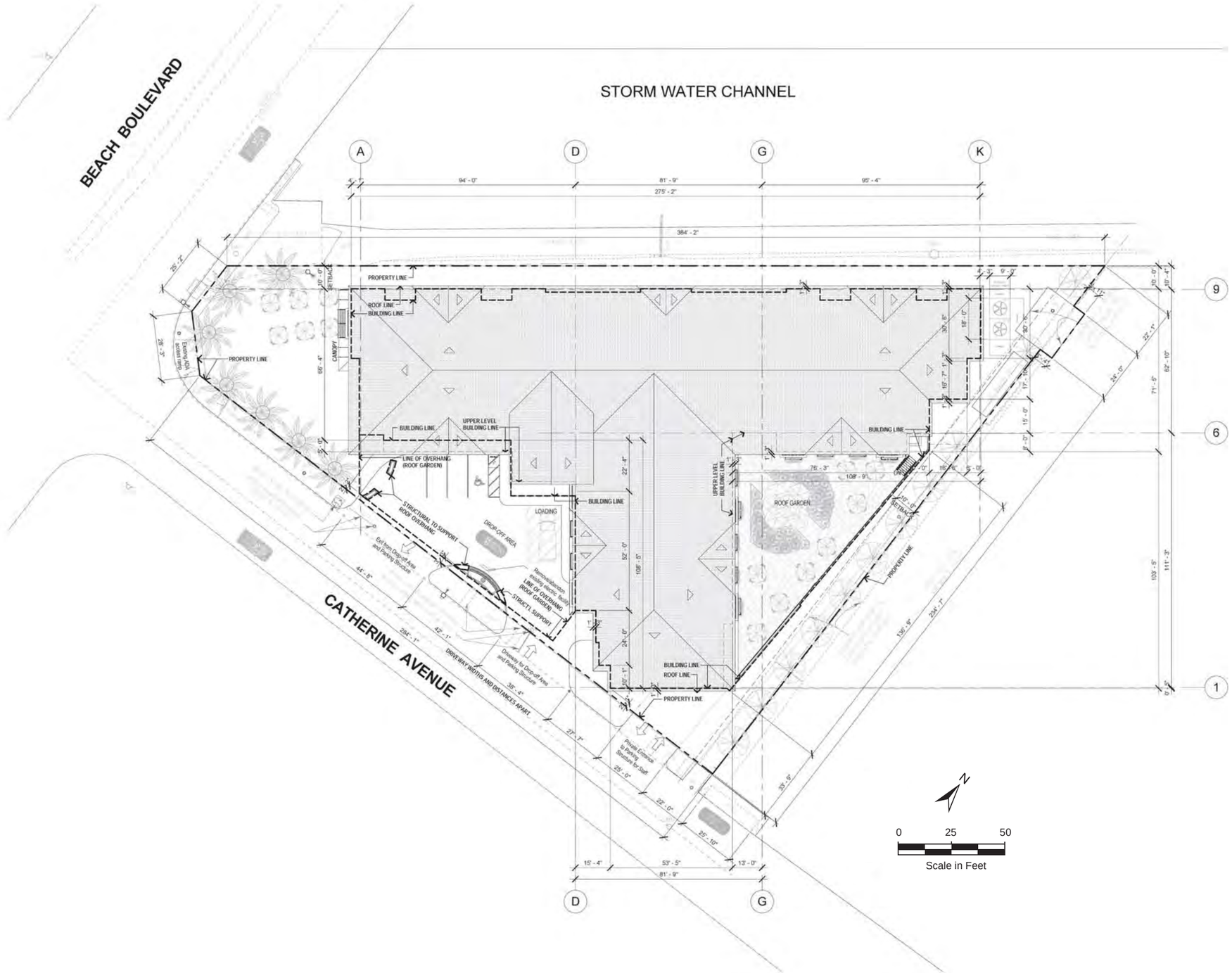
Project Location

Figure 2



Site Plan

Figure 3

Base Drawing provided by Studio TT² and USS Cal Builders, 2014.

allow for larger exterior balcony/emergency walkway projections. Construction of the project would begin in early 2016 with occupancy expected in early 2017. The duration of construction would be approximately 12 months.

The proposed onsite drainage system would collect runoff from the site and transmit flows to a drainage pipe on the south side of the site along Catherine Avenue. Excess flows would be directed to a StormTech Subsurface Stormwater Management System (StormTech System). This system, described in detail in Item VI, *Geology and Soils*, of this Initial Study, removes sediments, trash and debris that may otherwise continue downstream and also stores a volume of water prior to biofiltration treatment. The StormTech System allows runoff to be detained and slowly released into a Modular Wetlands Stormwater Biofiltration System (MWS) for biofiltration treatment before being discharged into the public drainage system.

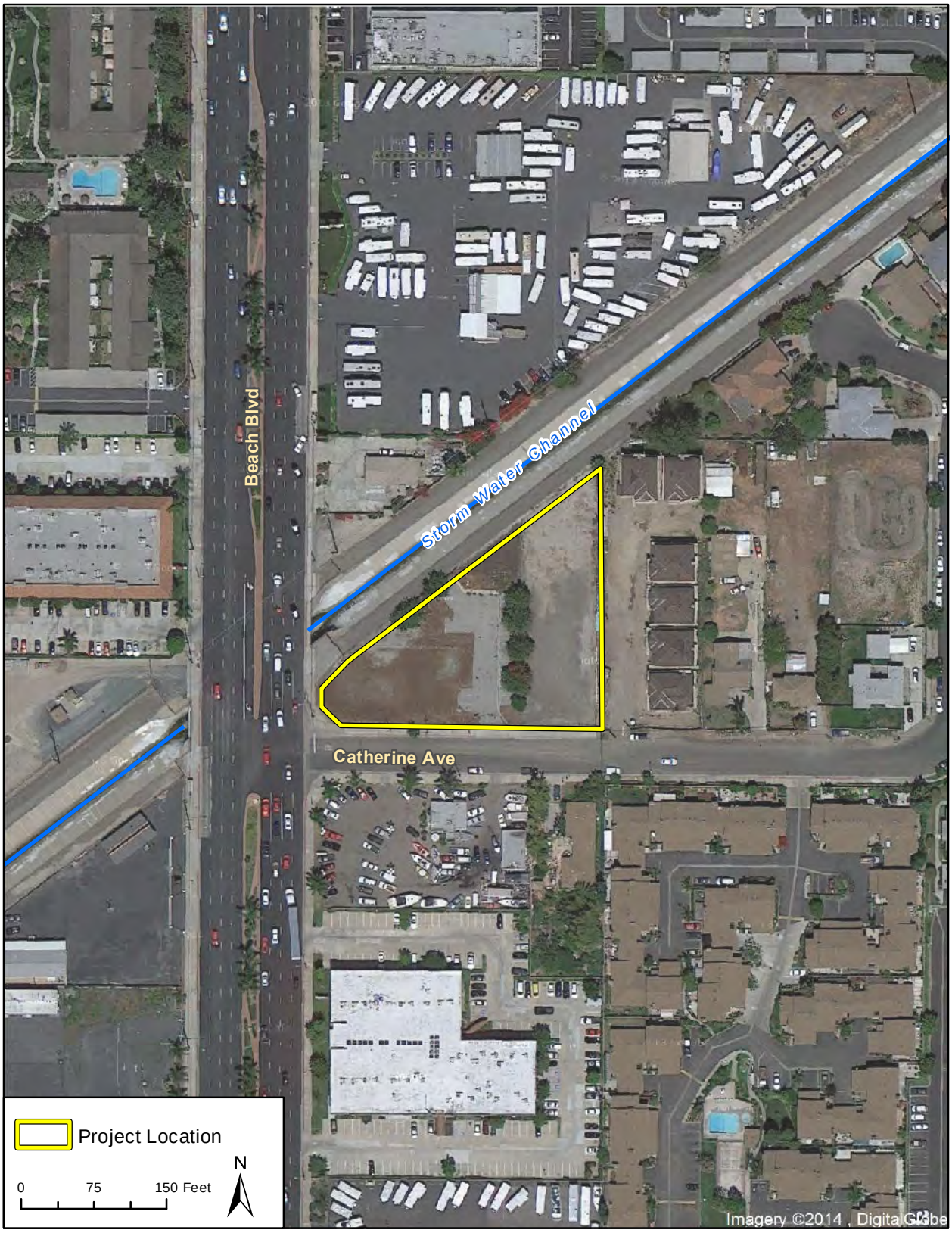
Surrounding Land Uses and Setting

The project site is located on the northeast corner of Beach Boulevard and Catherine Avenue in the southern portion of the City of Stanton. The site is currently vacant and primarily dirt, but a portion of the site is paved. A row of trees is present in the central portion of the site and the entire site is surrounded by a chain link fence approximately 6 six feet high. A water well and associated pumping equipment are located along the eastern property line near the northern edge of the project site. The site is bordered to the north by an Orange County Flood Control District stormwater channel and an adjacent commercial center. The commercial center includes a test only smog center and a recreational vehicle sales business. An automotive sales lot is located to the south of the site. Single family residences are located east of the project site along the east side of Matthew Place. West of the project site, across Beach Boulevard is a commercial area including offices and small retail stores. Figure 4 shows an aerial photograph of the project site and surrounding uses. Figures 5a and 5b show the site and its surroundings.

Required Entitlements

The project requires the following discretionary approvals (entitlements) from the City of Stanton:

- Initial Study and Mitigated Negative Declaration adoption;
- Variance allowing construction of the project on a site smaller than that allowed per the zoning code;
- Parcel merger;
- Precise Plan of Development for approval of building and site improvements; and
- Amendment to the zoning code to allow for larger projections from the building in the South Gateway Mixed-Use District.
- Approval of a Development Agreement



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Aerial of Site

Figure 4

Photo 1: Looking northwest from the southeast corner of the project site.

Photo 2: Looking south along Beach Boulevard.

Site Photos

Figure 5a

Photo 3: Looking southeast from the northwest corner of the project site.

Photo 4: Looking southwest from the east side of the project site.

Site Photos

Figure 5b

Other Public Agencies Whose Approval is Required

The City of Stanton is the lead agency for the project and holds primary approval authority. The applicant would need to prepare a Stormwater Pollution Prevention Plan (SWPPP) that would be subject to Regional Water Quality Control Board review and approval.

ENVIRONMENTAL FACTORS EFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Potentially Significant" or "Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forest Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☒ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☒ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☒ Transportation/Traffic	☐ Utilities/Service Systems	☒ Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potential significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Kelly Hart
Signature

3/21/16
Date

KELLY HART
Printed Name

ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I. AESTHETICS				
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

The project site is located in an urbanized area within the City of Stanton. The site is currently vacant and primarily dirt, although a portion of the site is paved. A row of trees is present in the central portion of the site. The entire site is surrounded by a chain link fence approximately six feet high. Surrounding land uses include a mix of single-family, multi-family and commercial development. The buildings to the north, east, and south are one-story; the office building located to the west across Beach Boulevard and the multi-family complex located to the southeast are two stories. There are no scenic views or highways in proximity to the project site. Lighting in the site vicinity is limited to lights within the nearby structures and street lighting along Catherine Avenue and Beach Boulevard. Vehicle lights are also visible during hours of darkness.

a) The proposed project involves development of the site with a five-story mixed-use building, perimeter fencing and landscaping. While views of and through the site would change, there are no scenic views or highways in proximity to the project site, so no scenic views would be affected. There would be **no impact.**

b) Figures 5a and b provide representative photos of the project site and immediate surroundings. As shown, no scenic trees, rock outcroppings, or historic buildings occur within or in proximity to the project site. **No impact** to scenic resources would occur.

c) Development of the proposed project could result in a significant impact if it results in substantial degradation of the existing visual character or quality of the site and surroundings. Degradation of visual character or quality is generally defined as a substantial change to the existing site appearance as a result of new development. The project site is located in an urbanized area and contains no scenic resources.

The project site is currently vacant and contains a few trees, some paving, remnant utility cabinets, sign posts, and related features associated with past development. It currently exhibits low visual quality due to its vacant and unmaintained condition. Two-story, single-family residences are located along the east side of Matthew Place. Matthew Place is an access driveway serving the adjacent residences. While it can accommodate two lanes of traffic, it is narrow and consequently the distance between the project site and neighboring residences is approximately 20 feet. Because of the relatively short distance, visual changes associated with the proposed project would be most evident to the residents living along the east side of Matthew Place. While the proposed building would be three stories taller than the adjacent residences at its peak elevation, it has been designed to incorporate terracing, balconies, and related features that set the upper floors back from the eastern property line. These design features are intended to minimize the visual impact when looking into the site from residences east of the site. In addition to the building design elements, the applicant is proposing to install mature landscaping along the eastern property line that would be tall enough to partially shield the project from neighboring residences.

The applicant prepared a shadow analysis to demonstrate how the proposed building's shadow would affect residences to the east (Appendix A). The project would have little effect during the morning or mid-day hours year round. The greatest effect would be during the winter months in the afternoon and early evening as the building would block the setting sun earlier in the day than under existing conditions. This would change the visual environment but would not significantly degrade the visual quality of the site or surrounding environment.

The project would replace a vacant lot of low visual quality with a new residential building with landscaping. For the reasons and based on the above, impacts to visual character would be **less than significant**.

d) New security lighting would be installed in the parking lot and lights within the new building would be visible from surrounding areas. Interior lighting is typically associated with residential uses; however the lights are generally positioned toward the inside of the room. Additionally, blinds, shades, and curtains would minimize "light trespass" from interior lights within the proposed project from impacting adjacent residents. Vehicle lights in the parking structure may also be visible. To minimize light trespass from the parking structure, the applicant has agreed to construct the exterior walls high enough (4-5 feet) to block headlights, while also meeting ventilation requirements. In addition, four-foot high walls have been proposed throughout the parking structure to block the light from the vehicle headlights. Other features such as awnings over openings on the parking structure have been included to improve the aesthetic appearance of the building exterior while restricting light trespass.

On-site building and security lighting would be installed consistent with California Building Code requirements to minimize spillover onto adjacent parcels. While light and glare emanating from the site would change from existing conditions, the project would comply with lighting code requirements, and incorporate design features to minimize impacts from lighting. Impacts would be **less than significant**.

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II.	AGRICULTURE AND FOREST RESOURCES				
	In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:				
a)	Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒

a-e) The site is zoned Commercial General Zone South Gateway Mixed-Use Overlay. No portion of the site is designated for agricultural/forest use. No prime or unique farmland or farmland of statewide importance is located on or in proximity to the site (Farmland Mapping and Monitoring Program, 2011). The project would not impact or conflict with agricultural zoning or a Williamson Act designation (US Department of Conservation, 2004). The project would not conflict with forest or timberland zoning or result in the loss of forest land or the conversion of forest to non-forest use. The proposed project would not change the existing use of the site such that agricultural activities would be eliminated or agricultural lands lost as a result of project approval. **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
III. AIR QUALITY				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

The project site is within the South Coast Air Basin (the Basin), which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). As the local air quality management agency, the SCAQMD is required to monitor air pollutant levels to ensure that state and federal air quality standards are met and, if they are not met, to develop strategies to meet the standards.

Depending on whether the standards are met or exceeded, the Basin is classified as being in "attainment" or "nonattainment." The part of the Basin within which the project site is located is in nonattainment for the federal standards for ozone, $PM_{2.5}$, and lead and the state standards for ozone, PM_{10}, $PM_{2.5}$, NO_2, and lead (California Air Resources Board, Area Designations Maps/State and National, September 2011; EPA, June 26, 2013). Thus, the Basin currently exceeds several state and federal ambient air quality standards and is required to implement strategies to reduce pollutant levels to recognized acceptable standards. The non-attainment

status results in part from the fact that meteorological conditions limit the dispersion and diffusion of pollutants, the capacity of the local airshed to eliminate pollutants from the air is limited, and there are many different emission sources within the Basin. The health effects associated with criteria pollutants are described in Table 1.

Table 1
Health Effects Associated with Criteria Pollutants

Pollutant	Adverse Effects
Ozone	(1) Short-term exposures: (a) pulmonary function decrements and localized lung edema in humans and animals and (b) risk to public health implied by alterations in pulmonary morphology and host defense in animals; (2) long-term exposures: risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (3) vegetation damage; and (4) property damage.
Carbon monoxide (CO)	(1) Aggravation of angina pectoris and other aspects of coronary heart disease; (2) decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (3) impairment of central nervous system functions; and (4) possible increased risk to fetuses.
Nitrogen dioxide (NO_2)	(1) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (2) risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (3) contribution to atmospheric discoloration.
Sulfur dioxide (SO_2)	(1) Bronchoconstriction accompanied by symptoms that may include wheezing, shortness of breath, and chest tightness during exercise or physical activity in persons with asthma.
Suspended particulate matter (PM_{10})	(1) Excess deaths from short-term and long-term exposures; (2) excess seasonal declines in pulmonary function, especially in children; (3) asthma exacerbation and possibly induction; (4) adverse birth outcomes including low birth weight; (5) increased infant mortality; (6) increased respiratory symptoms in children such as cough and bronchitis; and (7) increased hospitalization for both cardiovascular and respiratory disease (including asthma).[a]
Suspended particulate matter ($PM_{2.5}$)	(1) Excess deaths from short- and long-term exposures; (2) excess seasonal declines in pulmonary function, especially in children; (3) asthma exacerbation and possibly induction; (4) adverse birth outcomes, including low birth weight; (5) increased infant mortality; (6) increased respiratory symptoms in children, such as cough and bronchitis; and (7) increased hospitalization for both cardiovascular and respiratory disease, including asthma.[a]

Source: EPA 2008c.
[a] More detailed discussions on the health effects associated with exposure to suspended particulate matter can be found in the following documents: Office of Environmental Health Hazard Assessment, Particulate Matter Health Effects and Standard Recommendations, www.oehha.ca.gov/air/toxic_contaminants/PM10notice.html#may, May 9, 2002; and EPA, Air Quality Criteria for Particulate Matter, October 2004.

The SCAQMD has adopted an Air Quality Management Plan (AQMP) that provides a strategy for the attainment of state and federal air quality standards. The SCAQMD has adopted the following thresholds for temporary construction-related pollutant emissions:

- *75 pounds per day of reactive organic compounds (ROC or ROG)*
- *100 pounds per day nitrogen oxides (NO_x)*
- *550 pounds per day carbon monoxide (CO)*
- *150 pounds per day of sulfur oxides (SO_x)*
- *150 pounds per day of particulate matter less than 10 microns in diameter (PM_{10})*
- *55 pounds per day of particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)*

The SCAQMD also has established the following significance thresholds for project operations within the South Coast Air Basin:

- *55 pounds per day of ROC or ROG*
- *55 pounds per day of NO_x*
- *550 pounds per day of CO*
- *150 pounds per day of SO_x*
- *150 pounds per day of PM_{10}*
- *55 pounds per day of $PM_{2.5}$*

In addition to the above thresholds, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4), which was prepared to update the *CEQA Air Quality Handbook*. LSTs were developed in response to concern regarding exposure of individuals to criteria pollutants in local communities. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor taking into consideration factors such as ambient concentrations in each source receptor area (SRA), project size and distance to the sensitive receptor. However, LSTs only apply to emissions within a fixed stationary location, including idling emissions during project construction and operation. LSTs have been developed for NO_x, CO, PM_{10} and $PM_{2.5}$ and are not applicable to mobile sources such as cars on a roadway (Final Localized Significance Threshold Methodology, SCAQMD, June 2003). As such, LSTs for operational emissions generally do not apply to the proposed project because the majority of project-related operational emissions would be generated by vehicles traveling to/from the site.

The project site is located in Source Receptor Area 7 (SRA-77). The SCAQMD provides lookup tables for project sites that measure one, two, or five acres. The project involves 1.1 acres of on-site construction. SCAQMD's *Sample Construction Scenarios for Projects Less than 5 Acres in Size* contains methodology for determining the thresholds for projects that are not exactly 1, 2, or 5 acres in size. This methodology was implemented to determine the thresholds for the proposed project. According to the SCAQMD's publication *Final Localized Significant (LST) Thresholds Methodology*, the use of LSTs is voluntary and to be implemented at the discretion of local agencies.

a) A project may be inconsistent with the AQMP if it would generate population, housing, or employment growth exceeding the forecasts used in the development of the AQMP. The project would generate temporary employment opportunities during construction and, as discussed in Section XIII, *Population and Housing*, would generate an estimated 36 long-term jobs. According to the California Department of Finance, the City of Stanton has a current population of 38,963. The Southern California Council of Governments (SCAG) projects that the City's population will increase to 43,400 by 2035. The proposed project includes 66 assisted living rooms and 120 beds. It is anticipated that some of the residents would come from the City of Stanton. However, assuming that all residents would come from out of the area, the 120 residents living at the proposed facility would account for 3% of the projected growth within the City. Therefore the project would not conflict with the population forecasts contained in the 2012 AQMP. Impacts would be **less than significant**.

b-d) Emissions generated by the proposed project would include temporary construction emissions and long-term operational emissions. Emissions are quantified and compared to SCAQMD significance thresholds below.

Construction Emissions

Demolition and project construction would generate temporary air pollutant emissions. These emissions are associated with fugitive dust (PM_{10} and $PM_{2.5}$) and exhaust emissions from heavy construction vehicles, in addition to reactive organic gases (ROG) that would be released during the drying phase upon application of architectural coatings (i.e., paint). Construction would generally consist of demolition, site preparation, grading, erection of the building, paving and architectural coating.

Grading, excavation and site preparation would involve the largest use of heavy equipment and generation of fugitive dust. For the purposes of modeling, it was assumed that the project would comply with SCAQMD Rule 403, which identifies measures to reduce fugitive dust and is required to be implemented at all construction sites located within the South Coast Air Basin. Therefore, the following conditions would be required to reduce fugitive dust in compliance with SCAQMD Rule 403 and were included in the CalEEMod model version 2013.2.2 for site preparation and grading phases of construction.

1. ***Minimization of Disturbance.*** *Construction contractors should minimize the area disturbed by clearing, grading, earth moving, or excavation operations to prevent excessive dust generation.*

2. ***Soil Treatment.*** *Construction contractors should treat all graded and excavated material, exposed soil areas, and active portions of the construction site, including unpaved on-site roadways to minimize fugitive dust. Treatment shall include, but not necessarily be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll compaction as appropriate. Watering shall occur as necessary, and at least twice daily, preferably in the late morning and after work is completed for the day.*

3. ***Soil Stabilization.*** *Construction contractors should monitor all graded and/or excavated inactive areas of the construction site daily for dust stabilization. Soil stabilization methods, such as water and roll compaction, and environmentally safe dust control materials, shall be applied to portions of the construction site that are inactive for over four days. If no further grading or excavation operations are planned for the area, the area shall be periodically treated with environmentally safe dust suppressants to prevent excessive fugitive dust.*

4. ***No Grading During High Winds.*** *Construction contractors should stop all clearing, grading, earth moving, and excavation operations during periods of high winds (20 miles per hour or greater, as measured continuously over a one-hour period).*

5. ***Street Sweeping.*** *Construction contractors should sweep all on-site driveways and adjacent streets and roads at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.*

Table 2 shows the estimated maximum daily emissions associated with on-site construction activities and off-site mobile source emissions as well as on-site construction emissions as required for comparison to LSTs. Construction emissions would not exceed thresholds related to ROG, NO_x, CO, and SO_x. With adherence to the conditions listed above that are required by SCAQMD Rule 403 to reduce fugitive dust during the grading phase of construction, maximum daily emissions of fugitive dust (PM_{10} and $PM_{2.5}$) would not exceed SCAQMD or LST thresholds. Therefore, impacts would be **less than significant**.

Table 2
Estimated Construction Maximum Daily Air Pollutant Emissions

	Maximum Daily Emissions (lbs/day)				
	ROG	**NO_x**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Maximum Daily Emissions[a]	**38.4**	**25.8**	**25.3**	**4.0**	**2.7**
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*55*
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**
Maximum Daily On-Site Emissions[b]	**34.5**	**25.8**	**16.5**	**4.0**	**2.7**
Local Significance Thresholds (LSTs)	*n/a*	*84*	*508*	*4*	*3*
Threshold Exceeded?	**n/a**	**No**	**No**	**No**	**No**

[a] *All calculations were made using CalEEMod version 2012.2.2. See Appendix B for calculations. Calculations assume adherence to the conditions listed previously that are required by SCAQMD Rule 403 to reduce fugitive dust.*

[b] *LSTs only apply to on-site emissions and do not apply to mobile emissions (the majority of operational emissions). Therefore, only on-site construction emissions are compared to LSTs.*

Long-term Emissions

Long-term emissions associated with project operation, as shown in Table 3, would include emissions from vehicle trips, natural gas and electricity use, landscape maintenance equipment, consumer products, and architectural coating associated with on-site development. Emissions would not exceed SCAQMD thresholds for any criteria pollutant. Consequently, the project's regional air quality impacts would be **less than significant.**

e) The proposed project would involve construction of a restaurant, parking area, outpatient clinic and assisted living facility. These uses are not included on Figure 5-5, *Land Uses Associated with Odor Complaints,* of the 1993 SCAQMD CEQA Air Quality Handbook and are not expected to generate odors in the long--term. Diesel exhaust may be noticeable during construction; however, the proposed project would not generate objectionable odors affecting a substantial number of people and impacts would be **less than significant**.

Table 3
Estimated Project Operational Emissions

	Estimated Emissions (lbs/day)					
	ROG	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project Operational Emissions	6.4	6.5	38.3	0.1	4.9	1.4
SCAQMD Thresholds	*55*	*55*	*550*	*150*	*150*	*55*
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

See Appendix B for CalEEMod output.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES				
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒

IV. BIOLOGICAL RESOURCES	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

The project site is located within an urbanized area of the City of Stanton. On-site vegetation is limited to ruderal species and ornamental bushes and trees. A portion of the site is paved. The site contains six trees that would be removed to construct the proposed project.

a) The site is heavily disturbed and void of natural habitat. Species listed under the federal Endangered Species Act or California Special Concern Species are not expected to occur on or in proximity to the site. Therefore, the proposed project would not have a substantial adverse effect on any species identified as a candidate, sensitive, or special-status species in local or regional plans or by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS).

The site contains six ornamental trees that would be removed to construct the proposed project. These trees could provide nesting sites for bird protected by the Migratory Bird Treaty Act (MBTA). To ensure that no take of birds protected by the MBTA occurs, Mitigation Measure BIO-1 has been incorporated.

BIO-1 **Nesting Bird Surveys and Avoidance.** Initial site disturbance shall be prohibited during the general avian nesting season (February 1 – August 30), if feasible. If breeding season avoidance is not feasible, the applicant shall deposit adequate funds with the Community Development Department to retain a qualified biologist to conduct a preconstruction nesting bird survey to determine the presence/absence, location, and status of any active nests on or adjacent to the project site. The extent of the survey buffer area surrounding the site shall be established by the qualified biologist to ensure that direct and indirect effects to nesting birds are avoided. To avoid the destruction of active nests and to protect the reproductive success of birds protected by MBTA, nesting bird surveys shall be performed not more than 14 days prior to the scheduled vegetation clearance. In the event that active nests are discovered, a suitable buffer should be established around such active nests and no

construction within the buffer allowed until a qualified biologist has determined that the nest is no longer active (e.g. the nestlings have fledged and are no longer reliant on the nest). No ground disturbing activities shall occur within this buffer until the qualified biologist has confirmed that breeding/nesting is completed and the young have fledged the nest. Survey results shall be presented in a letter report and submitted to the Community Development Department. Nesting bird surveys are not required for construction activities occurring between August 30 and February 1.

Impacts would be **less than significant after mitigation.**

b) There are no riparian habitats or other sensitive natural communities located on-site or in the site vicinity. **No impact** would occur.

c) Section 404 of the Clean Water Act administers wetland jurisdiction to the U.S. Army Corps of Engineers (USACE). The USACE 1987 Wetland Delineation Manual defines jurisdictional wetlands as lands that possess hydric soils and a dominance of wetland vegetation, and are inundated with water for at least 5% of the growing season in most years. The project site is within a highly urbanized area and does not contain any wetlands. **No impact** would occur.

d) The project site is located within an urbanized portion of the City of Stanton. No wildlife corridors or wildlife nurseries are present on or in proximity to the proposed site. **No impact** would occur.

e) Title 12, Chapter 12.20 of the Stanton Municipal Code addresses the City's Street Tree Plan. There are no street trees that would be affected by the proposed project. The City of Stanton does not have local policies or ordinances related to tree preservation. **No impact** would occur.

f) No sensitive biological resources are present on-site. The project site is not included in any Habitat Conservation Plans or Natural Community Conservation Plans. Thus, **no impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
V. CULTURAL RESOURCES				
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☒	☐	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
V. CULTURAL RESOURCES				
Would the project:				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

a) The project site is vacant and does not contain any structures or historical resources. Therefore, development of the project would not cause a substantial adverse change in the significance of a historical resource. **No impact** to historic resources would occur.

b) No archaeological or tribal cultural resources are known to be present on-site or in the site vicinity. However, the proposed project would require ground disturbance that could have the potential to disturb previously unrecorded archaeological resources. Impacts could be **potentially significant unless mitigation is incorporated**. Implementation of the Mitigation Measure CR-1 would avoid, reduce, or minimize potentially significant impacts to archaeological resources. Additionally, in accordance with Assembly Bill 52 (AB 52), if tribal cultural resources are present, the lead agency must consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area. Three tribes sent the City letters requesting notification of any projects. The City sent letters with the project information to all three tribes, but none responded.

CR-1 **Archaeological Resources.** Should significant subsurface prehistoric, historic archaeological, paleontological, or tribal cultural resources appear to be encountered during construction and/or earthmoving activities, the evaluation of any such resources should proceed in accordance with the criteria outlined in Section 106 of the National Historic Preservation Act (1966, as amended), in accordance with CEQA guidelines (1970, as amended), and in accordance with the City of Stanton General Plan. Specifically, all work must be halted in the immediate vicinity of the cultural resource found until a qualified archaeologist can assess the significance of the resource.

c) Construction of the proposed project could potentially unearth undiscovered paleontological resources. Impacts would be **potentially significant unless mitigation is incorporated**. Implementation of mitigation measure CR-1 above would reduce, avoid, or minimize potentially significant impacts to paleontological resources.

d) The project site is vacant though portions are paved. There are no known human remains on-site and the presence of such remains is unlikely. However, ground disturbance would be required

to construct the proposed project. While the likelihood of finding human remains is remote, this impact could be **potentially significant unless mitigation is incorporated**. Implementation of Mitigation Measure CR-2 would avoid, reduce, or minimize potentially significant impacts to buried remains.

CR-2 **Human Remains.** If human remains are unearthed, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the Los Angeles County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent (MLD) of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. GEOLOGY AND SOILS				
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 1-B of the Uniform Building Code, creating substantial risks to life or property?	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. GEOLOGY AND SOILS				
Would the project:				
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

a-i) According to the State Department of Conservation Seismic Hazards Maps, although the project site is located in seismically active Southern California, the site is not located within an Alquist-Priolo Earthquake Fault Zone. The closest earthquake fault zone defined by the Alquist-Priolo Earthquake Fault Zoning Act, is the Los Alamitos fault, which is located approximately three miles to the west of the proposed project site. A rupture of the Los Alamitos Fault would likely be felt at the project site; however, no fault rupture at the site is expected. The impact would be **less than significant**.

a-ii) The project site is located in the seismically active region of Southern California; thus, it would be subject to strong seismic groundshaking. As discussed, the closest active fault to the site is the Los Alamitos fault. As with any new development in California, building design and construction for the project would be required to conform to the current seismic design provisions of the California Building Code (CBC). The 2013 CBC incorporates the latest seismic design standards for structural loads and materials, as well as provisions from the National Earthquake Hazards Reduction Program, to mitigate losses from an earthquake and provide for the latest in earthquake safety. Therefore, the project would not cause or accelerate geologic hazards that would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury impacts from strong seismic ground shaking. Impacts associated with seismicity and ground shaking would be **less than significant**, and no mitigation measures are required.

a-iii) According to the California Department of Conservation, Division of Mines and Geology's Seismic Hazard Zone Map for the Anaheim Quadrangle (April 1998), the entire City of Stanton, including the project site, is located within a liquefaction zone. Liquefaction occurs when the strength and stiffness of a soil is reduced by intense ground shaking typically associated with an earthquake in areas with a high groundwater table. As with any new development in California, building design and construction for the project would be required to comply with applicable provisions of the most recently adopted version of the CBC. Adherence to these regulations would ensure that liquefaction impacts would be **less than significant.**

a-iv) The site and surrounding area is relatively flat and not susceptible to landslide hazards. Furthermore, the project site is not located within a State-designated seismic hazard zone for landslide potential (City of Stanton, 2008). Potential impacts related to landslides would be **less than significant**.

b) Loose soils create conditions that can lead to erosion. The potential for erosion generally increases after soil has been disturbed by clearing and grading. As discussed in Section 3.3, *Air Quality*, dust control measures would be implemented during construction as required by the SCAQMD Rule 403 to minimize fugitive dust emissions. Measures to minimize fugitive dust emissions include watering exposed surfaces and covering soil stockpiles. These measures are also effective for reducing soil erosion.

The California State Water Board adopted the most recent Construction General Permit (2009-0009-DWQ) on September 2, 2009. This permit became effective on July 1, 2010, and is applicable to construction sites greater than one-acre in size. As required by the Construction General Permit, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared for the proposed project. The SWPPP will specify Best Management Practices (BMPs) that will be implemented by the contractor during construction to minimize stormwater runoff and downstream impacts to water quality. Typical BMPs include the use of soil binders, straw mulch, earth dikes, drainage swales, and velocity dissipation devices.

The applicant has prepared a conceptual Water Quality Management Plan (WQMP) that outlines BMPs that would address the project's operational impacts to surface water quality (see the complete WQMP in Appendix F). The proposed drainage system would collect runoff from the site and transmit flows to a drainage pipe on the south side of the site along Catherine Avenue. The excess runoff volume from the 2-year storm cannot feasibly be retained by infiltration or capture/use; therefore the project would utilize on-site hydromodification controls to retain the excess volume to the maximum extent possible. These flows would be directed to a StormTech Subsurface Stormwater Management System (StormTech System). This BMP removes sediments, trash and debris that may otherwise continue downstream and also stores a volume of water prior to biofiltration treatment. The StormTech System consists of a series of half-pipes and aggregates that includes an underdrain. Flows are directed into the system, allowing the treated volume to be stored in the half-pipes and pore spaces of the aggregates. The volume is detained and slowly released into a Modular Wetlands Stormwater Biofiltration System (MWS) for biofiltration treatment before being discharged into the public drainage system. High flows during storms that are greater than the design storm are designed to bypass the StormTech storage system and drain directly to the back of the catch basin in Beach Boulevard. The MWS provides primary treatment of pollutants through biofiltration prior to joining the high flows and discharging into the catch basin in Beach Boulevard. With this system in place, operational impacts associated with sedimentation and erosion would be **less than significant**.

c) No known active or potentially active faults with the potential for surface fault rupture cross or project towards the project site; thus, the potential for surface fault rupture on the site is presumed to be low. Like all of southern California, the site is subject to seismic shaking. Implementation of CBC requirements would minimize the potential for damage resulting from a seismic event. Impacts would be **less than significant**.

d) On-site soils consist of Hueneme sandy loam and Metz loamy sand. Hueneme fine sandy loam is poorly drained and Metz loamy sand is somewhat excessively drained. Both soil types are subject to expansion; thus, foundation and structural design would incorporate measures as

prescribed in the CBC to address these issues and minimize related project impacts. Structural design measures would address depth, thickness, and reinforcement requirements for concrete footings and the ground floor building slab. With implementation of standard design measures to address expansive soils, impacts would be **less than significant**.

e) The proposed project would be required to connect to the existing sanitary sewer system. No septic systems would be required. **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VII. GREENHOUSE GAS EMISSIONS				
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Project construction and operation would generate greenhouse gas (GHG) emissions primarily through the combustion of fossil fuels or other emissions of GHGs; thus, potentially contributing to cumulative impacts related to global climate change. The following summarizes global climate change, GHG emissions, and the regulatory framework related to climate change.

Local Regulations and CEQA Requirements

Pursuant to the requirements of SB 97, the Resources Agency adopted amendments to the *CEQA Guidelines* for the feasible mitigation of GHG emissions and analysis of the effects of GHG emissions. The adopted *CEQA Guidelines* provide regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts. To date, the Bay Area Air Quality Management District (BAAQMD), the South Coast Air Quality Management District (SCAQMD), and the San Joaquin Air Pollution Control District (SJVAPCD) have adopted significance thresholds for GHGs. The SCAQMD threshold, which was adopted in December 2008, considers emissions of over 10,000 metric tons carbon dioxide equivalent (CO_2e)/year to be significant. However, the SCAQMD's threshold applies only to stationary sources and is intended to apply only when the SCAQMD is the CEQA lead agency. Although not formally adopted, the SCAQMD has a recommended quantitative threshold for all land use types of 3,000 metric tons CO_2e/year (SCAQMD, "Proposed Tier 3 Quantitative Thresholds – Option 1", September 2010).
Because the SCAQMD has not adopted GHG emissions thresholds that apply to land use projects where the SCAQMD is not the lead agency and no GHG emissions reduction plan or GHG emissions thresholds have been adopted in the City of Stanton, the proposed project is

evaluated based on the SCAQMD's recommended/preferred option threshold for all land use types of 3,000 metric tons CO_2e per year (SCAQMD, "Proposed Tier 3 Quantitative Thresholds – Option 1", September 2010).

Methodology

This analysis is based on the methodologies recommended by the California Air Pollution Control Officers Association [CAPCOA] (January 2008) *CEQA and Climate Change* white paper. The analysis focuses on CO_2, N_2O, and CH_4 as these are the GHG emissions that on-site development would generate in the largest quantities. Fluorinated gases, such as HFCs, PFCs, and SF_6, were also considered. However, because the proposed project is not comprised of industrial uses, the quantity of fluorinated gases would not be significant because fluorinated gases are primarily associated with industrial processes. Calculations were based on the methodologies discussed in the CAPCOA white paper (January 2008) and included the use of the California Climate Action Registry General Reporting Protocol (January 2009).

Construction Emissions

Although construction activity is addressed in this analysis, CAPCOA does not discuss whether any of the suggested threshold approaches (as discussed below in *GHG Cumulative Significance*) adequately address impacts from temporary construction activity. As stated in the *CEQA and Climate Change* white paper, "more study is needed to make this assessment or to develop separate thresholds for construction activity" (CAPCOA, 2008). Nevertheless, air districts such as the SCAQMD (2011) have suggested amortizing construction-related emissions over a 30-year period in conjunction with the proposed project's operational emissions.

Construction of the proposed project would generate temporary GHG emissions primarily from construction equipment operation and truck trips. For this analysis, it was assumed that construction would commence in January,2016 and would be completed in December 2016. Emissions associated with the construction period were estimated using the California Emissions Estimator Model (CalEEMod), based on the projected maximum amount of equipment that would be used on-site at one time. Complete CalEEMod input assumptions and results can be viewed in Appendix B.

Indirect Emissions

Operational emissions associated with energy use (electricity and natural gas use) were estimated using the CalEEMod model. The emission values on which the CalEEMod model are based include the California Energy Commission (CEC) sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies. CalEEMod provides operational emissions of CO_2, N_2O, and CH_4. This methodology is considered reasonable and reliable for use, as it has been subjected to peer review by numerous public and private stakeholders, and in particular by the CEC. It is also recommended by CAPCOA (January 2008).

Emissions associated with area sources including consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from CARB, USEPA, and district supplied emission factor values (CalEEMod User Guide, 2011).

Emissions from waste generation were also calculated in CalEEMod and are based on the IPCC's methods for quantifying GHG emissions from solid waste using the degradable organic content of waste (CalEEMod User Guide, 2011). Waste disposal rates by land use and overall composition of municipal solid waste in California was primarily based on data provided by the California Department of Resources Recycling and Recovery (CalRecycle).

Emissions from water and wastewater calculated in CalEEMod were based on the default electricity intensity is from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for Northern and Southern California.

Direct Emissions from Mobile Combustion

Emissions of CO_2 and CH_4 from transportation sources for the project were quantified using CalEEMod. Because CalEEMod does not calculate N_2O emissions from mobile sources, N_2O emissions were quantified using the California Climate Action Registry General Reporting Protocol (January 2009) direct emissions factors for mobile combustion (see Appendix B). Total daily trips for the proposed project were based on the project traffic study prepared by Kunzman Associates, Inc. (June 2014) and were calculated and extrapolated to derive total annual mileage in CalEEMod. Emission rates for N_2O emissions were based on the vehicle mix output generated by CalEEMod and the emission factors found in the California Climate Action Registry General Reporting Protocol.

One of the limitations to a quantitative analysis is that emission models such as CalEEMod, evaluate aggregate emissions and do not demonstrate what proportion are "new" emissions, specifically attributable to the project in question. For most projects, the main contribution of GHG emissions is from motor vehicles and the total vehicle miles traveled (VMT), but the quantity of these emissions appropriately characterized as "new" is uncertain. Traffic associated with a project may be relocated trips, and consequently, may result in either higher or lower net VMT. For the proposed project, it is likely that some of the GHG emissions associated with traffic and energy demand would be truly "new" emissions; however, most of the trips would be generated by staff and vendors already working in the area. Thus, although GHG emissions are associated with the project, it is not possible to discern how much diversion is occurring or what fraction of those emissions represents global increases. In the absence of information regarding the different types of trips (i.e., existing versus new), the VMT estimate generated by CalEEMod is used to provide an estimate of maximum annual emissions.

a) GHG emissions associated with construction emissions and operational emissions are discussed below.

<u>Construction Emissions</u>

Based on CalEEMod results, construction activity for the project would generate an estimated 389 metric tons of carbon dioxide equivalent (CO_2e) units (as shown in Table 4). Amortized over a 30-year period (the assumed life of the project), construction of the proposed project would generate about 13.0 metric tons of CO_2e per year.

Table 4
Estimated Construction Emissions of Greenhouse Gases

	Annual Emissions (metric tons CO_2e)
Total Emissions	388.63 metric tons
Amortized over 30 years	12.97 metric tons per year

See Appendix B for CalEEMod Results.

Operational Indirect and Stationary Direct Emissions

Operational Emissions include area sources, energy use, solid waste, water use, and transportation emissions. Table 5 combines the construction, operational, and mobile GHG emissions associated with the proposed project. For the proposed project, the combined annual GHG emissions would total approximately 1,327 metric tons per year in CO_2e. The total amount of GHG emissions would be lower than the threshold of 3,000 metric tons CO_2e per year. Impacts related to GHG emissions would be **less than significant.**

Table 5
Combined Annual Emissions of Greenhouse Gases

Emission Source	**Annual Emissions CO_2e**
Construction	14 metric tons
Operational *Area* *Energy* *Solid Waste* *Water*	 40 metric tons 318 metric tons 75 metric tons 62 metric tons
Mobile	818 metric tons
Total Emissions from the Proposed Project	**1,327 metric tons**

Sources: See Appendix B for calculations and for GHG emission factor assumptions.

b) Senate Bill (SB) 375, signed in August 2008, requires the inclusion of sustainable communities' strategies in regional transportation plans for the purpose of reducing GHG emissions. In April 2012, the Southern California Association of Governments (SCAG) adopted the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). SCAG's RTP/SCS includes a commitment to reduce emissions from transportation sources by promoting compact and infill development and promoting alternative modes of transportation. A goal of the SCS is to "promote the development of better places to live and work through measures that encourage more compact development, varied housing options, bike and pedestrian improvements and efficient transportation infrastructure." The proposed project would create infill development that would also be located within walking distance to jobs,

public transportation and other alternative transportation modes, thereby reducing vehicle trips and vehicle miles traveled. Therefore, it would be consistent with this RTP/SCS goal.

Executive Order B-30-15, signed by the governor in April 2015, establishes a new interim statewide greenhouse gas emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80% below 1990 levels by 2050. SB 350was adopted in October 2015, setting goals of reaching a 50% reduction in petroleum use from motor vehicles; generating 50% of California's electricity from renewable power sources; and doubling energy efficiency in existing buildings, all by 2030. As discussed above, the proposed project involves infill residential development that would be consistent with SCS goals related to reducing vehicle trips and vehicle miles traveled. The project would also comply with applicable requirements pertaining to energy conservation and would not conflict with statewide efforts aimed at reducing petroleum use from motor vehicles, increasing the use of renewable power sources, or increasing the energy efficiency of existing buildings. As such, the project would not conflict with Executive Order B-30-15 or SB 350.

Based on the above, the proposed project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs and would be consistent with the objectives of the RTP/SCS, AB 32, SB 97, and SB 375. As discussed under item a, the project's GHG emissions would be less than the 3,000 metric tons per year threshold. Impacts would be **less than significant**.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS				
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS				
Would the project:				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

a-b) Potentially hazardous materials such as fuels, lubricants, and solvents would be used during construction on the proposed project site. The transport, use, and storage of hazardous materials during the construction of the project would be conducted in accordance with all applicable state and federal laws, such as the Hazardous Materials Transportation Act, Resource Conservation and Recovery Act, the California Hazardous Material Management Act, and the California Code of Regulations, Title 22. Compliance with applicable laws and regulations during construction of the proposed project would reduce the potential impact associated with the routine transport, use, storage, or disposal of hazardous materials to **less than significant** and no mitigation would be required.

The proposed restaurant and assisted living facility would store cleaning supplies needed to maintain the facilities. No large quantities would be stored on-site. Because medical services would be performed on-site, pharmaceuticals and related chemicals would be used. Further, medical waste would be generated. The State Medical Waste Management Act (MWMA) (22 CCR Sections 65600–65628) provides for regulation of medical waste generators, haulers, and treatment facilities. The MWMA defines medical waste as all of the following:

- Biohazardous waste, or “sharps” waste;
- Waste that is generated or produced as a result of the diagnosis, treatment, or immunization of human beings or animals, in related research, in the production or

testing of biologicals, or in the accumulation of properly contained home-generated "sharps" waste; and
- Trauma scene waste contaminated with human blood or other fluids, produced by an accident or illness.

The MWMA recognizes two separate types of generators, Small Quantity Generators (less than 200 pounds per month) and Large Quantity Generators (more than 200 pounds per month). Small Quantity Generators may treat their waste on-site, and Large Quantity Generators must complete a Medical Waste Management Plan and register it with the local enforcement agency (Orange County Environmental Health Department). It is unknown how much medical waste would be generated on-site; however, the project would be required to comply with the MWMA to ensure proper handling and disposal of medical wastes. Impacts would be **less than significant.**

c) The project site is located approximately 0.2 miles from St. Polycarp Elementary School and Wakeham Elementary School. With the exception of domestic cleaning supplies, no hazardous materials would be used on-site. The proposed assisted living facility and outpatient clinic would be required to dispose of all medical waste according to the MWMA. People, including students at the nearest schools, would not be exposed to these materials in quantities that would be hazardous. This impact would be **less than significant**.

d) The project site is not on any hazardous material site list compiled pursuant to Government Code Section 65962.5. The following databases were checked (May 2014) for known hazardous materials contamination at the project site:

- GeoTracker (California State Water Resources Control Board): list of leaking underground storage tank sites
- EnviroStor (California Department of Toxic Substances Control): list of hazardous waste and substances sites
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database
- Cortese list of Hazardous Waste and Substances Sites

The project site is not included on any list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. There is one leaking underground storage tank (LUST) cleanup site located within 1,000 feet of the project site (12153 Beach Boulevard, approximately 900 feet north of the project site). The status for this listing is "completed-case closed," indicating that no hazards remain on-site. There are no known or permitted underground storage tank (UST) facilities on the project site. No other hazardous materials sites were found within 1,000 feet of the site. **No impact** would occur.

e, f) The project site is located approximately 2.5 miles east of the Joint Forces Training Base (JFTB) in Los Alamitos and six miles south of the Fullerton Airport. The site is not within the airport influence area for either of these two airports as defined by the Orange County Airport Environs Land Use Plan (2004). **No impact** would occur.

g) The proposed project would not substantially change existing conditions with regard to transportation routes or evacuation plans. Construction activities may temporarily restrict vehicular traffic along Catherine Avenue and Beach Boulevard; thus, the contractor would be required to implement standard traffic control conditions to facilitate the passage of people and vehicles through/around any required lane closures. Project specific conditions would be developed as part of the preconstruction process.

Access to the project site would be from three points along Catherine Avenue on the south side of the project site. During the operational phase of the project, on-site access would be required to comply with standards established by the City of Stanton Public Works Department. The size and location of fire suppression facilities (e.g., hydrants) and fire access routes would be required to conform to Orange County Fire Department standards. As required of all development in the City, the proposed project would conform to applicable Uniform Fire Code standards. The submittal of such plans would be subject to conditions of approval, which would be developed as part of the permitting process approved by the City in accordance with City standards. Therefore, implementation of the proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan and no mitigation is required. The project's potential impact to emergency response and evacuation routes would be **less than significant**.

h) The proposed project is located within a heavily urbanized area. Wildfire conditions do not occur; thus, there is no significant risk associated with wildland fires. **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. HYDROLOGY AND WATER QUALITY				
Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering or the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. HYDROLOGY AND WATER QUALITY				
Would the project:				
d) Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☒	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

a, e, f) Section 303 of the federal Clean Water Act requires states to develop water quality standards to protect the beneficial uses of receiving waters. In accordance with California's Porter/Cologne Act, the Regional Water Quality Control Boards (RWQCBs) of the State Water Resources Control Board (SWRCB) are required to develop water quality objectives that ensure each region meets requirements related to Section 303 of the Clean Water Act.

Stanton is within the jurisdiction of the Santa Ana RWQCB, which has adopted water quality objectives in its Stormwater Quality Management Plan (SQMP). This SQMP is designed to ensure that stormwater complies with receiving water contamination limitations. Stormwater that complies with the SQMP would not exceed the limitations of receiving waters; and thus, would not exceed water quality standards.

Compliance with the SQMP is ensured by Section 402 of the Clean Water Act , which is referred to as the National Pollutant Discharge Elimination System (NPDES). Under this section, municipalities are required to obtain Municipal Separate Storm Sewer Systems (MS4) permits. Orange County and 26 incorporated cities therein, including Stanton, obtained an MS4 from the Santa Ana RWQCB. Short-term stormwater pollutant discharges would be mitigated through compliance with the applicable NPDES permitting process. Permit holders must verify compliance with permit requirements by monitoring effluent, maintaining records, and filing periodic reports. A NPDES permit would generally specify an acceptable level of a pollutant or pollutant parameter (for example, a certain level of bacteria) in a discharge. The permit holder may choose which technologies to use to achieve that level.

Development on the project site would disturb more than one acre; therefore, the project would be subject to the NPDES General Construction permit. Implementation of NPDES permit requirements ensures that a state's mandatory standards for clean water and the federal minimums are met. Coverage with the permit would prevent sedimentation and soil erosion through implementation of a Stormwater Pollution Prevention Plan (SWPPP) and periodic inspections by RWQCB staff. A SWPPP is a written document that describes the construction operator's activities to comply with the requirements in the NPDES permit. Required elements of an SWPPP include (1) site description addressing the elements and characteristics specific to the project site; (2) descriptions of BMPs for erosion and sediment controls; (3) BMPs for construction waste handling and disposal; (4) implementation of approved local plans; and (5) proposed post-construction controls, including a description of local post-construction erosion and sediment control requirements. The SWPPP is intended to facilitate a process whereby the operator evaluates potential pollutant sources at the site and selects and implements BMPs designed to prevent or control the discharge of pollutants in stormwater runoff. As discussed in Section VI, Geology and Soils, the applicant has prepared a Conceptual Water Quality Management Plan, dated February 15, 2016, that includes a range of BMPs aimed at meeting these requirements. The WQMP is included in Appendix F.

During the construction period, all activities on the project site would use a series of BMPs to reduce erosion and sedimentation, as outlined in mitigation measure H-1. These measures may include the use of gravel bags, silt fences, hay bales, check dams, hydroseed, and soil binders. The construction contractor would be required to operate and maintain these controls throughout the duration of construction. In addition, the construction contractor would be required to maintain an inspection log and have the log on-site to be reviewed by the City and representatives of the RWQCB.

H-1 **Water Quality Management Plan.** The applicant shall implement applicable BMPs outlined in the Orange County 2011 Model Water Quality Management Plan as appropriate. These may include but are not limited to:

- Site design measures;
- Implementing Low Impact Development (LID) BMPs on-site;
- Constructing or participating in sub-regional/regional LID BMPs;
- Implementing hydromodification control BMPs;
- Utilizing alternative programs or treatment control BMPs;
- Employing applicable source control BMPs.

H-2 **Stormwater Filtration.** The applicant must include filtration in all stormwater drain basins. The proposed filtration systems must be submitted to the City of Stanton for approval prior to issuance of a grading permit.

With the implementation of regulatory requirements and mitigation measures H-1 and H-2, impacts related to stormwater quality would be **less than significant**.

b) The availability of groundwater and issues involving the adequacy of recharge capability are regional concerns. The Groundwater Management Act (AB 3030)(CWC 2011) provides a systematic procedure for an existing local agency to develop a groundwater management plan. AB 3030 allows a local agency whose service includes a groundwater basin that is not already subject to groundwater management pursuant to law or court order to adopt and implement a groundwater management plan and includes plans to mitigate overdraft conditions, control brackish water, and to monitor and replenish groundwater. Potable water for the proposed development would be supplied by the City. Further analysis of water supplies that would serve the development on the project site is provided in Section XVII (Utilities and Service Systems) of this Initial Study.

An operating water well is located along the eastern property line near the northern edge of the project site. This facility would not be disturbed by the proposed development. The proposed onsite drainage system would collect runoff from the site and transmit flows to a drainage pipe on the south side of the site along Catherine Avenue. These flows would be directed to a StormTech Subsurface Stormwater Management System, (StormTech System). This BMP removes sediments, trash and debris that may otherwise continue downstream and also stores a volume of water prior to biofiltration treatment. The drain system would direct surface flows away from the existing well. Therefore, this and other BMPs implemented on the site would ensure that project development would not adversely affect the existing onsite well.

According to the Orange County Water District, groundwater recharge in Orange County occurs solely within the Cities of Anaheim and Orange. Therefore, development of the proposed project would not interfere with groundwater recharge. A portion of the site is paved while the remainder is bare ground. The project would increase the amount of impervious surface on the site, however, because the site is not in a groundwater recharge area, this would not cause a significant impact. Impacts associated with this issue would be **less than significant** and no mitigation is required.

c) A portion of the site would be landscaped, leaving it as pervious surface, while the remainder would be covered in impervious surface. The nearest river is Coyote Creek located five miles northwest of the project site. The proposed project would not alter any watershed boundaries or affect the course or water supply of any stream or river. The project would be subject to the requirements of Orange County's 2011 Model Water Quality Management Plan. This plan requires projects in the area to utilize Low Impact Design (LID) BMPs, including bioretention, vegetated swales, sand filters, infiltration trenches, drywells, and catch basins, which contribute to reduced peak stormwater runoff volumes and filter contaminants associated with stormwater runoff. Therefore, the proposed project would not increase peak surface runoff from the site or otherwise adversely affect the local storm drain system. Erosion or siltation impacts

would be minimized through implementation of erosion control techniques as discussed in Section III, *Air Quality*, and the proposed onsite drainage system discussed in detail in Section VI, *Geology and Soils*. Impacts would be **less than significant**.

d) The proposed project would not alter any watershed boundaries, impact a stream course, or increase the quantity of water in a stream or river. The project site is relatively flat; thus, while the project would add impervious surface to the site, it would not substantially affect runoff volumes or patterns on the site. As such, the proposed project would not alter drainage patterns in a manner that would cause flooding. Impacts would be **less than significant.**

g-i) The project site is located in Zone X as designated by the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Maps (FIRMs) Panel #06059C0136J. Zone X is outside the 500 and 100-year flood zone. The site is bordered by the Orange County Flood Control District's stormwater channel. All storm flows, including 100-year flood (or 1% annual flood) flows from the area are collected and contained within this channel. The project would not affect this channel or place housing within a 100-year flood hazard area. The project would not impact flood patterns and would not put people or structures at risk from natural flooding. Further, **t**he proposed project would not expose people to the risk of injury or death from flooding. **No impact** would occur per this threshold.

j) Stanton is located inland from the Pacific Ocean and not within a tsunami flood zone. There are no water bodies such as lakes or reservoirs in proximity to the project that could generate seiches should a seismic event occur. Therefore, the project would not be affected by seiche or tsunamis. The project site is flat as is the surrounding topography; thus, the project would not be affected by mudflows. **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
X. LAND USE AND PLANNING				
Would the proposal:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with an applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a) The proposed project is located on an infill site surrounded by commercial and residential development. The project does not include any features that would physically divide the surrounding community, such as construction of a new roadway, flood control channel, or other structure. The project involves the construction of a commercial assisted living building on a vacant site. The site does not separate complementary uses nor is it used as a point of ingress/egress for the neighborhood. Therefore, **no impact** would occur.

b) The project is consistent with the General Plan (South Gateway Mixed-Use District) and zoning (Commercial General Zone South Gateway Mixed-Use Overlay) designations. The proposed project requires City approval of four entitlements. A parcel merger is required to consolidate three parcels that comprise the site into one parcel. Section 20.230.050 of the Zoning Ordinance requires a minimum lot size of 50,000 square feet for the proposed project. The lot is 49,494 square feet; thus, a variance is needed to allow development of the project as proposed. Additionally, an amendment to the zoning code is required to allow for a larger projection from the buildings and a development permit for the approval of the building and site improvements.

With approval of the proposed entitlements, the project would be consistent with applicable land use plans, policies, and regulations. The proposed project site is not located in the coastal zone; and thus, is not subject to local coastal programs and/or related elements of the California Coastal Act. **No impact** would occur.

c) The project site is located within a highly urbanized area of Stanton. No habitat conservation plans or natural community conservation plans apply to project site. **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XI. MINERAL RESOURCES				
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a-b) The project site is located in a completely urbanized area. There are no mineral extraction or processing facilities on or adjacent to the site. No known mineral resources are identified in the City of Stanton General Plan. Thus, the project would not result in the loss of availability of an important mineral resource recovery site; **no impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. NOISE				
Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise?	☐	☐	☐	☒

Noise is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound power levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano keyboard) and less sensitive to low frequencies (below 100 Hertz).

Because of the logarithmic scale of the decibel unit, sound levels cannot be added or subtracted arithmetically. If a sound's physical intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example, 60 dB plus 60 dB equals 63 dB, 80 dB plus 80 dB equals 83 dB. However, where ambient noise levels are high in comparison to a new noise source, there will be a small change in noise levels. For example, when 70 dB ambient noise levels are combined with a 60 dB noise source the resulting noise level equals 70.4 dB.

Noise that is experienced at any receptor can be attenuated by distance or the presence of noise barriers or intervening terrain. Sound from a single source (i.e., a point source) radiates

uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates (or drops off) at a rate of 6 dBA for each doubling of distance. For acoustically absorptive, or soft, sites (i.e., sites with an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dBA per doubling of distance is normally assumed. A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by this shielding depends on the size of the object, proximity to the noise source and receiver, surface weight, solidity, and the frequency content of the noise source. Natural terrain features (such as hills and dense woods) and human-made features (such as buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction.

The City of Stanton has adopted a Noise Ordinance as Chapter 9.28 of the Stanton Municipal Code (SMC). For construction noise, Section 9.28.070(e) of the SMC states that the operation of construction equipment in or adjacent to residential areas is prohibited except between the hours of 7:00 a.m. and 8:00 p.m. on weekdays and Saturdays and is prohibited on Sundays and holidays. Construction of the proposed project would be subject to these timing restrictions. For operational noise, the SMC states the following noise limits:

- Exterior and interior noise of 55 dBA during the hours of 7:00 a.m. to 10:00 p.m.;
- Exterior noise of 50 dBA during the hours of 10:00 p.m. to 7:00 a.m.; and,
- Interior noise of 45 dBA during the hours of 10:00 p.m. to 7:00 a.m.

Stanton Municipal Code Section 9.28.050(C) states that if ambient noise levels exceed the maximum allowed noise level, then the ambient level becomes the standard. The ordinance further prohibits noise levels to exceed the following:

- The noise standard for a cumulative period of more than thirty minutes in any hour; or
- The noise standard plus 5 dB(A) for a cumulative period of more than fifteen minutes in any hour; or
- The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour; or
- The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour; or
- The noise standard plus 20 dB(A) for any period of time.

Vibration is a unique form of noise as the energy is transmitted through buildings, structures and the ground whereas audible noise energy is transmitted through the air. Thus, vibration is generally felt rather than heard. The ground motion caused by vibration is measured as particle velocity in inches per second and is referenced as vibration decibels (VdB). The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels.

The City has not adopted specific thresholds or regulations addressing vibration; thus, for the purpose of evaluating project-related vibration impacts, thresholds established in the Federal

Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (May 2006) are used. A threshold of 65 VdB is used for buildings where low ambient vibration is essential for interior operations. These buildings include hospitals and recording studios. A threshold of 72 VdB is used for residences and buildings where people normally sleep (i.e., hotels and rest homes). A threshold of 75 VdB is used for institutional land uses where activities occur primarily during the daytime (i.e., churches and schools). The threshold used for the proposed project is 72 VdB as residences are the only sensitive receptors in proximity to the site.

With respect to ground-borne vibration impacts on structures, the FTA states that ground-borne vibration levels in excess of 100 VdB would damage fragile buildings and levels in excess of 95 VdB would damage extremely fragile historic buildings. No historic buildings are known to occur in proximity to the site; thus, 100 VdB is used to quantify potential vibration impacts to neighboring structures.

a, c, d) Potential noise impacts include those from temporary sources during grading and construction, and long-term sources from project occupancy.

<u>Short-Term Impacts</u>

Construction activity associated with development of the proposed mixed-use building would generate temporary increases in noise levels. Short-term noise levels associated with project construction would be higher than existing ambient noise levels. Construction noise would be limited to construction hours and would terminate completely when construction is finished. Noise impacts associated with construction activity are a function of the noise generated by construction equipment, location, sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Normally, these activities are carried out in stages and each stage has its own characteristics based on the mix of equipment in use. Table 6 shows typical noise levels associated with construction equipment. The project site is bordered by residential buildings to the south and east. Adjacent residential buildings would be most sensitive to construction noise. Typical maximum construction noise levels at 25 feet from the source, assuming use of the equipment shown in Table 6, range from 81 to 95 dBA. Construction-related noise would exceed ambient noise levels and may cause periodic annoyance to nearby residents. Construction noise is highly variable and dependent on the type(s) of equipment being used, where the equipment is operating on the site relative to the receiving properties, and the operating duration.

Based on Section 9.28.070(e) of the City's Municipal Code, construction-related noise is not permitted between the hours of 8:00 p.m. and 7:00 a.m. on weekdays and Saturdays, or anytime on Sundays or holidays. The contractor would be required to adhere to the construction hours specified in the City's Municipal Code. With adherence to these timing restrictions and mitigation measure N-1, noise impacts associated with project construction would be **less than significant.**

Table 6
Typical Construction Equipment Noise Levels

Equipment On-site	Typical Level (dBA) 25 Feet from the Source	Typical Level (dBA) 50 Feet from the Source	Typical Level (dBA) 100 Feet from the Source
Air Compressor	84	78	64
Backhoe	84	78	64
Bobcat Tractor	84	78	64
Concrete Mixer	86	79	73
Bulldozer	88	82	76
Jack Hammer	95	89	83
Pavement Roller	86	80	74
Street Sweeper	86	82	76
Man Lift	81	75	69
Dump Truck	82	76	70

Source: Noise levels based on FHWA Roadway Construction Noise Model (2006) Users Guide Table 1
Noise levels based on actual maximum measured noise levels at 50 feet (Lmax)
Noise levels assume a noise attenuation rate of 6dBA per doubling of distance.

Although compliance with Municipal Code timing restrictions on construction would reduce impacts to below a level of significance under CEQA, the following is recommended to minimize the effects of construction noise on neighboring properties.

N-1 **Construction Noise.** The proposed project shall implement measures to reduce noise during construction. These include, but are not limited to:

- Ensure that all construction equipment is in proper operating condition and fitted with standard factory noise attenuation features. All equipment shall be properly maintained to ensure that no additional noise, due to worn or improperly maintained parts, would be generated;
- Use noise control devices, such as equipment mufflers, enclosures, and barriers;
- Perform all construction in a manner to minimize noise. The contractor will be required to select construction processes and techniques that create the lowest noise levels. Examples include using predrilled piles instead of impact pile driving, mixing concrete off-site instead of on-site, using hydraulic tools instead of pneumatic impact tools, and use of silencing packages for air compressors;
- Stage construction operations as far from noise sensitive uses as possible;
- Limit idling of trucks to less than five minutes;
- Avoid residential areas when planning haul truck routes;
- Change the timing and/or sequence of the noisiest construction operations to avoid sensitive times of the day; and

- Maintain all sound-reducing devices and restrictions throughout the construction period.

Long-Term Impacts

Potential noise impacts associated with the operation of the proposed mixed-use building are a result of increased vehicular traffic on the project vicinity roadways. Additionally, the project would include mechanical equipment such as a cooling tower and trash compactor. The trash compactor and cooling tower would be located on the first-floor at the northeastern corner of the project site. The nearest sensitive receptor would be located approximately 125 feet away to the southwest at the out-patient clinic; however, first-floor parking is located between this equipment and nearby receptors. The compactor would be accessible to residents on each floor via a chute. The compactor would be enclosed and used intermittently and infrequently, not resulting in a permanent source of noise. An elevator, set of stairs, and the trash chute would be positioned above the trash compactor on the subsequent floors. The cooling tower would also be enclosed and would not result in an increased sound pressure level (see the *Closed Circuit Cooler Data Sheet* in Appendix E). The proposed project would be located on a site zoned Commercial General Zone South Gateway Mixed-Use Overlay. The properties directly east of the site are zoned Medium Density Residential South Gateway Mixed-Use Overlay. The most common source of noise in the project vicinity is traffic on Beach Boulevard. On May 20, 2014, between 11:00 a.m. and 12:00 p.m., two 20-minute weekday noise measurements were taken using a Rion NL-21 sound level meter to establish baseline noise conditions at the project site. Noise monitoring locations and results are shown in Table 7.

Table 7
Noise Measurement Results

Measurement Number	Measurement Location	Primary Noise Source	Leq (dBA)
1	Catherine Avenue adjacent to southeast corner of project site	Traffic	57.0
2	Corner of Beach Boulevard and Catherine Avenue adjacent to project site	Traffic	64.8

Source: Rincon Consultants, Inc. Recorded during field visit using Rion NL-21 sound level meter. See Appendix C for full results.

Measured noise levels were about 57 dBA at the southeast corner of the site on Catherine Avenue and about 65 dBA at the intersection of Beach Boulevard and Catherine Avenue. Because volumes and speeds are higher on Beach Boulevard, corresponding noise levels are also higher. Traffic-related noise impacts would be significant if project-generated traffic results in exposure of sensitive receptors to unacceptable noise levels. The City does not have an established significance criteria for traffic-related noise; thus, FTA (May 2006) recommendations are used herein to determine whether increases in traffic noise would be considered significant. Under these thresholds, the allowable project-related noise exposure increase varies depending on existing noise levels. Lower existing noise levels noise levels allow a greater increase in project-related noise levels before triggering an impact. Conversely, higher existing noise levels

allow a smaller increase in project-related noise before triggering an impact. Table 8 shows the impact criteria used in this evaluation.

Table 8
Significance of Changes in Operational Roadway Noise Exposure

Ldn or Leq in dBA	
Existing Noise Exposure	**Allowable Noise Exposure Increase**
45-50	7
50-55	5
55-60	3
60-65	2
65-75	1
75+	0

Source: Federal Transit Administration (FTA), May 2006

The traffic study prepared for the project by Kunzman Associates (May, 2014) (see Appendix D) states that the project would generate 997 average daily trips (ADT). Table 9 shows the distribution of these trips on Beach Boulevard and Catherine Avenue. As stated above, it would take a doubling of the intensity (doubling of traffic volumes while maintaining the same speed) of the source to cause a 3 dBA increase. Using the scale from Table 8, it would take an increase in noise level of 3 dBA on Catherine Avenue and an increase of 2 dBA on Beach Boulevard for the increase in noise level to be considered significant. As shown in Table 9 the project would not cause a doubling of traffic on any of the street segments adjacent to the site. Volumes on Beach Boulevard would increase by less than 1% as a result of the project. Volumes on Catherine Avenue would increase by 40%; thus, it is assumed that traffic-related noise levels would also increase. Noise levels associated with existing and projected volumes on Catherine Avenue were estimated using the Federal Highway Administration Transportation Noise Model Look Up tables. The purpose was to perform simple calculations to determine how project traffic would affect noise levels at receivers located adjacent to Catherine Avenue. Existing noise levels, assuming peak hour traffic volumes are 10% (120 vehicles) of the ADT shown Table 9, are 56.7 dBA. Project related traffic (80 vehicles per hour) volumes were modeled to account for cars/light trucks as well delivery/vendor vehicles. Assuming total traffic on Catherine Avenue would be 200 vehicles per hour, noise levels would increase by 2 dBA to 57.4 dBA. The increase in traffic that would result from operation of the proposed project would not cause a perceptible change in the existing noise environment.

Table 9
Trip Distribution

Measurement Location	Leg	Average Daily Traffic Volumes			Percent Increase Due to Project
		Existing	Project	Existing Plus Project	
Beach Boulevard and Catherine Avenue	North	71,000	400	71,400	0.6%
	South	71,000	400	71,400	0.6%
	East	1,200	800	2,000	40.0%
	West	0	0	0	0.0%

Source: Kunzman Associates, 2014

The project includes parking on the first and second floors of the building. Noise associated with vehicles operating on the first floor would be attenuated by the block wall constructed along the east property boundary and the structure itself. As discussed in Section I, *Aesthetics*, the garage walls would be four to five feet high with gaps to allow ventilation. The structure would attenuate noise. In addition, vehicles operating on the second floor would be traveling slowly and intermittently. Noise from within the structure is not expected to be audible above ambient noise and noise associated with overall operation of the facility. Impacts would be **less than significant**.

b) Based on the information presented in Table 10, vibration levels could reach approximately 87 VdB at the residences adjacent to and east of the site during construction.

Table 10
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	87	81	79	77	75
Loaded Trucks	86	80	78	76	74
Jackhammer	79	73	71	69	67
Small Bulldozer	58	52	50	48	46

Source: Federal Railroad Administration, 1998

As discussed above, 100 VdB is the threshold where minor damage can occur in fragile buildings. These residences are new construction and vibration levels are projected to be under 100 VdB. Thus, structural damage would not occur as a result of construction activities associated with the proposed project. The nearest residence is approximately 20 feet from the property line. Vibration levels at residential units located east of the project site could exceed the ground borne velocity threshold level of 72 VdB for residences and/or buildings where people sleep as discussed above. However, in accordance with the City's Noise Ordinance, the operation of construction equipment adjacent to residential buildings is prohibited except between the hours of 7:00 a.m. and 8:00 p.m. on weekdays and Saturdays and all construction is prohibited on Sundays, and holidays. Adherence to these standards would restrict construction

to time outside of normal sleep hours. Operation of the proposed project would not be expected to generate vibration in the long term. Therefore, the impact would be **less than significant.**

e) The project site is approximately 2.5 miles from the nearest airport (Joint Forces Training Base). The site is not within the airport influence area defined by the Orange County Airport Environs Land Use Plan (2004). Thus, the proposed project would not expose people working or living on the project site to excessive noise levels related to airport operation. Impacts would be **less than significant**.

f) There are no private airstrips in the vicinity of the project site. **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIII. POPULATION AND HOUSING				
Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

As of January, 2014, the population of the City of Stanton was estimated to be 38,963 (E-1 Cities, Counties, and State Population Estimates with Percent Change, January 2013- 2014, California Department of Finance, March, 2014).

a) The proposed assisted living facility would have approximately 120 residents and 21 employees. According to SCAG's *Employee Density Study* (2001), the outpatient clinic and restaurant would have one employee for every 450 SF for a total of 15 employees. The total employee count would be 36. Assuming all residents and employees are new to Stanton, the total population increase would be 156. SCAG estimates that the population of the City of Stanton will be 43,400 in 2035. This is an increase of 4,437 residents over the 20 year period. The addition of 156 new residents to Stanton would equal 4% of the estimated growth for the City. Therefore the project would not induce substantial population growth and impacts would be **less than significant.**

b-c) The site is vacant, though a portion has been paved to accommodate previous activities on the site. The project site does not contain residential uses. No existing housing or people would

be displaced due to construction of the proposed project. **No impact** would occur under these criteria.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIV. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

a.i) Fire protection service within the City of Stanton is provided by Orange County Fire Authority (OCFA). The closest fire station is Station 46 located at 7871 Pacific Street, approximately 1.6 miles north of the project site. While the proposed facility would be constructed consistent with all applicable fire codes, the senior living facility could increase emergency service calls to the property. The applicant would be responsible for paying all impact fees associated with the project which in part, are intended to ensure adequate funding is available for equipment needed to provide proper service. The project site is within the existing OCFA service area and, therefore, would not require the construction of a new or expanded fire station. Therefore, the proposed project would not require new or expanded Fire Department facilities to maintain acceptable service ratios, response times, or other performance objectives and would have **no environmental impact** related to the provision of fire protection.

a.ii) Law enforcement services are provided by the Orange County Sheriff-Coroner Department from the Stanton Substation located at 11100 Cedar Street approximately 1.2 miles north of the project site. The project site is located in an area developed with commercial and residential buildings. The project site is surrounded by urban uses and is already within the service area of the Police Department. The proposed project may cause an increase in law enforcement service calls. However, because the project site is within the current service area of the Sheriff-Coroner Department, it would not require the construction of new or expanded Department facilities. Thus, **no environmental impact** related to the provision of police protection service would

occur. The payment of applicable impact fees would fund equipment needed to provide law enforcement service.

a.iii) The project site is located within the Garden Grove Unified School District and would be served by Lawrence Elementary, Alamitos Intermediate, and Rancho Alamitos High Schools. The project would not directly affect any existing schools or cause an increase in school age population and thus would have no impact to local schools. Thus, the proposed project would not require new or expanded schools to maintain acceptable service ratios or other performance objectives. The project would have **no impact** with respect to schools.

a.iv) Refer to Section XV, *Recreation*.

a.v) Library services are provided by a branch of the Orange County Public Library (OCPL) located at 7850 Katella Avenue. Assuming all facility residents are new to Stanton, the proposed project would directly increase the population by 120 residents and indirectly by 36, if all new employees relocated to Stanton. Residents and employees may use existing library facilities; however, increased demand would be nominal and the project is not expected to require the construction of new or expanded facilities. The project would have **no impact**.

Impacts to other public facilities (e.g., sewer, storm drains, and roadways) are discussed in Sections XVI (Transportation/Traffic) and Section XVII (Utilities and Public Services) of this Initial Study.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XV. RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

a) The City of Stanton Parks and Recreation Services Department provides park and recreation services to Stanton residents. Premier Park is the park nearest the site. It is located approximately 0.4 miles northeast of the site. Assuming all facility residents are new to Stanton, the project would cause a direct increase in population of 120 residents and an indirect increase of 36, if all new employees move to Stanton from elsewhere. This is 4% of the projected population growth as discussed in Section XIII, *Population and Housing*. The proposed project will have recreational resources; thus, it is unlikely that the residents of the facility would utilize parks and recreation facilities. Employees may utilize parks and recreation facilities; however,

this increase would be negligible when compared to the existing population of the City. The project would not cause physical deterioration of parks. Impacts would be **less than significant.**

b) No public recreational facilities are proposed as part of the project. The City of Stanton has 25.25 acres of parkland and a current population of 38,963. This is a ratio of 0.65 acres per 1,000 residents. If it is assumed that the 36 employees relocated to Stanton, the addition would not affect the current ratio of 0.65 acres of parkland per person. The project would not require the construction or expansion of recreational facilities. Impacts would be **less than significant**.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. TRANSPORTATION AND TRAFFIC				
Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit?	☐	☒	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☒	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?	☐	☒	☐	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bikeways, or pedestrian facilities, or otherwise substantially decrease the performance or safety of such facilities?	☐	☐	☒	☐

a, b) Construction activities may temporarily restrict vehicular traffic along Catherine Street Avenue and Beach Boulevard; thus, the contractor would be required to implement standard traffic control conditions to facilitate the passage of people and vehicles through/around any required lane closures. Project specific measures conditions would be developed as part of the preconstruction process.

Kunzman Associates, Inc. prepared a traffic impact study for the proposed project (May 2014, revised October 2014; see Appendix D of this document). Trip generation rates used for the proposed project were developed in consultation with City of Stanton. As shown in Table 11, the proposed project would generate approximately 997 daily vehicle trips.

Table 11
Estimated Project Traffic Trip Generation

Land Use	Quantity	Weekday Peak Hour		Total Daily Trips
		Morning	Evening	
Assisted Living	120 beds	17	27	319
High-Turnover (Sit-Down) Restaurant	4,296 SF	47	42	546
Outpatient Clinic*	1,471 SF	5	12	132
Total Trips				**997**

Source: Kunzman Associates, Inc. 2014; See Appendix D for full Traffic Study.
**-Trip generation rates were unavailable for the outpatient clinic; thus, data for a pharmacy were used.*

Level of Service (LOS) calculations were performed at the three proposed access points for the project and at the unsignalized intersection of Catherine Avenue and Beach Boulevard.

The following scenarios were evaluated:

- Existing Traffic Conditions;
- Existing + Project Traffic Conditions;
- Opening Year Traffic Conditions (2016);
- Opening Year + Project Traffic Conditions.

The City of Stanton General Plan defines acceptable LOS as LOS D and above for city streets. The study area intersection and access points are projected to operate within acceptable LOS during the peak hours for Existing + Project traffic conditions, except for the intersection of Catherine Avenue and Beach Boulevard during both the AM and PM peak hours as shown on Table 12.

Based on the analysis contained in the traffic study and summarized in Table 12 (Existing Plus Project Impacts) and Table 13 (Opening Year Plus Project Impacts), the proposed project would add trips to the intersection of Beach Boulevard and Catherine Avenue which currently operates at LOS F. The project would add a nominal number of new trips to this intersection; however, because the intersection is already operating at an unacceptable LOS, the addition of

project traffic would cause a significant traffic impact. Implementation of Mitigation Measure T-1 would reduce potential traffic impacts to a **less than significant** level.

Table 12
Existing Plus Project Intersection Impacts

#	Intersection	Peak Hour	Existing		Existing + Project		Existing + Project with Mitigation		Significant Impact?
			Delay-LOS	V/C LOS	Delay-LOS	V/C-LOS	Delay-LOS	V/C-LOS	
1	Beach Boulevard at Catherine Avenue	AM PM	99.9[1]-F 99.9[1]-F	0.436-A 0.484-A	99.9[1]-F 99.9[1]-F	0.452-A 0.515-A	- -	0.452-A 0.515-A	**YES**
2	Project West Access at Catherine Avenue	AM PM	- -	- -	8.8-A 8.8-A	- -	- -	- -	No
3	Project Central Access at Catherine Avenue	AM PM	- -	- -	7.3-A 7.3-A	- -	- -	- -	No
4	Project East Access at Catherine Avenue	AM PM	- -	- -	8.8-A 8.8-A	- -	- -	- -	No

[1] 99.9 Delay High, Intersection Unstable. However, as discussed in the Traffic Study (Appendix D), due to the nature of the intersection of Beach Boulevard and Catherine Avenue, the Intersection Capacity Utilization (V/C – LOS) methodology rather than the takes precedence rather than the Intersection Delay Method, which does not account for acceptable gaps created on Beach Boulevard for traffic to enter/exit onto Catherine Avenue due to traffic signals north and south of this intersection. These traffic signals produce periodic gaps in traffic for upstream and downstream traffic as they are fulfilling their traffic cycles which allow for the creation of gaps to occur. The intersection Capacity Utilization methodology is preferred as it does not single out the most minimalistic movements in relation to total traffic volumes utilizing that intersection to then assess the entire intersection performance.
Source: Kunzman Associates, Inc., 2014; See Appendix D for full Traffic Study.

Table 13
Opening Year (2016) Plus Project Intersection Impacts

#	Intersection	Peak Hour	Opening Year		Opening Year + Project		Opening Year + Project with Mitigation		Significant Impact?
			Delay-LOS	V/C LOS	Delay-LOS	V/C-LOS	Delay-LOS	V/C-LOS	
1	Beach Boulevard at Catherine Avenue	AM PM	99.9[1]-F 99.9[1]-F	0.444-A 0.493-A	99.9[1]-F 99.9[1]-F	0.459-A 0.524-A	- -	0.459-A 0.524-A	**YES**
2	Project West Access at Catherine Avenue	AM PM	- -	- -	8.8-A 8.8-A	- -	- -	- -	No
3	Project Central Access at Catherine Avenue	AM PM	- -	- -	7.3-A 7.3-A	- -	- -	- -	No
4	Project East Access at Catherine Avenue	AM PM	- -	- -	8.8-A 8.8-A	- -	- -	- -	No

[1] See Note 1 under Table 12 for explanation.
Source: Kunzman Associates, Inc., 2014; See Appendix D for full Traffic Study.

T-1 **Catherine Avenue/Beach Boulevard Improvements.** Prior to issuance of final occupancy permits, the project proponent shall complete the following:

- Construct Catherine Avenue from Beach Boulevard to the east project boundary to its ultimate half-section width, including landscaping and parkway improvements and dedicate the additional roadway to the City.
- Construct Beach Boulevard from the north project boundary to Catherine Avenue at its ultimate half-section width as a Smart Street including landscaping and parkway improvements.

Both Catherine Avenue and Beach Boulevard have been widened to the ultimate width. This measure will require the applicant to make landscaping and parkway improvements (sidewalk/curb/gutter) on portions of both roadways fronting the project site.

c) As discussed in Section VIII, *Hazards and Hazardous Materials*, and Section XII, *Noise,* given the fact that the project site is located approximately 2.5 miles from the nearest airport (Joint Forces Training Base), the project would not present any impediments to air traffic, and would not affect air traffic patterns. Therefore, **no impact** would occur.

d) The proposed project would not introduce any design features such as sharp curves or dangerous intersections, or incompatible uses to the project site or surrounding road network that would increase hazards. Catherine Avenue is narrow and typically lined with parked cars. Thus, temporary construction traffic may create short-term safety impacts or access impediments. Impacts would be **potentially significant unless mitigation is incorporated.** Implementation of Mitigation Measure T-2 would reduce potential safety impacts to a less than significant level.

T-2 **Traffic Control Plan.** The contractor shall prepare a Traffic Control Plan (TCP). Data to be included in the TCP will clearly depict the exact sequence of the construction operation(s), the construction to be performed, and the traveled way that will be utilized by all movements of traffic during each phase of construction. As appropriate, information including construction signs, warning lights (flares, lanterns, electric markers, or flashers), barriers, and flag persons shall be identified. The TCP shall also include specific protocol for notifying the Police and Fire Departments of the construction schedule and available detours. This would allow emergency vehicles to use alternate routes for emergency response. In addition, information addressing alternative bicycle and pedestrian routes shall be included.

e) The project would not affect emergency access. Three points of ingress/egress would be provided along Catherine Avenue and site circulation would be designed to meet OCFD requirements. Impacts would be **less than significant.**

f) The project is proposed on an infill site in an area already served by public transportation and bicycle programs. The proposed project would not affect or conflict with adopted policies, plans, or programs regarding public transit, bikeways, or pedestrian facilities, or otherwise

substantially decrease the performance or safety of such facilities. The proposed project would have a **less than significant impact** with respect to alternative transportation.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. UTILITIES AND SERVICE SYSTEMS				
Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

a, b, e) The proposed project would require connection to existing sewer infrastructure and would result in an increase in the amount of wastewater produced on the site. Wastewater from the City of Stanton is conveyed by the City of Stanton Public Works Department's Sewer Maintenance Division to the Orange County Sanitation District's (OCSD) two wastewater treatment facilities (Reclamation Plant No. 1 and Treatment Plant No. 2). Average flows for Reclamation Plant No. 1 and Treatment Plant No. 2 are 91 million gallons per day (mgd) and 138 mgd, respectively. The combined average flow is 229 mgd. The treatment capacity for Reclamation Plant No. 1 is 180 mgd and the treatment capacity for Treatment Plant No. 2 is 150 mgd. The City of Los Angeles Wastewater Generation Rates were used to estimate wastewater

generation. The wastewater generation rates and quantities for the project are shown in Table 14.

Table 14
Wastewater Generation Rates

Use	Generation Rate (gallons per day)	Unit	Wastewater Generated
Restaurant	300	1,000 SF	1,289
Assisted Living Facility	75	Per bed	9,000
Outpatient Clinic	250	1,000 SF	368
Offices	250	1,000 SF	1,259
		Total	11,916

This is 0.01% of the remaining capacity of Reclamation Plant No. 1 and 0.1% of the remaining capacity of Treatment Plant No. 2. Thus, the project would not exceed wastewater treatment requirements, exceed the capacity of the City's wastewater systems, or require the construction of new wastewater treatment facilities. These impacts would be **less than significant**.

c) As discussed in Section VIII, *Hydrology and Water Quality*, the existing site consists of mostly pervious surfaces with a small paved area. The area of impervious surface would increase with the proposed project. Stormwater drainage in the City is provided by a network of regional drainage channels and local drainage facilities. Surface water is deposited into regional channels, which are owned and maintained by Orange County. The project would be required to comply with the area's MS4 permit which requires that the amount of runoff from the site must be the same before and after construction of a project.

A storm drain system would be designed, installed, and maintained per City of Stanton Public Works Division standards. Because the project would be required to include site drainage systems according to standards and provisions set forth by the City of Stanton, impacts would be **less than significant.**

d) Golden State Water Company (GSWC), West Orange County System, provides water services in Stanton. Water demand rates established by the City of Los Angeles were used to estimate project water demand. For the purpose of this discussion, water rates are assumed to be approximately 120% of the wastewater generated by the site. The proposed project would generate approximately 14,166 gallons per day of wastewater; therefore, it would use approximately 16,999 gallons of potable water per day.

According to the GSWC's 2010 Urban Water Management Plan (UWMP), overall service area demand for 2010 was 13,831 acre-feet. This is projected to increase by 4,809 acre-feet (or 35%) to 18,640 acre-feet in 2035. This increase in demand is calculated based on projected increases in population for the service area. Water demand associated with the project would be

approximately 0.006% of the water demand forecast within the service area. Adequate water supplies and network capacity are identified in the UWMP to meet future demand. The proposed project is not expected to require new sources of water supply. Although the State of California has declared a drought, the UWMP identifies a Drought Management Plan that identifies conservations methods and ensures that there are sufficient water supplies to meet the needs of the area. This would be a **less than significant impact.**

f) Solid waste collection is a "demand-responsive" service and current service levels can be expanded and funded through user fees. CR&R, Incorporated (CR&R) operates Stanton Disposal Services, which provides solid waste collection service within the city. CR&R also operates the Materials Recovery Facility (MRF) and a transfer station located on Knott and Western Avenues in Stanton. Most solid waste collected in Stanton is transferred to one of the three Orange County sanitary landfills including; Frank R. Bowerman, Prima Deschecha and Olinda Alpha. The Frank R. Bowerman Landfill has a maximum permitted capacity of 11,500 tons per day and an estimated closure date of 2053. The Prima Deshecha Landfill has a maximum permitted capacity of 4,000 tons per day and an estimated closure date of 2067. The Olinda Alpha Landfill has a maximum permitted capacity of 8,000 tons per day and an estimated closure date of 2021.

Solid waste generation for the project was estimated based on the CalRecycle's solid waste generation rates. These rates are shown in Table 15.

Table 15
Solid Waste Generation Rates

Use	Generation Rate (pounds per day)	Unit	Solid Waste Generated
Restaurant	0.005	1 SF	21
Assisted Living Facility	5	Per person	930
Outpatient Clinic	6	1,000 SF	9
Offices	6	1,000 SF	30
		Total	990

This is 8.6% of the daily capacity at the Frank R. Bowerman Landfill, 25% of the daily capacity of Prima Deschecha Landfill, and 12% of the daily capacity of Olinda Alpha Landfill. Development of the proposed project would not significantly affect current operations or the expected lifetime of the landfills.

On-site uses would be required to comply with the City and State waste reduction and recycling standards including the State Medical Waste Management Act (MWMA) (22 CCR Sections 65600–65628) summarized in Section VIII above. For these reasons, potential impacts associated with landfill capacity would be less than significant and no mitigation is required. Therefore, potential impacts associated with landfill capacity would **be less than significant.**

g) The City, applicant, and project contractor would comply with all local, state, and federal requirements for integrated waste management (e.g., recycling, green waste) and solid waste disposal as required by the CIWMA of 1989. Additionally, the assisted living facility and outpatient clinic would comply with the MWMA as summarized above. **No impact** would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self- sustaining levels, eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term goals?	☐	☐	☒	☐
c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

a) As noted under item V, *Cultural Resources*, implementation of the proposed project would not significantly affect known cultural resources. However, it is possible that grading activities could potentially encounter archeological or paleontological resources. Therefore, Mitigation Measure CR-1 is required to reduce potential impacts. Additionally, implementation of the proposed project could significantly impact migratory birds through the removal of trees on the site. Mitigation Measure BIO-1 is required to reduce potential impacts. After incorporation of these mitigation measures, project impacts would be **less than significant**.

b) Mitigation measures have been recommended to minimize or avoid potentially significant adverse environmental impacts. Thus, the proposed project would achieve short-term

environmental goals while avoiding all long-term adverse environmental impacts. Impacts would be **less than significant**.

c) As described in the discussion of environmental checklist Sections I through XVII, the project would have no impact, a less than significant impact, or a less than significant impact after mitigation with respect to all environmental issues. As shown in Table 6 of the Traffic Study in Appendix D, planned and pending developments in the general vicinity of the project site include five residential projects with a total of 49 units and a 4,900 square foot industrial project. The opening year traffic analysis identified as significant impact at the Beach Boulevard/Catherine Avenue intersection, but that impact can be reduced to below a level of significance with proposed mitigation. No other significant cumulative impacts have been identified or are anticipated. Cumulative impacts would be **less than significant with mitigation incorporated**.

d) In general, impacts to human beings are associated with air quality, hazards and hazardous materials, and noise impacts. The South Coast Air Basin is currently designated as a non-attainment area for ozone, PM_{10}, and $PM_{2.5}$. The development of the proposed project would contribute to air pollutant emissions on a short-term basis. As a result, the project would be required to comply with regional rules that assist in reducing short-term air pollutant emissions. The purpose of SCAQMD Rule 403 is to reduce the amount of particulate matter in the atmosphere resulting from man-made fugitive dust sources. After compliance with applicable rules and regulations, potential impacts on human beings would be **less than significant**.

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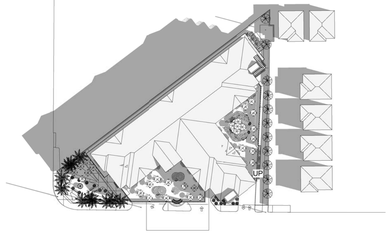
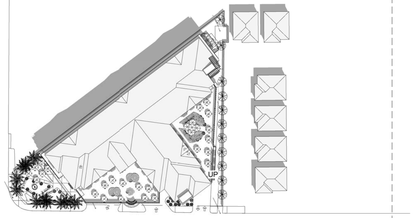
Appendix A

Shade/Shadow Analysis

SPRING



1 **SHADOW SPRING APRIL 8 AM**
SCALE 1" = 80'-0"



4 **SHADOW SPRING APRIL 11 AM**
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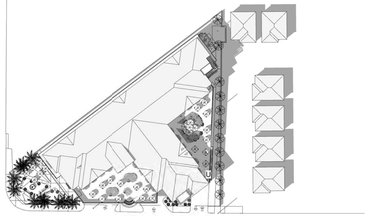
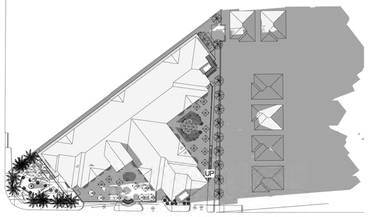
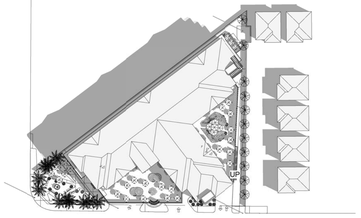


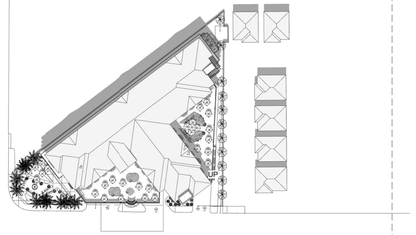
7 **SHADOW SPRING APRIL 2 PM**
SCALE 1" = 80'-0"



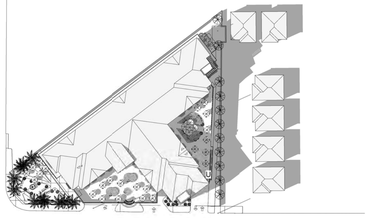
10 **SHADOW SPRING APRIL 5 PM**
SCALE 1" = 80'-0"



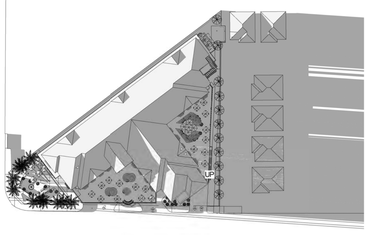
2 **SHADOW SPRING APRIL 9 AM**
SCALE 1" = 80'-0"



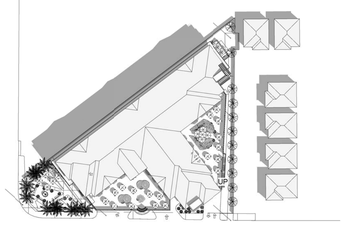
5 **SHADOW SPRING APRIL 12 NOON**
SCALE 1" = 80'-0"



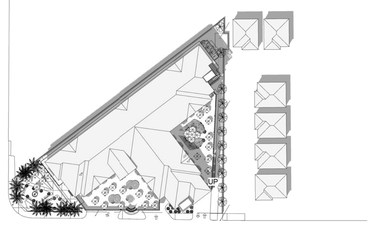
8 **SHADOW SPRING APRIL 3 PM**
SCALE 1" = 80'-0"



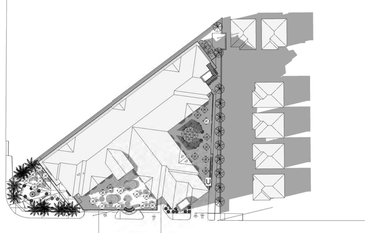
11 **SHADOW SPRING APRIL 6 PM**
SCALE 1" = 80'-0"



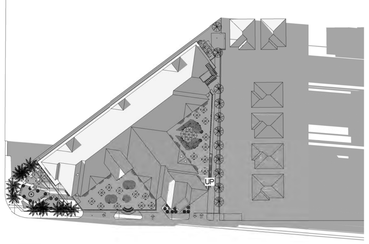
3 **SHADOW SPRING APRIL 10 AM**
SCALE 1" = 80'-0"



6 **SHADOW SPRING APRIL 1 PM**
SCALE 1" = 80'-0"



9 **SHADOW SPRING APRIL 4 PM**
SCALE 1" = 80'-0"



12 **SHADOW SPRING APRIL 7 PM**
SCALE 1" = 80'-0"

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REV. NO.	DESCRIPTION	DATE

CLIENT:
Building Your Future
USS CAL BUILDERS

ADDRESS: 8051 MAIN STREET
STANTON, CA 90680

PHONE: (714)828-4882

PROJECT:
ASSISTED LIVING FACILITY
MIXED-USE

PROPERTY ADDRESS:
12282 BEACH BLVD
STANTON, CA. 90680

SITE SHADOW STUDY SPRING

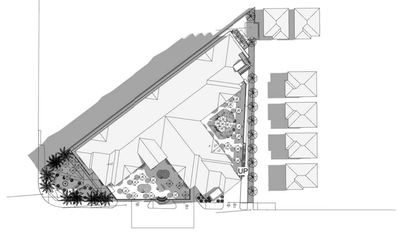
PROJECT NUMBER	0903
DATE	06/15/15
DRAWN BY	Patrick Mobini
CHECK BY	B.KHADIV

G-003

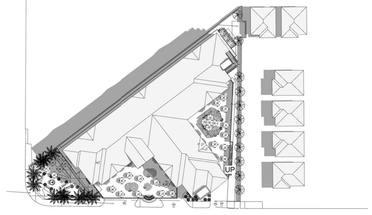
SCALE 1" = 80'-0"

6/17/2015 10:34:19 AM

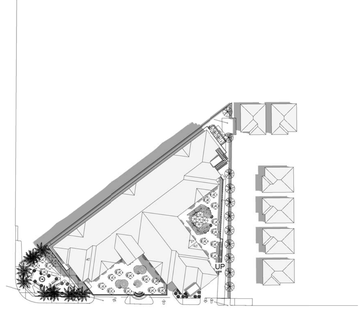
SUMMER



1 **SHADOW SUMMER JULY 8 AM**
SCALE 1" = 80'-0"



2 **SHADOW SUMMER JULY 9 AM**
SCALE 1" = 80'-0"



3 **SHADOW SUMMER JULY10 AM**
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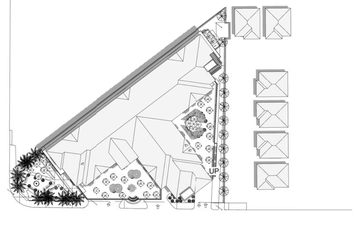
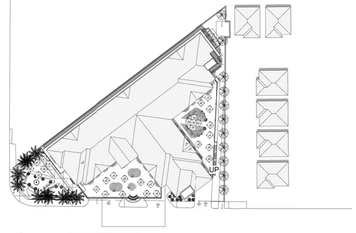
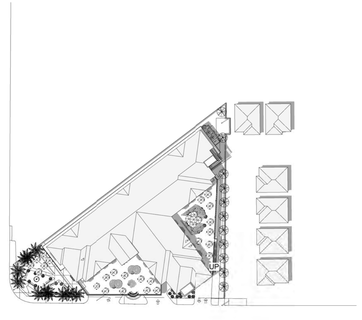


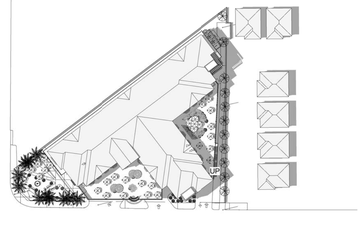
4 **SHADOW SUMMER JULY11 AM**
SCALE 1" = 80'-0"



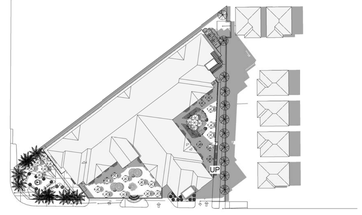
5 **SHADOW SUMMER JULY 12 NOON**
SCALE 1" = 80'-0"



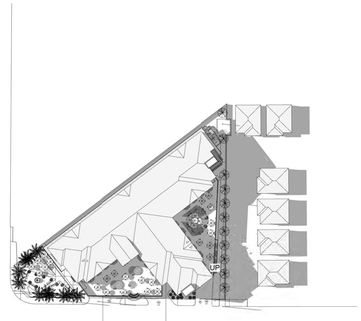
8 **SHADOW SUMMER JULY 1 PM**
SCALE 1" = 80'-0"



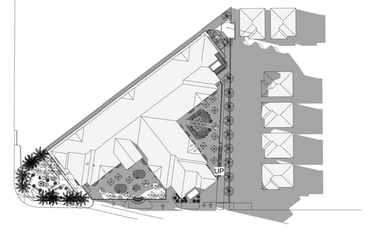
7 **SHADOW SUMMER JULY 2 PM**
SCALE 1" = 80'-0"



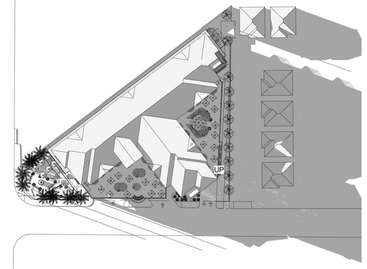
6 **SHADOW SUMMER JULY 3 PM**
SCALE 1" = 80'-0"



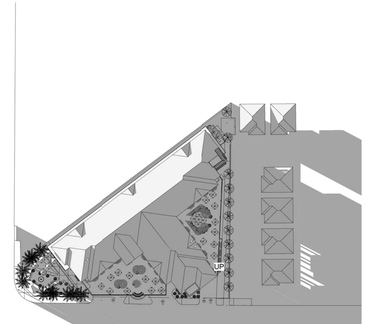
9 **SHADOW SUMMER JULY 4 PM**
SCALE 1" = 80'-0"



10 **SHADOW SUMMER JULY 5 PM**
SCALE 1" = 80'-0"



11 **SHADOW SUMMER JULY 6 PM**
SCALE 1" = 80'-0"



12 **SHADOW SUMMER JULY 7 PM**
SCALE 1" = 80'-0"

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REV. NO.	DESCRIPTION	DATE

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USS CAL BUILDERS

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PHONE: (714)828-4882

PROJECT:

ASSISTED LIVING FACILITY
MIXED-USE

PROPERTY ADDRESS:

12282 BEACH BLVD
STANTON, CA. 90680

SITE SHADOW STUDY SUMMER

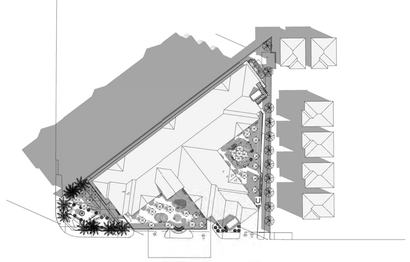
PROJECT NUMBER	0903
DATE	06/15/15
DRAWN BY	Patrick Mobini
CHECK BY	B.KHADIV

G-004

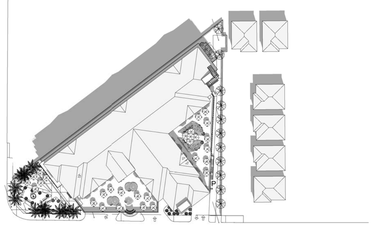
SCALE 1" = 80'-0"

6/17/2015 10:37:07 AM

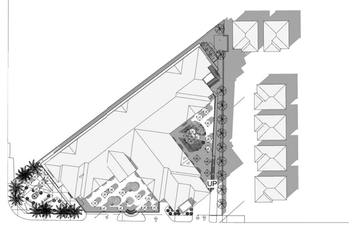
AUTUMN



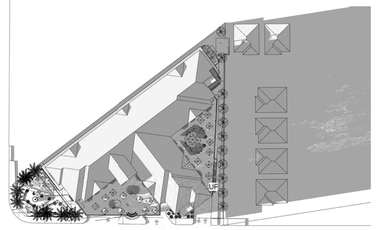
1 **SHADOW AUTUMN OCTOBER 8 AM**
SCALE 1" = 80'-0"



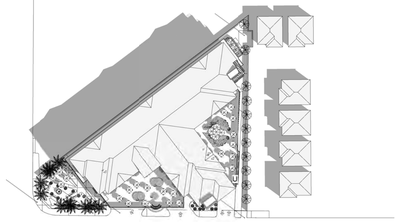
4 **SHADOW AUTUMN OCTOBER 11 AM**
SCALE 1" = 80'-0"



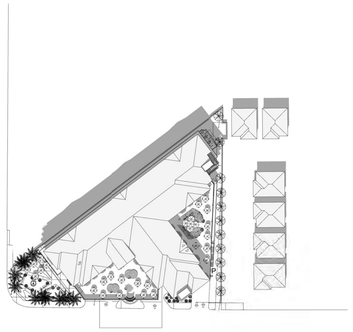
7 **SHADOW AUTUMN OCTOBER 2 PM**
SCALE 1" = 80'-0"



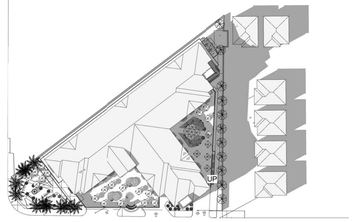
10 **SHADOW AUTUMN OCTOBER 5 PM**
SCALE 1" = 80'-0"



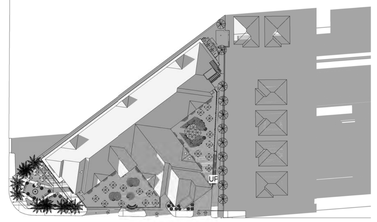
2 **SHADOW AUTUMN OCTOBER 9 AM**
SCALE 1" = 80'-0"



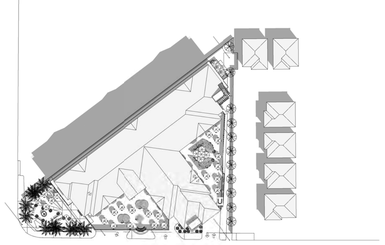
5 **SHADOW AUTUMN OCTOBER 12 NOON**
SCALE 1" = 80'-0"



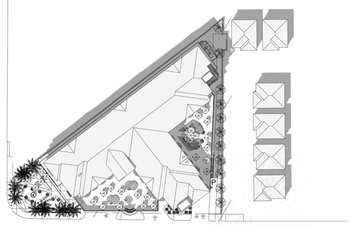
8 **SHADOW AUTUMN OCTOBER 3 PM**
SCALE 1" = 80'-0"



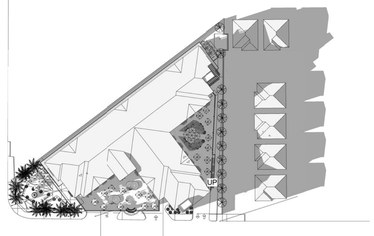
11 **SHADOW AUTUMN OCTOBER 6 PM**
SCALE 1" = 80'-0"



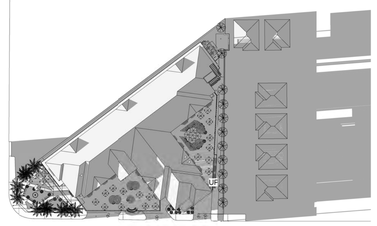
3 **SHADOW AUTUMN OCTOBER 10 AM**
SCALE 1" = 80'-0"



6 **SHADOW AUTUMN OCTOBER 1 PM**
SCALE 1" = 80'-0"



9 **SHADOW AUTUMN OCTOBER 4 PM**
SCALE 1" = 80'-0"



12 **SHADOW AUTUMN OCTOBER 7 PM**
SCALE 1" = 80'-0"

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PROPERTY ADDRESS:
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STANTON, CA. 90680

SITE SHADOW STUDY AUTUMN

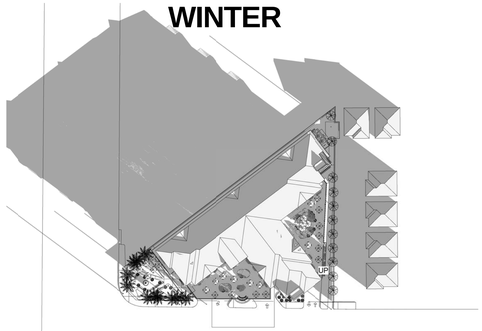
PROJECT NUMBER	0903
DATE	06/15/15
DRAWN BY	Patrick Mobini
CHECK BY	B.KHADIV

G-005

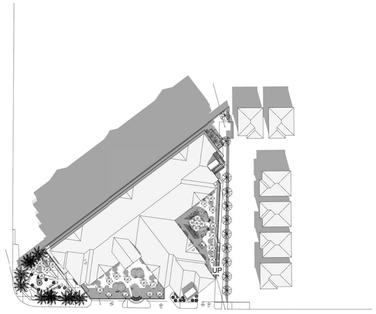
SCALE 1" = 80'-0"

6/17/2015 10:40:04 AM

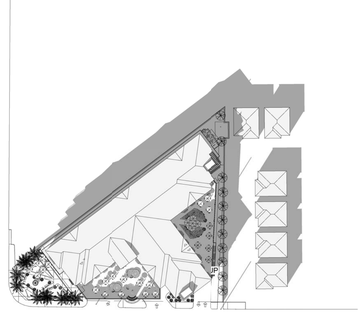
WINTER



1 **SHADOW WINTER JANUARY 8 AM**
SCALE 1" = 80'-0"

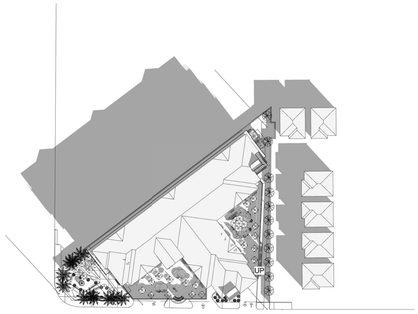


4 **SHADOW WINTER JANUARY 11 AM**
SCALE 1" = 80'-0"

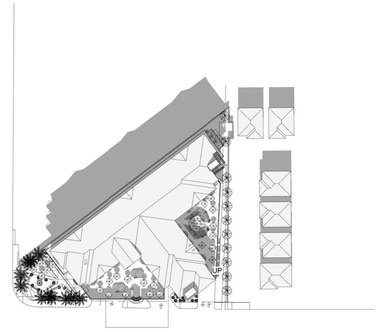


7 **SHADOW WINTER JANUARY 2 PM**
SCALE 1" = 80'-0"

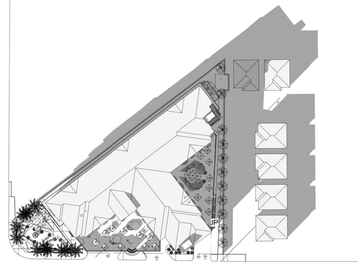
10 **SHADOW WINTER JANUARY 5 PM**
SCALE 1" = 80'-0"



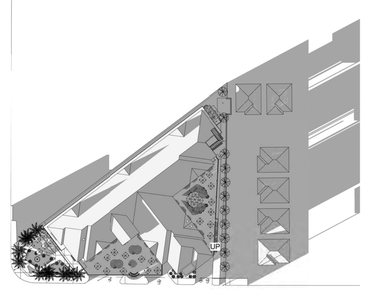
2 **SHADOW WINTER JANUARY 9 AM**
SCALE 1" = 80'-0"



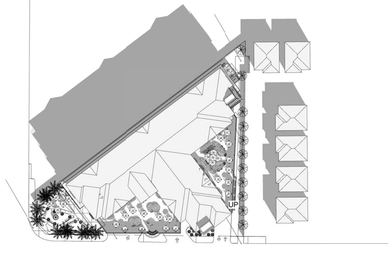
5 **SHADOW WINTER JANUARY 12 N00N**
SCALE 1" = 80'-0"



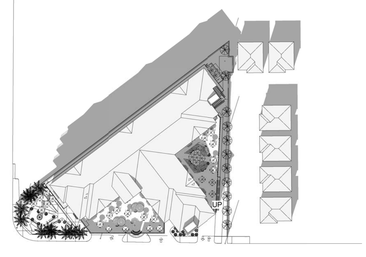
8 **SHADOW WINTER JANUARY 3 PM**
SCALE 1" = 80'-0"



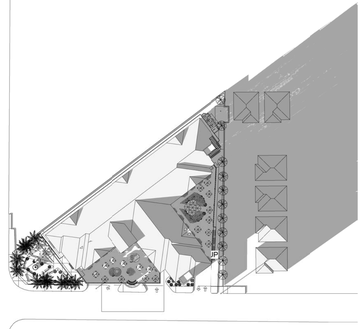
11 **SHADOW WINTER JANUARY 6 PM**
SCALE 1" = 80'-0"



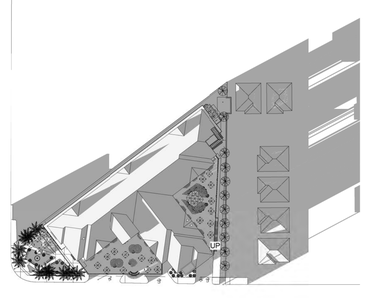
3 **SHADOW WINTER JANUARY 10 AM**
SCALE 1" = 80'-0"



6 **SHADOW WINTER JANUARY 1 PM**
SCALE 1" = 80'-0"



9 **SHADOW WINTER JANUARY 4 PM**
SCALE 1" = 80'-0"



12 **SHADOW WINTER JANUARY 7 PM**
SCALE 1" = 80'-0"

studioπ^2
architecture + design

ADDRESS: 20 TRUMAN SUITE 210
IRVINE, CA 92620

PHONE: (949)608-0245
E-MAIL: manju@studiopi2.com

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CONSULTANT: CIVIL ENGINEER
Sessions Consulting Engineers
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Fullerton, CA. 92831
PHONE: (714) 213-8854
E-MAIL: kerry@sessionsconsulting.com

CONSULTANT: STRUCTURAL ENGINEER
TTG
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CONSULTANT: MECHANICAL ENGINEER
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CONSULTANT: ELECTRICAL ENGINEER
TTG
ADDRESS: 16935 West Bernardo Dr. Suite 100
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CONSULTANT: FIRE CONSULTANT
TTG
ADDRESS: 16935 West Bernardo Dr. Suite 100
San Diego, CA 92127
PHONE: (858) 368-3400
E-MAIL: ayuson@ttgcrop.com

REV. NO.	DESCRIPTION	DATE

CLIENT:
Building Your Future
USS CAL BUILDERS

ADDRESS: 8051 MAIN STREET
STANTON, CA 90680

PHONE: (714)828-4882

PROJECT:
ASSISTED LIVING FACILITY
MIXED-USE

PROPERTY ADDRESS:
12282 BEACH BLVD
STANTON, CA. 90680

SITE SHADOW STUDY WINTER

PROJECT NUMBER	0903
DATE	06/15/15
DRAWN BY	Patrick Mobini
CHECK BY	B.KHADIV

G-006

SCALE 1" = 80'-0"

6/17/2015 10:43:49 AM

Appendix B

Air Quality and Greenhouse Gas Emissions Modeling Results

12282 Beach Boulevard Mixed-Use Project

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Pharmacy/Drugstore w/o Drive Thru	1.47	1000sqft	0.00	1,470.00	0
Unenclosed Parking with Elevator	71.00	Space	0.00	34,072.00	0
High Turnover (Sit Down Restaurant)	4.30	1000sqft	0.00	4,296.00	0
Congregate Care (Assisted Living)	120.00	Dwelling Unit	1.10	78,299.00	120

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The project site is 1.1 acres. The square footages for the uses have been updated as per the project description.

Construction Phase - Construction is anticipated to take approximately one year.

Vehicle Trips - Trip rates are based on the Traffic Study prepared by Kunzman Associates, Inc. May 2014.

Woodstoves - No woodstoves or fireplaces are proposed in any units on the site.

Construction Off-road Equipment Mitigation -

Area Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	45.00
tblConstructionPhase	NumDays	200.00	216.00
tblConstructionPhase	NumDays	4.00	8.00
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	2.00	4.00
tblConstructionPhase	PhaseEndDate	1/17/2017	12/30/2016
tblConstructionPhase	PhaseEndDate	2/3/2017	12/30/2016
tblConstructionPhase	PhaseStartDate	11/16/2016	10/30/2016
tblConstructionPhase	PhaseStartDate	12/31/2016	11/27/2016
tblGrading	AcresOfGrading	3.00	1.50
tblGrading	AcresOfGrading	2.00	1.00
tblLandUse	LandUseSquareFeet	28,400.00	34,072.00
tblLandUse	LandUseSquareFeet	4,300.00	4,296.00
tblLandUse	LandUseSquareFeet	120,000.00	78,299.00
tblLandUse	LotAcreage	0.03	0.00
tblLandUse	LotAcreage	0.64	0.00
tblLandUse	LotAcreage	0.10	0.00
tblLandUse	LotAcreage	7.50	1.10
tblLandUse	Population	343.00	120.00
tblProjectCharacteristics	OperationalYear	2014	2017

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.2201	2.8181	2.6972	4.6800e-003	0.1722	0.1731	0.3453	0.0539	0.1662	0.2201	0.0000	387.4119	387.4119	0.0579	0.0000	388.6285
Total	**1.2201**	**2.8181**	**2.6972**	**4.6800e-003**	**0.1722**	**0.1731**	**0.3453**	**0.0539**	**0.1662**	**0.2201**	**0.0000**	**387.4119**	**387.4119**	**0.0579**	**0.0000**	**388.6285**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.2201	2.8181	2.6972	4.6800e-003	0.1557	0.1731	0.3288	0.0452	0.1662	0.2114	0.0000	387.4116	387.4116	0.0579	0.0000	388.6282
Total	**1.2201**	**2.8181**	**2.6972**	**4.6800e-003**	**0.1557**	**0.1731**	**0.3288**	**0.0452**	**0.1662**	**0.2114**	**0.0000**	**387.4116**	**387.4116**	**0.0579**	**0.0000**	**388.6282**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**9.56**	**0.00**	**4.77**	**16.18**	**0.00**	**3.97**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9357	0.0246	2.0050	1.2600e-003		0.1214	0.1214		0.1214	0.1214	12.7463	26.5174	39.2637	0.0401	8.7000e-004	40.3728
Energy	0.0117	0.1033	0.0670	6.4000e-004		8.0800e-003	8.0800e-003		8.0800e-003	8.0800e-003	0.0000	316.4072	316.4072	0.0114	4.0300e-003	317.8968
Mobile	0.4929	0.9719	4.5828	0.0107	0.7671	0.0124	0.7795	0.2050	0.0114	0.2164	0.0000	816.8867	816.8867	0.0330	0.0000	817.5804
Waste						0.0000	0.0000		0.0000	0.0000	33.5118	0.0000	33.5118	1.9805	0.0000	75.1021
Water						0.0000	0.0000		0.0000	0.0000	2.9274	50.5200	53.4474	0.3030	7.5800e-003	62.1600
Total	**1.4404**	**1.0997**	**6.6547**	**0.0126**	**0.7671**	**0.1418**	**0.9089**	**0.2050**	**0.1408**	**0.3458**	**49.1855**	**1,210.3313**	**1,259.5167**	**2.3680**	**0.0125**	**1,313.1121**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.5427	0.0146	1.2510	7.0000e-005		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	2.0234	2.0234	2.0300e-003	0.0000	2.0661
Energy	0.0117	0.1033	0.0670	6.4000e-004		8.0800e-003	8.0800e-003		8.0800e-003	8.0800e-003	0.0000	316.4072	316.4072	0.0114	4.0300e-003	317.8968
Mobile	0.4929	0.9719	4.5828	0.0107	0.7671	0.0124	0.7795	0.2050	0.0114	0.2164	0.0000	816.8867	816.8867	0.0330	0.0000	817.5804
Waste						0.0000	0.0000		0.0000	0.0000	16.7559	0.0000	16.7559	0.9902	0.0000	37.5510
Water						0.0000	0.0000		0.0000	0.0000	2.9274	50.5200	53.4474	0.3029	7.5700e-003	62.1553
Total	**1.0473**	**1.0898**	**5.9007**	**0.0114**	**0.7671**	**0.0272**	**0.7943**	**0.2050**	**0.0263**	**0.2312**	**19.6833**	**1,185.8373**	**1,205.5206**	**1.3397**	**0.0116**	**1,237.2496**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**27.29**	**0.91**	**11.33**	**9.44**	**0.00**	**80.79**	**12.61**	**0.00**	**81.35**	**33.13**	**59.98**	**2.02**	**4.29**	**43.43**	**7.05**	**5.78**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/6/2016	5	4	
2	Grading	Grading	1/7/2016	1/18/2016	5	8	
3	Building Construction	Building Construction	1/19/2016	11/15/2016	5	216	
4	Architectural Coating	Architectural Coating	10/30/2016	12/30/2016	5	45	
5	Paving	Paving	11/27/2016	12/30/2016	5	25	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 158,555; Residential Outdoor: 52,852; Non-Residential Indoor: 59,757; Non-Residential Outdoor: 19,919 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	103.00	19.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	21.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0111	0.0000	0.0111	5.8500e-003	0.0000	5.8500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.8900e-003	0.0515	0.0330	3.0000e-005		2.8000e-003	2.8000e-003		2.5700e-003	2.5700e-003	0.0000	3.2316	3.2316	9.7000e-004	0.0000	3.2520
Total	**4.8900e-003**	**0.0515**	**0.0330**	**3.0000e-005**	**0.0111**	**2.8000e-003**	**0.0139**	**5.8500e-003**	**2.5700e-003**	**8.4200e-003**	**0.0000**	**3.2316**	**3.2316**	**9.7000e-004**	**0.0000**	**3.2520**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	8.0000e-005	8.4000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1583	0.1583	1.0000e-005	0.0000	0.1585
Total	**5.0000e-005**	**8.0000e-005**	**8.4000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1583**	**0.1583**	**1.0000e-005**	**0.0000**	**0.1585**

3.2 Site Preparation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.9800e-003	0.0000	4.9800e-003	2.6300e-003	0.0000	2.6300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.8900e-003	0.0515	0.0330	3.0000e-005		2.8000e-003	2.8000e-003		2.5700e-003	2.5700e-003	0.0000	3.2316	3.2316	9.7000e-004	0.0000	3.2520
Total	**4.8900e-003**	**0.0515**	**0.0330**	**3.0000e-005**	**4.9800e-003**	**2.8000e-003**	**7.7800e-003**	**2.6300e-003**	**2.5700e-003**	**5.2000e-003**	**0.0000**	**3.2316**	**3.2316**	**9.7000e-004**	**0.0000**	**3.2520**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	8.0000e-005	8.4000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1583	0.1583	1.0000e-005	0.0000	0.1585
Total	**5.0000e-005**	**8.0000e-005**	**8.4000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1583**	**0.1583**	**1.0000e-005**	**0.0000**	**0.1585**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0189	0.0000	0.0189	0.0100	0.0000	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9600e-003	0.0841	0.0547	6.0000e-005		4.5600e-003	4.5600e-003		4.2000e-003	4.2000e-003	0.0000	5.3083	5.3083	1.6000e-003	0.0000	5.3419
Total	**7.9600e-003**	**0.0841**	**0.0547**	**6.0000e-005**	**0.0189**	**4.5600e-003**	**0.0234**	**0.0100**	**4.2000e-003**	**0.0142**	**0.0000**	**5.3083**	**5.3083**	**1.6000e-003**	**0.0000**	**5.3419**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	1.6000e-004	1.6900e-003	0.0000	3.5000e-004	0.0000	3.5000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3166	0.3166	2.0000e-005	0.0000	0.3170
Total	**1.1000e-004**	**1.6000e-004**	**1.6900e-003**	**0.0000**	**3.5000e-004**	**0.0000**	**3.5000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3166**	**0.3166**	**2.0000e-005**	**0.0000**	**0.3170**

3.3 Grading - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.4900e-003	0.0000	8.4900e-003	4.5100e-003	0.0000	4.5100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9600e-003	0.0841	0.0547	6.0000e-005		4.5600e-003	4.5600e-003		4.2000e-003	4.2000e-003	0.0000	5.3083	5.3083	1.6000e-003	0.0000	5.3419
Total	**7.9600e-003**	**0.0841**	**0.0547**	**6.0000e-005**	**8.4900e-003**	**4.5600e-003**	**0.0131**	**4.5100e-003**	**4.2000e-003**	**8.7100e-003**	**0.0000**	**5.3083**	**5.3083**	**1.6000e-003**	**0.0000**	**5.3419**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	1.6000e-004	1.6900e-003	0.0000	3.5000e-004	0.0000	3.5000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3166	0.3166	2.0000e-005	0.0000	0.3170
Total	**1.1000e-004**	**1.6000e-004**	**1.6900e-003**	**0.0000**	**3.5000e-004**	**0.0000**	**3.5000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3166**	**0.3166**	**2.0000e-005**	**0.0000**	**0.3170**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3555	2.2190	1.5884	2.3700e-003		0.1475	0.1475		0.1423	0.1423	0.0000	200.5512	200.5512	0.0441	0.0000	201.4769
Total	**0.3555**	**2.2190**	**1.5884**	**2.3700e-003**		**0.1475**	**0.1475**		**0.1423**	**0.1423**	**0.0000**	**200.5512**	**200.5512**	**0.0441**	**0.0000**	**201.4769**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0192	0.1853	0.2419	4.4000e-004	0.0126	2.8300e-003	0.0155	3.6000e-003	2.6000e-003	6.2000e-003	0.0000	40.2263	40.2263	2.9000e-004	0.0000	40.2324
Worker	0.0380	0.0563	0.5871	1.4500e-003	0.1221	8.7000e-004	0.1230	0.0324	8.0000e-004	0.0332	0.0000	110.0735	110.0735	5.3800e-003	0.0000	110.1866
Total	**0.0572**	**0.2416**	**0.8291**	**1.8900e-003**	**0.1348**	**3.7000e-003**	**0.1385**	**0.0360**	**3.4000e-003**	**0.0394**	**0.0000**	**150.2998**	**150.2998**	**5.6700e-003**	**0.0000**	**150.4190**

3.4 Building Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3555	2.2190	1.5884	2.3700e-003		0.1475	0.1475		0.1423	0.1423	0.0000	200.5510	200.5510	0.0441	0.0000	201.4767
Total	**0.3555**	**2.2190**	**1.5884**	**2.3700e-003**		**0.1475**	**0.1475**		**0.1423**	**0.1423**	**0.0000**	**200.5510**	**200.5510**	**0.0441**	**0.0000**	**201.4767**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0192	0.1853	0.2419	4.4000e-004	0.0126	2.8300e-003	0.0155	3.6000e-003	2.6000e-003	6.2000e-003	0.0000	40.2263	40.2263	2.9000e-004	0.0000	40.2324
Worker	0.0380	0.0563	0.5871	1.4500e-003	0.1221	8.7000e-004	0.1230	0.0324	8.0000e-004	0.0332	0.0000	110.0735	110.0735	5.3800e-003	0.0000	110.1866
Total	**0.0572**	**0.2416**	**0.8291**	**1.8900e-003**	**0.1348**	**3.7000e-003**	**0.1385**	**0.0360**	**3.4000e-003**	**0.0394**	**0.0000**	**150.2998**	**150.2998**	**5.6700e-003**	**0.0000**	**150.4190**

3.5 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7678					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.2900e-003	0.0534	0.0424	7.0000e-005		4.4200e-003	4.4200e-003		4.4200e-003	4.4200e-003	0.0000	5.7448	5.7448	6.8000e-004	0.0000	5.7590
Total	**0.7761**	**0.0534**	**0.0424**	**7.0000e-005**		**4.4200e-003**	**4.4200e-003**		**4.4200e-003**	**4.4200e-003**	**0.0000**	**5.7448**	**5.7448**	**6.8000e-004**	**0.0000**	**5.7590**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6100e-003	2.3900e-003	0.0249	6.0000e-005	5.1900e-003	4.0000e-005	5.2200e-003	1.3800e-003	3.0000e-005	1.4100e-003	0.0000	4.6755	4.6755	2.3000e-004	0.0000	4.6803
Total	**1.6100e-003**	**2.3900e-003**	**0.0249**	**6.0000e-005**	**5.1900e-003**	**4.0000e-005**	**5.2200e-003**	**1.3800e-003**	**3.0000e-005**	**1.4100e-003**	**0.0000**	**4.6755**	**4.6755**	**2.3000e-004**	**0.0000**	**4.6803**

3.5 Architectural Coating - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7678					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.2900e-003	0.0534	0.0424	7.0000e-005		4.4200e-003	4.4200e-003		4.4200e-003	4.4200e-003	0.0000	5.7448	5.7448	6.8000e-004	0.0000	5.7590
Total	**0.7761**	**0.0534**	**0.0424**	**7.0000e-005**		**4.4200e-003**	**4.4200e-003**		**4.4200e-003**	**4.4200e-003**	**0.0000**	**5.7448**	**5.7448**	**6.8000e-004**	**0.0000**	**5.7590**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6100e-003	2.3900e-003	0.0249	6.0000e-005	5.1900e-003	4.0000e-005	5.2200e-003	1.3800e-003	3.0000e-005	1.4100e-003	0.0000	4.6755	4.6755	2.3000e-004	0.0000	4.6803
Total	**1.6100e-003**	**2.3900e-003**	**0.0249**	**6.0000e-005**	**5.1900e-003**	**4.0000e-005**	**5.2200e-003**	**1.3800e-003**	**3.0000e-005**	**1.4100e-003**	**0.0000**	**4.6755**	**4.6755**	**2.3000e-004**	**0.0000**	**4.6803**

3.6 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0161	0.1651	0.1136	1.7000e-004		0.0101	0.0101		9.3000e-003	9.3000e-003	0.0000	15.5178	15.5178	4.6000e-003	0.0000	15.6143
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0161**	**0.1651**	**0.1136**	**1.7000e-004**		**0.0101**	**0.0101**		**9.3000e-003**	**9.3000e-003**	**0.0000**	**15.5178**	**15.5178**	**4.6000e-003**	**0.0000**	**15.6143**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	8.2000e-004	8.5800e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.8000e-003	4.7000e-004	1.0000e-005	4.9000e-004	0.0000	1.6080	1.6080	8.0000e-005	0.0000	1.6096
Total	**5.6000e-004**	**8.2000e-004**	**8.5800e-003**	**2.0000e-005**	**1.7800e-003**	**1.0000e-005**	**1.8000e-003**	**4.7000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.6080**	**1.6080**	**8.0000e-005**	**0.0000**	**1.6096**

3.6 Paving - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0161	0.1651	0.1136	1.7000e-004		0.0101	0.0101		9.3000e-003	9.3000e-003	0.0000	15.5178	15.5178	4.6000e-003	0.0000	15.6143
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0161**	**0.1651**	**0.1136**	**1.7000e-004**		**0.0101**	**0.0101**		**9.3000e-003**	**9.3000e-003**	**0.0000**	**15.5178**	**15.5178**	**4.6000e-003**	**0.0000**	**15.6143**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	8.2000e-004	8.5800e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.8000e-003	4.7000e-004	1.0000e-005	4.9000e-004	0.0000	1.6080	1.6080	8.0000e-005	0.0000	1.6096
Total	**5.6000e-004**	**8.2000e-004**	**8.5800e-003**	**2.0000e-005**	**1.7800e-003**	**1.0000e-005**	**1.8000e-003**	**4.7000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.6080**	**1.6080**	**8.0000e-005**	**0.0000**	**1.6096**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4929	0.9719	4.5828	0.0107	0.7671	0.0124	0.7795	0.2050	0.0114	0.2164	0.0000	816.8867	816.8867	0.0330	0.0000	817.5804
Unmitigated	0.4929	0.9719	4.5828	0.0107	0.7671	0.0124	0.7795	0.2050	0.0114	0.2164	0.0000	816.8867	816.8867	0.0330	0.0000	817.5804

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Congregate Care (Assisted Living)	328.80	264.00	292.80	1,074,353	1,074,353
High Turnover (Sit Down Restaurant)	546.75	680.99	566.91	775,183	775,183
Pharmacy/Drugstore w/o Drive Thru	132.39	132.39	132.39	181,180	181,180
Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	1,007.93	1,077.38	992.10	2,030,716	2,030,716

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Congregate Care (Assisted	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Pharmacy/Drugstore w/o Drive	16.60	8.40	6.90	7.40	73.60	19.00	41	6	53
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	200.6950	200.6950	9.2300e-003	1.9100e-003	201.4804
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	200.6950	200.6950	9.2300e-003	1.9100e-003	201.4804
NaturalGas Mitigated	0.0117	0.1033	0.0670	6.4000e-004		8.0800e-003	8.0800e-003		8.0800e-003	8.0800e-003	0.0000	115.7122	115.7122	2.2200e-003	2.1200e-003	116.4164
NaturalGas Unmitigated	0.0117	0.1033	0.0670	6.4000e-004		8.0800e-003	8.0800e-003		8.0800e-003	8.0800e-003	0.0000	115.7122	115.7122	2.2200e-003	2.1200e-003	116.4164

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Congregate Care (Assisted Living)	1.03366e+006	5.5700e-003	0.0476	0.0203	3.0000e-004		3.8500e-003	3.8500e-003		3.8500e-003	3.8500e-003	0.0000	55.1598	55.1598	1.0600e-003	1.0100e-003	55.4955
High Turnover (Sit Down Restaurant)	1.1317e+006	6.1000e-003	0.0555	0.0466	3.3000e-004		4.2200e-003	4.2200e-003		4.2200e-003	4.2200e-003	0.0000	60.3916	60.3916	1.1600e-003	1.1100e-003	60.7591
Pharmacy/Drugstore w/o Drive Thru	3013.5	2.0000e-005	1.5000e-004	1.2000e-004	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.1608	0.1608	0.0000	0.0000	0.1618
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0117**	**0.1033**	**0.0670**	**6.3000e-004**		**8.0800e-003**	**8.0800e-003**		**8.0800e-003**	**8.0800e-003**	**0.0000**	**115.7122**	**115.7122**	**2.2200e-003**	**2.1200e-003**	**116.4164**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	1.1317e+006	6.1000e-003	0.0555	0.0466	3.3000e-004		4.2200e-003	4.2200e-003		4.2200e-003	4.2200e-003	0.0000	60.3916	60.3916	1.1600e-003	1.1100e-003	60.7591
Pharmacy/Drugstore w/o Drive Thru	3013.5	2.0000e-005	1.5000e-004	1.2000e-004	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.1608	0.1608	0.0000	0.0000	0.1618
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Congregate Care (Assisted Living)	1.03366e+006	5.5700e-003	0.0476	0.0203	3.0000e-004		3.8500e-003	3.8500e-003		3.8500e-003	3.8500e-003	0.0000	55.1598	55.1598	1.0600e-003	1.0100e-003	55.4955
Total		**0.0117**	**0.1033**	**0.0670**	**6.3000e-004**		**8.0800e-003**	**8.0800e-003**		**8.0800e-003**	**8.0800e-003**	**0.0000**	**115.7122**	**115.7122**	**2.2200e-003**	**2.1200e-003**	**116.4164**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Congregate Care (Assisted Living)	417461	119.4635	5.4900e-003	1.1400e-003	119.9310
High Turnover (Sit Down Restaurant)	168962	48.3512	2.2200e-003	4.6000e-004	48.5405
Pharmacy/Drugstore w/o Drive Thru	18816	5.3845	2.5000e-004	5.0000e-005	5.4056
Unenclosed Parking with Elevator	96083	27.4958	1.2600e-003	2.6000e-004	27.6034
Total		**200.6950**	**9.2200e-003**	**1.9100e-003**	**201.4804**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Congregate Care (Assisted Living)	417461	119.4635	5.4900e-003	1.1400e-003	119.9310
High Turnover (Sit Down Restaurant)	168962	48.3512	2.2200e-003	4.6000e-004	48.5405
Pharmacy/Drugstore w/o Drive Thru	18816	5.3845	2.5000e-004	5.0000e-005	5.4056
Unenclosed Parking with Elevator	96083	27.4958	1.2600e-003	2.6000e-004	27.6034
Total		**200.6950**	**9.2200e-003**	**1.9100e-003**	**201.4804**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5427	0.0146	1.2510	7.0000e-005		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	2.0234	2.0234	2.0300e-003	0.0000	2.0661
Unmitigated	0.9357	0.0246	2.0050	1.2600e-003		0.1214	0.1214		0.1214	0.1214	12.7463	26.5174	39.2637	0.0401	8.7000e-004	40.3728

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0768					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4269					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.3931	9.9700e-003	0.7540	1.2000e-003		0.1146	0.1146		0.1146	0.1146	12.7463	24.4940	37.2403	0.0380	8.7000e-004	38.3067
Landscaping	0.0390	0.0146	1.2510	7.0000e-005		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	2.0234	2.0234	2.0300e-003	0.0000	2.0661
Total	**0.9357**	**0.0246**	**2.0049**	**1.2700e-003**		**0.1214**	**0.1214**		**0.1214**	**0.1214**	**12.7463**	**26.5174**	**39.2637**	**0.0400**	**8.7000e-004**	**40.3728**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0768					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4269					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0390	0.0146	1.2510	7.0000e-005		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	2.0234	2.0234	2.0300e-003	0.0000	2.0661
Total	**0.5427**	**0.0146**	**1.2510**	**7.0000e-005**		**6.7900e-003**	**6.7900e-003**		**6.7900e-003**	**6.7900e-003**	**0.0000**	**2.0234**	**2.0234**	**2.0300e-003**	**0.0000**	**2.0661**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	53.4474	0.3029	7.5700e-003	62.1553
Unmitigated	53.4474	0.3030	7.5800e-003	62.1600

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Congregate Care (Assisted Living)	7.81848 / 4.92904	47.2845	0.2568	6.4400e-003	54.6747
High Turnover (Sit Down Restaurant)	1.30519 / 0.0833103	5.5423	0.0428	1.0500e-003	6.7668
Pharmacy/Drugstore w/o Drive Thru	0.103558 / 0.0634709	0.6205	3.4000e-003	9.0000e-005	0.7184
Unenclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**53.4474**	**0.3030**	**7.5800e-003**	**62.1600**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Congregate Care (Assisted Living)	7.81848 / 4.92904	47.2845	0.2568	6.4300e-003	54.6708
High Turnover (Sit Down Restaurant)	1.30519 / 0.0833103	5.5423	0.0428	1.0500e-003	6.7662
Pharmacy/Drugstore w/o Drive Thru	0.103558 / 0.0634709	0.6205	3.4000e-003	9.0000e-005	0.7183
Unenclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**53.4474**	**0.3029**	**7.5700e-003**	**62.1553**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	16.7559	0.9902	0.0000	37.5510
Unmitigated	33.5118	1.9805	0.0000	75.1021

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Congregate Care (Assisted Living)	109.5	22.2275	1.3136	0.0000	49.8133
High Turnover (Sit Down Restaurant)	51.17	10.3871	0.6139	0.0000	23.2780
Pharmacy/Drugstore w/o Drive Thru	4.42	0.8972	0.0530	0.0000	2.0107
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Total		**33.5118**	**1.9805**	**0.0000**	**75.1021**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Congregate Care (Assisted Living)	54.75	11.1138	0.6568	0.0000	24.9066
High Turnover (Sit Down Restaurant)	25.585	5.1935	0.3069	0.0000	11.6390
Pharmacy/Drugstore w/o Drive Thru	2.21	0.4486	0.0265	0.0000	1.0054
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Total		**16.7559**	**0.9902**	**0.0000**	**37.5510**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

12282 Beach Boulevard Mixed-Use Project

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Pharmacy/Drugstore w/o Drive Thru	1.47	1000sqft	0.00	1,470.00	0
Unenclosed Parking with Elevator	71.00	Space	0.00	34,072.00	0
High Turnover (Sit Down Restaurant)	4.30	1000sqft	0.00	4,296.00	0
Congregate Care (Assisted Living)	120.00	Dwelling Unit	1.10	78,299.00	120

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The project site is 1.1 acres. The square footages for the uses have been updated as per the project description.

Construction Phase - Construction is anticipated to take approximately one year.

Vehicle Trips - Trip rates are based on the Traffic Study prepared by Kunzman Associates, Inc. May 2014.

Woodstoves - No woodstoves or fireplaces are proposed in any units on the site.

Construction Off-road Equipment Mitigation -

Area Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	45.00
tblConstructionPhase	NumDays	200.00	216.00
tblConstructionPhase	NumDays	4.00	8.00
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	2.00	4.00
tblConstructionPhase	PhaseEndDate	1/17/2017	12/30/2016
tblConstructionPhase	PhaseEndDate	2/3/2017	12/30/2016
tblConstructionPhase	PhaseStartDate	11/16/2016	10/30/2016
tblConstructionPhase	PhaseStartDate	12/31/2016	11/27/2016
tblGrading	AcresOfGrading	3.00	1.50
tblGrading	AcresOfGrading	2.00	1.00
tblLandUse	LandUseSquareFeet	28,400.00	34,072.00
tblLandUse	LandUseSquareFeet	4,300.00	4,296.00
tblLandUse	LandUseSquareFeet	120,000.00	78,299.00
tblLandUse	LotAcreage	0.03	0.00
tblLandUse	LotAcreage	0.64	0.00
tblLandUse	LotAcreage	0.10	0.00
tblLandUse	LotAcreage	7.50	1.10
tblLandUse	Population	343.00	120.00
tblProjectCharacteristics	OperationalYear	2014	2017

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	38.3822	25.8077	25.3406	0.0459	5.6239	1.5980	7.0230	2.9488	1.5470	4.2360	0.0000	4,147.3290	4,147.3290	0.5522	0.0000	4,158.9247
Total	**38.3822**	**25.8077**	**25.3406**	**0.0459**	**5.6239**	**1.5980**	**7.0230**	**2.9488**	**1.5470**	**4.2360**	**0.0000**	**4,147.3290**	**4,147.3290**	**0.5522**	**0.0000**	**4,158.9247**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	38.3822	25.8077	25.3406	0.0459	2.5799	1.5980	3.9790	1.3400	1.5470	2.6272	0.0000	4,147.3290	4,147.3290	0.5522	0.0000	4,158.9247
Total	**38.3822**	**25.8077**	**25.3406**	**0.0459**	**2.5799**	**1.5980**	**3.9790**	**1.3400**	**1.5470**	**2.6272**	**0.0000**	**4,147.3290**	**4,147.3290**	**0.5522**	**0.0000**	**4,158.9247**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.13**	**0.00**	**43.34**	**54.56**	**0.00**	**37.98**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	34.5163	0.9144	70.3249	0.0965		9.2209	9.2209		9.2195	9.2195	1,124.0302	2,177.8431	3,301.8733	3.3700	0.0763	3,396.2939
Energy	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623
Mobile	3.0303	5.5062	27.2466	0.0669	4.7175	0.0748	4.7923	1.2587	0.0689	1.3276		5,628.0008	5,628.0008	0.2208		5,632.6380
Total	**37.6106**	**6.9864**	**97.9385**	**0.1669**	**4.7175**	**9.3400**	**14.0575**	**1.2587**	**9.3327**	**10.5914**	**1,124.0302**	**8,504.7527**	**9,628.7829**	**3.6042**	**0.0891**	**9,732.0942**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.0720	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543	0.0000	17.8431	17.8431	0.0179	0.0000	18.2198
Energy	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623
Mobile	3.0303	5.5062	27.2466	0.0669	4.7175	0.0748	4.7923	1.2587	0.0689	1.3276		5,628.0008	5,628.0008	0.2208		5,632.6380
Total	**6.1663**	**6.1886**	**37.6215**	**0.0709**	**4.7175**	**0.1734**	**4.8909**	**1.2587**	**0.1675**	**1.4262**	**0.0000**	**6,344.7527**	**6,344.7527**	**0.2522**	**0.0128**	**6,354.0201**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**83.60**	**11.42**	**61.59**	**57.50**	**0.00**	**98.14**	**65.21**	**0.00**	**98.21**	**86.53**	**100.00**	**25.40**	**34.11**	**93.00**	**85.62**	**34.71**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/6/2016	5	4	
2	Grading	Grading	1/7/2016	1/18/2016	5	8	
3	Building Construction	Building Construction	1/19/2016	11/15/2016	5	216	
4	Architectural Coating	Architectural Coating	10/30/2016	12/30/2016	5	45	
5	Paving	Paving	11/27/2016	12/30/2016	5	25	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 158,555; Residential Outdoor: 52,852; Non-Residential Indoor: 59,757; Non-Residential Outdoor: 19,919 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	103.00	19.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	21.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5345	0.0000	5.5345	2.9251	0.0000	2.9251			0.0000			0.0000
Off-Road	2.4428	25.7718	16.5144	0.0171		1.3985	1.3985		1.2866	1.2866		1,781.0872	1,781.0872	0.5372		1,792.3693
Total	**2.4428**	**25.7718**	**16.5144**	**0.0171**	**5.5345**	**1.3985**	**6.9329**	**2.9251**	**1.2866**	**4.2117**		**1,781.0872**	**1,781.0872**	**0.5372**		**1,792.3693**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0359	0.4392	1.0900e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		90.7681	90.7681	4.2700e-003		90.8578
Total	**0.0278**	**0.0359**	**0.4392**	**1.0900e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**90.7681**	**90.7681**	**4.2700e-003**		**90.8578**

3.2 Site Preparation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4905	0.0000	2.4905	1.3163	0.0000	1.3163			0.0000			0.0000
Off-Road	2.4428	25.7718	16.5144	0.0171		1.3985	1.3985		1.2866	1.2866	0.0000	1,781.0872	1,781.0872	0.5372		1,792.3693
Total	**2.4428**	**25.7718**	**16.5144**	**0.0171**	**2.4905**	**1.3985**	**3.8890**	**1.3163**	**1.2866**	**2.6029**	**0.0000**	**1,781.0872**	**1,781.0872**	**0.5372**		**1,792.3693**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0359	0.4392	1.0900e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		90.7681	90.7681	4.2700e-003		90.8578
Total	**0.0278**	**0.0359**	**0.4392**	**1.0900e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**90.7681**	**90.7681**	**4.2700e-003**		**90.8578**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.7154	0.0000	4.7154	2.5041	0.0000	2.5041			0.0000			0.0000
Off-Road	1.9908	21.0361	13.6704	0.0141		1.1407	1.1407		1.0494	1.0494		1,462.8468	1,462.8468	0.4413		1,472.1130
Total	**1.9908**	**21.0361**	**13.6704**	**0.0141**	**4.7154**	**1.1407**	**5.8561**	**2.5041**	**1.0494**	**3.5536**		**1,462.8468**	**1,462.8468**	**0.4413**		**1,472.1130**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0359	0.4392	1.0900e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		90.7681	90.7681	4.2700e-003		90.8578
Total	**0.0278**	**0.0359**	**0.4392**	**1.0900e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**90.7681**	**90.7681**	**4.2700e-003**		**90.8578**

3.3 Grading - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.1219	0.0000	2.1219	1.1269	0.0000	1.1269			0.0000			0.0000
Off-Road	1.9908	21.0361	13.6704	0.0141		1.1407	1.1407		1.0494	1.0494	0.0000	1,462.8468	1,462.8468	0.4413		1,472.1130
Total	**1.9908**	**21.0361**	**13.6704**	**0.0141**	**2.1219**	**1.1407**	**3.2626**	**1.1269**	**1.0494**	**2.1763**	**0.0000**	**1,462.8468**	**1,462.8468**	**0.4413**		**1,472.1130**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0359	0.4392	1.0900e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		90.7681	90.7681	4.2700e-003		90.8578
Total	**0.0278**	**0.0359**	**0.4392**	**1.0900e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**90.7681**	**90.7681**	**4.2700e-003**		**90.8578**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2915	20.5459	14.7074	0.0220		1.3656	1.3656		1.3176	1.3176		2,046.9432	2,046.9432	0.4499		2,056.3913
Total	**3.2915**	**20.5459**	**14.7074**	**0.0220**		**1.3656**	**1.3656**		**1.3176**	**1.3176**		**2,046.9432**	**2,046.9432**	**0.4499**		**2,056.3913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1661	1.6435	1.9420	4.1100e-003	0.1187	0.0260	0.1448	0.0338	0.0240	0.0578		412.0319	412.0319	2.9300e-003		412.0933
Worker	0.3573	0.4617	5.6545	0.0140	1.1513	8.0400e-003	1.1593	0.3053	7.4100e-003	0.3127		1,168.6396	1,168.6396	0.0550		1,169.7937
Total	**0.5234**	**2.1052**	**7.5965**	**0.0181**	**1.2700**	**0.0341**	**1.3041**	**0.3391**	**0.0314**	**0.3705**		**1,580.6714**	**1,580.6714**	**0.0579**		**1,581.8870**

3.4 Building Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2915	20.5459	14.7074	0.0220		1.3656	1.3656		1.3176	1.3176	0.0000	2,046.9432	2,046.9432	0.4499		2,056.3913
Total	**3.2915**	**20.5459**	**14.7074**	**0.0220**		**1.3656**	**1.3656**		**1.3176**	**1.3176**	**0.0000**	**2,046.9432**	**2,046.9432**	**0.4499**		**2,056.3913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1661	1.6435	1.9420	4.1100e-003	0.1187	0.0260	0.1448	0.0338	0.0240	0.0578		412.0319	412.0319	2.9300e-003		412.0933
Worker	0.3573	0.4617	5.6545	0.0140	1.1513	8.0400e-003	1.1593	0.3053	7.4100e-003	0.3127		1,168.6396	1,168.6396	0.0550		1,169.7937
Total	**0.5234**	**2.1052**	**7.5965**	**0.0181**	**1.2700**	**0.0341**	**1.3041**	**0.3391**	**0.0314**	**0.3705**		**1,580.6714**	**1,580.6714**	**0.0579**		**1,581.8870**

3.5 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	34.1259					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**34.4944**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0729	0.0941	1.1529	2.8500e-003	0.2347	1.6400e-003	0.2364	0.0623	1.5100e-003	0.0638		238.2663	238.2663	0.0112		238.5016
Total	**0.0729**	**0.0941**	**1.1529**	**2.8500e-003**	**0.2347**	**1.6400e-003**	**0.2364**	**0.0623**	**1.5100e-003**	**0.0638**		**238.2663**	**238.2663**	**0.0112**		**238.5016**

3.5 Architectural Coating - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	34.1259					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**34.4944**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0729	0.0941	1.1529	2.8500e-003	0.2347	1.6400e-003	0.2364	0.0623	1.5100e-003	0.0638		238.2663	238.2663	0.0112		238.5016
Total	**0.0729**	**0.0941**	**1.1529**	**2.8500e-003**	**0.2347**	**1.6400e-003**	**0.2364**	**0.0623**	**1.5100e-003**	**0.0638**		**238.2663**	**238.2663**	**0.0112**		**238.5016**

3.6 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2872	13.2076	9.0880	0.0133		0.8075	0.8075		0.7438	0.7438		1,368.4366	1,368.4366	0.4053		1,376.9473
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2872**	**13.2076**	**9.0880**	**0.0133**		**0.8075**	**0.8075**		**0.7438**	**0.7438**		**1,368.4366**	**1,368.4366**	**0.4053**		**1,376.9473**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0451	0.0583	0.7137	1.7600e-003	0.1453	1.0200e-003	0.1463	0.0385	9.4000e-004	0.0395		147.4982	147.4982	6.9400e-003		147.6439
Total	**0.0451**	**0.0583**	**0.7137**	**1.7600e-003**	**0.1453**	**1.0200e-003**	**0.1463**	**0.0385**	**9.4000e-004**	**0.0395**		**147.4982**	**147.4982**	**6.9400e-003**		**147.6439**

3.6 Paving - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2872	13.2076	9.0880	0.0133		0.8075	0.8075		0.7438	0.7438	0.0000	1,368.4366	1,368.4366	0.4053		1,376.9473
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2872**	**13.2076**	**9.0880**	**0.0133**		**0.8075**	**0.8075**		**0.7438**	**0.7438**	**0.0000**	**1,368.4366**	**1,368.4366**	**0.4053**		**1,376.9473**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0451	0.0583	0.7137	1.7600e-003	0.1453	1.0200e-003	0.1463	0.0385	9.4000e-004	0.0395		147.4982	147.4982	6.9400e-003		147.6439
Total	**0.0451**	**0.0583**	**0.7137**	**1.7600e-003**	**0.1453**	**1.0200e-003**	**0.1463**	**0.0385**	**9.4000e-004**	**0.0395**		**147.4982**	**147.4982**	**6.9400e-003**		**147.6439**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.0303	5.5062	27.2466	0.0669	4.7175	0.0748	4.7923	1.2587	0.0689	1.3276		5,628.0008	5,628.0008	0.2208		5,632.6380
Unmitigated	3.0303	5.5062	27.2466	0.0669	4.7175	0.0748	4.7923	1.2587	0.0689	1.3276		5,628.0008	5,628.0008	0.2208		5,632.6380

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Congregate Care (Assisted Living)	328.80	264.00	292.80	1,074,353	1,074,353
High Turnover (Sit Down Restaurant)	546.75	680.99	566.91	775,183	775,183
Pharmacy/Drugstore w/o Drive Thru	132.39	132.39	132.39	181,180	181,180
Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	1,007.93	1,077.38	992.10	2,030,716	2,030,716

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Congregate Care (Assisted	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Pharmacy/Drugstore w/o Drive	16.60	8.40	6.90	7.40	73.60	19.00	41	6	53
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623
NaturalGas Unmitigated	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Congregate Care (Assisted Living)	2831.93	0.0305	0.2610	0.1111	1.6700e-003		0.0211	0.0211		0.0211	0.0211		333.1687	333.1687	6.3900e-003	6.1100e-003	335.1963
High Turnover (Sit Down Restaurant)	3100.54	0.0334	0.3040	0.2553	1.8200e-003		0.0231	0.0231		0.0231	0.0231		364.7688	364.7688	6.9900e-003	6.6900e-003	366.9888
Pharmacy/Drugstore w/o Drive Thru	8.25616	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.9713	0.9713	2.0000e-005	2.0000e-005	0.9772
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0641**	**0.5658**	**0.3671**	**3.4900e-003**		**0.0443**	**0.0443**		**0.0443**	**0.0443**		**698.9089**	**698.9089**	**0.0134**	**0.0128**	**703.1623**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
High Turnover (Sit Down Restaurant)	3.10054	0.0334	0.3040	0.2553	1.8200e-003		0.0231	0.0231		0.0231	0.0231		364.7688	364.7688	6.9900e-003	6.6900e-003	366.9888
Pharmacy/Drugstore w/o Drive Thru	0.00825616	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.9713	0.9713	2.0000e-005	2.0000e-005	0.9772
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Congregate Care (Assisted Living)	2.83193	0.0305	0.2610	0.1111	1.6700e-003		0.0211	0.0211		0.0211	0.0211		333.1687	333.1687	6.3900e-003	6.1100e-003	335.1963
Total		**0.0641**	**0.5658**	**0.3671**	**3.4900e-003**		**0.0443**	**0.0443**		**0.0443**	**0.0443**		**698.9089**	**698.9089**	**0.0134**	**0.0128**	**703.1623**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.0720	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543	0.0000	17.8431	17.8431	0.0179	0.0000	18.2198
Unmitigated	34.5163	0.9144	70.3249	0.0965		9.2209	9.2209		9.2195	9.2195	1,124.0302	2,177.8431	3,301.8733	3.3700	0.0763	3,396.2939

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4207					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.3391					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	31.4443	0.7978	60.3170	0.0960		9.1666	9.1666		9.1652	9.1652	1,124.0302	2,160.0000	3,284.0302	3.3521	0.0763	3,378.0741
Landscaping	0.3121	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543		17.8431	17.8431	0.0179		18.2198
Total	**34.5163**	**0.9145**	**70.3249**	**0.0965**		**9.2209**	**9.2209**		**9.2195**	**9.2195**	**1,124.0302**	**2,177.8431**	**3,301.8733**	**3.3700**	**0.0763**	**3,396.2939**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4207					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.3391					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.3121	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543		17.8431	17.8431	0.0179		18.2198
Total	**3.0720**	**0.1166**	**10.0079**	**5.2000e-004**		**0.0543**	**0.0543**		**0.0543**	**0.0543**	**0.0000**	**17.8431**	**17.8431**	**0.0179**	**0.0000**	**18.2198**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

12282 Beach Boulevard Mixed-Use Project

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Pharmacy/Drugstore w/o Drive Thru	1.47	1000sqft	0.00	1,470.00	0
Unenclosed Parking with Elevator	71.00	Space	0.00	34,072.00	0
High Turnover (Sit Down Restaurant)	4.30	1000sqft	0.00	4,296.00	0
Congregate Care (Assisted Living)	120.00	Dwelling Unit	1.10	78,299.00	120

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The project site is 1.1 acres. The square footages for the uses have been updated as per the project description.

Construction Phase - Construction is anticipated to take approximately one year.

Vehicle Trips - Trip rates are based on the Traffic Study prepared by Kunzman Associates, Inc. May 2014.

Woodstoves - No woodstoves or fireplaces are proposed in any units on the site.

Construction Off-road Equipment Mitigation -

Area Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	45.00
tblConstructionPhase	NumDays	200.00	216.00
tblConstructionPhase	NumDays	4.00	8.00
tblConstructionPhase	NumDays	10.00	25.00
tblConstructionPhase	NumDays	2.00	4.00
tblConstructionPhase	PhaseEndDate	1/17/2017	12/30/2016
tblConstructionPhase	PhaseEndDate	2/3/2017	12/30/2016
tblConstructionPhase	PhaseStartDate	11/16/2016	10/30/2016
tblConstructionPhase	PhaseStartDate	12/31/2016	11/27/2016
tblGrading	AcresOfGrading	3.00	1.50
tblGrading	AcresOfGrading	2.00	1.00
tblLandUse	LandUseSquareFeet	28,400.00	34,072.00
tblLandUse	LandUseSquareFeet	4,300.00	4,296.00
tblLandUse	LandUseSquareFeet	120,000.00	78,299.00
tblLandUse	LotAcreage	0.03	0.00
tblLandUse	LotAcreage	0.64	0.00
tblLandUse	LotAcreage	0.10	0.00
tblLandUse	LotAcreage	7.50	1.10
tblLandUse	Population	343.00	120.00
tblProjectCharacteristics	OperationalYear	2014	2017

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	38.4229	25.8113	25.3373	0.0449	5.6239	1.5982	7.0230	2.9488	1.5473	4.2360	0.0000	4,069.4130	4,069.4130	0.5523	0.0000	4,081.0106
Total	**38.4229**	**25.8113**	**25.3373**	**0.0449**	**5.6239**	**1.5982**	**7.0230**	**2.9488**	**1.5473**	**4.2360**	**0.0000**	**4,069.4130**	**4,069.4130**	**0.5523**	**0.0000**	**4,081.0106**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	38.4229	25.8113	25.3373	0.0449	2.5799	1.5982	3.9790	1.3400	1.5473	2.6272	0.0000	4,069.4130	4,069.4130	0.5523	0.0000	4,081.0106
Total	**38.4229**	**25.8113**	**25.3373**	**0.0449**	**2.5799**	**1.5982**	**3.9790**	**1.3400**	**1.5473**	**2.6272**	**0.0000**	**4,069.4130**	**4,069.4130**	**0.5523**	**0.0000**	**4,081.0106**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.13**	**0.00**	**43.34**	**54.56**	**0.00**	**37.98**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	34.5163	0.9144	70.3249	0.0965		9.2209	9.2209		9.2195	9.2195	1,124.0302	2,177.8431	3,301.8733	3.3700	0.0763	3,396.2939
Energy	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623
Mobile	3.2375	5.7958	27.9364	0.0639	4.7175	0.0753	4.7928	1.2587	0.0693	1.3280		5,383.6875	5,383.6875	0.2210		5,388.3284
Total	**37.8179**	**7.2760**	**98.6284**	**0.1639**	**4.7175**	**9.3405**	**14.0580**	**1.2587**	**9.3331**	**10.5918**	**1,124.0302**	**8,260.4394**	**9,384.4697**	**3.6044**	**0.0891**	**9,487.7845**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.0720	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543	0.0000	17.8431	17.8431	0.0179	0.0000	18.2198
Energy	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623
Mobile	3.2375	5.7958	27.9364	0.0639	4.7175	0.0753	4.7928	1.2587	0.0693	1.3280		5,383.6875	5,383.6875	0.2210		5,388.3284
Total	**6.3736**	**6.4782**	**38.3113**	**0.0680**	**4.7175**	**0.1739**	**4.8914**	**1.2587**	**0.1679**	**1.4266**	**0.0000**	**6,100.4394**	**6,100.4394**	**0.2523**	**0.0128**	**6,109.7105**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**83.15**	**10.96**	**61.16**	**58.54**	**0.00**	**98.14**	**65.21**	**0.00**	**98.20**	**86.53**	**100.00**	**26.15**	**34.99**	**93.00**	**85.62**	**35.60**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/6/2016	5	4	
2	Grading	Grading	1/7/2016	1/18/2016	5	8	
3	Building Construction	Building Construction	1/19/2016	11/15/2016	5	216	
4	Architectural Coating	Architectural Coating	10/30/2016	12/30/2016	5	45	
5	Paving	Paving	11/27/2016	12/30/2016	5	25	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 158,555; Residential Outdoor: 52,852; Non-Residential Indoor: 59,757; Non-Residential Outdoor: 19,919 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	125	0.42
Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	103.00	19.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	21.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.5345	0.0000	5.5345	2.9251	0.0000	2.9251			0.0000			0.0000
Off-Road	2.4428	25.7718	16.5144	0.0171		1.3985	1.3985		1.2866	1.2866		1,781.0872	1,781.0872	0.5372		1,792.3693
Total	**2.4428**	**25.7718**	**16.5144**	**0.0171**	**5.5345**	**1.3985**	**6.9329**	**2.9251**	**1.2866**	**4.2117**		**1,781.0872**	**1,781.0872**	**0.5372**		**1,792.3693**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0292	0.0394	0.4137	1.0300e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		85.9654	85.9654	4.2700e-003		86.0551
Total	**0.0292**	**0.0394**	**0.4137**	**1.0300e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**85.9654**	**85.9654**	**4.2700e-003**		**86.0551**

3.2 Site Preparation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4905	0.0000	2.4905	1.3163	0.0000	1.3163			0.0000			0.0000
Off-Road	2.4428	25.7718	16.5144	0.0171		1.3985	1.3985		1.2866	1.2866	0.0000	1,781.0872	1,781.0872	0.5372		1,792.3693
Total	**2.4428**	**25.7718**	**16.5144**	**0.0171**	**2.4905**	**1.3985**	**3.8890**	**1.3163**	**1.2866**	**2.6029**	**0.0000**	**1,781.0872**	**1,781.0872**	**0.5372**		**1,792.3693**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0292	0.0394	0.4137	1.0300e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		85.9654	85.9654	4.2700e-003		86.0551
Total	**0.0292**	**0.0394**	**0.4137**	**1.0300e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**85.9654**	**85.9654**	**4.2700e-003**		**86.0551**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.7154	0.0000	4.7154	2.5041	0.0000	2.5041			0.0000			0.0000
Off-Road	1.9908	21.0361	13.6704	0.0141		1.1407	1.1407		1.0494	1.0494		1,462.8468	1,462.8468	0.4413		1,472.1130
Total	**1.9908**	**21.0361**	**13.6704**	**0.0141**	**4.7154**	**1.1407**	**5.8561**	**2.5041**	**1.0494**	**3.5536**		**1,462.8468**	**1,462.8468**	**0.4413**		**1,472.1130**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0292	0.0394	0.4137	1.0300e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		85.9654	85.9654	4.2700e-003		86.0551
Total	**0.0292**	**0.0394**	**0.4137**	**1.0300e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**85.9654**	**85.9654**	**4.2700e-003**		**86.0551**

3.3 Grading - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.1219	0.0000	2.1219	1.1269	0.0000	1.1269			0.0000			0.0000
Off-Road	1.9908	21.0361	13.6704	0.0141		1.1407	1.1407		1.0494	1.0494	0.0000	1,462.8468	1,462.8468	0.4413		1,472.1130
Total	**1.9908**	**21.0361**	**13.6704**	**0.0141**	**2.1219**	**1.1407**	**3.2626**	**1.1269**	**1.0494**	**2.1763**	**0.0000**	**1,462.8468**	**1,462.8468**	**0.4413**		**1,472.1130**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0292	0.0394	0.4137	1.0300e-003	0.0894	6.2000e-004	0.0901	0.0237	5.8000e-004	0.0243		85.9654	85.9654	4.2700e-003		86.0551
Total	**0.0292**	**0.0394**	**0.4137**	**1.0300e-003**	**0.0894**	**6.2000e-004**	**0.0901**	**0.0237**	**5.8000e-004**	**0.0243**		**85.9654**	**85.9654**	**4.2700e-003**		**86.0551**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2915	20.5459	14.7074	0.0220		1.3656	1.3656		1.3176	1.3176		2,046.9432	2,046.9432	0.4499		2,056.3913
Total	**3.2915**	**20.5459**	**14.7074**	**0.0220**		**1.3656**	**1.3656**		**1.3176**	**1.3176**		**2,046.9432**	**2,046.9432**	**0.4499**		**2,056.3913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1842	1.6822	2.3339	4.0800e-003	0.1187	0.0263	0.1451	0.0338	0.0242	0.0580		408.5577	408.5577	3.0100e-003		408.6210
Worker	0.3762	0.5077	5.3262	0.0132	1.1513	8.0400e-003	1.1593	0.3053	7.4100e-003	0.3127		1,106.8048	1,106.8048	0.0550		1,107.9589
Total	**0.5603**	**2.1900**	**7.6601**	**0.0173**	**1.2700**	**0.0344**	**1.3044**	**0.3391**	**0.0316**	**0.3708**		**1,515.3625**	**1,515.3625**	**0.0580**		**1,516.5799**

3.4 Building Construction - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2915	20.5459	14.7074	0.0220		1.3656	1.3656		1.3176	1.3176	0.0000	2,046.9432	2,046.9432	0.4499		2,056.3913
Total	**3.2915**	**20.5459**	**14.7074**	**0.0220**		**1.3656**	**1.3656**		**1.3176**	**1.3176**	**0.0000**	**2,046.9432**	**2,046.9432**	**0.4499**		**2,056.3913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1842	1.6822	2.3339	4.0800e-003	0.1187	0.0263	0.1451	0.0338	0.0242	0.0580		408.5577	408.5577	3.0100e-003		408.6210
Worker	0.3762	0.5077	5.3262	0.0132	1.1513	8.0400e-003	1.1593	0.3053	7.4100e-003	0.3127		1,106.8048	1,106.8048	0.0550		1,107.9589
Total	**0.5603**	**2.1900**	**7.6601**	**0.0173**	**1.2700**	**0.0344**	**1.3044**	**0.3391**	**0.0316**	**0.3708**		**1,515.3625**	**1,515.3625**	**0.0580**		**1,516.5799**

3.5 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	34.1259					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**34.4944**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0767	0.1035	1.0859	2.7000e-003	0.2347	1.6400e-003	0.2364	0.0623	1.5100e-003	0.0638		225.6592	225.6592	0.0112		225.8945
Total	**0.0767**	**0.1035**	**1.0859**	**2.7000e-003**	**0.2347**	**1.6400e-003**	**0.2364**	**0.0623**	**1.5100e-003**	**0.0638**		**225.6592**	**225.6592**	**0.0112**		**225.8945**

3.5 Architectural Coating - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	34.1259					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**34.4944**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0767	0.1035	1.0859	2.7000e-003	0.2347	1.6400e-003	0.2364	0.0623	1.5100e-003	0.0638		225.6592	225.6592	0.0112		225.8945
Total	**0.0767**	**0.1035**	**1.0859**	**2.7000e-003**	**0.2347**	**1.6400e-003**	**0.2364**	**0.0623**	**1.5100e-003**	**0.0638**		**225.6592**	**225.6592**	**0.0112**		**225.8945**

3.6 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2872	13.2076	9.0880	0.0133		0.8075	0.8075		0.7438	0.7438		1,368.4366	1,368.4366	0.4053		1,376.9473
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2872**	**13.2076**	**9.0880**	**0.0133**		**0.8075**	**0.8075**		**0.7438**	**0.7438**		**1,368.4366**	**1,368.4366**	**0.4053**		**1,376.9473**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0641	0.6722	1.6700e-003	0.1453	1.0200e-003	0.1463	0.0385	9.4000e-004	0.0395		139.6938	139.6938	6.9400e-003		139.8395
Total	**0.0475**	**0.0641**	**0.6722**	**1.6700e-003**	**0.1453**	**1.0200e-003**	**0.1463**	**0.0385**	**9.4000e-004**	**0.0395**		**139.6938**	**139.6938**	**6.9400e-003**		**139.8395**

3.6 Paving - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2872	13.2076	9.0880	0.0133		0.8075	0.8075		0.7438	0.7438	0.0000	1,368.4366	1,368.4366	0.4053		1,376.9473
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2872**	**13.2076**	**9.0880**	**0.0133**		**0.8075**	**0.8075**		**0.7438**	**0.7438**	**0.0000**	**1,368.4366**	**1,368.4366**	**0.4053**		**1,376.9473**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0641	0.6722	1.6700e-003	0.1453	1.0200e-003	0.1463	0.0385	9.4000e-004	0.0395		139.6938	139.6938	6.9400e-003		139.8395
Total	**0.0475**	**0.0641**	**0.6722**	**1.6700e-003**	**0.1453**	**1.0200e-003**	**0.1463**	**0.0385**	**9.4000e-004**	**0.0395**		**139.6938**	**139.6938**	**6.9400e-003**		**139.8395**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.2375	5.7958	27.9364	0.0639	4.7175	0.0753	4.7928	1.2587	0.0693	1.3280		5,383.6875	5,383.6875	0.2210		5,388.3284
Unmitigated	3.2375	5.7958	27.9364	0.0639	4.7175	0.0753	4.7928	1.2587	0.0693	1.3280		5,383.6875	5,383.6875	0.2210		5,388.3284

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Congregate Care (Assisted Living)	328.80	264.00	292.80	1,074,353	1,074,353
High Turnover (Sit Down Restaurant)	546.75	680.99	566.91	775,183	775,183
Pharmacy/Drugstore w/o Drive Thru	132.39	132.39	132.39	181,180	181,180
Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	1,007.93	1,077.38	992.10	2,030,716	2,030,716

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Congregate Care (Assisted	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Pharmacy/Drugstore w/o Drive	16.60	8.40	6.90	7.40	73.60	19.00	41	6	53
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623
NaturalGas Unmitigated	0.0641	0.5658	0.3671	3.4900e-003		0.0443	0.0443		0.0443	0.0443		698.9089	698.9089	0.0134	0.0128	703.1623

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Congregate Care (Assisted Living)	2831.93	0.0305	0.2610	0.1111	1.6700e-003		0.0211	0.0211		0.0211	0.0211		333.1687	333.1687	6.3900e-003	6.1100e-003	335.1963
High Turnover (Sit Down Restaurant)	3100.54	0.0334	0.3040	0.2553	1.8200e-003		0.0231	0.0231		0.0231	0.0231		364.7688	364.7688	6.9900e-003	6.6900e-003	366.9888
Pharmacy/Drugstore w/o Drive Thru	8.25616	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.9713	0.9713	2.0000e-005	2.0000e-005	0.9772
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0641**	**0.5658**	**0.3671**	**3.4900e-003**		**0.0443**	**0.0443**		**0.0443**	**0.0443**		**698.9089**	**698.9089**	**0.0134**	**0.0128**	**703.1623**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Congregate Care (Assisted Living)	2.83193	0.0305	0.2610	0.1111	1.6700e-003		0.0211	0.0211		0.0211	0.0211		333.1687	333.1687	6.3900e-003	6.1100e-003	335.1963
High Turnover (Sit Down Restaurant)	3.10054	0.0334	0.3040	0.2553	1.8200e-003		0.0231	0.0231		0.0231	0.0231		364.7688	364.7688	6.9900e-003	6.6900e-003	366.9888
Pharmacy/Drugstore w/o Drive Thru	0.00825616	9.0000e-005	8.1000e-004	6.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.9713	0.9713	2.0000e-005	2.0000e-005	0.9772
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0641**	**0.5658**	**0.3671**	**3.4900e-003**		**0.0443**	**0.0443**		**0.0443**	**0.0443**		**698.9089**	**698.9089**	**0.0134**	**0.0128**	**703.1623**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.0720	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543	0.0000	17.8431	17.8431	0.0179	0.0000	18.2198
Unmitigated	34.5163	0.9144	70.3249	0.0965		9.2209	9.2209		9.2195	9.2195	1,124.0302	2,177.8431	3,301.8733	3.3700	0.0763	3,396.2939

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4207					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.3391					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	31.4443	0.7978	60.3170	0.0960		9.1666	9.1666		9.1652	9.1652	1,124.0302	2,160.0000	3,284.0302	3.3521	0.0763	3,378.0741
Landscaping	0.3121	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543		17.8431	17.8431	0.0179		18.2198
Total	**34.5163**	**0.9145**	**70.3249**	**0.0965**		**9.2209**	**9.2209**		**9.2195**	**9.2195**	**1,124.0302**	**2,177.8431**	**3,301.8733**	**3.3700**	**0.0763**	**3,396.2939**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4207					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.3391					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.3121	0.1166	10.0079	5.2000e-004		0.0543	0.0543		0.0543	0.0543		17.8431	17.8431	0.0179		18.2198
Total	**3.0720**	**0.1166**	**10.0079**	**5.2000e-004**		**0.0543**	**0.0543**		**0.0543**	**0.0543**	**0.0000**	**17.8431**	**17.8431**	**0.0179**	**0.0000**	**18.2198**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix C

Noise Measurements

File name,AU2_0101
File number, 1
Data number, 2
Frequency-weight,A
Time-weight,Fast
Filter,-
Center/High pass filter cutoff,-
Low pass filter cutoff,-
Time setting,15min
Start Time,2014/05/15 23:09:13
Stop Time,2014/05/15 23:24:27
Lx1,L10
Lx2,L33
Lx3,L50
Lx4,L90
Lx5,L95
Ly,Lppeak

Address,Time,Measurment Time,LAeq,LAE,LAmax,LAmin,LA10,LA33,LA50,LA90,LA95,Lppeak,Over,Under,Pause

1,2014/05/15 23:09:13, 0:15:00, 57.0, 86.6, 71.9, 46.5, 59.6, 56.4, 54.4, 50.7, 49.9,101.8,- ,- ,-

2,2014/05/15 23:24:13, 0:00:14, 57.4, 68.9, 64.3, 51.3, 62.2, 55.2, 53.5, 51.7, 51.6, 93.9,- ,- ,-

File name,AU2_0102
File number, 1
Data number, 2
Frequency-weight,A
Time-weight,Fast
Filter,-
Center/High pass filter cutoff,-
Low pass filter cutoff,-
Time setting,15min
Start Time,2014/05/15 23:26:22
Stop Time,2014/05/15 23:41:56
Lx1,L10
Lx2,L33
Lx3,L50
Lx4,L90
Lx5,L95
Ly,Lppeak

Address	Time	Measurment Time	LAeq	LAE	LAmax	LAmin	LA10	LA33	LA50	LA90	LA95	Lppeak	Over	Under	Pause
1	2014/05/15 23:26:22	0:15:00	64.8	94.4	84.0	47.2	68.5	64.3	60.4	52.7	51.0	111.4	-	-	-
2	2014/05/15 23:41:22	0:00:33	64.5	79.7	74.9	47.0	69.8	63.2	59.8	48.9	48.0	100.7	-	-	-

Appendix D

Project Traffic Study

KUNZMAN ASSOCIATES, INC.

12282 BEACH BOULEVARD PROJECT

REVISED FOCUSED TRAFFIC ANALYSIS

October 16, 2014

Traffic Engineering | Transportation Planning | Parking | Noise/Vibration | Expert Witness
Air Quality | Global Climate Change | Health Risk Assessment

KUNZMAN ASSOCIATES, INC.

12282 BEACH BOULEVARD PROJECT

REVISED FOCUSED TRAFFIC ANALYSIS

October 16, 2014

Prepared by:

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12282 BEACH BOULEVARD PROJECT

REVISED FOCUSED TRAFFIC ANALYSIS

This report contains the revised focused traffic analysis for the 12282 Beach Boulevard Project. The project site is located on the northeast corner of the Beach Boulevard and Catherine Avenue intersection in the City of Stanton. The project site is proposed to be developed with an 120 bed assisted living facility with 4,296 square feet of high-turnover (sit-down) restaurant and 1,471 square feet of pharmacy without drive-thru.

The traffic report contains documentation of existing traffic conditions, trips generated by the project, distribution of the project trips to roads outside the project, and an analysis of future traffic conditions. Each of these topics is contained in a separate section of the report. The first section is "Findings", and subsequent sections expand upon the findings. In this way, information on any particular aspect of the study can be easily located by the reader.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided within Appendix A.

I. Findings

This section summarizes the existing traffic conditions, project traffic impacts, and the proposed mitigation measures.

A. Existing Traffic Conditions

1. The project site is currently vacant and not generating significant traffic.

2. The study area includes the following intersections:

   Beach Boulevard (NS) at:
   Catherine Avenue (EW) - #1

   Project West Access (NS) at:
   Catherine Avenue (EW) - #2

   Project Central Access (NS) at:
   Catherine Avenue (EW) - #3

   Project East Access (NS) at:
   Catherine Avenue (EW) - #4

3. The study area intersection currently operates at unacceptable Levels of Service during the peak hours for Existing traffic conditions using the Intersection Delay Method and currently operates at acceptable Levels of Service during the peak hours for Existing traffic conditions using the Intersection Capacity Utilization methodology.

B. Traffic Impacts

1. The project site is proposed to be developed with an 120 bed assisted living facility with 4,296 square feet of high-turnover (sit-down) restaurant and 1,471 square feet of pharmacy without drive-thru. The project site will have access to Catherine Avenue.

2. The proposed development is projected to generate a total of approximately 997 daily vehicle trips, 69 of which will occur during the morning peak hour and 81 of which will occur during the evening peak hour.

3. The study area intersections are projected to operate within acceptable Levels of Service during the peak hours for Existing Plus Project traffic conditions using the Intersection Delay Method, except for the following study area intersection which is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

   Beach Boulevard (NS) at:
   Catherine Avenue (EW) - #1

For Existing Plus Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours using the Intersection Capacity Utilization Method.

4. The study area intersection is projected to operate at unacceptable Levels of Service during the peak hours for Opening Year (2016) Without Project traffic conditions using the Intersection Delay Method, without improvements:

   Beach Boulevard (NS) at:
   Catherine Avenue (EW) - #1

   For Opening Year (2016) Without Project traffic conditions, the study area intersection is projected to operate at acceptable Levels of Service during the peak hours using the Intersection Capacity Utilization Method.

5. The study area intersections are projected to operate within acceptable Levels of Service during the peak hours for Opening Year (2016) With Project traffic conditions using the Intersection Delay Method, except for the following study area intersection which is projected to operate at unacceptable Levels of Service during the peak hours, without improvements:

   Beach Boulevard (NS) at:
   Catherine Avenue (EW) - #1

   For Opening Year (2016) With Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours using the Intersection Capacity Utilization Method.

C. Mitigation Measures

The following measures are recommended to mitigate the impact of the project on traffic circulation:

1. Site-specific circulation and access recommendations are depicted on Figure 28.

2. Construct Catherine Avenue from Beach Boulevard to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

3. Construct Beach Boulevard from the north project boundary to Catherine Avenue at its ultimate half-section width as a Smart Street including landscaping and parkway improvements in conjunction with development, as necessary.

4. Sufficient on-site parking shall be provided to meet City of Stanton parking code requirements.

5. On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

6. Sight distance at project accesses shall comply with standard California Department of Transportation and City of Stanton sight distance standards. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

7. As is the case for any roadway design, the City of Stanton should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

II. Congestion Management Program Methodology

This section discusses the County Congestion Management Program. The purpose, prescribed methodology, and definition of a significant traffic impact are discussed.

A. County Congestion Management Program

The Congestion Management Program is a result of Proposition 111 which was a statewide initiative approved by the voters in June, 1990. The proposition allowed for a nine cent per gallon State gasoline tax increase over a five year period.

Proposition 111 explicitly stated that the new gas tax revenues were to be used to fix existing traffic problems and was not to be used to promote future development. For a City to get its share of the Proposition 111 gas tax, it has to follow certain procedures specified by the State Legislature. The legislation requires that a traffic impact analysis be prepared for new development. The traffic impact analysis is prepared to monitor and fix traffic problems caused by new development.

The Legislature requires that adjacent jurisdictions use a standard methodology for conducting a traffic impact analysis. To assure that adjacent jurisdictions use a standard methodology in preparing traffic impact analyses, one common procedure is that all Cities within a County, and the County agency itself, adopt and use one standard methodology for conducting traffic impact analyses.

Although each County has developed standards for preparing traffic impact analyses, traffic impact analysis requirements do vary in detail from one County to another, but not in overall intent or concept. The general approach selected by each County for conducting traffic impact analyses has common elements.

The general approach for conducting a traffic impact analysis is that existing weekday peak hour traffic is counted and the percent of roadway capacity currently used is determined. Then the project traffic is added and the percent of roadway capacity used is again determined. If the new project adds traffic to an overcrowded facility, then the new project has to mitigate the traffic impact so that the facility operates at a level which is no worse than before the project traffic was added.

If the project size is below a certain minimum threshold level, then a project does not have to have a traffic impact analysis prepared, once it is shown or agreed that the project is below the minimum threshold. In Orange County a project needs a traffic impact analysis if it generates more than 200 daily trips. If a project is bigger than the minimum threshold size, then a traffic impact analysis is required.

B. Prescribed Methodology for a Traffic Impact Analysis

The traffic impact analysis must include all monitored intersections to which the project adds traffic above a certain minimum amount.

In the City of Stanton, the monitored intersections are all arterial to arterial intersections.

In the City of Stanton, the minimum traffic impact that is required before an intersection has to be analyzed is if the Intersection Capacity Utilization increases by 3 percent of the Level of Service E capacity.

If a project increases the Intersection Capacity Utilization by more than 3 percent, then that intersection has to be analyzed for deficiencies.

In the City of Stanton, mitigation is required if (1) the intersection operates at worse than an Intersection Capacity Utilization of 100 percent or more; and (2) the Intersection Capacity Utilization increases by 10 percent.

An intersection mitigation measure shall either fix the deficiency, or reduce the Intersection Capacity Utilization so that it is below the level which occurs without the project.

In the City of Stanton, the technique used to calculate Intersection Capacity Utilization for a signalized intersection is as follows. Lane capacity is 1,700 vehicles per lane per hour of green time for through and turn lanes. A total yellow clearance time of 5 percent is added.

The technique used to assess the capacity needs of an unsignalized intersection is known as the Intersection Delay Method (see Appendix C). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

Although the intersection of Beach Boulevard and Catherine Avenue is an unsignalized intersection, it has been analyzed utilizing both the Intersection Delay Method and Intersection Capacity Utilization to exhibit the difference between the methodologies.

It is recommended that due to the nature of the intersection of Beach Boulevard and Catherine Avenue, the Intersection Capacity Utilization should take precedence. Due to relatively high north-south traffic volumes on Beach Boulevard, minimal east-west traffic volumes on Catherine Avenue cause a significant delay for these traffic movements creating a situation that is not able to be mitigated without the installation of a traffic signal. The Intersection Delay Method does not account for acceptable gaps created on Beach Boulevard for traffic to enter/exit onto Catherine Avenue due to traffic signals north and south of this intersection. These traffic signals produce periodic gaps in traffic for upstream and downstream traffic as they are fulfilling their traffic cycles which allow for the creation of gaps to occur. The intersection Capacity Utilization methodology is preferred as it does not single out the most minimalistic movements in relation to total traffic volumes utilizing that intersection to then assess the entire intersection performance.

Project traffic is generated using rates and procedures contained in the Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012. To determine the trip

distribution for the proposed project, peak hour traffic counts of the existing directional distribution of traffic for existing areas in the vicinity of the site, and other additional information on future development and traffic impacts in the area were reviewed. The Traffic Impact Analysis has to be prepared by a licensed Traffic Engineer.

This traffic analysis has been prepared in accordance with the Traffic Impact Analysis requirements except as noted. The Traffic Impact Analysis not only examined the Congestion Management Program system of roads and intersections, but also other roads and intersections.

The project generated traffic was added to intersections, and a full intersection analysis was conducted, even when the project added traffic failed to meet the minimum thresholds that require an intersection analysis.

C. Mitigation Measures

If a project is large enough to require that a Traffic Impact Analysis be prepared, and if the project adds traffic to an intersection above a minimum threshold, and if the intersection is operating at above an acceptable level of operation, then the project must mitigate its traffic impact.

Traffic mitigation can be in many forms including adding lanes. Lanes can sometimes be obtained through restriping or elimination of parking, and sometimes require spot roadway widening.

III. Project Description

This section discusses the project's location and proposed development. Figure 1 shows the project location map and Figure 2 illustrates the site plan.

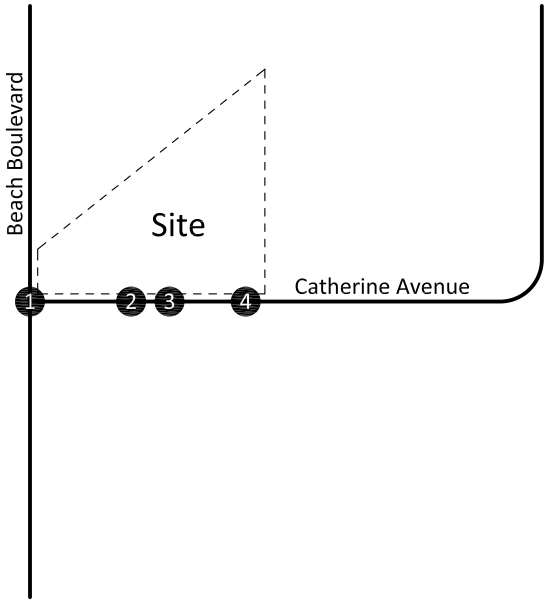
A. Location

The project site is located on the northeast corner of the Beach Boulevard and Catherine Avenue intersection in the City of Stanton.

B. Proposed Development

The project site is proposed to be developed with an 120 bed assisted living facility with 4,296 square feet of high-turnover (sit-down) restaurant and 1,471 square feet of pharmacy without drive-thru. The project site will have access to Catherine Avenue.

Figure 1
Project Location Map



Legend

1 = Intersection Reference Number

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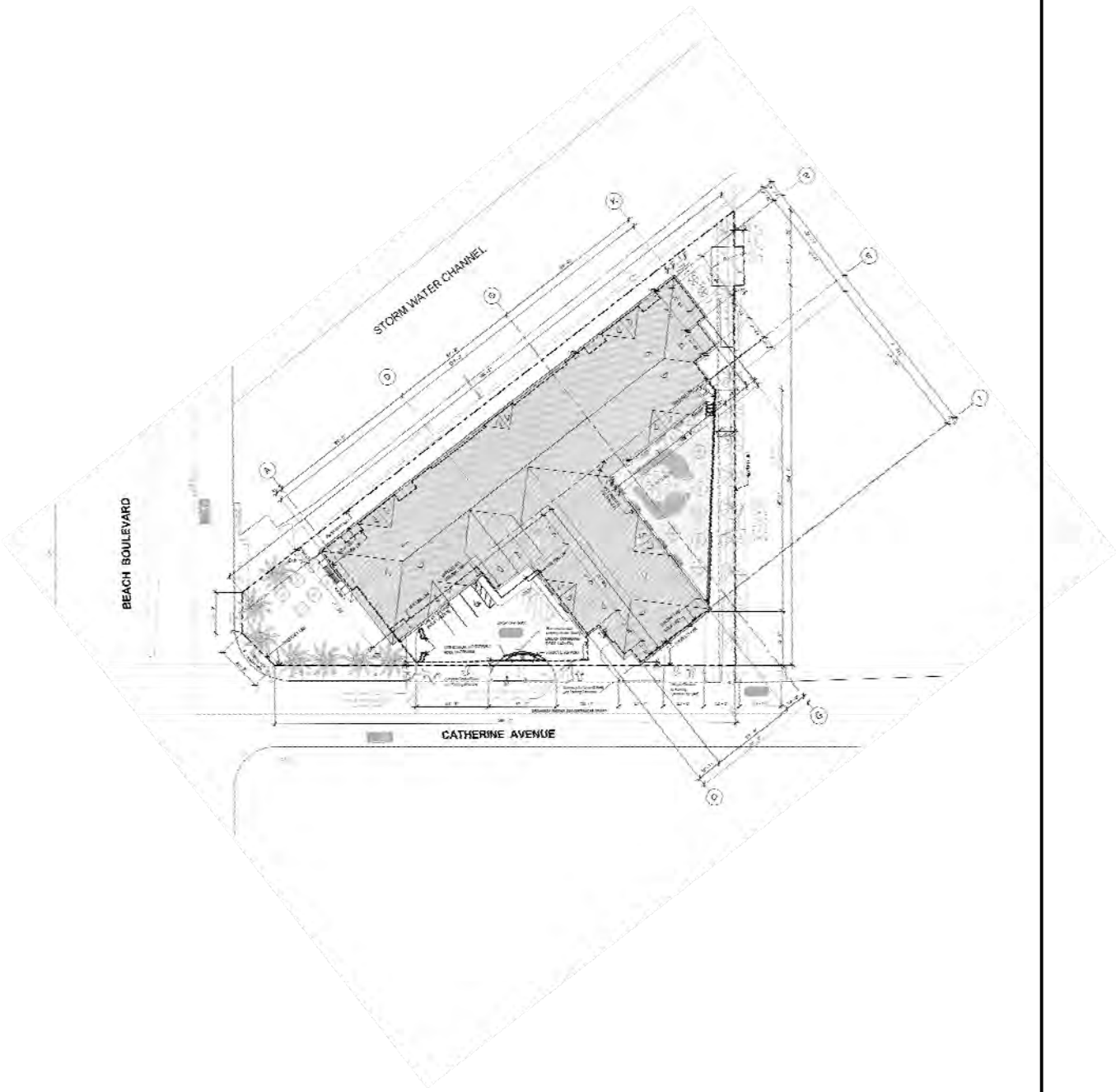
OVER 35 YEARS OF EXCELLENT SERVICE

Figure 2
Site Plan



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IV. Existing Traffic Conditions

The project site is currently vacant. The traffic conditions as they exist today are discussed below and illustrated on Figures 3 to 7.

A. Surrounding Street System

Study area roadways that will be utilized by the development include Beach Boulevard and Catherine Avenue.

Beach Boulevard: This north-south roadway currently is eight lanes divided in the study area. Beach Boulevard is currently classified as a Smart Street on the City of Stanton General Plan Circulation Element. It currently carries approximately 71,000 vehicles per day in the study area.

Catherine Avenue: This east-west roadway currently is two lanes undivided in the study area. Catherine Avenue is currently not classified on the City of Stanton General Plan Circulation Element. It currently carries approximately 1,200 vehicles per day in the study area.

B. Existing Travel Lanes and Intersection Controls

Figure 3 identifies the existing roadway conditions for study area roadways. The number of through lanes for existing roadways and the existing intersection controls are identified.

C. Existing Average Daily Traffic Volumes

Figure 4 depicts the existing average daily traffic volumes. Table 1 summarizes the existing average daily traffic volumes at the intersection of Beach Boulevard and Catherine Avenue during a typical weekday. The existing average daily traffic volumes were factored from traffic counts (see Appendix B) obtained by Kunzman Associates, Inc. in May 2014 and from the Annual Traffic Volume Maps by the Orange County Transportation Authority.

D. Existing Levels of Service

The technique used to assess the operation of a signalized intersection is known as Intersection Capacity Utilization, as described in Appendix C. To calculate an Intersection Capacity Utilization value, the volume of traffic using the intersection is compared with the capacity of the intersection. An Intersection Capacity Utilization value is usually expressed as a decimal. The decimal represents that portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity.

The technique used to assess the capacity needs of an unsignalized intersection is known as the Intersection Delay Method (see Appendix C). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The Levels of Service for the existing traffic conditions have been calculated and are shown in Table 2. Existing Level of Service is based upon manual morning and evening peak hour intersection turning movement counts made for Kunzman Associates, Inc. in May 2014 (see Figures 5 and 6). Traffic count worksheets are provided in Appendix B.

Although the intersection of Beach Boulevard and Catherine Avenue is an unsignalized intersection, it has been analyzed utilizing both the Intersection Delay Method and Intersection Capacity Utilization to exhibit the difference between the methodologies.

It is recommended that due to the nature of the intersection of Beach Boulevard and Catherine Avenue, the Intersection Capacity Utilization should take precedence. Due to relatively high north-south traffic volumes on Beach Boulevard, minimal east-west traffic volumes on Catherine Avenue cause a significant delay for these traffic movements creating a situation that is not able to be mitigated without the installation of a traffic signal. The Intersection Delay Method does not account for acceptable gaps created on Beach Boulevard for traffic to enter/exit onto Catherine Avenue due to traffic signals north and south of this intersection. These traffic signals produce periodic gaps in traffic for upstream and downstream traffic as they are fulfilling their traffic cycles which allow for the creation of gaps to occur. The intersection Capacity Utilization methodology is preferred as it does not single out the most minimalistic movements in relation to total traffic volumes utilizing that intersection to then assess the entire intersection performance.

There are two peak hours in a weekday. The morning peak hour is between 7:00 AM and 9:00 AM, and the evening peak hour is between 4:00 PM and 6:00 PM. The actual peak hour within the two hour interval is the four consecutive 15 minute periods with the highest total volume when all movements are added together. Thus, the evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15 minute periods have the highest combined volume.

The study area intersection currently operates at unacceptable Levels of Service during the peak hours for Existing traffic conditions using the Intersection Delay Method and currently operates at acceptable Levels of Service during the peak hours for Existing traffic conditions using the Intersection Capacity Utilization methodology (see Table 2). Existing Intersection Level of Service worksheets are provided in Appendix C.

E. Existing General Plan Circulation Element

Figure 7 shows the current City of Stanton General Plan Circulation Element. Both existing and future roadways are included in the General Plan Circulation Element and are graphically depicted on Figure 7. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the land use element of the General Plan.

F. Transit Service

Transit service is currently provided along Beach Boulevard by the Orange County Transportation Authority Route 29.

Table 1

Existing Roadway Segment Average Daily Traffic Volumes

Intersection	Leg	Existing Average Daily Traffic Volumes
Beach Boulevard (NS) at Catherine Avenue (EW) - #1	North	71,000
	South	71,000
	East	1
	West	0

Table 2

Existing Intersection Levels of Service

Intersection	Traffic Control[4]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]		Peak Hour V/C - LOS[3]	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening	Morning	Evening
Beach Boulevard (NS) at:																	
Catherine Avenue (EW) - #1	CSS	0	3.5	0.5	1	4	0	0	0	0	0.5	0	0.5	99.9-F[5]	99.9-F	0.436-A	0.484-A

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right

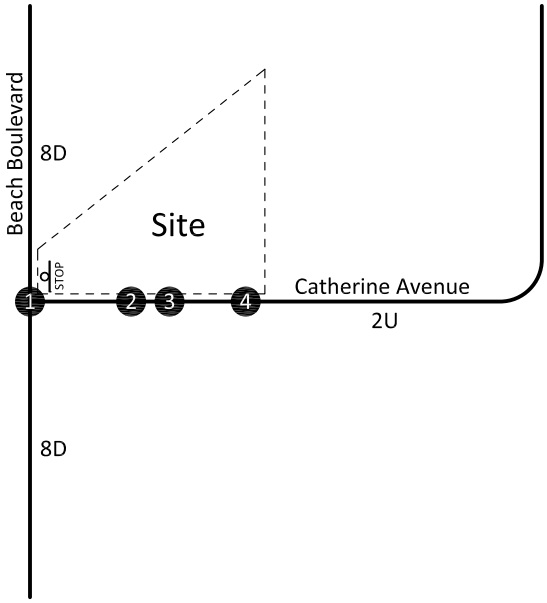
[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service are shown for the individual movement (or movements sharing a single lane) are shown.

[3] Level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008).

[4] CSS = Cross Street Stop

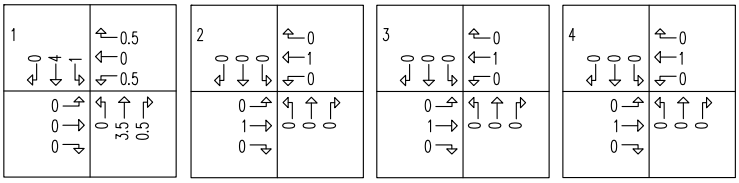
[5] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Figure 3
Existing Through Travel Lanes and Intersection Controls



Legend

STOP = Stop Sign
8 = Through Travel Lanes
D = Divided
U = Undivided



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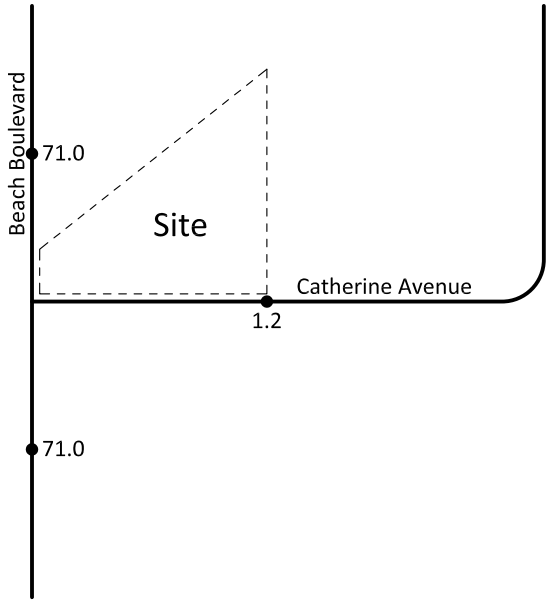
Intersection reference numbers are in upper left corner of turning movement boxes.

Figure 4
Existing Average Daily Traffic Volumes



Legend

71.0 = Vehicles Per Day (1,000's)

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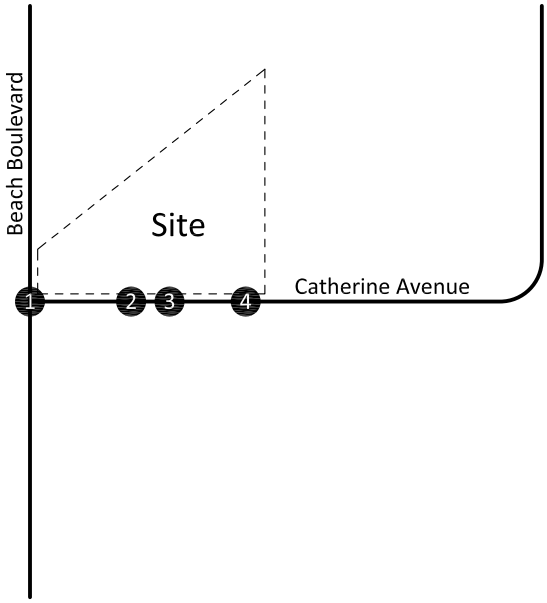
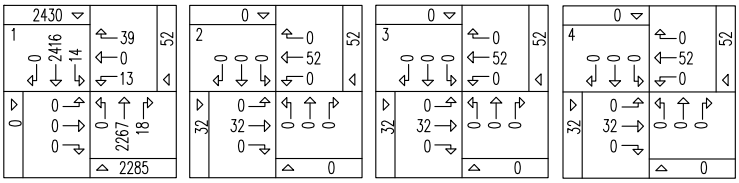
Figure 5
Existing Morning Peak Hour Intersection Turning Movement Volumes





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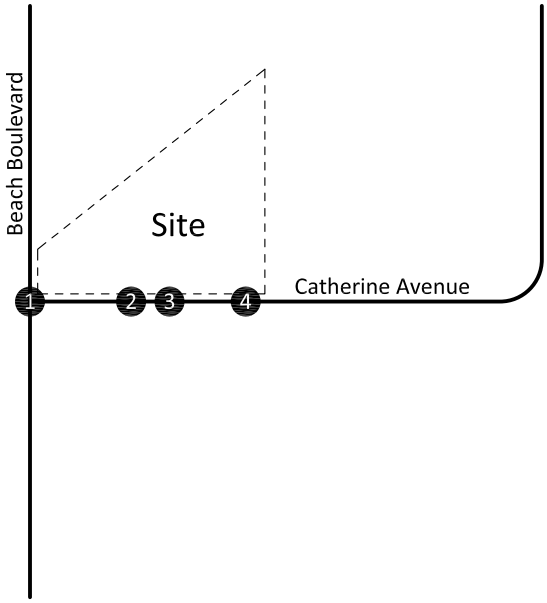
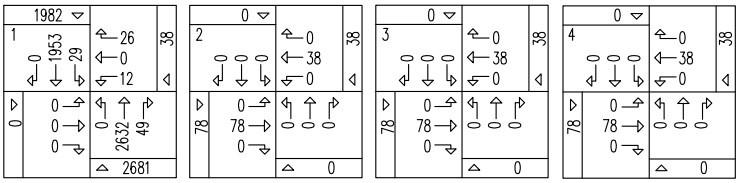
Intersection reference numbers are in upper left corner of turning movement boxes.

Figure 6
Existing Evening Peak Hour Intersection Turning Movement Volumes





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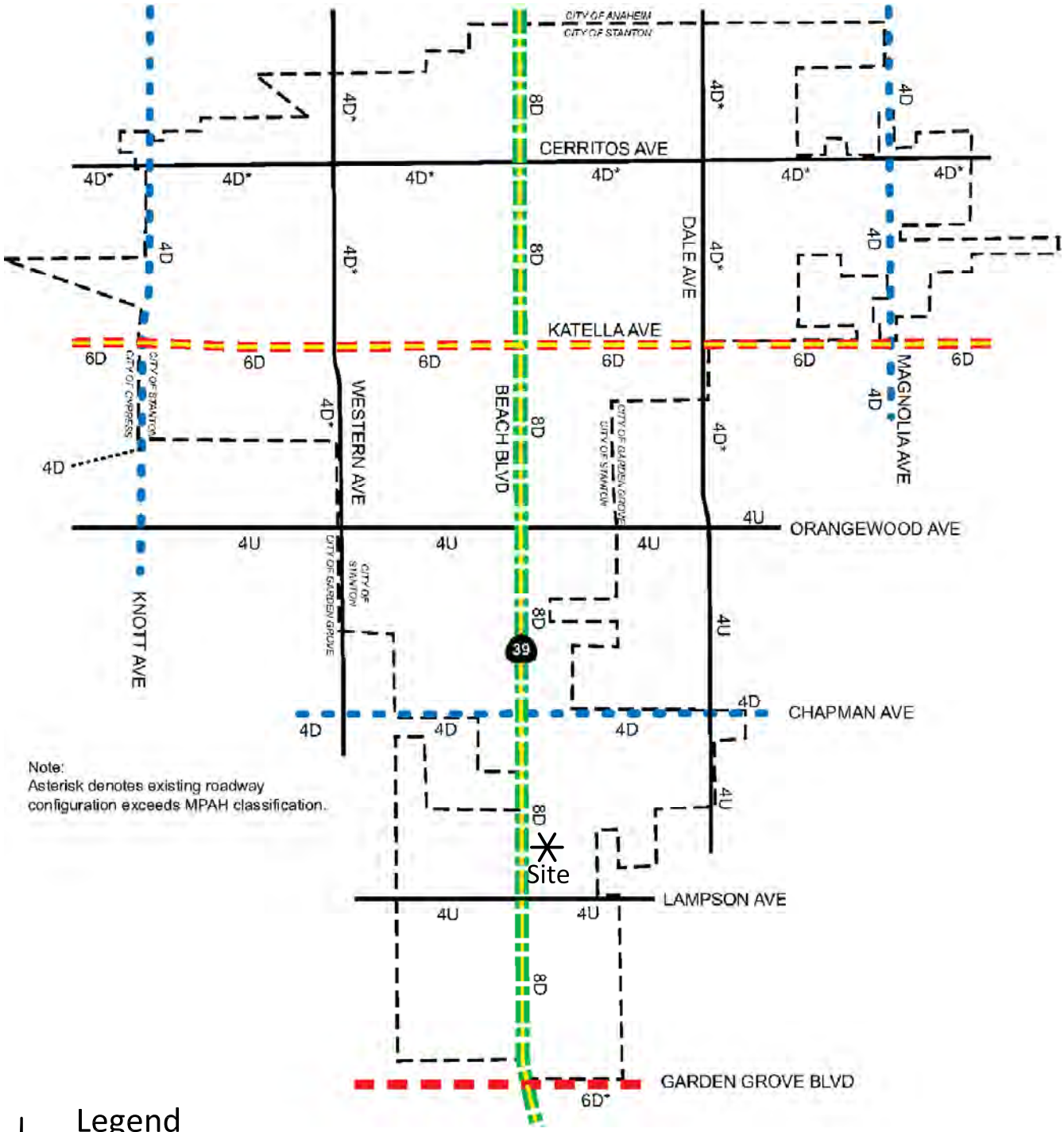
Intersection reference numbers are in upper left corner of turning movement boxes.

Figure 7
City of Stanton General Plan Circulation Element



Legend

- Pricipal Arterial (8-lane Divided Roadway; 45,000 - 60,000 ADT)
- Major Arterial (6-lane Divided Roadway; 30,000 - 45,000 ADT)
- Primary Arterial (4-lane Divided Roadway; 20,000 - 30,000 ADT)
- Secondary Arterial (4-lane Undivided Roadway; 10,000 - 20,000 ADT)
- Smart Street (8-lanes)
- Smart Street (6-lanes)
- City Boundary

N

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Source: City of Stanton

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OVER 35 YEARS OF EXCELLENT SERVICE

V. Project Traffic

The project site is proposed to be developed with an 120 bed assisted living facility with 4,296 square feet of high-turnover (sit-down) restaurant and 1,471 square feet of pharmacy without drive-thru. The project site will have access to Catherine Avenue.

A. Trip Generation

The trips generated by the project are determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and life styles remain similar to what are known today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for average daily traffic, morning peak hour inbound and outbound traffic, and evening peak hour inbound and outbound traffic for the proposed land uses. By multiplying the trip generation rates by the land use quantities, the traffic volumes are determined. Table 3 exhibits the trip generation rates, project peak hour volumes, and project average daily traffic volumes for the proposed project site. The trip generation rates are from the Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012.

The proposed development is projected to generate a total of approximately 997 daily vehicle trips, 69 of which will occur during the morning peak hour and 81 of which will occur during the evening peak hour (see Table 3).

Traffic volumes shown in Table 3 consist of the total trips generated for each project land use. As a restaurant and pharmacy trip generated by the project will also be making trips to the assisted living land use within the project, a double counting of those trips occurs. In order to analyze a "conservative" scenario in terms of the assignment of trips, the trips generated by the project have not been reduced as a result of internal interaction.

B. Trip Distribution

Figure 8 contains the directional distribution of the project trips for the proposed land uses.

To determine the trip distribution for the proposed project, peak hour traffic counts of the existing directional distribution of traffic for existing areas in the vicinity of the site, and other additional information on future development and traffic impacts in the area were reviewed.

C. Trip Assignment

Based on the identified trip generation and distribution, project average daily traffic volumes have been calculated and shown on Figure 9. Morning and evening peak hour

intersection turning movement volumes expected from the project are shown on Figures 10 and 11, respectively.

D. Modal Split

The trip reducing potential of public transit has not been considered in this report. Essentially the traffic projections are conservative in that public transit might be able to reduce the traffic volumes.

Table 3

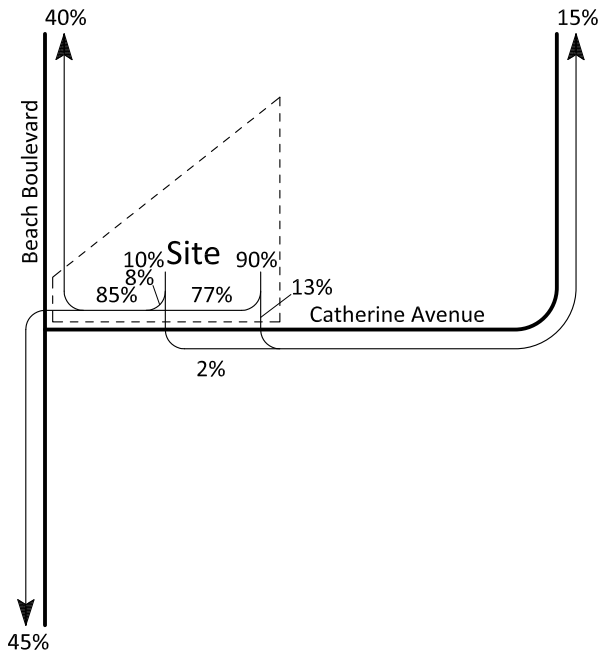
Project Trip Generation[1]

Land Use	Quantity	Units[2]	Peak Hour						Daily
			Morning			Evening			
			Inbound	Outbound	Total	Inbound	Outbound	Total	
Trip Generation Rates									
Assisted Living	120	Beds	0.09	0.05	0.14	0.10	0.12	0.22	2.66
High-Turnover (Sit-Down) Restaurant	4.296	TSF	5.95	4.86	10.81	5.91	3.94	9.85	127.15
Pharmacy W/O Drive-Thru	1.471	TSF	1.91	1.03	2.94	4.12	4.28	8.40	90.06
Trips Generated									
Assisted Living	120	Beds	11	6	17	12	15	27	319
High-Turnover (Sit-Down) Restaurant	4.296	TSF	26	21	47	25	17	42	546
Pharmacy W/O Drive-Thru	1.471	TSF	3	2	5	6	6	12	132
Total			40	29	69	43	38	81	997

[1] Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Categories 254, 932, and 880.

[2] TSF = Thousand Square Feet

Figure 8
Project Trip Distribution



Legend

10% = Percent To/From Project

N

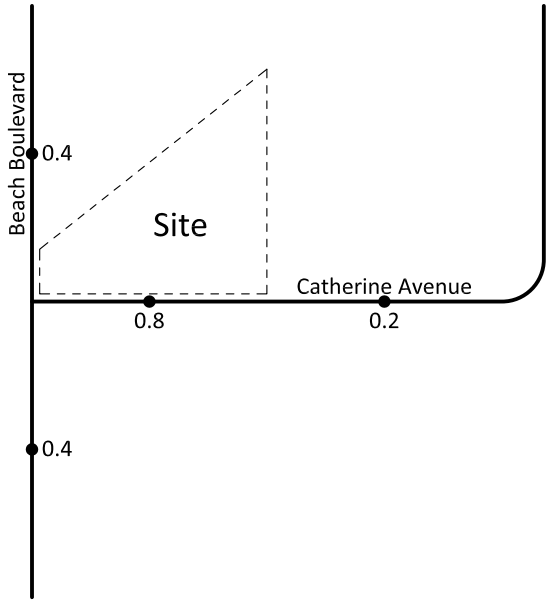
NTS

5648/8

KUNZMAN ASSOCIATES, INC.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 9
Project Average Daily Traffic Volumes



Legend

0.4 = Vehicles Per Day (1,000's)

N

NTS

5648/9

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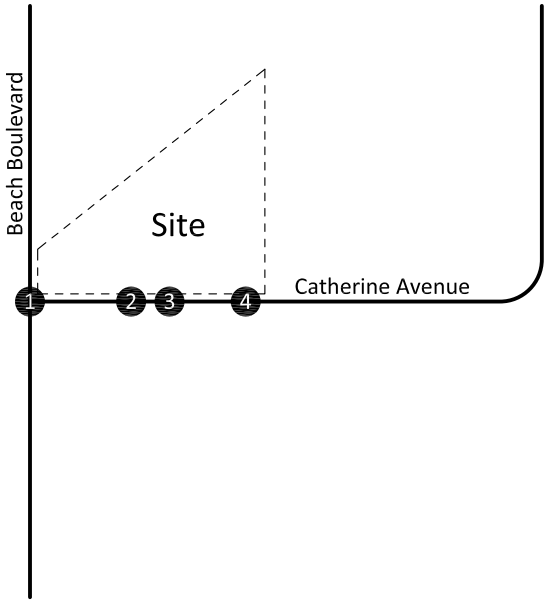
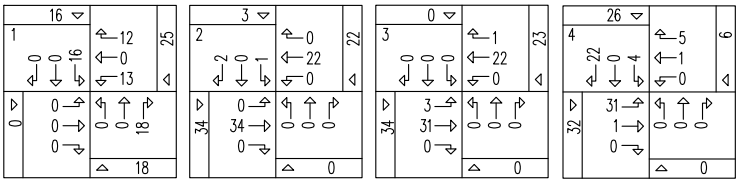
Figure 10
Project Morning Peak Hour Intersection Turning Movement Volumes





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5648/10

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

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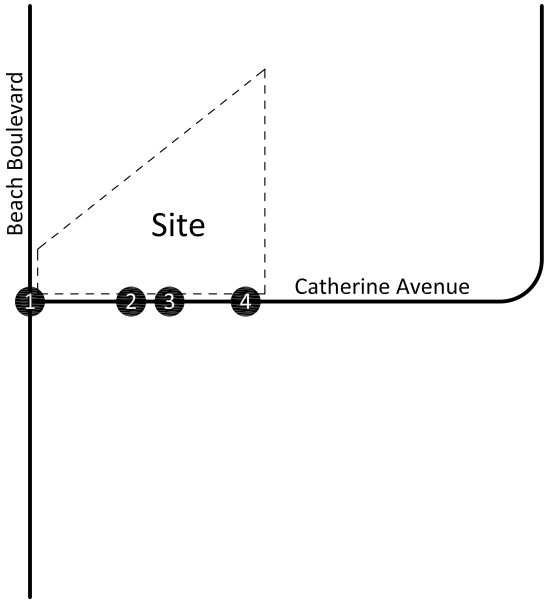
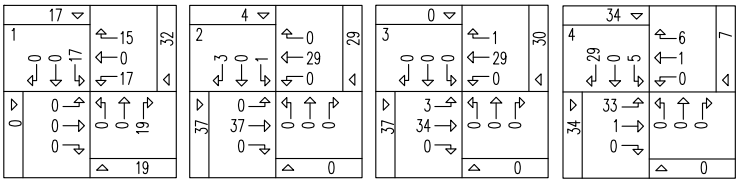
Figure 11
Project Evening Peak Hour Intersection Turning Movement Volumes





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KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 35 YEARS OF EXCELLENT SERVICE

VI. Existing Plus Project Traffic Conditions

In this section, Existing Plus Project traffic conditions are discussed. Figures 12 to 14 depict the Existing Plus Project traffic conditions.

A. Method of Projection

To assess Existing Plus Project traffic conditions, existing traffic is combined with the project.

B. Existing Plus Project Average Daily Traffic Volumes

Existing Plus Project average daily traffic volumes are illustrated on Figure 12 and are shown in Table 4.

C. Existing Plus Project Levels of Service

The technique used to assess the operation of a signalized intersection is known as Intersection Capacity Utilization, as described in Appendix C. To calculate an Intersection Capacity Utilization value, the volume of traffic using the intersection is compared with the capacity of the intersection. An Intersection Capacity Utilization value is usually expressed as a decimal. The decimal represents that portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity.

The technique used to assess the capacity needs of an unsignalized intersection is known as the Intersection Delay Method (see Appendix C). To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

Although the intersection of Beach Boulevard and Catherine Avenue is an unsignalized intersection, it has been analyzed utilizing both the Intersection Delay Method and Intersection Capacity Utilization to exhibit the difference between the methodologies.

It is recommended that due to the nature of the intersection of Beach Boulevard and Catherine Avenue, the Intersection Capacity Utilization should take precedence. Due to relatively high north-south traffic volumes on Beach Boulevard, minimal east-west traffic volumes on Catherine Avenue cause a significant delay for these traffic movements creating a situation that is not able to be mitigated without the installation of a traffic signal. The Intersection Delay Method does not account for acceptable gaps created on Beach Boulevard for traffic to enter/exit onto Catherine Avenue due to traffic signals north and south of this intersection. These traffic signals produce periodic gaps in traffic for upstream and downstream traffic as they are fulfilling their traffic cycles which allow for the creation of gaps to occur. The intersection Capacity Utilization methodology is preferred as it does not single out the most minimalistic movements in relation to total traffic volumes utilizing that intersection to then assess the entire intersection performance.

The Levels of Service for Existing Plus Project traffic conditions have been calculated and are shown in Table 5. Existing Plus Project morning and evening peak hour intersection turning movement volumes are shown on Figures 13 and 14, respectively.

The study area intersections are projected to operate within acceptable Levels of Service during the peak hours for Existing Plus Project traffic conditions using the Intersection Delay Method, except for the following study area intersection which is projected to operate at unacceptable Levels of Service during the peak hours, without improvements (see Table 5):

Beach Boulevard (NS) at:
Catherine Avenue (EW) - #1

For Existing Plus Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours using the Intersection Capacity Utilization Method.

D. Existing Plus Project Traffic Signal Warrant Analysis

For Existing Plus Project traffic conditions, a traffic signal is not projected to be warranted at the following study area intersection (see Appendix D):

Beach Boulevard (NS) at:
Catherine Avenue (EW) - #1

The unsignalized intersection has been evaluated for a traffic signal using the California Department of Transportation Warrant 2 Four-Hour traffic signal warrant analysis, as specified in the Manual of Uniform Traffic Control Devices 2003 California Supplement, dated May 20, 2004.

It should be noted that Chapter 4C.01 of the California Manual of Uniform Traffic Control Devices 2012 Edition states: "[08] The study should consider the effects of the right-turning vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2."

Being that Catherine Avenue is located approximately 1,000 feet north of the Beach Boulevard at Lampson Avenue intersection and this intersection is signalized, this traffic signal is projected to provide acceptable gaps for northbound traffic through the Beach Boulevard at Catherine Avenue intersection. With these acceptable gaps occurring allowing the ability of westbound right turns to turn northbound onto Beach Boulevard during the standard traffic signal cycle at Beach Boulevard and Lampson Avenue, the westbound right turns on the minor street (Catherine Avenue) have been excluded from the traffic signal warrant analysis. This practice is consistent with the narrative from Chapter 4C.01 of the California Manual of Uniform Traffic Control Devices 2012 Edition shown above.

Table 4

Existing Plus Project Roadway Segment Average Daily Traffic Volumes

Intersection	Leg	Average Daily Traffic Volumes			Percent Increase by Project
		Existing	Project	Existing Plus Project	
Beach Boulevard (NS) at Catherine Avenue (EW) - #1	North	71,000	400	71,400	0.6%
	South	71,000	400	71,400	0.6%
	East	1,200	800	2,000	40.0%
	West	0	0	0	0.0%

Table 6

Existing Plus Project Intersection Levels of Service

Intersection	Traffic Control[4]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]		Peak Hour V/C - LOS[3]	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening	Morning	Evening
Beach Boulevard (NS) at: Catherine Avenue (EW) - #1	CSS	0	3.5	0.5	1	4	0	0	0	0	0.5	0	0.5	99.9-F[5]	99.9-F	0.452-A	0.515-A
Project West Access (NS) at: Catherine Avenue (EW) - #2	**CSS**	0	0	0	**0.5**	0	**0.5**	0	1	0	0	1	0	8.8-A	8.8-A	--	--
Project Central Access (NS) at: Catherine Avenue (EW) - #3	**CSS**	0	0	0	0	0	0	0.5	0.5	0	0	0.5	0.5	7.3-A	7.3-A	--	--
Project East Access (NS) at: Catherine Avenue (EW) - #4	**CSS**	0	0	0	**0.5**	0	**0.5**	0.5	0.5	0	0	0.5	0.5	8.8-A	8.8-A	--	--

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

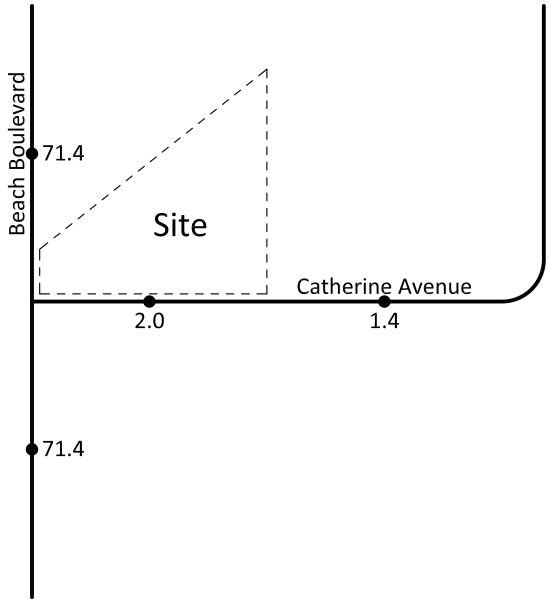
[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service are shown for the individual movement (or movements sharing a single lane) are shown.

[3] Level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008).

[4] CSS = Cross Street Stop

[5] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Figure 12
Existing Plus Project Average Daily Traffic Volumes



Legend

71.4 = Vehicles Per Day (1,000's)

N

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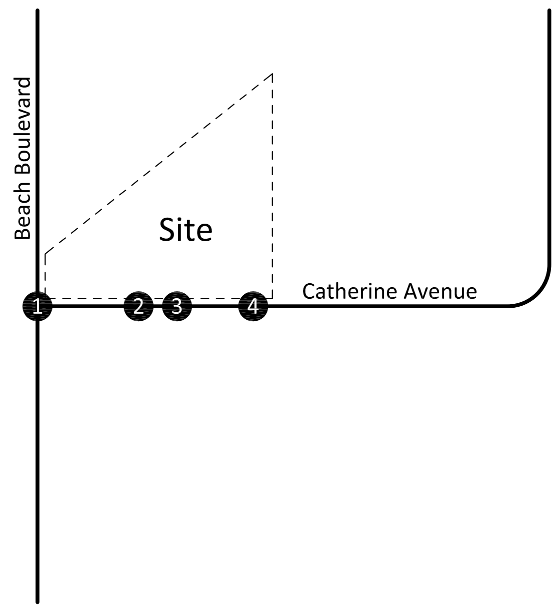
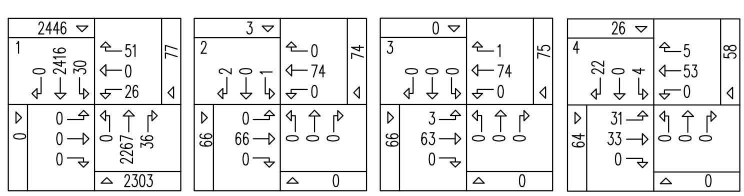
Figure 13
Existing Plus Project
Morning Peak Hour Intersection Turning Movement Volumes





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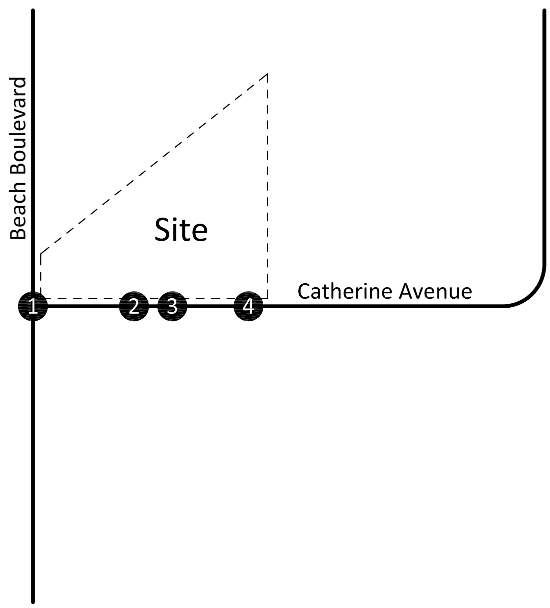
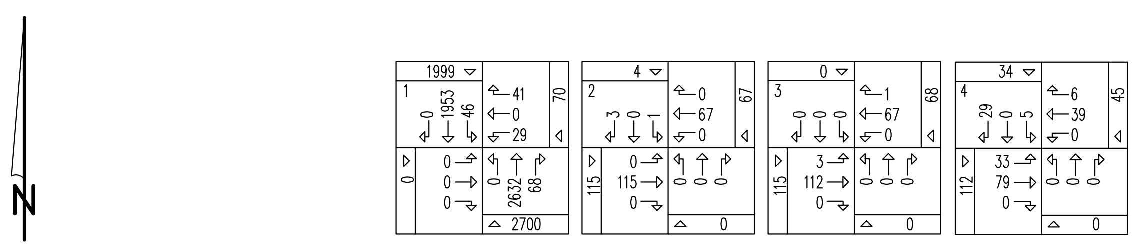
Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

Over 35 Years of Excellent Service

Figure 14
Existing Plus Project
Evening Peak Hour Intersection Turning Movement Volumes





5648/14
KUNZMAN ASSOCIATES, INC. Intersection reference numbers are in upper left corner of turning movement boxes.
OVER 35 YEARS OF EXCELLENT SERVICE

VII. Opening Year (2016) Traffic Conditions

Figures 15 to 27 illustrate the Year 2035 traffic conditions.

A. Method of Projection

For Opening Year (2016) traffic conditions, an areawide growth rate has been utilized to account for areawide growth on study area roadways. Opening Year (2016) traffic volumes have been calculated based on a 1.0 percent annual growth rate of existing traffic volumes over a three year period. The areawide growth rate has been obtained from the City of Stanton staff.

Areawide growth has been added to existing daily and peak hour traffic volumes on surrounding roadways, in addition to trips generated by the project.

B. Other Development

Table 6 lists the proposed land uses for other development (see Figure 15) obtained from the Cities of Stanton, Garden Grove, and Westminster Planning Departments. The list includes projects whose trips are projected to contribute traffic to the study area. Table 6 shows the daily and peak hour vehicle trips generated by the surrounding other development in the study area. Figures 16 to 18 contain the directional distribution and assignment of the other development trips.

Figure 19 shows the average daily traffic volumes that can be expected for the other development traffic conditions. Other development morning and evening peak hour intersection turning movement volumes are shown on Figures 20 and 21, respectively.

C. Opening Year (2016) Average Daily Traffic Volumes

Opening Year (2016) average daily traffic volumes are shown in Table 7. Figure 22 shows the average daily traffic volumes that can be expected for Opening Year (2016) Without Project traffic conditions and Figure 23 shows the average daily traffic volumes that can be expected for Opening Year (2016) With Project traffic conditions.

D. Opening Year (2016) Intersection Levels of Service

Level of Service at Opening Year (2016) Without Project

The Opening Year (2016) Without Project Levels of Service for the study area roadway network without the proposed project are shown in Table 8. Opening Year (2016) Without Project morning and evening peak hour intersection turning movement volumes are shown on Figures 24 and 25, respectively. Opening Year (2016) Without Project Intersection Level of Service worksheets are provided in Appendix C.

The study area intersection is projected to operate at unacceptable Levels of Service during the peak hours for Opening Year (2016) Without Project traffic conditions using the Intersection Delay Method, without improvements (see Table 8):

Beach Boulevard (NS) at:
Catherine Avenue (EW) - #1

For Opening Year (2016) Without Project traffic conditions, the study area intersection is projected to operate at acceptable Levels of Service during the peak hours using the Intersection Capacity Utilization Method.

Level of Service at Opening Year (2016) With Project

The Opening Year (2016) With Project Levels of Service for the study area roadway network with the proposed project are shown in Table 9. Opening Year (2016) With Project morning and evening peak hour intersection turning movement volumes are shown on Figures 26 and 27, respectively. Opening Year (2016) With Project Intersection Level of Service worksheets are provided in Appendix C.

The study area intersections are projected to operate within acceptable Levels of Service during the peak hours for Opening Year (2016) With Project traffic conditions using the Intersection Delay Method, except for the following study area intersection which is projected to operate at unacceptable Levels of Service during the peak hours, without improvements (see Table 9):

Beach Boulevard (NS) at:
Catherine Avenue (EW) - #1

For Opening Year (2016) With Project traffic conditions, the study area intersections are projected to operate at acceptable Levels of Service during the peak hours using the Intersection Capacity Utilization Method.

Table 6

Other Development Trip Generation[1]

Traffic Analysis Zone	Project Name	Land Use	Quantity	Units[2]	Peak Hour						Daily
					Morning			Evening			
					Inbound	Outbound	Total	Inbound	Outbound	Total	
1	SP-422-07	Residential PUD	8	DU	1	3	4	3	2	5	60
	SP-470-12	Apartments	24	DU	2	10	12	10	5	15	160
	SP-006-2014	Single-Family Detached Residential	6	DU	1	3	4	4	2	6	57
	SP-466-12TE1	Single-Family Detached Residential	4	DU	1	2	3	3	1	4	38
	Subtotal				5	18	23	20	10	30	315
2	SP-008-2014	Apartments	7	DU	1	3	4	3	2	5	47
3	SP-478-13	Industrial	4.900	TSF	4	1	5	1	4	5	34
Total					10	22	32	24	16	40	396

[1] Source: Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012, Land Use Categories 110, 210, 220, and 270.

[2] DU = Dwelling Units; TSF = Thousand Square Feet

Table 7

Opening Year (2016) Roadway Segment Average Daily Traffic Volumes

Intersection	Leg	Average Daily Traffic Volumes			Percent Increase by Project
		Opening Year (2016) Without Project	Project	Opening Year (2016) With Project	
Beach Boulevard (NS) at Catherine Avenue (EW) - #1	North	72,400	400	72,800	0.5%
	South	72,400	400	72,800	0.5%
	East	1,200	800	2,000	40.0%
	West	0	0	0	0.0%

Table 8

Opening Year (2016) Without Project Intersection Levels of Service

Intersection	Traffic Control[4]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]		Peak Hour V/C - LOS[3]	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening	Morning	Evening
Beach Boulevard (NS) at: Catherine Avenue (EW) - #1	CSS	0	3.5	0.5	1	4	0	0	0	0	0.5	0	0.5	99.9-F[5]	99.9-F	0.444-A	0.493-A

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right;**1** = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service are shown for the individual movement (or movements sharing a single lane) are shown.

[3] Level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008).

[4] CSS = Cross Street Stop

[5] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Table 9

Opening Year (2016) With Project Intersection Levels of Service

Intersection	Traffic Control[4]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]		Peak Hour V/C - LOS[3]	
		Northbound			Southbound			Eastbound			Westbound						
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening	Morning	Evening
Beach Boulevard (NS) at: Catherine Avenue (EW) - #1	CSS	0	3.5	0.5	1	4	0	0	0	0	0.5	0	0.5	99.9-F[5]	99.9-F	0.459-A	0.524-A
Project West Access (NS) at: Catherine Avenue (EW) - #2	**CSS**	0	0	0	**0.5**	0	**0.5**	0	1	0	0	1	0	8.8-A	8.8-A	--	--
Project Central Access (NS) at: Catherine Avenue (EW) - #3	**CSS**	0	0	0	0	0	0	0.5	0.5	0	0	0.5	0.5	7.3-A	7.3-A	--	--
Project East Access (NS) at: Catherine Avenue (EW) - #4	**CSS**	0	0	0	**0.5**	0	**0.5**	0.5	0.5	0	0	0.5	0.5	8.8-A	8.8-A	--	--

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

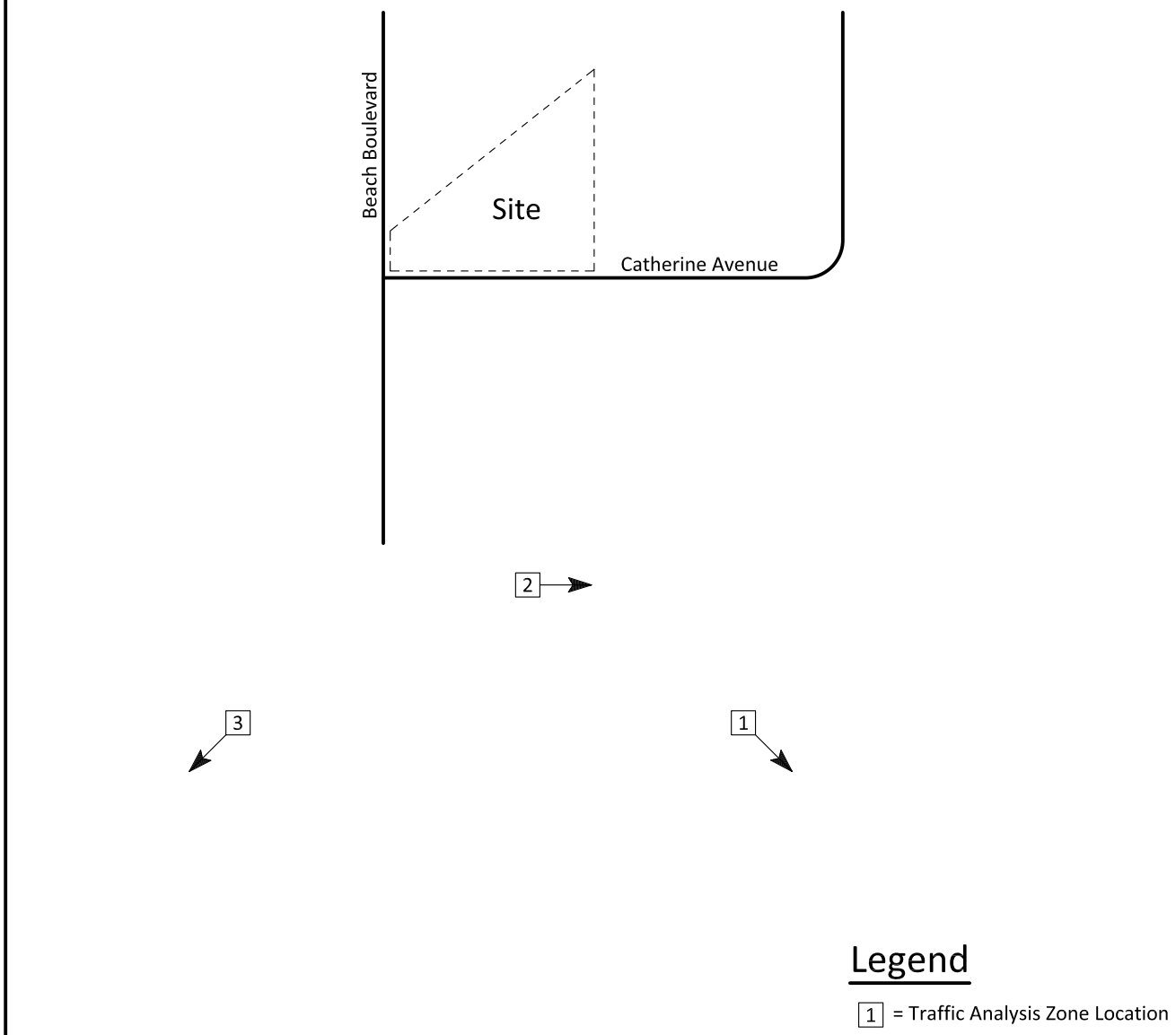
[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service are shown for the individual movement (or movements sharing a single lane) are shown.

[3] Level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008).

[4] CSS = Cross Street Stop

[5] 99.9-F = Delay High, Intersection Unstable, Level of Service F.

Figure 15
Other Development Traffic Analysis Zone Map



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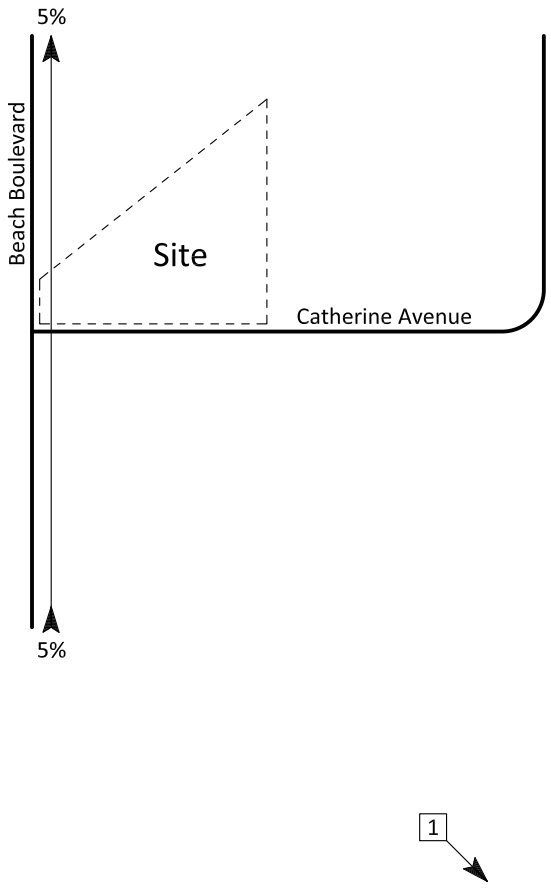
OVER 35 YEARS OF EXCELLENT SERVICE

Figure 16
Other Development (Traffic Analysis Zone 1) Trip Distribution



Legend

10% = Percent To/From Project

N

NTS

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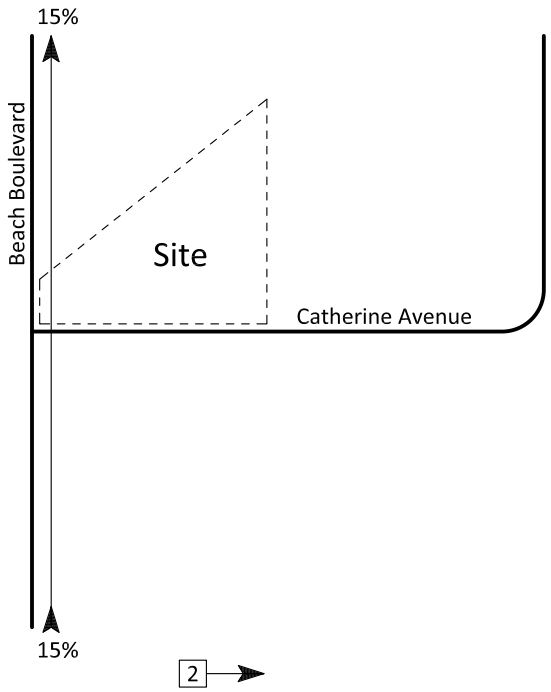
KUNZMAN ASSOCIATES, INC.

OVER 35 YEARS OF EXCELLENT SERVICE

Figure 17
Other Development (Traffic Analysis Zone 2) Trip Distribution



Legend

10% = Percent To/From Project

N

NTS

5648/17

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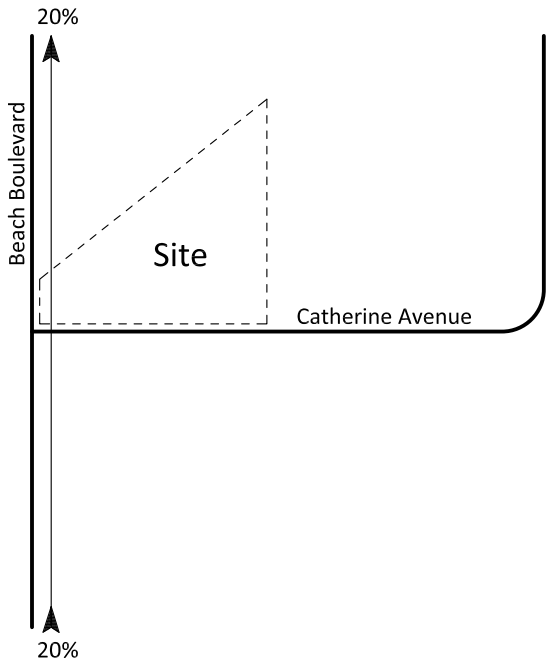
OVER 35 YEARS OF EXCELLENT SERVICE

Figure 18
Other Development (Traffic Analysis Zone 3) Trip Distribution



Legend

10% = Percent To/From Project

NTS

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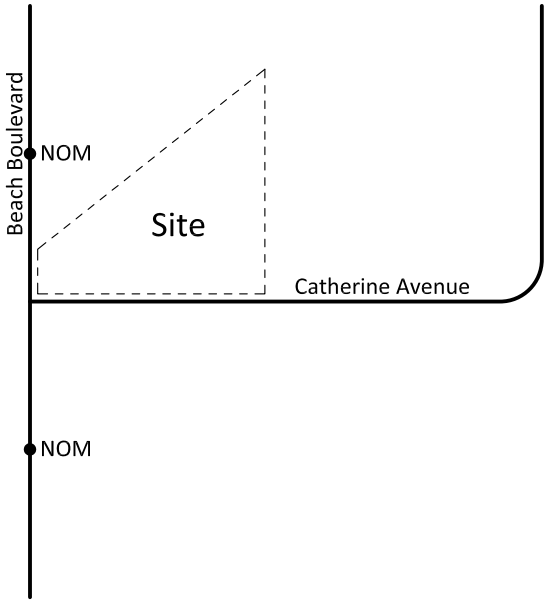
OVER 35 YEARS OF EXCELLENT SERVICE

Figure 19
Other Development Average Daily Traffic Volumes



Legend

NOM = Nominal, Less Than 50 Vehicles Per Day

N

NTS

5648/19

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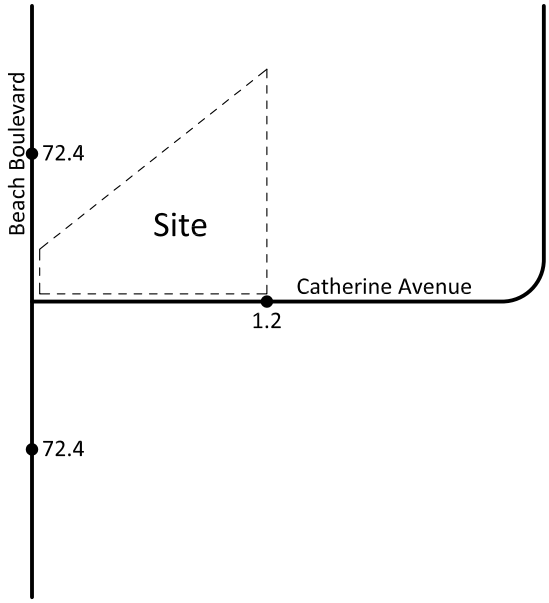
OVER 35 YEARS OF EXCELLENT SERVICE

Figure 20
Opening Year (2016) Without Project Average Daily Traffic Volumes



Legend

72.4 = Vehicles Per Day (1,000's)

N

NTS

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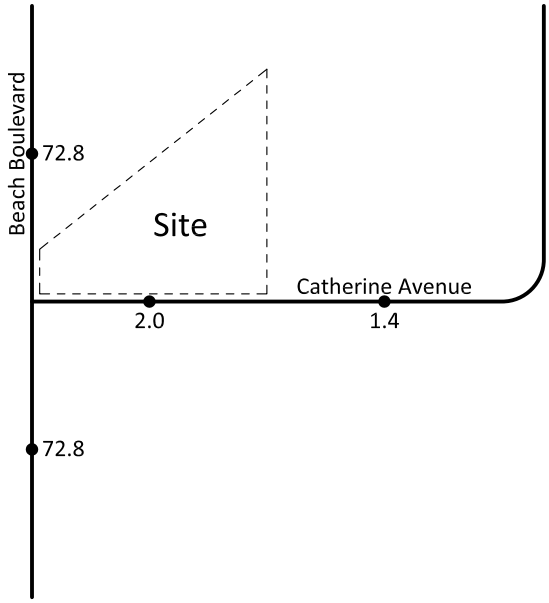
OVER 35 YEARS OF EXCELLENT SERVICE

Figure 21
Opening Year (2016) With Project Average Daily Traffic Volumes



Legend

72.8 = Vehicles Per Day (1,000's)

N

NTS

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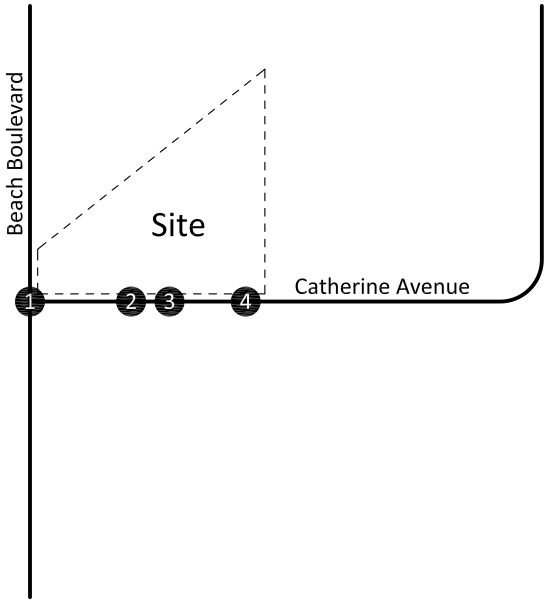
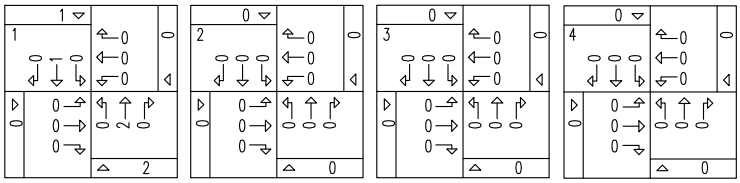
OVER 35 YEARS OF EXCELLENT SERVICE

Figure 22
Other Development
Morning Peak Hour Intersection Turning Movement Volumes





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NTS

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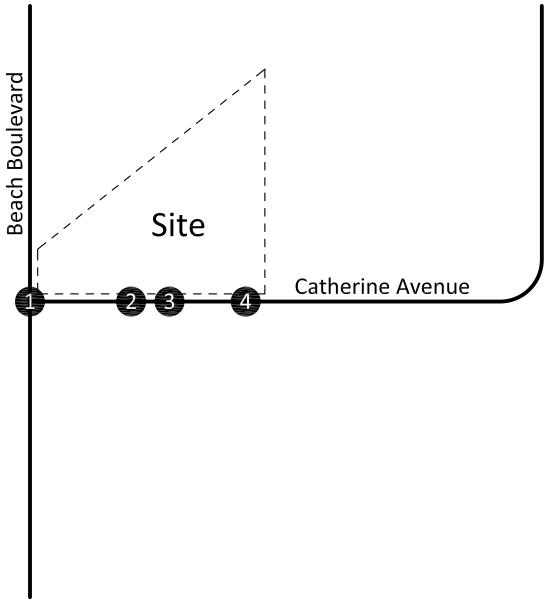
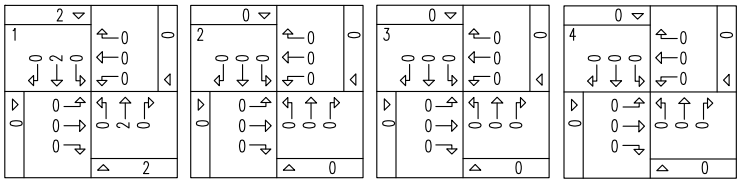
Intersection reference numbers are in upper left corner of turning movement boxes.

Figure 23
Other Development
Evening Peak Hour Intersection Turning Movement Volumes



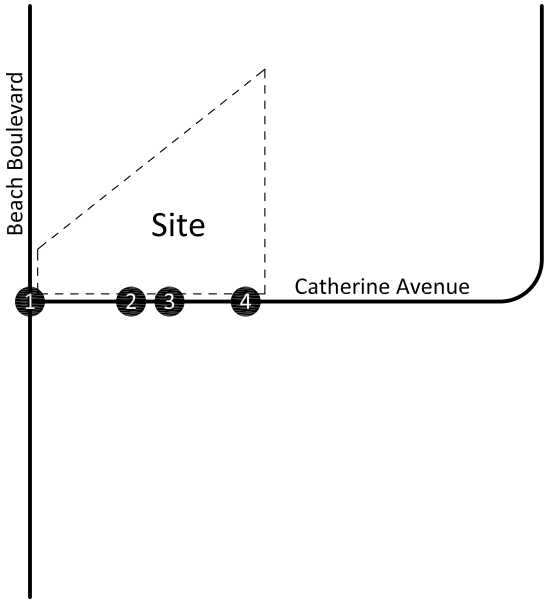


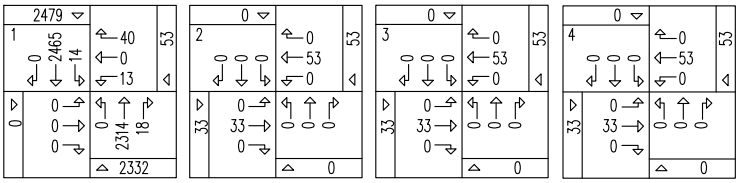
NTS

5648/23

Intersection reference numbers are in upper left corner of turning movement boxes.

Figure 24
Opening Year (2016) Without Project
Morning Peak Hour Intersection Turning Movement Volumes





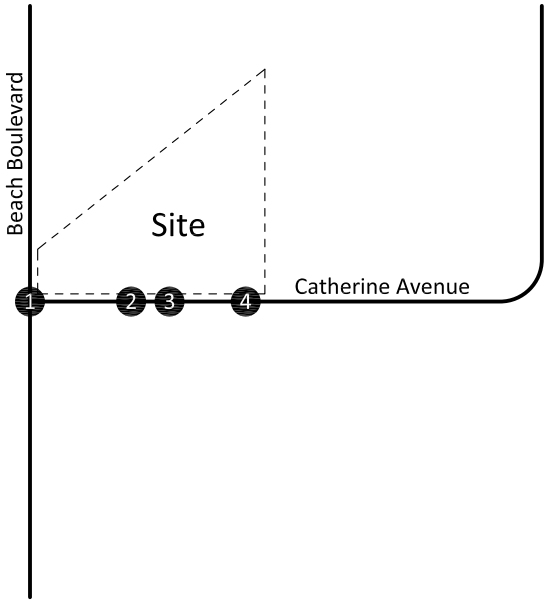
NTS

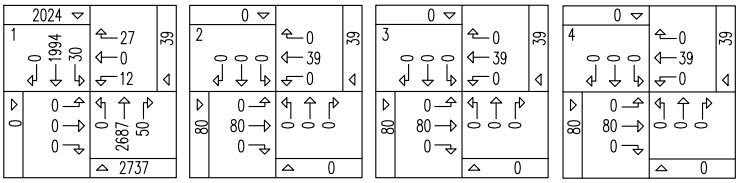
5648/24

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

Over 35 Years of Excellent Service

Figure 25
Opening Year (2016) Without Project
Evening Peak Hour Intersection Turning Movement Volumes





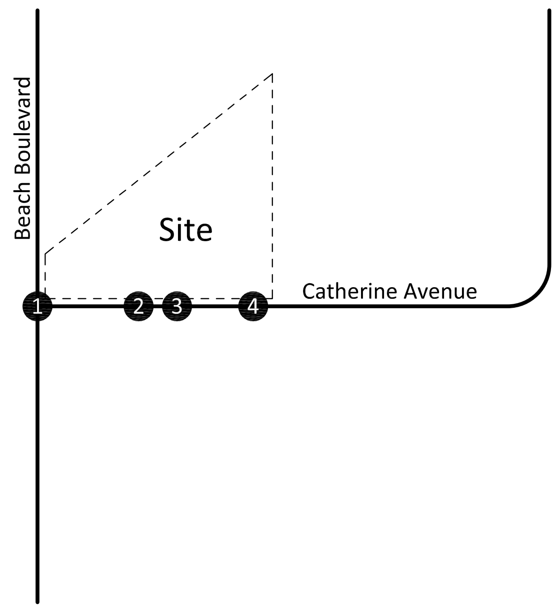
NTS

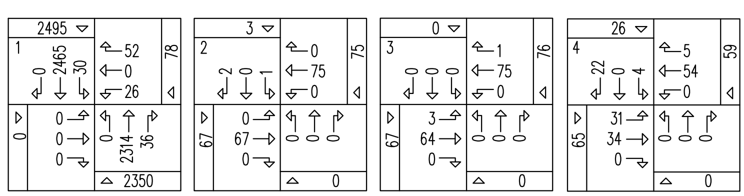
5648/25

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

Over 35 Years of Excellent Service

Figure 26
Opening Year (2016) With Project
Morning Peak Hour Intersection Turning Movement Volumes





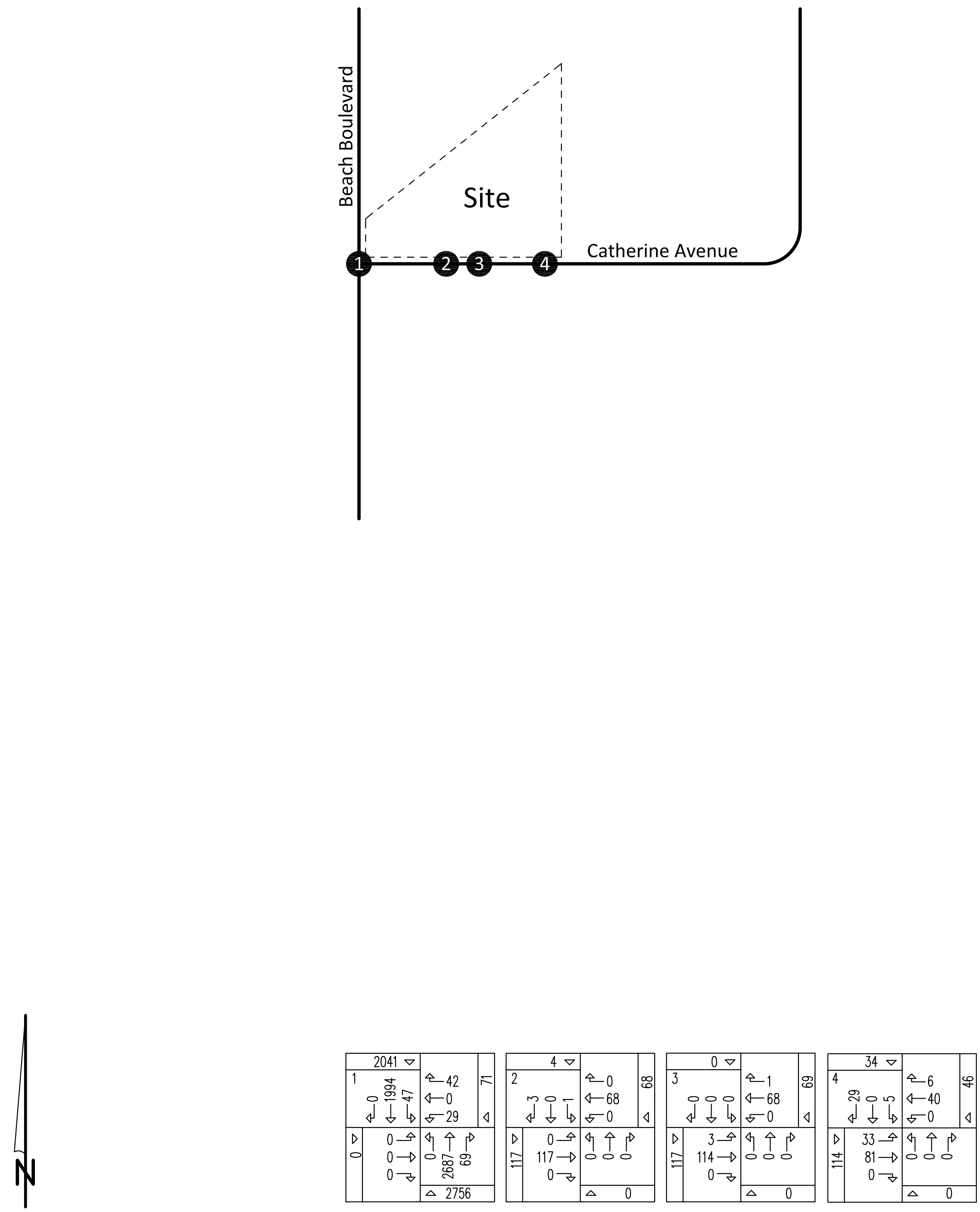
NTS

5648/26

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

Over 35 Years of Excellent Service

Figure 27
Opening Year (2016) With Project
Evening Peak Hour Intersection Turning Movement Volumes



5648/27

Kunzman Associates, Inc. Intersection reference numbers are in upper left corner of turning movement boxes.

Over 35 Years of Excellent Service

VIII. Recommendations

A. Site Access

The project site will have access to Catherine Avenue.

B. Roadway Improvements

Site-specific circulation and access recommendations are depicted on Figure 28.

Construct Catherine Avenue from Beach Boulevard to the east project boundary at its ultimate half-section width including landscaping and parkway improvements in conjunction with development, as necessary.

Construct Beach Boulevard from the north project boundary to Catherine Avenue at its ultimate half-section width as a Smart Street including landscaping and parkway improvements in conjunction with development, as necessary.

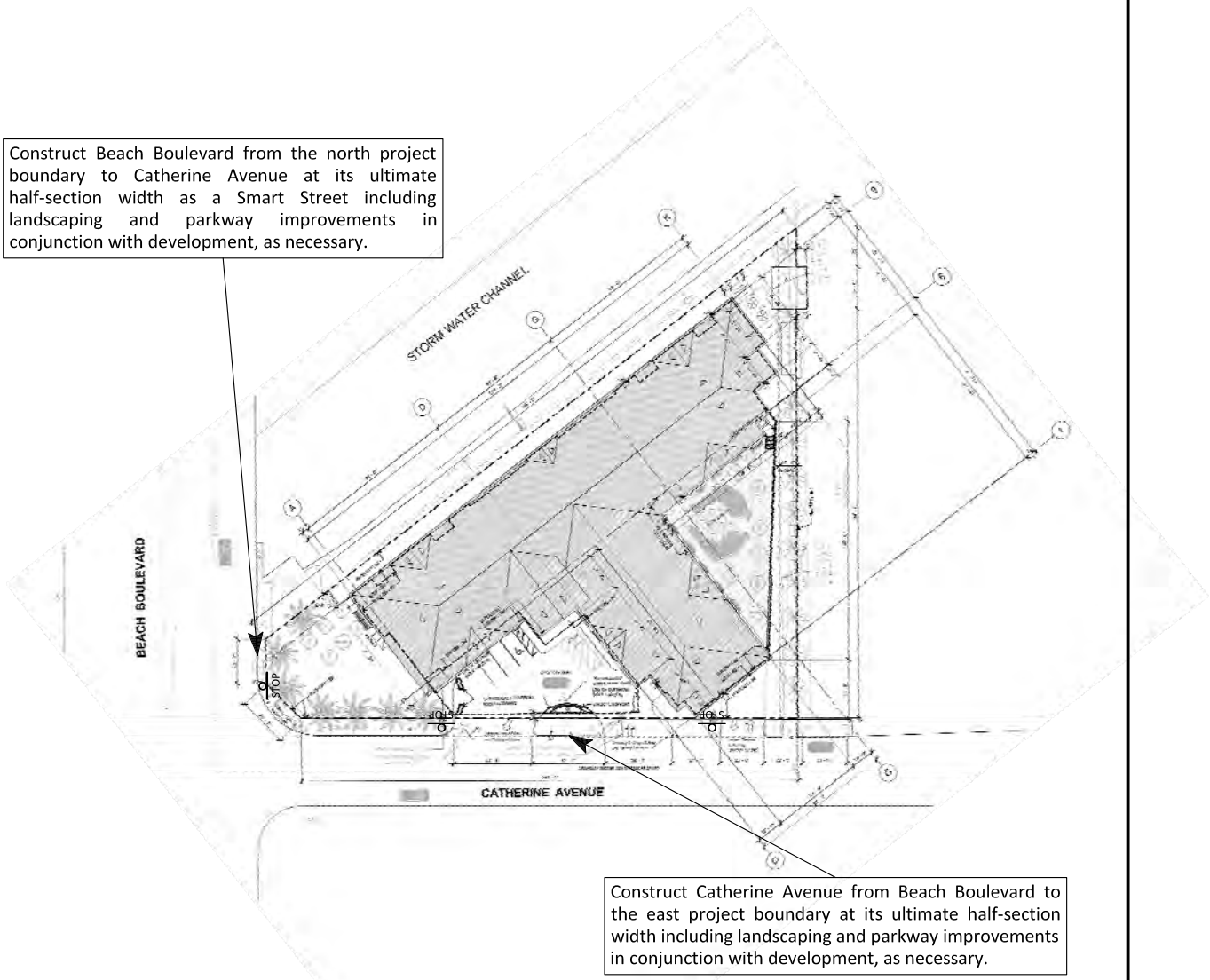
Sufficient on-site parking shall be provided to meet City of Stanton parking code requirements.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

Sight distance at project accesses shall comply with standard California Department of Transportation and City of Stanton sight distance standards. The final grading, landscaping, and street improvement plans shall demonstrate that sight distance standards are met. Such plans must be reviewed by the City and approved as consistent with this measure prior to issue of grading permits.

As is the case for any roadway design, the City of Stanton should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Figure 28
Circulation Recommendations



Construct Beach Boulevard from the north project boundary to Catherine Avenue at its ultimate half-section width as a Smart Street including landscaping and parkway improvements in conjunction with development, as necessary.

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As is the case for any roadway design, the City of Stanton should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

Legend

STOP = Stop Sign

N

NTS

5648/28

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Appendices

Appendix A – Glossary of Transportation Terms

Appendix B – Traffic Count Worksheets

Appendix C – Explanation and Calculation of Intersection Capacity Utilization/Delay

Appendix D – Traffic Signal Warrant Worksheet

APPENDIX A

Glossary of Transportation Terms

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
Caltrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic that will result in a volume during the peak hour equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

ORIGIN-DESTINATION SURVEY: A survey to determine the point of origin and the point of destination for a given vehicle trip.

PASSENGER CAR EQUIVALENTS (PCE): One car is one Passenger Car Equivalent. A truck is equal to 2 or 3 Passenger Car Equivalents in that a truck requires longer to start, goes slower, and accelerates slower. Loaded trucks have a higher Passenger Car Equivalent than empty trucks.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quantity of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

Traffic Count Worksheets

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC, tel: 951 249-0026 pacific@aimtd.com

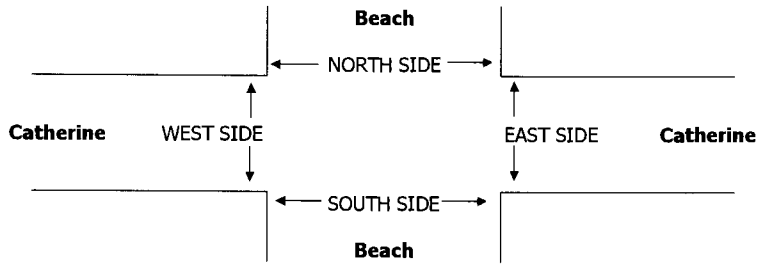
DATE:	LOCATION:	Stanton	PROJECT #:	
Tue, May 20, 14	NORTH & SOUTH:	Beach	LOCATION #:	1
	EAST & WEST:	Catherine	CONTROL:	Stop 1way-W

NOTES:

AM / PM / MD / OTHER / OTHER

N ▲ ◄ W E ► S ▼

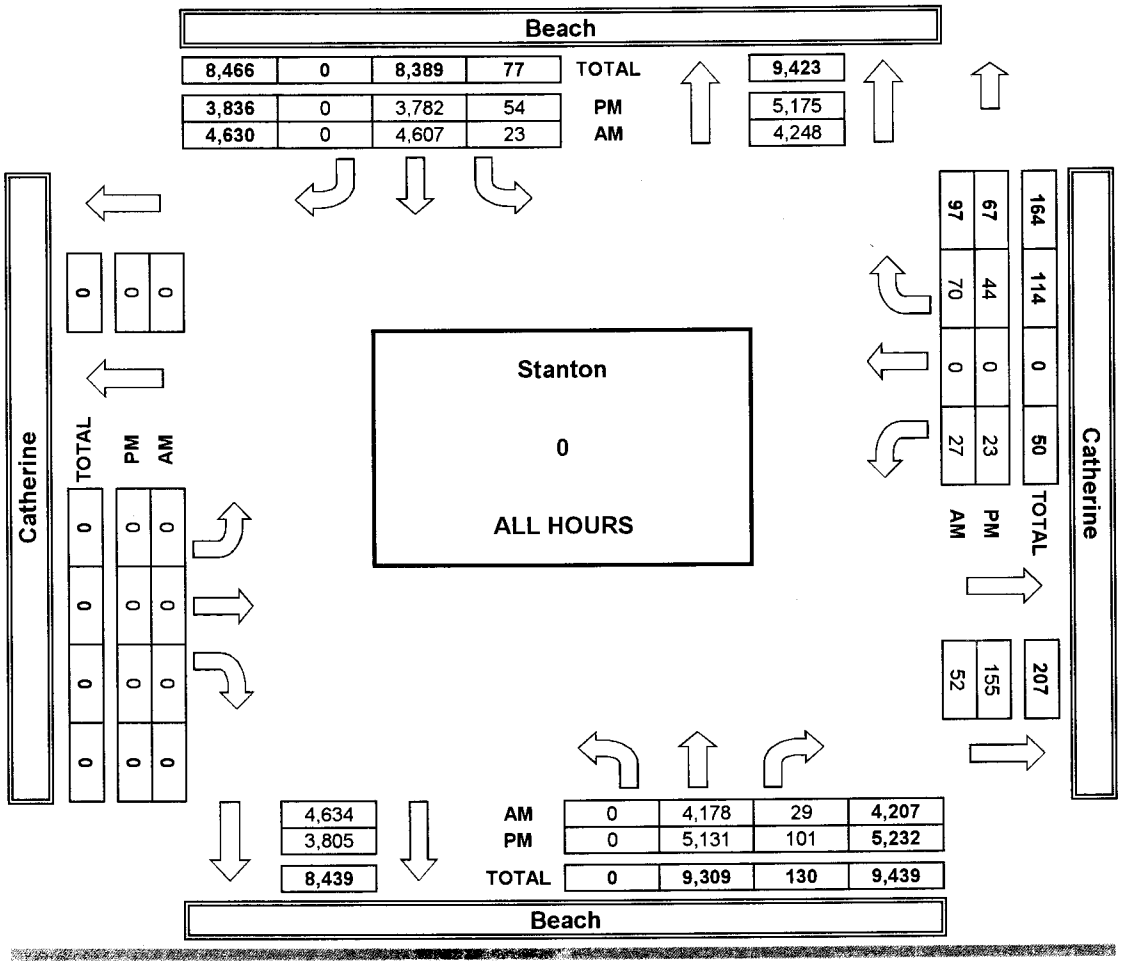
		NORTHBOUND Beach			SOUTHBOUND Beach			EASTBOUND Catherine			WESTBOUND Catherine				U-TURNS				
	LANES:	NL X	NT 4	NR 0	SL 1	ST 4	SR 1	EL 0	ET X	ER X	WL 0.5	WT X	WR 0.5	TOTAL	NB X	SB 0	EB X	WB 0	TTL
AM	7:00 AM	0	448	3	1	495	0	0	0	0	1	0	8	953	0	0	0	0	0
	7:15 AM	0	461	4	1	567	4	0	0	0	3	0	7	1,043	0	5	0	0	5
	7:30 AM	0	566	5	2	588	0	0	0	0	4	0	11	1,176	0	3	0	0	3
	7:45 AM	0	550	5	5	623	0	0	0	0	3	0	13	1,199	0	5	0	0	5
	8:00 AM	0	600	4	4	632	0	0	0	0	1	0	6	1,247	0	5	0	0	5
	8:15 AM	0	551	4	3	573	0	0	0	0	5	0	9	1,145	0	7	0	0	7
	8:30 AM	0	484	4	5	588	0	0	0	0	7	0	11	1,099	0	3	0	0	3
	8:45 AM	0	521	0	2	541	0	0	0	0	3	0	5	1,072	0	4	0	0	4
	VOLUMES	0	4,178	29	23	4,607	0	0	0	0	27	0	70	8,966	0	32	0	0	32
	APPROACH %	0%	99%	1%	0%	100%	0%	0%	0%	0%	28%	0%	72%						
	APP/DEPART	4,207	/	4,280	4,662	/	4,634	0	/	52	97	/	0	0					
	BEGIN PEAK HR		7:30 AM																
	VOLUMES	0	2,267	18	14	2,416	0	0	0	0	13	0	39	4,767					
	APPROACH %	0%	99%	1%	1%	99%	0%	0%	0%	0%	25%	0%	75%						
	PEAK HR FACTOR		0.946			0.955			0.000			0.813		0.956					
	APP/DEPART	2,285	/	2,306	2,430	/	2,429	0	/	32	52	/	0	0					
PM	4:00 PM	0	610	14	5	461	0	0	0	0	4	0	3	1,097	0	5	0	0	5
	4:15 PM	0	599	11	4	483	0	0	0	0	2	0	7	1,106	0	5	0	0	5
	4:30 PM	0	592	13	8	452	0	0	0	0	2	0	3	1,070	0	9	0	0	9
	4:45 PM	0	667	14	11	480	0	0	0	0	2	0	6	1,180	0	5	0	0	5
	5:00 PM	0	657	13	5	485	0	0	0	0	3	0	9	1,172	0	4	0	0	4
	5:15 PM	0	675	12	7	509	0	0	0	0	1	0	5	1,209	0	3	0	0	3
	5:30 PM	0	633	10	6	479	0	0	0	0	5	0	6	1,140	0	5	0	0	5
	5:45 PM	0	698	14	8	433	0	0	0	0	3	0	5	1,161	0	3	0	0	3
	VOLUMES	0	5,131	101	54	3,782	0	0	0	0	23	0	44	9,174	0	39	0	0	39
	APPROACH %	0%	98%	2%	1%	99%	0%	0%	0%	0%	34%	0%	66%						
	APP/DEPART	5,232	/	5,214	3,875	/	3,805	0	/	155	67	/	0	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	0	2,632	49	29	1,953	0	0	0	0	12	0	26	4,701					
	APPROACH %	0%	98%	2%	1%	99%	0%	0%	0%	0%	32%	0%	68%						
	PEAK HR FACTOR		0.976			0.960			0.000			0.792		0.972					
	APP/DEPART	2,681	/	2,658	1,982	/	1,965	0	/	78	38	/	0	0					

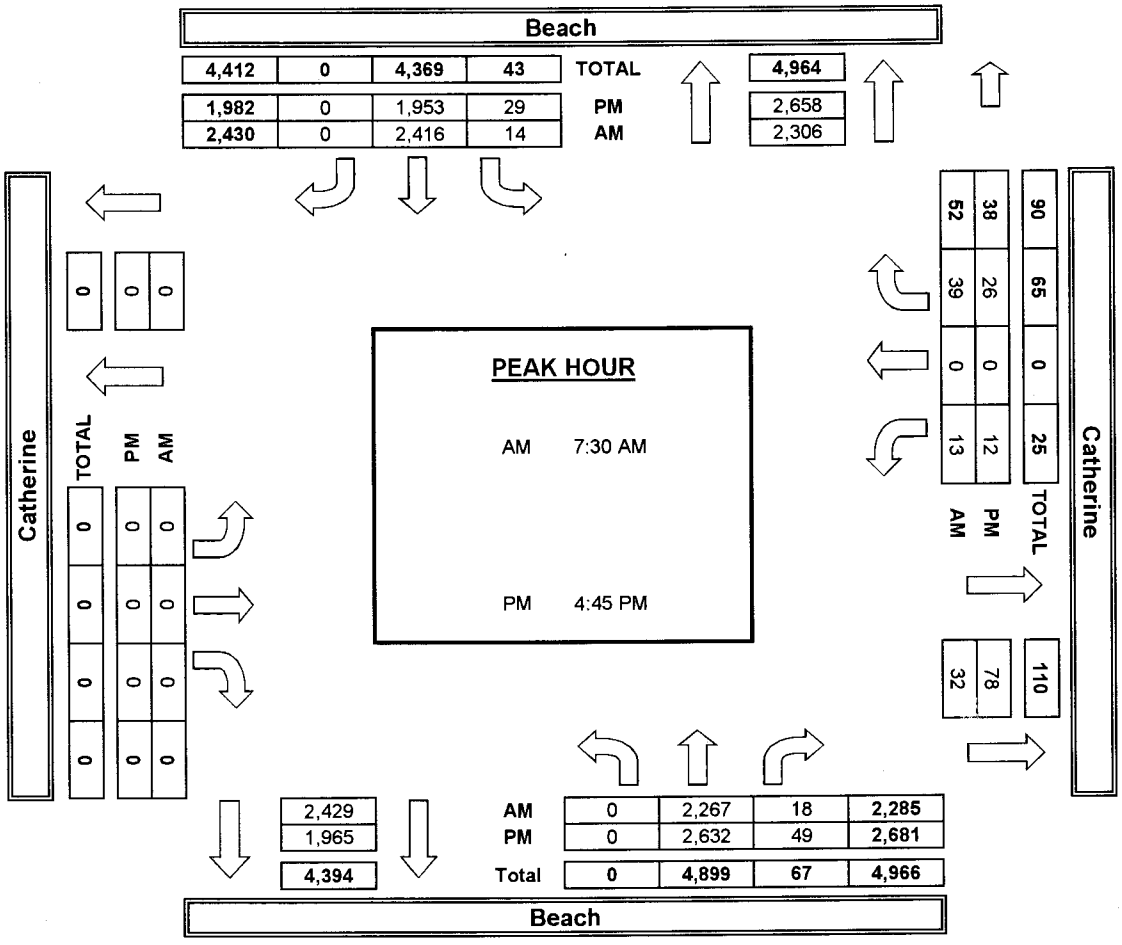


		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TRAFFIC DATA SERVICES

TURNING MOVEMENT COUNTS





APPENDIX C

Explanation and Calculation of Intersection Capacity Utilization/Delay

EXPLANATION AND CALCULATION OF INTERSECTION CAPACITY UTILIZATION

Overview

The ability of a roadway to carry traffic is referred to as capacity. The capacity is usually greater between intersections and less at intersections because traffic flows continuously between them and only during the green phase at them. Capacity at intersections is best defined in terms of vehicles per lane per hour of green. If capacity is 1600 vehicles per lane per hour of green, and if the green phase is 50 percent of the cycle and there are three lanes, then the capacity is 1600 times 50 percent times 3 lanes, or 2400 vehicles per hour for that approach.

The technique used to compare the volume and capacity at an intersection is known as Intersection Capacity Utilization. Intersection Capacity Utilization, usually expressed as a percent, is the proportion of an hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity. If an intersection is operating at 80 percent of capacity (i.e., an Intersection Capacity Utilization of 80 percent), then 20 percent of the signal cycle is not used. The signal could show red on all indications 20 percent of the time and the signal would just accommodate approaching traffic.

Intersection Capacity Utilization analysis consists of (a) determining the proportion of signal time needed to serve each conflicting movement of traffic, (b) summing the times for the movements, and (c) comparing the total time required to the total time available. For example, if for north-south traffic the northbound traffic is 1600 vehicles per hour, the southbound traffic is 1200 vehicles per hour, and the capacity of either direction is 3200 vehicles per hour, then the northbound traffic is critical and requires 1600/3200 or 50 percent of the signal time. If for east-west traffic, 30 percent of the signal time is required, then it can be seen that the Intersection Capacity Utilization is 50 plus 30, or 80 percent. When left turn arrows (left turn phasing) exist, they are incorporated into the analysis. The critical movements are usually the heavy left turn movements and the opposing through movements.

The Intersection Capacity Utilization technique is an ideal tool to quantify existing as well as future intersection operation. The impact of adding a lane can be quickly determined by examining the effect the lane has on the Intersection Capacity Utilization.

Intersection Capacity Utilization Worksheets That Follow This Discussion

The Intersection Capacity Utilization worksheet table contains the following information:

1. Peak hour turning movement volumes.

2. Number of lanes that serve each movement.

3. For right turn lanes, whether the lane is a free right turn lane, whether it has a right turn arrow, and the percent of right turns on red that are assumed.

4. Capacity assumed per lane.

5. Capacity available to serve each movement (number of lanes times capacity per lane).

6. Volume to capacity ratio for each movement.

7. Whether the movement's volume to capacity ratio is critical and adds to the Intersection Capacity Utilization value.

8. The yellow time or clearance interval assumed.

9. Adjustments for right turn movements.

10. The Intersection Capacity Utilization and Level of Service.

The Intersection Capacity Utilization Worksheet also has two graphics on the same page. These two graphics show the following:

1. Peak hour turning movement volumes.

2. Number of lanes that serve each movement.

3. The approach and exit leg volumes.

4. The two-way leg volumes.

5. An estimate of daily traffic volumes that is fairly close to actual counts and is based strictly on the peak hour leg volumes multiplied by a factor.

6. Percent of daily traffic in peak hours.

7. Percent of peak hour leg volume that is inbound versus outbound.

A more detailed discussion of Intersection Capacity Utilization and Level of Service follows.

Level of Service

Level of Service is used to describe the quality of traffic flow. Levels of Service A to C operate quite well. Level of Service C is typically the standard to which rural roadways are designed.

Level of Service D is characterized by fairly restricted traffic flow. Level of Service D is the standard to which urban roadways are typically designed. Level of Service E is the maximum volume a facility can accommodate and will result in possible stoppages of momentary duration. Level of Service F occurs when a facility is overloaded and is characterized by stop-and-go traffic with stoppages of long duration.

A description of the various Levels of Service appears at the end of the ICU description, along with the relationship between Intersection Capacity Utilization and Level of Service.

Signalized and Unsignalized Intersections

Although calculating an Intersection Capacity Utilization value for an unsignalized intersection is invalid, the presumption is that a signal can be installed and the calculation shows whether the geometrics are capable of accommodating the expected volumes with a signal. A traffic signal becomes warranted before Level of Service D is reached for a signalized intersection.

Signal Timing

The Intersection Capacity Utilization calculation assumes that a signal is properly timed. It is possible to have an Intersection Capacity Utilization well below 100 percent, yet have severe traffic congestion. This would occur if one or more movements is not getting sufficient green time to satisfy its demand, and excess green time exists on other movements. This is an operational problem that should be remedied.

Lane Capacity

Capacity is often defined in terms of roadway width; however, standard lanes have approximately the same capacity whether they are 11 or 14 feet wide. Our data indicates a typical lane, whether a through lane or a left turn lane, has a capacity of

approximately 1750 vehicles per hour of green time, with nearly all locations showing a capacity greater than 1600 vehicles per hour of green per lane. Right turn lanes have a slightly lower capacity; however 1600 vehicles per hour is a valid capacity assumption for right turn lanes.

This finding is published in the August, 1978 issue of Institute of Transportation Engineers Journal in the article entitled, "Another Look at Signalized Intersection Capacity" by William Kunzman. A capacity of 1600 vehicles per hour per lane with no yellow time penalty, or 1700 vehicles per hour with a 3 or 5 percent yellow time penalty is reasonable.

Yellow Time

The yellow time can either be assumed to be completely used and no penalty applied, or it can be assumed to be only partially usable. Total yellow time accounts for approximately 10 percent of a signal cycle, and a penalty of 3 to 5 percent is reasonable.

During peak hour traffic operation the yellow times are nearly completely used. If there is no left turn phasing, the left turn vehicles completely use the yellow time. Even if there is left turn phasing, the through traffic continues to enter the intersection on the yellow until just a split second before the red.

Shared Lanes

Shared lanes occur in many locations. A shared lane is often found at the end of an off ramp where the ramp forms an intersection with the cross street. Often at a diamond interchange off ramp, there are three lanes. In the case of a diamond interchange, the middle lane is sometimes shared, and the driver can turn left, go through, or turn right from that lane.

If one assumes a three lane off ramp as described above, and if one assumes that each lane has 1600 capacity, and if one assumes that there are 1000 left turns per hour, 500 right turns per hour, and 100 through vehicles per hour, then how should one assume that the three lanes operate. There are three ways that it is done.

One way is to just assume that all 1600 vehicles (1000 plus 500 plus 100) are served simultaneously by three lanes. When this is done, the capacity is 3 times 1600 or 4800, and the amount of green time needed to serve the ramp is 1600 vehicles divided by 4800 capacity or 33.3 percent. This assumption effectively assumes perfect lane distribution between the three lanes that is not realistic. It also means a left turn can be made from the right lane.

Another way is to equally split the capacity of a shared lane and in this case to assume there are 1.33 left turn lanes, 1.33 right turn lanes, and 0.33 through lanes. With this assumption, the critical movement is the left turns and the 1000 left turns are served by a capacity of 1.33 times 1600, or 2133. The volume to capacity ratio of the critical move is 1000 divided by 2133 or 46.9 percent.

The first method results in a critical move of 33.3 percent and the second method results in a critical move of 46.9 percent. Neither is very accurate, and the difference in the calculated Level of Service will be approximately 1.5 Levels of Service (one Level of Service is 10 percent).

The way Kunzman Associates, Inc. does it is to assign fractional lanes in a reasonable way. In this example, it would be assumed that there is 1.1 right turn lanes, 0.2 through lanes, and 1.7 left turn lanes. The volume to capacity ratios for each movement would be 31.3 percent for the through traffic, 28.4 percent for the right turn movement, and 36.8 percent for the left turn movement. The critical movement would be the 36.8 percent for the left turns.

Right Turn on Red

The Kunzman Associates, Inc. software treats right turn lanes in one of five different ways. Each right turn lane is classified into one of five cases. The five cases are (1) free right turn lane, (2) right turn lane with separate right turn arrow, (3) standard right turn lane with no right turns on red allowed, (4) standard right turn lane with a certain percentage of right turns on red allowed, and (5) separate right turn arrow and a certain percentage of right turns on red allowed.

Free Right Turn Lane

If it is a free right turn lane, then it is given a capacity of one full lane with continuous or 100 percent green time. A Free right turn lane occurs when there is a separate approach lane for right turning vehicles, there is a separate departure lane for the right turning vehicles after they turn and are exiting the intersection, and the through cross street traffic does not interfere with the vehicles after they turn right.

Separate Right Turn Arrow

If there is a separate right turn arrow, then it is assumed that vehicles are given a green indication and can proceed on what is known as the left turn overlap.

The left turn overlap for a northbound right turn is the westbound left turn. When the left turn overlap has a green indication, the right turn lane is also given a green arrow

indication. Thus, if there is a northbound right turn arrow, then it can be turned green for the period of time that the westbound left turns are proceeding.

If there are more right turns than can be accommodated during the northbound through green and the time that the northbound right turn arrow is on, then an adjustment is made to the Intersection Capacity Utilization to account for the green time that needs to be added to the northbound through green to accommodate the northbound right turns.

Standard Right Turn Lane, No Right Turns on Red

A standard right turn lane, with no right turn on red assumed, proceeds only when there is a green indication displayed for the adjacent through movement. If additional green time is needed above that amount of time, then in the Intersection Capacity Utilization calculation a right turn adjustment green time is added above the green time that is needed to serve the adjacent through movement.

Standard Right Turn Lane, With Right Turns on Red

A standard right turn lane with say 20 percent of the right turns allowed to turn right on a red indication is calculated the same as the standard right turn case where there is no right turn on red allowed, except that the right turn adjustment is reduced to account for the 20 percent of the right turning vehicles that can logically turn right on a red light. The right turns on red are never allowed to exceed the time the overlap left turns take plus the unused part of the green cycle that the cross street traffic moving from left to right has.

As an example of how 20 percent of the cars are allowed to turn right on a red indication, assume that the northbound right turn volume needs 40 percent of the signal cycle to be satisfied. To allow 20 percent of the northbound right turns to turn right on red, then during 8 percent of the signal cycle (40 percent of signal cycle times 20 percent that can turn right on red) right turns on red will be allowed if it is feasible.

For this example, assume that 15 percent of the signal cycle is green for the northbound through traffic, and that means that 15 percent of the signal cycle is available to satisfy northbound right turns. After the northbound through traffic has received its green, 25 percent of the signal cycle is still needed to satisfy the northbound right turns (40 percent of the signal cycle minus the 15 percent of the signal cycle that the northbound through used).

Assume that the westbound left turns require a green time of 6 percent of the signal cycle. This 6 percent of the signal cycle is used by northbound right turns on red. After accounting for the northbound right turns that occur on the westbound overlap

left turn, 19 percent of the signal cycle is still needed for the northbound right turns (25 percent of the cycle was needed after the northbound through green time was accounted for [see above paragraph], and 6 percent was served during the westbound left turn overlap). Also, at this point 6 percent of the signal cycle has been used for northbound right turns on red, and still 2 percent more of the right turns will be allowed to occur on the red if there is unused eastbound through green time.

For purpose of this example, assume that the westbound through green is critical, and that 15 percent of the signal cycle is unused by eastbound through traffic. Thus, 2 percent more of the signal cycle can be used by the northbound right turns on red since there is 15 seconds of unused green time being given to the eastbound through traffic.

At this point, 8 percent of the signal cycle was available to serve northbound right turning vehicles on red, and 15 percent of the signal cycle was available to serve right turning vehicles on the northbound through green. So 23 percent of the signal cycle has been available for northbound right turns.

Because 40 percent of the signal cycle is needed to serve northbound right turns, there is still a need for 17 percent more of the signal cycle to be available for northbound right turns. What this means is the northbound through traffic green time is increased by 17 percent of the cycle length to serve the unserved right turn volume, and a 17 percent adjustment is added to the Intersection Capacity Utilization to account for the northbound right turns that were not served on the northbound through green time or when right turns on red were assumed.

Separate Right Turn Arrow, With Right Turns on Red

A right turn lane with a separate right turn arrow, plus a certain percentage of right turns allowed on red is calculated the same way as a standard right turn lane with a certain percentage of right turns allowed on red, except the turns which occur on the right turn arrow are not counted as part of the percentage of right turns that occur on red.

Critical Lane Method

Intersection Capacity Utilization parallels another calculation procedure known as the Critical Lane Method with one exception. Critical Lane Method dimensions capacity in terms of standardized vehicles per hour per lane. A Critical Lane Method result of 800 vehicles per hour means that the intersection operates as though 800 vehicles were using a single lane continuously. If one assumes a lane capacity of 1600 vehicles per hour, then a Critical Lane Method calculation resulting in 800 vehicles per hour is the same as an Intersection Capacity Utilization calculation of 50 percent since 800/1600

is 50 percent. It is our opinion that the Critical Lane Method is inferior to the Intersection Capacity Utilization method simply because a statement such as "The Critical Lane Method value is 800 vehicles per hour" means little to most persons, whereas a statement such as "The Intersection Capacity Utilization is 50 percent" communicates clearly. Critical Lane Method results directly correspond to Intersection Capacity Utilization results. The correspondence is as follows, assuming a lane capacity of 1600 vehicles per hour and no clearance interval.

Critical Lane Method Result	Intersection Capacity Utilization Result
800 vehicles per hour	50 percent
960 vehicles per hour	60 percent
1120 vehicles per hour	70 percent
1280 vehicles per hour	80 percent
1440 vehicles per hour	90 percent
1600 vehicles per hour	100 percent
1760 vehicles per hour	110 percent

INTERSECTION CAPACITY UTILIZATION
LEVEL OF SERVICE DESCRIPTION[1]

Level of Service	Description	Volume to Capacity Ratio
A	Level of Service A occurs when progression is extremely favorable and vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0.600 and below
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average delay.	0.601 to 0.700
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	0.701 to 0.800
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	0.801 to 0.900
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent.	0.901 to 1.000
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs when oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	1.001 and up

[1]Source: Highway Capacity Manual Special Report 209, Transportation Research Board, National Research Council Washington D.C., 2000.

EXPLANATION AND CALCULATION OF INTERSECTION LEVEL OF SERVICE USING DELAY METHODOLOGY

The levels of service at the unsignalized and signalized intersections are calculated using the delay methodology in the Highway Capacity Manual. This methodology views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth. It is also possible for one lane to serve two lane groups. A shared lane might result in there being 1.5 lanes in the northbound left turn lane group and 2.5 lanes in the northbound through lane group.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity per lane time's 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned when a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns

10. Left turns

11. Pedestrian activity

12. Signal progression

The maximum theoretical lane capacity and the 12 adjustment factors for it are all unknowns for which approximate estimates have been recommended in the Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. However, it is possible to use the delay method and get reasonable results as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length

2. Amount of red time faced by a lane group

3. Amount of yellow time for that lane group

4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in the table that follows this discussion.

Experience has shown that when a maximum lane capacity of 1,900 vehicles per hour is used (as recommended in the Highway Capacity Manual), little or no yellow time penalty is used, and none of the 12 penalty factors are applied, calculated delay is realistic. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used.

An idiosyncrasy of the delay methodology is that it is possible to add traffic to an intersection and reduce the average total delay per vehicle. If the average total delay is 30 seconds per vehicle for all vehicles traveling through an intersection, and traffic is added to a movement that has an average total delay of 15 seconds per vehicle, then the overall average total delay is reduced.

The delay calculation for a lane group is based on a concept that the delay is a function of the amount of unused capacity available. As the volume approaches capacity and there is no more unused capacity available, then the delay rapidly increases. Delay is not proportional to volume, but rather increases rapidly as the unused capacity approaches zero.

Because delay is not linearly related to volumes, the delay does not reflect how close an intersection is to overloading. If an intersection is operating at Level of Service C and has an average total delay of 18 seconds per vehicle, you know very little as to what percent the traffic can increase before Level of Service E is reached.

DELAY METHODOLOGY
LEVEL OF SERVICE DESCRIPTION[1]

Level Of Service	Description	Average Total Delay Per Vehicle (Seconds)	
		Signalized	Unsignalized
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 10.00	0 to 10.00
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average total delay.	10.01 to 20.00	10.01 to 15.00
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.01 to 35.00	15.01 to 25.00
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.01 to 55.00	25.01 to 35.00
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	55.01 to 80.00	35.01 to 50.00
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	80.01 and up	50.01 and up

[1] Source: Highway Capacity Manual Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 2000.

Existing

12282 Beach Boulevard Project
Existing
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 3.6 Worst Case Level Of Service: F[327.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2267	18	14	2416	0	0	0	0	13	0	39
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2267	18	14	2416	0	0	0	0	13	0	39
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2267	18	14	2416	0	0	0	0	13	0	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	2267	18	14	2416	0	0	0	0	13	0	39
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.8	6.5	6.9
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2285	xxxx	xxxxx	xxxx	xxxx	xxxxx	2908	4720	576
Potent Cap.:	xxxx	xxxx	xxxxx	225	xxxx	xxxxx	xxxx	xxxx	xxxxx	13	1	466
Move Cap.:	xxxx	xxxx	xxxxx	225	xxxx	xxxxx	xxxx	xxxx	xxxxx	12	1	466
Volume/Cap:	xxxx	xxxx	xxxx	0.06	xxxx	xxxx	xxxx	xxxx	xxxx	1.07	0.00	0.08
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	22.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	C	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	45	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.9	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	327	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	F	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			327.5		
ApproachLOS:	*			*			*			F		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Existing
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 6.6 Worst Case Level Of Service: F[789.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 3	1	0	1 0 4	0	0	0 0 0	0	0	0 0 1!	0	0
Volume Module:												
Base Vol:	0 2632		49	29 1953		0	0	0	0	12	0	26
Growth Adj:	1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00
Initial Bse:	0 2632		49	29 1953		0	0	0	0	12	0	26
Added Vol:	0 0		0	0 0		0	0	0	0	0	0	0
PasserByVol:	0 0		0	0 0		0	0	0	0	0	0	0
Initial Fut:	0 2632		49	29 1953		0	0	0	0	12	0	26
User Adj:	1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00
PHF Adj:	1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00
PHF Volume:	0 2632		49	29 1953		0	0	0	0	12	0	26
Reduct Vol:	0 0		0	0 0		0	0	0	0	0	0	0
FinalVolume:	0 2632		49	29 1953		0	0	0	0	12	0	26
Critical Gap Module:												
Critical Gp:	xxxxx xxxx		xxxxx	4.1 xxxx		xxxxx	xxxxx xxxx		xxxxx	6.8	6.5	6.9
FollowUpTim:	xxxxx xxxx		xxxxx	2.2 xxxx		xxxxx	xxxxx xxxx		xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx xxxx		xxxxx	2681 xxxx		xxxxx	xxxx xxxx		xxxxx	3203	4668	683
Potent Cap.:	xxxx xxxx		xxxxx	157 xxxx		xxxxx	xxxx xxxx		xxxxx	8	1	397
Move Cap.:	xxxx xxxx		xxxxx	157 xxxx		xxxxx	xxxx xxxx		xxxxx	7	1	397
Volume/Cap:	xxxx xxxx		xxxx	0.18 xxxx		xxxx	xxxx xxxx		xxxx	1.77	0.00	0.07
Level Of Service Module:												
2Way95thQ:	xxxx xxxx		xxxxx	0.7 xxxx		xxxxx	xxxx xxxx		xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx xxxx		xxxxx	33.0 xxxx		xxxxx	xxxxx xxxx		xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	* *		*	D *		*	* *		*	*	*	*
Movement:	LT - LTR	-	RT	LT - LTR	-	RT	LT - LTR	-	RT	LT - LTR	-	RT
Shared Cap.:	xxxx xxxx		xxxxx	xxxx xxxx		xxxxx	xxxx xxxx		xxxxx	xxxx	21	xxxxx
SharedQueue:	xxxxx xxxx		xxxxx	xxxxx xxxx		xxxxx	xxxxx xxxx		xxxxx	xxxxx	5.0	xxxxx
Shrd ConDel:	xxxxx xxxx		xxxxx	xxxxx xxxx		xxxxx	xxxxx xxxx		xxxxx	xxxxx	789	xxxxx
Shared LOS:	* *		*	* *		*	* *		*	*	F	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			789.3		
ApproachLOS:	*			*			*			F		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Existing
Morning Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.436
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	1	0	1 0 4	0	0	0 0 0	0	0	0 0 1!	0	0
Volume Module:												
Base Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2267	18	14	2416	0	0	0	0	13	0	39
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2267	18	14	2416	0	0	0	0	13	0	39
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2267	18	14	2416	0	0	0	0	13	0	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2267	18	14	2416	0	0	0	0	13	0	39
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.97	0.03	1.00	4.00	0.00	0.00	0.00	0.00	0.25	0.00	0.75
Final Sat.:	0	6746	54	1700	6800	0	0	0	0	425	0	1275
Capacity Analysis Module:												
Vol/Sat:	0.00	0.34	0.34	0.01	0.36	0.00	0.00	0.00	0.00	0.01	0.00	0.03
Crit Moves:	****				****							****

12282 Beach Boulevard Project
Existing
Evening Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.484
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2632	49	29	1953	0	0	0	0	12	0	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2632	49	29	1953	0	0	0	0	12	0	26
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2632	49	29	1953	0	0	0	0	12	0	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2632	49	29	1953	0	0	0	0	12	0	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2632	49	29	1953	0	0	0	0	12	0	26
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2632	49	29	1953	0	0	0	0	12	0	26
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.93	0.07	1.00	4.00	0.00	0.00	0.00	0.00	0.32	0.00	0.68
Final Sat.:	0	6676	124	1700	6800	0	0	0	0	537	0	1163
Capacity Analysis Module:												
Vol/Sat:	0.00	0.39	0.39	0.02	0.29	0.00	0.00	0.00	0.00	0.01	0.00	0.02
Crit Moves:		****		****								****

Existing Plus Project

12282 Beach Boulevard Project
Existing Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

****

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

****

Average Delay (sec/veh): 15.8 Worst Case Level Of Service: F[979.8]

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 3 1 0			1 0 4 0 0			0 0 0 0 0			0 0 1! 0 0		
Volume Module:												
Base Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2267	18	14	2416	0	0	0	0	13	0	39
Added Vol:	0	0	18	16	0	0	0	0	0	13	0	12
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2267	36	30	2416	0	0	0	0	26	0	51
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2267	36	30	2416	0	0	0	0	26	0	51
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	2267	36	30	2416	0	0	0	0	26	0	51
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.8	6.5	6.9
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2303	xxxx	xxxxx	xxxx	xxxx	xxxxx	2949	4761	585
Potent Cap.:	xxxx	xxxx	xxxxx	221	xxxx	xxxxx	xxxx	xxxx	xxxxx	12	1	459
Move Cap.:	xxxx	xxxx	xxxxx	221	xxxx	xxxxx	xxxx	xxxx	xxxxx	11	1	459
Volume/Cap:	xxxx	xxxx	xxxx	0.14	xxxx	xxxx	xxxx	xxxx	xxxx	2.44	0.00	0.11
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.5	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	23.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	C	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	30	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	980	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	F	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			979.8		
ApproachLOS:	*			*			*			F		

****

Note: Queue reported is the number of cars per lane.

****

12282 Beach Boulevard Project
Existing Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 36.5 Worst Case Level Of Service: F[2461.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	3	1	0		1	0	4	0	0		0	0	0	0	0		0	0	1!	0	0	
Volume Module:																								
Base Vol:		0	2632		49		29	1953		0			0		0		0		12		0		26	
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
Initial Bse:		0	2632		49		29	1953		0			0		0		0		12		0		26	
Added Vol:		0	0		19		17	0		0			0		0		0		17		0		15	
PasserByVol:		0	0		0		0	0		0			0		0		0		0		0		0	
Initial Fut:		0	2632		68		46	1953		0			0		0		0		29		0		41	
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
PHF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
PHF Volume:		0	2632		68		46	1953		0			0		0		0		29		0		41	
Reduct Vol:		0	0		0		0	0		0			0		0		0		0		0		0	
FinalVolume:		0	2632		68		46	1953		0			0		0		0		29		0		41	
Critical Gap Module:																								
Critical Gp:	xxxxx	xxxx		xxxxx			4.1	xxxx		xxxxx		xxxxx	xxxx		xxxxx				6.8		6.5		6.9	
FollowUpTim:	xxxxx	xxxx		xxxxx			2.2	xxxx		xxxxx		xxxxx	xxxx		xxxxx				3.5		4.0		3.3	
Capacity Module:																								
Cnflict Vol:	xxxx	xxxx		xxxxx			2700	xxxx		xxxxx		xxxx	xxxx		xxxxx				3246		4711		692	
Potent Cap.:	xxxx	xxxx		xxxxx			154	xxxx		xxxxx		xxxx	xxxx		xxxxx				7		1		391	
Move Cap.:	xxxx	xxxx		xxxxx			154	xxxx		xxxxx		xxxx	xxxx		xxxxx				6		1		391	
Volume/Cap:	xxxx	xxxx		xxxx			0.30	xxxx		xxxx		xxxx	xxxx		xxxx				5.12		0.00		0.10	
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx		xxxxx			1.2	xxxx		xxxxx		xxxx	xxxx		xxxxx				xxxx		xxxx		xxxxx	
Control Del:	xxxxx	xxxx		xxxxx			37.9	xxxx		xxxxx		xxxxx	xxxx		xxxxx				xxxxx		xxxx		xxxxx	
LOS by Move:	*		*		*		E	*		*		*		*		*			*		*		*	
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx	xxxx		xxxxx			xxxx		13		xxxxx	
SharedQueue:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx		9.8		xxxxx	
Shrd ConDel:	xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx	xxxx		xxxxx			xxxxx		2462		xxxxx	
Shared LOS:	*		*		*		*	*		*			*		*				*		F		*	
ApproachDel:	xxxxxx						xxxxxx						xxxxxx						2461.6					
ApproachLOS:			*						*						*						F			

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Existing Plus Project
Morning Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.452
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2267	18	14	2416	0	0	0	0	13	0	39
Added Vol:	0	0	18	16	0	0	0	0	0	13	0	12
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2267	36	30	2416	0	0	0	0	26	0	51
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2267	36	30	2416	0	0	0	0	26	0	51
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2267	36	30	2416	0	0	0	0	26	0	51
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2267	36	30	2416	0	0	0	0	26	0	51
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.94	0.06	1.00	4.00	0.00	0.00	0.00	0.00	0.34	0.00	0.66
Final Sat.:	0	6694	106	1700	6800	0	0	0	0	574	0	1126
Capacity Analysis Module:												
Vol/Sat:	0.00	0.34	0.34	0.02	0.36	0.00	0.00	0.00	0.00	0.02	0.00	0.05
Crit Moves:		****		****								****

12282 Beach Boulevard Project
Existing Plus Project
Evening Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.515
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2632	49	29	1953	0	0	0	0	12	0	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	2632	49	29	1953	0	0	0	0	12	0	26
Added Vol:	0	0	19	17	0	0	0	0	0	17	0	15
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2632	68	46	1953	0	0	0	0	29	0	41
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2632	68	46	1953	0	0	0	0	29	0	41
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2632	68	46	1953	0	0	0	0	29	0	41
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2632	68	46	1953	0	0	0	0	29	0	41
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.90	0.10	1.00	4.00	0.00	0.00	0.00	0.00	0.41	0.00	0.59
Final Sat.:	0	6629	171	1700	6800	0	0	0	0	704	0	996
Capacity Analysis Module:												
Vol/Sat:	0.00	0.40	0.40	0.03	0.29	0.00	0.00	0.00	0.00	0.02	0.00	0.04
Crit Moves:		****		****								****

12282 Beach Boulevard Project
Existing Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Project West Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: A[8.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0 0		0 0	1! 0	0	0 0	1 0	0	0 0	1 0	0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	32	0	0	52	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	32	0	0	52	0
Added Vol:	0	0	0	1	0	2	0	34	0	0	22	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	1	0	2	0	66	0	0	74	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	1	0	2	0	66	0	0	74	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	1	0	2	0	66	0	0	74	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	140	140	74	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	858	755	993	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	858	755	993	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	0.00	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	944	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.0	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	A	*	*	*	*	*	*	*
ApproachDel:	xxxxxx				8.8		xxxxxx			xxxxxx		
ApproachLOS:		*			A			*			*	

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Existing Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Project West Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: A[8.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 0 1 0 0			0 0 1 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	78	0	0	38	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	78	0	0	38	0
Added Vol:	0	0	0	1	0	3	0	37	0	0	29	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	1	0	3	0	115	0	0	67	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	1	0	3	0	115	0	0	67	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	1	0	3	0	115	0	0	67	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	182	182	67	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	812	716	1002	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	812	716	1002	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	0.00	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	947	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.0	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	A	*	*	*	*	*	*	*
ApproachDel:	xxxxxx				8.8		xxxxxx			xxxxxx		
ApproachLOS:	*				A		*			*		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Existing Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Project Central Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: A[7.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 0 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	32	0	0	52	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	32	0	0	52	0
Added Vol:	0	0	0	0	0	0	3	31	0	0	22	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	0	0	0	3	63	0	0	74	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	0	0	3	63	0	0	74	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	0	0	0	3	63	0	0	74	1
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	75	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1537	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1537	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			*			*		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Existing Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Project Central Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.1 Worst Case Level Of Service: A[7.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0 0	0	0 0	0 0	0	0 1	0 0	0	0 0	0 1	0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	78	0	0	38	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	78	0	0	38	0
Added Vol:	0	0	0	0	0	0	3	34	0	0	29	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	0	0	0	3	112	0	0	67	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	0	0	3	112	0	0	67	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	0	0	0	3	112	0	0	67	1
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	68	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1546	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1546	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			*			*		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Existing Plus Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

****

Intersection #4 Project East Access (NS) at Catherine Avenue (EW)

****

Average Delay (sec/veh): 3.1 Worst Case Level Of Service: A[8.8]

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	32	0	0	52	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	32	0	0	52	0
Added Vol:	0	0	0	4	0	22	31	1	0	0	1	5
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	4	0	22	31	33	0	0	53	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	4	0	22	31	33	0	0	53	5
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	4	0	22	31	33	0	0	53	5
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	151	151	56	58	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	846	745	1017	1559	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	833	730	1017	1559	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	0.00	0.02	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	984	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	A	*	A	*	*	*	*	*
ApproachDel:	xxxxxx				8.8		xxxxxx			xxxxxx		
ApproachLOS:	*				A		*			*		

****

Note: Queue reported is the number of cars per lane.

****

12282 Beach Boulevard Project
Existing Plus Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

****

Intersection #4 Project East Access (NS) at Catherine Avenue (EW)

****

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[8.8]

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T	- R		L - T	- R		L - T	- R		L - T	- R	
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0 0		0 0	1! 0 0		0 1 0	0 0		0 0 0	1 0	
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	78	0	0	38	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	78	0	0	38	0
Added Vol:	0	0	0	5	0	29	33	1	0	0	1	6
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	5	0	29	33	79	0	0	39	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	5	0	29	33	79	0	0	39	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	5	0	29	33	79	0	0	39	6
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	187	187	42	45	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	807	711	1034	1576	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	794	696	1034	1576	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.01	0.00	0.03	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT - LTR	- RT		LT - LTR	- RT		LT - LTR	- RT		LT - LTR	- RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	990	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	A	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			8.8			xxxxxx			xxxxxx		
ApproachLOS:	*			A			*			*		

****

Note: Queue reported is the number of cars per lane.

****

Opening Year (2016) Without Project

12282 Beach Boulevard Project
Opening Year (2016) Without Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 4.4 Worst Case Level Of Service: F[396.1]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 3	1	0	1 0 4	0	0	0 0 0	0	0	0 0 1!	0	0
Volume Module:												
Base Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	2312	18	14	2464	0	0	0	0	13	0	40
Added Vol:	0	2	0	0	1	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2314	18	14	2465	0	0	0	0	13	0	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2314	18	14	2465	0	0	0	0	13	0	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	2314	18	14	2465	0	0	0	0	13	0	40
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.8	6.5	6.9
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2333	xxxx	xxxxx	xxxx	xxxx	xxxxx	2968	4817	588
Potent Cap.:	xxxx	xxxx	xxxxx	216	xxxx	xxxxx	xxxx	xxxx	xxxxx	12	1	457
Move Cap.:	xxxx	xxxx	xxxxx	216	xxxx	xxxxx	xxxx	xxxx	xxxxx	11	1	457
Volume/Cap:	xxxx	xxxx	xxxx	0.07	xxxx	xxxx	xxxx	xxxx	xxxx	1.21	0.00	0.09
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	22.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	C	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	41	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	5.3	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	396	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	F	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			396.1		
ApproachLOS:	*			*			*			F		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) Without Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 7.8 Worst Case Level Of Service: F[945.2]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 3	1	0	1 0 4	0	0	0 0 0	0	0	0 0 1!	0	0
Volume Module:												
Base Vol:	0 2632		49	29 1953		0	0	0	0	12	0	26
Growth Adj:	1.02 1.02	1.02		1.02 1.02	1.02		1.02 1.02	1.02		1.02 1.02	1.02	
Initial Bse:	0 2685		50	30 1992		0	0	0	0	12	0	27
Added Vol:	0 2		0	0 2		0	0	0	0	0	0	0
PasserByVol:	0 0		0	0 0		0	0	0	0	0	0	0
Initial Fut:	0 2687		50	30 1994		0	0	0	0	12	0	27
User Adj:	1.00 1.00	1.00		1.00 1.00	1.00		1.00 1.00	1.00		1.00 1.00	1.00	
PHF Adj:	1.00 1.00	1.00		1.00 1.00	1.00		1.00 1.00	1.00		1.00 1.00	1.00	
PHF Volume:	0 2687		50	30 1994		0	0	0	0	12	0	27
Reduct Vol:	0 0		0	0 0		0	0	0	0	0	0	0
FinalVolume:	0 2687		50	30 1994		0	0	0	0	12	0	27
Critical Gap Module:												
Critical Gp:	xxxxx xxxx	xxxxx		4.1 xxxx	xxxxx	xxxxx	xxxx	xxxxx		6.8	6.5	6.9
FollowUpTim:	xxxxx xxxx	xxxxx		2.2 xxxx	xxxxx	xxxxx	xxxx	xxxxx		3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx xxxx	xxxxx		2737 xxxx	xxxxx	xxxx	xxxx	xxxxx		3269	4765	697
Potent Cap.:	xxxx xxxx	xxxxx		149 xxxx	xxxxx	xxxx	xxxx	xxxxx		7	1	388
Move Cap.:	xxxx xxxx	xxxxx		149 xxxx	xxxxx	xxxx	xxxx	xxxxx		6	1	388
Volume/Cap:	xxxx xxxx	xxxx		0.20 xxxx	xxxx	xxxx	xxxx	xxxx		2.04	0.00	0.07
Level Of Service Module:												
2Way95thQ:	xxxx xxxx	xxxxx		0.7 xxxx	xxxxx	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx
Control Del:	xxxxx xxxx	xxxxx		35.0 xxxx	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx
LOS by Move:	* *	*		D *	*	*	*	*		*	*	*
Movement:	LT - LTR	- RT		LT - LTR	- RT		LT - LTR	- RT		LT - LTR	- RT	
Shared Cap.:	xxxx xxxx	xxxxx		xxxx xxxx	xxxxx		xxxx xxxx	xxxxx		xxxx	18	xxxxx
SharedQueue:	xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx	5.3	xxxxx
Shrd ConDel:	xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx	945	xxxxx
Shared LOS:	* *	*		* *	*		* *	*		*	F	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			945.2		
ApproachLOS:	*			*			*				F	

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) Without Project
Morning Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.444
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	1	0	1 0 4	0	0	0 0 0	0	0	0 0 1!	0	0
Volume Module:												
Base Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	2312	18	14	2464	0	0	0	0	13	0	40
Added Vol:	0	2	0	0	1	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2314	18	14	2465	0	0	0	0	13	0	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2314	18	14	2465	0	0	0	0	13	0	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2314	18	14	2465	0	0	0	0	13	0	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2314	18	14	2465	0	0	0	0	13	0	40
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.97	0.03	1.00	4.00	0.00	0.00	0.00	0.00	0.25	0.00	0.75
Final Sat.:	0	6746	54	1700	6800	0	0	0	0	425	0	1275
Capacity Analysis Module:												
Vol/Sat:	0.00	0.34	0.34	0.01	0.36	0.00	0.00	0.00	0.00	0.01	0.00	0.03
Crit Moves:	****				****							****

12282 Beach Boulevard Project
Opening Year (2016) Without Project
Evening Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.493
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2632	49	29	1953	0	0	0	0	12	0	26
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	2685	50	30	1992	0	0	0	0	12	0	27
Added Vol:	0	2	0	0	2	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2687	50	30	1994	0	0	0	0	12	0	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2687	50	30	1994	0	0	0	0	12	0	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2687	50	30	1994	0	0	0	0	12	0	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2687	50	30	1994	0	0	0	0	12	0	27
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.93	0.07	1.00	4.00	0.00	0.00	0.00	0.00	0.32	0.00	0.68
Final Sat.:	0	6676	124	1700	6800	0	0	0	0	537	0	1163
Capacity Analysis Module:												
Vol/Sat:	0.00	0.40	0.40	0.02	0.29	0.00	0.00	0.00	0.00	0.01	0.00	0.02
Crit Moves:		****		****								****

Opening Year (2016) With Project

12282 Beach Boulevard Project
Opening Year (2016) With Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 18.1 Worst Case Level Of Service: F[1134.0]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 3	1	0	1 0 4	0	0	0 0 0	0	0	0 0 1!	0	0
Volume Module:												
Base Vol:	0 2267	18		14 2416		0	0	0	0	13	0	39
Growth Adj:	1.02 1.02	1.02		1.02 1.02		1.02	1.02 1.02		1.02	1.02 1.02		1.02
Initial Bse:	0 2312	18		14 2464		0	0	0	0	13	0	40
Added Vol:	0 2	18		16 1		0	0	0	0	13	0	12
PasserByVol:	0 0	0		0 0		0	0	0	0	0	0	0
Initial Fut:	0 2314	36		30 2465		0	0	0	0	26	0	52
User Adj:	1.00 1.00	1.00		1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00
PHF Adj:	1.00 1.00	1.00		1.00 1.00		1.00	1.00 1.00		1.00	1.00 1.00		1.00
PHF Volume:	0 2314	36		30 2465		0	0	0	0	26	0	52
Reduct Vol:	0 0	0		0 0		0	0	0	0	0	0	0
FinalVolume:	0 2314	36		30 2465		0	0	0	0	26	0	52
Critical Gap Module:												
Critical Gp:	xxxxx xxxx	xxxxx		4.1 xxxx	xxxxx	xxxxx	xxxx	xxxxx		6.8	6.5	6.9
FollowUpTim:	xxxxx xxxx	xxxxx		2.2 xxxx	xxxxx	xxxxx	xxxx	xxxxx		3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx xxxx	xxxxx		2351 xxxx	xxxxx	xxxx	xxxx	xxxxx		3009	4858	597
Potent Cap.:	xxxx xxxx	xxxxx		212 xxxx	xxxxx	xxxx	xxxx	xxxxx		11	1	451
Move Cap.:	xxxx xxxx	xxxxx		212 xxxx	xxxxx	xxxx	xxxx	xxxxx		10	1	451
Volume/Cap:	xxxx xxxx	xxxx		0.14 xxxx	xxxx	xxxx	xxxx	xxxx		2.73	0.00	0.11
Level Of Service Module:												
2Way95thQ:	xxxx xxxx	xxxxx		0.5 xxxx	xxxxx	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx
Control Del:	xxxxx xxxx	xxxxx		24.8 xxxx	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx
LOS by Move:	* *	*		C *		*	*	*		*	*	*
Movement:	LT - LTR	- RT		LT - LTR	- RT		LT - LTR	- RT		LT - LTR	- RT	
Shared Cap.:	xxxx xxxx	xxxxx		xxxx xxxx	xxxxx		xxxx xxxx	xxxxx		xxxx	27	xxxxx
SharedQueue:	xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx	9.4	xxxxx
Shrd ConDel:	xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx xxxx	xxxxx		xxxxx	1134	xxxxx
Shared LOS:	* *	*		* *		*	*	*		*	F	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			1134.0		
ApproachLOS:	*			*			*			F		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) With Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 42.1 Worst Case Level Of Service: F[2867.0]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2632	49	29	1953	0	0	0	0	12	0	26
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	2685	50	30	1992	0	0	0	0	12	0	27
Added Vol:	0	2	19	17	2	0	0	0	0	17	0	15
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2687	69	47	1994	0	0	0	0	29	0	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2687	69	47	1994	0	0	0	0	29	0	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	2687	69	47	1994	0	0	0	0	29	0	42
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.8	6.5	6.9
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2756	xxxx	xxxxx	xxxx	xxxx	xxxxx	3313	4808	706
Potent Cap.:	xxxx	xxxx	xxxxx	147	xxxx	xxxxx	xxxx	xxxx	xxxxx	7	1	383
Move Cap.:	xxxx	xxxx	xxxxx	147	xxxx	xxxxx	xxxx	xxxx	xxxxx	5	1	383
Volume/Cap:	xxxx	xxxx	xxxx	0.32	xxxx	xxxx	xxxx	xxxx	xxxx	5.87	0.00	0.11
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	1.3	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	40.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	E	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	12	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	2867	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	F	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			2867.0		
ApproachLOS:	*			*			*			F		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) With Project
Morning Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.459
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2267	18	14	2416	0	0	0	0	13	0	39
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	2312	18	14	2464	0	0	0	0	13	0	40
Added Vol:	0	2	18	16	1	0	0	0	0	13	0	12
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2314	36	30	2465	0	0	0	0	26	0	52
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2314	36	30	2465	0	0	0	0	26	0	52
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2314	36	30	2465	0	0	0	0	26	0	52
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2314	36	30	2465	0	0	0	0	26	0	52
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.94	0.06	1.00	4.00	0.00	0.00	0.00	0.00	0.34	0.00	0.66
Final Sat.:	0	6695	105	1700	6800	0	0	0	0	572	0	1128
Capacity Analysis Module:												
Vol/Sat:	0.00	0.35	0.35	0.02	0.36	0.00	0.00	0.00	0.00	0.02	0.00	0.05
Crit Moves:		****		****								****

12282 Beach Boulevard Project
Opening Year (2016) With Project
Evening Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Beach Boulevard (NS) at Catherine Avenue (EW)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.524
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	3 1	0	1 0	4 0	0	0 0	0 0	0	0 0	1! 0	0
Volume Module:												
Base Vol:	0	2632	49	29	1953	0	0	0	0	12	0	26
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	2685	50	30	1992	0	0	0	0	12	0	27
Added Vol:	0	2	19	17	2	0	0	0	0	17	0	15
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	2687	69	47	1994	0	0	0	0	29	0	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	2687	69	47	1994	0	0	0	0	29	0	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	2687	69	47	1994	0	0	0	0	29	0	42
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	2687	69	47	1994	0	0	0	0	29	0	42
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.90	0.10	1.00	4.00	0.00	0.00	0.00	0.00	0.41	0.00	0.59
Final Sat.:	0	6630	170	1700	6800	0	0	0	0	702	0	998
Capacity Analysis Module:												
Vol/Sat:	0.00	0.41	0.41	0.03	0.29	0.00	0.00	0.00	0.00	0.02	0.00	0.04
Crit Moves:		****		****								****

12282 Beach Boulevard Project
Opening Year (2016) With Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Project West Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: A[8.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 0 1 0 0			0 0 1 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	32	0	0	52	0
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	0	0	0	0	0	0	33	0	0	53	0
Added Vol:	0	0	0	1	0	2	0	34	0	0	22	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	1	0	2	0	67	0	0	75	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	1	0	2	0	67	0	0	75	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	1	0	2	0	67	0	0	75	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	142	142	75	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	856	753	992	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	856	753	992	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	0.00	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	942	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.0	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	A	*	*	*	*	*	*	*
ApproachDel:	xxxxxx				8.8		xxxxxx			xxxxxx		
ApproachLOS:	*				A		*			*		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) With Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 Project West Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: A[8.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0 0	0	0 0	1! 0	0	0 0	1 0	0	0 0	1 0	0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	78	0	0	38	0
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	0	0	0	0	0	0	80	0	0	39	0
Added Vol:	0	0	0	1	0	3	0	37	0	0	29	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	1	0	3	0	117	0	0	68	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	1	0	3	0	117	0	0	68	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	1	0	3	0	117	0	0	68	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	184	184	68	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	810	714	1001	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	810	714	1001	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	0.00	0.00	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	945	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.0	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	A	*	*	*	*	*	*	*
ApproachDel:	xxxxxx				8.8		xxxxxx			xxxxxx		
ApproachLOS:		*			A			*			*	

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) With Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Project Central Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.2 Worst Case Level Of Service: A[7.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0 0		0 0 0	0 0		0 1 0	0 0		0 0 0	1 0	
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	32	0	0	52	0
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	0	0	0	0	0	0	33	0	0	53	0
Added Vol:	0	0	0	0	0	0	3	31	0	0	22	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	0	0	0	3	64	0	0	75	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	0	0	3	64	0	0	75	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	0	0	0	3	64	0	0	75	1
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	76	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1536	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1536	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			*			*		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) With Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #3 Project Central Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 0.1 Worst Case Level Of Service: A[7.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0 0	0	0 0	0 0	0	0 1	0 0	0	0 0	0 1	0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	78	0	0	38	0
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	0	0	0	0	0	0	80	0	0	39	0
Added Vol:	0	0	0	0	0	0	3	34	0	0	29	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	0	0	0	3	114	0	0	68	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	0	0	3	114	0	0	68	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	0	0	0	3	114	0	0	68	1
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	69	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1545	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1545	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.00	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			*			*		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) With Project
Morning Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Project East Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 3.0 Worst Case Level Of Service: A[8.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	32	0	0	52	0
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Initial Bse:	0	0	0	0	0	0	0	33	0	0	53	0
Added Vol:	0	0	0	4	0	22	31	1	0	0	1	5
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	4	0	22	31	34	0	0	54	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	4	0	22	31	34	0	0	54	5
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	4	0	22	31	34	0	0	54	5
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	152	152	57	59	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	844	743	1016	1558	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	831	728	1016	1558	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.00	0.00	0.02	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	982	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	A	*	A	*	*	*	*	*
ApproachDel:	xxxxxx				8.8		xxxxxx			xxxxxx		
ApproachLOS:	*				A		*			*		

Note: Queue reported is the number of cars per lane.

12282 Beach Boulevard Project
Opening Year (2016) With Project
Evening Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #4 Project East Access (NS) at Catherine Avenue (EW)

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[8.8]

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	0	0	0	0	0	0	0	1!	0	0	0	1	0	0	0	0	0	0	1	0
Volume Module:																				
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	78	0	0	0	0	38	0		
Growth Adj:	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02		
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	39	0		
Added Vol:	0	0	0	5	0	29	33	1	0	0	1	6								
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0								
Initial Fut:	0	0	0	5	0	29	33	81	0	0	40	6								
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
PHF Volume:	0	0	0	5	0	29	33	81	0	0	40	6								
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0								
FinalVolume:	0	0	0	5	0	29	33	81	0	0	40	6								
Critical Gap Module:																				
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
Capacity Module:																				
Cnflict Vol:	xxxx	xxxx	xxxxx	189	189	43	46	xxxx	xxxxx	xxxx	xxxx	xxxxx								
Potent Cap.:	xxxx	xxxx	xxxxx	804	709	1033	1575	xxxx	xxxxx	xxxx	xxxx	xxxxx								
Move Cap.:	xxxx	xxxx	xxxxx	791	694	1033	1575	xxxx	xxxxx	xxxx	xxxx	xxxxx								
Volume/Cap:	xxxx	xxxx	xxxx	0.01	0.00	0.03	0.02	xxxx	xxxx	xxxx	xxxx	xxxx								
Level Of Service Module:																				
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx								
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*								
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	989	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx								
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.1	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	8.8	xxxxx	7.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx								
Shared LOS:	*	*	*	*	A	*	A	*	*	*	*	*								
ApproachDel:	xxxxxx			8.8			xxxxxx			xxxxxx										
ApproachLOS:	*			A			*			*										

Note: Queue reported is the number of cars per lane.

APPENDIX D

Traffic Signal Warrant Worksheet

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 1 of 5)

Count Date: 5/20/2014

City of Stanton — Jurisdiction
Beach Boulevard/Catherine Avenue — Intersection

Calc: BC Date: 9/11/2014
Check: Date:

Major St: Beach Boulevard — Critical Approach Speed: 45 mph
Minor St: Catherine Avenue — Critical Approach Speed: N/A mph

Speed limit or critical speed on major street traffic > 40 mph ..... ☑
or
In built up area of isolated community of < 10,000 population ..... ☐
} RURAL (R)

☐ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

SATISFIED ☐ YES ☑ NO

(Condition A or Condition B or Combination of A and B must be satisfied)

Condition A - Minimum Vehicle Volume

100% SATISFIED ☐ YES ☑ NO
80% SATISFIED ☐ YES ☑ NO

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)											
	Urban	Rural	Urban	Rural								
APPROACH LANES	1		2 or More		5:00 PM	8:00 AM	4:00 PM	7:00 AM	12:00 AM	1:00 AM	2:00 AM	3:00 AM
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)	4,679	4,590	4,460	4,355	0	0	0	0
Highest Approach Minor Street	150 (120)	105 (84)	200 (160)	140 (112)	30	29	27	24	0	0	0	0

Hour

Condition B - Interruption of Continuous Traffic

100% SATISFIED ☐ YES ☑ NO
80% SATISFIED ☐ YES ☑ NO

	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS)											
	Urban	Rural	Urban	Rural								
APPROACH LANES	1		2 or More		5:00 PM	8:00 AM	4:00 PM	7:00 AM	12:00 AM	1:00 AM	2:00 AM	3:00 AM
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)	4,679	4,590	4,460	4,355	0	0	0	0
Highest Approach Minor Street	75 (60)	53 (42)	100 (80)	70 (56)	30	29	27	24	0	0	0	0

Hour

Combination of Conditions A & B

SATISFIED ☐ YES ☑ NO

REQUIREMENT	CONDITION	X	FULFILLED
TWO CONDITIONS SATISFIED 80%	A. Minimum Vehicular Volume		☐ YES ☑ NO
	AND, B. Interruption of Continuous Traffic		
AND, an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems			☐ YES ☑ NO

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-101 (CA). Traffic Signal Warrants Worksheet (Sheet 2 of 5)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED* ☐ YES ☑ NO

Record hourly vehicular volumes for any four hours of an average day.

APPROACH LANES	One	2 or More	5:00 PM	8:00 AM	4:00 PM	7:00 AM	Hour
Both Approaches - Major Street		X	4,679	4,590	4,460	4,355	
Higher Approach - Minor Street	X		30	29	27	24	

*All plotted points fall above the applicable curve in Figure 4C-1. (URBAN AREAS)	☐ YES	☑ NO
OR, All plotted points fall above the applicable curve in Figure 4C-2. (RURAL AREAS)	☐ YES	☑ NO

WARRANT 3 - Peak Hour

SATISFIED ☑ YES ☐ NO

(Part A or Part B must be satisfied)

PART A **SATISFIED** ☑ YES ☐ NO

(All parts 1, 2, and 3 below must be satisfied for the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two-lane approach; AND	☑ YES	☐ NO
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND	☑ YES	☐ NO
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches	☑ YES	☐ NO

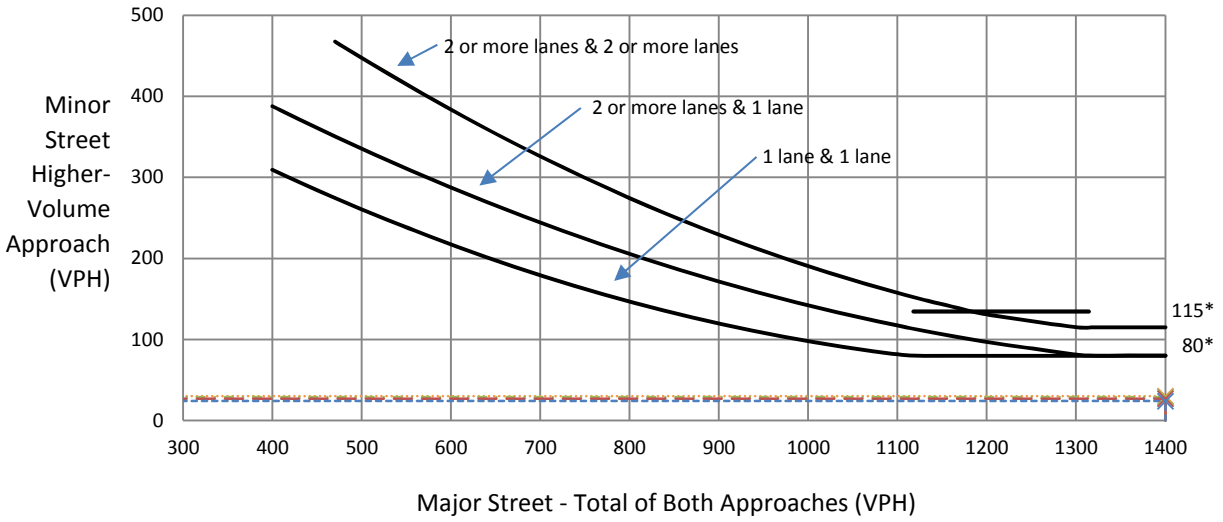
PART B **SATISFIED** ☐ YES ☑ NO

APPROACH LANES	One	2 or More	5:00 PM
Both Approaches - Major Street		X	4,679
Higher Approach - Minor Street	X		30

The plotted point falls above the applicable curve in Figure 4C-3. (URBAN AREAS)	☐ YES	☑ NO
OR, The plotted point falls above the applicable curve in Figure 4C-4. (RURAL AREAS)	☐ YES	☑ NO

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

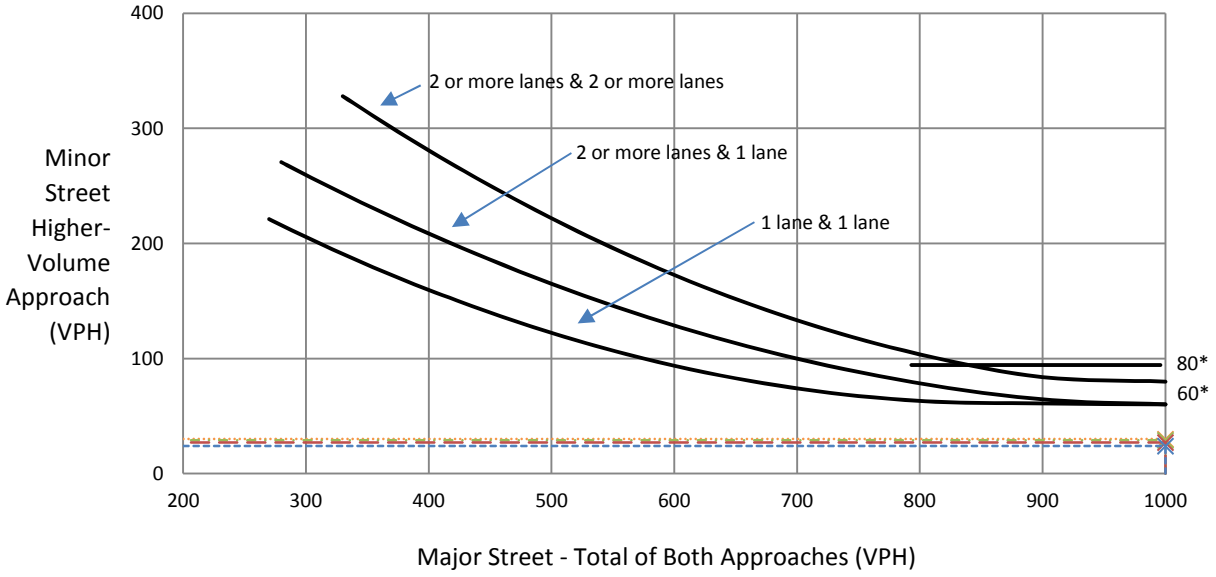


This figure is not applicable; see Figure 4C-2 below.

*Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(Community less than 10,000 population or above 40 mph on the major street)



Traffic Signal Warrant Is NOT Satisfied

*Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor street approach with one lane.

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(714) 973-8383

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Appendix E

Closed Circuit Cooler Data Sheet

Closed Circuit Cooler Data Sheet

Edgar Pagdanganan
TMAD, SD

USA

Eric Valine
VERTICAL SYSTEMS, SD
8316 Clairemont Mesa Blvd
Suite 213
San Diego, CA 92111
USA
Phone: 858-564-0308

Project : Assisted Living Facility ALF
Equipment Reference:
Product Type : ESWB Closed Circuit Cooler

Date: 12/20/2013 Page: 1

Selection Criteria

Capacity (Tons):	353
Capacity (MBH):	5,300.00
Fluid Type:	Water
Flow (GPM):	1060.0
Entering Fluid Temp (°F):	95.0
Leaving Fluid Temp (°F):	85.0
Wet Bulb (°F):	74.0

IBC Design Criteria

Seismic Design Force (g)	1g
Velocity Pressure (psf)	up to 60

Unit is CTI certified for water as the process fluid and is ASHRAE 90.1 compliant

Qty	Model	Capacity (MBH)	Percent Capacity
1	ESWB 9-43K18	5,509.985	104.0

All Weights, Dimensions and Technical Data are Shown per Unit

Fans:	2	Overall Length:	18' 0.000"
# Fan Motors @ HP:	(2) @ 20.00 (460/3/60)	Overall Width:	8' 5.500"
# Pump Motors @ HP:	(2) @ 5.00	Overall Height:	17' 10.000"
Air Flow (CFM)	107,600		
Spray Water Flow (gpm)	1015.0	Operating Weight (lbs):	31,530
Pressure Drop Through Coil (psi):	11.0	Shipping Weight (lbs):	21,790
Evaporated Water Rate (gpm):	8.48	Heaviest Section (lbs):	14,790
Riser Pipe Diameter (inch):	8		

Options Selected

(2) Fan Motor: Inverter Capable, Premium Efficient
High Flow Coil
IBC Compliant up to 1g
External Service Platform with Ladder
Motor Davit with Base
304 Stainless Steel Cold Water Basin
Vibration Switch
Sump Sweeper Piping (High Flow Eductors)
304 Stainless Steel Upper

Sound Data (Sound Pressure Levels in dB(A))

	End	Mtr Side	Opp End	Opp Mtr Side	Top
S.P.L. dB(A) at 5'	0	0	0	0	0
S.P.L. dB(A) at 50'	0	0	0	0	0

Note 1: Sound Data shown is for 1 Cell operating at full speed

Note 2: The use of frequency inverters (Variable Frequency Drives) can increase sound levels.

Note 3: Sound option(s) selected: None

Layout Criteria

Recommended Clearances Around Units (Feet)

From Unit Ends to Wall:	3.00	Between Unit Ends:	3.00
From Sides to Wall:	3.00	Between Unit Sides:	6.00

Refer to the Equipment Layout Manual or contact your Sales Representative for more details on layout criteria.

Shipping Data

Description		Domestic Skidded Dimensions (in)			Cubic Feet	Total Cubic Feet	Gross Wt (lbs)	Total Gross Wt (lbs)
Section		**Length**	**Width**	**Height**				
Basin	1	251	102	109	1,614	1,614	14,790	14,790
Casing	1	251	102	115	1,703	1,703	7,000	7,000
	2				3,317	3,317	21,790	21,790

Note:

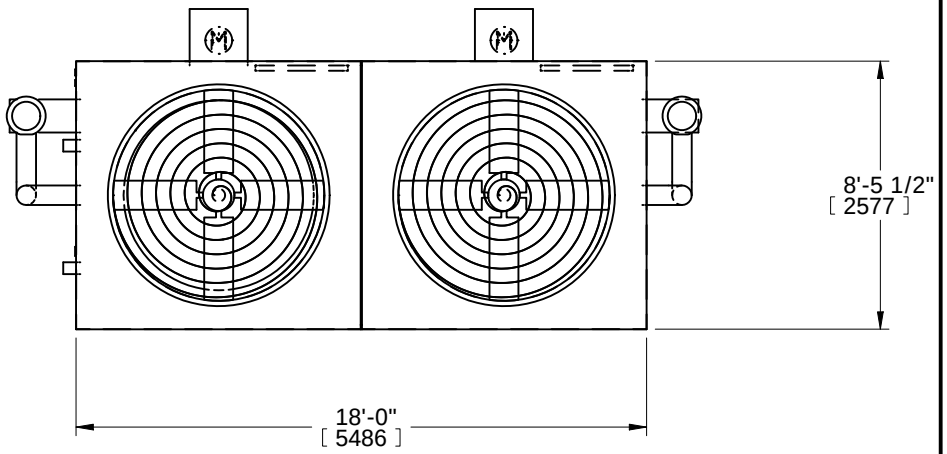
EVAPCO, INC.

UNIT	MODEL #	SCALE	DWG. #	REV.	DATE	SERIAL #
CLOSED CIRCUIT COOLER	ESWB 9-43K18		WXB09184806-DRA-ST		12/20/2013	

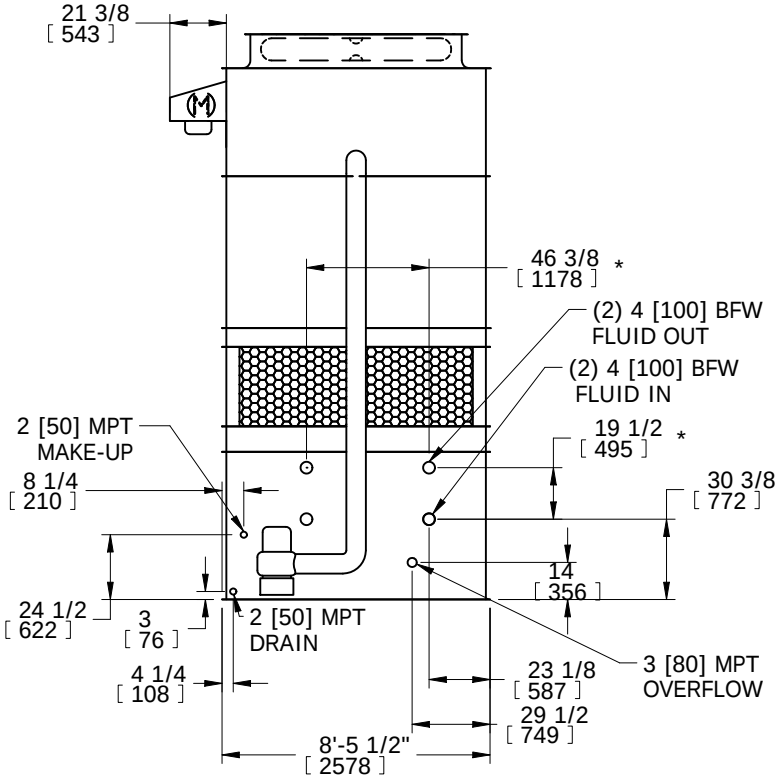
NOTES:
1. (M)- FAN MOTOR LOCATION
2. HEAVIEST SECTION IS COIL SECTION
3. MPT DENOTES MALE PIPE THREAD
   FPT DENOTES FEMALE PIPE THREAD
   BFW DENOTES BEVELED FOR WELDING
4. +UNIT WEIGHT DOES NOT INCLUDE ACCESSORIES (SEE ACCESSORY DRAWINGS)
5. 3/4" [19MM] DIA. MOUNTING HOLES. REFER TO RECOMMENDED STEEL SUPPORT DRAWING
6. MAKE-UP WATER PRESSURE
   20 psi [137 kPa] MIN,
   50 psi [344 kPa] MAX
7. DIMENSIONS LISTED AS FOLLOWS:
   ENGLISH IN
   [METRIC] [mm]
8. * - APPROXIMATE DIMENSIONS DO NOT USE FOR PRE-FABRICATION OF CONNECTING PIPING.

Preliminary

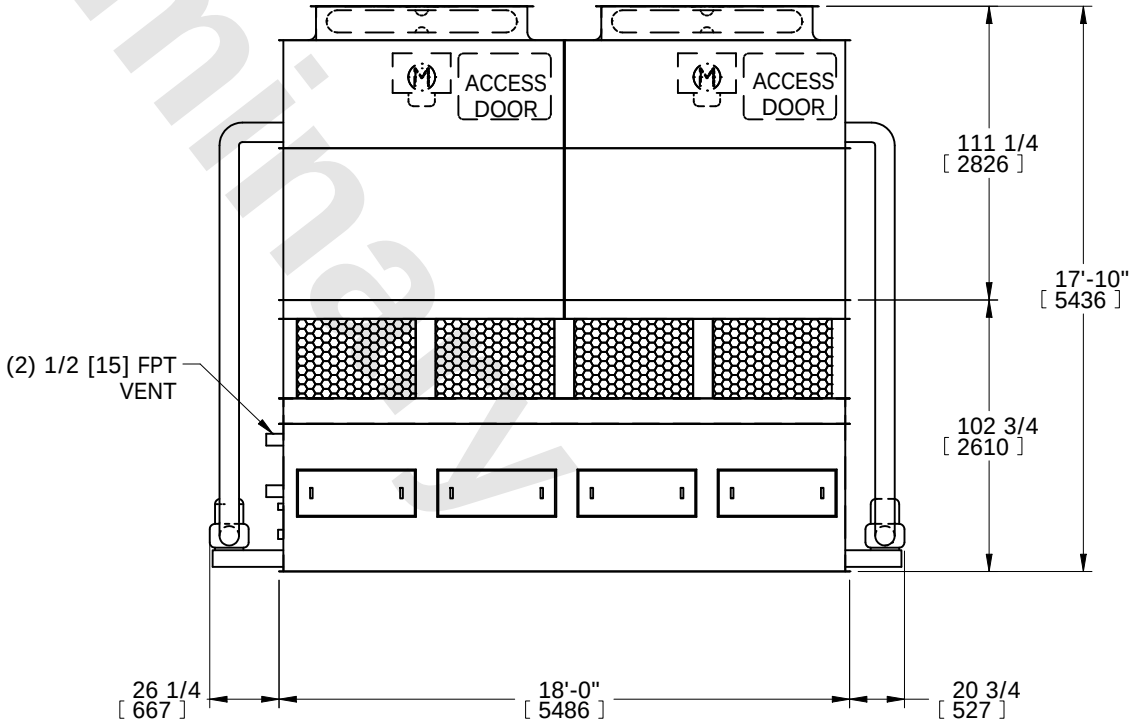
FACE 2
PLAN VIEW



FACE 1



FACE 2



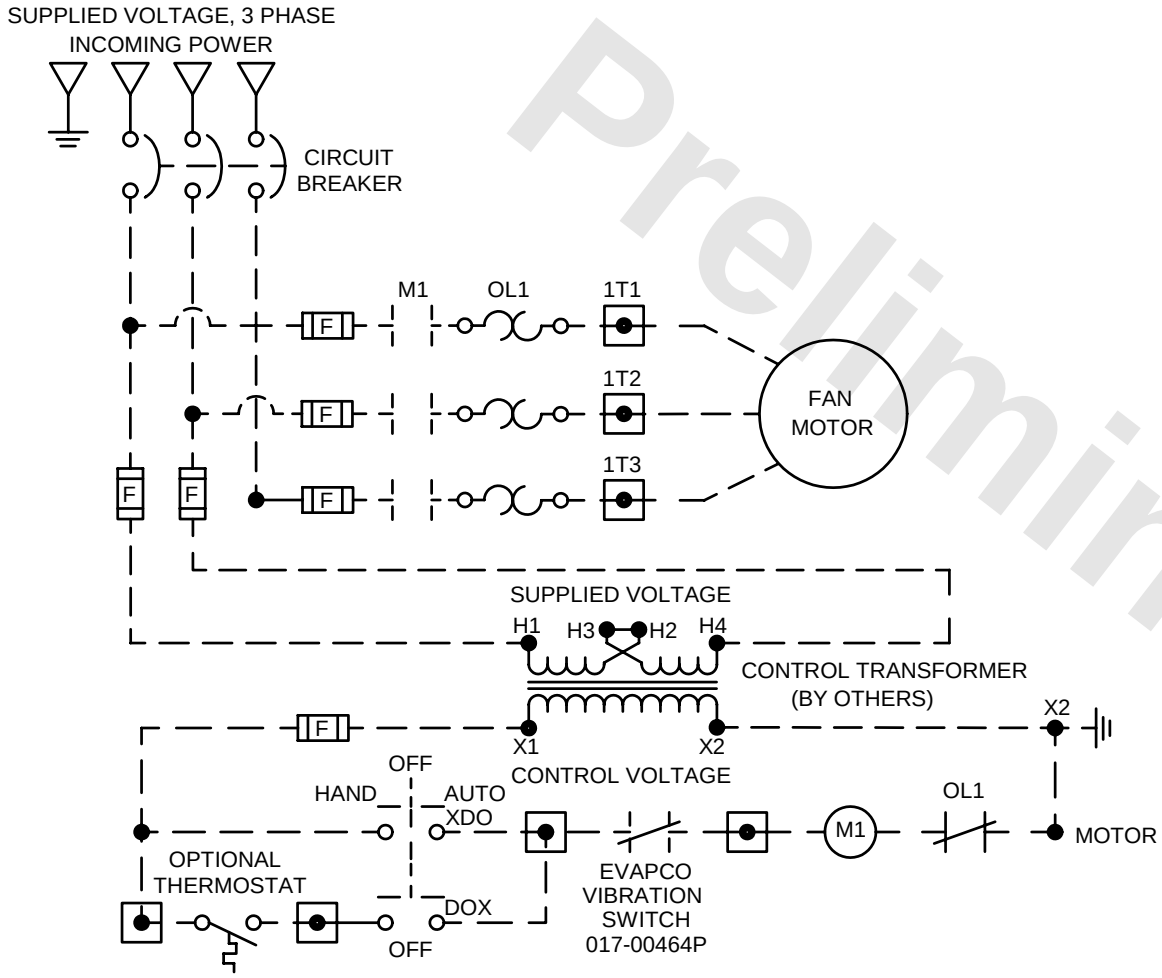
FACE 1

SHIPPING WEIGHT	OPERATING WEIGHT	HEAVIEST SECTION WEIGHT	NO. OF SHIPPING SECTIONS	DRAWN BY:
21790 lbs[9885] kg	31530 lbs[14305] kg	14790 lbs[6710] kg	2	SLR

EVAPCO, INC.

TITLE	DESCRIPTION:	DWG. #
VIBRATION SWITCH	ESWB 9-43K18 SINGLE SPEED	12/20/2013 V1AU0000-EE

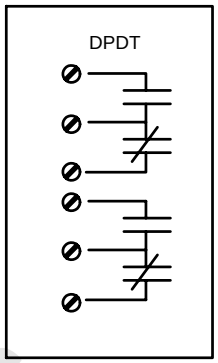
Preliminary



SWITCH CONTACT RATING:

15 AMPS, 125, OR 480 Vac; 1/8 HP, 125 Vac; 1/4 HP, 250 Vac; 1/2 AMP, 125 Vdc; 1/4 AMP, 250 Vdc.

WIRING DIAGRAM:



NOTES:

1. DASHED LINES INDICATE WIRING(BY OTHERS)

ADJUSTMENT

ADJUST THE SWITCH SO THAT DURING FULL SPEED START-UP AND UNDER NORMAL CONDITIONS, THE CONTACTS DO NOT TRIP. FIRST, WITH THE MOTOR OFF, TURN THE ADJUSTMENT SCREW COUNTER-CLOCKWISE (MORE SENSITIVE DIRECTION) UNTIL THE SWITCH TRIPS. NEXT, TURN THE ADJUSTMENT SCREW CLOCKWISE 1/8 TURN (LESS SENSITIVE DIRECTION). RESET THE SWITCH BY DEPRESSING THE PUSH-BUTTON RESET LOCATED ON TOP OF THE SWITCH. START THE MOTOR ON FULL SPEED. IF THE MOTOR TRIPS THE SWITCH, THEN TURN THE ADJUSTMENT SCREW CLOCKWISE AN ADDITIONAL 1/8 TURN. RESET THE SWITCH AND START THE MOTOR AGAIN. REPEAT THE ABOVE PROCEDURE UNTIL THE MOTOR CONTINUES TO RUN.

Appendix F

Water Quality Management Plan

City of Stanton
CONCEPTUAL
Water Quality Management Plan
(WQMP)

Project Name:
Stanton Assisted Living Facility
Grading Permit No. PENDING
Planning Application No. PENDING
12282 Beach Boulevard, Stanton, CA 90680
APNs 131-483-01, 131-483-02, 131-483-03

Prepared for:
USS Cal Builders
8051 Main Street
Stanton, CA 90680
(714) 828-4882

Prepared by:
Sessions Consulting Engineers
231 East Imperial Highway, Suite 201B
Fullerton, CA 92835
(714) 213-8854
kerry@sessionsconsulting.com

Date of Preparation: February 15, 2016

Project Owner's Certification			
Planning Application No. (If applicable)	PENDING	Grading Permit No.	PENDING
Tract/Parcel Map and Lot(s) No.	Por. Of S36, T4S, R11W SBBM	Building Permit No.	PENDING
Address of Project Site and APN			12282 Beach Blvd. Stanton, CA 90680 APNs 131-483-01, 131-483-02, 131-483-03

This Water Quality Management Plan (WQMP) has been prepared for USS Cal Builders by Sessions Consulting Engineers. The WQMP is intended to comply with the requirements of the County of Orange NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan , including the ongoing operation and maintenance of all best management practices (BMPs), and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner: Lutfi Bustami			
Title	Vice President		
Company	USS Cal Builders		
Address	8051 Main Street, Stanton, CA 90680		
Email	lutfib@usscalbuilders.com		
Telephone #	(714) 699-5232		
I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein.			
Owner Signature		Date	

Preparer (Engineer): Kerry Sessions			
Title	President	PE Registration #	PE 50461
Company	Sessions Consulting Engineers		
Address	231 East Imperial Highway, Suite 201B, Fullerton CA 92835		
Email	kerry@sessionsconsulting.com		
Telephone #	(714) 213-8854		
I hereby certify that this Water Quality Management Plan is in compliance with, and meets the requirements set forth in, Order No. R8-2009-0030/NPDES No. CAS618030, of the Santa Ana Regional Water Quality Control Board.			
Preparer Signature		Date	
Place Stamp Here			

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Section I Permit(s) and Water Quality Conditions of Approval or Issuance

No permits have been issued at this time. This Conceptual WQMP will be revised to include the permitting information after approval of planning documents.

Project Infomation			
Permit/Application No. (If applicable)	PENDING	Grading or Building Permit No. (If applicable)	PENDING
Address of Project Site (or Tract Map and Lot Number if no address) and APN	12282 Beach Boulevard, Stanton, CA 90680		
Water Quality Conditions of Approval or Issuance			
Water Quality Conditions of Approval or Issuance applied to this project. (Please list verbatim.)	This is the Preliminary WQMP. The water quality conditions will be included in the Final WQMP after discretionary review and approval.		
Conceptual WQMP			
Was a Conceptual Water Quality Management Plan previously approved for this project?	The current submittal is for Conceptual/Preliminary WQMP.		
Watershed-Based Plan Conditions			
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	There are currently no approved WIHMPs or TMDLs for the Anaheim Bay – Huntington Harbour Watershed.		

Section II Project Description

II.1 Project Description

Description of Proposed Project				
Development Category (From Model WQMP, Table 7.11-2; or -3)	Category 1 – New development project that creates 10,000 square feet or more of impervious surface.			
Project Area (ft2): 48,396	Number of Dwelling Units: 66		SIC Code: N/A	
Project Area	Pervious		Impervious	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	40,452 SF	84%	7,942 SF	16%
Post-Project Conditions	12,143 SF	25%	36,253 SF	75%
Drainage Patterns/Connections	The majority of site drainage proceeds southerly from the site into Catherine Street. From there it drains westerly to Beach Boulevard and into a catch basin that lies westerly of the project. The catch basin discharges into the Anaheim-Barber Channel that lies north of the site. The proposed drainage system will connect into the back of this catch basin. A small portion of the site drains to an existing 10″pipe at a headwall on the northerly side of the site which drains directly into the channel. This discharge point will not be used in this project.			

Narrative Project Description:	The project is located at 12282 Beach Boulevard in Stanton, CA, and consists of 1.136 Acres. The project has a disturbed area of 1.111 acres and does not include work outside of the property boundary. (There are portions of the property behind fences along the channel that encroach onto the property that do not contribute to the "disturbed area".) The proposed land use for the project is Multi-Family Residential. The current land use consists of 7,598 SF of parking area, 344 SF of sidewalks, and 40,452 SF of pervious area. The proposed land use will consist of 2 buildings totaling 12,631 SF; 23,622 SF of parking areas; and 12,143 SF of pervious area. The site is mostly vacant. Remnants of a previous development on parts of the site include pavement, curbs & gutters, walks, trees, fences and miscellaneous utilities. The site is bounded on the south by Catherine Avenue, on the west by Beach Boulevard, on the east by an existing single-family development, and on the north by a concrete-lined drainage channel named the Anaheim-Barber City Channel. The site presently drains predominantly southerly on the surface directly into the curb & gutter along Catherine Avenue. From there it drains west to Beach Boulevard, then north into a catch basin on Beach Boulevard. The catch basin outlet drains into the Anaheim-Barber City Channel. A small portion of the site currently drains northerly to a headwall with an opening that drains directly into the channel. Final grades will direct 100% of flows to the new treatment system and this outlet will be abandoned. The project consists of constructing: a 66-unit assisted living development; landscape areas; a parking lot, trash enclosure, garage, and other miscellaneous structures that support facility operations. The majority of the proposed site is covered by the building roof. An area west of the building will remain pervious landscaped area. The proposed development collects drainage from the site and transmits flows to a drainage pipe on the south side of the property along Catherine Avenue. These flows will be directed to a StormTech Subsurface Stormwater Management System, (StormTech System). This BMP removes sediments, trash and debris that may otherwise continue downstream and also stores a volume of water prior to biofiltration treatment. (See the attachments for plans and other detailed information about the StormTech System.)

The excess runoff volume from the 2-year storm cannot feasibly be retained by infiltration or capture/use, therefore the project will utilize on-site hydromodification controls to retain the excess volume to the maximum extent possible. This will be accomplished with the StormTech System. The StormTech System consists of a series of half-pipes and aggregates that includes an underdrain. Flows are directed into the system allowing the treated volume to be stored in the half-pipes and pore spaces of the aggregates. The volume is detained and slowly released into a Modular Wetlands Stormwater Biofiltration System (MWS) for biofiltration treatment before being discharged into the public drainage system. High flows during storms that are greater than the design storm are designed to bypass the StormTech storage system and drain directly to the back of the catch basin in Beach Boulevard.

The MWS provides primary treatment of pollutants through biofiltration prior to joining the high flows and discharging into the catch basin in Beach Blvd. The MWS allows the flows to pass through a vegetated media for treatment prior to discharge into the storm drain system.

II.2 Potential Stormwater Pollutants

Pollutants of Concern			
Pollutant	Check One for each: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended-Solid/ Sediment	E ☒	N ☐	Runoff from the parking areas and landscaped areas will carry suspended solids and sediments to the drainage system.
Nutrients	E ☒	N ☐	Nutrients from fertilizers in the landscaped areas, trash and debris, and eroded soils can make their way into the drainage system.
Heavy Metals	E ☒	N ☐	Heavy metal pollutants are expected due to the presence of the parking lot associated with the project.
Pathogens (Bacteria/Virus)	E ☒	N ☐	Pathogens occur in the natural environment and can contribute as a source of pollutants to the drainage system.
Pesticides	E ☒	N ☐	May be used at the site and could be a contributing pollutant source.
Oil and Grease	E ☒	N ☐	Potential pollutant from cars in the parking areas.
Toxic Organic Compounds	E ☒	N ☐	Toxic organic compounds are expected due to the presence of the parking lot associated with the project.
Trash and Debris	E ☒	N ☐	Trash & debris could collect in areas throughout the development making its way into the drainage system.

II.3 Hydrologic Conditions of Concern

☐ No

☒ Yes

Calculations have been performed in the hydrology report, (included in the attachments), to determine whether this site has Hydrologic Conditions of Concern (HCOCs). An analysis of the 2-year, 24-hour storm event for the site has been made and the results of the calculations are as follows:

Pre-development 2-year flowrate (Q_1)	=	0.67 cfs
Pre-development T_c	=	23.1 min.
Pre-development 2-year runoff volume (V_1)	=	0.0628 ac-ft.
	=	2,735 cu. ft.
Post-development 2-year flowrate (Q_1)	=	1.08 cfs
Post-development T_c	=	18.6 min.
Post- development 2-year runoff volume (V_2)	=	0.1451 ac-ft.
	=	6,320 cu. ft.

It has been determined that infiltration at the site is infeasible, therefore mitigation of HCOCs will be accomplished using a combination of the StormTech System and MWS.

The detention volume will be detained in the StormTech System. Since biofiltration is being used to treat the runoff the volume that must be detained prior to discharge is the Post-development 2-year, 24-hour runoff volume which is equal to 6,320 cu. ft. The StormTech System has been designed to store 6,754 cu. ft. which is greater than the minimum requirement. (See StormTech attachment for details.)

The flowrate out of the system is controlled by the outlet from the MWS. The post-development flowrate out of the unit shall not be 10% greater than the 2-year, 24-hour flowrate from pre-project flowrate. The pre-project flowrate has been determined to be 0.67 cfs or 300 gpm. The post-project flowrate out of the MWS is approximately 13 gpm which is much less than the pre-project flowrate. The drain down time for the flow has been determined to be 31.26 hours which is less than the maximum allowable drain down time of 48 hours.

Figure XVI-3b is a map included in the attachments that depicts the conveyance system that transmits the flows from the site to the Pacific Ocean. The figure shows that flows discharge to an area susceptible to hydromodification impacts.

II.4 Post Development Drainage Characteristics

The proposed development collects drainage from the site and transmits flows to a drainage pipe on the south side of the property along Catherine Avenue. These flows will be directed to a StormTech Subsurface Stormwater Management System, (StormTech System). This BMP removes sediments, trash and debris that may otherwise continue downstream and also stores a volume of water prior to biofiltration treatment. (See the attachments for plans and other detailed information about the StormTech System.)

The excess runoff volume from the 2-year storm cannot feasibly be retained by infiltration or capture/use, therefore the project will utilize on-site hydromodification controls to retain the excess volume to the maximum extent possible. This will be accomplished with the StormTech System. The StormTech System consists of a series of half-pipes and aggregates that includes an underdrain. Flows are directed into the system allowing the treated volume to be stored in the half-pipes and pore spaces of the aggregates. The volume is detained and slowly released into a Modular Wetlands Stormwater Biofiltration System (MWS) for biofiltration treatment before being discharged into the public drainage system. High flows during storms that are greater than the design storm are designed to bypass the StormTech storage system and drain directly to the back of the catch basin in Beach Boulevard.

The MWS provides primary treatment of pollutants through biofiltration prior to joining the high flows and discharging into the catch basin in Beach Blvd. The MWS allows the flows to pass through a vegetated media for treatment prior to discharge into the storm drain system.

II.5 Property Ownership/Management

The property is presently owned by USS Cal Builders:

Lutfi Bustami, Vice President
8051 Main Street, Stanton CA 90680
lutfib@usscalbuilders.com
(714) 699-5232

There will be no infrastructure improvements transferred to public agencies.

Due to the nature of the development, no homeowners/property owners association will be formed. The facility management team will be responsible for long-term maintenance of the project's stormwater facilities.

Section III Site Description

III.1 Physical Setting

Name of Planned Community/Planning Area (if applicable)	South Gateway Mixed Use District
Location/Address	12282 Beach Boulevard
	Stanton, CA 90680
General Plan Land Use Designation	Mixed Use
Zoning	Commercial General Zone
Acreage of Project Site	1.136
Predominant Soil Type	The subsurface of the site consists of 3.5 feet of non-certified fill material placed over the existing 2.0 feet of thick loose sandy silt. This layer is underlain by dense interbedded layers of clay, silt, and sand derived from alluviums.

III.2 Site Characteristics

Site Characteristics	
Precipitation Zone	The Project is located in the 0.80″ zone as shown on Fig. XVI-1 (Rainfall Zones) of the TGD.
Topography	The site is generally flat with a maximum elevation of 62.2 located in a mounded area at the west end of the site. Elevations throughout the site differ by no more than a foot or so for the most part. The minimum elevation on the site of 58.42 is located at the bottom of a depression at a 10″ diameter opening in a headwall that drains into the Anaheim-Barber City Channel.
Drainage Patterns/Connections	A portion of the site along the northerly boundary drains to and through the 10″ opening to the channel. The majority of the site drains on the surface southerly into Catherine Avenue then westerly and northerly to a catch basin that discharges into the channel.
Soil Type, Geology, and Infiltration Properties	The site is located in a region of soils designated as Hydrologic Soil Group B as shown on Fig. XVI-2a (NRCS Hydrologic Soils Groups) of the TGD. Generally, the subsurface of the site consists of 3.5 feet of non-certified fill material placed over the existing 2.0 feet of thick, loose, sandy silt. This layer is underlain by dense interbedded layers of clay, silt and sand derived from alluviums.
Hydrogeologic (Groundwater) Conditions	Field observations have revealed that groundwater was encountered at depths of 17.5 feet. Due to seasonal changes, water may be observed at shallower depths at different times of the year.
Geotechnical Conditions (relevant to infiltration)	Site soils consist of dark, olive, sandy silt to dark, olive/gray silty clay within the top 4 feet of exploratory borings. This is underlain by sandy silts, and silty sands at increasing moisture and density down to the water table at a depth of about 18 feet. Percolation tests at the site have revealed that the infiltration rate for the soil is 0.2 inches per hour. Since this rate is less than the allowable infiltration rate of 0.3 inches per hour infiltration BMPs are infeasible for this project.
Off-Site Drainage	There is no off-site drainage to the site.
Utility and Infrastructure Information	Existing abandoned electrical, drainage, gas and other unknown utilities are anticipated to be present at the site. Any existing utilities that interfere with the proposed drainage system and BMPs will be removed. Proposed utilities have been positioned to avoid conflict with the proposed drainage system and BMPs.

III.3 Watershed Description

Receiving Waters	**Anaheim-Barber City Channel** **Bolsa Chica Channel** **Huntington Harbor** **Anaheim Bay** **Pacific Ocean**
303(d) Listed Impairments	**Bolsa Chica Channel –** Ammonia (Unionized), Indicator Bacteria, pH **Huntington Harbor –** Chlordane, Copper, Lead, Nickel, Pathogens, PCBs, Sediment Toxicity **Anaheim Bay –** Dieldrin, Nickel, PCBs, Sediment Toxicity
Applicable TMDLs	**Bolsa Chica Channel –** TMDLs not yet developed **Anaheim Bay –** TMDLs not yet developed
Pollutants of Concern for the Project	Suspended-Solid/Sediment; Nutrients; Heavy Metals; Pathogens (Bacteria/Virus); Pesticides; Oil & Grease; Toxic Organic Compounds; Trash & Debris
Environmentally Sensitive and Special Biological Significant Areas	The project is not located within any known Environmentally Sensitive Areas (ESAs) or Areas of Special Biological Concern (ASBs).

Section IV Best Management Practices (BMPs)

IV.1 Project Performance Criteria

(NOC Permit Area only) Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	There are currently no approved WIHMPs for the Anaheim Bay – Huntington Harbor Watershed.	

Project Performance Criteria	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	Hydromodification controls shall be implemented for this project such that: • Post-development runoff volume for the 2-year frequency storm does not exceed that of the pre-development condition by more than 5% • Time of concentration of post-development runoff for the 2-year storm event is not less than that for the pre-development condition by more than 5%.
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	Priority projects must infiltrate, harvest and use, evapotranspire, or biotreat/biofilter the 85th percentile, 24-hour storm event (Design Capture Volume).
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	Treatment Control BMPs may only be used as an alternative compliance path if the full design capture volume (DCV) cannot be treated by the use of infiltration, retention, and/or biotreatment BMPs.
Calculate LID DCV for Project. (Appendix III of TGD)	DCV = C x d x A x (43,560 sf/ac) x (1 ft/12 in) C = (0.75 x 0.75) + 0.15 = 0.7125 d = 0.80 in. (From Rainfall Zone Map; Figure XVI-1, TGD) A = 1.111 ac. DCV = 2,300 cu. ft.

IV.2. Site Design and Drainage

The project consists of constructing: a 66-unit assisted living development; landscape areas; a parking lot, trash enclosure, garage, and other miscellaneous structures that support facility operations.

The majority of the proposed site is covered by the building roof. An area west of the building will remain pervious landscaped area.

The proposed development collects drainage from the site and transmits flows to a drainage pipe on the south side of the property along Catherine Avenue. These flows will be directed to a StormTech Subsurface Stormwater Management System, (StormTech System). This BMP removes sediments, trash and debris that may otherwise continue downstream and also stores a volume of water prior to biofiltration treatment. (See the attachments for plans and other detailed information about the StormTech System.)

The excess runoff volume from the 2-year storm cannot feasibly be retained by infiltration or capture/use, therefore the project will utilize on-site hydromodification controls to retain the excess volume to the maximum extent possible. This will be accomplished with the StormTech System. The StormTech System consists of a series of half-pipes and aggregates that includes an underdrain. Flows are directed into the system allowing the treated volume to be stored in the half-pipes and pore spaces of the aggregates. The volume is detained and slowly released into a Modular Wetlands Stormwater Biofiltration System (MWS) for biofiltration treatment before being discharged into the public drainage system. High flows during storms that are greater than the design storm are designed to bypass the StormTech storage system and drain directly to the back of the catch basin in Beach Boulevard.

The MWS provides primary treatment of pollutants through biofiltration prior to joining the high flows and discharging into the catch basin in Beach Blvd. The MWS allows the flows to pass through a vegetated media for treatment prior to discharge into the storm drain system.

IV.3 LID BMP Selection and Project Conformance Analysis

IV.3.1 Hydrologic Source Controls (HSCs)

The project will not be seeking any credit for the use of HSCs.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☐
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐
Other:	☐

IV.3.2 Infiltration BMPs

Infiltration is infeasible for this project, therefore infiltration BMPs are not proposed. See the Impervious BMP Feasibility Worksheet in the attachments.

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐

Permeable concrete pavers	☐
Other:	☐

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Rainwater harvesting is deemed to be infeasible and is not used in the design. See Worksheet J in the attachments.

Name	Included?
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
Above-ground cisterns and basins	☐
Underground detention	☐

IV.3.4 Biotreatment BMPs

The MWS will be used to provide biotreatment of flows being discharged from the site. The MWS is a proprietary biotreatment BMP and meets the criteria as described in the Design Standards Sheet BIO-7 included in the attachments.

Name	Included?
Bioretention with underdrains	☐
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☐
Wet extended detention basin	☐
Dry extended detention basins	☐
Other: Modular Wetlands System (MWS)	☒

IV.3.5 Hydromodification Control BMPs

Hydromodification control is attained using the StormTech System and the Modular Wetlands System as follows:

Hydromodification Control BMPs	
BMP Name	**BMP Description**
StormTech Subsurface Stormwater Management System (StormTech System)	This BMP stores a volume of water equal to the volume produced from the post-development 2-year, 24-hour storm event prior to entering the MWS for biofiltration treatment and outlet flowrate control. (See the attachments for plans and other detailed information about the StormTech System.)
Modular Wetlands System (MWS)	The MWS is designed to treat the flows for biofiltration, but also controls the flowrate out of the system with an orifice outlet control. Calculations have been made to determine the post-development flowrate and are included in the attachment titled "MWS – Linear Volume Based Sizing Sheet".

HCOCs have been determined to exist as shown in Section II.3. The detention volume will be detained in the StormTech System. Since biofiltration is being used to treat the runoff the volume that must be detained prior to discharge is the Post-development 2-year, 24-hour runoff volume which is equal to 6,320 cu. ft. The StormTech System has been designed to store 6,754 cu. ft. which is greater than the minimum requirement. (See StormTech attachment for details.)

The flowrate out of the system is controlled by the outlet from the MWS. The post-development flowrate out of the unit shall not be 10% greater than the 2-year, 24-hour flowrate from pre-project flowrate. The pre-project flowrate has been determined to be 0.67 cfs or 300 gpm. The post-project flowrate out of the MWS is approximately 13 gpm which is much less than the pre-project flowrate. The drain down time for the flow has been determined to be 31.26 hours which is less than the maximum allowable drain down time of 48 hours.

IV.3.6 Regional/Sub-Regional LID BMPs

There are no Regional or Sub-Regional BMPs required for this project.

IV.3.7 Treatment Control BMPs

Pre-treatment of flows prior to entering StormTech storage system is achieved in the "Isolator Row" of the containment chambers. Trash and debris settles out in this set of chambers to be removed during routine maintenance of the system.

Treatment Control BMPs	
BMP Name	**BMP Description**
StormTech Subsurface Stormwater Management System (StormTech System)	This BMP removes sediments, trash and debris that may otherwise continue downstream and also stores a volume of water prior to biofiltration treatment. (See the attachments for plans and other detailed information about the StormTech System.)

IV.3.8 Non-structural Source Control BMPs

Fill out non-structural source control check box forms or provide a brief narrative explaining if non-structural source controls were not used.

Non-Structural Source Control BMPs				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	No hazardous waste generation or handling for this project.
N6	Local Industrial Permit Compliance	☐	☒	Not an industrial site.
N7	Spill Contingency Plan	☐	☒	No hazardous materials are to be stored at the site.
N8	Underground Storage Tank Compliance	☐	☒	No underground storage tanks to be used at the site.
N9	Hazardous Materials Disclosure Compliance	☐	☒	No hazardous materials are to be stored at the site.
N10	Uniform Fire Code Implementation	☐	☒	No hazardous materials are to be stored at the site.
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☒	☐	
N13	Housekeeping of Loading Docks	☐	☒	No loading docks on the site.
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Private Streets and Parking Lots	☒	☐	
N16	Retail Gasoline Outlets	☐	☒	Not a gas station site.

(N1) Education for Property Owners, Tenants & Occupants

The owner of the property will provide information and instruction to all users and successors of the property. This will include instructions on good housekeeping practices and posting of handouts, which provide general information and actions to be taken to maintain water quality management of the site. Educational materials are included in Section VII of this WQMP. In accordance with the requirements of the *Model Water Quality Management Plan,* these materials will be provided to the facility's maintenance personnel responsible for campus maintenance.

(N2) Activity Restrictions

There is no Property Owner's Association (POA) associated with this project. The facility officials will assume responsibility for restricting activities at the site. The following items shall be prohibited or required as noted:

- Hosing down of sidewalk areas is prohibited.
- Blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into streets or storm drains is prohibited.
- Dumpster lids are required to be kept closed at all times.
- Trash receptacles are required to be covered or sheltered by a roof overhang or canopy.
- Discharges of paint or masonry wastes are prohibited.
- Washing of kitchen wastes or kitchen equipment to storm drain facilities is prohibited.
- Vehicle washing, maintenance or repair on the premises are prohibited.

(N3) Common Area Landscape Management

Landscape irrigation methods will be constructed to comply with the requirements of the City of Stanton's Water Conservation Standards (Municipal Code Section 20.315.050.) The use of fertilizers and pesticides shall be implemented in accordance with the requirements of the *County Management Guidelines for the use of Fertilizers and Pesticides* (Refer to Appendix C).

(N4) BMP Maintenance

BMP maintenance, implementation schedules, and responsible parties are included with each specific BMP narrative.

(N11) Common Area Litter Control

The facility official will institute a program to implement trash management and litter control procedures. The facility's maintenance crew will be directed to patrol the grounds for litter on a weekly basis as part of their normal duties. Trash receptacles shall be placed at various locations on the site as determined by the facility official, and they shall be emptied daily.

(N12) Employee Training

The facility official will be responsible for training and educating employees in the proper measures required to meet the objectives of this WQMP. This will consist of reviewing the requirements of this WQMP with the facility's staff and maintenance personnel. New employees shall be educated and trained as part of their initial employee orientation.

(N14) Catch Basin Inspection

The facility official will ensure that the catch basins are inspected and cleaned at the beginning of the rainy season on October 15th of each year, and following any significant storm event.

(N15) Street Sweeping Private Streets and Parking Lots

The facility official will insure that the parking lot will be swept on a regular basis. Sweeping shall be done by mechanical means (i.e. by street sweepers) and shall be done bi-weekly. Parking lots are to be kept clean and free of litter. Streets and parking lots will be swept in accordance with the requirements of the City of Stanton.

IV.3.9 Structural Source Control BMPs

Structural Source Control BMPs				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No Outdoor storage at site.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☐	☒	Not applicable; site is relatively flat.
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	Not applicable to this project.
S6	Dock areas	☐	☒	None on the site.
S7	Maintenance bays	☐	☒	None on the site.
S8	Vehicle wash areas	☐	☒	None on the site.
S9	Outdoor processing areas	☐	☒	None on the site.
S10	Equipment wash areas	☐	☒	None on the site.
S11	Fueling areas	☐	☒	None on the site.
S12	Hillside landscaping	☐	☒	No hillsides on the site.
S13	Wash water control for food preparation areas	☐	☒	No food preparation areas on the site.
S14	Community car wash racks	☐	☒	No community car wash

(S1) Storm Drain System Stenciling and Signage

Storm drain inlets shall be marked with das makers, (or equal), to notify users of the site not to dump into the drainage system. The project grading plans shall include a detail showing the das marker to be installed at each inlet.

(S3) Trash and Waste Storage Area Design

Trash bin areas shall be designed with a roof over the structure to prevent rainwater from falling within the enclosure and transmitting trash and waste to the drainage system.

(S4) Efficient Irrigation Systems and Landscape Design

The project will be designed in a manner that minimizes the time and method of irrigation to minimize runoff from the excess irrigation water into the drainage system.

IV.4 Alternative Compliance Plan (If Applicable)

Alternative compliance is not required for this project and not used.

IV.4.1 Water Quality Credits

Water quality credits have not been used in the design of this project.

Description of Proposed Project				
Project Types that Qualify for Water Quality Credits (Select all that apply):				
☐Redevelopment projects that reduce the overall impervious footprint of the project site.	☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.		☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).	
☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).		☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned		☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).
☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.	☐ Developments in a city center area.	☐ Developments in historic districts or historic preservation areas.	☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.	☐In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.
Calculation of Water Quality Credits (if applicable)				

IV.4.2 Alternative Compliance Plan Information

No alternative compliance plan used for this project.

Section V Inspection/Maintenance Responsibility for BMPs

BMP Inspection/Maintenance			
BMP	**Reponsible Party(ies)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
StormTech Subsurface Stormwater Management System, (StormTech System)	Lutfi Bustami	Maintenance is to be done in accordance with manufacturer's specifications.	Frequency of maintenance is to be determined by the manufacturer.
Modular Wetlands Stormwater Biofiltration System (MWS)	Lutfi Bustami	The NSBB is to be maintained as designated by the manufacturer / distributor of the device. This involves regular inspection and cleaning of the device as specified by the manufacturer. The work shall be done by a crew qualified in proper handling and disposal of trash and debris collected during maintenance.	Frequency of maintenance is to be determined by the pollutant load of the surrounding area. Initially, the unit shall be inspected every few months to determine the long-term inspection frequency requirements and a routine maintenance schedule shall then be developed based on that frequency.
N1 Education for Property Owners, Tenants and Occupants	Lutfi Bustami	The owner of the property will provide information and instruction to all users and successors of the property. This will include instructions on good housekeeping practices and posting of handouts, which provide general information and actions to be taken to maintain water quality management of the site. Educational materials are included in Section VII of this WQMP. In accordance with the requirements of the Model Water Quality Management Plan, these materials will be provided to the facility's maintenance personnel responsible for campus maintenance.	Materials shall be presented to employees upon initial City approval of this WQMP; presented to new employees as part of their orientation at initial hire; and reviewed with all employees on an annual basis.

BMP Inspection / Maintenance			
BMP	**Reponsible Party(ies)**	**Inspection / Maintenance Activities Required**	**Minimum Frequency of Activities**
N2 Activity Restriction	Lutfi Bustami	The property owner will be responsible for managing this property and will assume responsibility for restricting activities at the site as outlined herein. Hosing down of sidewalk areas is prohibited.	Activity restrictions shall be presented to employees upon initial approval of this WQMP; presented to new employees as part of their orientation at initial hire; and reviewed with all employees on an annual basis.
N3 Common Area Landscape Management	Lutfi Bustami	Landscaping and irrigation methods will be constructed to comply with the requirements of the City of Stanton Ordinance Number 968 specifying local water conservation standards. The use of fertilizers and pesticides shall be implemented in accordance with the requirements of the County Management Guidelines for the use of Fertilizers and Pesticides.	Landscape practices shall be reviewed with the landscape maintenance crews upon initial City approval of this WQMP; presented to new employees as part of their orientation at initial hire; and reviewed with all employees on an annual basis.
N4 BMP Maintenance	Lutfi Bustami	The property owner will contract with an appropriately trained maintenance company to regularly inspect and clean the manholes, catch basins and filter inserts in accordance with the manufacturer's requirements and as otherwise directed by the City of Stanton.	Monthly routine inspection of the area and removal of any trash and debris. Inspection and cleaning of the insert itself shall be done in accordance with the manufacturer's specifications.
N11 Common Area Litter Control	Lutfi Bustami	The owner will institute a program to implement trash management and litter control procedures.	The facility's maintenance crew will be directed to patrol the grounds for litter on a weekly basis as part of their normal duties.

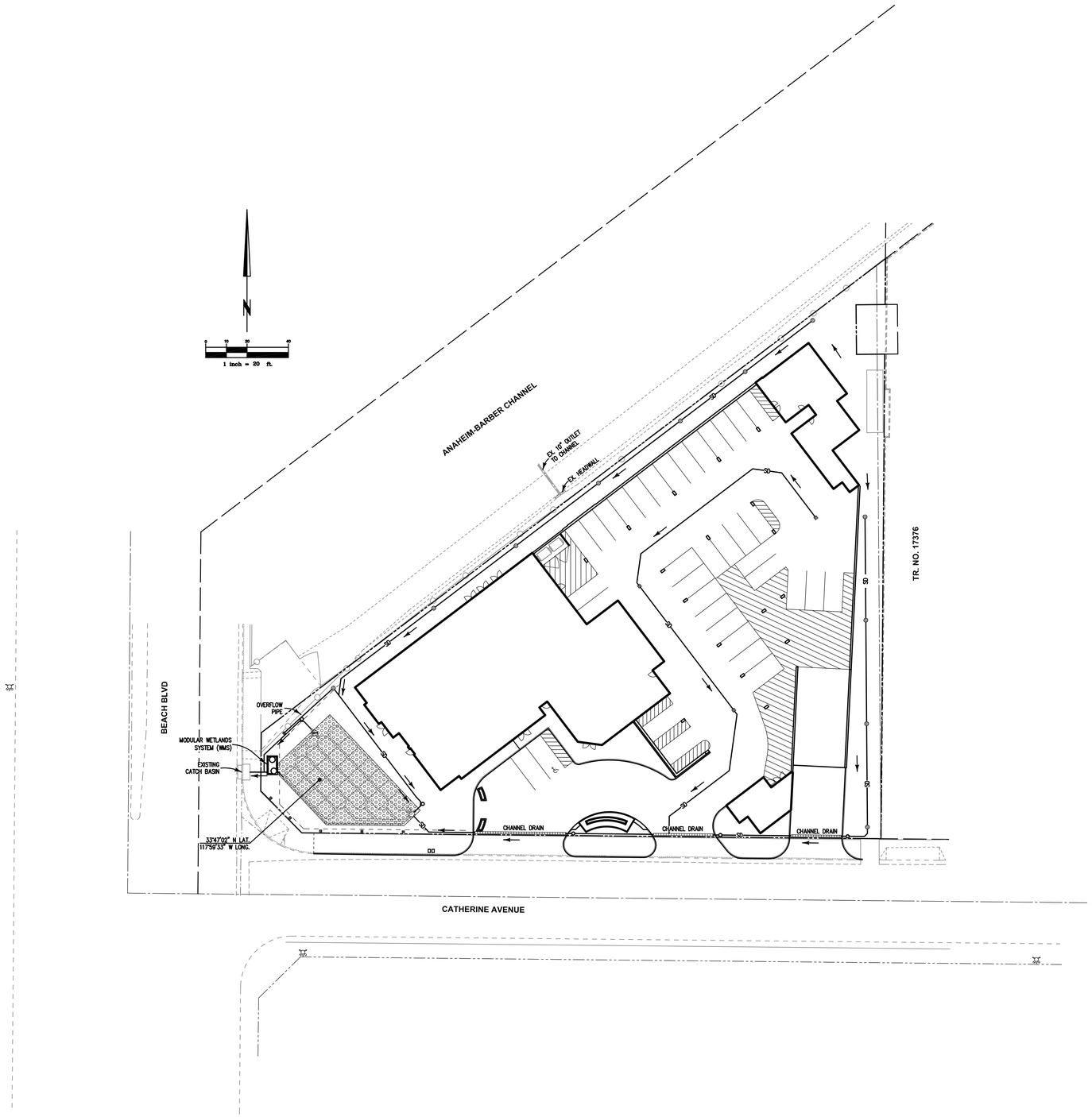
BMP Inspection / Maintenance			
BMP	**Reponsible Party(ies)**	**Inspection / Maintenance Activities Required**	**Minimum Frequency of Activities**
N12 Employee Training	Lutfi Bustami	The owner will be responsible for training and educating employees in the proper measures required to meet the objectives of this WQMP. This will consist of reviewing the requirements of this WQMP with the facility's staff and maintenance personnel. New employees shall be educated and trained as part of their initial employee orientation.	Materials shall be presented to employees upon initial City approval of this WQMP; presented to new employees as part of their orientation at initial hire; and reviewed with all employees on an annual basis.
N14 Common Area Catch Basin Inspection	Lutfi Bustami	Catch basins shall be inspected on a regular basis by the maintenance crew. Trash and debris shall be removed from the area and the maintenance crew shall coordinate clean-up efforts with the catch basin maintenance company as described in N4 above.	The facility's maintenance crew will be directed to patrol the grounds for litter on a weekly basis as part of their normal duties.
N15 Street Sweeping Private Streets and Parking Lots	Lutfi Bustami	The owner will insure that the parking lot will be swept on a regular basis. Parking lots are to be kept clean and free of litter. Streets and parking lots will be swept in accordance with the requirements of the City of Stanton.	Bi-weekly sweeping by mechanical means (i.e. by street sweepers).

The owner is aware of the maintenance responsibilities of the proposed BMPs. A funding mechanism is in place to maintain the BMPs at the frequency stated in this WQMP.

Section VI BMP Exhibit (Site Plan)

VI.1 BMP Exhibit (Site Plan)

See Site Plan on the following page.



LEGEND & ABBREVIATIONS

←	FLOW DIRECTION
SD	STORM DRAIN
RW	RAINWATER SUPPLY
NSBB	NUTRIENT SEPARATING BAFFLE BOX
	STORMTECH SUBSURFACE STORMWATER MANAGEMENT SYSTEM

WQMP NO. _____

OWNER

USS CAL BUILDERS
8051 MAIN STREET
STANTON, CA 90680
(714) 699-5232

CIVIL ENGINEER

Sessions Consulting Engineers
231 E. Imperial Hwy, Ste. 201B Fullerton, CA 92835
(714) 213-8854 Email: kerry@sessionsconsulting.com

REGISTERED PROFESSIONAL ENGINEER
KERRY B. SESSIONS
No. 50461
Exp. 6-30-17
CIVIL
STATE OF CALIFORNIA

BMP EXHIBIT (SITE PLAN)

ASSISTED LIVING PROJECT
12282 BEACH BLVD.
STANTON, CA

PROJECT NO. 80-212-0
DATE: 01/26/16
SHEET 1 OF 1

VI.2 Submittal and Recordation of Water Quality Management Plan

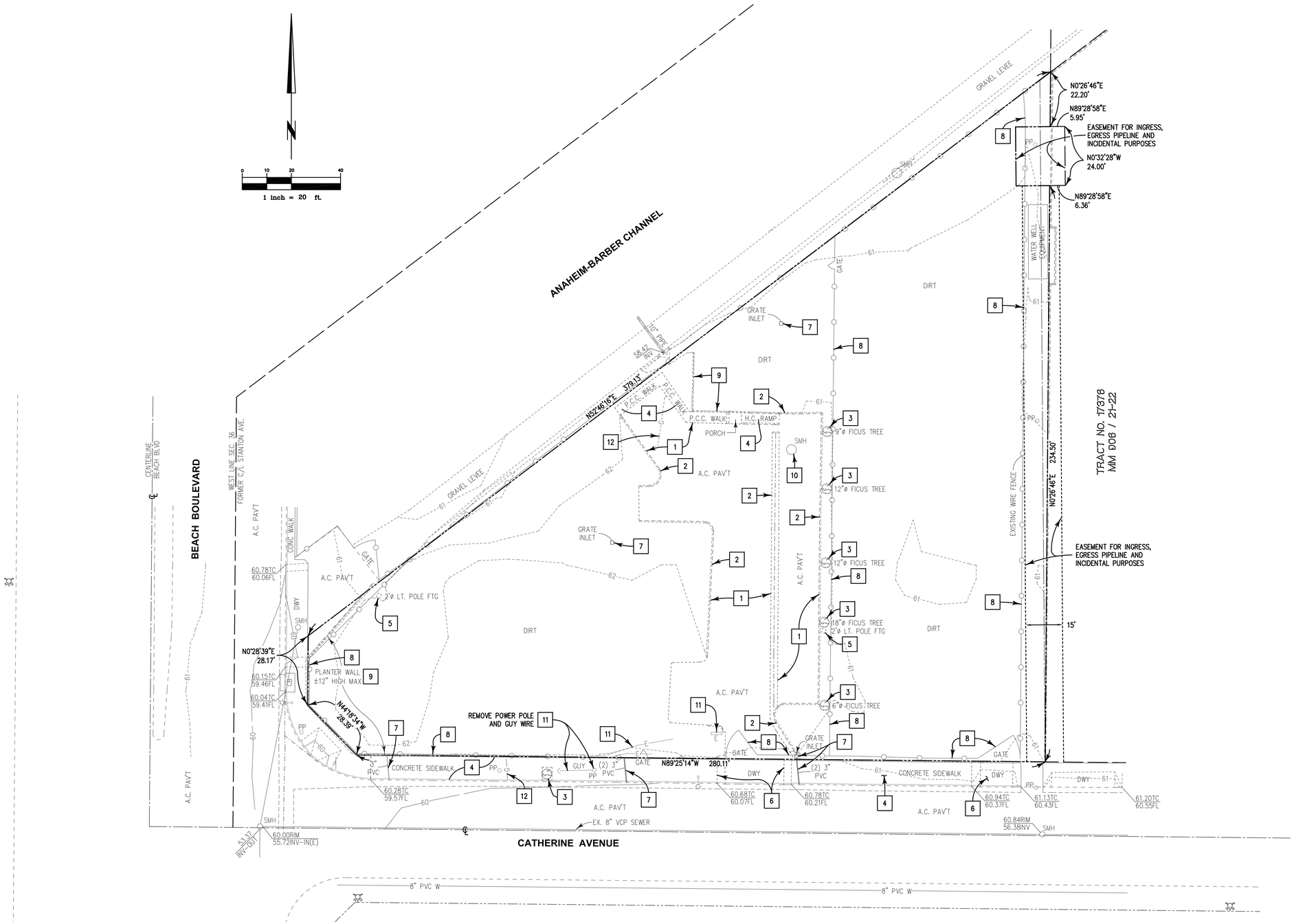
Following approval of the Final Project-Specific WQMP, three copies of the approved WQMP (including BMP Exhibit, Operations and Maintenance (O&M) Plan, and Appendices) shall be submitted. In addition, these documents shall be submitted in a PDF format.

Each approved WQMP (including BMP Exhibit, Operations and Maintenance (O&M) Plan, and Appendices) shall be recorded in the Orange County Clerk-Recorder's Office, prior to close-out of grading and/or building permit. Educational Materials are not required to be included.

Section VII Educational Materials

Refer to the Orange County Stormwater Program (ocwatersheds.com) for a library of materials available.

Education Materials			
Residential Material (http://www.ocwatersheds.com)	**Check If Applicable**	**Business Material (http://www.ocwatersheds.com)**	**Check If Applicable**
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☐	Tips for the Food Service Industry	☒
Homeowners Guide for Sustainable Water Use	☐	Proper Maintenance Practices for Your Business	☒
Household Tips	☒	**Other Material**	**Check If Attached**
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☐		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☐		☐
Sewer Spill	☐		☐
Tips for the Home Improvement Projects	☐		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☐		☐
Tips for Pool Maintenance	☐		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☐		☐
Tips for Projects Using Paint	☐		☐



DEMOLITION NOTES

1. SAWCUT & REMOVE EXISTING AC PAVEMENT
2. REMOVE EXISTING CURB &/OR GUTTER
3. REMOVE EXISTING TREES/SHRUBS
4. REMOVE EXISTING CONCRETE SIDEWALK/SLAB
5. REMOVE EXISTING LIGHT POLE FOUNDATION
6. REMOVE EXISTING DRIVEWAY APPROACH
7. REMOVE EXISTING DRAIN LINES AND INLETS
8. REMOVE EXISTING FENCE & GATES
9. REMOVE EXISTING WALL
10. REMOVE EXISTING SEWER MANHOLE AND REMOVE/ABANDON EXISTING SEWER LINES
11. REMOVE/ABANDON EXISTING ELECTRICAL FACILITIES
12. REMOVE/ABANDON EXISTING GAS FACILITIES

CIVIL ENGINEER

Sessions Consulting Engineers

231 E. Imperial Hwy, Ste. 201B Fullerton, CA 92835
(714) 213-8854 Email: kerry@sessionsconsulting.com

REGISTERED PROFESSIONAL ENGINEER
KERRY B. SESSIONS
No. 50461
Exp. 6-30-17
CIVIL
STATE OF CALIFORNIA

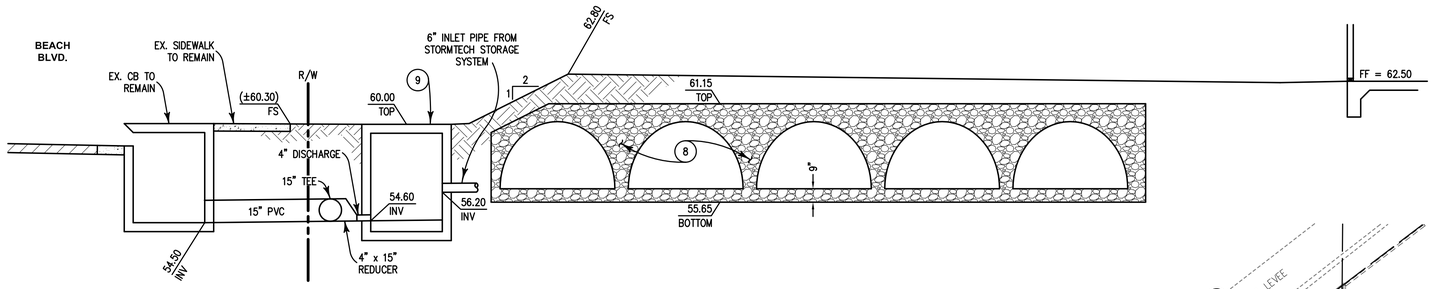
TOPOGRAPHIC MAP & DEMOLITION PLAN

ASSISTED LIVING PROJECT
12282 BEACH BLVD.
STANTON, CA

PROJECT NO. 80-212-0

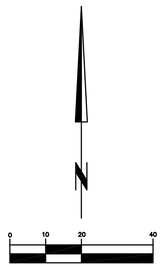
DATE: 01/26/16

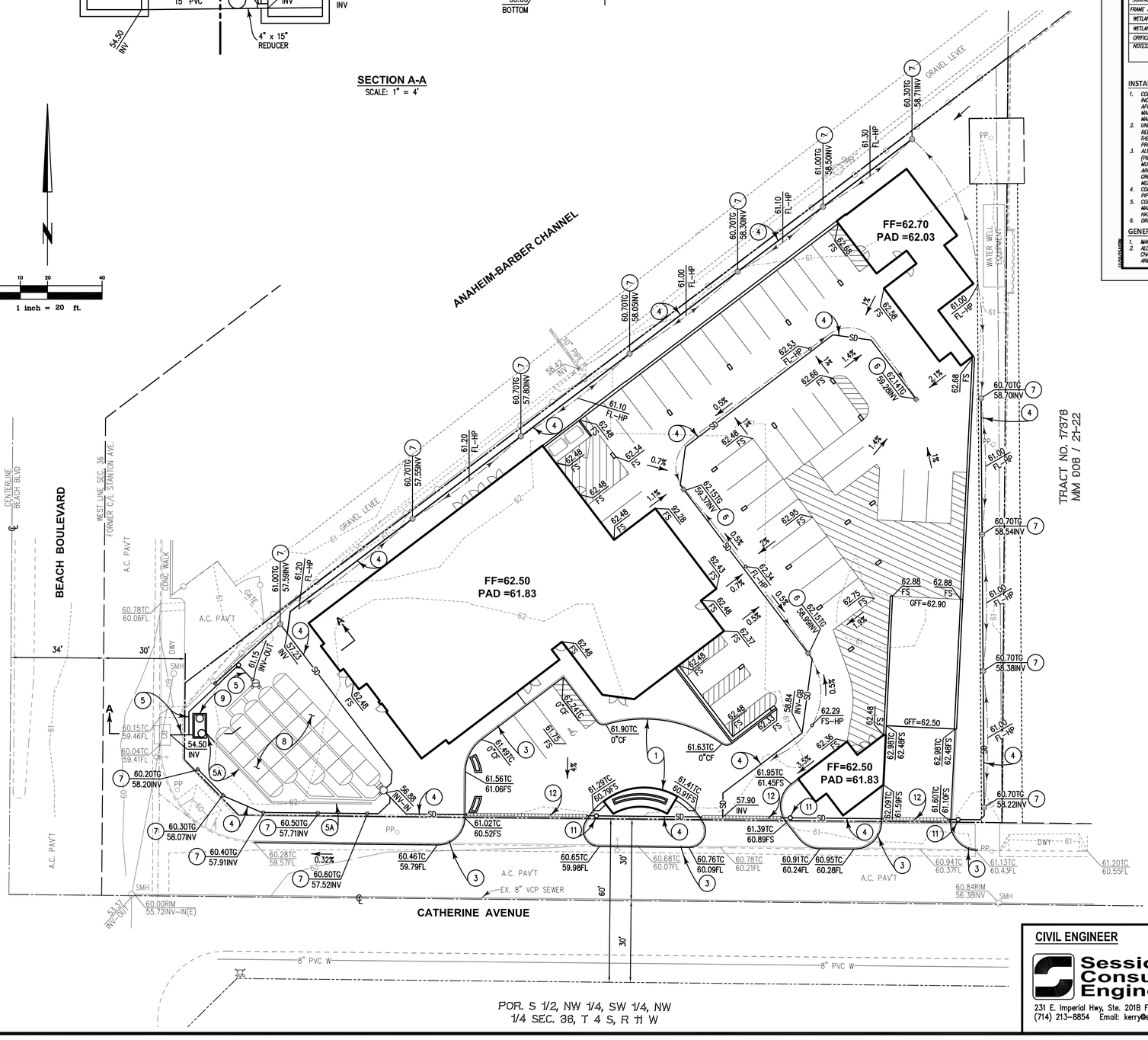
SHEET 1 OF 3



SECTION A-A

SCALE: 1" = 4'





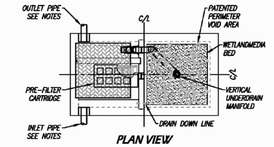
SITE SPECIFIC DATA			
PROJECT NUMBER	2864		
PROJECT NAME	STANTON ASSISTED LIVING		
PROJECT LOCATION	STANTON, CA		
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
3585			
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	56.20	PVC	4"
INLET PIPE 2			
OUTLET PIPE	55.70	PVC	4"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	60.0		
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	36" x 36"	N/A	N/A
WETLANDMEDIA VOLUME (CY)			2.49
WETLANDMEDIA DELIVERY METHOD			PER CONTRACT
ORIFICE SIZE (DIA. INCHES)			#0.77"
NOTES:			

INSTALLATION NOTES

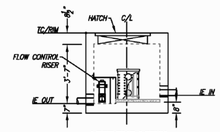
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON-SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

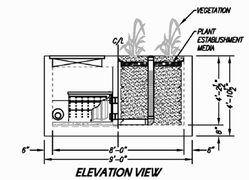
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.



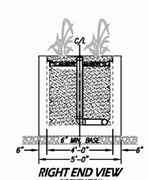
PLAN VIEW



LEFT END VIEW
PRETREATMENT/DISCHARGE



ELEVATION VIEW



RIGHT END VIEW
BIOFILTRATION

TREATMENT CAPACITY (CF)	5036
DRAINDOWN TIME (HR)	48
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	0.26

THE PRESENT DESIGNERS MAY BE THE PROPERTY OF SOME OR ALL OF THE FOLLOWING US PATENTS: 7,425,265; 7,470,365; 7,474,370; 8,313,643; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

PROPRIETARY AND CONFIDENTIAL:
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MODULAR WETLANDS SYSTEMS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MODULAR WETLANDS SYSTEMS IS PROHIBITED.

MODULAR WETLANDS
www.modularwetlands.com | (833) 628-0-WQ

MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

CONSTRUCTION NOTES

1. CONSTRUCT 3" AC / 6" AB PAVEMENT
2. CONSTRUCT PCC CURB & GUTTER PER DETAIL HEREON
3. CONSTRUCT PCC CURB PER DETAIL HEREON
4. CONSTRUCT 6" PVC SDR35 DRAIN LINE
5. CONSTRUCT 15" PVC SDR35 DRAIN LINE
5A. CONSTRUCT 6" PERFORATED UNDERDRAIN AND CONNECT TO PROPOSED MWS
6. CONSTRUCT 12" DRAIN INLET PER DETAIL HEREON
7. CONSTRUCT 18" DRAIN INLET WITH ATRIUM GRATE
8. CONSTRUCT STORMTECH STORMWATER SUBSURFACE MANAGEMENT SYSTEM PER MANUFACTURER'S SPECIFICATIONS AND DETAILS HEREON
9. CONSTRUCT MODULAR WETLANDS MWS LINEAR SYSTEM PER MANUFACTURER'S SPECIFICATIONS AND DETAILS HEREON
10. (NOT USED)
11. CONSTRUCT CLEANOUT
12. CONSTRUCT 5" WIDE NDS #823 HEAVY DUTY CAST IRON HEAVY TRAFFIC CHANNEL GRATE OR APPROVED EQUAL

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REGISTERED PROFESSIONAL ENGINEER
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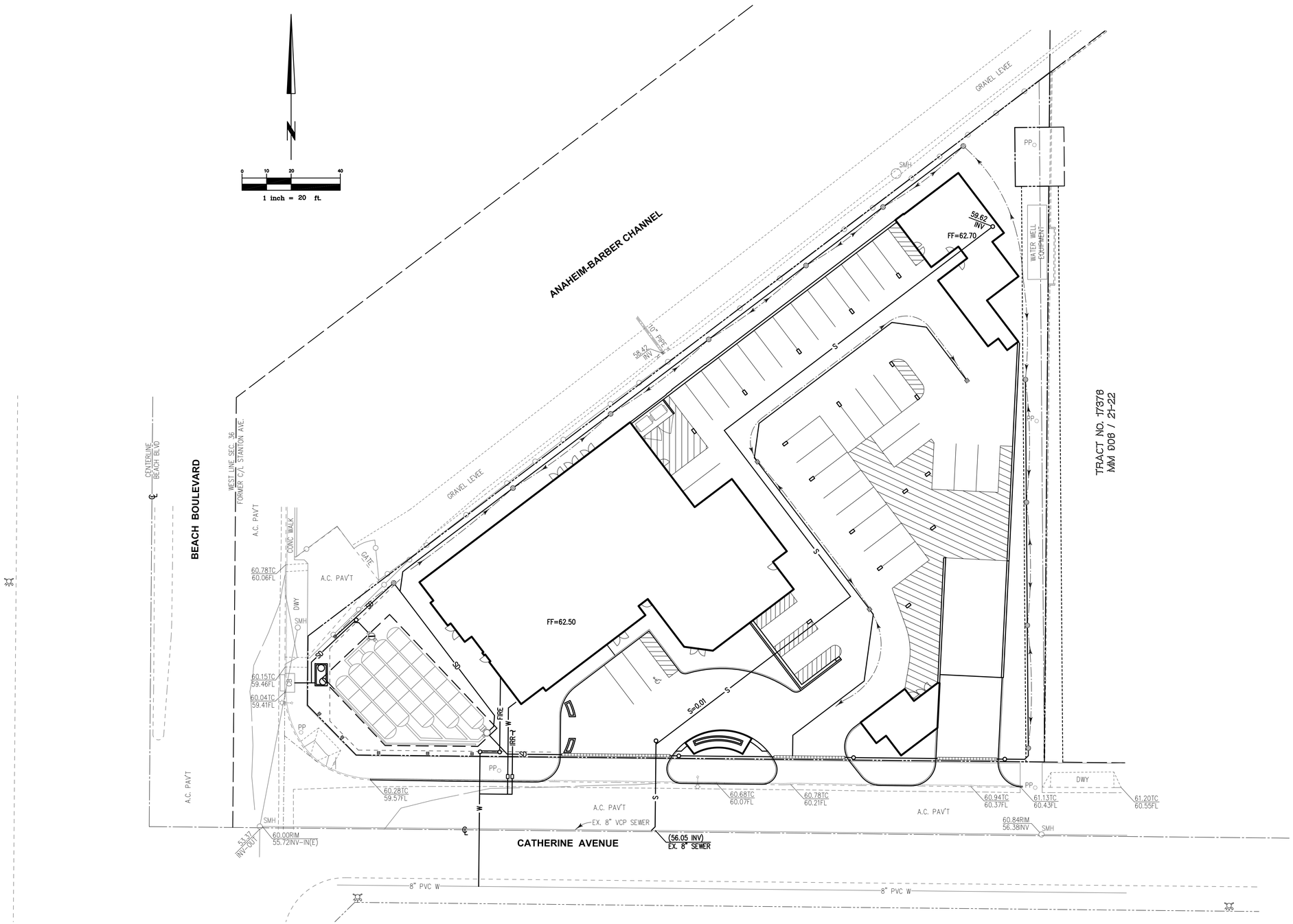
No. 50461
Exp. 6-30-17
CIVIL
STATE OF CALIFORNIA

PRELIMINARY GRADING PLAN

ASSISTED LIVING PROJECT
12282 BEACH BLVD.
STANTON, CA

PROJECT NO. 80-212-0
DATE: 02/15/16
SHEET 2 OF 3



CIVIL ENGINEER

Sessions Consulting Engineers
231 E. Imperial Hwy, Ste. 201B Fullerton, CA 92835
(714) 213-8854 Email: kerry@sessionsconsulting.com

REGISTERED PROFESSIONAL ENGINEER
KERRY B. SESSIONS
No. 50461
Exp. 6-30-17
CIVIL
STATE OF CALIFORNIA

PRELIMINARY UTILITY PLAN

ASSISTED LIVING PROJECT
12282 BEACH BLVD.
STANTON, CA

PROJECT NO. 80-212-0
DATE: 01/26/16
SHEET 3 OF 3

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	BILL DE JONG 714-394-8922 BILL.DEJONG@ADS-PIPE.COM
ADS SALES REP:	DAVID MORSCH 619-405-8771 DAVID.MORSCH@ADS-PIPE.COM
PROJECT NO:	128575

ADVANCED DRAINAGE SYSTEMS, INC.

STANTON ASSISTED LIVING

SANTON, CA

STORMWATER CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MADE FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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PROPOSED LAYOUT

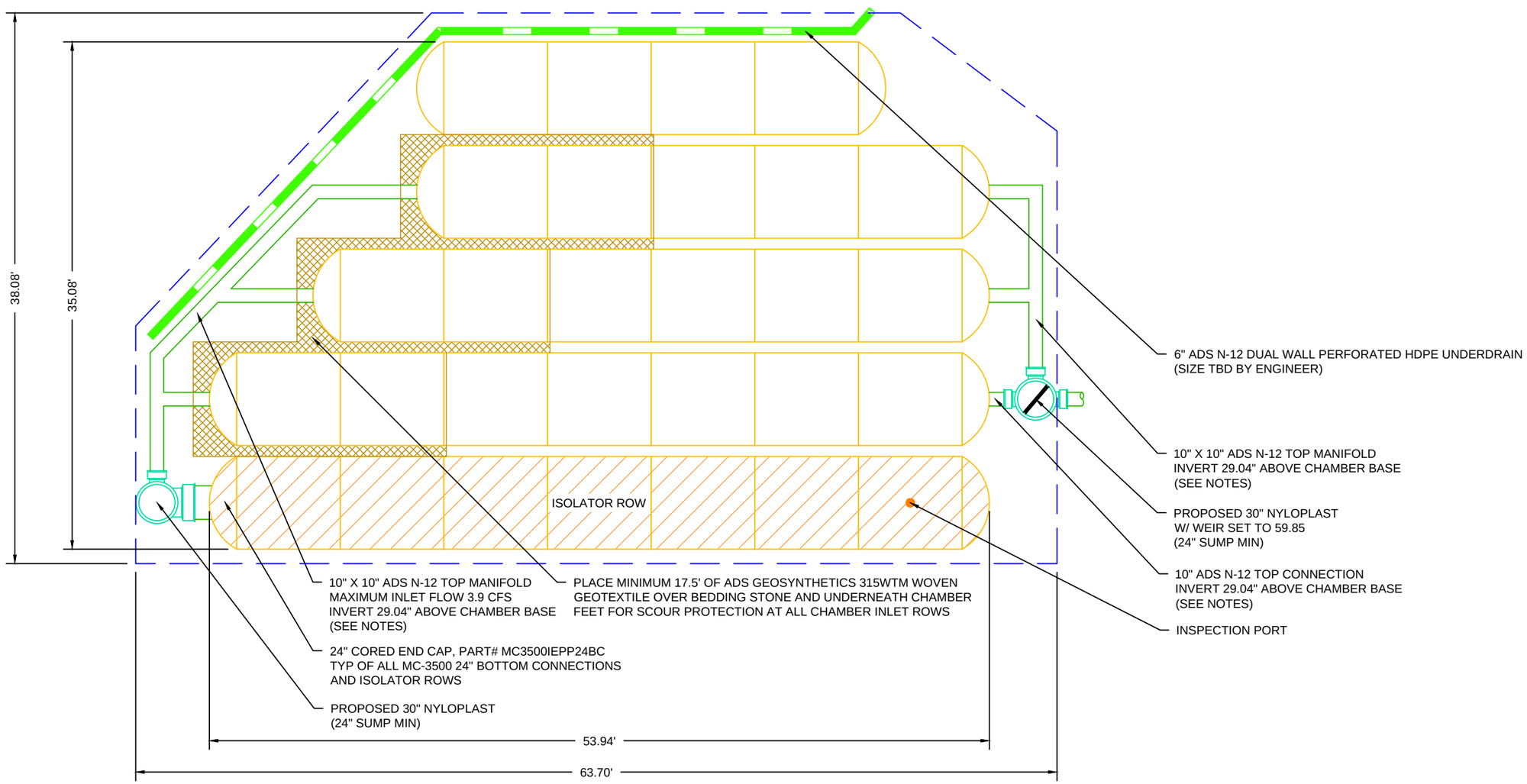
(29) STORMTECH MC-3500 CHAMBERS
(10) STORMTECH MC-3500 END CAPS
INSTALLED WITH 12" COVER STONE, 9" BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 6,754 CF (PERIMETER STONE INCLUDED)
AREA OF SYSTEM: 2,160 FT²
PERIMETER OF SYSTEM: 185 FT

PROPOSED ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	66.85
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	61.35
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	60.85
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	60.85
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	60.85
TOP OF STONE:	59.85
TOP OF CHAMBER:	58.85
10" TOP MANIFOLD INVERT:	57.52
24" ISOLATOR ROW INVERT:	55.27
BOTTOM OF CHAMBER:	55.10
UNDERDRAIN INVERT:	55.10
BOTTOM OF STONE:	54.35

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH SHEET #7 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.



STANTON ASSISTED LIVING
SANTON, CA

DATE: 1-12-16 | DRAWN: MSY
PROJECT #: 128575 | CHECKED: KMS

REV	DRW	CHK	DESCRIPTION

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SCALE = 1 : 100

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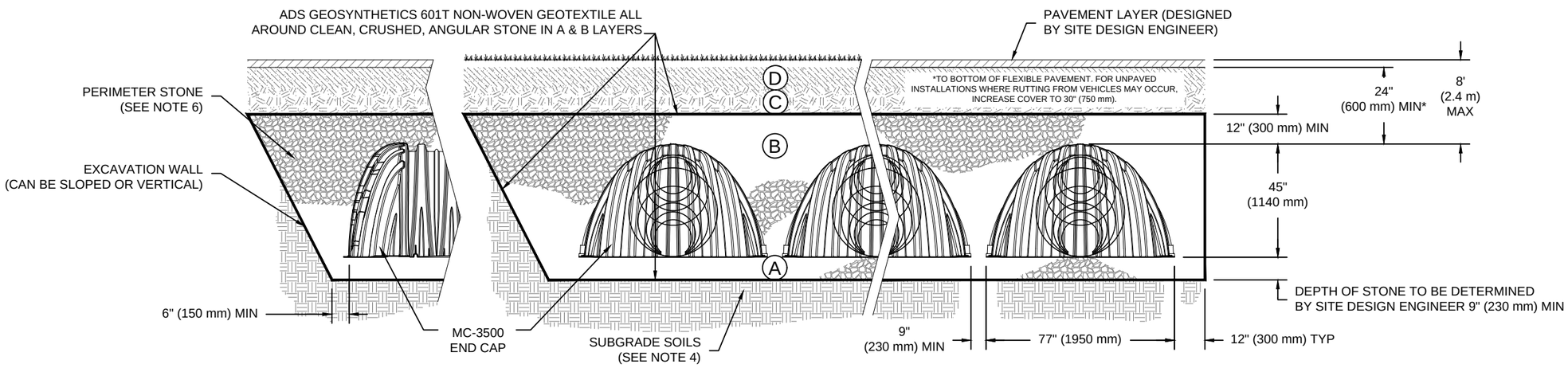
ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2] [3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. MC-3500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
   PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

STANTON ASSISTED LIVING
SANTON, CA

DATE: 1-12-16 | DRAWN: MSY
PROJECT #: 128575 | CHECKED: KMS

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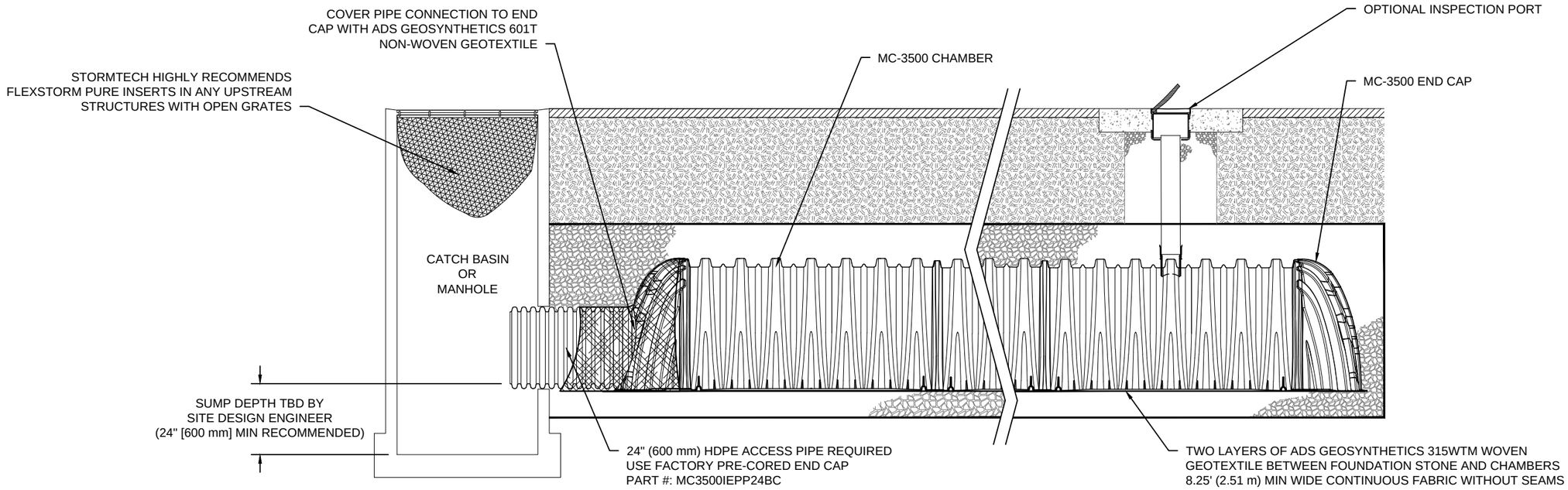


MC-3500 ISOLATOR ROW DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

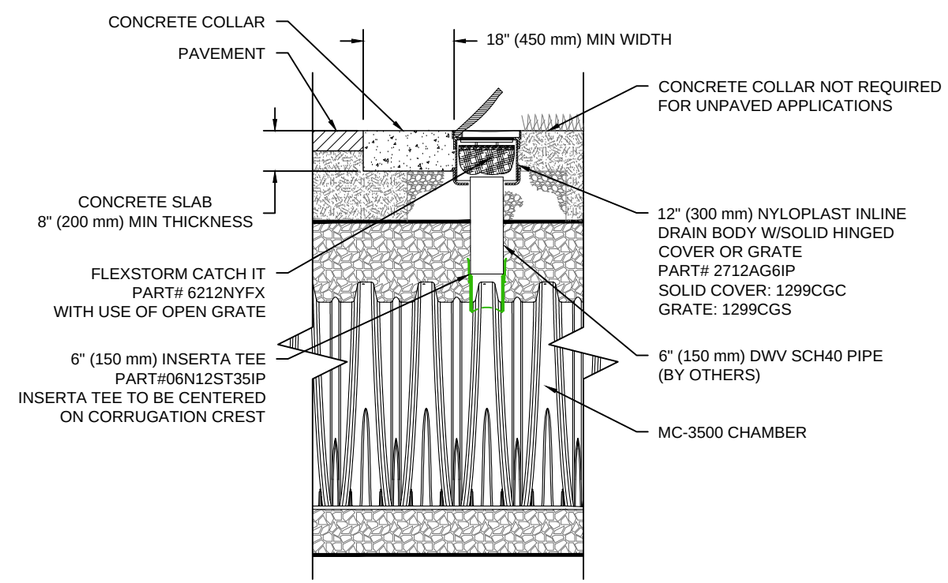
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-3500 6" INSPECTION PORT DETAIL

NTS

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SANTON, CA

DATE: 1-12-16 | DRAWN: MSY
PROJECT #: 128575 | CHECKED: KMS

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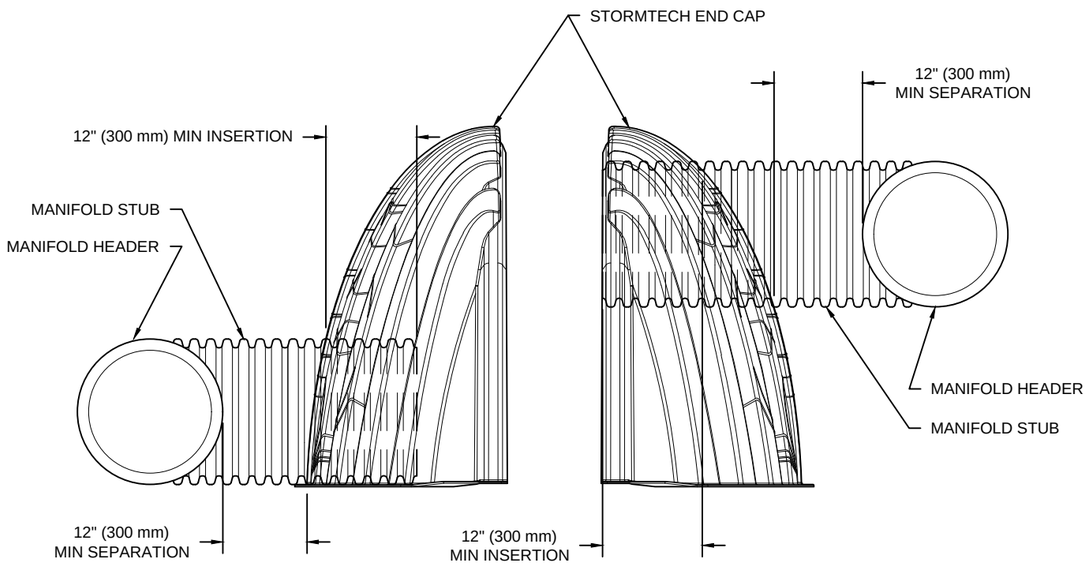
MC-SERIES END CAP INSERTION DETAIL

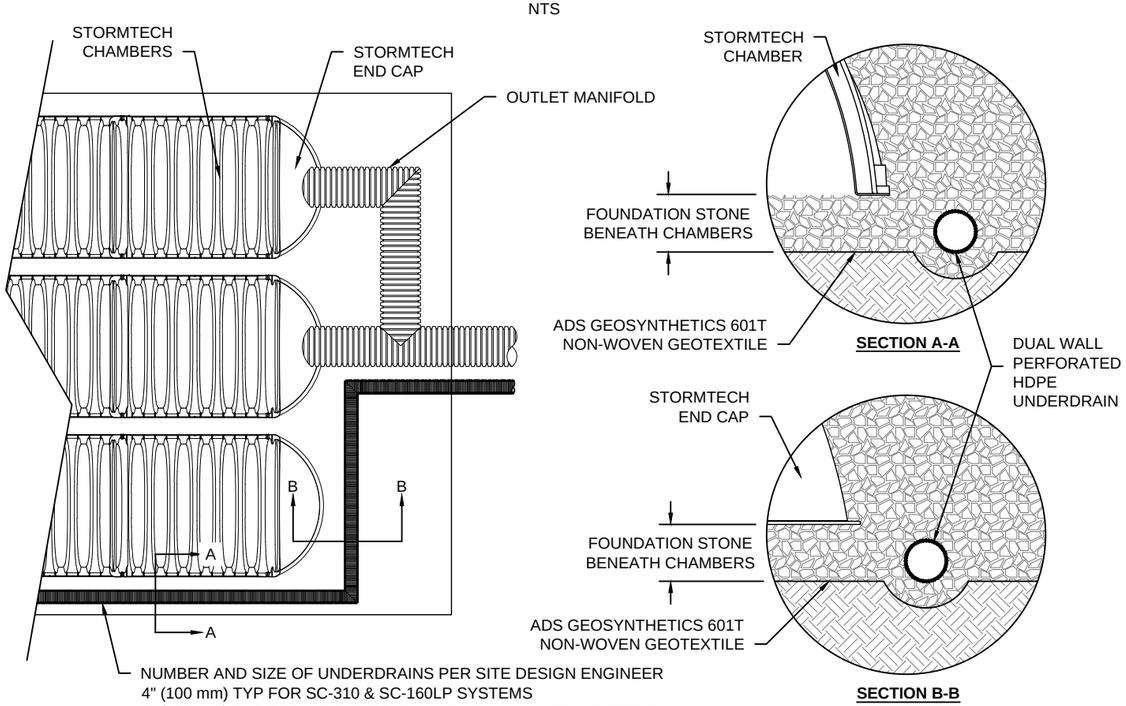
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

UNDERDRAIN DETAIL

NTS



MC-3500 TECHNICAL SPECIFICATION

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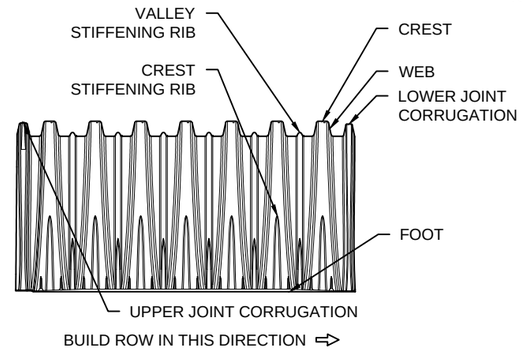
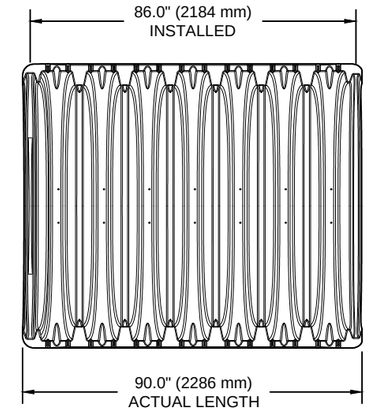
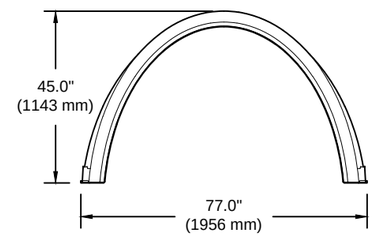
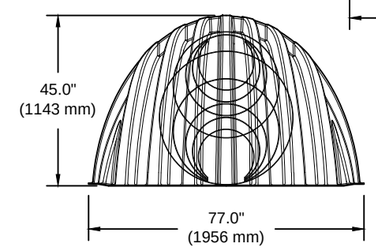
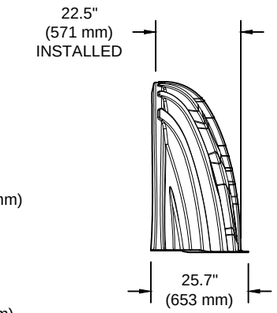










NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	178.9 CUBIC FEET	(5.06 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 22.5"	(1956 mm X 1143 mm X 571 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	46.0 CUBIC FEET	(1.30 m³)
WEIGHT	50.0 lbs.	(22.7 kg)

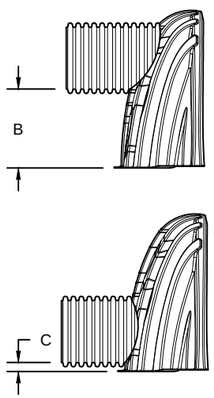
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP30BC	30" (750 mm)	---	

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS.
CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm)
THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHTEST POSSIBLE FOR THE PIPE SIZE.



STANTON ASSISTED LIVING
SANTON, CA

DATE: 1-12-16 | DRAWN: MSY
PROJECT #: 128575 | CHECKED: KMS

REV	DRW	CHK	DESCRIPTION

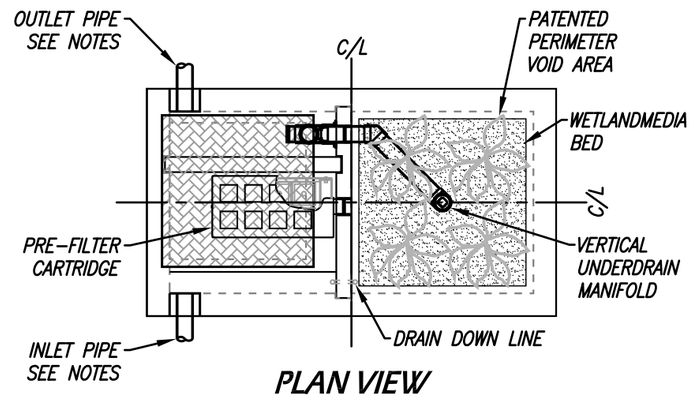
StormTech® Detention•Retention•Water Quality
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS® ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

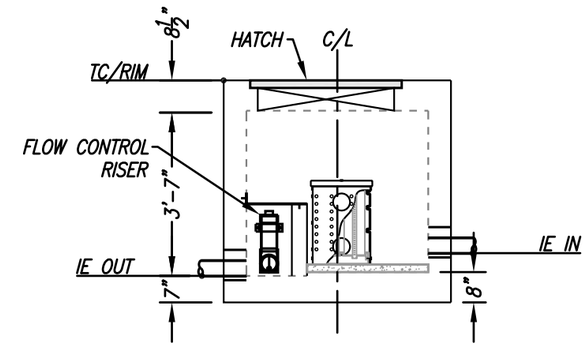
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

INV-OUT
56.82
INV
56.40
INV-IN
56.55
SD
SD
SD
INV-IN
56.86
INV-OUT
57.80
INV
54.50
CB
SMH
DWY
A.C. PAVT
GATE
FS
62.48
2%
2%
0.32%
60.28TC
59.57FL
60.35TC
59.68FL
60.15TC
59.46FL
PP
PP
30'
4
4A
5
9
10
13
14

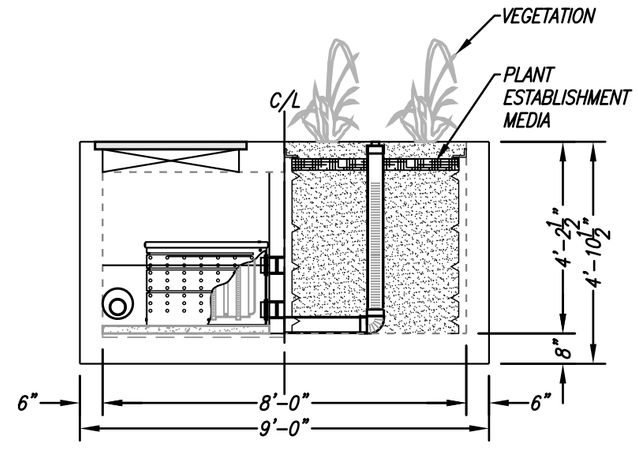
SITE SPECIFIC DATA			
PROJECT NUMBER		2864	
PROJECT NAME		STANTON ASSISTED LIVING	
PROJECT LOCATION		STANTON, CA	
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
3585			
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	56.20	PVC	4"
INLET PIPE 2			
OUTLET PIPE	55.70	PVC	4"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	60.0		
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	36" x 36"	N/A	N/A
WETLANDMEDIA VOLUME (CY)			2.49
WETLANDMEDIA DELIVERY METHOD			PER CONTRACT
ORIFICE SIZE (DIA. INCHES)			ø0.77"
NOTES:			



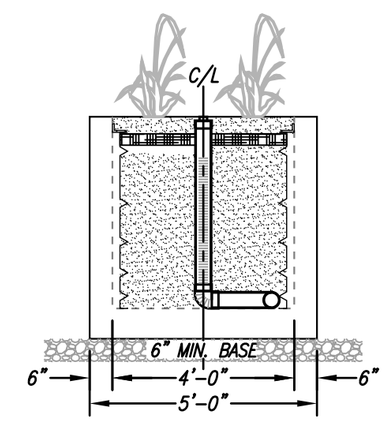
PLAN VIEW



LEFT END VIEW
PRETREATMENT/DISCHARGE



ELEVATION VIEW



RIGHT END VIEW
BIOFILTRATION

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON–SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.

TREATMENT CAPACITY (CF)	5036
DRAINDOWN TIME (HR)	48
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	0.26

THE PRODUCT DESCRIBED MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

PROPRIETARY AND CONFIDENTIAL:

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MODULAR WETLANDS SYSTEMS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF MODULAR WETLANDS SYSTEMS IS PROHIBITED.

MODULAR WETLANDS
www.ModularWetlands.com | (855) 5MOD-WET

MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

12/10/15,JUSTIN

Table 2.7: Infiltration BMP Feasibility Worksheet

	Infeasibility Criteria	*Yes*	*No*
1	**Would Infiltration BMPs pose significant risk for groundwater related concerns?** Refer to **Appendix VIII** (Worksheet I) for guidance on groundwater-related infiltration feasibility criteria.		X
Provide basis: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Would Infiltration BMPs **pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level**? (Yes if the answer to any of the following questions is yes, as established by a geotechnical expert): • The BMP can only be located less than 50 feet away from slopes steeper than 15 percent • The BMP can only be located less than eight feet from building foundations or an alternative setback. • A study prepared by a geotechnical professional or an available watershed study substantiates that stormwater infiltration would potentially result in significantly increased risks of geotechnical hazards that cannot be mitigated to an acceptable level.		X
Provide basis: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
3	Would infiltration of the DCV from drainage area **violate downstream water rights**?		X
Provide basis: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Table 2.7: Infiltration BMP Feasibility Worksheet (continued)

	Partial Infeasibility Criteria	*Yes*	*No*
4	Is proposed infiltration facility **located on HSG D soils** or the site geotechnical investigation identifies presence of soil characteristics which support categorization as D soils?		X
Provide basis: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
5	Is **measured infiltration rate below proposed facility less than 0.3 inches per hour**? This calculation shall be based on the methods described in **Appendix VII**.	X	
Provide basis: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
6	Would **reduction of over predeveloped conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?**		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
7	Would **an increase in infiltration over predeveloped conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?**		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Table 2.7: Infiltration BMP Feasibility Worksheet (continued)

Infiltration Screening Results (check box corresponding to result):		
8	Is there substantial evidence that infiltration from the project would result in a significant increase in I&I to the sanitary sewer that cannot be sufficiently mitigated? (See **Appendix XVII**) Provide narrative discussion and supporting evidence: Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.	No
9	If any answer from row 1-3 is yes: infiltration of any volume is **not feasible** within the DMA or equivalent. Provide basis: Summarize findings of infeasibility screening	N/A
10	If any answer from row 4-7 is yes, infiltration is **permissible but is not presumed to be feasible for the entire DCV.** Criteria for designing biotreatment BMPs to achieve the maximum feasible infiltration and ET shall apply. Provide basis: Summarize findings of infeasibility screening	The infiltration rate is less than 0.3 in./hr but is deemed to be permissible, therefore biotreatment BMPs will be used to achieve the maximum feasible infiltration.
11	If all answers to rows 1 through 11 are no, infiltration of the full DCV is potentially feasible, BMPs must be designed to infiltrate the full DCV to the maximum extent practicable.	N/A

Harvest and Use Infeasibility

Harvest and use infeasibility criteria include:

- If inadequate demand exists for the use of the harvested rainwater. See **Appendix X** for guidance on determining harvested water demand and applicable feasibility thresholds.
- If the use of harvested water for the type of demand on the project violates codes or ordinances most applicable to stormwater harvesting in effect at the time of project application and a waiver of these codes and/or ordinances cannot be obtained. It is noted that codes and ordinances most applicable to stormwater harvesting may change

Table X.8: Minimum Irrigated Area for Potential Partial Capture Feasibility

General Landscape Type	Conservation Design: K_L = 0.35			Active Turf Areas: K_L = 0.7		
Closest ET Station	*Irvine*	*Santa Ana*	*Laguna*	*Irvine*	*Santa Ana*	*Laguna*
Design Capture Storm Depth, inches	**Minimum Required Irrigated Area per Tributary Impervious Acre for Potential Partial Capture, ac/ac**					
0.60	0.66	0.68	0.72	0.33	0.34	0.36
0.65	0.72	0.73	0.78	0.36	0.37	0.39
0.70	0.77	0.79	0.84	0.39	0.39	0.42
0.75	0.83	0.84	0.90	0.41	0.42	0.45
0.80	0.88	0.90	0.96	0.44	0.45	0.48
0.85	0.93	0.95	1.02	0.47	0.48	0.51
0.90	0.99	1.01	1.08	0.49	0.51	0.54
0.95	1.04	1.07	1.14	0.52	0.53	0.57
1.00	1.10	1.12	1.20	0.55	0.56	0.60

Worksheet J: Summary of Harvested Water Demand and Feasibility

1	What demands for harvested water exist in the tributary area (check all that apply):			
2	Toilet and urinal flushing		☐	
3	Landscape irrigation		☒	
4	Other:_____		☐	
5	What is the design capture storm depth? (Figure III.1)	d	0.80	inches
6	What is the project size?	A	1.111	ac
7	What is the acreage of impervious area?	IA	0.832	ac
	For projects with both toilet flushing and indoor demand			
8	What is the minimum use required for partial capture? (Table X.6)	N/A		gpd
9	What is the project estimated minimum wet season total daily use?	N/A		gpd
10	Is partial capture potentially feasible? (Line 9 > Line 8?)	N/A		
	For projects with only toilet flushing demand			
11	What is the minimum TUTIA for partial capture? (Table X.7)	N/A		
12	What is the project estimated TUTIA?	N/A		

Worksheet J: Summary of Harvested Water Demand and Feasibility

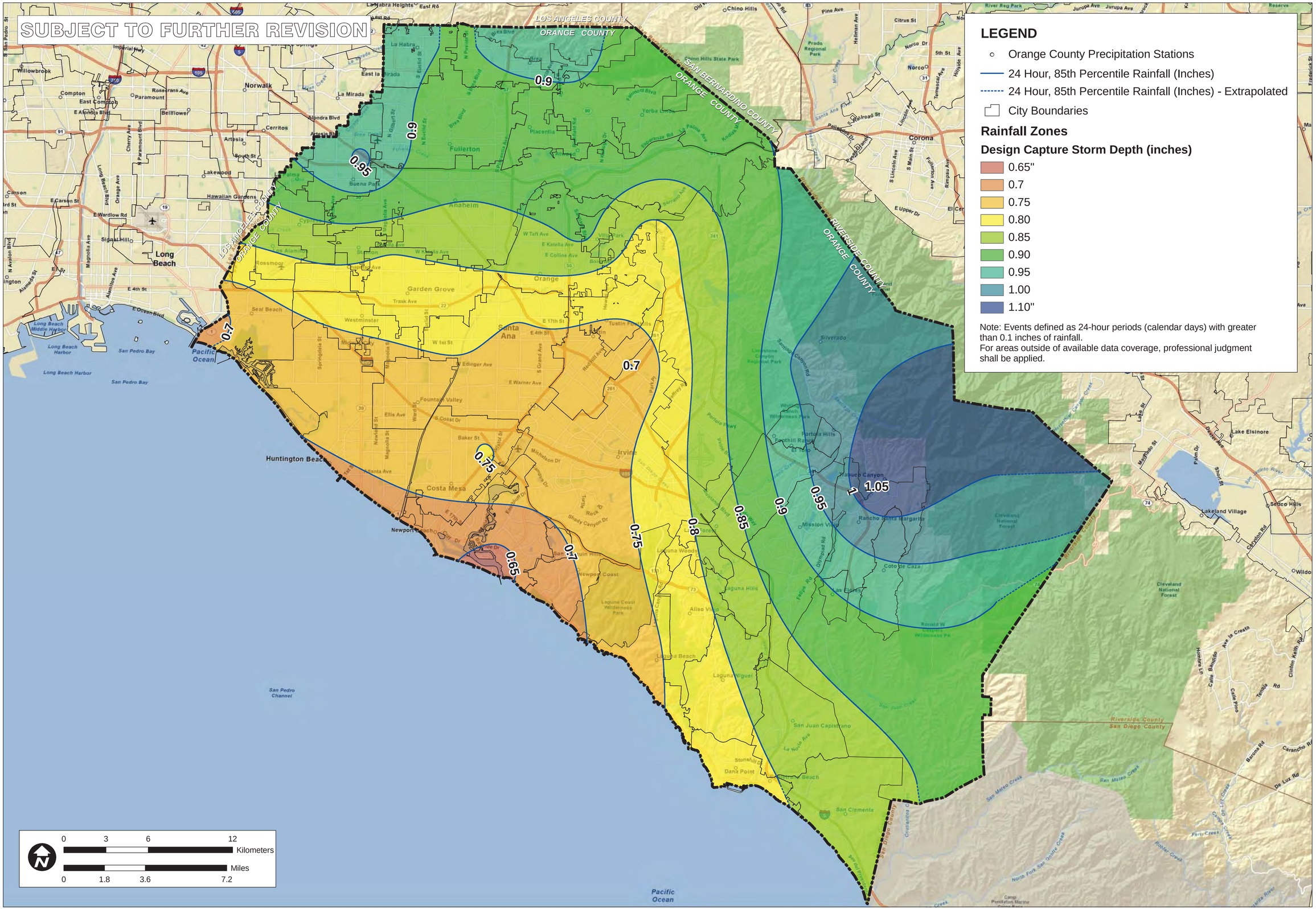
13	Is partial capture potentially feasible? (Line 12 > Line 11?)	N/A	
	For projects with only irrigation demand		
14	What is the minimum irrigation area required based on conservation landscape design? (Table X.8)	0.749	ac
15	What is the proposed project irrigated area? (multiply conservation landscaping by 1; multiply active turf by 2)	0.279	ac
16	Is partial capture potentially feasible? (Line 15 > Line 14?)	No	

Provide supporting assumptions and citations for controlling demand calculation:

For #14, the value of the minimum irrigation area required based on conservation landscape design is 0.90 ac/ac (on the previous page). Multiplying that value by the impervious area gives 0.749, which is shown above.

For #15, the assumption is that all areas that are not included in the impervious area are pervious. The difference between the project size and the impervious area gives 0.279, which is shown above.

SUBJECT TO FURTHER REVISION



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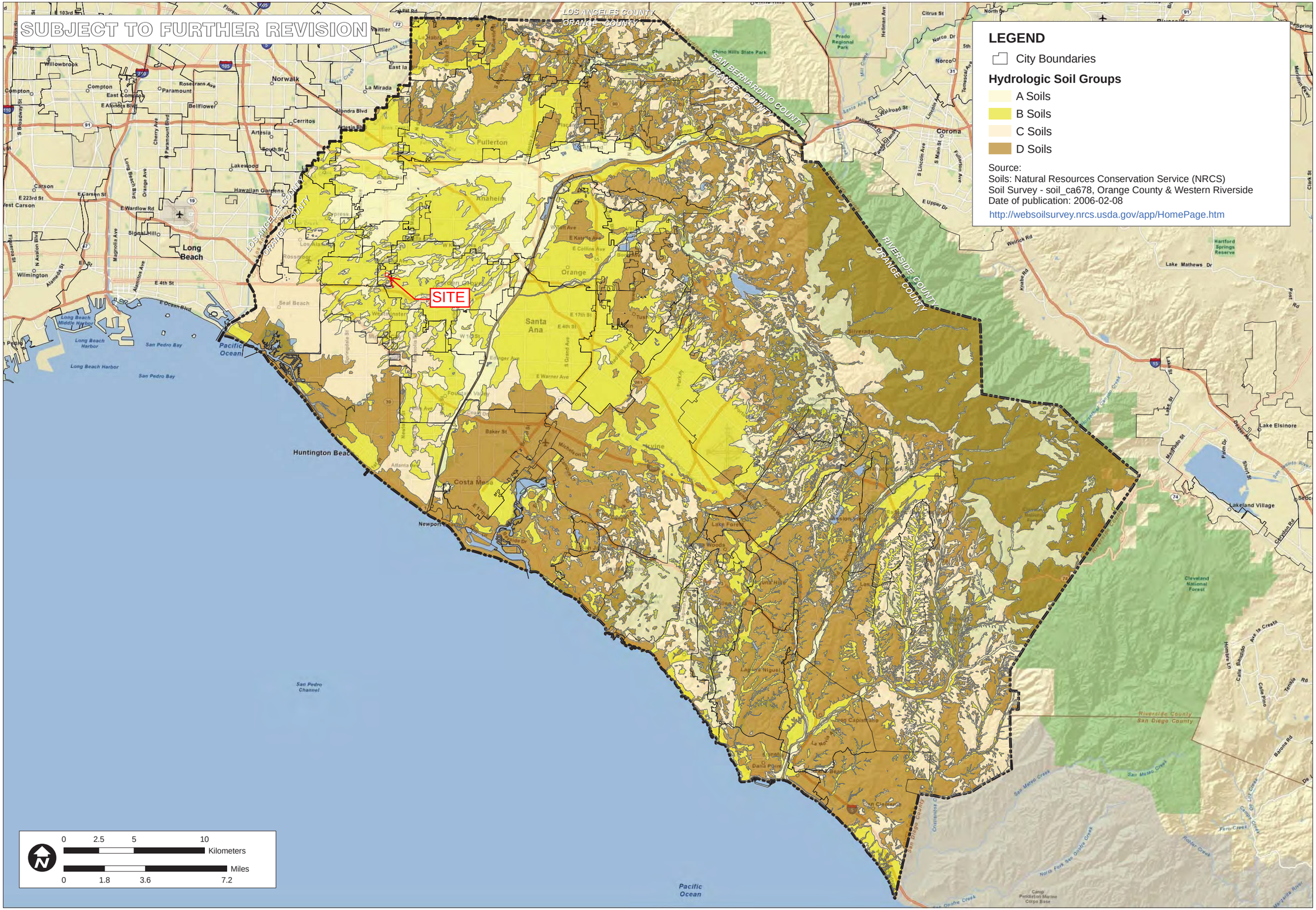
TITLE
RAINFALL ZONES

JOB
ORANGE COUNTY
TECHNICAL GUIDANCE
DOCUMENT
ORANGE CO. CA

SCALE	1" = 1.8 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/22/10
JOB NO.	9526-E

PACE
Advanced Water Engineering

FIGURE
XVI-1



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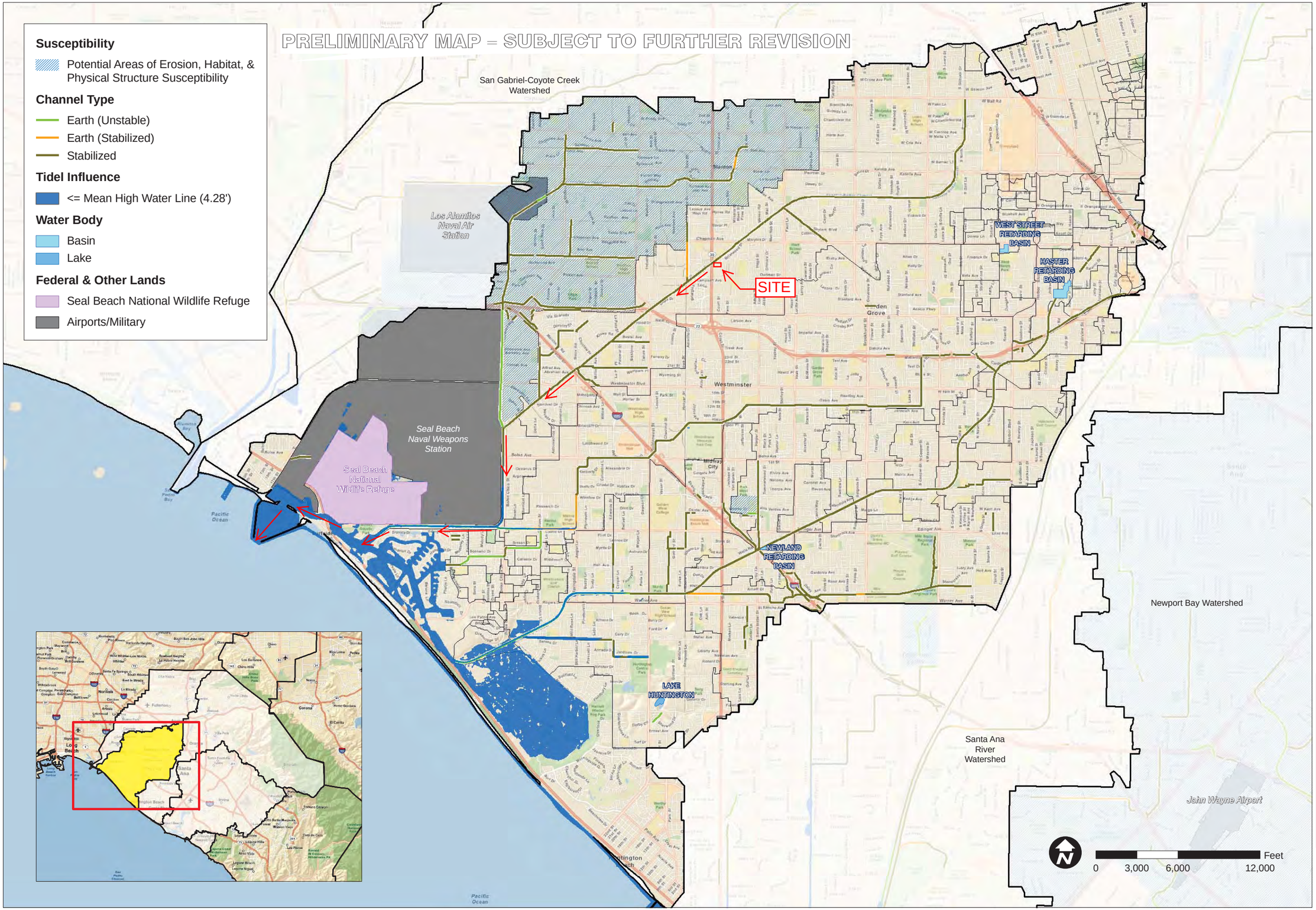
TITLE
NRCS HYDROLOGIC SOILS GROUPS

JOB
ORANGE COUNTY INFILTRATION STUDY
ORANGE CO. CA

SCALE	1" = 1.8 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	02/09/11
JOB NO.	9526-E

PACE Advanced Water Engineering

FIGURE
XVI-2a



TITLE
SUSCEPTIBILITY ANALYIS
ANAHEIM BAY-
HUNTINGTON HARBOR

JOB
ORANGE COUNTY
WATERSHED
MASTER PLANNING
ORANGE CO.
CA

SCALE	1" = 3000'
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/22/10
JOB NO.	9526-E

PACE
Advanced Water Engineering

FIGURE
XVI-3b

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Worksheet B: Simple Design Capture Volume Sizing Method

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.80	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0.00	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.80	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	1.111	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.75	
3	Calculate runoff coefficient, *C= (0.75 x imp) + 0.15*	C=	0.7125	
4	Calculate runoff volume, V_{design}= $(C \times d_{remainder} \times A \times 43560 \times (1/12))$	V_{design}=	2299	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{measured}$ (in/hr) (**Appendix VII**)	$K_{measured}$=	0.2	In/hr
2	Enter combined safety factor from Worksheet H, S_{final} (unitless)	S_{final}=	1	
3	Calculate design infiltration rate, $K_{design} = K_{measured} \times S_{final}$	K_{design}=	0.2	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	48	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	0.8	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	2874	sq-ft

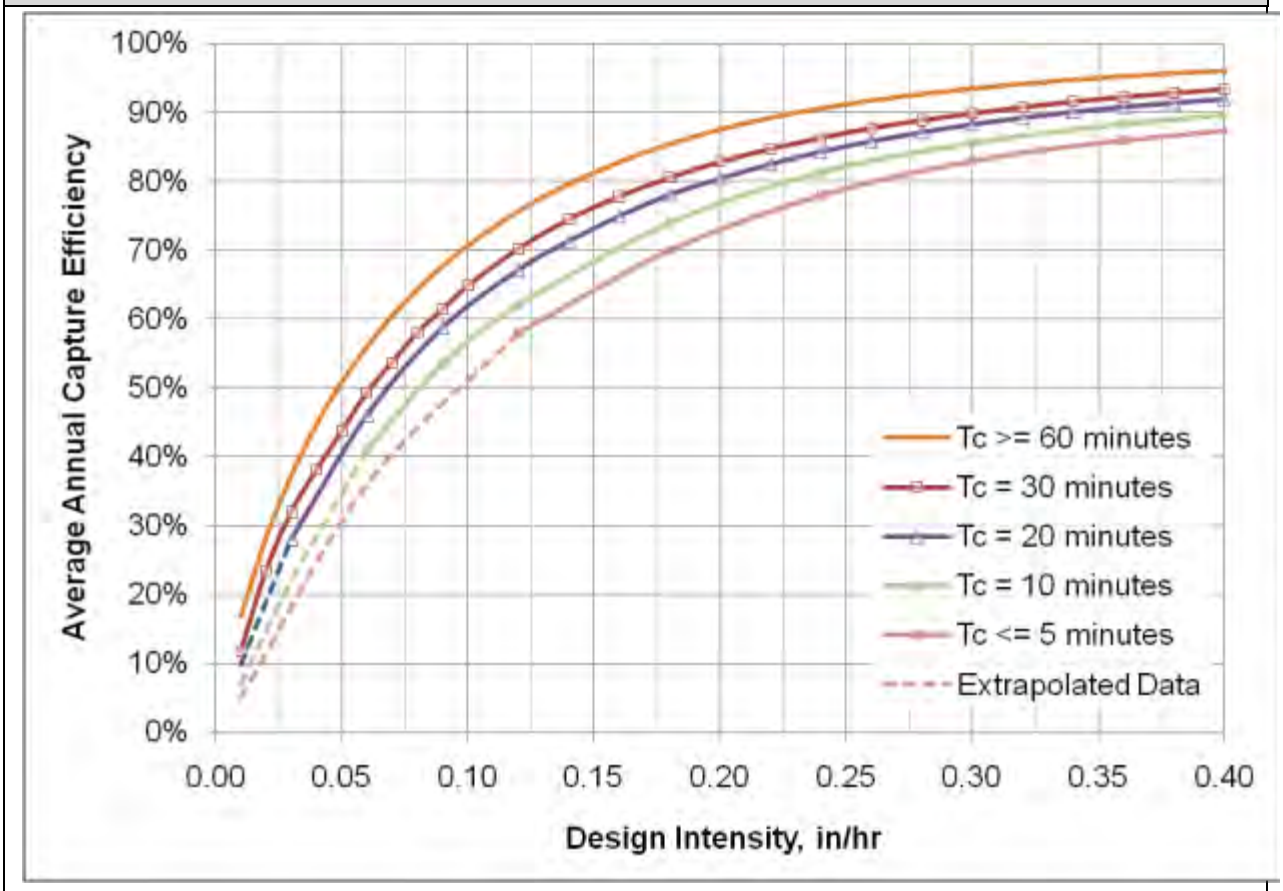
WQMP Section II.1, Project Description

Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See **Appendix IV.2**)	T_c=	18.6	min.
2	Using **Figure III.4**, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.21	in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (**Worksheet A**)	d_{HSC}=	0.00	inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 (**Worksheet A**)	Y_2=	0	%
5	Using **Figure III.4**, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	
6	Determine the design intensity that must be provided by BMP, $I_{design}= I_1-I_2$	I_{design}=	0.21	
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	1.11	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.75	
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=	0.7125	
4	Calculate design flowrate, $Q_{design}= (C \times i_{design} \times A)$	Q_{design}=	0.17	cfs
Supporting Calculations				
Describe system: Modular Wetlands System				
Provide time of concentration assumptions: Time of concentration established in hydrology report.				

Worksheet D: Capture Efficiency Method for Flow-Based BMPs

Graphical Operations



Provide supporting graphical operations. See Example III.7.

MWS - LINEAR VOLUME BASED SIZING SHEET

Horizontal Flow Biofiltration System

Project Location

Project Name	STANTON ASSISTED LIVING
City/Town	
State	
Zip Code	

SIZING CALCULATIONS

	Inputs	Units	Notes/References
Impervious Area			
BMP Drainage Area (not required - manual entry - not part of formula)		**Acres**	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not reguired - manual entry - not part of formula)			Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	**3585**	**cubic feet**	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	**3**	**hours**	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.
MWS - Linear Sizing			
MWS - Linear Model Number (from matrix)	**MWS-4-8**	**quantity**	Please choose size from "Model Size Matrix" Tab
# Of Units	**1**	**quantity**	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	**13.08**	**gallons/minute**	Loading Rate of 0.26 gpm/sq ft or 25 in/hr. Field Verified.
Volume Treated During Event			
Processed through MWS - Linear	**313.92**	**cubic feet**	**13.08 gals/minute**
Volume Treated Following Event			
MWS - Linear Static Capacity (from matrix)	**80.51**	**cubic feet**	
Volume Needed in *Pre-Storage*	**3191**	**cubic feet**	Set at zero to start. Size pre-storage system to hold this volume
			Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	**3585**	**cubic feet**	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	**31.26**	**hours**	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to fax or email proposed sizing calculations to Modular Wetlands Systems, Inc. for assistance with sizing, compliance, and design.

Phone: 760.433.7640
Fax: 760.433.3176
Email: Info@modularwetlands.com

BIO-7: Proprietary Biotreatment

Proprietary biotreatment devices are devices that are manufactured to mimic natural systems such as bioretention areas by incorporating plants, soil, and microbes engineered to provide treatment at higher flow rates or volumes and with smaller footprints than their natural counterparts. Incoming flows are typically filtered through a planting media (mulch, compost, soil, plants, microbes, etc.) and either infiltrated or collected by an underdrain and delivered to the storm water conveyance system. Tree box filters are an increasingly common type of proprietary biotreatment device that are installed at curb level and filled with a bioretention type soil. For low to moderate flows they operate similarly to bioretention systems and are bypassed during high flows. Tree box filters are highly adaptable solutions that can be used in all types of development and in all types of soils but are especially applicable to dense urban parking lots, street, and roadways.

Also known as:

- *Catch basin planter box*
- *Bioretention vault*
- *Tree box filter*

Proprietary biotreatment
Source: http://www.americastusa.com /index.php/filterra/

Feasibility Screening Considerations

- Proprietary biotreatment devices that are unlined may cause incidental infiltration. Therefore, an evaluation of site conditions should be conducted to evaluate whether the BMP should include an impermeable liner to avoid infiltration into the subsurface.

Opportunity Criteria

- Drainage areas of 0.25 to 1.0 acres.
- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Proprietary biotreatment facilities may also be applied in parking lot islands, traffic circles, road shoulders, and road medians.
- Must not adversely affect the level of flood protection provided by the drainage system.

OC-Specific Design Criteria and Considerations

[X] Frequent maintenance and the use of screens and grates to keep trash out may decrease the likelihood of clogging and prevent obstruction and bypass of incoming flows.

[X] Consult proprietors for specific criteria concerning the design and performance.

[X] Proprietary biotreatment may include specific media to address pollutants of concern. However, for proprietary device to be considered a biotreatment device the media must be capable of supporting rigorous growth of vegetation.

[X] Proprietary systems must be acceptable to the reviewing agency. Reviewing agencies shall have the discretion to request performance information. Reviewing agencies shall have the discretion to deny the use of a proprietary BMP on the grounds of performance, maintenance considerations, or other relevant factors.

☒ In right of way areas, plant selection should not impair traffic lines of site. Local jurisdictions may also limit plant selection in keeping with landscaping themes.

Computing Sizing Criteria for Proprietary Biotreatment Device

- Proprietary biotreatment devices can be volume based or flow-based BMPs.
- Volume-based proprietary devices should be sized using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** or the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs described in **Appendix III.3.2**.
- The required design flowrate for flow-based proprietary devices should be computed using the Capture Efficiency Method for Flow-based BMPs described in **Appendix III.3.3)**.

Additional References for Design Guidance

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**
- Santa Barbara BMP Guidance Manual, Chapter 6: **http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf**

PROFESSIONAL ENGINEERS CONSULTING, Inc.
GEOTECHNICAL ENVIRONMENTAL TESTING INSPECTION
25422 Trabuco Rd. #105 Lake Forest, CA 92630 Phone 949-768-3693 info@pesoil.com
27636 Ynez Road, # L7 Temecula, CA 92591 Phone 951-698-4598 www.pesoil.com

GEOTECHNICAL INVESTIGATIONS

SITE:

12282 Beach Boulevard
Stanton, CA 90680

DATE:

January 31, 2014

Project Number:

ST0114

PREPARED FOR:

Ms. Manju Pai
Studio π^2
20 Truman, Ste 210,
Irvine, CA 92620

PROFESSIONAL ENGINEERS CONSULTING, Inc.

GEOTECHNICAL ENVIRONMENTAL TESTING INSPECTION

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January 31, 2014

Ms. Manju Pai
Studio π^2
20 Truman, Ste 210,
Irvine, CA 92620

Dear Ms. Manju:

Professional Engineers Consulting, Inc. is pleased to present you this soil report for your project located at 12282 Beach Blvd, Stanton, CA 90680.

Based on the actual site condition, laboratory analyses, and our field observations, we are providing you a summary of geotechnical studies. It is our opinion that the enclosed conclusions and recommendations can be used for the design and construction of this project.

This opportunity to be of professional service is greatly appreciated. Should you have any questions or require additional information, please do not hesitate to contact our office at 949-768-3693.

Respectfully Submitted,

PROFESSIONAL ENGINEERS CONSULTING, Inc.

Saeed Shahidi
Registered Civil Engineer

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INTRODUCTION

This report was prepared by Professional Engineers Consulting, Inc. to provide geotechnical investigation for the construction of assisted living building facilities at 12282 Beach Blvd, Stanton, CA 90680. See figures 1 &2.

The scope of this study is designed to determine and evaluate the surface and subsurface conditions on the subject site and to present preliminary recommendations for the foundation systems and grading requirements as they relate to the development of the residential lot.

SCOPE OF WORK

- Placing four exploratory boreholes, at least four to depth of 50 feet, logging, soil Sampling and preparation for the purpose of laboratory testing, engineering, and liquefaction analysis
- Laboratory testing of selected soil and/or bedrock samples, including visual classification
- Preparation of geotechnical analysis, including bearing and settlement potentials
- Preparation of a report presenting our findings, conclusions, and recommendations for the type of foundation and grading procedures
- Providing seismic design values and recommendations
- Liquefaction analyses, determining the vertical and horizontal extend of liquefaction and provide engineering recommendation to remediate the conditions, if any

SITE LOCATION & DESCRIPTION

The subject lot is within the City of Stanton. The property is located on the east side of Beach Boulevard, at approximately one mile north of 22 Freeway.

The area in general is developed with residential and commercial structures. Currently, the site is vacant and covered by soil and sparse weeds.

PROPOSED DEVELOPMENT

The lot is going to be used for the construction an assisted living complex. Structures are to be supported on continuous and isolated pad footing type foundations. Loads on the foundations are unknown but are not anticipated to exceed 50 kips per linear foot for column loads. The proposed floors could consist of continuous concrete slabs placed on finish grade and supported by footings. Finished floor elevations will be anticipated to have approximately + 2 % gradient from the street level and also in accordance with the city of Stanton design standards.

Surface drainage will be controlled by sloped concrete flatwork earth swales and area drains will be designed to carry surface water to drain outside the property.

Should details involved in final design vary from those outlined above, this firm should be notified for review and possible revision of our recommendations. Otherwise we can not take any responsibility.

LIQUEFACTION CONDITIONS

Liquefaction can occur when saturated loose and fine granular soils are subjected to excessive ground vibrations or exposure to groundwater.

Per Seismic Hazard Map Quadrangle, the site lies within the area with liquefaction potential as shown on Figure 4.

The subsurface mainly consists of silty soil material with some layers of clay and sand.

Groundwater was encountered during our investigation at depth of 17.5 feet. However due to seasonal changes, water may be observed at shallower depth.

Liquefaction study by our firm indicated that the top 5 to 6 feet of subsurface contains loose sandy artificial fill material with minimal amount of fines, these materials seem to be poorly compacted and have high potential for excessive settlement due to liquefaction. The liquefaction study is included in Appendix “D”.

SEISMICITY and FAULTING

PER Conterminous 48 States, 2005 ASCE 7 Standard:
Latitude = 33.79 Longitude = -118.00

Spectral Response Accelerations Ss and S1

Ss and S1 = Mapped Spectral Acceleration Values
Site Class B - Fa = 1.0 ,Fv = 1.0
Data are based on a 0.01 deg grid spacing

Period (sec)	Sa (g)	
0.2	1.407	(Ss, Site Class D)
1.0	0.508	(S1, Site Class D)

Spectral Response Accelerations SMs and SM1

SMs = Fa x Ss and SM1 = Fv x S1
Site Class D - Fa = 1.0 ,Fv = 1.5

Period (sec)	Sa (g)	
0.2	1.407	(SMs, Site Class D)
1.0	0.762	(SM1, Site Class D)

Design Spectral Response Accelerations SDs and SD1

SDs = 2/3 x SMs and SD1 = 2/3 x SM1
Site Class D - Fa = 1.0 ,Fv = 1.5

Period (sec)	Sa (g)	
0.2	0.938	(SDs, Site Class D)
1.0	0.508	(SD1, Site Class D)

GEOTECHNICAL INVESTIGATIONS
FIELD STUDY

Geotechnical field studies consisting of site observations and subsurface exploration were started on January 22, by placing total of four borings to depths of 50 feet to verify the subsurface conditions. Our Registered Civil Engineer the encountered formations. The Boring logs are included in Appendix `B'. Approximate locations of Borings are shown on Figure 2.

The borings were also used for liquefaction study as presented in Appendix "D".

Undisturbed samples of the soils were obtained at selected intervals. Undisturbed samples were obtained by driving a thin walled steel sampler with successive drops of a 25-pound weight having a free fall of 18 inches. Undisturbed soils were retained in close fitting moisture proof containers and transported to our laboratory. Grab samples were also taken to perform geotechnical laboratory tests.

The exploratory trenches used for subsurface exploration were backfilled with the native soil and with reasonable effort to restore the area to their original condition.

LABORATORY TESTING

Laboratory analyses were performed per STM Standards.

ATTERBERG LIMITS (ASTM D 4318)

The sample is processed to remove any material retained on a 425-um (No. 40) sieve. The Liquid Limit is determined by performing trials in which a portion of the sample is spread in a brass cup, divided in two by a grooving tool, and then allowed to flow together from the shocks caused by repeatedly dropping the cup in a standard mechanical device. The multipoint liquid limit, Method A, requires three or more trials over a range of water contents to be performed and the data from the trial plotted or calculated to make a relationship from which the liquid limit is determined.

The one-point liquid limit, method B, uses the data from two trials at one water content multiplied by a correction factor to determine the liquid limit.

The Plastic Limit is determined by alternatively pressing together and rolling into a 3.2 mm diameter thread a small portion of the plastic soil until its water content is reduced to a point at which the thread is crumbles and can no longer be pressed together and rolled. The water content of the soil at this point is reported as Plastic Limit. Plasticity Index is the difference between Liquid and Plastic Limit.

SOIL CLASSIFICATION

The field classification of the soils was verified in the laboratory in general accordance with the Unified Soil Classification System. The final classification is shown on the boring logs.

PARTICLE SIZE ANALYSIS

The procedure is repeated for a sufficient number of water contents to establish a relationship between the dry unit weight and the water content of the soil. This data, when plotted, presents a curvilinear relationship known as the compaction curve. The values of optimum water content and modified maximum dry unit weight are determined from the compaction curve. A specimen of the soil is washed over a 75-um (No. 200) sieve. Clay and other particles that are dispersed by the wash water, as well as water-soluble materials, are removed from the soil during the test.

The loss is mass resulting from the wash treatment is calculated as mass percent of the original sample and is reported as the percentage of material finer than a 75-um (No. 200) sieve by washing.

FIELD OBSERVATION

Based on field observations from the samples obtained from the four 50 feet deep borings, we can present the following:

Generally, the subsurface of the site consists of 3.5 feet of non-certified fill material placed over the existing 2.0 feet thick loose sandy silt. This layer is underlain by dense interbedded layers of clay, silt and sand derived from alluviums.

Groundwater was encountered in our boring at depth of 17.5 feet.

CONCLUSIONS AND RECOMMENDATIONS

It is our opinion that subject property can be developed by using conventional and deepened footings with grade beams and slab-on-grade floors, provided that our enclosed conclusions and recommendations are implemented into the design criteria and project specifications. However, our conclusions at this time are preliminary and are subject to review and modification after reviewing the final plans and design specifications.

FOUNDATION DESIGN RECOMMENDATIONS

- All exterior-building footings should be founded at a minimum depth of 24 inches below the lowest adjacent final grade. Interior footings may be founded at a minimum depth of 24 inches below the lowest adjacent final grade.

- Continuous footings should be reinforced with 4 No. 4 bars, 2 at every one foot.

- Exterior isolated pad footings intended for support of roof overhangs such as patio covers should be a minimum of 24 inches square, and founded at a minimum depth of 48 inches below the lowest adjacent final grade. The pad footings should be reinforced with No. 4 bars spaced 18 inches on centers, both ways, near the bottoms of the footings.

- Living area concrete floor slabs should be a full 5 inches thick an underlain with 3 inches of clean sand or gravel. All slabs should be reinforced with No. 3 bars spaced 18 inches on centers, both ways. All slab reinforcement should be supported on concrete chairs or bricks to ensure the desired placement near mid depth.

- Living area floor slabs should be underlain with a moisture vapor barrier consisting of a polyvinyl chloride membrane such as 6—mil Visqueen, or equivalent, placed on top of the 2-inch sand. At least 2 inch of clean sand should be placed over the membrane to promote uniform curing of the concrete.

- Garage floor slabs should be a full 5 inches thick and underlain with 4 inches of clean sand or gravel. Garage and parking slabs should be reinforced in a similar manner as living area slabs and poured separately from adjacent wall footings with a positive separation maintained with 3/8-inch minimum felt expansion joint materials, and then quartered with weakened plane joints. A 12-inch wide by 24-inch deep grade beam should also be provided across garage entrances. The grade beam should be reinforced with four No. 4 bars, two top and two at every one foot.

- Prior to placing concrete, the subgrade below all living area and garage slabs should be presoaked to achieve a moisture content that is 30 percent or greater above optimum moisture content. This moisture content should penetrate to a minimum depth of 12 inches into the subgrade

ALLOWABLE FOUNDATION PRESURE

The allowable foundation pressure value is 1,500 psf for footings having a minimum width and depth of 12 inches. An increase of twenty percent shall be allowed for each additional foot of width of depth to a maximum value of three times the designated value. Additionally, an increase of one third shall be permitted when considering load combinations including wind or earthquake loads.

The above values are based on footings placed directly against compacted fill. In the case where footing sides are formed, all backfill against footings should be compacted to at least 90 percent of maximum dry density.

LATERAL RESISTANCE

A passive earth pressure of 150 pounds per square foot per foot of depth may be used to determine lateral bearing resistance for footings. Lateral sliding resistance coefficient should be 0.25. The above values are based on footings placed directly against bedrock or compacted fill. In the case where footing sides are formed, all backfill against footings should be compacted to at least 90 percent of maximum dry density.

SETTLEMENT

According to our liquefaction study, (Appendix D), the top six feet of the formation is subject to the liquefaction which may produce excessive settlement of up to one inch per 25 feet. This is due to sandy nature of the soil and lack of proper compaction. This can be reduced to 50 % by properly removing and recompacting the upper six feet.

The majority of total and differential settlements are expected to occur during construction or shortly thereafter as building loads are applied. However, should there be any ground shaking, some small seismically induced settlements may be occurred. We recommended using 0.5 inches per 25 feet as differential settlement, after overexcavation and recompaction of the top six feet.

EARTHWORK AND GROUND PREPARATION

All earthwork and grading should be performed in accordance with all applicable requirements of the grading code of the city of Stanton, California, and the recommendations provided below:

- For any area used for structure, surface must be over-excavated for a minimum of **6** feet below the existing grade and recompacted for **90%** of laboratory maximum density. The overexcavation must be extended to a minimum of **5** feet beyond the boundaries.

- For any area used for parking, surface must be over-excavated for a minimum of **5** feet below the existing grade and recompacted for **90%** of laboratory maximum

density. The overexcavation must be extended to a minimum of **5** feet beyond the boundaries.

- Prior to placing fill, all areas to receive fill should first be scarified, watered or air dried as necessary to achieve near optimum moisture conditions, and then recompacted in-place for **90%**.

- For proposed driveway and parking subgrade areas, all base material shall be compacted for **95%** of laboratory maximum density.

- The soil must be moisture conditioned to achieve no more than **3%** higher than optimum moisture content.

- Fill soils shall be placed in 8-inch lifts; moisture conditioned and compacted to the required level of compaction.

- All significant weeds or rootlets should be stripped and removed offsite

- All cobbles and gravels over **8"** diameter must be removed from the pad or any backfilling area.

- Stockpile soil materials that are to be used as fill should be cleared of any unsuitable materials prior to placement as properly compacted fill.

IMPORTED SOILS

Imported soils should consist of clean materials void of trash, organic and similar deleterious materials, and rock exceeding a maximum dimension of 8 inches.

The imported soil should also exhibit an expansion potential of low expansion, as determined in accordance with UBC Standard Test No. 29-2. The onsite soils exhibit a low expansion potential.

Sieve analysis, and Plasticity index tests are recommended to perform on the import soil material prior to the approval of the soil.

A representative of this firm should approve prospective import soils before transporting to the site. The grading contractor should accommodate sufficient time for performing the above tests, prior to importing soil materials.

FILL PACEMENT AND TESTING

All fills should be placed in 8-inch-thick maximum lifts, watered or air-dried as necessary to achieve near optimum moisture conditions, and then compacted in-place to a minimum relative compaction of 90% for the pads and 95% for the base material for driveway and parking areas.

The laboratory maximum dry density and optimum moisture content for each change in soil type should be determined in accordance with Test Method ASTM D 1557-91.

A representative of this firm should be present onsite during grading operations to verify proper placement and adequate compaction of all fills, as well as to verify compliance with the other geotechnical recommendations presented herein.

EFFECTS OF GRADING ON ADJOINING PROPERTIES

Based on our site observation, the proposed grading and construction will not adversely affect the geotechnical stability of adjoining properties provided that grading and construction are performed in accordance with the recommendations presented herein.

Should there be any anticipation regarding this issue, it will be the responsibility of the grading contractor to contact our firm and the owner before starting the job or during the construction. Otherwise we can not take any responsibility.

POST-GRADING CONSIDERATIONS
PAD DRAINAGE

Positive drainage devices consisting of sloped concrete flatwork, area drains, and graded earth swales have been designed for the site. The purpose of these devices is to

reduce water infiltration into the subgrade, and to direct surface waters away from building foundations, walls and sloped areas. The homeowner is advised that all drainage devices should be properly maintained throughout the lifetime of the development.

UTILITY TRENCH BACKFILL

All utility trench backfill should be compacted to a minimum relative compaction of 90 percent. Trench backfill materials should be placed in lifts no greater than 8 inches in thickness, watered or air dried as necessary to achieve a moisture content that is 2 to 3 points over optimum moisture content, and then mechanically compacted in place to a minimum relative compaction of 90 percent.

Where exterior and/or interior utility trenches are proposed parallel to any building footing, the bottoms of these trenches should not extend below a 1:1 plane projected downward from the bottom edge of the adjacent footing. Where this condition occurs, the adjacent footing should be deepened or the utility constructed and backfilled prior to constructing the footing.

A representative of this firm should be notified 48 hours in advance to verify adequate compaction of the backfill.

SITE CLEARING

All soil, vegetation, and rock debris excavated from stripping and also foundation trenches are to be disposed offsite in a proper manner. This also includes, refuses such as bushes, organic material, stumps and construction debris. No debris or reject materials from the excavations are to be placed on the slope behind the retaining walls or used as backfill.

FOOTING OBSERVATIONS

All footing trenches should be observed by a representative of this firm to verify that they have been excavated into competent bearing materials. These observations should be performed prior to the placement of forms, reinforcement, or concrete. The excavations should be trimmed neat, level and square. All loose, sloughed or moisture-

softened soils and/or construction debris should be removed prior to the placement of concrete. Excavated soils derived from footing and utility trenches should not be placed in slab-on-grade areas unless they are compacted to at least 90 percent of maximum dry density

SOLUBLE SULFATE ANALYSES

Per UBC standards, type V cement with 2,500 psi and 0.5 water content ratios is recommended.

MASONRY GARDEN WALLS

Footings for masonry garden walls on level ground should be embedded at a minimum depth of 12 inches below the lowest competent soil material.

All footings should also be reinforced with a minimum of four No. 4 bars, two top and two bottom. In order to mitigate the potential for unsightly cracking related to the possible effects of differential settlement and/or expansion, construction joints should also be provided in the garden walls at each corner and at horizontal intervals of at least 20 feet.

The separation should be provided in the blocks and not extend through the footings. The footings should be poured monolithically with continuous rebars to serve as effective "grade beams" below the walls.

EXTERIOR CONCRETE FLATWORK

To reduce the potential of unsightly cracking related to the effects of soils, concrete sidewalks and patio-type slabs should be at least 4 inches thick and provided with saw cuts or expansion joint every 6 feet or less. Concrete driveway slabs should be at least 6 inches thick and provided with saw cuts or expansion joints every 10 feet or less.

REINFORCEMENT

Consideration should be given to reinforcing all concrete patio-type slabs, driveways and sidewalks greater than 5 feet in width with No. 3 bars spaced 18 inches on centers, both ways. The reinforcement should be positioned near the middle of the slabs by means of concrete chairs or brick. All cold joints should be provide with dowels consisting of No. 3 bars, 24 inches in length, and spaced 18 inches on center.

SUBGRADE PREPARATION

As a further measure to mitigate cracking and/or shifting of concrete flatwork, the subgrade soils below concrete flatwork should be thoroughly moistened prior to placing concrete. The moisture content of the soils should be about 130 percent of optimum moisture content and penetrate to a depth of approximately 12 inches below the bottom of the slabs.

EDGE BEAMS

Where the outer edges of concrete flatwork such as patios and driveways are to be bordered by landscaping, consideration should be given to the use of edge beams (thickened edges) to mitigate infiltration of water under the slabs. Edge beams should be 6 to 8 inches wide, extend 12 inches below the tops of the finish slab surfaces, and be reinforced with a minimum of two No. 4 bars, one top and one bottom.

FUTURE IMPROVEMENTS

Should any new structures or improvements be proposed at any time in the future other than those shown on the enclosed site plan and discussed herein, our firm should be notified so that we may provide design recommendations to maintain the integrity of the new improvement.

Potential problems can develop when drainage on the pad is altered in any way (i.e., excavations or placement of fills associated with construction of new walkways, patios, garden walls and planters). Therefore, it is recommended that we be engaged to

review the final design drawings, specifications and grading plan prior to any new constructions.

If we are not given the opportunity to review these documents with respect to the geotechnical aspects of new construction and grading, we can take no responsibility for misinterpretation of our recommendations presented herein.

DRIVEWAY & HARDSCAPE RECOMMENDATION

Proposed hardscape, driveway and walkway subgrade areas shall be overexcavated as was mentioned earlier, moisture condition to achieve optimum moisture content and be compacted prior to placement of fill. Fill soils shall be placed in thin lifts; moisture conditioned and compacted to 90% of laboratory maximum density. Prior to placement of concrete, presoaking the subgrade to a minimum 130% is recommended.

GEOTECHNICAL OBSERVATION & TESTING

Several observations, site inspections, meetings, and testing will be required throughout the construction, followings are the typical items:

- Pre-construction meeting.
- Bottom inspection of all overexcavations.
- During the compaction of overexcavated area and the precise grade.
- Footing excavations, prior to the pouring of concrete.
- After presoaking the slabs upgrade and prior to pouring concrete slabs.
- During the construction of area drain and utility trenches.
- During the placement of subgrade for parking and driveways.
- During the placement of the base material for the parking and driveway.
- When any unusual conditions are encountered during any construction operation subsequent to this report.

All inspections are subject to a minimum of prior 24 hours notice (within working day period). Pre-grade meeting is subject to a minimum of two working days notice.

To avoid any possible delays or misinterpretations, a representative of our firm must be notified to attend the pre-construction meeting with the grading contractor and city inspector to review the grading plans and the soil report and site condition and discuss potential changes prior to proceeding grading. We cannot take any responsibility for changes if we are not given the opportunity to attend the pr-grade meeting and also review the grading plans and foundation plans prior to the construction.

LIQUEFACTION CONDITIONS

- The site is located within area that is susceptible to potential settlement and also liquefaction, if there is any exposure to water. Our liquefaction report in Appendix "D" confirms this statement. There is no readily available document from the city to determine the extent of the liquefaction or settlement in the area.

- All grading and design values recommendations are considered to improve the site condition. Additionally, construction performed in accordance with our recommendations which are standard practice by Reregistered Civil Engineers has been found to mitigate but not positively prevent post-construction movement, cracking or settlement.

- Proper drainage is very important for this site. Any accumulation of water within the sandy zone shall produce settlement due to liquefaction. Therefore we highly recommend that the entire surface to be paved with asphalt or concrete and no water impoundment should occur in any part of the property. All the surface drainage would be away from the structure and directed to the street gutter.

- Should imported soils be needed to complete the proposed grading, additional laboratory tests performed on actual samples of soil existing at grade within the various areas of the site at the completion of grading will be necessary to verify the soil conditions. Depending on the results of this final evaluation, modifications to the recommendations presented herein may be warranted.

LIMITATIONS

The geotechnical assessment activities presented in this report have been conducted in accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in this area.

No warranty, expressed or implied, is made regarding the conclusions, professional opinions, and recommendations expressed in this report. The conclusions are based solely upon an analysis of the conditions as observed by our personnel and as reported to use by regulatory agencies and other named sources are and also based on surface and subsurface conditions present and our present state of geotechnical knowledge. They are not meant to imply a control of nature. If actual conditions differ from those described in this report, our office should be notified.

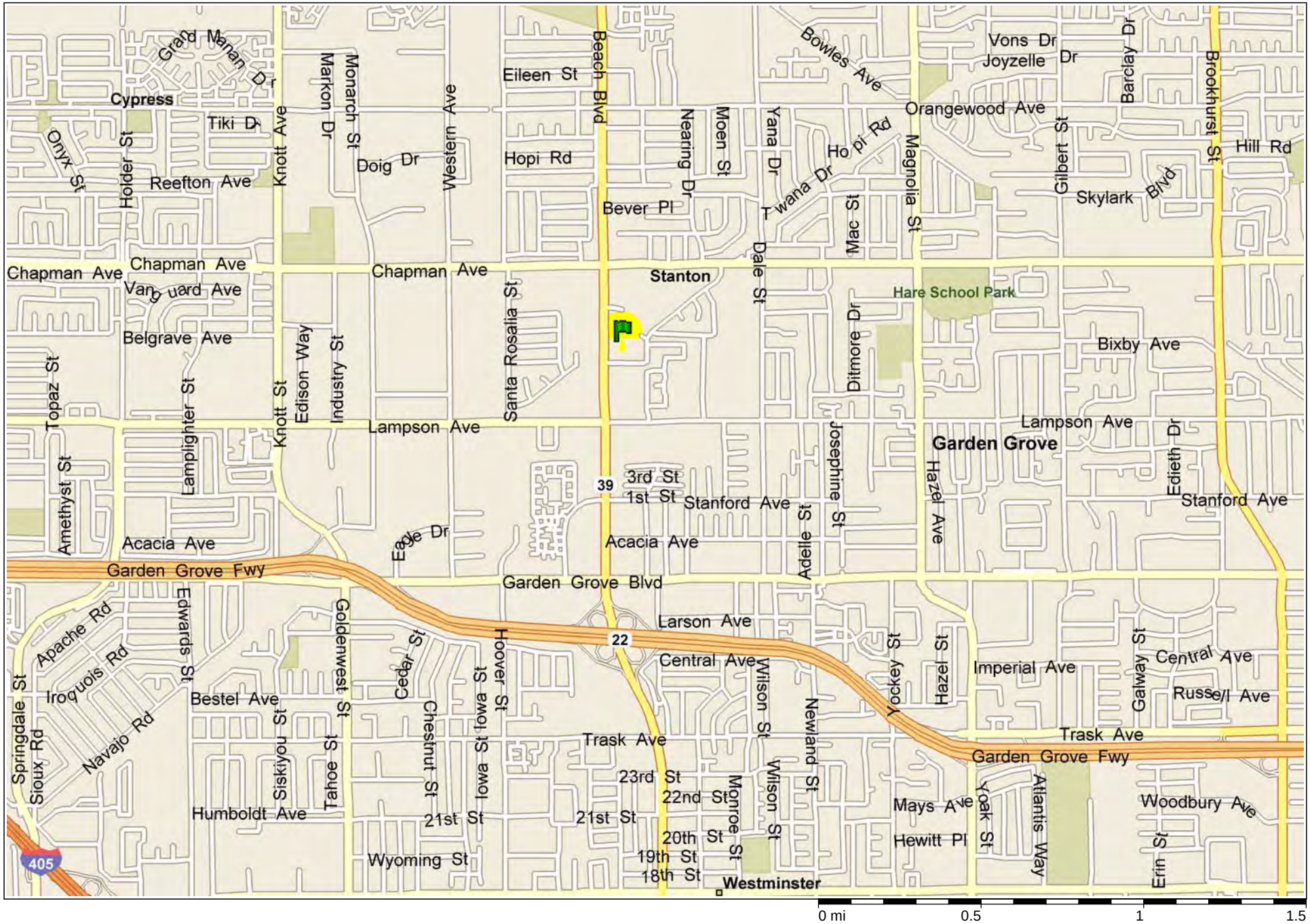
The usage of this report in any independent form cannot be approved unless specific, written verification of the applicability of the recommendations is obtained from our firm.

The services provided in this report are only to provide geotechnical characteristics of the subsurface, based on our field data and observations only and also following the ASTM standards. By accepting this report, the client will agree that we are not responsible for reviewing any private investigation that may have been performed at the site or surroundings and not released to public agencies, particularly by the Homeowner association or leading property management company. We take no responsibility for any matter that is not disclosed to us prior or during our studies.

APPENDIX “A”

FIGURES & MAPS

FIGURE 1: SITE LOCATION, 12282 Beach Blvd., Stanton, CA 90680



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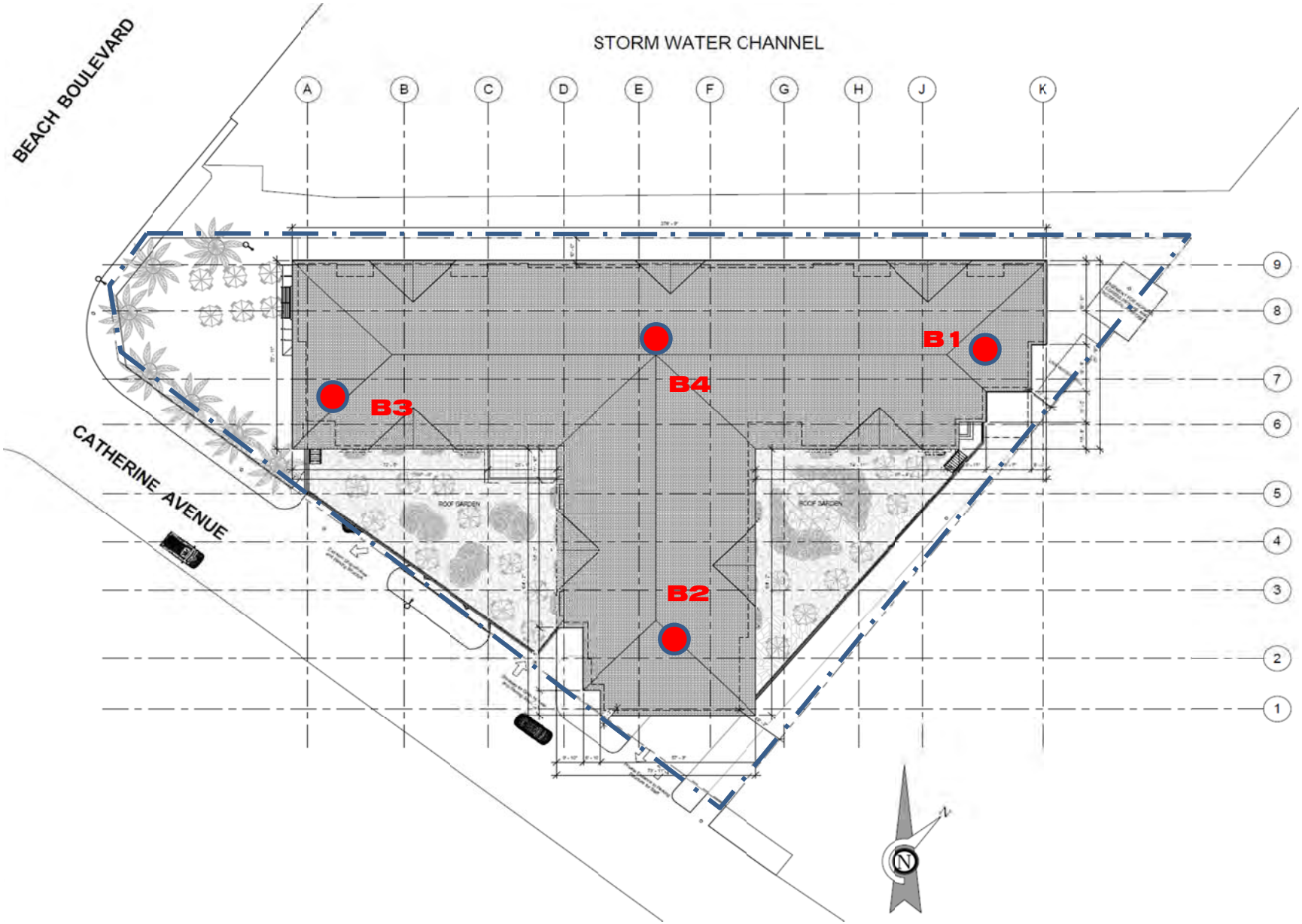
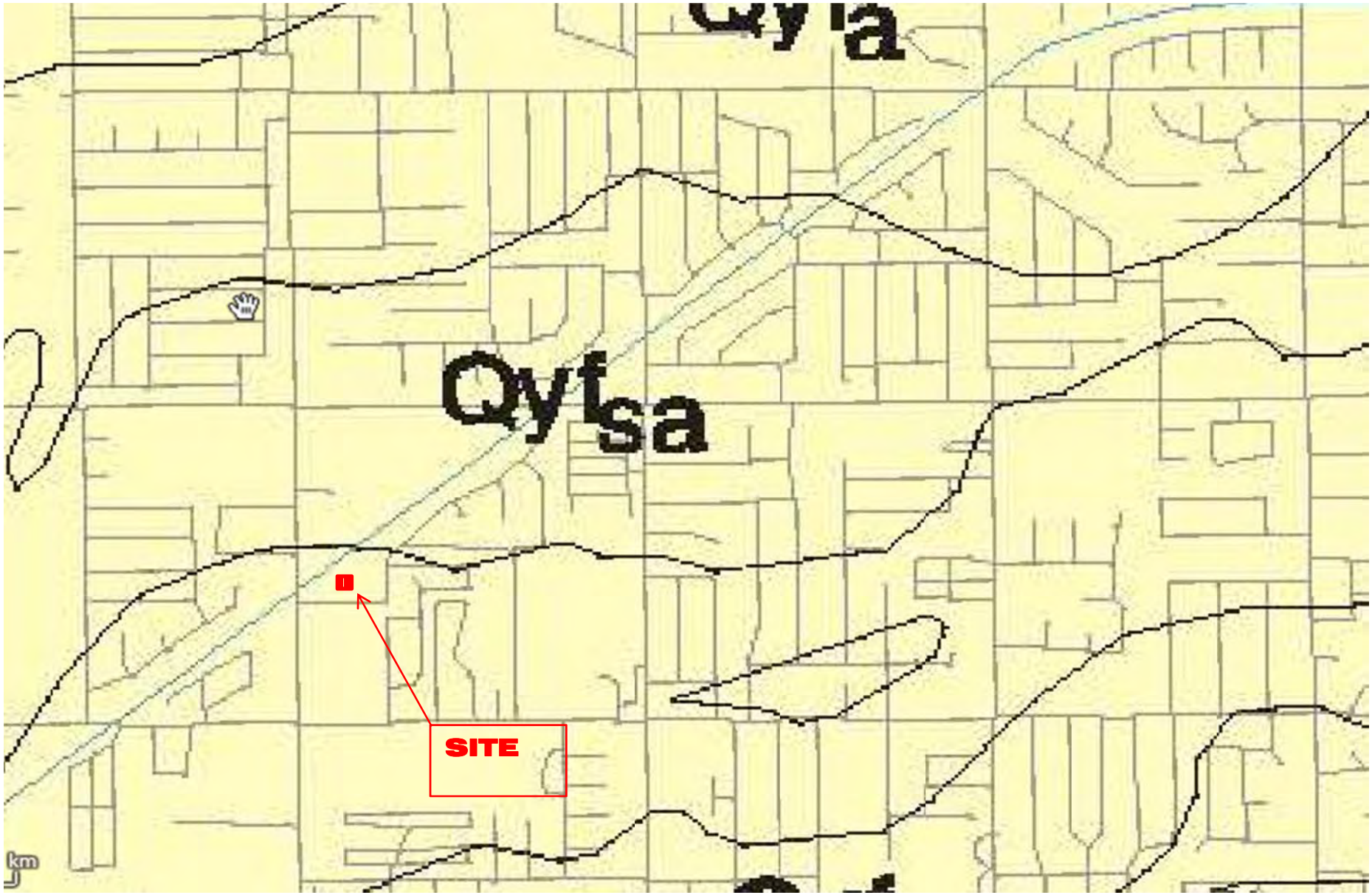


SITE MAP - SAMPLING LOCATIONS

12282 Beach Blvd, Stanton, CA 90680

Project No.: ST0114 **Figure: 2**

PROFESSIONAL ENGINEERS CONSULTING, Inc.

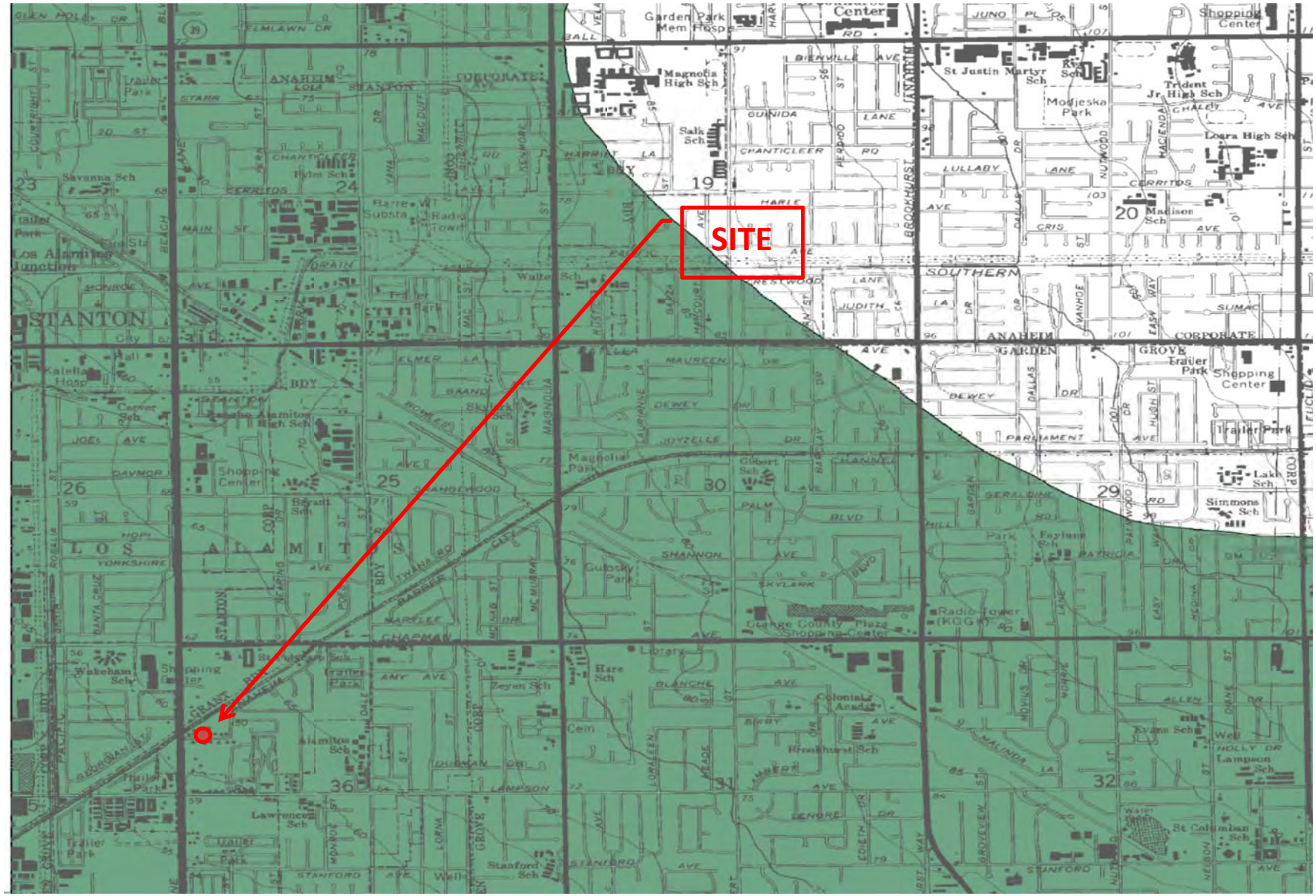


PROFESSIONAL ENGINEERS CONSULTING, Inc.

GEOLOGIC MAP

12282 Beach Blvd, Stanton, CA 90680

Project No.: ST0114 **Figure: 3**



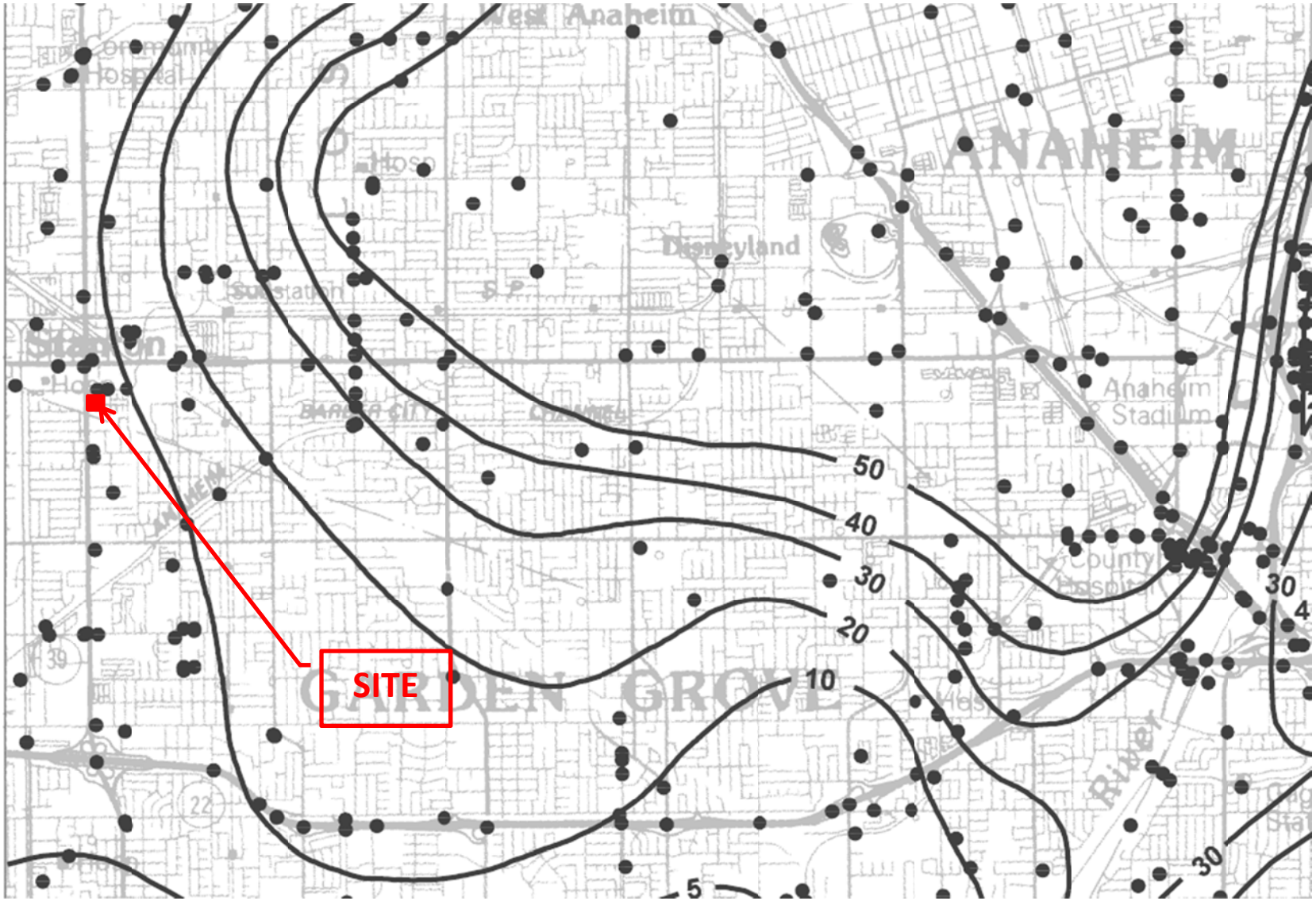
LIQUEFACTION ZONE

PROFESSIONAL ENGINEERS CONSULTING, Inc.

SEISMIC HAZARDS MAP

12282 Beach Blvd, Stanton, CA 90680

Project No.: ST0114 **Figure: 4**



PROFESSIONAL ENGINEERS CONSULTING, Inc.

GROUNDWATER ELEVATIONS

12282 Beach Blvd, Stanton, CA 90680

Project No.: ST0114 **Figure: 5**

APPENDIX “B”

BORING LOGS

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-1**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	SPT Blows.	USCS Symbol	density	Depth in Feet	Graphic Log	Description and Remarks
			sm				Dark olive Sandy Silt, artificial fill within top three feet, dry, loose
	X	17	sm/ml	114.1	5		Dark olive gray Silty Clay, moist, medium dense
	X	19	sm/ml	118.3	10		Mottled olive gray Sandy Silt, dry to moist, dense
	X	21	ml/cl	122.4	15		Mottled olive gray Silty Sand, some thin layers of Clay. moist, dense Groundwater at 17 feet
	X	23	cl/ml	119.0	20		Mottled gray Clay, wet, dense
	X	22	cl	120.5	25		Mottled olive gray Silty Clay. saturated, dense
	X	24	Cl/sm	122.3	30		Mottled olive gray Silty Sand, some layers of Clay. saturated, dense
	X	27	sm	117.6	35		Olive gray Clay with Sand, some gravel, saturated, dense.
	X	28	sm	119.8	40		Olive Clayey Sand, some gravel, moist, dense.

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-1**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	N_{60} Blows.	USCS Symbol	Density	Depth in Feet	Graphic Log	Description and Remarks
	X	30	sm	121.5	45		Dark olive, Clayey Sand, moist, very dense, cemented, dense
	X	32	Cl/ml	123.9	50		Olive brown Clayey Silt, moist, cemented, very dense
							TOTAL DEPTH = 50.0 FEET

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-2**

Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..

Sample Bulk	Sample Tube	SPT Blows.	USCS Symbol	density	Depth in Feet	Graphic Log	Description and Remarks
			sm				Dark olive Sandy Silt with some gravel, artificial fill within top 4.0 feet, dry, loose
	X	17	sm/ml	110.2	5		Dark olive gray Silty Clay, moist, medium dense
	X	20	sm/ml	118.2	10		Mottled olive gray Sandy Silt, dry to moist, dense
	X	21	ml/sm	119.6	15		Mottled olive gray Silty Sand, some thin layers of Clay. moist, dense
							Groundwater at 17 feet
	X	20	cl/ml	120.4	20		Mottled gray Sandy Clay, wet, dense
	X	22	cl	122.4	25		Mottled olive gray Silty Clay with Sand. saturated, dense
	X	24	cl	120.9	30		Mottled olive gray Silty Sand with Clay. saturated, dense
	X	23	ml	119.7	35		Olive gray Clay with Sand, some gravel, saturated, dense.
	X	25	sm/cl	120.4	40		Olive Clayey Sand, moist, dense.

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-2**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	N_{60} Blows.	USCS Symbol	Density	Depth in Feet	Graphic Log	Description and Remarks
	X	27	Cl/ml	120.9	45		Dark olive Clayey Silt, moist, very dense, cemented, dense
	X	26	Cl/ml	121.1	50		Olive brown Clayey Silt, moist, cemented, very dense
							TOTAL DEPTH = 50.0 FEET

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-3**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	SPT Blows.	USCS Symbol	density	Depth in Feet	Graphic Log	Description and Remarks
							Dark olive Sandy Silt, artificial fill within top 4.0 feet, dry, loose
	X	16	sm/ml	110. 8	5		Dark olive gray Silty Clay, moist, medium dense
	X	20	sm/ml	120.5	10		Mottled olive gray Sandy Silt, dry to moist, dense
	X	19	ml/cl	120.6	15		Mottled olive gray Silty Sand, some thin layers of Clay. moist, dense
							Groundwater at 18 feet
	X	20	Cl/sm	122.8	20		Mottled gray sandy Clay, wet, dense
	X	20	cl	125.4	25		Mottled olive gray Clay. saturated, dense
	X	21	cl	122.8	30		Olive gray Silty Sand, some layers of Clay. saturated, dense
	X	23	ml	121.6	35		Olive Clay with Sand, some gravel, saturated, dense.
	X	24	ml/cl	122.1	40		Olive Clayey Sand, some gravel, moist, dense.

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LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-3**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	N_{60} Blows.	USCS Symbol	Density	Depth in Feet	Graphic Log	Description and Remarks
	X	26	Cl/sm	123.2	45		Dark olive, Clayey Sand, moist, very dense, cemented, dense
	X	32	clml	124.1	50		Olive brown Clayey Silt, moist, cemented, very dense
							TOTAL DEPTH = 50.0 FEET

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-4**

Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..

Sample Bulk	Sample Tube	SPT Blows.	USCS Symbol	density	Depth in Feet	Graphic Log	Description and Remarks
							Dark olive Sandy Silt, artificial fill within top 3.5 feet, dry, loose
	X	18	sm/ml	110. 8	5		Dark olive gray Silty Clay, moist, medium dense
	X	20	sm/ml	120.5	10		Mottled olive gray Sandy Silt, moist, dense
	X	19	ml/cl	120.6	15		Mottled olive gray Silty Sand with Clay. moist, dense
							Groundwater at 17.5 feet
	X	21	Cl/sm	122.8	20		Mottled gray Clay, wet, dense
	X	23	cl	125.4	25		Mottled olive gray Silty Clay. saturated, dense
	X	22	cl	122.8	30		Mottled olive gray Silty Sand, some layers of Clay. saturated, dense
	X	24	ml	121.6	35		Olive Clay with Sand, some gravel, saturated, dense.
	X	22	ml/cl	122.1	40		Olive Clayey Sand, moist, cemented, dense.

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LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-4**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	N_{60} Blows.	USCS Symbol	Density	Depth in Feet	Graphic Log	Description and Remarks
	X	24	Cl/sm	123.2	45		Dark olive, Clayey Sand with, moist, very dense, cemented, dense
	X	26	clml	124.1	50		Olive Clayey Silt, moist, cemented, very dense
							TOTAL DEPTH = 50.0 FEET

APPENDIX "C"

LABORATORY RESULTS

PROFESSIONAL ENGINEERS CONSULTING Inc.

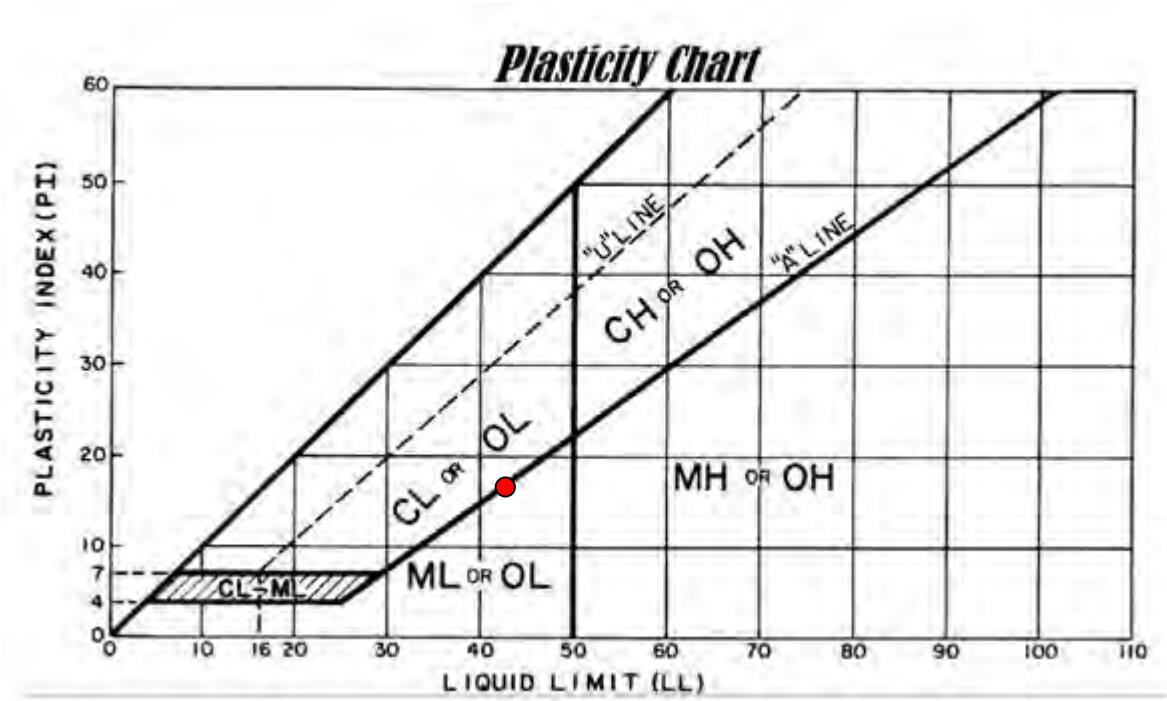
PLASTICITY TEST

12282 Beach Blvd.
Stanton, CA 90680

ATTERBERG LIMITS
Particles passed # 200

Sample	Liquid Limit	Plastic Limit	Plasticity Index
B2 @ 10.0’	44	27	17

Soil Classification: SILT-CLAY (ML-CL)



PROFESSIONAL ENGINEERS CONSULTING Inc.

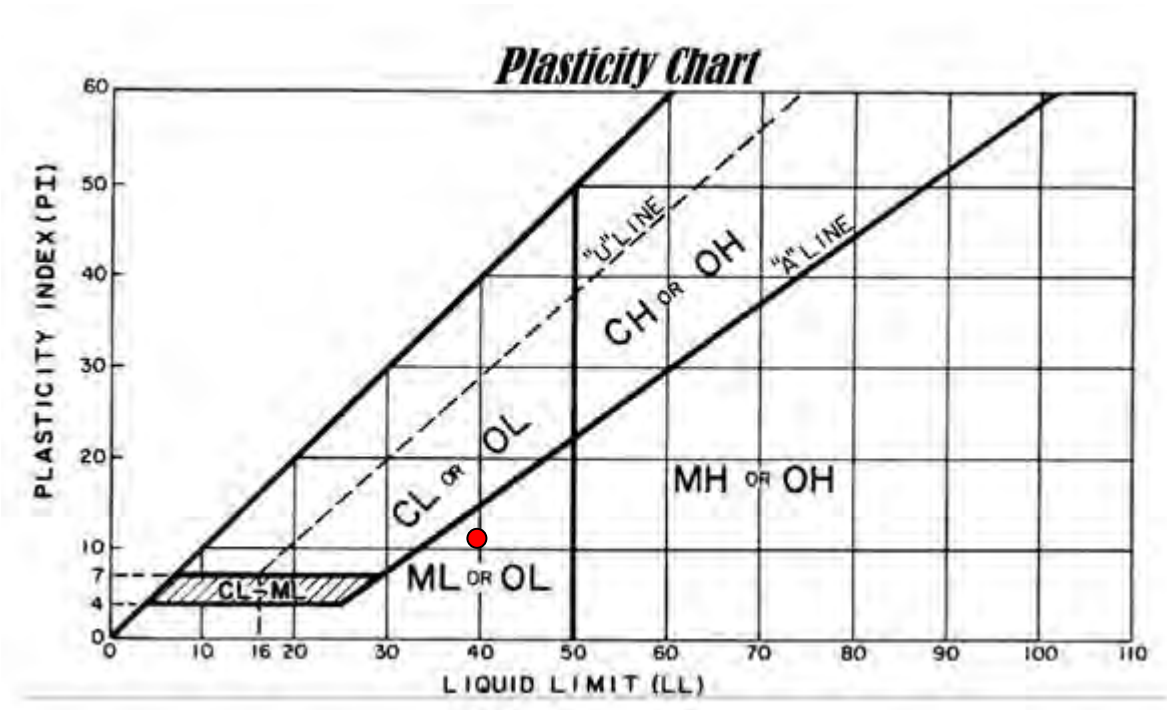
PLASTICITY TEST

12282 Beach Blvd.
Stanton, CA 90680

ATTERBERG LIMITS
Particles passed # 200

Sample	Liquid Limit	Plastic Limit	Plasticity Index
B1 @ 5.0'	41	52	11

Soil Classification: SILT(ML)



PROFESSIONAL ENGINEERS CONSULTING Inc.

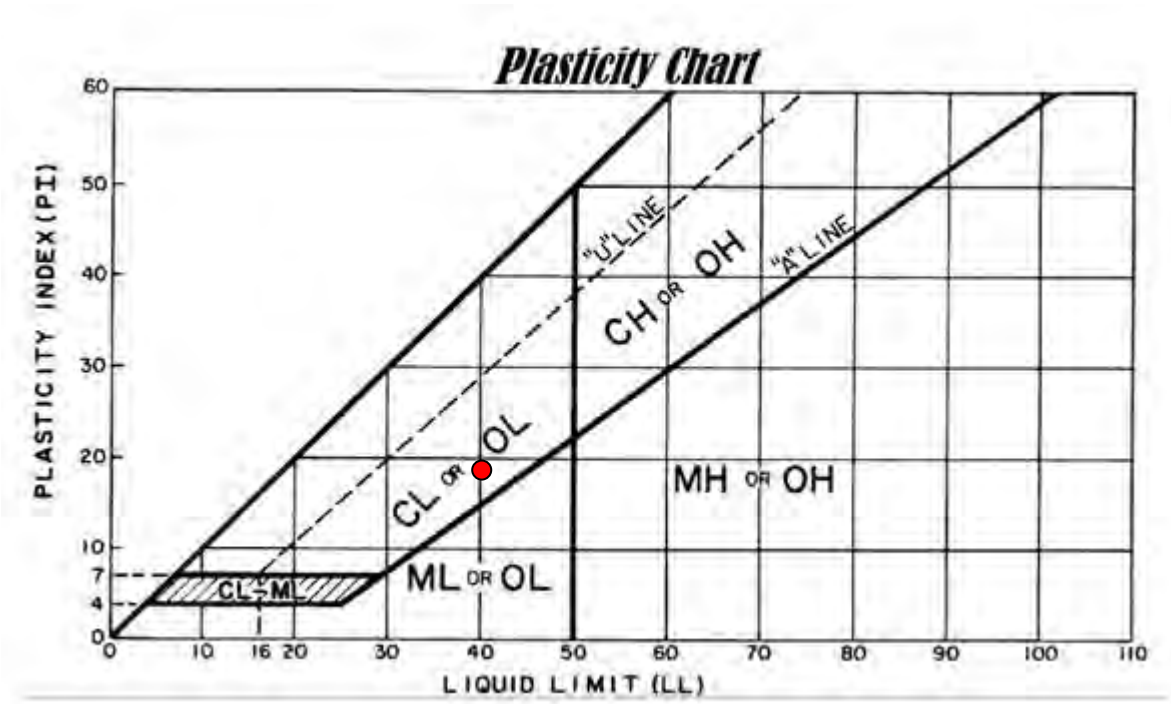
PLASTICITY TEST

12282 Beach Blvd.
Stanton, CA 90680

ATTERBERG LIMITS
Particles passed # 200

Sample	Liquid Limit	Plastic Limit	Plasticity Index
B3 @ 15.0’	40	21	19

Soil Classification: CLAY(CL)



PROFESSIONAL ENGINEERS CONSULTING Inc.

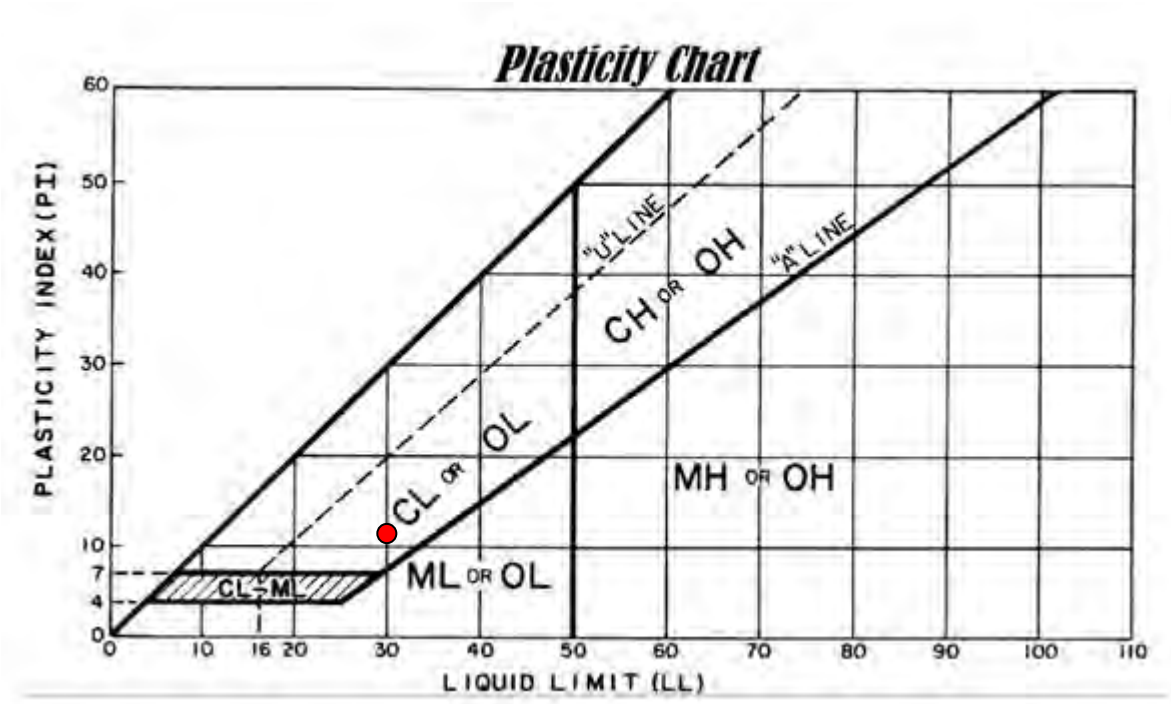
PLASTICITY TEST

12282 Beach Blvd.
Stanton, CA 90680

ATTERBERG LIMITS
Particles passed # 200

Sample	Liquid Limit	Plastic Limit	Plasticity Index
B1 @ 5.0’	30	19	11

Soil Classification: CLAY(CL)



PROFESSIONAL ENGINEERS CONSULTING Inc.

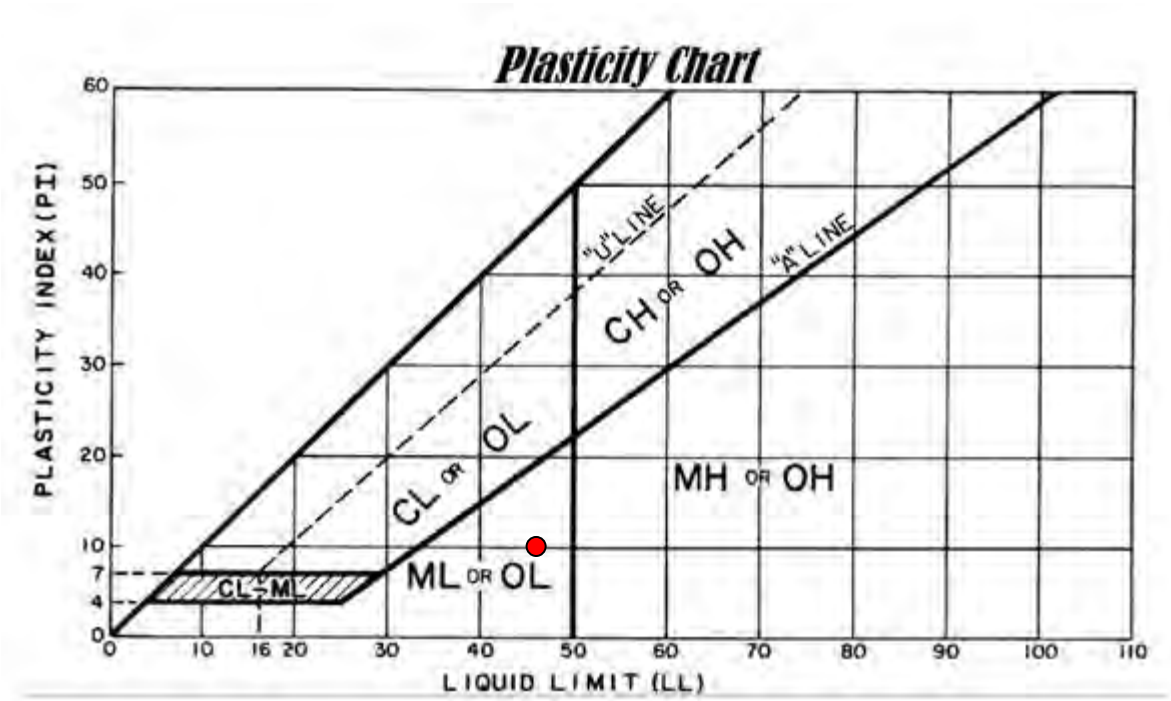
PLASTICITY TEST

12282 Beach Blvd.
Stanton, CA 90680

ATTERBERG LIMITS
Particles passed # 200

Sample	Liquid Limit	Plastic Limit	Plasticity Index
B1 @ 15.0’	47	37	10

Soil Classification: CLAY(CL)



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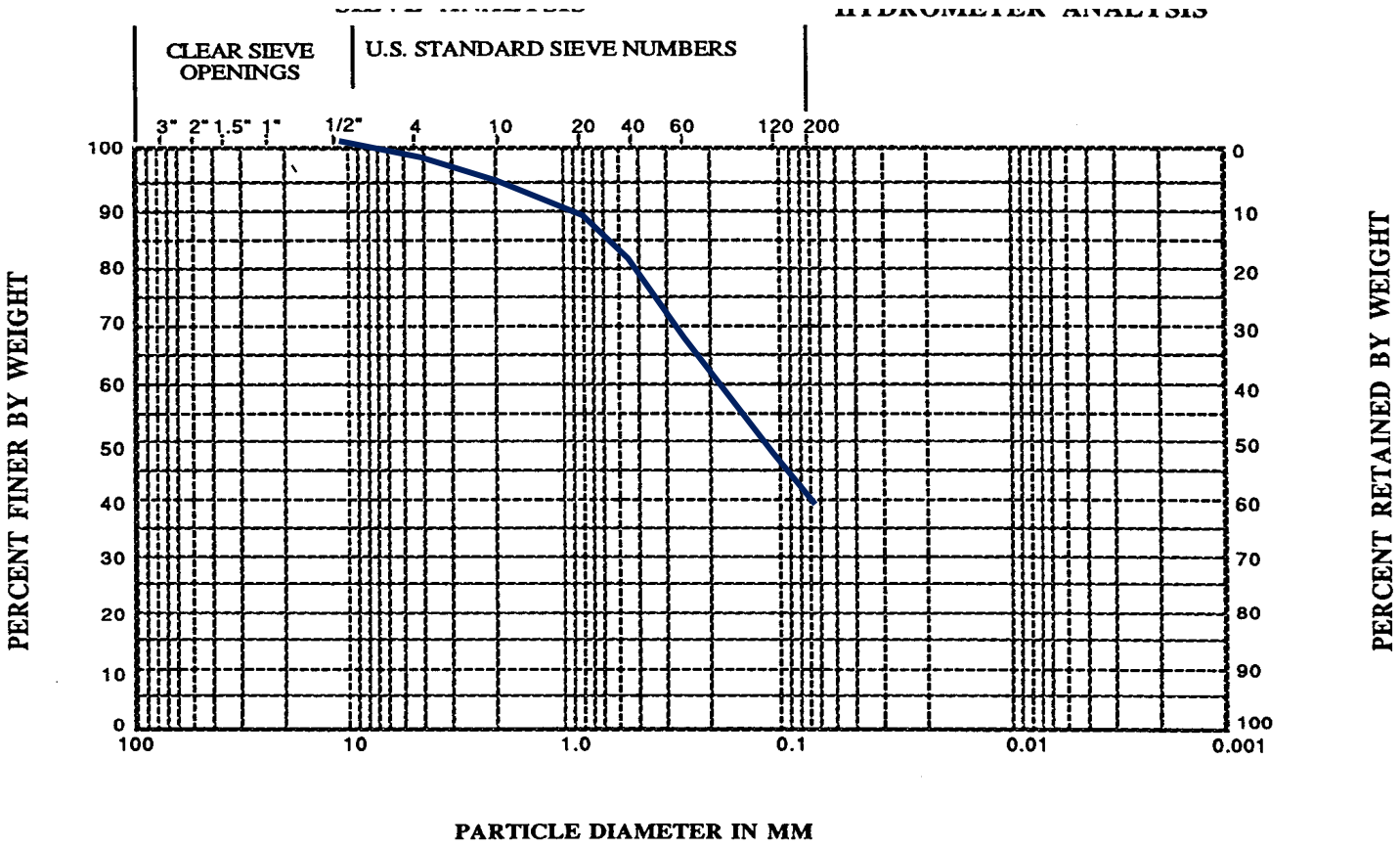
PARTICL SIZE ANALYSIS

PROJECT NUMBER: ST0114 **SITE:** 12282 Beach Blvd, Stanton, CA 90680

SAMPLE: B-1 **DEPTH:** 5.0 -15.0 ft.



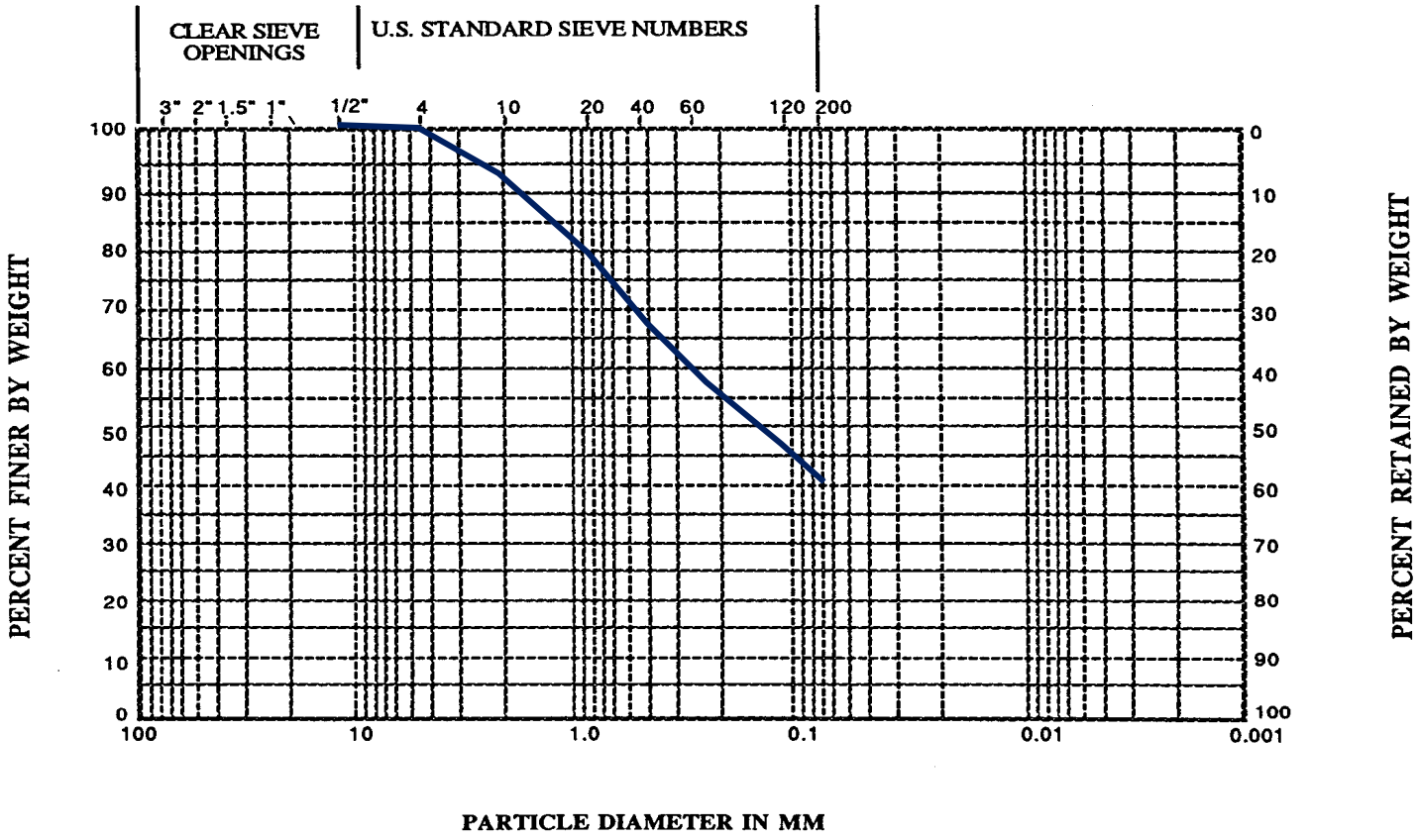
COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

PROFESSIONAL ENGINEERS CONSULTING, Inc.

PARTICL SIZE ANALYSIS

PROJECT NUMBER: ST0114 **SITE:** 12282 Beach Blvd, Stanton, CA 90680

SAMPLE: B-2 **DEPTH:** 5.0- 15.0 ft.

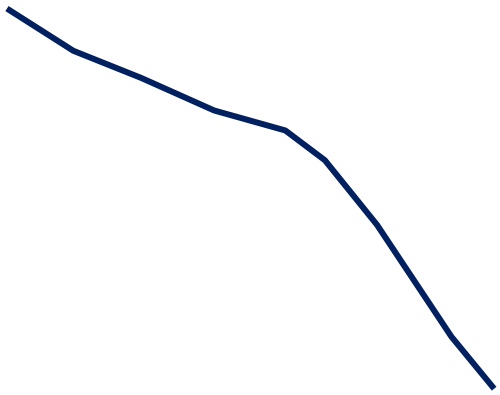


COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

PARTICL SIZE ANALYSIS

PROJECT NUMBER: ST0114 **SITE:** 12282 Beach Blvd, Stanton, CA 90680

PROFESSIONAL ENGINEERS CONSULTING, Inc.



PARTICL SIZE ANALYSIS

PROJECT NUMBER: ST0114 **SITE:** 12282 Beach Blvd, Stanton, CA 90680

APPENDIX "D"

LIQUEFACTION ANALYSES

LIQUEFACTION STUDY

Liquefaction study was performed on January 22, 2014: Four borings (B-1 to B-4) were advanced to depth of 50 feet. Our Registered Civil Engineer logged the encountered formations and performed all sampling, blow count measurements, density results, and general observations are included in the Boring Logs in Appendix `B'. The locations of borehole are shown on the plot plan on Figure 2.

Grab samples of the soils were obtained at every five feet intervals. Soil samples were retained in close fitting moisture proof containers and transported to our laboratory.

The exploratory boring used for subsurface exploration was backfilled with the native soil and with reasonable effort to restore the area to their original condition.

The area within the site is consistently contained of sandy material with multiple layers of silt, some clayey layers were observed at lower depths. Sieve analyses showed that the percentage of the fines are within the range of 18% and 38% .

The liquefaction study was performed per "Recommended Procedures for Implementation of DMG Special Publication 117 Guideline for Mitigation and Analyzing Liquefaction in California". Field procedures were conducted per section 5.0 and all

corrections were performed per Tables 5.1 and 5.2 and also (Influence of SPT Procedures in Soil Liquefaction Resistance Evaluation), technical paper done by Seed et al.

Their recommendations are: M_w = 7.5 and a_{max} = 0.275g.(Chinese Criteria is 0.2, for more conservative approach, we chose 0.275)
The correction for $N_{60\ was}$ within range of 0.72 and 0.91.

For this study we used SPT with 2" OD, Automatic Trip Hammer, and blow count rate of 30 to 40 per minute.

Based on our study within the area, and performing analyses on samples at every five feet interval, we can conclude that the top five feet of the proposed area for development is susceptible to liquefaction due to poor compaction. Results are shown on Plates I to IV and plates A to D.

We recommended removal and compaction of the top six feet, followed by replacement and recompaction per our earthwork and ground preparation section and city of Stanton grading requirements.

LIQUEFACTION STUDY, BORING B-1
12282 Beach Boulevard, Stanton, CA 90680

$(N1)_{60}$	Depth ft	Density	a_{max}	σ_0 tsf	σ'_0 tsf	R_d	τ_{av}/σ'_0
17	5	114.1	0.275	0.285	0.259	0.986	0.194
19	10	118.3	0.275	0.581	0.538	0.971	0.187
21	15	119	0.275	0.879	0.821	0.957	0.183
23	20	120.5	0.275	1.180	1.1115	0.943	0.179
22	25	122.3	0.275	1.486	1.411	0.929	0.175
24	30	117.6	0.275	1.780	1.687	0.914	0.172
27	35	119.8	0.275	2.079	1.974	0.9	0.169
28	40	123.9	0.275	2.389	2.2815	0.9	0.168
30	45	120.1	0.275	2.689	2.57	0.9	0.168
32	50	123.9	0.275	2.999	2.8775	0.9	0.168

LIQUEFACTION STUDY, BORING B-2
12282 Beach Boulevard, Stanton, CA 90680

$(N1)_{60}$	Depth ft	Density	a_{max}	σ_0 tsf	σ'_0 tsf	R_d	τ_{av}/σ'_0
17	5	112.1	0.275	0.280	0.249	0.986	0.199
20	10	118.2	0.275	0.296	0.279	0.971	0.184
21	15	119.6	0.275	0.299	0.286	0.957	0.179
20	20	120.4	0.275	0.301	0.290	0.943	0.175
22	25	122.4	0.275	0.306	0.300	0.929	0.169
24	30	120.9	0.275	0.302	0.293	0.914	0.169
23	35	119.7	0.275	0.299	0.287	0.91	0.170
25	40	120.4	0.275	0.301	0.290	0.9	0.167
27	45	120.9	0.275	0.302	0.293	0.9	0.166
26	50	121.1	0.275	0.303	0.294	0.9	0.166

LIQUEFACTION STUDY, BORING B-3
12282 Beach Boulevard, Stanton, CA 90680

$(N1)_{60}$	Depth ft	Density	a_{max}	σ_0 tsf	σ'_0 tsf	R_d	τ_{av}/σ'_0
16	5	110.8	0.275	0.277	0.242	0.986	0.202
20	10	120.5	0.275	0.578	0.5325	0.971	0.187
19	15	120.6	0.275	0.879	0.821	0.957	0.183
20	20	122.8	0.275	1.180	1.1115	0.943	0.179
20	25	125.4	0.275	1.486	1.411	0.929	0.175
21	30	122.8	0.275	1.780	1.687	0.914	0.172
23	35	121.6	0.275	2.079	1.974	0.9	0.169
24	40	122.1	0.275	2.389	2.2815	0.9	0.168
26	45	123.2	0.275	2.689	2.57	0.9	0.168
32	50	124.1	0.275	2.999	2.8775	0.9	0.168

LIQUEFACTION STUDY, BORING B-4
12282 Beach Boulevard, Stanton, CA 90680

$(N1)_{60}$	Depth ft	Density	a_{max}	σ_0 tsf	σ'_0 tsf	R_d	τ_{av}/σ'_0
18	5	111.3	0.275	0.278	0.245	0.986	0.201
20	10	123.2	0.275	0.586	0.5485	0.971	0.187
19	15	121.9	0.275	0.879	0.821	0.957	0.183
21	20	120.6	0.275	1.180	1.1115	0.943	0.179
23	25	124.7	0.275	1.486	1.411	0.929	0.175
22	30	120.8	0.275	1.780	1.687	0.914	0.172
24	35	120.1	0.275	2.079	1.974	0.9	0.169
22	40	121.7	0.275	2.389	2.2815	0.9	0.168
24	45	122.5	0.275	2.689	2.57	0.9	0.168
26	50	122.9	0.275	2.999	2.8775	0.9	0.168

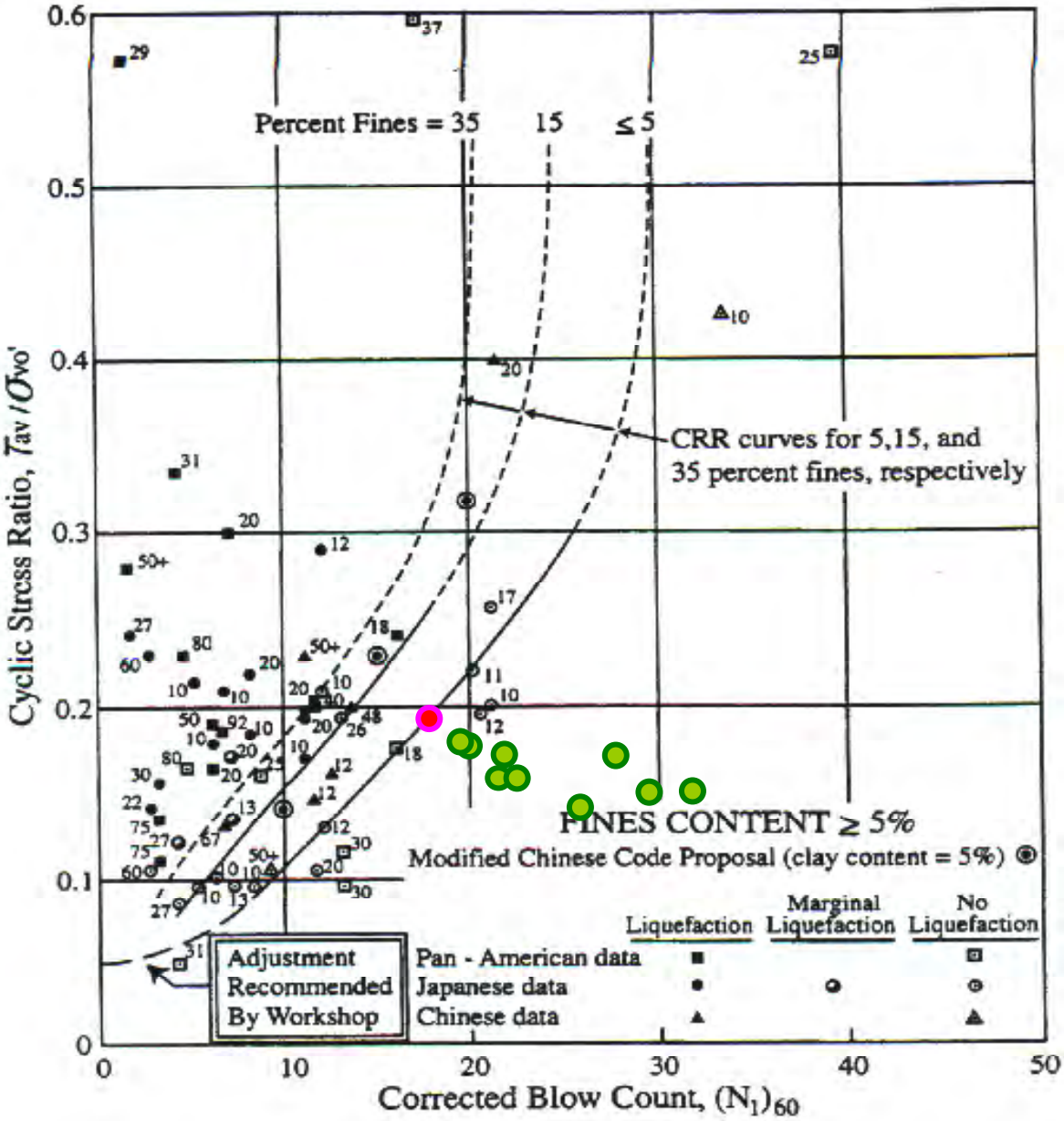


Figure 7.1. Simplified Base Curve Recommended for Determination of CRR from SPT Data for Moment Magnitude 7.5 Along with Empirical Liquefaction Data (after Youd and Idriss, 1997)

PROFESSIONAL ENGINEERS CONSULTING, Inc.

25422 Trabuco Rd. #105 Lake Forest, CA 92630

Phone 949-768-3693 Fax 949-588-8386

Drown By: P.S.	**Date: January 2014**
Proj. No.: ST0114	**Plate: A**

LIQUEFACTION STUDY B-1

12282 Beach Blvd, Stanton, CA 90680

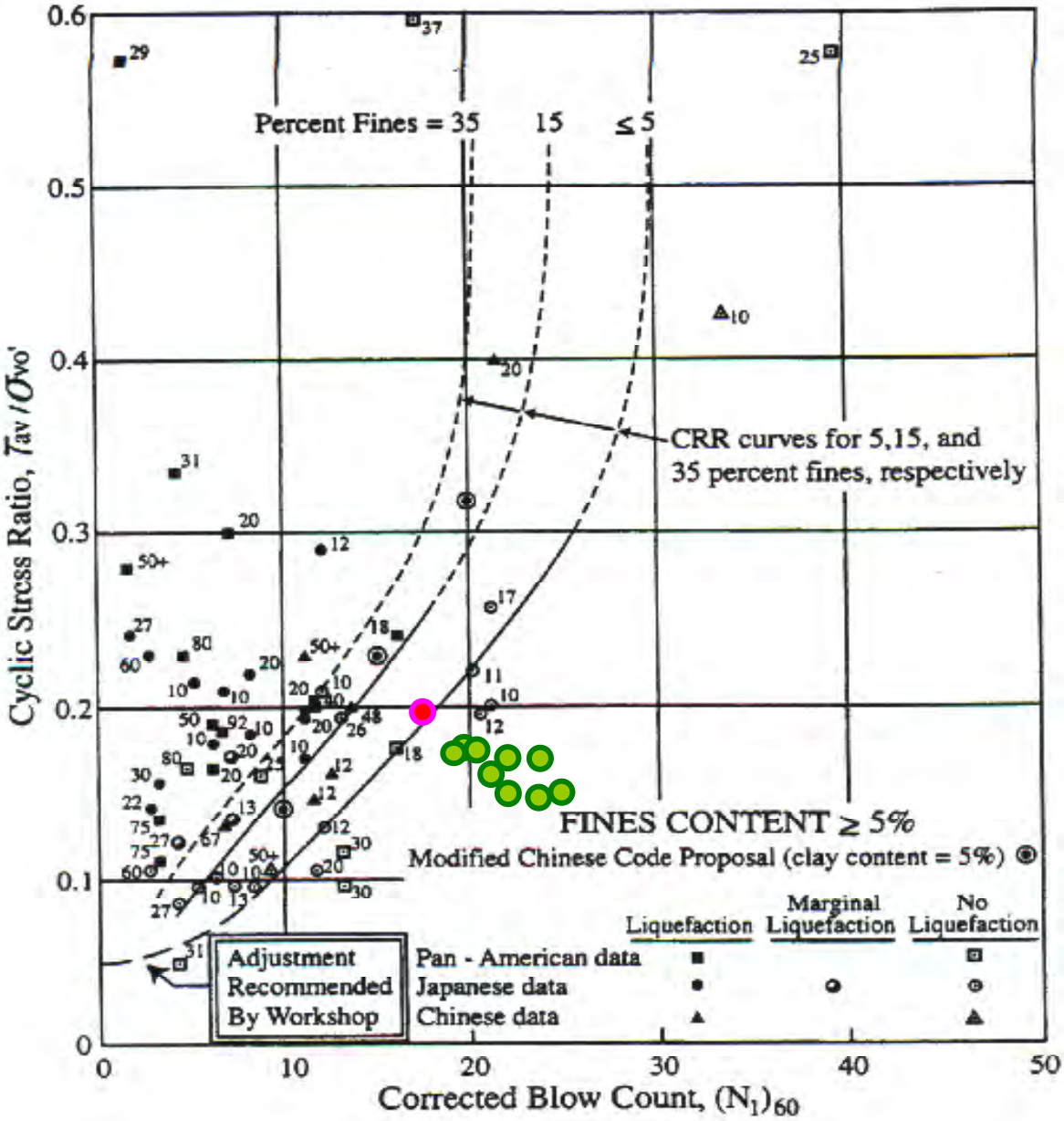


Figure 7.1. Simplified Base Curve Recommended for Determination of CRR from SPT Data for Moment Magnitude 7.5 Along with Empirical Liquefaction Data (after Youd and Idriss, 1997)

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Drown By: P.S.	**Date: January 2014**
Proj. No.: ST0114	**Plate: B**

LIQUEFACTION STUDY B-2

12282 Beach Blvd, Stanton, CA 90680

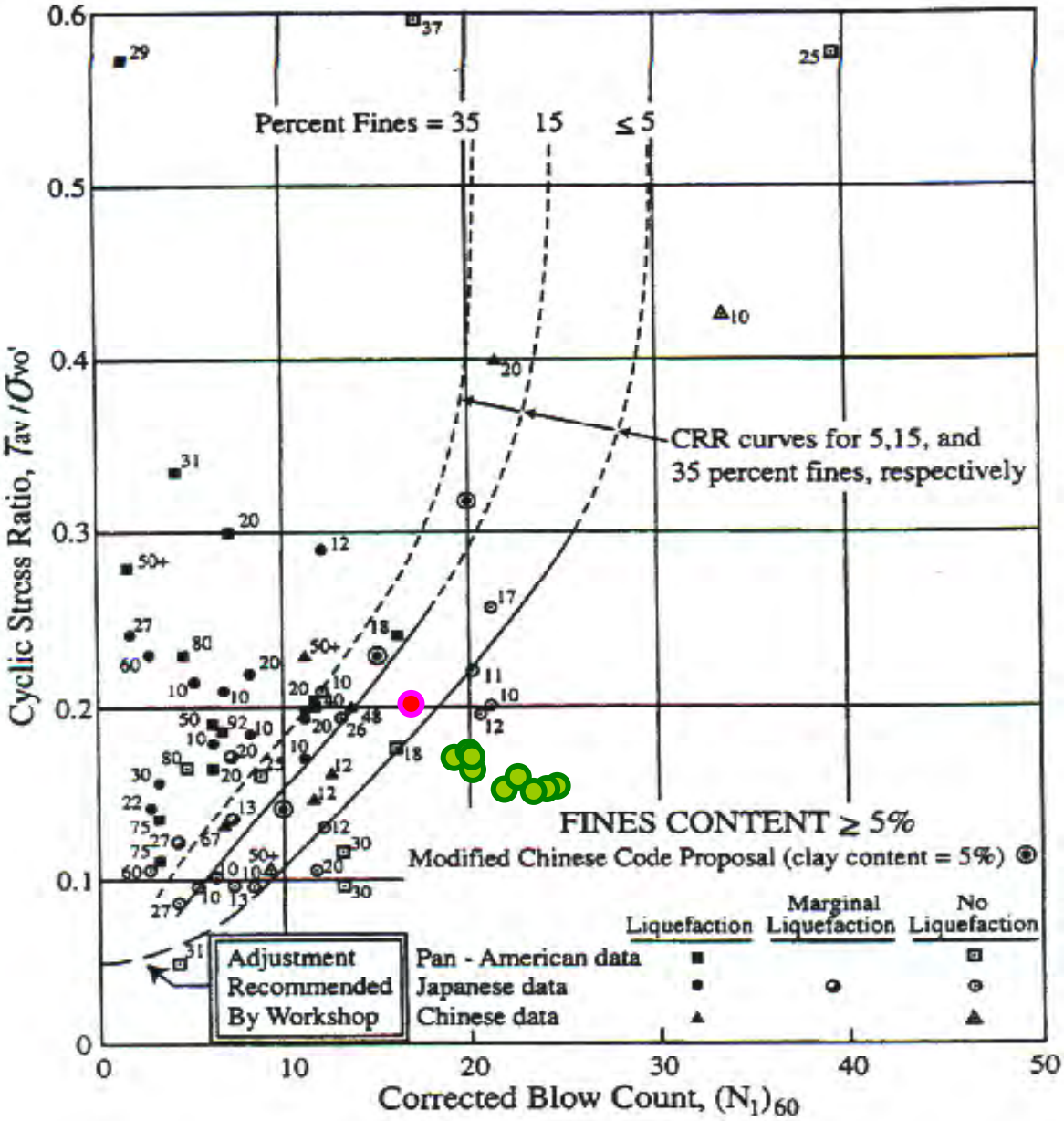

Figure 7.1. Simplified Base Curve Recommended for Determination of CRR from SPT Data for Moment Magnitude 7.5 Along with Empirical Liquefaction Data (after Youd and Idriss, 1997)

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Phone 949-768-3693 Fax 949-588-8386

Drown By: P.S.	**Date: January 2014**
Proj. No.: ST0114	**Plate: C**

LIQUEFACTION STUDY B-3
12282 Beach Blvd, Stanton, CA 90680

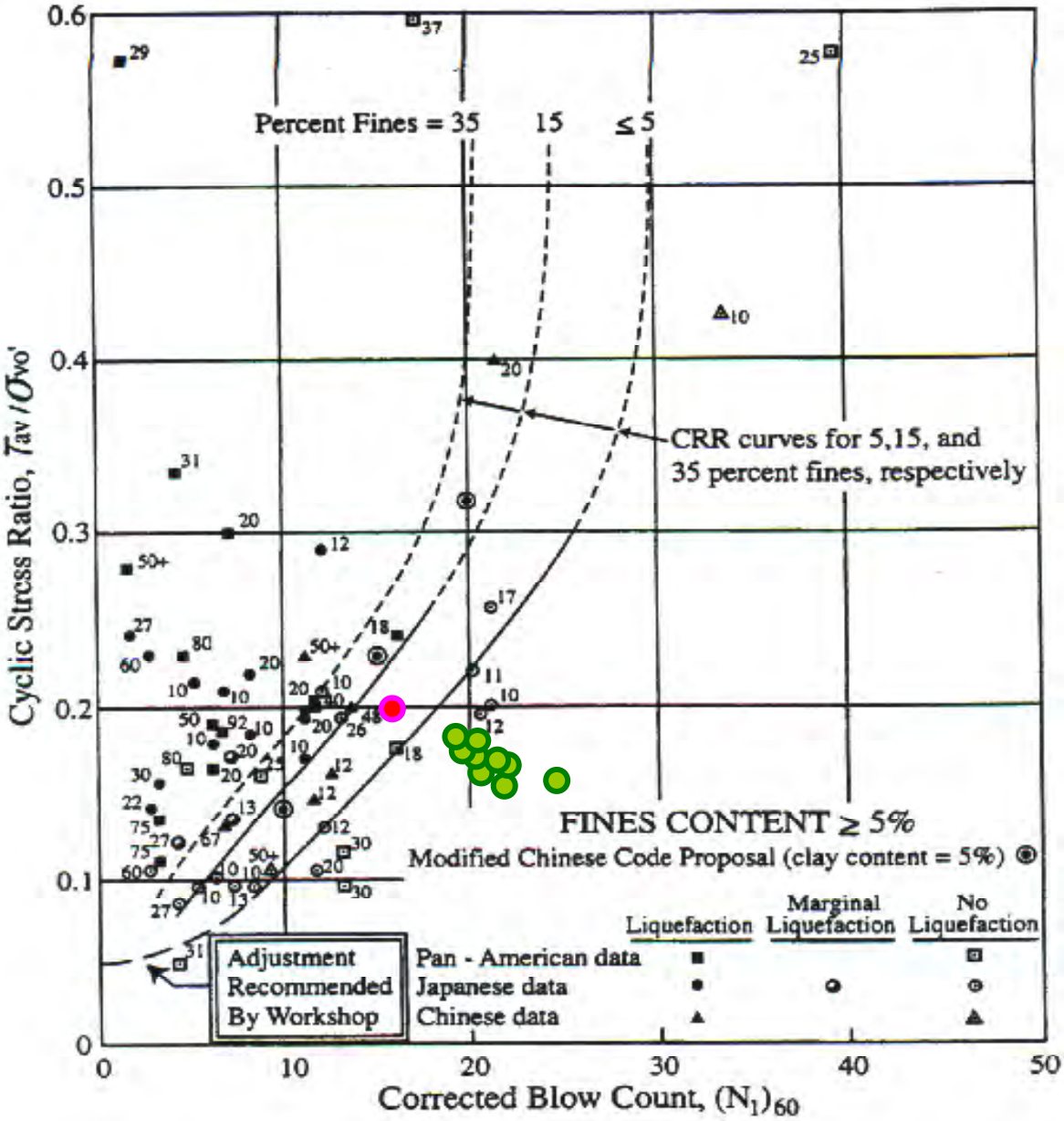

Figure 7.1. Simplified Base Curve Recommended for Determination of CRR from SPT Data for Moment Magnitude 7.5 Along with Empirical Liquefaction Data (after Youd and Idriss, 1997)

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Phone 949-768-3693 Fax 949-588-8386

Drown By: P.S.	**Date: January 2014**
Proj. No.: ST0114	**Plate: D**

LIQUEFACTION STUDY B-4
12282 Beach Blvd, Stanton, CA 90680

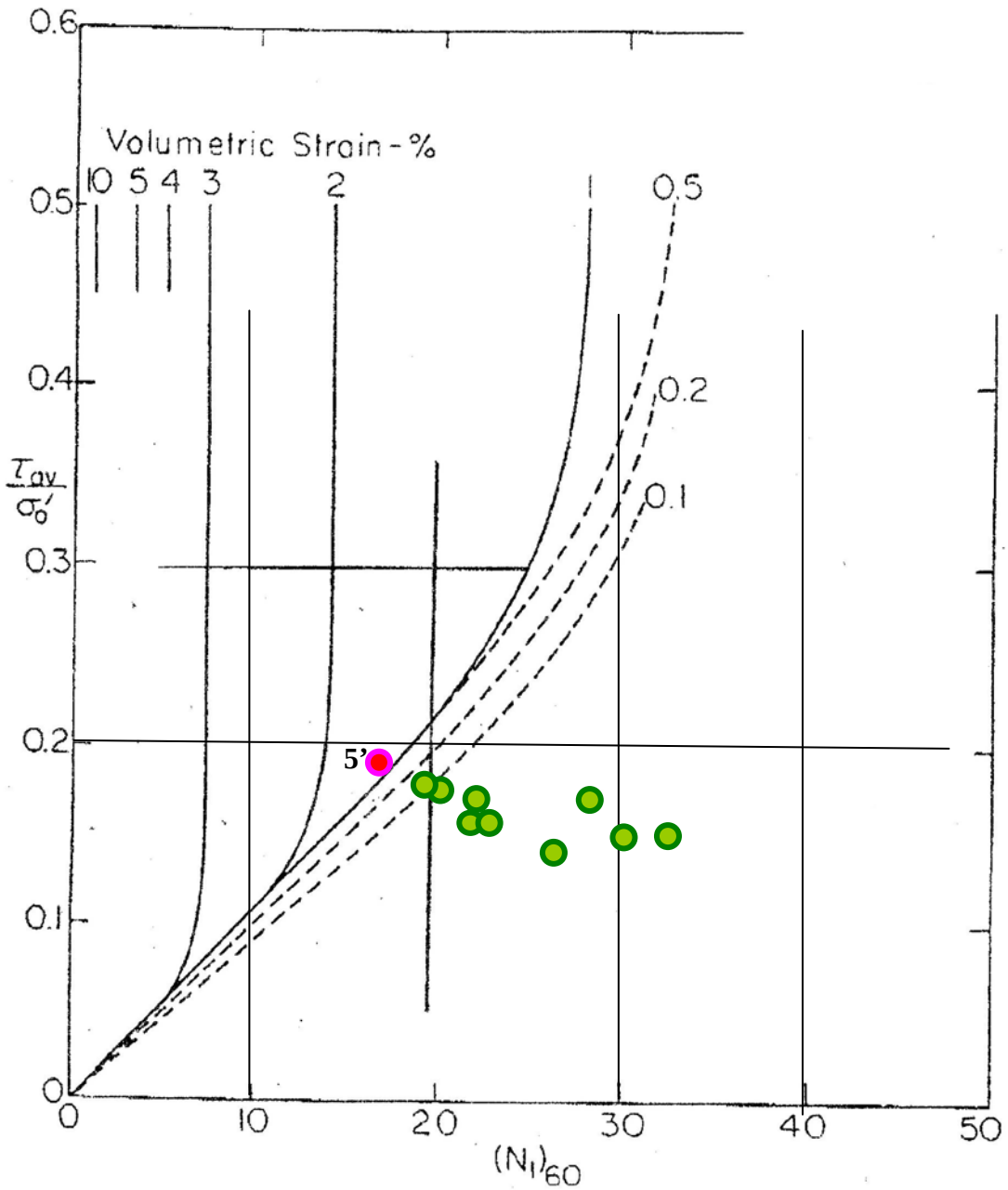

FIG. 6 PROPOSED RELATIONSHIP BETWEEN CYCLIC STRESS RATIO, $(N_1)_{60}$ AND VOLUMETRIC STRAIN FOR SATURATED CLEAN SANDS

SOURCE: Seed& Tokematso, 1987

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Drown By: P.S.	**Date: Jan. 2014**
Proj. No.: ST0114	**Plate: I**

LIQUEFACTION STUDY B- 1
12282 Beach Blvd, Stanton, CA 90680

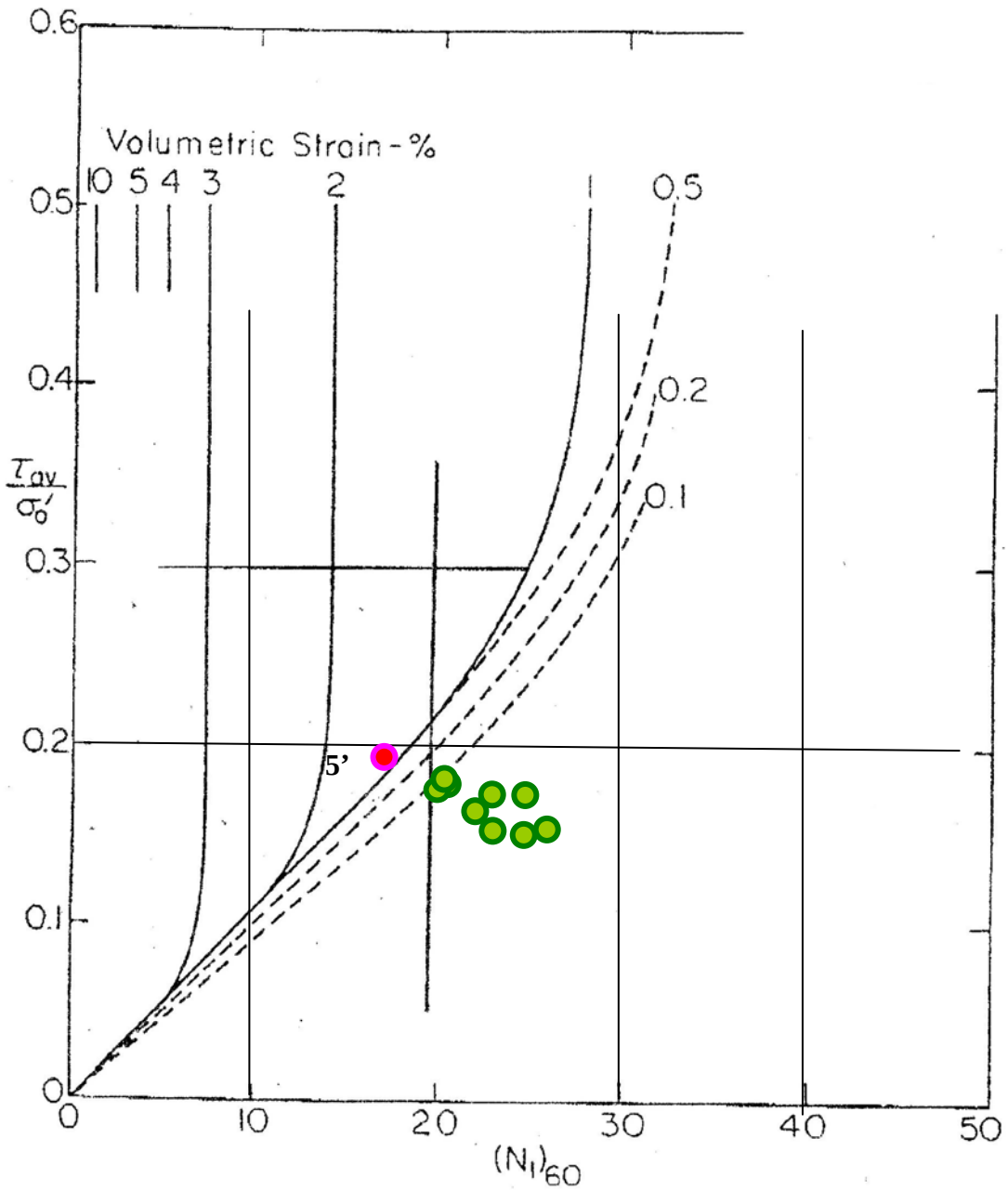

FIG. 6 PROPOSED RELATIONSHIP BETWEEN CYCLIC STRESS RATIO, $(N_1)_{60}$ AND VOLUMETRIC STRAIN FOR SATURATED CLEAN SANDS

SOURCE: Seed& Tokematso, 1987

PROFESSIONAL ENGINEERS CONSULTING, Inc.
25422 Trabuco Rd. #105-401 Lake Forest, CA 92630
Phone 949-768-3693 Fax 949-588-8386

Drown By: P.S.	**Date: Jan. 2014**
Proj. No.: ST0114	**Plate: II**

LIQUEFACTION STUDY B- 2
12282 Beach Blvd, Stanton, CA 90680

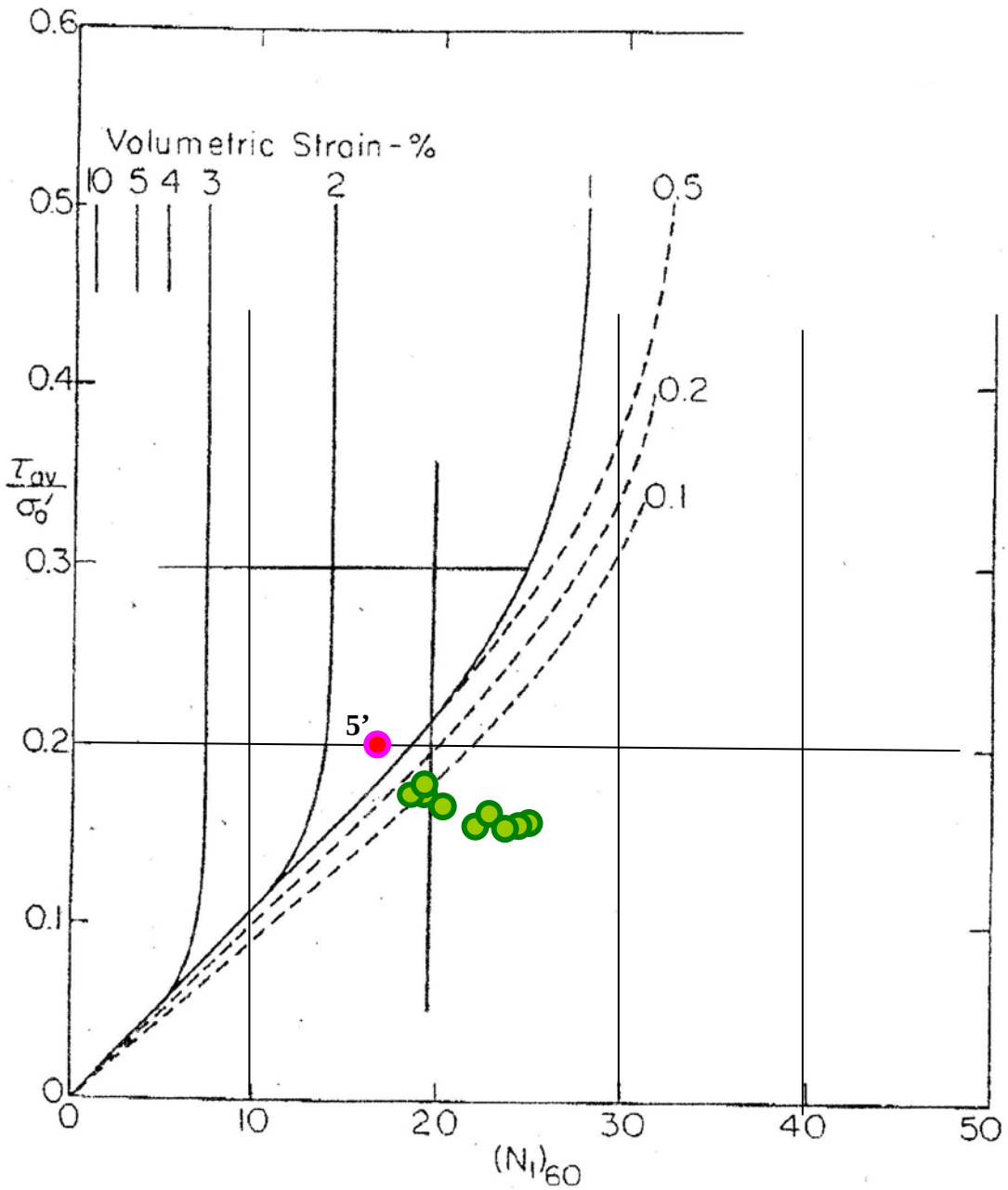

FIG. 6 PROPOSED RELATIONSHIP BETWEEN CYCLIC STRESS RATIO, $(N_1)_{60}$ AND VOLUMETRIC STRAIN FOR SATURATED CLEAN SANDS

SOURCE: Seed& Tokematso, 1987

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Drown By: P.S.	**Date: Jan. 2014**
Proj. No.: ST0114	**Plate: III**

LIQUEFACTION STUDY B- 3
12282 Beach Blvd, Stanton, CA 90680

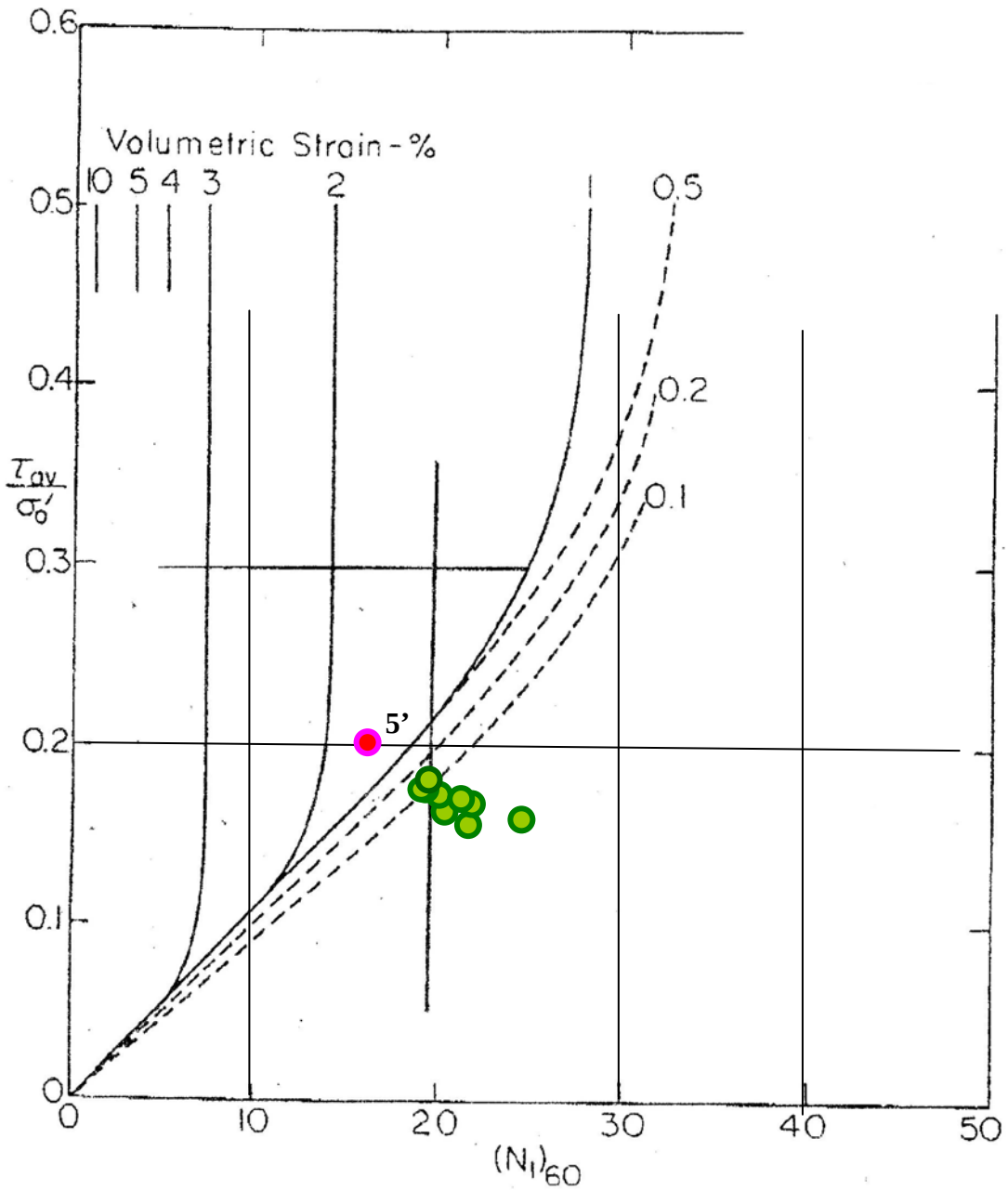

FIG. 6 PROPOSED RELATIONSHIP BETWEEN CYCLIC STRESS RATIO, $(N_1)_{60}$ AND VOLUMETRIC STRAIN FOR SATURATED CLEAN SANDS

SOURCE: Seed& Tokematso, 1987

PROFESSIONAL ENGINEERS CONSULTING, Inc.
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Drown By: P.S.	**Date: Jan. 2014**
Proj. No.: ST0114	**Plate: IV**

LIQUEFACTION STUDY B- 4
12282 Beach Blvd, Stanton, CA 90680

PROFESSIONAL ENGINEERS CONSULTING, Inc.
GEOTECHNICAL ENVIRONMENTAL TESTING INSPECTION
25422 Trabuco Rd. #105 Lake Forest, CA 92630 Phone 949-768-3693 info@pesoil.com
27636 Ynez Road, # L7 Temecula, CA 92591 Phone 951-698-4598 www.pesoil.com

INFILTROMETER STUDY

SITE:

12282 Beach Boulevard
Stanton, CA 90680

DATE:

May 19, 2014

Project Number:

ST0114

PREPARED FOR:

Ms. Manju Pai
Studio π^2
20 Truman, Ste 210,
Irvine, CA 92620

PROFESSIONAL ENGINEERS CONSULTING, Inc.
GEOTECHNICAL ENVIRONMENTAL TESTING INSPECTION
25422 Trabuco Rd. #105 Lake Forest, CA 92630 Phone 949-768-3693 info@pesoil.com
27636 Ynez Road, # L7 Temecula, CA 92591 Phone 951-698-4598 www.pesoil.com

May 19, 2014

Ms. Manju Pai
Studio π^2
20 Truman, Ste 210,
Irvine, CA 92620

Dear Ms. Manju:

Professional Engineers Consulting, Inc. is pleased to present you this infiltrometer study report for your project located at 12282 Beach Blvd, Stanton, CA 90680.

Based on the actual site condition, laboratory analyses, and our field observations, we are providing you a summary of geotechnical studies. It is our opinion that the enclosed conclusions and recommendations can be used for the design and construction of this project.

This opportunity to be of professional service is greatly appreciated. Should you have any questions or require additional information, please do not hesitate to contact our office at 949-768-3693.

Respectfully Submitted,

PROFESSIONAL ENGINEERS CONSULTING, Inc.

REGISTERED PROFESSIONAL ENGINEER
SAEED SHAHIDI
No. 51711
Exp. 6/30/14
CIVIL
STATE OF CALIFORNIA

Saeed Shahidi
Registered Civil Engineer

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SITE LOCATION & DESCRIPTION	1
PROPOSED DEVEOPMENT	1
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INFILTROMETER	2
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APPENDIX A

FIGURES

1. SITE LOCATION
2. TEST LOCATIONS

APPENDIX B

BORING LOGS

APPENDIX C

INFILTROMETER STUDY CALCULATIONS

TABLE 1 BH-1 READINGS AND CALCULATIONS

PLATE 1 BH-1 FILTRATION RATE CURVE

APPENDIX D

LABORATORY ANALYSES

INTRODUCTION

This report was prepared by Professional Engineers Consulting, Inc. to provide an infiltration study for the construction of assisted living building facilities at 12282 Beach Blvd, Stanton, CA 90680. See figures 1 &2.

The scope of this study is to provide and evaluate the surface and subsurface conditions by determining the infiltration rate to help design the detention basins on the subject site as they relate to the development.

SITE LOCATION & DESCRIPTION

The subject lot is within the City of Stanton. The property is located on the east side of Beach Boulevard, at approximately one mile north of 22 Freeway.

The area in general is developed with residential and commercial structures. Currently, the site is vacant and covered by soil and sparse weeds.

GROUNDWATER CONDITIONS

During our previous surface explorations, we encountered the groundwater at the depth of 17.5 feet below the existing grade. A copy of the boring log is included.

INFILTROMETER

This test method describes the procedure for field measurement of the rate of infiltration of water into soils using double-ring infiltrometer. This test method is particularly applicable to relatively uniformed fine grained soils with an absence of very plastic clays and gravel size particles and with moderate to low resistance to ring penetration.

EQUIPMENTS

Inner infiltrometer ring cylinders 20" high, 12" diameter
Outer infiltrometer ring cylinder, 20" high, 24" diameter
Thermometer
Water containers
Watch
Measuring tape

TESTING PROCEDURES

One test pit was excavated to provide the data, within the proposed basin area. Location of test pit is shown on Figures 2. The measurement of the volume of the water that was added to maintain a constant head in the inner ring and annular space during each timing interval was done by measuring the change in elevation of liquid level in the appropriate graduated cylinder.

The time intervals, as shown on the enclosed graph/table, were fifteen minutes for the first hour, thirty minutes for second and third hour and sixty minutes during the remainder of a period of six hours.

The temperature of water was also recorded.

The volume of water used during each measured time interval into an incremental infiltration velocity for both the inner ring and annual space using the following equations:

For inner ring:

$V_{IR} = \Delta_{VIR}/(_{AIR} \cdot D\Delta t)$

Where,

VIR Inner ring incremental infiltration velocity, cm/h

Δ_{VIR} Volume of water used during time interval to maintain constant head in the inner ring, cm3

A_{IR} Internal area of inner ring, cm2

Δt Time interval, h

For the annual space between rings

$VA = \Delta VA/(AA \cdot \Delta t)$

Where,

VA Inner ring incremental infiltration velocity, cm/h

ΔVA Volume of water used during time interval to maintain constant head in the inner ring, cm3

AA Internal area of inner ring, cm2

Δt Time interval, h

INFILTRATION RATE

Per measured values and enclosed graph. The infiltration rate is 0.20 in/hr.

FUTURE IMPROVEMENTS

Should any new structures or improvements be proposed at any time in the future other than those shown on the enclosed site plan and discussed herein, our firm should be notified so that we may provide design recommendations to maintain the integrity of the new improvement. Potential problems can develop when drainage is altered in any way (i.e., excavations or placement of fills associated with construction of new walkways, patios, garden walls and planters). Therefore, it is recommended that we be engaged to review the final design drawings, specifications and grading plan prior to any new constructions.

LIMITATIONS

The geotechnical assessment activities presented in this report have been conducted in accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in this area.

No warranty, expressed or implied, is made regarding the conclusions, professional opinions, and recommendations expressed in this report. The conclusions are based solely upon an analysis of the conditions as observed by our personnel and as reported to use by regulatory agencies and other named sources are and also based on surface and subsurface conditions present and our present state of geotechnical knowledge. They are not meant to imply a control of nature. If actual conditions differ from those described in this report, our office should be notified.

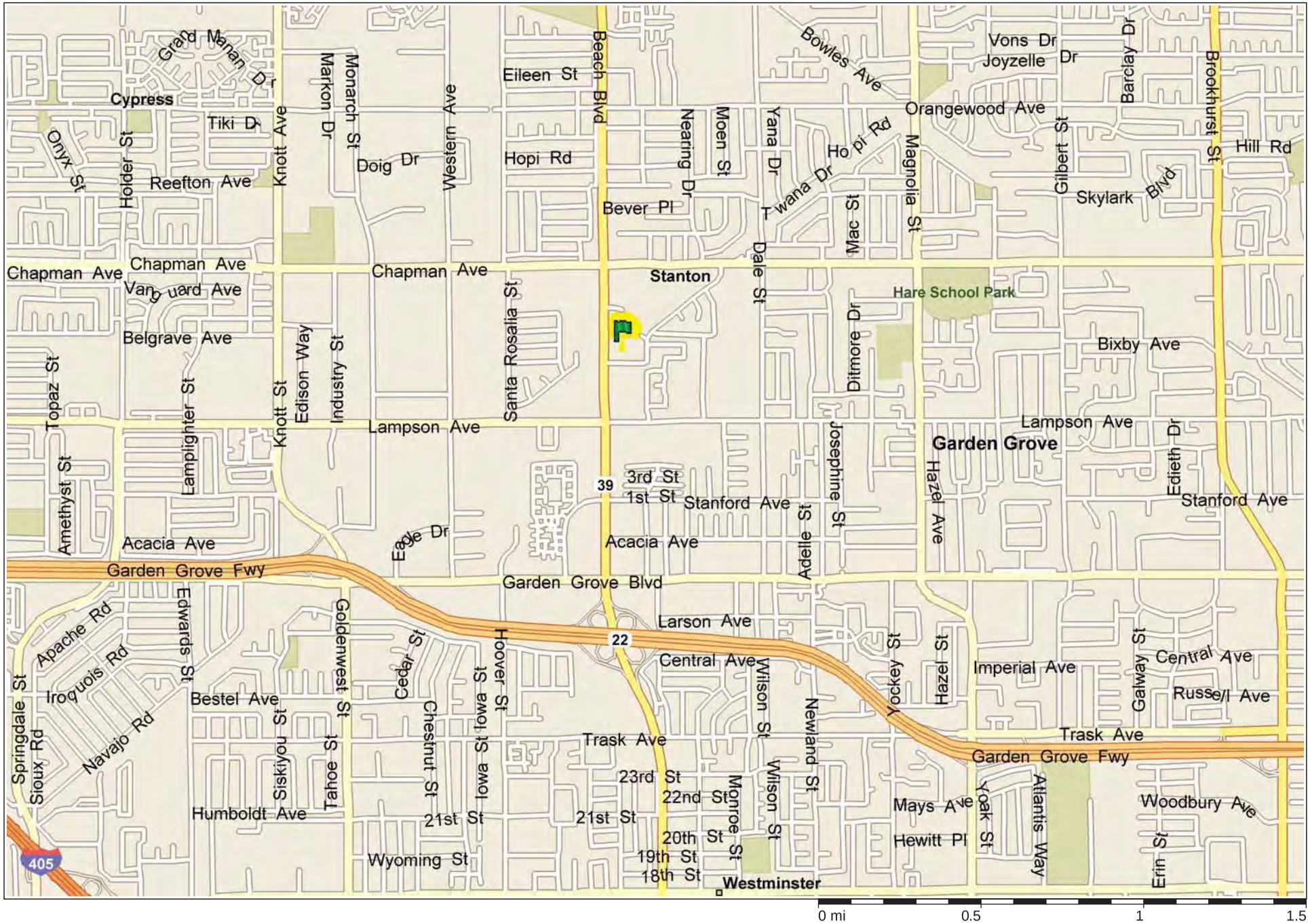
The usage of this report in any independent form cannot be approved unless specific, written verification of the applicability of the recommendations is obtained from our firm.

The services provided in this report are only to provide geotechnical characteristics of the subsurface, based on our field data and observations only and also following the ASTM standards. By accepting this report, the client will agree that we are not responsible for reviewing any private investigation that may have been performed at the site or surroundings and not released to public agencies, particularly by the Homeowner Association or leading property management company. We take no responsibility for any matter that is not disclosed to us prior or during our studies.

APPENDIX “A”

FIGURES & MAPS

FIGURE 1: SITE LOCATION, 12282 Beach Blvd., Stanton, CA 90680



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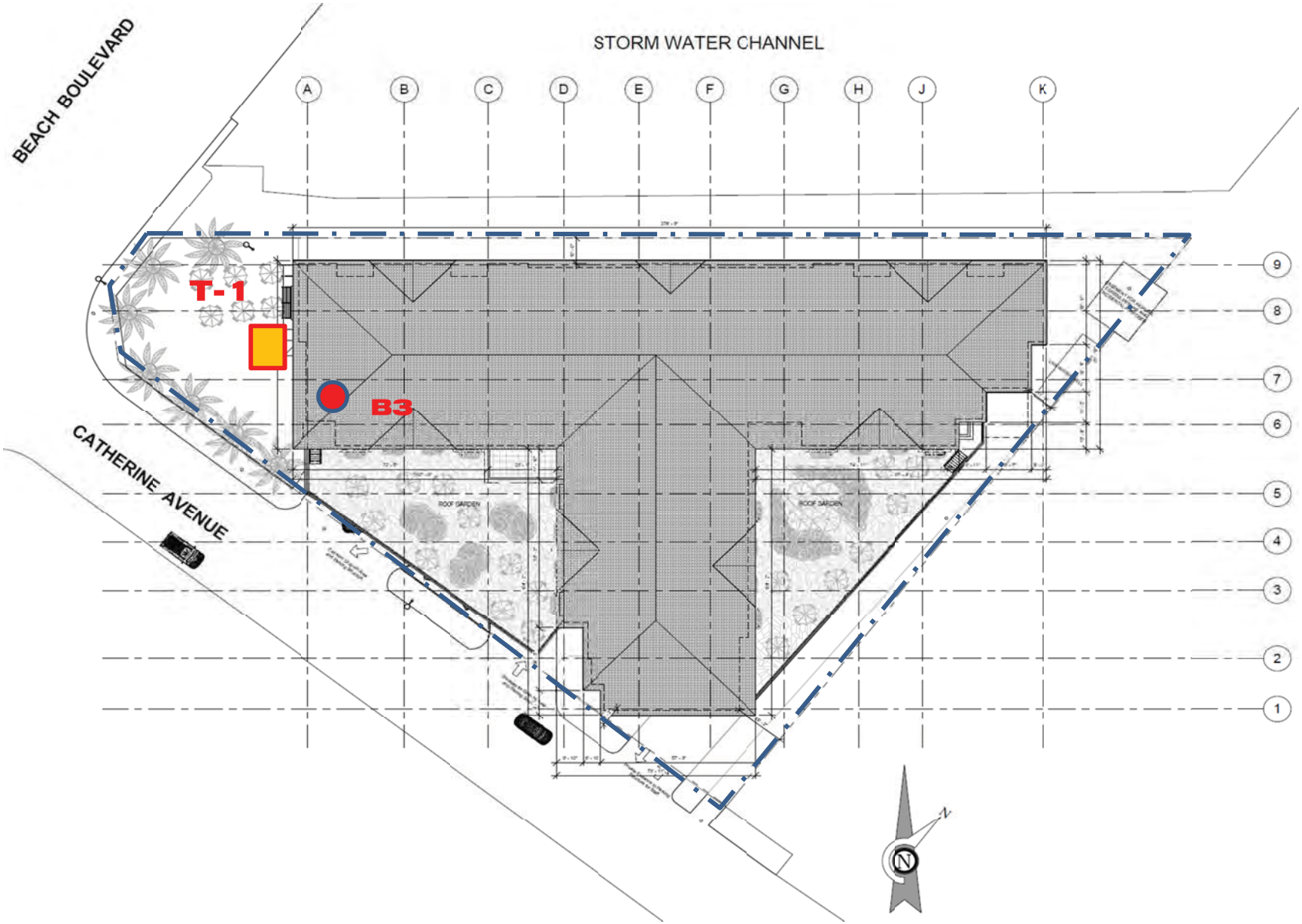


SITE MAP – TEST LOCATION

12282 Beach Blvd, Stanton, CA 90680

PROFESSIONAL ENGINEERS CONSULTING, Inc.

Project No.: ST0114 **Figure: 2**

APPENDIX “B”

BORING LOGS

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 12.0" O.D.	Boring Elevation:	Boring Number: **BH - 1**
Date Drilled: 5/8/14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample		SPT Blows.	USCS Symbol	density	Depth in Feet	Graphic Log	Description and Remarks
Bulk	Tube						
	X				5		Dark olive Sandy Silt, artificial fill within top 3.0 feet, dry, medium dense Dark olive gray Silty Clay, moist, medium dense
					10		
					15		
					20		

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-3**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	SPT Blows.	USCS Symbol	density	Depth in Feet	Graphic Log	Description and Remarks
							Dark olive Sandy Silt, artificial fill within top 4.0 feet, dry, loose
	X	16	sm/ml	110. 8	5		Dark olive gray Silty Clay, moist, medium dense
	X	20	sm/ml	120.5	10		Mottled olive gray Sandy Silt, dry to moist, dense
	X	19	ml/cl	120.6	15		Mottled olive gray Silty Sand, some thin layers of Clay. moist, dense
							Groundwater at 18 feet
	X	20	Cl/sm	122.8	20		Mottled gray sandy Clay, wet, dense
	X	20	cl	125.4	25		Mottled olive gray Clay. saturated, dense
	X	21	cl	122.8	30		Olive gray Silty Sand, some layers of Clay. saturated, dense
	X	23	ml	121.6	35		Olive Clay with Sand, some gravel, saturated, dense.
	X	24	ml/cl	122.1	40		Olive Clayey Sand, some gravel, moist, dense.

PROFESSIONAL ENGINEERS CONSULTING, Inc.

LOG OF BORING

JOB LOCATION: 12282 Beach Blvd, Stanton, CA 90680

	Boring Diameter: 8.0" O.D.	Boring Elevation:	Boring Number: **B-3**
Date Drilled: 1-22-14	Logged by: S.S.	This log is a representation of subsurface, soil and groundwater conditions at the time and place of drilling. With the passage of time as at any other location there may be substantial changes in conditions..	

Sample Bulk	Sample Tube	N_{60} Blows.	USCS Symbol	Density	Depth in Feet	Graphic Log	Description and Remarks
	X	26	Cl/sm	123.2	45		Dark olive, Clayey Sand, moist, very dense, cemented, dense
	X	32	clml	124.1	50		Olive brown Clayey Silt, moist, cemented, very dense
							TOTAL DEPTH = 50.0 FEET

APPENDIX "C"

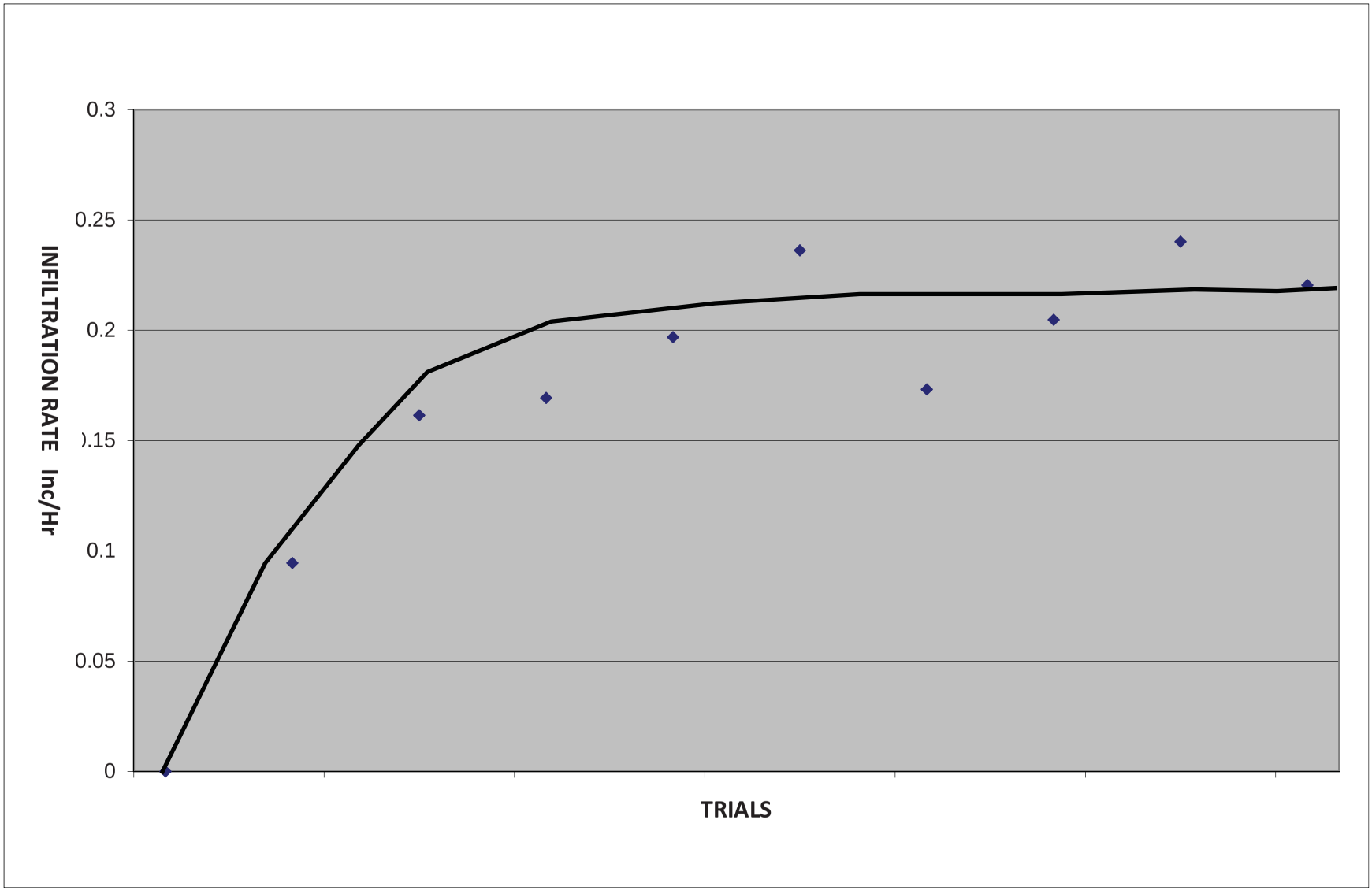
INFILTROMETER STUDIES

TABLE 1

DOUBLE-RING FILTROMETER TEST

Stanton Assisted Living -- 12282 Beach Blvd, Stanton, CA 90680

TRIAL #	DATE	TIME	ELAPSED	INNER RING		ANNULAR SPACE		Temp	INFILTRATION RATE	
		Min	TIME, min	READING, CM	FLOW , CM3	READING, CM	FLOW, CM3	F		
									In/hr	
1	5/8/2014	8:00	15	1.0		2.0		57		
	5/8/2014	14:00	**15**	3.3	178	4.0	354	57	0.09	
2	5/8/2014	10:45	15	3.3		4.0		57		
	5/8/2014	12:00	**30**	6.8	274	8.0	712	57	0.16	
3	5/8/2014	12:00	30	6.8		8.0		57		
	5/8/2014	12:30	**60**	10.0	254	15.1	1243	57	0.17	
4	5/8/2014	12:30	30	10.0		15.1		57		
	5/8/2014	13:00	**90**	17.5	589	24.1	1590	57	0.20	
5	5/8/2014	13:00	30	17.5		24.1		57		Refilled
	5/8/2014	13:30	**120**	25.3	610	35.4	1994	57	0.24	
6	5/8/2014	13:30	30	2.6		3.1		57		Refilled
	5/8/2014	14:00	**150**	13.0	812	18.8	2763	57	0.17	
7	5/8/2014	14:00	30	3.8		4.6		57		Refilled
	5/8/2014	14:30	**180**	16.0	954	21.1	2912	57	0.20	
8	5/8/2014	14:30	60	4.5		5.6		57		Refilled
	5/8/2014	15:30	**240**	19.0	1135	26.9	3746	57	0.24	
9	5/8/2014	15:30	60	3.6		5.1		57		Refilled
	5/8/2014	16:30	**300**	22.5	1480	27.7	3986	57	0.22	



INFILTRATION CURVE – BH1

12282 Beach Blvd, Stanton, CA 90680

PROFESSIONAL ENGINEERS CONSULTING, Inc.

Project No.: ST0114 **PLATE 1**

APPENDIX "D"

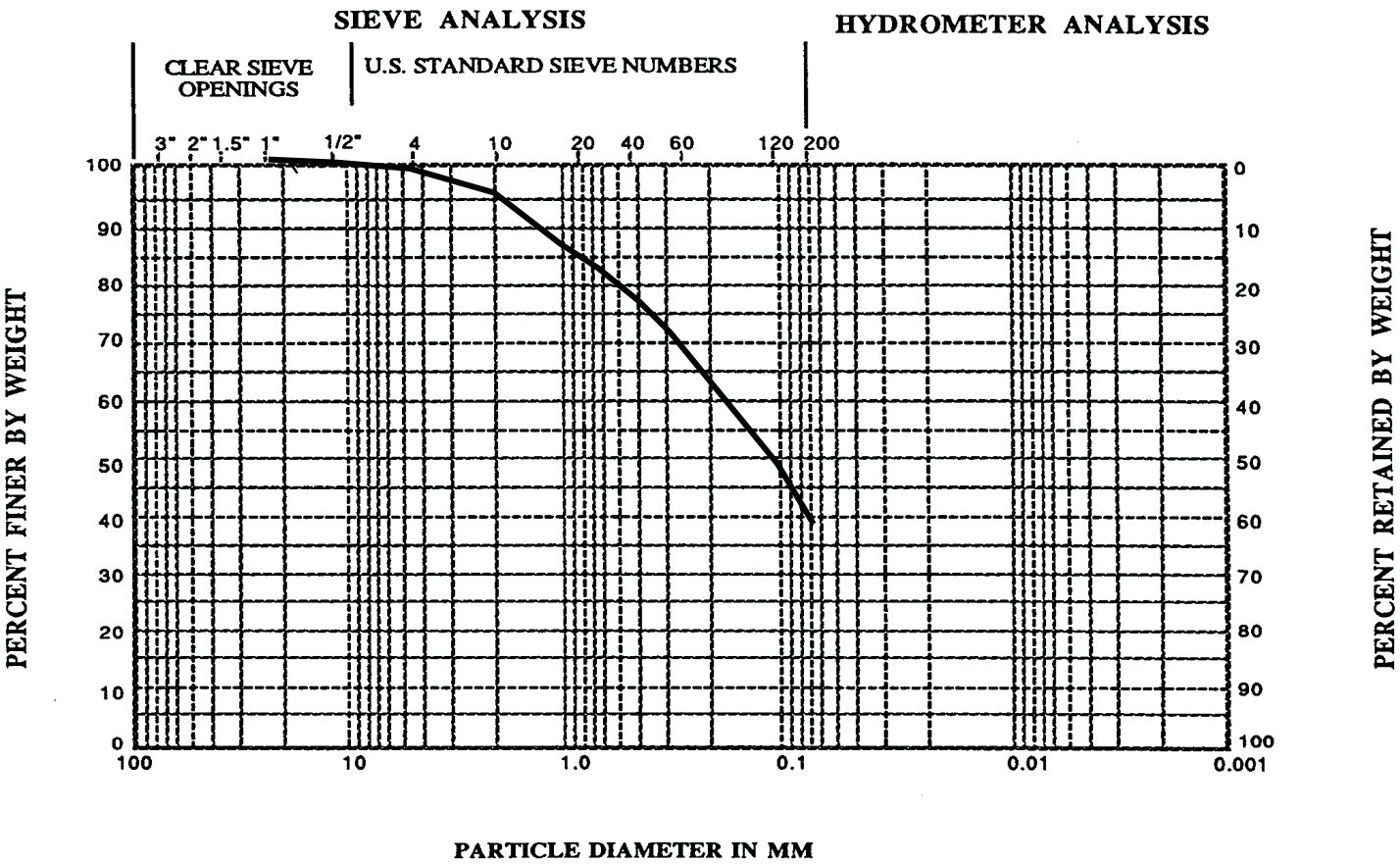
LABORATORY ANALYSES

PROFESSIONAL ENGINEERS CONSULTING, Inc.

PARTICL SIZE ANALYSIS

PROJECT NUMBER: ST0114 **SITE:** 12282 Beach Blvd, Stanton, CA 90680

SAMPLE: BH-1 **DEPTH:** 1.0 -5.0 ft.



COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

PLASTICITY TEST

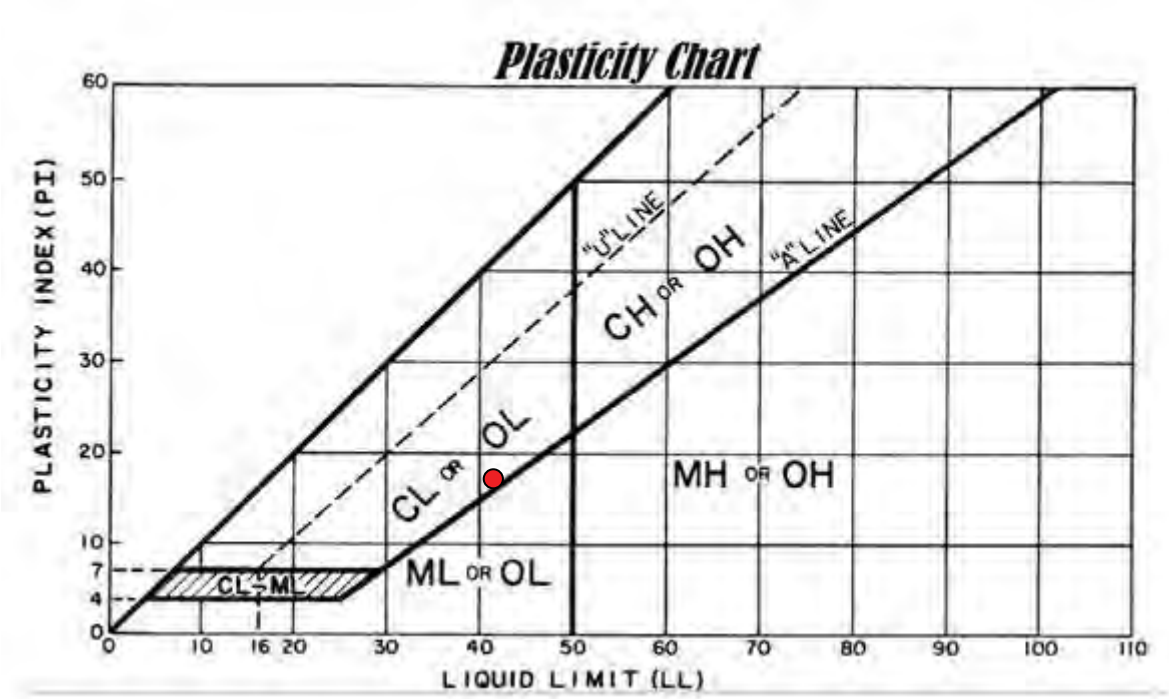
PROFESSIONAL ENGINEERS CONSULTING, Inc.

12282 Beach Blvd, Stanton, CA 90680

ATTERBERG LIMITS
Particles passed # 200

Sample	Liquid Limit	Plastic Limit	Plasticity Index
BH1 @ 1.0 to 5.0’	42	25	17

Soil Classification: CLAY (CL)



HYDROLOGY AND HYDRAULIC CALCULATIONS
FOR
Stanton Assisted Living Project
12282 Beach Blvd.
Stanton, CA

PREPARED BY

Sessions Consulting Engineers
231 East Imperial Highway, Suite 201B
Fullerton, CA 92835

Kerry Sessions
PE 50461
Exp. 6/30/17

Date of Preparation:
01/07/16

Purpose

The purpose of this report is to prepare calculations and design drainage devices and BMPs to adequately convey the stormwater runoff from the proposed development while complying with NPDES requirements.

Description of Existing Watershed

The property is located near the intersection of Beach Boulevard and Catherine Avenue at 12282 Beach Blvd, Stanton CA. The site is mostly vacant with remnants of a previous development on parts of the site including pavement, curbs & gutters, walks and miscellaneous utilities. The site is bounded on the south by Catherine Avenue, on the west by Beach Boulevard, and on the east by an existing single family development. North of the site there is a concrete-lined drainage channel named the Anaheim-Barber City Channel.

The site presently drains predominantly southerly by surface drainage directly into the curb & gutter along Catherine Avenue to the south. From there it drains west to Beach Boulevard, then north into a catch basin located on Beach Boulevard west of the site. The catch basin outlet drains into Anaheim-Barber City Channel. A very small portion of the site drains northerly to a headwall with a 10” diameter opening that drains directly into the channel.

Proposed Drainage System

The proposed development will collect drainage from the site and transmit flows to a drainage pipe located along the south side of the property. These flows will be directed to a Nutrient Separating Baffle Box (NSBB), a BMP that will remove sediments, trash and debris that may be collected in the upstream drainage system and transmitted to the NSBB. This will serve to provide initial treatment of the water to comply with water quality standards.

After passing through the NSBB drainage will flow into a perforated pipe passing through a below-grade Underground Detention System, (UDS), wrapped in filter fabric. This BMP is designed to provide initial runoff retention, water quality filtration, and infiltration into the native soils. Low flows then proceed through the UDS into a Modular Wetlands Biofiltration System, (MWS), to treat the flows, prior to being outlet by a pipe into the back of the existing catch basin in Beach Blvd.

Flows that are larger than the treatment flows are then conveyed to a Control Drain Box that is designed with an outlet pipe at a higher elevation than the inlet, and the bottom of the drain box is open to the gravel aquifer below. During high flows the water level will rise to the saturation point of the gravel aquifer before discharging through the outlet pipe. The outlet pipe will carry flows to the same discharge point as the treated flows at the back of the catch basin in Beach Blvd.

Methodology

Rational method hydrology calculations are based on criteria set forth in the OCEMA Hydrology Manual (1986). 100-year and 2-year storm event hydrology calculations have been made using the Rational Method Hydrology Computer Program, by Bonadamin Software.

Bonadamin Software was also used to perform 2-year unit hydrograph calculations. Hydraulic calculations for the sizing of pipes have been made using the *Flowmaster* software by Bentley Systems, Inc. Inlet sizing calculations are based on criteria set forth in the County of Orange Local Drainage Manual.

Summary

The drainage system has been designed to adequately convey the peak flows in a 100-year storm event and mitigate the increase in runoff due to hydromodification resulting from the proposed development. Below is a summary of pertinent data used to design for the 100-year runoff and meet the HCOC mitigation requirements of the WQMP:

Peak flowrate (Q_{100})	=	4.1 cfs
Maximum required pipe diameter	=	15”
Pre-development 2-year Flowrate (Q_1)	=	0.67 cfs
Post-development 2-year Flowrate (Q_2)	=	1.08 cfs
Pre-development 2-year flow volume (V_1)	=	0.0628 ac-ft.
	=	2,735 cu. ft.
Post-development 2-year flow volume (V_2)	=	0.1451 ac-ft.
	=	6,320 cu. ft.

2-Year Rational Method Hydrology
Existing Conditions

Orange County Rational Hydrology Program

(Hydrology Manual Date(s) October 1986 & November 1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2012 Version 8.2
Rational Hydrology Study, Date: 01/06/16 File Name: e212.roc

Stanton Assisted Living Project
12282 Beach Blvd., Stanton
2-year Hydrology
Existing Conditions

Program License Serial Number 6312

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 2.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 78.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fp)= 0.300(In/Hr)
Max Catchment Loss (Fm) = 0.300(In/Hr)
Initial subarea data:
Initial area flow distance = 550.000(Ft.)
Top (of initial area) elevation = 61.300(Ft.)
Bottom (of initial area) elevation = 60.300(Ft.)
Difference in elevation = 1.000(Ft.)
Slope = 0.00182 s(%)= 0.18
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 23.141 min.
Rainfall intensity = 0.939(In/Hr) for a 2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.613
Subarea runoff = 0.668(CFS)
Total initial stream area = 1.160(Ac.)
End of computations, total study area = 1.16 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number (AMC 2) = 78.0

2-Year Rational Method Hydrology
Proposed Conditions

```
                 Orange County Rational Hydrology Program

            (Hydrology Manual Date(s) October 1986 & November 1996)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2012 Version 8.2
      Rational Hydrology Study, Date: 01/06/16  File Name: p212.roc
----------------------------------------------------------------------
Stanton Assisted Living Project
12282 Beach Blvd., Stanton
2-year Hydrology
Proposed Conditions
----------------------------------------------------------------------


Program License Serial Number 6312

----------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

----------------------------------------------------------------------

Rational hydrology study storm event year is     2.0

Decimal fraction of study above 2000 ft., 600M  =     0.0000
English Units Used for input data


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.300(In/Hr)
Max Catchment Loss (Fm) =     0.030(In/Hr)
Initial subarea data:
Initial area flow distance =   200.000(Ft.)
Top (of initial area) elevation =    61.000(Ft.)
Bottom (of initial area) elevation =    60.700(Ft.)
Difference in elevation =     0.300(Ft.)
Slope =    0.00150  s(%)=       0.15
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.291 min.
Rainfall intensity =      1.586(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.883
Subarea runoff =      0.098(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =    58.300(Ft.)
Downstream point/station elevation =    58.200(Ft.)
```

```
Pipe length  =   330.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.098(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.098(CFS)
Normal flow depth in pipe =    3.62(In.)
Flow top width inside pipe =    8.83(In.)
Critical Depth =    1.65(In.)
Pipe flow velocity =      0.59(Ft/s)
Travel time through pipe =    9.33 min.
Time of concentration (TC) =    18.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.300(In/Hr)
Max Catchment Loss (Fm) =     0.030(In/Hr)
Time of concentration =    18.62 min.
Rainfall intensity =      1.064(In/Hr) for a     2.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.875
Subarea runoff =      0.982(CFS) for    1.090(Ac.)
Total runoff =      1.080(CFS)   Total area =        1.16(Ac.)
Area averaged Fm value =    0.030(In/Hr)
End of computations, total study area =            1.16 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number (AMC 2) =  56.0
```

100-Year Rational Method Hydrology
Proposed Conditions

```
                 Orange County Rational Hydrology Program

            (Hydrology Manual Date(s) October 1986 & November 1996)

 CIVILCADD/CIVILDESIGN  Engineering Software, (c) 1989-2012 Version 8.2
      Rational Hydrology Study, Date: 01/07/16  File Name: 212100.roc
----------------------------------------------------------------------
Stanton Assisted Living Project
12282 Beach Blvd., Stanton, CA
100-year Hydrology
Proposed Conditions
----------------------------------------------------------------------


Program License Serial Number 6312

----------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

----------------------------------------------------------------------

Rational hydrology study storm event year is   100.0

Decimal fraction of study above 2000 ft., 600M  =     0.0000
English Units Used for input data


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station        2.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.300(In/Hr)
Max Catchment Loss (Fm) =     0.030(In/Hr)
Initial subarea data:
Initial area flow distance =   200.000(Ft.)
Top (of initial area) elevation =    61.000(Ft.)
Bottom (of initial area) elevation =    60.700(Ft.)
Difference in elevation =     0.300(Ft.)
Slope =    0.00150  s(%)=       0.15
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.291 min.
Rainfall intensity =      4.338(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff =      0.271(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________
Upstream point/station elevation =    58.300(Ft.)
Downstream point/station elevation =    56.900(Ft.)
```

```
Pipe length  =   220.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.271(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.271(CFS)
Normal flow depth in pipe =    3.37(In.)
Flow top width inside pipe =    5.95(In.)
Critical Depth =    3.15(In.)
Pipe flow velocity =      2.39(Ft/s)
Travel time through pipe =    1.54 min.
Time of concentration (TC) =    10.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       2.000 to Point/Station       3.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Pervious ratio(Ap) = 0.1000  Max loss rate(Fp)=     0.300(In/Hr)
Max Catchment Loss (Fm) =     0.030(In/Hr)
Time of concentration =    10.83 min.
Rainfall intensity =      3.974(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.893
Subarea runoff =      3.846(CFS) for    1.090(Ac.)
Total runoff =      4.118(CFS)      Total area =        1.16(Ac.)
Area averaged Fm value =    0.030(In/Hr)
End of computations, total study area =            1.16 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number (AMC 2) =  56.0
```

2-Year Unit Hydrograph Analysis
Existing Conditions

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/07/16 File Name e174hyd.out

++

Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 6312

Stanton Assisted Living Project
2-year Unit Hydrograph Analysis
Existing Conditions

Storm Event Year = 2

Antecedent Moisture Condition = 1

English (in-lb) Input Units Used
++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
78.0	1.2	1.00	B	0.300	0.780	0.234

Area-averaged adjusted loss rate Fm (In/Hr) = 0.234

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
0.90	0.780	78.0	60.6	6.50	0.038
0.26	0.220	98.0	98.0	0.20	0.890

Area-averaged catchment yield fraction, Y = 0.225
Area-averaged low loss fraction, Yb = 0.775
++
User entry of time of concentration = 0.385 (hours)
Watershed area = 1.16(Ac.)
Catchment Lag time = 0.308 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 27.0563
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.234(In/Hr)
Average low loss rate fraction (Yb) = 0.775 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.190(In)

Computed peak 30-minute rainfall = 0.400(In)
Specified peak 1-hour rainfall = 0.530(In)
Computed peak 3-hour rainfall = 0.890(In)
Specified peak 6-hour rainfall = 1.220(In)
Specified peak 24-hour rainfall = 2.050(In)

Rainfall depth area reduction factors:
Using a total area of 1.16(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.190(In)
30-minute factor = 1.000 Adjusted rainfall = 0.400(In)
1-hour factor = 1.000 Adjusted rainfall = 0.530(In)
3-hour factor = 1.000 Adjusted rainfall = 0.890(In)
6-hour factor = 1.000 Adjusted rainfall = 1.220(In)
24-hour factor = 1.000 Adjusted rainfall = 2.050(In)

U n i t H y d r o g r a p h

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 14.03 (CFS))		
1	1.704	0.239
2	8.959	1.018
3	24.196	2.138
4	44.808	2.892
5	67.967	3.249
6	81.945	1.961
7	90.444	1.192
8	95.044	0.645
9	97.499	0.344
10	98.427	0.130
11	98.914	0.068
12	99.401	0.068
13	100.000	0.034

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1900	0.1900
2	0.2534	0.0634
3	0.2999	0.0465
4	0.3380	0.0381
5	0.3708	0.0328
6	0.4000	0.0292
7	0.4258	0.0258
8	0.4495	0.0237
9	0.4716	0.0220
10	0.4922	0.0206
11	0.5116	0.0194
12	0.5300	0.0184
13	0.5504	0.0204
14	0.5700	0.0196
15	0.5888	0.0189
16	0.6070	0.0182
17	0.6246	0.0176
18	0.6417	0.0171
19	0.6583	0.0166

20	0.6744	0.0161
21	0.6901	0.0157
22	0.7054	0.0153
23	0.7204	0.0150
24	0.7350	0.0146
25	0.7493	0.0143
26	0.7633	0.0140
27	0.7770	0.0137
28	0.7905	0.0134
29	0.8037	0.0132
30	0.8166	0.0130
31	0.8294	0.0127
32	0.8419	0.0125
33	0.8542	0.0123
34	0.8663	0.0121
35	0.8782	0.0119
36	0.8900	0.0118
37	0.9012	0.0112
38	0.9122	0.0110
39	0.9230	0.0108
40	0.9337	0.0107
41	0.9442	0.0105
42	0.9547	0.0104
43	0.9649	0.0103
44	0.9751	0.0101
45	0.9851	0.0100
46	0.9950	0.0099
47	1.0048	0.0098
48	1.0145	0.0097
49	1.0240	0.0096
50	1.0335	0.0095
51	1.0428	0.0094
52	1.0521	0.0093
53	1.0612	0.0092
54	1.0703	0.0091
55	1.0793	0.0090
56	1.0882	0.0089
57	1.0970	0.0088
58	1.1057	0.0087
59	1.1143	0.0086
60	1.1229	0.0086
61	1.1313	0.0085
62	1.1398	0.0084
63	1.1481	0.0083
64	1.1563	0.0083
65	1.1645	0.0082
66	1.1726	0.0081
67	1.1807	0.0081
68	1.1887	0.0080
69	1.1966	0.0079
70	1.2045	0.0079
71	1.2123	0.0078
72	1.2200	0.0077
73	1.2263	0.0063
74	1.2326	0.0063
75	1.2388	0.0062
76	1.2449	0.0062
77	1.2510	0.0061
78	1.2571	0.0061
79	1.2631	0.0060

80	1.2691	0.0060
81	1.2750	0.0059
82	1.2809	0.0059
83	1.2867	0.0058
84	1.2925	0.0058
85	1.2982	0.0057
86	1.3039	0.0057
87	1.3096	0.0057
88	1.3152	0.0056
89	1.3208	0.0056
90	1.3263	0.0055
91	1.3318	0.0055
92	1.3372	0.0055
93	1.3427	0.0054
94	1.3481	0.0054
95	1.3534	0.0054
96	1.3587	0.0053
97	1.3640	0.0053
98	1.3693	0.0052
99	1.3745	0.0052
100	1.3797	0.0052
101	1.3848	0.0051
102	1.3899	0.0051
103	1.3950	0.0051
104	1.4001	0.0051
105	1.4051	0.0050
106	1.4101	0.0050
107	1.4150	0.0050
108	1.4200	0.0049
109	1.4249	0.0049
110	1.4298	0.0049
111	1.4346	0.0049
112	1.4394	0.0048
113	1.4442	0.0048
114	1.4490	0.0048
115	1.4538	0.0047
116	1.4585	0.0047
117	1.4632	0.0047
118	1.4678	0.0047
119	1.4725	0.0046
120	1.4771	0.0046
121	1.4817	0.0046
122	1.4863	0.0046
123	1.4908	0.0045
124	1.4954	0.0045
125	1.4999	0.0045
126	1.5043	0.0045
127	1.5088	0.0045
128	1.5132	0.0044
129	1.5176	0.0044
130	1.5220	0.0044
131	1.5264	0.0044
132	1.5308	0.0044
133	1.5351	0.0043
134	1.5394	0.0043
135	1.5437	0.0043
136	1.5480	0.0043
137	1.5522	0.0043
138	1.5565	0.0042
139	1.5607	0.0042

140	1.5649	0.0042
141	1.5690	0.0042
142	1.5732	0.0042
143	1.5773	0.0041
144	1.5815	0.0041
145	1.5856	0.0041
146	1.5896	0.0041
147	1.5937	0.0041
148	1.5978	0.0041
149	1.6018	0.0040
150	1.6058	0.0040
151	1.6098	0.0040
152	1.6138	0.0040
153	1.6178	0.0040
154	1.6217	0.0040
155	1.6256	0.0039
156	1.6296	0.0039
157	1.6335	0.0039
158	1.6373	0.0039
159	1.6412	0.0039
160	1.6451	0.0039
161	1.6489	0.0038
162	1.6527	0.0038
163	1.6566	0.0038
164	1.6604	0.0038
165	1.6641	0.0038
166	1.6679	0.0038
167	1.6717	0.0038
168	1.6754	0.0037
169	1.6791	0.0037
170	1.6828	0.0037
171	1.6865	0.0037
172	1.6902	0.0037
173	1.6939	0.0037
174	1.6976	0.0037
175	1.7012	0.0036
176	1.7048	0.0036
177	1.7085	0.0036
178	1.7121	0.0036
179	1.7157	0.0036
180	1.7192	0.0036
181	1.7228	0.0036
182	1.7264	0.0036
183	1.7299	0.0035
184	1.7334	0.0035
185	1.7370	0.0035
186	1.7405	0.0035
187	1.7440	0.0035
188	1.7475	0.0035
189	1.7509	0.0035
190	1.7544	0.0035
191	1.7578	0.0035
192	1.7613	0.0034
193	1.7647	0.0034
194	1.7681	0.0034
195	1.7715	0.0034
196	1.7749	0.0034
197	1.7783	0.0034
198	1.7817	0.0034
199	1.7851	0.0034

200	1.7884	0.0034
201	1.7918	0.0033
202	1.7951	0.0033
203	1.7984	0.0033
204	1.8017	0.0033
205	1.8050	0.0033
206	1.8083	0.0033
207	1.8116	0.0033
208	1.8149	0.0033
209	1.8181	0.0033
210	1.8214	0.0033
211	1.8246	0.0032
212	1.8278	0.0032
213	1.8311	0.0032
214	1.8343	0.0032
215	1.8375	0.0032
216	1.8407	0.0032
217	1.8439	0.0032
218	1.8470	0.0032
219	1.8502	0.0032
220	1.8534	0.0032
221	1.8565	0.0031
222	1.8597	0.0031
223	1.8628	0.0031
224	1.8659	0.0031
225	1.8690	0.0031
226	1.8721	0.0031
227	1.8752	0.0031
228	1.8783	0.0031
229	1.8814	0.0031
230	1.8845	0.0031
231	1.8875	0.0031
232	1.8906	0.0031
233	1.8936	0.0030
234	1.8967	0.0030
235	1.8997	0.0030
236	1.9027	0.0030
237	1.9057	0.0030
238	1.9088	0.0030
239	1.9117	0.0030
240	1.9147	0.0030
241	1.9177	0.0030
242	1.9207	0.0030
243	1.9237	0.0030
244	1.9266	0.0030
245	1.9296	0.0030
246	1.9325	0.0029
247	1.9355	0.0029
248	1.9384	0.0029
249	1.9413	0.0029
250	1.9442	0.0029
251	1.9471	0.0029
252	1.9500	0.0029
253	1.9529	0.0029
254	1.9558	0.0029
255	1.9587	0.0029
256	1.9616	0.0029
257	1.9644	0.0029
258	1.9673	0.0029
259	1.9701	0.0029

260	1.9730	0.0028
261	1.9758	0.0028
262	1.9787	0.0028
263	1.9815	0.0028
264	1.9843	0.0028
265	1.9871	0.0028
266	1.9899	0.0028
267	1.9927	0.0028
268	1.9955	0.0028
269	1.9983	0.0028
270	2.0011	0.0028
271	2.0038	0.0028
272	2.0066	0.0028
273	2.0094	0.0028
274	2.0121	0.0028
275	2.0149	0.0027
276	2.0176	0.0027
277	2.0203	0.0027
278	2.0231	0.0027
279	2.0258	0.0027
280	2.0285	0.0027
281	2.0312	0.0027
282	2.0339	0.0027
283	2.0366	0.0027
284	2.0393	0.0027
285	2.0420	0.0027
286	2.0447	0.0027
287	2.0473	0.0027
288	2.0500	0.0027

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0027	0.0021	0.0006
2	0.0027	0.0021	0.0006
3	0.0027	0.0021	0.0006
4	0.0027	0.0021	0.0006
5	0.0027	0.0021	0.0006
6	0.0027	0.0021	0.0006
7	0.0027	0.0021	0.0006
8	0.0027	0.0021	0.0006
9	0.0027	0.0021	0.0006
10	0.0027	0.0021	0.0006
11	0.0028	0.0021	0.0006
12	0.0028	0.0021	0.0006
13	0.0028	0.0022	0.0006
14	0.0028	0.0022	0.0006
15	0.0028	0.0022	0.0006
16	0.0028	0.0022	0.0006
17	0.0028	0.0022	0.0006
18	0.0028	0.0022	0.0006
19	0.0028	0.0022	0.0006
20	0.0028	0.0022	0.0006
21	0.0029	0.0022	0.0006
22	0.0029	0.0022	0.0006
23	0.0029	0.0022	0.0006
24	0.0029	0.0022	0.0007
25	0.0029	0.0022	0.0007
26	0.0029	0.0023	0.0007

27	0.0029	0.0023	0.0007
28	0.0029	0.0023	0.0007
29	0.0029	0.0023	0.0007
30	0.0030	0.0023	0.0007
31	0.0030	0.0023	0.0007
32	0.0030	0.0023	0.0007
33	0.0030	0.0023	0.0007
34	0.0030	0.0023	0.0007
35	0.0030	0.0023	0.0007
36	0.0030	0.0023	0.0007
37	0.0030	0.0024	0.0007
38	0.0030	0.0024	0.0007
39	0.0031	0.0024	0.0007
40	0.0031	0.0024	0.0007
41	0.0031	0.0024	0.0007
42	0.0031	0.0024	0.0007
43	0.0031	0.0024	0.0007
44	0.0031	0.0024	0.0007
45	0.0031	0.0024	0.0007
46	0.0031	0.0024	0.0007
47	0.0032	0.0025	0.0007
48	0.0032	0.0025	0.0007
49	0.0032	0.0025	0.0007
50	0.0032	0.0025	0.0007
51	0.0032	0.0025	0.0007
52	0.0032	0.0025	0.0007
53	0.0033	0.0025	0.0007
54	0.0033	0.0025	0.0007
55	0.0033	0.0025	0.0007
56	0.0033	0.0026	0.0007
57	0.0033	0.0026	0.0007
58	0.0033	0.0026	0.0007
59	0.0033	0.0026	0.0008
60	0.0034	0.0026	0.0008
61	0.0034	0.0026	0.0008
62	0.0034	0.0026	0.0008
63	0.0034	0.0026	0.0008
64	0.0034	0.0026	0.0008
65	0.0034	0.0027	0.0008
66	0.0035	0.0027	0.0008
67	0.0035	0.0027	0.0008
68	0.0035	0.0027	0.0008
69	0.0035	0.0027	0.0008
70	0.0035	0.0027	0.0008
71	0.0035	0.0027	0.0008
72	0.0036	0.0028	0.0008
73	0.0036	0.0028	0.0008
74	0.0036	0.0028	0.0008
75	0.0036	0.0028	0.0008
76	0.0036	0.0028	0.0008
77	0.0037	0.0028	0.0008
78	0.0037	0.0028	0.0008
79	0.0037	0.0029	0.0008
80	0.0037	0.0029	0.0008
81	0.0037	0.0029	0.0008
82	0.0038	0.0029	0.0008
83	0.0038	0.0029	0.0009
84	0.0038	0.0029	0.0009
85	0.0038	0.0030	0.0009
86	0.0038	0.0030	0.0009

87	0.0039	0.0030	0.0009
88	0.0039	0.0030	0.0009
89	0.0039	0.0030	0.0009
90	0.0039	0.0030	0.0009
91	0.0040	0.0031	0.0009
92	0.0040	0.0031	0.0009
93	0.0040	0.0031	0.0009
94	0.0040	0.0031	0.0009
95	0.0041	0.0032	0.0009
96	0.0041	0.0032	0.0009
97	0.0041	0.0032	0.0009
98	0.0041	0.0032	0.0009
99	0.0042	0.0032	0.0009
100	0.0042	0.0032	0.0009
101	0.0042	0.0033	0.0010
102	0.0043	0.0033	0.0010
103	0.0043	0.0033	0.0010
104	0.0043	0.0033	0.0010
105	0.0044	0.0034	0.0010
106	0.0044	0.0034	0.0010
107	0.0044	0.0034	0.0010
108	0.0044	0.0034	0.0010
109	0.0045	0.0035	0.0010
110	0.0045	0.0035	0.0010
111	0.0045	0.0035	0.0010
112	0.0046	0.0035	0.0010
113	0.0046	0.0036	0.0010
114	0.0046	0.0036	0.0010
115	0.0047	0.0036	0.0011
116	0.0047	0.0037	0.0011
117	0.0048	0.0037	0.0011
118	0.0048	0.0037	0.0011
119	0.0049	0.0038	0.0011
120	0.0049	0.0038	0.0011
121	0.0049	0.0038	0.0011
122	0.0050	0.0038	0.0011
123	0.0050	0.0039	0.0011
124	0.0051	0.0039	0.0011
125	0.0051	0.0040	0.0012
126	0.0051	0.0040	0.0012
127	0.0052	0.0040	0.0012
128	0.0052	0.0041	0.0012
129	0.0053	0.0041	0.0012
130	0.0054	0.0041	0.0012
131	0.0054	0.0042	0.0012
132	0.0055	0.0042	0.0012
133	0.0055	0.0043	0.0012
134	0.0056	0.0043	0.0013
135	0.0057	0.0044	0.0013
136	0.0057	0.0044	0.0013
137	0.0058	0.0045	0.0013
138	0.0058	0.0045	0.0013
139	0.0059	0.0046	0.0013
140	0.0060	0.0046	0.0013
141	0.0061	0.0047	0.0014
142	0.0061	0.0047	0.0014
143	0.0062	0.0048	0.0014
144	0.0063	0.0049	0.0014
145	0.0077	0.0060	0.0017
146	0.0078	0.0060	0.0018

147	0.0079	0.0061	0.0018
148	0.0080	0.0062	0.0018
149	0.0081	0.0063	0.0018
150	0.0082	0.0063	0.0018
151	0.0083	0.0065	0.0019
152	0.0084	0.0065	0.0019
153	0.0086	0.0066	0.0019
154	0.0086	0.0067	0.0019
155	0.0088	0.0068	0.0020
156	0.0089	0.0069	0.0020
157	0.0091	0.0070	0.0020
158	0.0092	0.0071	0.0021
159	0.0094	0.0072	0.0021
160	0.0095	0.0073	0.0021
161	0.0097	0.0075	0.0022
162	0.0098	0.0076	0.0022
163	0.0100	0.0078	0.0023
164	0.0101	0.0079	0.0023
165	0.0104	0.0081	0.0023
166	0.0105	0.0082	0.0024
167	0.0108	0.0084	0.0024
168	0.0110	0.0085	0.0025
169	0.0118	0.0091	0.0026
170	0.0119	0.0092	0.0027
171	0.0123	0.0095	0.0028
172	0.0125	0.0097	0.0028
173	0.0130	0.0100	0.0029
174	0.0132	0.0102	0.0030
175	0.0137	0.0106	0.0031
176	0.0140	0.0108	0.0032
177	0.0146	0.0113	0.0033
178	0.0150	0.0116	0.0034
179	0.0157	0.0122	0.0035
180	0.0161	0.0125	0.0036
181	0.0171	0.0132	0.0038
182	0.0176	0.0136	0.0040
183	0.0189	0.0146	0.0042
184	0.0196	0.0152	0.0044
185	0.0184	0.0143	0.0041
186	0.0194	0.0150	0.0044
187	0.0220	0.0171	0.0050
188	0.0237	0.0184	0.0053
189	0.0292	0.0195	0.0097
190	0.0328	0.0195	0.0133
191	0.0465	0.0195	0.0270
192	0.0634	0.0195	0.0439
193	0.1900	0.0195	0.1705
194	0.0381	0.0195	0.0186
195	0.0258	0.0195	0.0063
196	0.0206	0.0160	0.0046
197	0.0204	0.0158	0.0046
198	0.0182	0.0141	0.0041
199	0.0166	0.0128	0.0037
200	0.0153	0.0119	0.0034
201	0.0143	0.0111	0.0032
202	0.0134	0.0104	0.0030
203	0.0127	0.0099	0.0029
204	0.0121	0.0094	0.0027
205	0.0112	0.0087	0.0025
206	0.0107	0.0083	0.0024

207	0.0103	0.0080	0.0023
208	0.0099	0.0077	0.0022
209	0.0096	0.0074	0.0022
210	0.0093	0.0072	0.0021
211	0.0090	0.0070	0.0020
212	0.0087	0.0068	0.0020
213	0.0085	0.0066	0.0019
214	0.0083	0.0064	0.0019
215	0.0081	0.0062	0.0018
216	0.0079	0.0061	0.0018
217	0.0063	0.0049	0.0014
218	0.0062	0.0048	0.0014
219	0.0060	0.0047	0.0014
220	0.0059	0.0045	0.0013
221	0.0057	0.0044	0.0013
222	0.0056	0.0044	0.0013
223	0.0055	0.0043	0.0012
224	0.0054	0.0042	0.0012
225	0.0053	0.0041	0.0012
226	0.0052	0.0040	0.0012
227	0.0051	0.0039	0.0011
228	0.0050	0.0039	0.0011
229	0.0049	0.0038	0.0011
230	0.0048	0.0037	0.0011
231	0.0047	0.0037	0.0011
232	0.0047	0.0036	0.0011
233	0.0046	0.0036	0.0010
234	0.0045	0.0035	0.0010
235	0.0045	0.0035	0.0010
236	0.0044	0.0034	0.0010
237	0.0043	0.0034	0.0010
238	0.0043	0.0033	0.0010
239	0.0042	0.0033	0.0009
240	0.0042	0.0032	0.0009
241	0.0041	0.0032	0.0009
242	0.0041	0.0031	0.0009
243	0.0040	0.0031	0.0009
244	0.0040	0.0031	0.0009
245	0.0039	0.0030	0.0009
246	0.0039	0.0030	0.0009
247	0.0038	0.0030	0.0009
248	0.0038	0.0029	0.0008
249	0.0037	0.0029	0.0008
250	0.0037	0.0029	0.0008
251	0.0036	0.0028	0.0008
252	0.0036	0.0028	0.0008
253	0.0036	0.0028	0.0008
254	0.0035	0.0027	0.0008
255	0.0035	0.0027	0.0008
256	0.0035	0.0027	0.0008
257	0.0034	0.0027	0.0008
258	0.0034	0.0026	0.0008
259	0.0034	0.0026	0.0008
260	0.0033	0.0026	0.0008
261	0.0033	0.0026	0.0007
262	0.0033	0.0025	0.0007
263	0.0032	0.0025	0.0007
264	0.0032	0.0025	0.0007
265	0.0032	0.0025	0.0007
266	0.0032	0.0024	0.0007

267	0.0031	0.0024	0.0007
268	0.0031	0.0024	0.0007
269	0.0031	0.0024	0.0007
270	0.0031	0.0024	0.0007
271	0.0030	0.0023	0.0007
272	0.0030	0.0023	0.0007
273	0.0030	0.0023	0.0007
274	0.0030	0.0023	0.0007
275	0.0029	0.0023	0.0007
276	0.0029	0.0023	0.0007
277	0.0029	0.0022	0.0007
278	0.0029	0.0022	0.0006
279	0.0029	0.0022	0.0006
280	0.0028	0.0022	0.0006
281	0.0028	0.0022	0.0006
282	0.0028	0.0022	0.0006
283	0.0028	0.0021	0.0006
284	0.0028	0.0021	0.0006
285	0.0027	0.0021	0.0006
286	0.0027	0.0021	0.0006
287	0.0027	0.0021	0.0006
288	0.0027	0.0021	0.0006

Total soil rain loss = 1.39(In)
Total effective rainfall = 0.66(In)
Peak flow rate in flood hydrograph = 0.76(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

```
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-------------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0000      0.00  Q         |         |         |         |
  0+15       0.0000      0.00  Q         |         |         |         |
  0+20       0.0000      0.00  Q         |         |         |         |
  0+25       0.0001      0.01  Q         |         |         |         |
  0+30       0.0001      0.01  Q         |         |         |         |
  0+35       0.0002      0.01  Q         |         |         |         |
  0+40       0.0002      0.01  Q         |         |         |         |
  0+45       0.0003      0.01  Q         |         |         |         |
  0+50       0.0004      0.01  Q         |         |         |         |
  0+55       0.0004      0.01  Q         |         |         |         |
  1+ 0       0.0005      0.01  Q         |         |         |         |
  1+ 5       0.0005      0.01  Q         |         |         |         |
  1+10       0.0006      0.01  Q         |         |         |         |
  1+15       0.0007      0.01  Q         |         |         |         |
  1+20       0.0007      0.01  Q         |         |         |         |
  1+25       0.0008      0.01  Q         |         |         |         |
  1+30       0.0008      0.01  Q         |         |         |         |
  1+35       0.0009      0.01  Q         |         |         |         |
  1+40       0.0010      0.01  Q         |         |         |         |
  1+45       0.0010      0.01  Q         |         |         |         |
  1+50       0.0011      0.01  Q         |         |         |         |
  1+55       0.0011      0.01  Q         |         |         |         |
```

2+ 0	0.0012	0.01	Q				
2+ 5	0.0013	0.01	Q				
2+10	0.0013	0.01	Q				
2+15	0.0014	0.01	Q				
2+20	0.0015	0.01	Q				
2+25	0.0015	0.01	Q				
2+30	0.0016	0.01	QV				
2+35	0.0016	0.01	QV				
2+40	0.0017	0.01	QV				
2+45	0.0018	0.01	QV				
2+50	0.0018	0.01	QV				
2+55	0.0019	0.01	QV				
3+ 0	0.0020	0.01	QV				
3+ 5	0.0020	0.01	QV				
3+10	0.0021	0.01	QV				
3+15	0.0022	0.01	QV				
3+20	0.0022	0.01	QV				
3+25	0.0023	0.01	QV				
3+30	0.0024	0.01	QV				
3+35	0.0024	0.01	QV				
3+40	0.0025	0.01	QV				
3+45	0.0026	0.01	QV				
3+50	0.0026	0.01	QV				
3+55	0.0027	0.01	QV				
4+ 0	0.0028	0.01	QV				
4+ 5	0.0028	0.01	QV				
4+10	0.0029	0.01	QV				
4+15	0.0030	0.01	QV				
4+20	0.0030	0.01	QV				
4+25	0.0031	0.01	QV				
4+30	0.0032	0.01	Q V				
4+35	0.0032	0.01	Q V				
4+40	0.0033	0.01	Q V				
4+45	0.0034	0.01	Q V				
4+50	0.0035	0.01	Q V				
4+55	0.0035	0.01	Q V				
5+ 0	0.0036	0.01	Q V				
5+ 5	0.0037	0.01	Q V				
5+10	0.0037	0.01	Q V				
5+15	0.0038	0.01	Q V				
5+20	0.0039	0.01	Q V				
5+25	0.0040	0.01	Q V				
5+30	0.0040	0.01	Q V				
5+35	0.0041	0.01	Q V				
5+40	0.0042	0.01	Q V				
5+45	0.0043	0.01	Q V				
5+50	0.0043	0.01	Q V				
5+55	0.0044	0.01	Q V				
6+ 0	0.0045	0.01	Q V				
6+ 5	0.0046	0.01	Q V				
6+10	0.0046	0.01	Q V				
6+15	0.0047	0.01	Q V				
6+20	0.0048	0.01	Q V				
6+25	0.0049	0.01	Q V				
6+30	0.0049	0.01	Q V				
6+35	0.0050	0.01	Q V				
6+40	0.0051	0.01	Q V				
6+45	0.0052	0.01	Q V				
6+50	0.0053	0.01	Q V				
6+55	0.0053	0.01	Q V				

7+ 0	0.0054	0.01	Q	V				
7+ 5	0.0055	0.01	Q	V				
7+10	0.0056	0.01	Q	V				
7+15	0.0057	0.01	Q	V				
7+20	0.0057	0.01	Q	V				
7+25	0.0058	0.01	Q	V				
7+30	0.0059	0.01	Q	V				
7+35	0.0060	0.01	Q	V				
7+40	0.0061	0.01	Q	V				
7+45	0.0062	0.01	Q	V				
7+50	0.0063	0.01	Q	V				
7+55	0.0063	0.01	Q	V				
8+ 0	0.0064	0.01	Q	V				
8+ 5	0.0065	0.01	Q	V				
8+10	0.0066	0.01	Q	V				
8+15	0.0067	0.01	Q	V				
8+20	0.0068	0.01	Q	V				
8+25	0.0069	0.01	Q	V				
8+30	0.0070	0.01	Q	V				
8+35	0.0070	0.01	Q	V				
8+40	0.0071	0.01	Q	V				
8+45	0.0072	0.01	Q	V				
8+50	0.0073	0.01	Q	V				
8+55	0.0074	0.01	Q	V				
9+ 0	0.0075	0.01	Q	V				
9+ 5	0.0076	0.01	Q	V				
9+10	0.0077	0.01	Q	V				
9+15	0.0078	0.01	Q	V				
9+20	0.0079	0.01	Q	V				
9+25	0.0080	0.01	Q	V				
9+30	0.0081	0.01	Q	V				
9+35	0.0082	0.01	Q	V				
9+40	0.0083	0.01	Q	V				
9+45	0.0084	0.01	Q	V				
9+50	0.0085	0.01	Q	V				
9+55	0.0086	0.01	Q	V				
10+ 0	0.0087	0.01	Q	V				
10+ 5	0.0088	0.02	Q	V				
10+10	0.0089	0.02	Q	V				
10+15	0.0090	0.02	Q	V				
10+20	0.0091	0.02	Q	V				
10+25	0.0092	0.02	Q	V				
10+30	0.0093	0.02	Q	V				
10+35	0.0094	0.02	Q	V				
10+40	0.0095	0.02	Q	V				
10+45	0.0097	0.02	Q	V				
10+50	0.0098	0.02	Q	V				
10+55	0.0099	0.02	Q	V				
11+ 0	0.0100	0.02	Q	V				
11+ 5	0.0101	0.02	Q	V				
11+10	0.0102	0.02	Q	V				
11+15	0.0103	0.02	Q	V				
11+20	0.0105	0.02	Q	V				
11+25	0.0106	0.02	Q	V				
11+30	0.0107	0.02	Q	V				
11+35	0.0108	0.02	Q	V				
11+40	0.0109	0.02	Q	V				
11+45	0.0111	0.02	Q	V				
11+50	0.0112	0.02	Q	V				
11+55	0.0113	0.02	Q	V				

```
12+ 0       0.0115      0.02  Q      V  |         |         |         |
12+ 5       0.0116      0.02  Q      V  |         |         |         |
12+10       0.0117      0.02  Q      V  |         |         |         |
12+15       0.0119      0.02  Q      V  |         |         |         |
12+20       0.0120      0.02  Q      V  |         |         |         |
12+25       0.0122      0.02  Q      V  |         |         |         |
12+30       0.0123      0.02  Q      V  |         |         |         |
12+35       0.0125      0.02  Q      V  |         |         |         |
12+40       0.0127      0.03  Q       V |         |         |         |
12+45       0.0129      0.03  Q       V |         |         |         |
12+50       0.0130      0.03  Q       V |         |         |         |
12+55       0.0132      0.03  Q       V |         |         |         |
13+ 0       0.0134      0.03  Q       V |         |         |         |
13+ 5       0.0136      0.03  Q       V |         |         |         |
13+10       0.0138      0.03  Q       V |         |         |         |
13+15       0.0140      0.03  Q       V |         |         |         |
13+20       0.0142      0.03  Q       V |         |         |         |
13+25       0.0144      0.03  Q        V|         |         |         |
13+30       0.0146      0.03  Q        V|         |         |         |
13+35       0.0148      0.03  Q        V|         |         |         |
13+40       0.0150      0.03  Q        V|         |         |         |
13+45       0.0152      0.03  Q        V|         |         |         |
13+50       0.0154      0.03  Q        V|         |         |         |
13+55       0.0156      0.03  Q        V|         |         |         |
14+ 0       0.0158      0.03  Q         V         |         |         |
14+ 5       0.0160      0.03  Q         V         |         |         |
14+10       0.0163      0.03  Q         V         |         |         |
14+15       0.0165      0.03  Q         V         |         |         |
14+20       0.0168      0.04  Q         V         |         |         |
14+25       0.0170      0.04  Q         V         |         |         |
14+30       0.0173      0.04  Q         V         |         |         |
14+35       0.0175      0.04  Q         |V        |         |         |
14+40       0.0178      0.04  Q         |V        |         |         |
14+45       0.0181      0.04  Q         |V        |         |         |
14+50       0.0184      0.04  Q         |V        |         |         |
14+55       0.0187      0.04  Q         |V        |         |         |
15+ 0       0.0190      0.04  Q         | V       |         |         |
15+ 5       0.0193      0.05  Q         | V       |         |         |
15+10       0.0196      0.05  Q         | V       |         |         |
15+15       0.0200      0.05  Q         | V       |         |         |
15+20       0.0203      0.05  Q         | V       |         |         |
15+25       0.0207      0.05  Q         |  V      |         |         |
15+30       0.0211      0.06  Q         |  V      |         |         |
15+35       0.0215      0.06  Q         |  V      |         |         |
15+40       0.0219      0.06  Q         |  V      |         |         |
15+45       0.0223      0.06  Q         |   V     |         |         |
15+50       0.0228      0.07  Q         |   V     |         |         |
15+55       0.0235      0.09  Q         |   V     |         |         |
16+ 0       0.0244      0.13  Q         |    V    |         |         |
16+ 5       0.0260      0.24  Q         |     V   |         |         |
16+10       0.0289      0.42  |Q        |       V |         |         |
16+15       0.0334      0.64  | Q       |         |V        |         |
16+20       0.0386      0.76  |  Q      |         |   V     |         |
16+25       0.0438      0.76  |  Q      |         |      V  |         |
16+30       0.0473      0.51  | Q       |         |        V|         |
16+35       0.0496      0.33  |Q        |         |         |V        |
16+40       0.0510      0.21  Q         |         |         | V       |
16+45       0.0519      0.14  Q         |         |         | V       |
16+50       0.0525      0.09  Q         |         |         |  V      |
16+55       0.0530      0.07  Q         |         |         |  V      |
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17+ 0       0.0534      0.06  Q          |          |          |  V      |
17+ 5       0.0538      0.05  Q          |          |          |   V     |
17+10       0.0541      0.04  Q          |          |          |   V     |
17+15       0.0544      0.04  Q          |          |          |   V     |
17+20       0.0546      0.04  Q          |          |          |   V     |
17+25       0.0549      0.04  Q          |          |          |   V     |
17+30       0.0551      0.03  Q          |          |          |   V     |
17+35       0.0553      0.03  Q          |          |          |    V    |
17+40       0.0556      0.03  Q          |          |          |    V    |
17+45       0.0558      0.03  Q          |          |          |    V    |
17+50       0.0560      0.03  Q          |          |          |    V    |
17+55       0.0562      0.03  Q          |          |          |    V    |
18+ 0       0.0563      0.03  Q          |          |          |    V    |
18+ 5       0.0565      0.03  Q          |          |          |    V    |
18+10       0.0567      0.03  Q          |          |          |    V    |
18+15       0.0569      0.02  Q          |          |          |     V   |
18+20       0.0570      0.02  Q          |          |          |     V   |
18+25       0.0572      0.02  Q          |          |          |     V   |
18+30       0.0573      0.02  Q          |          |          |     V   |
18+35       0.0575      0.02  Q          |          |          |     V   |
18+40       0.0576      0.02  Q          |          |          |     V   |
18+45       0.0577      0.02  Q          |          |          |     V   |
18+50       0.0578      0.02  Q          |          |          |     V   |
18+55       0.0579      0.02  Q          |          |          |     V   |
19+ 0       0.0581      0.02  Q          |          |          |     V   |
19+ 5       0.0582      0.02  Q          |          |          |     V   |
19+10       0.0583      0.02  Q          |          |          |     V   |
19+15       0.0584      0.02  Q          |          |          |      V  |
19+20       0.0585      0.02  Q          |          |          |      V  |
19+25       0.0586      0.02  Q          |          |          |      V  |
19+30       0.0587      0.02  Q          |          |          |      V  |
19+35       0.0588      0.01  Q          |          |          |      V  |
19+40       0.0589      0.01  Q          |          |          |      V  |
19+45       0.0590      0.01  Q          |          |          |      V  |
19+50       0.0591      0.01  Q          |          |          |      V  |
19+55       0.0592      0.01  Q          |          |          |      V  |
20+ 0       0.0593      0.01  Q          |          |          |      V  |
20+ 5       0.0594      0.01  Q          |          |          |      V  |
20+10       0.0595      0.01  Q          |          |          |      V  |
20+15       0.0596      0.01  Q          |          |          |      V  |
20+20       0.0597      0.01  Q          |          |          |      V  |
20+25       0.0598      0.01  Q          |          |          |      V  |
20+30       0.0599      0.01  Q          |          |          |      V  |
20+35       0.0599      0.01  Q          |          |          |       V |
20+40       0.0600      0.01  Q          |          |          |       V |
20+45       0.0601      0.01  Q          |          |          |       V |
20+50       0.0602      0.01  Q          |          |          |       V |
20+55       0.0603      0.01  Q          |          |          |       V |
21+ 0       0.0604      0.01  Q          |          |          |       V |
21+ 5       0.0604      0.01  Q          |          |          |       V |
21+10       0.0605      0.01  Q          |          |          |       V |
21+15       0.0606      0.01  Q          |          |          |       V |
21+20       0.0607      0.01  Q          |          |          |       V |
21+25       0.0608      0.01  Q          |          |          |       V |
21+30       0.0608      0.01  Q          |          |          |       V |
21+35       0.0609      0.01  Q          |          |          |       V |
21+40       0.0610      0.01  Q          |          |          |       V |
21+45       0.0611      0.01  Q          |          |          |       V |
21+50       0.0611      0.01  Q          |          |          |       V |
21+55       0.0612      0.01  Q          |          |          |       V |
```

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  22+ 0       0.0613      0.01  Q          |          |          |        V |
  22+ 5       0.0614      0.01  Q          |          |          |        V |
  22+10       0.0614      0.01  Q          |          |          |        V |
  22+15       0.0615      0.01  Q          |          |          |        V |
  22+20       0.0616      0.01  Q          |          |          |         V|
  22+25       0.0616      0.01  Q          |          |          |         V|
  22+30       0.0617      0.01  Q          |          |          |         V|
  22+35       0.0618      0.01  Q          |          |          |         V|
  22+40       0.0618      0.01  Q          |          |          |         V|
  22+45       0.0619      0.01  Q          |          |          |         V|
  22+50       0.0620      0.01  Q          |          |          |         V|
  22+55       0.0620      0.01  Q          |          |          |         V|
  23+ 0       0.0621      0.01  Q          |          |          |         V|
  23+ 5       0.0622      0.01  Q          |          |          |         V|
  23+10       0.0622      0.01  Q          |          |          |         V|
  23+15       0.0623      0.01  Q          |          |          |         V|
  23+20       0.0624      0.01  Q          |          |          |         V|
  23+25       0.0624      0.01  Q          |          |          |         V|
  23+30       0.0625      0.01  Q          |          |          |         V|
  23+35       0.0625      0.01  Q          |          |          |         V|
  23+40       0.0626      0.01  Q          |          |          |         V|
  23+45       0.0627      0.01  Q          |          |          |         V|
  23+50       0.0627      0.01  Q          |          |          |         V|
  23+55       0.0628      0.01  Q          |          |          |         V|
  24+ 0       0.0628      0.01  Q          |          |          |         V|
  24+ 5       0.0629      0.01  Q          |          |          |         V|
  24+10       0.0630      0.01  Q          |          |          |         V|
  24+15       0.0630      0.01  Q          |          |          |         V|
  24+20       0.0630      0.00  Q          |          |          |         V|
  24+25       0.0630      0.00  Q          |          |          |         V|
  24+30       0.0631      0.00  Q          |          |          |         V|
  24+35       0.0631      0.00  Q          |          |          |         V|
  24+40       0.0631      0.00  Q          |          |          |         V|
  24+45       0.0631      0.00  Q          |          |          |         V|
  24+50       0.0631      0.00  Q          |          |          |         V|
  24+55       0.0631      0.00  Q          |          |          |         V|
  25+ 0       0.0631      0.00  Q          |          |          |         V|
-----------------------------------------------------------------------
```

2-Year Unit Hydrograph Analysis
Proposed Conditions

U n i t H y d r o g r a p h A n a l y s i s

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Study date 01/07/16 File Name p174hyd.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 6312

Stanton Assisted Living Project
2-year Unit Hydrograph Analysis
Proposed Conditions

Storm Event Year = 2

Antecedent Moisture Condition = 1

English (in-lb) Input Units Used
++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
57.0	1.2	1.00	B	0.300	0.240	0.072

Area-averaged adjusted loss rate Fm (In/Hr) = 0.072

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC1)	S	Pervious Yield Fr
0.28	0.240	57.0	37.0	17.03	0.057
0.88	0.760	98.0	98.0	0.20	0.890

Area-averaged catchment yield fraction, Y = 0.690
Area-averaged low loss fraction, Yb = 0.310
++
User entry of time of concentration = 0.310 (hours)
Watershed area = 1.16(Ac.)
Catchment Lag time = 0.248 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 33.6022
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.072(In/Hr)
Average low loss rate fraction (Yb) = 0.310 (decimal)
VALLEY DEVELOPED S-Graph Selected
Computed peak 5-minute rainfall = 0.190(In)

Computed peak 30-minute rainfall = 0.400(In)
Specified peak 1-hour rainfall = 0.530(In)
Computed peak 3-hour rainfall = 0.890(In)
Specified peak 6-hour rainfall = 1.220(In)
Specified peak 24-hour rainfall = 2.050(In)

Rainfall depth area reduction factors:
Using a total area of 1.16(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.190(In)
30-minute factor = 1.000 Adjusted rainfall = 0.400(In)
1-hour factor = 1.000 Adjusted rainfall = 0.530(In)
3-hour factor = 1.000 Adjusted rainfall = 0.890(In)
6-hour factor = 1.000 Adjusted rainfall = 1.220(In)
24-hour factor = 1.000 Adjusted rainfall = 2.050(In)

U n i t H y d r o g r a p h

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 14.03 (CFS))		
1	2.299	0.322
2	13.934	1.632
3	36.131	3.114
4	64.543	3.986
5	82.874	2.572
6	92.118	1.297
7	96.619	0.631
8	98.327	0.240
9	98.941	0.086
10	99.546	0.085
11	100.000	0.064

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.1900	0.1900
2	0.2534	0.0634
3	0.2999	0.0465
4	0.3380	0.0381
5	0.3708	0.0328
6	0.4000	0.0292
7	0.4258	0.0258
8	0.4495	0.0237
9	0.4716	0.0220
10	0.4922	0.0206
11	0.5116	0.0194
12	0.5300	0.0184
13	0.5504	0.0204
14	0.5700	0.0196
15	0.5888	0.0189
16	0.6070	0.0182
17	0.6246	0.0176
18	0.6417	0.0171
19	0.6583	0.0166
20	0.6744	0.0161
21	0.6901	0.0157

22	0.7054	0.0153
23	0.7204	0.0150
24	0.7350	0.0146
25	0.7493	0.0143
26	0.7633	0.0140
27	0.7770	0.0137
28	0.7905	0.0134
29	0.8037	0.0132
30	0.8166	0.0130
31	0.8294	0.0127
32	0.8419	0.0125
33	0.8542	0.0123
34	0.8663	0.0121
35	0.8782	0.0119
36	0.8900	0.0118
37	0.9012	0.0112
38	0.9122	0.0110
39	0.9230	0.0108
40	0.9337	0.0107
41	0.9442	0.0105
42	0.9547	0.0104
43	0.9649	0.0103
44	0.9751	0.0101
45	0.9851	0.0100
46	0.9950	0.0099
47	1.0048	0.0098
48	1.0145	0.0097
49	1.0240	0.0096
50	1.0335	0.0095
51	1.0428	0.0094
52	1.0521	0.0093
53	1.0612	0.0092
54	1.0703	0.0091
55	1.0793	0.0090
56	1.0882	0.0089
57	1.0970	0.0088
58	1.1057	0.0087
59	1.1143	0.0086
60	1.1229	0.0086
61	1.1313	0.0085
62	1.1398	0.0084
63	1.1481	0.0083
64	1.1563	0.0083
65	1.1645	0.0082
66	1.1726	0.0081
67	1.1807	0.0081
68	1.1887	0.0080
69	1.1966	0.0079
70	1.2045	0.0079
71	1.2123	0.0078
72	1.2200	0.0077
73	1.2263	0.0063
74	1.2326	0.0063
75	1.2388	0.0062
76	1.2449	0.0062
77	1.2510	0.0061
78	1.2571	0.0061
79	1.2631	0.0060
80	1.2691	0.0060
81	1.2750	0.0059

82	1.2809	0.0059
83	1.2867	0.0058
84	1.2925	0.0058
85	1.2982	0.0057
86	1.3039	0.0057
87	1.3096	0.0057
88	1.3152	0.0056
89	1.3208	0.0056
90	1.3263	0.0055
91	1.3318	0.0055
92	1.3372	0.0055
93	1.3427	0.0054
94	1.3481	0.0054
95	1.3534	0.0054
96	1.3587	0.0053
97	1.3640	0.0053
98	1.3693	0.0052
99	1.3745	0.0052
100	1.3797	0.0052
101	1.3848	0.0051
102	1.3899	0.0051
103	1.3950	0.0051
104	1.4001	0.0051
105	1.4051	0.0050
106	1.4101	0.0050
107	1.4150	0.0050
108	1.4200	0.0049
109	1.4249	0.0049
110	1.4298	0.0049
111	1.4346	0.0049
112	1.4394	0.0048
113	1.4442	0.0048
114	1.4490	0.0048
115	1.4538	0.0047
116	1.4585	0.0047
117	1.4632	0.0047
118	1.4678	0.0047
119	1.4725	0.0046
120	1.4771	0.0046
121	1.4817	0.0046
122	1.4863	0.0046
123	1.4908	0.0045
124	1.4954	0.0045
125	1.4999	0.0045
126	1.5043	0.0045
127	1.5088	0.0045
128	1.5132	0.0044
129	1.5176	0.0044
130	1.5220	0.0044
131	1.5264	0.0044
132	1.5308	0.0044
133	1.5351	0.0043
134	1.5394	0.0043
135	1.5437	0.0043
136	1.5480	0.0043
137	1.5522	0.0043
138	1.5565	0.0042
139	1.5607	0.0042
140	1.5649	0.0042
141	1.5690	0.0042

142	1.5732	0.0042
143	1.5773	0.0041
144	1.5815	0.0041
145	1.5856	0.0041
146	1.5896	0.0041
147	1.5937	0.0041
148	1.5978	0.0041
149	1.6018	0.0040
150	1.6058	0.0040
151	1.6098	0.0040
152	1.6138	0.0040
153	1.6178	0.0040
154	1.6217	0.0040
155	1.6256	0.0039
156	1.6296	0.0039
157	1.6335	0.0039
158	1.6373	0.0039
159	1.6412	0.0039
160	1.6451	0.0039
161	1.6489	0.0038
162	1.6527	0.0038
163	1.6566	0.0038
164	1.6604	0.0038
165	1.6641	0.0038
166	1.6679	0.0038
167	1.6717	0.0038
168	1.6754	0.0037
169	1.6791	0.0037
170	1.6828	0.0037
171	1.6865	0.0037
172	1.6902	0.0037
173	1.6939	0.0037
174	1.6976	0.0037
175	1.7012	0.0036
176	1.7048	0.0036
177	1.7085	0.0036
178	1.7121	0.0036
179	1.7157	0.0036
180	1.7192	0.0036
181	1.7228	0.0036
182	1.7264	0.0036
183	1.7299	0.0035
184	1.7334	0.0035
185	1.7370	0.0035
186	1.7405	0.0035
187	1.7440	0.0035
188	1.7475	0.0035
189	1.7509	0.0035
190	1.7544	0.0035
191	1.7578	0.0035
192	1.7613	0.0034
193	1.7647	0.0034
194	1.7681	0.0034
195	1.7715	0.0034
196	1.7749	0.0034
197	1.7783	0.0034
198	1.7817	0.0034
199	1.7851	0.0034
200	1.7884	0.0034
201	1.7918	0.0033

202	1.7951	0.0033
203	1.7984	0.0033
204	1.8017	0.0033
205	1.8050	0.0033
206	1.8083	0.0033
207	1.8116	0.0033
208	1.8149	0.0033
209	1.8181	0.0033
210	1.8214	0.0033
211	1.8246	0.0032
212	1.8278	0.0032
213	1.8311	0.0032
214	1.8343	0.0032
215	1.8375	0.0032
216	1.8407	0.0032
217	1.8439	0.0032
218	1.8470	0.0032
219	1.8502	0.0032
220	1.8534	0.0032
221	1.8565	0.0031
222	1.8597	0.0031
223	1.8628	0.0031
224	1.8659	0.0031
225	1.8690	0.0031
226	1.8721	0.0031
227	1.8752	0.0031
228	1.8783	0.0031
229	1.8814	0.0031
230	1.8845	0.0031
231	1.8875	0.0031
232	1.8906	0.0031
233	1.8936	0.0030
234	1.8967	0.0030
235	1.8997	0.0030
236	1.9027	0.0030
237	1.9057	0.0030
238	1.9088	0.0030
239	1.9117	0.0030
240	1.9147	0.0030
241	1.9177	0.0030
242	1.9207	0.0030
243	1.9237	0.0030
244	1.9266	0.0030
245	1.9296	0.0030
246	1.9325	0.0029
247	1.9355	0.0029
248	1.9384	0.0029
249	1.9413	0.0029
250	1.9442	0.0029
251	1.9471	0.0029
252	1.9500	0.0029
253	1.9529	0.0029
254	1.9558	0.0029
255	1.9587	0.0029
256	1.9616	0.0029
257	1.9644	0.0029
258	1.9673	0.0029
259	1.9701	0.0029
260	1.9730	0.0028
261	1.9758	0.0028

262	1.9787	0.0028
263	1.9815	0.0028
264	1.9843	0.0028
265	1.9871	0.0028
266	1.9899	0.0028
267	1.9927	0.0028
268	1.9955	0.0028
269	1.9983	0.0028
270	2.0011	0.0028
271	2.0038	0.0028
272	2.0066	0.0028
273	2.0094	0.0028
274	2.0121	0.0028
275	2.0149	0.0027
276	2.0176	0.0027
277	2.0203	0.0027
278	2.0231	0.0027
279	2.0258	0.0027
280	2.0285	0.0027
281	2.0312	0.0027
282	2.0339	0.0027
283	2.0366	0.0027
284	2.0393	0.0027
285	2.0420	0.0027
286	2.0447	0.0027
287	2.0473	0.0027
288	2.0500	0.0027

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0027	0.0008	0.0018
2	0.0027	0.0008	0.0018
3	0.0027	0.0008	0.0019
4	0.0027	0.0008	0.0019
5	0.0027	0.0008	0.0019
6	0.0027	0.0008	0.0019
7	0.0027	0.0008	0.0019
8	0.0027	0.0008	0.0019
9	0.0027	0.0008	0.0019
10	0.0027	0.0009	0.0019
11	0.0028	0.0009	0.0019
12	0.0028	0.0009	0.0019
13	0.0028	0.0009	0.0019
14	0.0028	0.0009	0.0019
15	0.0028	0.0009	0.0019
16	0.0028	0.0009	0.0019
17	0.0028	0.0009	0.0019
18	0.0028	0.0009	0.0019
19	0.0028	0.0009	0.0020
20	0.0028	0.0009	0.0020
21	0.0029	0.0009	0.0020
22	0.0029	0.0009	0.0020
23	0.0029	0.0009	0.0020
24	0.0029	0.0009	0.0020
25	0.0029	0.0009	0.0020
26	0.0029	0.0009	0.0020
27	0.0029	0.0009	0.0020
28	0.0029	0.0009	0.0020

29	0.0029	0.0009	0.0020
30	0.0030	0.0009	0.0020
31	0.0030	0.0009	0.0020
32	0.0030	0.0009	0.0021
33	0.0030	0.0009	0.0021
34	0.0030	0.0009	0.0021
35	0.0030	0.0009	0.0021
36	0.0030	0.0009	0.0021
37	0.0030	0.0009	0.0021
38	0.0030	0.0009	0.0021
39	0.0031	0.0009	0.0021
40	0.0031	0.0010	0.0021
41	0.0031	0.0010	0.0021
42	0.0031	0.0010	0.0021
43	0.0031	0.0010	0.0021
44	0.0031	0.0010	0.0022
45	0.0031	0.0010	0.0022
46	0.0031	0.0010	0.0022
47	0.0032	0.0010	0.0022
48	0.0032	0.0010	0.0022
49	0.0032	0.0010	0.0022
50	0.0032	0.0010	0.0022
51	0.0032	0.0010	0.0022
52	0.0032	0.0010	0.0022
53	0.0033	0.0010	0.0022
54	0.0033	0.0010	0.0023
55	0.0033	0.0010	0.0023
56	0.0033	0.0010	0.0023
57	0.0033	0.0010	0.0023
58	0.0033	0.0010	0.0023
59	0.0033	0.0010	0.0023
60	0.0034	0.0010	0.0023
61	0.0034	0.0010	0.0023
62	0.0034	0.0010	0.0023
63	0.0034	0.0011	0.0024
64	0.0034	0.0011	0.0024
65	0.0034	0.0011	0.0024
66	0.0035	0.0011	0.0024
67	0.0035	0.0011	0.0024
68	0.0035	0.0011	0.0024
69	0.0035	0.0011	0.0024
70	0.0035	0.0011	0.0024
71	0.0035	0.0011	0.0024
72	0.0036	0.0011	0.0025
73	0.0036	0.0011	0.0025
74	0.0036	0.0011	0.0025
75	0.0036	0.0011	0.0025
76	0.0036	0.0011	0.0025
77	0.0037	0.0011	0.0025
78	0.0037	0.0011	0.0025
79	0.0037	0.0011	0.0026
80	0.0037	0.0012	0.0026
81	0.0037	0.0012	0.0026
82	0.0038	0.0012	0.0026
83	0.0038	0.0012	0.0026
84	0.0038	0.0012	0.0026
85	0.0038	0.0012	0.0026
86	0.0038	0.0012	0.0027
87	0.0039	0.0012	0.0027
88	0.0039	0.0012	0.0027

89	0.0039	0.0012	0.0027
90	0.0039	0.0012	0.0027
91	0.0040	0.0012	0.0027
92	0.0040	0.0012	0.0027
93	0.0040	0.0012	0.0028
94	0.0040	0.0013	0.0028
95	0.0041	0.0013	0.0028
96	0.0041	0.0013	0.0028
97	0.0041	0.0013	0.0028
98	0.0041	0.0013	0.0029
99	0.0042	0.0013	0.0029
100	0.0042	0.0013	0.0029
101	0.0042	0.0013	0.0029
102	0.0043	0.0013	0.0029
103	0.0043	0.0013	0.0030
104	0.0043	0.0013	0.0030
105	0.0044	0.0013	0.0030
106	0.0044	0.0014	0.0030
107	0.0044	0.0014	0.0030
108	0.0044	0.0014	0.0031
109	0.0045	0.0014	0.0031
110	0.0045	0.0014	0.0031
111	0.0045	0.0014	0.0031
112	0.0046	0.0014	0.0032
113	0.0046	0.0014	0.0032
114	0.0046	0.0014	0.0032
115	0.0047	0.0015	0.0032
116	0.0047	0.0015	0.0033
117	0.0048	0.0015	0.0033
118	0.0048	0.0015	0.0033
119	0.0049	0.0015	0.0033
120	0.0049	0.0015	0.0034
121	0.0049	0.0015	0.0034
122	0.0050	0.0015	0.0034
123	0.0050	0.0016	0.0035
124	0.0051	0.0016	0.0035
125	0.0051	0.0016	0.0035
126	0.0051	0.0016	0.0036
127	0.0052	0.0016	0.0036
128	0.0052	0.0016	0.0036
129	0.0053	0.0016	0.0037
130	0.0054	0.0017	0.0037
131	0.0054	0.0017	0.0037
132	0.0055	0.0017	0.0038
133	0.0055	0.0017	0.0038
134	0.0056	0.0017	0.0038
135	0.0057	0.0018	0.0039
136	0.0057	0.0018	0.0039
137	0.0058	0.0018	0.0040
138	0.0058	0.0018	0.0040
139	0.0059	0.0018	0.0041
140	0.0060	0.0018	0.0041
141	0.0061	0.0019	0.0042
142	0.0061	0.0019	0.0042
143	0.0062	0.0019	0.0043
144	0.0063	0.0019	0.0043
145	0.0077	0.0024	0.0053
146	0.0078	0.0024	0.0054
147	0.0079	0.0025	0.0055
148	0.0080	0.0025	0.0055

149	0.0081	0.0025	0.0056
150	0.0082	0.0025	0.0056
151	0.0083	0.0026	0.0057
152	0.0084	0.0026	0.0058
153	0.0086	0.0027	0.0059
154	0.0086	0.0027	0.0060
155	0.0088	0.0027	0.0061
156	0.0089	0.0028	0.0061
157	0.0091	0.0028	0.0063
158	0.0092	0.0028	0.0063
159	0.0094	0.0029	0.0065
160	0.0095	0.0029	0.0065
161	0.0097	0.0030	0.0067
162	0.0098	0.0030	0.0068
163	0.0100	0.0031	0.0069
164	0.0101	0.0031	0.0070
165	0.0104	0.0032	0.0072
166	0.0105	0.0033	0.0073
167	0.0108	0.0034	0.0075
168	0.0110	0.0034	0.0076
169	0.0118	0.0036	0.0081
170	0.0119	0.0037	0.0082
171	0.0123	0.0038	0.0085
172	0.0125	0.0039	0.0086
173	0.0130	0.0040	0.0089
174	0.0132	0.0041	0.0091
175	0.0137	0.0043	0.0095
176	0.0140	0.0043	0.0097
177	0.0146	0.0045	0.0101
178	0.0150	0.0046	0.0103
179	0.0157	0.0049	0.0108
180	0.0161	0.0050	0.0111
181	0.0171	0.0053	0.0118
182	0.0176	0.0055	0.0122
183	0.0189	0.0058	0.0130
184	0.0196	0.0060	0.0136
185	0.0184	0.0057	0.0127
186	0.0194	0.0060	0.0134
187	0.0220	0.0060	0.0160
188	0.0237	0.0060	0.0177
189	0.0292	0.0060	0.0232
190	0.0328	0.0060	0.0268
191	0.0465	0.0060	0.0405
192	0.0634	0.0060	0.0574
193	0.1900	0.0060	0.1840
194	0.0381	0.0060	0.0321
195	0.0258	0.0060	0.0198
196	0.0206	0.0060	0.0146
197	0.0204	0.0060	0.0144
198	0.0182	0.0056	0.0126
199	0.0166	0.0051	0.0114
200	0.0153	0.0047	0.0106
201	0.0143	0.0044	0.0099
202	0.0134	0.0042	0.0093
203	0.0127	0.0039	0.0088
204	0.0121	0.0038	0.0084
205	0.0112	0.0035	0.0077
206	0.0107	0.0033	0.0074
207	0.0103	0.0032	0.0071
208	0.0099	0.0031	0.0068

209	0.0096	0.0030	0.0066
210	0.0093	0.0029	0.0064
211	0.0090	0.0028	0.0062
212	0.0087	0.0027	0.0060
213	0.0085	0.0026	0.0058
214	0.0083	0.0026	0.0057
215	0.0081	0.0025	0.0056
216	0.0079	0.0024	0.0054
217	0.0063	0.0020	0.0044
218	0.0062	0.0019	0.0042
219	0.0060	0.0019	0.0041
220	0.0059	0.0018	0.0040
221	0.0057	0.0018	0.0040
222	0.0056	0.0017	0.0039
223	0.0055	0.0017	0.0038
224	0.0054	0.0017	0.0037
225	0.0053	0.0016	0.0036
226	0.0052	0.0016	0.0036
227	0.0051	0.0016	0.0035
228	0.0050	0.0015	0.0034
229	0.0049	0.0015	0.0034
230	0.0048	0.0015	0.0033
231	0.0047	0.0015	0.0033
232	0.0047	0.0014	0.0032
233	0.0046	0.0014	0.0032
234	0.0045	0.0014	0.0031
235	0.0045	0.0014	0.0031
236	0.0044	0.0014	0.0030
237	0.0043	0.0013	0.0030
238	0.0043	0.0013	0.0029
239	0.0042	0.0013	0.0029
240	0.0042	0.0013	0.0029
241	0.0041	0.0013	0.0028
242	0.0041	0.0013	0.0028
243	0.0040	0.0012	0.0028
244	0.0040	0.0012	0.0027
245	0.0039	0.0012	0.0027
246	0.0039	0.0012	0.0027
247	0.0038	0.0012	0.0026
248	0.0038	0.0012	0.0026
249	0.0037	0.0012	0.0026
250	0.0037	0.0011	0.0025
251	0.0036	0.0011	0.0025
252	0.0036	0.0011	0.0025
253	0.0036	0.0011	0.0025
254	0.0035	0.0011	0.0024
255	0.0035	0.0011	0.0024
256	0.0035	0.0011	0.0024
257	0.0034	0.0011	0.0024
258	0.0034	0.0011	0.0023
259	0.0034	0.0010	0.0023
260	0.0033	0.0010	0.0023
261	0.0033	0.0010	0.0023
262	0.0033	0.0010	0.0023
263	0.0032	0.0010	0.0022
264	0.0032	0.0010	0.0022
265	0.0032	0.0010	0.0022
266	0.0032	0.0010	0.0022
267	0.0031	0.0010	0.0022
268	0.0031	0.0010	0.0021

269	0.0031	0.0010	0.0021
270	0.0031	0.0009	0.0021
271	0.0030	0.0009	0.0021
272	0.0030	0.0009	0.0021
273	0.0030	0.0009	0.0021
274	0.0030	0.0009	0.0020
275	0.0029	0.0009	0.0020
276	0.0029	0.0009	0.0020
277	0.0029	0.0009	0.0020
278	0.0029	0.0009	0.0020
279	0.0029	0.0009	0.0020
280	0.0028	0.0009	0.0020
281	0.0028	0.0009	0.0019
282	0.0028	0.0009	0.0019
283	0.0028	0.0009	0.0019
284	0.0028	0.0009	0.0019
285	0.0027	0.0008	0.0019
286	0.0027	0.0008	0.0019
287	0.0027	0.0008	0.0019
288	0.0027	0.0008	0.0018

Total soil rain loss = 0.54(In)
Total effective rainfall = 1.51(In)
Peak flow rate in flood hydrograph = 1.10(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

```
Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5      10.0
-----------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q         |         |         |         |
  0+10       0.0000      0.00  Q         |         |         |         |
  0+15       0.0001      0.01  Q         |         |         |         |
  0+20       0.0002      0.02  Q         |         |         |         |
  0+25       0.0004      0.02  Q         |         |         |         |
  0+30       0.0005      0.02  Q         |         |         |         |
  0+35       0.0007      0.03  Q         |         |         |         |
  0+40       0.0009      0.03  Q         |         |         |         |
  0+45       0.0011      0.03  Q         |         |         |         |
  0+50       0.0012      0.03  Q         |         |         |         |
  0+55       0.0014      0.03  Q         |         |         |         |
  1+ 0       0.0016      0.03  Q         |         |         |         |
  1+ 5       0.0018      0.03  Q         |         |         |         |
  1+10       0.0020      0.03  Q         |         |         |         |
  1+15       0.0021      0.03  Q         |         |         |         |
  1+20       0.0023      0.03  Q         |         |         |         |
  1+25       0.0025      0.03  Q         |         |         |         |
  1+30       0.0027      0.03  Q         |         |         |         |
  1+35       0.0029      0.03  Q         |         |         |         |
  1+40       0.0031      0.03  Q         |         |         |         |
  1+45       0.0033      0.03  Q         |         |         |         |
  1+50       0.0035      0.03  Q         |         |         |         |
  1+55       0.0036      0.03  QV        |         |         |         |
  2+ 0       0.0038      0.03  QV        |         |         |         |
  2+ 5       0.0040      0.03  QV        |         |         |         |
```

2+10	0.0042	0.03	QV			
2+15	0.0044	0.03	QV			
2+20	0.0046	0.03	QV			
2+25	0.0048	0.03	QV			
2+30	0.0050	0.03	QV			
2+35	0.0052	0.03	QV			
2+40	0.0054	0.03	QV			
2+45	0.0056	0.03	QV			
2+50	0.0058	0.03	QV			
2+55	0.0060	0.03	QV			
3+ 0	0.0062	0.03	QV			
3+ 5	0.0064	0.03	QV			
3+10	0.0066	0.03	QV			
3+15	0.0068	0.03	QV			
3+20	0.0070	0.03	QV			
3+25	0.0072	0.03	QV			
3+30	0.0074	0.03	Q V			
3+35	0.0076	0.03	Q V			
3+40	0.0078	0.03	Q V			
3+45	0.0080	0.03	Q V			
3+50	0.0082	0.03	Q V			
3+55	0.0084	0.03	Q V			
4+ 0	0.0086	0.03	Q V			
4+ 5	0.0088	0.03	Q V			
4+10	0.0090	0.03	Q V			
4+15	0.0093	0.03	Q V			
4+20	0.0095	0.03	Q V			
4+25	0.0097	0.03	Q V			
4+30	0.0099	0.03	Q V			
4+35	0.0101	0.03	Q V			
4+40	0.0103	0.03	Q V			
4+45	0.0106	0.03	Q V			
4+50	0.0108	0.03	Q V			
4+55	0.0110	0.03	Q V			
5+ 0	0.0112	0.03	Q V			
5+ 5	0.0114	0.03	Q V			
5+10	0.0117	0.03	Q V			
5+15	0.0119	0.03	Q V			
5+20	0.0121	0.03	Q V			
5+25	0.0123	0.03	Q V			
5+30	0.0126	0.03	Q V			
5+35	0.0128	0.03	Q V			
5+40	0.0130	0.03	Q V			
5+45	0.0132	0.03	Q V			
5+50	0.0135	0.03	Q V			
5+55	0.0137	0.03	Q V			
6+ 0	0.0139	0.03	Q V			
6+ 5	0.0142	0.03	Q V			
6+10	0.0144	0.03	Q V			
6+15	0.0146	0.03	Q V			
6+20	0.0149	0.03	Q V			
6+25	0.0151	0.03	Q V			
6+30	0.0154	0.03	Q V			
6+35	0.0156	0.04	Q V			
6+40	0.0158	0.04	Q V			
6+45	0.0161	0.04	Q V			
6+50	0.0163	0.04	Q V			
6+55	0.0166	0.04	Q V			
7+ 0	0.0168	0.04	Q V			
7+ 5	0.0171	0.04	Q V			

```
 7+10       0.0173      0.04  Q   V     |          |          |          |
 7+15       0.0176      0.04  Q   V     |          |          |          |
 7+20       0.0178      0.04  Q   V     |          |          |          |
 7+25       0.0181      0.04  Q   V     |          |          |          |
 7+30       0.0184      0.04  Q    V    |          |          |          |
 7+35       0.0186      0.04  Q    V    |          |          |          |
 7+40       0.0189      0.04  Q    V    |          |          |          |
 7+45       0.0191      0.04  Q    V    |          |          |          |
 7+50       0.0194      0.04  Q    V    |          |          |          |
 7+55       0.0197      0.04  Q    V    |          |          |          |
 8+ 0       0.0199      0.04  Q    V    |          |          |          |
 8+ 5       0.0202      0.04  Q    V    |          |          |          |
 8+10       0.0205      0.04  Q    V    |          |          |          |
 8+15       0.0208      0.04  Q    V    |          |          |          |
 8+20       0.0210      0.04  Q    V    |          |          |          |
 8+25       0.0213      0.04  Q    V    |          |          |          |
 8+30       0.0216      0.04  Q    V    |          |          |          |
 8+35       0.0219      0.04  Q     V   |          |          |          |
 8+40       0.0221      0.04  Q     V   |          |          |          |
 8+45       0.0224      0.04  Q     V   |          |          |          |
 8+50       0.0227      0.04  Q     V   |          |          |          |
 8+55       0.0230      0.04  Q     V   |          |          |          |
 9+ 0       0.0233      0.04  Q     V   |          |          |          |
 9+ 5       0.0236      0.04  Q     V   |          |          |          |
 9+10       0.0239      0.04  Q     V   |          |          |          |
 9+15       0.0242      0.04  Q     V   |          |          |          |
 9+20       0.0245      0.04  Q     V   |          |          |          |
 9+25       0.0248      0.04  Q     V   |          |          |          |
 9+30       0.0251      0.04  Q     V   |          |          |          |
 9+35       0.0254      0.04  Q     V   |          |          |          |
 9+40       0.0257      0.04  Q      V  |          |          |          |
 9+45       0.0260      0.04  Q      V  |          |          |          |
 9+50       0.0263      0.05  Q      V  |          |          |          |
 9+55       0.0266      0.05  Q      V  |          |          |          |
10+ 0       0.0269      0.05  Q      V  |          |          |          |
10+ 5       0.0273      0.05  Q      V  |          |          |          |
10+10       0.0276      0.05  Q      V  |          |          |          |
10+15       0.0279      0.05  Q      V  |          |          |          |
10+20       0.0282      0.05  Q      V  |          |          |          |
10+25       0.0286      0.05  Q      V  |          |          |          |
10+30       0.0289      0.05  Q      V  |          |          |          |
10+35       0.0292      0.05  Q       V |          |          |          |
10+40       0.0296      0.05  Q       V |          |          |          |
10+45       0.0299      0.05  Q       V |          |          |          |
10+50       0.0303      0.05  Q       V |          |          |          |
10+55       0.0306      0.05  Q       V |          |          |          |
11+ 0       0.0310      0.05  Q       V |          |          |          |
11+ 5       0.0313      0.05  Q       V |          |          |          |
11+10       0.0317      0.05  Q       V |          |          |          |
11+15       0.0320      0.05  Q       V |          |          |          |
11+20       0.0324      0.05  Q       V |          |          |          |
11+25       0.0328      0.05  Q        V|          |          |          |
11+30       0.0332      0.05  Q        V|          |          |          |
11+35       0.0335      0.06  Q        V|          |          |          |
11+40       0.0339      0.06  Q        V|          |          |          |
11+45       0.0343      0.06  Q        V|          |          |          |
11+50       0.0347      0.06  Q        V|          |          |          |
11+55       0.0351      0.06  Q        V|          |          |          |
12+ 0       0.0355      0.06  Q        V|          |          |          |
12+ 5       0.0359      0.06  Q        V|          |          |          |
```

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12+10       0.0363      0.06  Q        V|         |         |         |
12+15       0.0368      0.07  Q         V         |         |         |
12+20       0.0373      0.07  Q         V         |         |         |
12+25       0.0378      0.07  Q         V         |         |         |
12+30       0.0383      0.08  Q         V         |         |         |
12+35       0.0388      0.08  Q         V         |         |         |
12+40       0.0394      0.08  Q         V         |         |         |
12+45       0.0399      0.08  Q         V         |         |         |
12+50       0.0405      0.08  Q         |V        |         |         |
12+55       0.0410      0.08  Q         |V        |         |         |
13+ 0       0.0416      0.08  Q         |V        |         |         |
13+ 5       0.0422      0.08  Q         |V        |         |         |
13+10       0.0428      0.08  Q         |V        |         |         |
13+15       0.0433      0.09  Q         |V        |         |         |
13+20       0.0440      0.09  Q         | V       |         |         |
13+25       0.0446      0.09  Q         | V       |         |         |
13+30       0.0452      0.09  Q         | V       |         |         |
13+35       0.0458      0.09  Q         | V       |         |         |
13+40       0.0465      0.09  Q         | V       |         |         |
13+45       0.0471      0.09  Q         | V       |         |         |
13+50       0.0478      0.10  Q         |  V      |         |         |
13+55       0.0485      0.10  Q         |  V      |         |         |
14+ 0       0.0491      0.10  Q         |  V      |         |         |
14+ 5       0.0498      0.10  Q         |  V      |         |         |
14+10       0.0506      0.11  Q         |  V      |         |         |
14+15       0.0513      0.11  Q         |   V     |         |         |
14+20       0.0521      0.11  Q         |   V     |         |         |
14+25       0.0529      0.12  Q         |   V     |         |         |
14+30       0.0537      0.12  Q         |   V     |         |         |
14+35       0.0545      0.12  Q         |   V     |         |         |
14+40       0.0554      0.12  Q         |    V    |         |         |
14+45       0.0563      0.13  Q         |    V    |         |         |
14+50       0.0572      0.13  Q         |    V    |         |         |
14+55       0.0581      0.14  Q         |    V    |         |         |
15+ 0       0.0591      0.14  Q         |     V   |         |         |
15+ 5       0.0601      0.15  Q         |     V   |         |         |
15+10       0.0611      0.15  Q         |     V   |         |         |
15+15       0.0622      0.16  Q         |      V  |         |         |
15+20       0.0633      0.16  Q         |      V  |         |         |
15+25       0.0645      0.17  Q         |      V  |         |         |
15+30       0.0657      0.18  Q         |       V |         |         |
15+35       0.0670      0.18  Q         |       V |         |         |
15+40       0.0683      0.19  Q         |       V |         |         |
15+45       0.0697      0.20  Q         |        V|         |         |
15+50       0.0713      0.23  Q         |        V|         |         |
15+55       0.0732      0.27  |Q        |         V         |         |
16+ 0       0.0755      0.34  |Q        |         V         |         |
16+ 5       0.0789      0.49  |Q        |         |V        |         |
16+10       0.0842      0.77  |  Q      |         |  V      |         |
16+15       0.0912      1.02  |   Q     |         |    V    |         |
16+20       0.0987      1.10  |   Q     |         |      V  |         |
16+25       0.1043      0.80  |  Q      |         |       V |         |
16+30       0.1079      0.52  | Q       |         |        V|         |
16+35       0.1103      0.36  |Q        |         |         V         |
16+40       0.1121      0.26  |Q        |         |         V         |
16+45       0.1135      0.21  Q         |         |         |V        |
16+50       0.1148      0.18  Q         |         |         |V        |
16+55       0.1159      0.17  Q         |         |         |V        |
17+ 0       0.1169      0.14  Q         |         |         | V       |
17+ 5       0.1178      0.13  Q         |         |         | V       |
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17+10       0.1187      0.13  Q          |          |          | V        |
17+15       0.1195      0.12  Q          |          |          | V        |
17+20       0.1203      0.11  Q          |          |          |  V       |
17+25       0.1210      0.11  Q          |          |          |  V       |
17+30       0.1217      0.10  Q          |          |          |  V       |
17+35       0.1224      0.10  Q          |          |          |  V       |
17+40       0.1230      0.09  Q          |          |          |  V       |
17+45       0.1236      0.09  Q          |          |          |  V       |
17+50       0.1242      0.09  Q          |          |          |   V      |
17+55       0.1248      0.08  Q          |          |          |   V      |
18+ 0       0.1254      0.08  Q          |          |          |   V      |
18+ 5       0.1259      0.08  Q          |          |          |   V      |
18+10       0.1265      0.08  Q          |          |          |   V      |
18+15       0.1270      0.07  Q          |          |          |   V      |
18+20       0.1274      0.07  Q          |          |          |   V      |
18+25       0.1279      0.06  Q          |          |          |    V     |
18+30       0.1283      0.06  Q          |          |          |    V     |
18+35       0.1287      0.06  Q          |          |          |    V     |
18+40       0.1290      0.06  Q          |          |          |    V     |
18+45       0.1294      0.05  Q          |          |          |    V     |
18+50       0.1298      0.05  Q          |          |          |    V     |
18+55       0.1302      0.05  Q          |          |          |    V     |
19+ 0       0.1305      0.05  Q          |          |          |    V     |
19+ 5       0.1309      0.05  Q          |          |          |    V     |
19+10       0.1312      0.05  Q          |          |          |     V    |
19+15       0.1315      0.05  Q          |          |          |     V    |
19+20       0.1319      0.05  Q          |          |          |     V    |
19+25       0.1322      0.05  Q          |          |          |     V    |
19+30       0.1325      0.05  Q          |          |          |     V    |
19+35       0.1328      0.05  Q          |          |          |     V    |
19+40       0.1331      0.04  Q          |          |          |     V    |
19+45       0.1334      0.04  Q          |          |          |     V    |
19+50       0.1337      0.04  Q          |          |          |     V    |
19+55       0.1340      0.04  Q          |          |          |     V    |
20+ 0       0.1343      0.04  Q          |          |          |     V    |
20+ 5       0.1346      0.04  Q          |          |          |     V    |
20+10       0.1349      0.04  Q          |          |          |      V   |
20+15       0.1351      0.04  Q          |          |          |      V   |
20+20       0.1354      0.04  Q          |          |          |      V   |
20+25       0.1357      0.04  Q          |          |          |      V   |
20+30       0.1360      0.04  Q          |          |          |      V   |
20+35       0.1362      0.04  Q          |          |          |      V   |
20+40       0.1365      0.04  Q          |          |          |      V   |
20+45       0.1367      0.04  Q          |          |          |      V   |
20+50       0.1370      0.04  Q          |          |          |      V   |
20+55       0.1372      0.04  Q          |          |          |      V   |
21+ 0       0.1375      0.04  Q          |          |          |      V   |
21+ 5       0.1377      0.04  Q          |          |          |      V   |
21+10       0.1380      0.04  Q          |          |          |      V   |
21+15       0.1382      0.03  Q          |          |          |      V   |
21+20       0.1385      0.03  Q          |          |          |       V  |
21+25       0.1387      0.03  Q          |          |          |       V  |
21+30       0.1389      0.03  Q          |          |          |       V  |
21+35       0.1392      0.03  Q          |          |          |       V  |
21+40       0.1394      0.03  Q          |          |          |       V  |
21+45       0.1396      0.03  Q          |          |          |       V  |
21+50       0.1398      0.03  Q          |          |          |       V  |
21+55       0.1401      0.03  Q          |          |          |       V  |
22+ 0       0.1403      0.03  Q          |          |          |       V  |
22+ 5       0.1405      0.03  Q          |          |          |       V  |
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   22+10       0.1407      0.03  Q          |          |          |        V |
   22+15       0.1409      0.03  Q          |          |          |        V |
   22+20       0.1412      0.03  Q          |          |          |        V |
   22+25       0.1414      0.03  Q          |          |          |        V |
   22+30       0.1416      0.03  Q          |          |          |        V |
   22+35       0.1418      0.03  Q          |          |          |        V |
   22+40       0.1420      0.03  Q          |          |          |        V |
   22+45       0.1422      0.03  Q          |          |          |         V|
   22+50       0.1424      0.03  Q          |          |          |         V|
   22+55       0.1426      0.03  Q          |          |          |         V|
   23+ 0       0.1428      0.03  Q          |          |          |         V|
   23+ 5       0.1430      0.03  Q          |          |          |         V|
   23+10       0.1432      0.03  Q          |          |          |         V|
   23+15       0.1434      0.03  Q          |          |          |         V|
   23+20       0.1436      0.03  Q          |          |          |         V|
   23+25       0.1438      0.03  Q          |          |          |         V|
   23+30       0.1440      0.03  Q          |          |          |         V|
   23+35       0.1441      0.03  Q          |          |          |         V|
   23+40       0.1443      0.03  Q          |          |          |         V|
   23+45       0.1445      0.03  Q          |          |          |         V|
   23+50       0.1447      0.03  Q          |          |          |         V|
   23+55       0.1449      0.03  Q          |          |          |         V|
   24+ 0       0.1451      0.03  Q          |          |          |         V|
   24+ 5       0.1452      0.03  Q          |          |          |         V|
   24+10       0.1454      0.02  Q          |          |          |         V|
   24+15       0.1455      0.02  Q          |          |          |         V|
   24+20       0.1456      0.01  Q          |          |          |         V|
   24+25       0.1456      0.00  Q          |          |          |         V|
   24+30       0.1456      0.00  Q          |          |          |         V|
   24+35       0.1456      0.00  Q          |          |          |         V|
   24+40       0.1456      0.00  Q          |          |          |         V|
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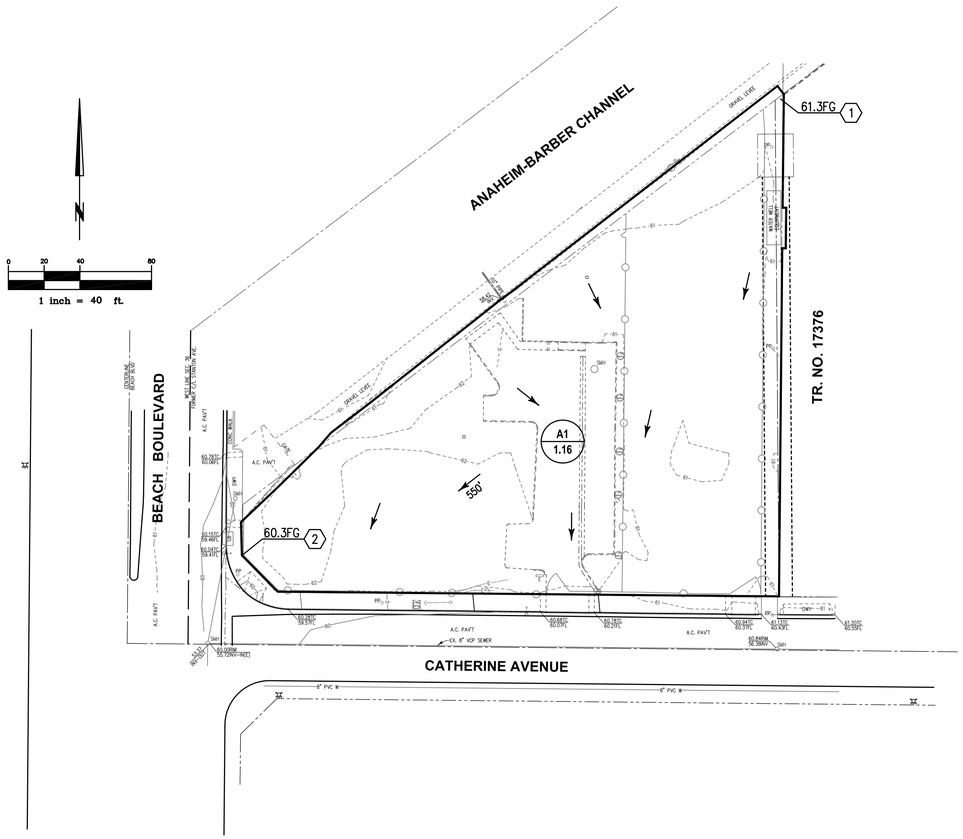
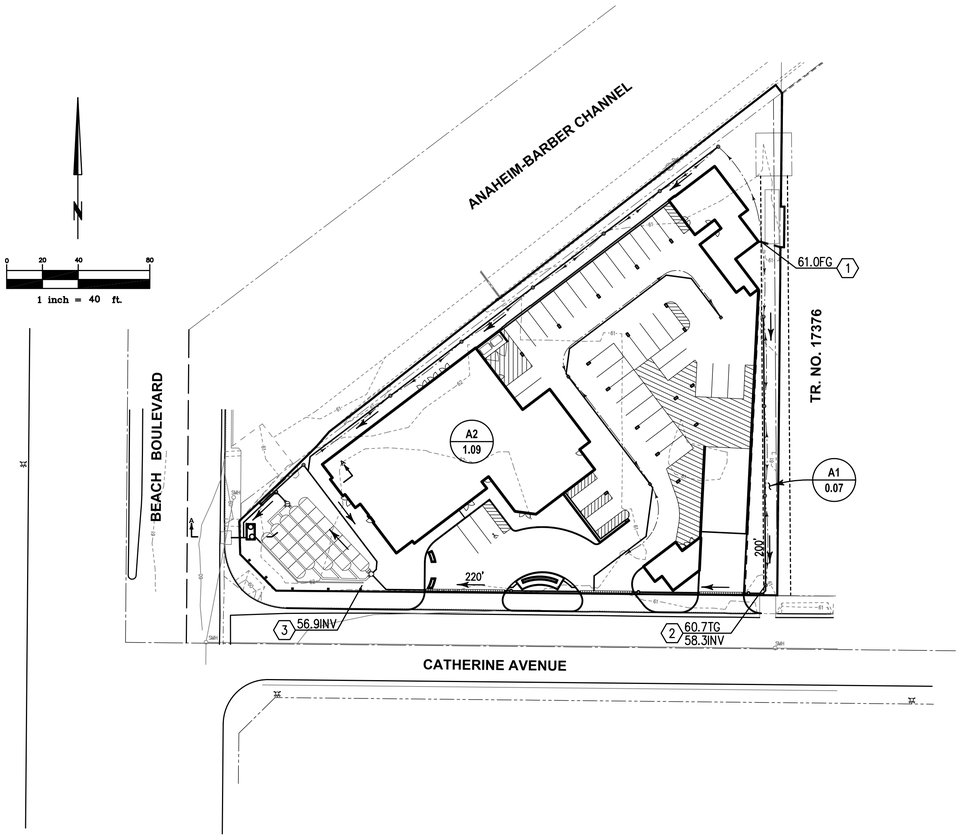


EXISTING CONDITIONS



PROPOSED CONDITIONS

LEGEND

A2	INDICATES SUBAREA DESIGNATION
1.49	INDICATES AREA IN ACRES
———	DRAINAGE BOUNDARY
- - - -	SUBAREA BOUNDARY
200'	FLOW PATH WITH LENGTH
(10)	NODE NUMBER

CIVIL ENGINEER

Sessions Consulting Engineers

1329 Shadow Lane Fullerton, CA 92831
(714) 213-8854 Email: kerry@sessionsconsulting.com

REGISTERED PROFESSIONAL ENGINEER
KERRY B. SESSIONS
No. 50461
Exp. 6-30-15
CIVIL
STATE OF CALIFORNIA

HYDROLOGY MAP

DATE: 01/07/16

ASSISTED LIVING PROJECT
12282 BEACH BLVD.
STANTON, CA

SHEET 1 OF 1

The Ocean Begins at Your Front Door

Orange County Stormwater Program

Even if you live miles from the Pacific Ocean, you may be unknowingly polluting it.

Dumping one quart of motor oil into a storm drain can contaminate 250,000 gallons of water.

Did You Know?

- Most people believe that the largest source of water pollution in urban areas comes from specific sources such as factories and sewage treatment plants. In fact, the largest source of water pollution comes from city streets, neighborhoods, construction sites and parking lots. This type of pollution is sometimes called "non-point source" pollution.
- There are two types of non-point source pollution: stormwater and urban runoff pollution.
- Stormwater runoff results from rainfall. When rainstorms cause large volumes of water to rinse the urban landscape, picking up pollutants along the way.
- Urban runoff can happen any time of the year when excessive water use from irrigation, vehicle washing and other sources carries trash, lawn clippings and other urban pollutants into storm drains.

Where Does It Go?

- Anything we use outside homes, vehicles and businesses – like motor oil, paint, pesticides, fertilizers and cleaners – can be blown or washed into storm drains.
- A little water from a garden hose or rain can also send materials into storm drains.
- Storm drains are separate from our sanitary sewer systems; unlike water in sanitary sewers (from sinks or toilets), water in storm drains is not treated before entering our waterways.

Sources of Non-Point Source Pollution

- Automotive leaks and spills.
- Improper disposal of used oil and other engine fluids.
- Metals found in vehicle exhaust, weathered paint, rust, metal plating and tires.
- Pesticides and fertilizers from lawns, gardens and farms.
- Improper disposal of cleaners, paint and paint removers.
- Soil erosion and dust debris from landscape and construction activities.
- Litter, lawn clippings, animal waste, and other organic matter.
- Oil stains on parking lots and paved surfaces.

The Effect on the Ocean

Non-point source pollution can have a serious impact on water quality in Orange County. Pollutants from the storm drain system can harm marine life as well as coastal and wetland habitats. They can also degrade recreation areas such as beaches, harbors and bays.

Stormwater quality management programs have been developed throughout Orange County to educate and encourage the public to protect water quality, monitor runoff in the storm drain system, investigate illegal dumping and maintain storm drains.

Support from Orange County residents and businesses is needed to improve water quality and reduce urban runoff pollution. Proper use and disposal of materials will help stop pollution before it reaches the storm drain and the ocean.

For More Information

California Environmental Protection Agency
www.calepa.ca.gov

- **Air Resources Board**
  www.arb.ca.gov
- **Department of Pesticide Regulation**
  www.cdpr.ca.gov
- **Department of Toxic Substances Control**
  www.dtsc.ca.gov
- **Integrated Waste Management Board**
  www.ciwmb.ca.gov
- **Office of Environmental Health Hazard Assessment**
  www.oehha.ca.gov
- **State Water Resources Control Board**
  www.waterboards.ca.gov

Earth 911 - Community-Specific Environmental Information 1-800-cleanup or visit www.1800cleanup.org

Health Care Agency's Ocean and Bay Water Closure and Posting Hotline
(714) 433-6400 or visit www.ocbeachinfo.com

Integrated Waste Management Dept. of Orange County (714) 834-6752 or visit www.oclandfills.com for information on household hazardous waste collection centers, recycling centers and solid waste collection

O.C. Agriculture Commissioner
(714) 447-7100 or visit www.ocagcomm.com

Stormwater Best Management Practice Handbook
Visit www.cabmphandbooks.com

UC Master Gardener Hotline
(714) 708-1646 or visit www.uccemg.com

The Orange County Stormwater Program has created and moderates an electronic mailing list to facilitate communications, take questions and exchange ideas among its users about issues and topics related to stormwater and urban runoff and the implementation of program elements. To join the list, please send an email to ocstormwaterinfo-join@list.ocwatersheds.com

Aliso Viejo	(949)	425-2535
Anaheim Public Works Operations	(714)	765-6860
Brea Engineering	(714)	990-7666
Buena Park Public Works	(714)	562-3655
Costa Mesa Public Services	(714)	754-5323
Cypress Public Works	(714)	229-6740
Dana Point Public Works	(949)	248-3584
Fountain Valley Public Works	(714)	593-4441
Fullerton Engineering Dept.	(714)	738-6853
Garden Grove Public Works	(714)	741-5956
Huntington Beach Public Works	(714)	536-5431
Irvine Public Works	(949)	724-6315
La Habra Public Services	(562)	905-9792
La Palma Public Works	(714)	690-3310
Laguna Beach Water Quality	(949)	497-0378
Laguna Hills Public Services	(949)	707-2650
Laguna Niguel Public Works	(949)	362-4337
Laguna Woods Public Works	(949)	639-0500
Lake Forest Public Works	(949)	461-3480
Los Alamitos Community Dev.	(562)	431-3538
Mission Viejo Public Works	(949)	470-3056
Newport Beach, Code & Water Quality Enforcement	(949)	644-3215
Orange Public Works	(714)	532-6480
Placentia Public Works	(714)	993-8245
Rancho Santa Margarita	(949)	635-1800
San Clemente Environmental Programs	(949)	361-6143
San Juan Capistrano Engineering	(949)	234-4413
Santa Ana Public Works	(714)	647-3380
Seal Beach Engineering	(562)	431-2527 x317
Stanton Public Works	(714)	379-9222 x204
Tustin Public Works/Engineering	(714)	573-3150
Villa Park Engineering	(714)	998-1500
Westminster Public Works/Engineering	(714)	898-3311 x446
Yorba Linda Engineering	(714)	961-7138
Orange County Stormwater Program	(877)	897-7455

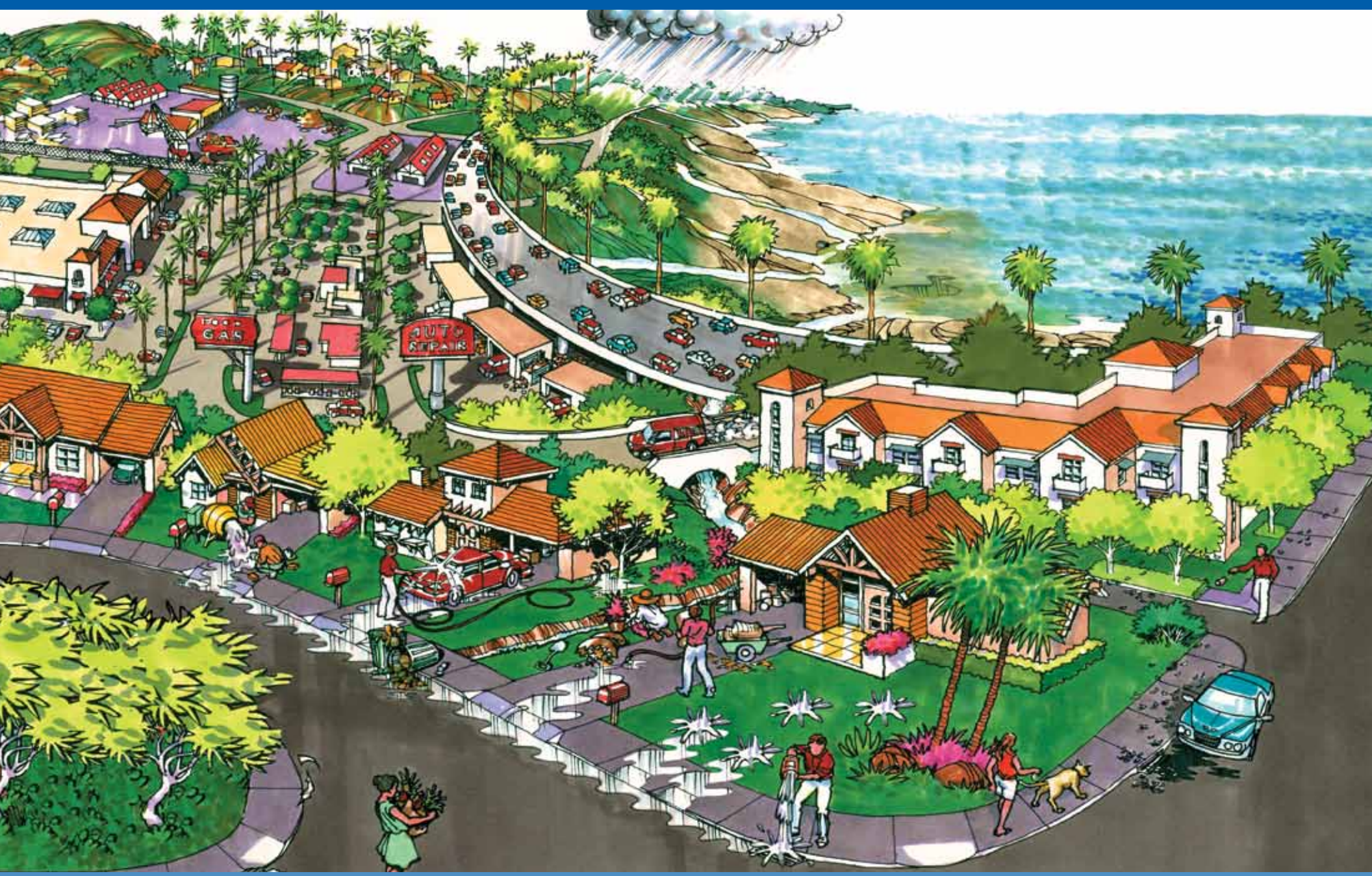
Orange County 24-Hour
Water Pollution Problem Reporting Hotline
1-877-89-SPILL (1-877-897-7455)

On-line Water Pollution Problem Reporting Form

www.ocwatersheds.com

Printed on Recycled Paper

The Ocean Begins at Your Front Door



Never allow pollutants to enter the street, gutter or storm drain!

Follow these simple steps to help reduce water pollution:

Household Activities

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

Automotive

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate- free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

Pool Maintenance

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

Landscape and Gardening

- Do not over-water. Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oclandfills.com.

Trash

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

Pet Care

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

Common Pollutants

Home Maintenance
- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

Lawn and Garden
- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

Automobile
- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

Do your part to prevent water pollution in our creeks, rivers, bays and ocean.

Clean beaches and healthy creeks, rivers, bays, and ocean are important to Orange County. However, many common household activities can lead to water pollution if you're not careful.

REMEMBER THE WATER IN YOUR STORM DRAIN IS NOT TREATED BEFORE IT ENTERS OUR WATERWAYS

Litter, oil, chemicals and other substances that are left on your yard or driveway can be blown or washed into storm drains that flow to the ocean. Over-watering your lawn and washing your car can also flush materials into the storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated.

You would never pour soap, fertilizers or oil into the ocean, so don't let them enter streets, gutters or storm drains. Follow the easy tips in this brochure to help prevent water pollution.

The tips contained in this brochure provide useful information to help prevent water pollution while performing everyday household activities.

For more information, or to report a spill during normal business hours, please call the City of Orange Public Works Department at (714) 532-6480 or visit www.cityoforange.org.

To report a spill after normal business hours or on weekends, please call the City of Orange 24-Hour Water Pollution Problem Reporting Hotline at (714) 538-1961.

For emergencies, dial 911.

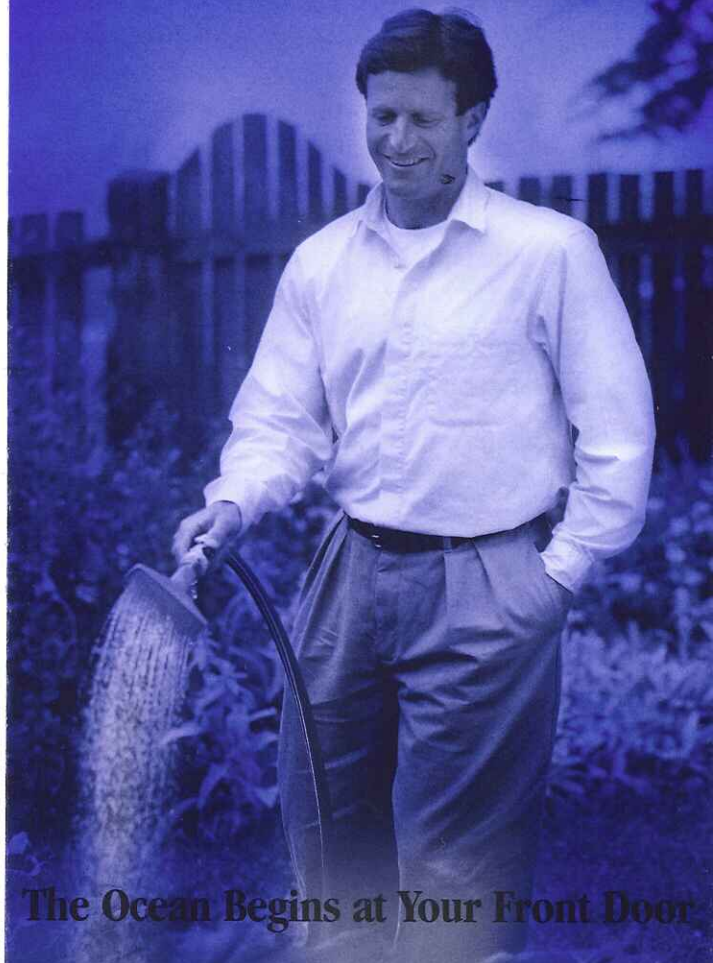
GENUINE RECYCLED PAPER

50% PRE-CONSUMER AND 15% POST-CONSUMER

RECYCLE USED OIL

Help Prevent Ocean Pollution:

Household Tips



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Do your part to prevent water pollution in our creeks, rivers, bays and ocean.

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, not properly disposing of household hazardous waste can lead to water pollution. Batteries, electronics, paint, oil, gardening chemicals, cleaners and other hazardous materials cannot be thrown in the trash. They also must never be poured or thrown into yards, sidewalks, driveways, gutters or streets. Rain or other water could wash the materials into the storm drain and eventually into our waterways and the ocean. In addition, hazardous waste must not be poured in the sanitary sewers (sinks and toilets).

NEVER DISPOSE OF HOUSEHOLD HAZARDOUS WASTE IN THE TRASH, STREET, GUTTER, STORM DRAIN OR SEWER.

For more information,
please call the
Orange County Stormwater Program
at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

To Report Illegal Dumping of Household Hazardous Waste call 1-800-69-TOXIC

To report a spill,
call the
Orange County 24-Hour Water Pollution Problem Reporting Hotline
1-877-89-SPILL (1-877-897-7455).

For emergencies, dial 911.

RECYCLE USED OIL

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Help Prevent Ocean Pollution:

Proper Disposal of Household Hazardous Waste

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

ORANGE COUNTY

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Fertilizers, pesticides and other chemicals that are left on yards or driveways can be blown or washed into storm drains that flow to the ocean. Overwatering lawns can also send materials into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour gardening products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.

For more information,
please call the
Orange County Stormwater Program
at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

UCCE Master Gardener Hotline:
(714) 708-1646

To report a spill,
call the
Orange County 24-Hour
Water Pollution Problem
Reporting Hotline
1-877-89-SPILL (1-877-897-7455).

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

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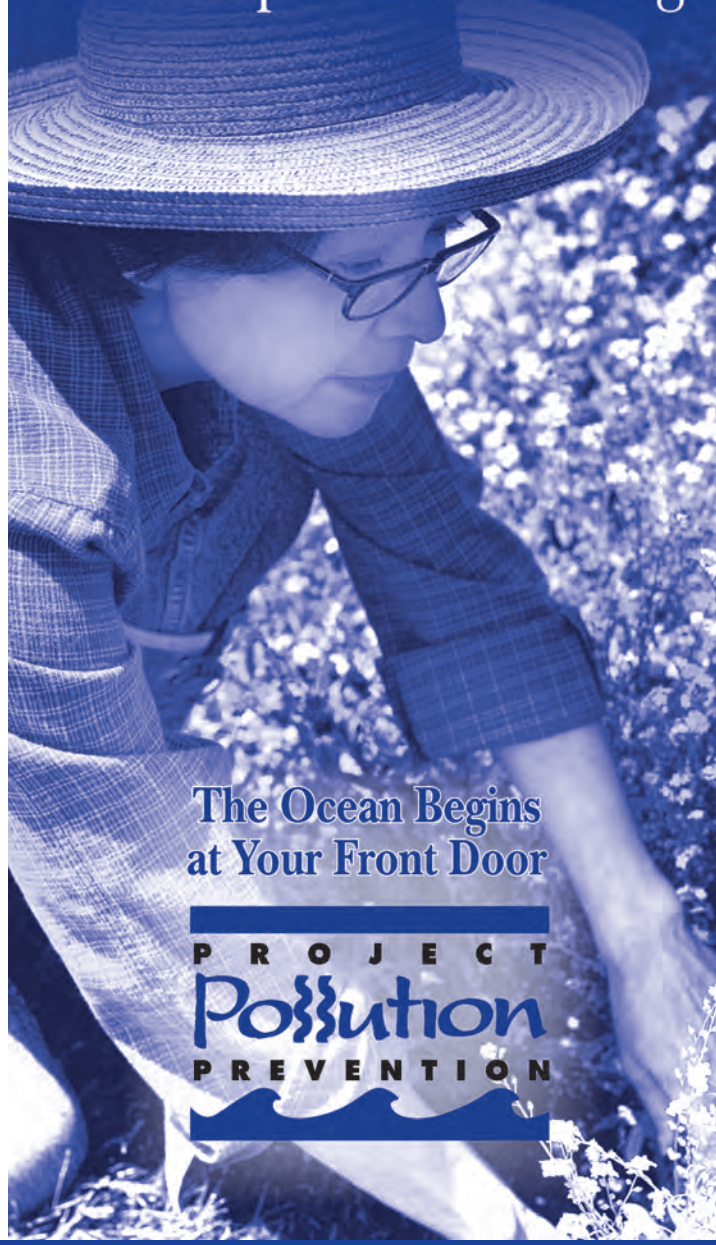
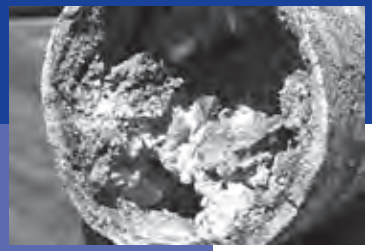
Help Prevent Ocean Pollution:

Tips for Landscape & Gardening



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION



Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. Fats, oils and grease from restaurants and food service facilities can cause sewer line blockages that may result in sewage overflow into your facility and into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways and should never contain washwater, trash, grease or other materials.

You would never dump oil and trash into the ocean, so don't let it enter the storm drains. Follow these tips to help prevent water pollution.

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com**

Report sewage spills and discharges that are not contained to your site to the **Orange County 24-Hour Water Pollution Problem Reporting Hotline** at **1-877-89-SPILL** (1-877-897-7455)

For emergencies, dial 911.

CALIFORNIA Restaurant ASSOCIATION SINCE 1906

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Help Prevent Ocean Pollution:

Tips for the Food Service Industry

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Best Kitchen Practices

Food Waste Disposal

- Scrape food waste off of plates, utensils, pots, food preparation and cooking areas and dispose of it in the trash.
- Never put food waste down the drain. Food scraps often contain grease, which can clog sewer pipes and result in sewage backups and overflows.

Grease & Oil Disposal

- Never put oil or grease down the drain. Contain grease and oil by using covered grease storage containers or installing a grease interceptor.
- Never overfill your grease storage container or transport it without a cover.
- Grease control devices must be emptied and cleaned by permitted companies.
- Keep maintenance records on site.

- For a list of oil/grease recycling companies, contact the CIWMB at **www.ciwmb.ca.gov/foodwaste/render.htm** or contact your local sanitation district.

Minor Spill Cleanup

- Always use dry cleanup methods, such as a rag, damp mop or broom.
- Never hose a spill into the street, gutter or storm drain.

Major Spill Cleanup

- Have spill containment and clean-up kits readily available, and train all employees on how to use them.
- Immediately contain and clean the spill using dry methods.
- If the spill leaves your site, call **(714) 567-6363**.

Dumpster Cleanup

- Pick up all debris around the dumpster.
- Always keep the lid on the dumpster closed.
- Never pour liquids into the dumpster or hose it out.

Floor Mat Cleaning

- Sweep the floor mats regularly, discarding the debris into the trash.
- Hose off the mats in a mop sink, at a floor drain, or in an outdoor area that can contain the water.
- Never hose the mats in an area where the wastewater can flow to the street, gutter or storm drain.

Washwater Disposal

- Dispose of washwater in a mop sink or an area with a floor drain.
- Never dispose of washwater in the street, gutter or storm drain.

PROJECT Pollution PREVENTION

Tips for Landscape & Gardening

Never allow gardening products or polluted water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.

- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.

- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.

- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.

- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.

- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.

- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.

- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.

- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.

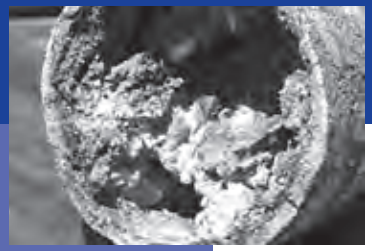
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.

- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

Household Hazardous Waste Collection Centers

Anaheim:	1071 N. Blue Gum St.
Huntington Beach:	17121 Nichols St.
Irvine:	6411 Oak Canyon
San Juan Capistrano:	32250 La Pata Ave.

For more information, call (714) 834-6752 or visit www.oclandfills.com



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CALIFORNIA Restaurant ASSOCIATION SINCE 1906

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Help Prevent Ocean Pollution:

Tips for the Food Service Industry

The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

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- For a list of oil/grease recycling companies, contact the CIWMB at **www.ciwmb.ca.gov/foodwaste/render.htm** or contact your local sanitation district.

Minor Spill Cleanup

- Always use dry cleanup methods, such as a rag, damp mop or broom.
- Never hose a spill into the street, gutter or storm drain.

Major Spill Cleanup

- Have spill containment and clean-up kits readily available, and train all employees on how to use them.
- Immediately contain and clean the spill using dry methods.
- If the spill leaves your site, call **(714) 567-6363**.

Dumpster Cleanup

- Pick up all debris around the dumpster.
- Always keep the lid on the dumpster closed.
- Never pour liquids into the dumpster or hose it out.

Floor Mat Cleaning

- Sweep the floor mats regularly, discarding the debris into the trash.
- Hose off the mats in a mop sink, at a floor drain, or in an outdoor area that can contain the water.
- Never hose the mats in an area where the wastewater can flow to the street, gutter or storm drain.

Washwater Disposal

- Dispose of washwater in a mop sink or an area with a floor drain.
- Never dispose of washwater in the street, gutter or storm drain.

PROJECT Pollution PREVENTION

Preventing water pollution at your commercial/industrial site

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many landscape and building maintenance activities can lead to water pollution if you're not careful. Paint, chemicals, plant clippings and other materials can be blown or washed into storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour soap or fertilizers into the ocean, so why would you let them enter the storm drains? Follow these easy tips to help prevent water pollution.

Some types of industrial facilities are required to obtain coverage under the State General Industrial Permit. For more information visit: **www.swrcb.ca.gov/stormwater/industrial.html**

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com**

To report a spill, call the **Orange County 24-Hour Water Pollution Problem Reporting Hotline** at **1-877-89-SPILL** (1-877-897-7455).

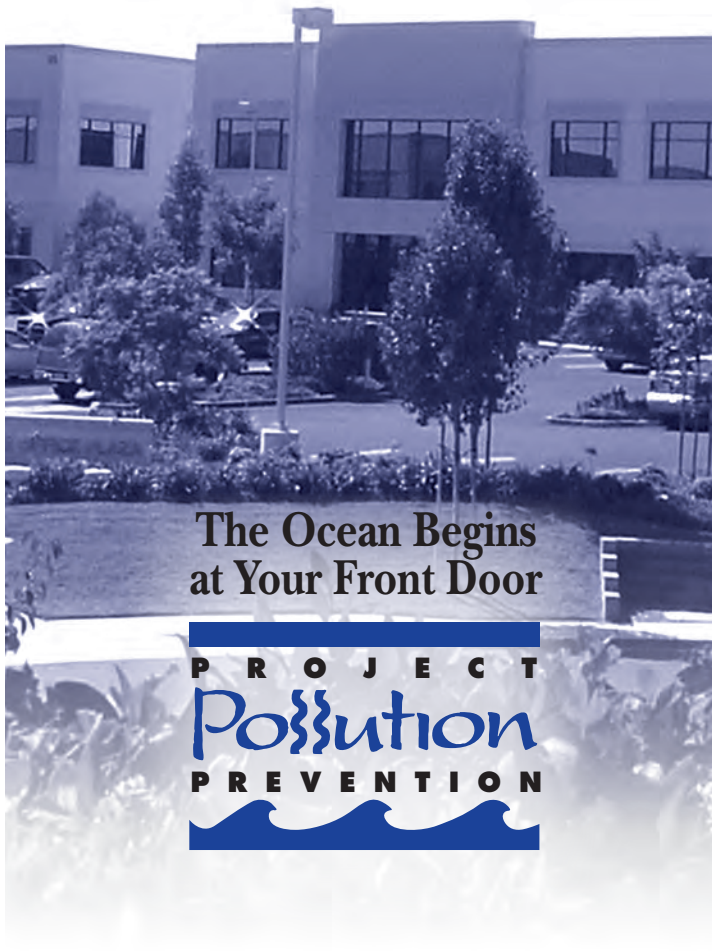
For emergencies, dial 911.

RECYCLE USED OIL

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Proper Maintenance Practices for Your Business



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Proper Maintenance Practices for your Business

Landscape Maintenance

- Compost grass clippings, leaves, sticks and other vegetation, or dispose of it at a permitted landfill or in green waste containers. Do not dispose of these materials in the street, gutter or storm drain.
- Irrigate slowly and inspect the system for leaks, overspraying and runoff. Adjust automatic timers to avoid overwatering.
- Follow label directions for the use and disposal of fertilizers and pesticides.
- Do not apply pesticides or fertilizers if rain is expected within 48 hours or if wind speeds are above 5 mph.
- Do not spray pesticides within 100 feet of waterways.
- Fertilizers should be worked into the soil rather than dumped onto the surface.
- If fertilizer is spilled on the pavement or sidewalk, sweep it up immediately and place it back in the container.

Building Maintenance

- Never allow washwater, sweepings or sediment to enter the storm drain.
- Sweep up dry spills and use cat litter, towels or similar materials to absorb wet spills. Dispose of it in the trash.
- If you wash your building, sidewalk or parking lot, you **must** contain the water. Use a shop vac to collect the water and contact your city or sanitation agency for proper disposal information. Do not let water enter the street, gutter or storm drain.
- Use drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of materials in the trash.
- Use a ground cloth or oversized tub for mixing paint and cleaning tools.
- Use a damp mop or broom to clean floors.
- Cover dumpsters to keep insects, animals, rainwater and sand from entering. Keep the area around the dumpster clear of trash and debris. Do not overfill the dumpster.
- Call your trash hauler to replace leaking dumpsters.
- Do not dump any toxic substance or liquid waste on the pavement, the ground, or near a storm drain. Even materials that seem harmless such as latex paint or biodegradable cleaners can damage the environment.

NEVER DISPOSE OF ANYTHING IN THE STORM DRAIN.

- Recycle paints, solvents and other materials. For more information about recycling and collection centers, visit **www.oclandfills.com**.
- Store materials indoors or under cover and away from storm drains.
- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry, carpet, plastic, pipes, drywall, rocks, dirt, and green waste. For a listing of construction and demolition recycling locations in your area, visit **www.ciwmb.ca.gov/recycle.**
- Properly label materials. Familiarize employees with Material Safety Data Sheets.

PROJECT Pollution PREVENTION