UPDATE
GEOTECHNICAL REPORT

DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

PARDEE HOMES
SAN DIEGO, CALIFORNIA

JUNE 24, 2016
PROJECT NO. 05439-42-95

Project No. 05439-42-95
June 24, 2016

Pardee Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, California 92128

Attention: Mr. Allen Kashani

Subject: UPDATE GEOTECHNICAL REPORT
DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

Dear Mr. Kashani:

In accordance with your request, we have prepared an update geotechnical report for the subject project. The site is underlain by Terrace Deposits and compacted fill that was placed during grading for the Del Mar Highlands Estates development.

The accompanying report presents the findings of our study, and our conclusions and recommendations pertaining to geotechnical aspects of developing the property. Based on the results of our field study, it is our opinion that the site can be developed as currently proposed, provided the recommendations of this report are followed.

Should you have questions regarding this investigation, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

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TABLE OF CONTENTS

TABLE OF CONTENTS (Concluded)

UPDATE GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This update geotechnical report is specific to the Affordable Housing (Lot 149) which is part of the Del Mar Highlands Estates development located in San Diego, California (see Vicinity Map, Figure 1). The purpose of this report is to provide geotechnical recommendations for continued development of the lot and to evaluate surface and subsurface soil conditions, general site geology, and to identify geotechnical constraints, if any, that might impact development of the property. This report is based on our review of the referenced as-graded report, recent field and laboratory testing, geologic review and interpretation, and engineering analyses.

To prepare this update report, we reviewed the following references:

1. *Affordable Site Plan, San Diego, California,* prepared by Latitude 33, dated June 10, 2016.
2. *Affordable Site Plan Alternate, San Diego, California,* prepared by Latitude 33, dated June 10, 2016.
3. *Final Report of Testing and Observation Services During Site Grading, Del Mar Highlands Estates (Lots 1 through 147), San Diego, California,* prepared by Geocon Incorporated, dated May 26, 1999 (Project No. 05439-42-02).
4. *Update Geotechnical Investigation for Del Mar Highlands, Map No. 94-0576, San Diego, California,* prepared by Geocon Incorporated, dated January 21, 1997 (Project No. 05439-42-01).

The scope of our field study included a review of the referenced reports and plans, a field investigation, infiltration testing, engineering analyses, laboratory testing, and preparation of this report. The field investigation consisted of excavating 12, exploratory trenches to examine the underlying soils within portions of the property. The infiltration testing consisted of performing 6, field-saturated hydraulic conductivity tests using an Aardvark Permeameter. The locations of the exploratory trenches and infiltration tests are shown the Geologic Map, Figure 2 (Map Pocket). Logs of the exploratory borings and a detailed discussion of the field investigation are presented in Appendix A.

We performed laboratory tests on selected soil samples obtained during the field investigation to evaluate pertinent physical properties for engineering analyses and to assist in providing recommendations for site grading and foundation design criteria. Details of the laboratory testing and a summary of test results are presented in Appendix B.

We performed 12, constant-head, hydraulic-conductivity tests (infiltration tests) at the locations shown on Figure 2. The tests were conducted in 8-inch-diameter boreholes using a Soilmoisture

Equipment Corp Aardvark Permeameter. The results of the hydraulic-conductivty testing and information relating to geotechnical aspects of storm water management are provided in Appendix C.

The conclusions and recommendations presented herein are based on our analysis of the data obtained from the exploratory field investigation, laboratory test results, our experience with similar soil and geologic conditions on this and adjacent properties, and our review of the as-graded report.

2. PREVIOUS GRADING

Previous grading on the property has resulted in the placement of structural fill across the pad. Fill thicknesses range from approximately 4 feet at the north end of the property to 70 feet near the southeast corner. A subdrain was installed in the canyon drainage. The approximate location of the existing subdrain is shown on the Geologic Map (Figure 2). Grading for the site was performed in conjunction with compaction testing and observation services by Geocon Incorporated. Compaction test results, as well as professional opinions pertaining to the previous grading are summarized in Geocon's report dated May 1999 (Reference No. 3).

3. SITE AND PROJECT DESCRIPTION

The Affordable Housing site is situated on Lot 149 of Del Mar Highlands Estates development located in the Del Mar Heights area of San Diego, California. The site is bordered on the north, south, and east by open space and on the west by an existing multi-family complex. Cut and fill slopes were constructed during previous grading around the north, east, and south perimeter of the lot. The cut slope on the north side of the lot is approximately 20 feet tall. Fill slopes on the east and south side of the lot are approximately 20 to 50 feet high. The slopes were constructed at an approximate 2:1 (horizontal:vertical) or flatter inclination.

Topographically, the site generally slopes from northwest to southeast with elevations ranging from a high of approximately 94 feet Mean Sea Level (MSL) to near 81 feet MSL across the sheet graded area.

A temporary detention basin, approximately 5 to 9 feet deep, is located at the southeast corner of the lot. A 30-inch CMP riser tied to an 18-inch RCP storm drain pipe outlets to a permanent basin located down gradient at the bottom of the slope. The permanent basin discharges through a 6-foot spillway that daylight to the canyon drainage southeast of the site.

Based on the CAD file provided by the project civil engineer, a multi-family building, Building 1, is proposed which will include a private driveway, hardscape walkways, and minor landscaping. In addition, a tot lot is planned just north of the building, and two, 1.5-foot deep basins, are planned between the building and existing covered car ports. To reach proposed building pad grade, 1 to 4 feet of fill will be required based on the elevations shown on the plans.

The locations and descriptions above are based on our field studies and review of the referenced grading plans. If development plans differ significantly from those described herein, Geocon Incorporated should be contacted for review and possible revisions to this report.

4. SOIL AND GEOLOGIC CONDITIONS

Based on review of previous as-graded geotechnical reports and observations during our subsurface investigation, the site is underlain by compacted fill and the Terrace Deposits. The soil and geologic unit are described below. Their approximate lateral extent is shown on the Geologic Map, Figure 2 and on the Geologic Cross-Sections A-A’ and B-B’, Figure 3 (Map Pocket).

4.1 Compacted Fill (Qcf)

Compacted fill placed during grading of the Del Mar Highlands Estates underlies the site. Geocon Incorporated provided observation and compaction testing during placement of the compacted fill. Fill thickness ranges from approximately 4 to 70 feet below existing grade. The approximate limits of previously compacted fills are shown on the geologic map. Grading for the site was completed May 1999. Based on recent field study, the upper portion (approximately 2 feet) of compacted fill is weathered and disturbed from the many years of wetting and drying cycles and will require remedial grading to support planned improvements.

4.2 Terrace Deposits

Terrace deposits underlie the compacted fill and is exposed on the slopes north and east of the property. The terrace deposits generally consist of dense, silty to clayey sand. The terrace deposits are suitable for the support of additional fill and settlement-sensitive structures.

5. GROUNDWATER

We did not encounter groundwater during our investigation; however, it is not uncommon for groundwater or seepage conditions to develop where none previously existed. Based on previous grading, groundwater is expected to be greater than 70 feet below the existing ground surface. Groundwater elevation is dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result. Proper surface drainage will be important to future performance of the project.

6. GEOLOGIC HAZARDS

6.1 Geologic Hazard Category

The *City of San Diego, Seismic Safety Study, Geologic Hazards and Faults (2008)* categorizes the site as *Geologic Hazard Category 53: Level or sloping terrain, unfavorable geologic structure, Low to moderate risk.*

It is our opinion, based on review of geologic literature and our knowledge of the general area, that the site is not underlain by active, potentially active, or inactive faults. The site is not located within State of California Earthquake Fault Zone.

6.2 Faulting and Seismicity

We used the computer program *EZ-FRISK* (2016) locate known active faults within a search radius of 50 miles from the property. The nearest known active fault is the Newport-Inglewood/Rose Canyon Fault Zone, located less than 4 miles west of the site. The Newport-Inglewood/Rose Canyon Fault Zone is the dominant source of potential ground motion. Earthquakes that might occur on the Newport-Inglewood/Rose Canyon Fault Zone or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated deterministic maximum earthquake magnitude and peak ground acceleration for the Newport-Inglewood/Rose Canyon Fault are 7.5 and 0.42g, respectively. Table 6.2.1 lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relationship to the site location. We calculated peak ground acceleration (PGA) using Boore and Atkinson (2008), Campbell and Bozorgnia (2008), and Chiou and Youngs (2007) acceleration-attenuation relationships.

TABLE 6.2.1
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson NGA USGS 2008 (g)	Campbell-Bozorgnia NGA USGS 2008 (g)	Chiou-Youngs (2007) NGA USGS 2008 (g)
Newport-Inglewood/Rose Canyon	4	7.5	0.35	0.24	0.42
Rose Canyon	4	6.9	0.31	0.31	0.36
Coronado Bank	18	7.4	0.20	0.14	0.17
Palos Verdes/Coronado Bank	18	7.7	0.22	0.15	0.20
Elsinore	29	7.85	0.18	0.12	0.15
Earthquake Valley	40	6.8	0.09	0.06	0.05
Palos Verdes	45	7.3	0.10	0.07	0.07
San Joaquin Hills	49	7.1	0.09	0.08	0.07

We used the computer program *EZ-FRISK* to perform a probabilistic seismic hazard analysis. The computer program *EZ-FRISK* operates under the assumption that the occurrence rate of earthquakes on each mapped Quaternary fault is proportional to the fault slip rate. The program accounts for earthquake magnitude as a function of fault rupture length. Site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore and Atkinson (2008), Campbell and Bozorgnia (2008), and Chiou and Youngs (2007) in the analysis. Table 6.2.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 6.2.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson NGA USGS 2008 (g)	Campbell-Bozorgnia NGA USGS 2008 (g)	Chiou-Youngs (2007) NGA USGS 2008 (g)
2% in a 50 Year Period	0.50	0.44	0.52
5% in a 50 Year Period	0.37	0.32	0.36
10% in a 50 Year Period	0.28	0.24	0.26

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the site. Seismic design of the structures should be evaluated in accordance with the California Building Code (CBC).

6.3 Ground Rupture

The risk associated with ground rupture hazard is low due to the absence of active faults at the subject site.

6.4 Liquefaction and Seismically Induced Settlement

The risk associated with soil liquefaction hazard at the site is low due to the dense nature of the compacted fill and underlying terrace deposits.

6.5 Landslides

Based on our review of published geologic maps of the site vicinity, it is our opinion landslides are not present at the property or at a location that could impact the site.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 From a geotechnical engineering standpoint, it is our opinion that the site is suitable for the proposed improvements provided the recommendations presented herein are implemented in design and construction of the project.

7.1.2 The site is underlain by approximately 4 to 70 feet of compacted fill overlying the terrace deposits. Moisture conditioning and recompaction of the upper portions of the compacted fill will be required in areas to receive structural fill or settlement-sensitive improvements.

7.1.3 We did not encounter groundwater at the time of our investigation. No subdrains will be required on the project, with the exception of retaining wall subdrains (if any).

7.1.4 The site is located approximately 4 miles from the nearest active fault, the Newport-Inglewood/Rose Canyon Fault Zone. It is our opinion that active or potentially active faults do not cross the site.

7.1.5 The risk associated with geologic hazards due to ground rupture, liquefaction, and landslides are low.

7.2 Excavation and Soil Characteristics

7.2.1 Excavation of the site soil should be possible with moderate to heavy effort using conventional heavy-duty equipment.

7.2.2 Based on the referenced as-graded report and the different soil types encountered during our recent field investigation, the onsite fill soils is expected to be both “non-expansive” (expansion index [EI] of 20 or less) and “expansive” (EI greater than 20) as defined by 2013 California Building Code (CBC) Section 1803.5.3. Table 7.2 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possess a *low* to *medium* expansion potential (EI of 90 or less).

TABLE 7.2
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2013 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 We previously performed laboratory tests on samples of the site soils to check the percentage of water-soluble sulfate content during original grading for the Del Mar Highlands Estates development. Results from the previous laboratory water-soluble sulfate content tests presented in the referenced as-graded report indicate that the on-site materials tested during original grading typically possess "Not Applicable" and "S0" sulfate exposure to concrete structures as defined by 2013 CBC Section 1904 and ACI 318-11 Sections 4.2 and 4.3. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

7.2.4 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be needed if improvements susceptible to corrosion are planned.

7.3 Canyon Subdrains

7.3.1 With the exception of the existing canyon subdrain installed during the original grading and subdrains for potential retaining walls, no other subdrains will be required.

7.4 Grading

7.4.1 All grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix D. Where the recommendations of Appendix D conflict with this section of the report, the recommendations of this section take precedence.

7.4.2 Prior to commencing grading, a preconstruction conference should be held at the site with the owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

7.4.3 Grading should be performed in conjunction with the observation and compaction testing services of Geocon Incorporated. Fill soil should be observed on a full-time basis during placement and tested to check in-place dry density and moisture content.

7.4.4 Site preparation should begin with removal of all deleterious material and vegetation. The depth of removal should be such that material exposed in cut areas or soil to be used for fill is relatively free of organic matter. Deleterious material generated during stripping and/or site demolition should be exported from the site.

7.4.5 If the basin at the southeast corner of the site will be abandoned, inlet and outlet pipes, concrete headwall, CMP riser, and buried utility lines associated with the basin should be completely removed. All demolished material generated during removal should be exported from the site.

7.4.6 In areas that will receive engineered fill, settlement sensitive structures, or surface improvements (concrete hardscape, pavement) the upper 2 foot of soil below existing grade should be removed, moisture conditioned to above optimum moisture content, and recompacted to a dry density of at least 90 percent of maximum dry density near as determined in accordance with ASTM Test Procedure D 1557. The remedial grading should extend at least 5 feet beyond the proposed improvements where possible. The project geotechnical engineer should observe the base of removals to assess if additional removal depths are necessary based on exposed conditions. If loose or otherwise unsuitable soil is encountered, additional removals may be required. The actual extent of unsuitable soil removals should be determined in the field by the soil engineer and/or engineering geologist.

7.4.7 Prior to placing fill in the temporary detention basin, loose soil should be removed until dense compacted fill is exposed. This includes loose soil on the basin side slopes in areas that will be graded.

7.4.8 Prior to placing fill, the upper 12 inches of soil should be scarified, moisture conditioned as necessary and recompacted. Soils derived from onsite excavations are suitable for reuse as fill if free from vegetation, debris and other deleterious material. Fill lifts should be no thicker than will allow for adequate bonding and compaction. Fill, backfill, and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of maximum dry density slightly above optimum moisture content, as determined in accordance with ASTM Test Procedure D 1557. Fill or backfill with in-place density test results indicating moisture contents less than optimum will require additional moisture conditioning prior to placing fill.

7.4.9 Imported fill (if necessary) should consist of granular soil with a "very low" to "low" expansion potential (EI of 50 or less) that is free of deleterious material or stones larger than 3 inches and should be compacted as recommended above. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing prior to its arrival at the site to evaluate its suitability as fill material.

7.5 Slope Stability

7.5.1 Slope stability analyses for the existing fill slope at the south side of the lot was performed using the computer program Slope/W produced by GeoStudio. The analysis utilized estimated shear strength parameters. Based on our analysis, the existing fill slope has a calculated factors of safety of at least 1.5 under static conditions with respect to deep-seated failure. Results of the analysis is presented on Figure 4. Figure 5 presents the stability analysis with respect to and shallow sloughing conditions, which also indicates a calculated factor of safety of at least 1.5.

7.5.2 All slopes should be landscaped with drought-tolerant vegetation having variable root depths and requiring minimal landscape irrigation. In addition, all slopes should be drained and properly maintained to reduce erosion. Slope planting should generally consist of drought tolerant plants having a variable root depth. Slope watering should be kept to a minimum to just support the plant growth.

7.6 Seismic Design Criteria

7.6.1 We used the computer program *U.S. Seismic Design Maps* (USGS, 2016). Table 7.6.1 summarizes site-specific design criteria obtained from the 2013 California Building Code (CBC; Based on the 2012 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 second. The building structure and improvements should be designed using a Site Class D. We evaluated the site class based on the discussion in Section 1613.3.2 of the 2013 CBC and Table 20.3-1 of ASCE 7-10. The values presented in Table 7.6.1 are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 7.6.1
2013 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2013 CBC Reference
Site Class	D	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.075g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.414g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.070	Table 1613.3.3(1)
Site Coefficient, F_V	1.586	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.150g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.657g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.767g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.483g	Section 1613.3.4 (Eqn 16-40)

7.6.2 Table 7.6.1 presents additional seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCEG).

TABLE 7.6.2
2013 CBC SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.439g	Figure 22-7
Site Coefficient, F_{PGA}	1.061	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.466g	Section 11.8.3 (Eqn 11.8-1)

7.6.3 Conformance to the criteria in Tables 7.6.1 and 7.6.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.7 Foundation and Concrete Slabs-On-Grade Recommendations

7.7.1 The following foundation recommendations assume the proposed multi-family structure, Building 1, will be bear entirely on competent compacted fill and that the prevailing soil within 3 feet of the footing will consist of soil with an Expansion Index (EI) less than 50. If soil with an Expansion Index greater than 50 is encountered or present within the upper 3 feet, foundation modifications may be necessary.

7.7.2 Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Continuous footings should be at least 12 inches wide and extend at least 24 inches below lowest adjacent pad grade. Isolated spread footings should have a minimum width of 24 inches and should extend at least 24 inches below lowest adjacent pad grade. Steel reinforcement for continuous footings should consist of at least four, No. 5 steel, reinforcing bars placed horizontally in the footings, two near the top and two near the bottom. The project structural engineer should design the concrete reinforcement for the spread footings. A typical footing dimension detail is provided on Figure 6.

7.7.3 Foundations may be designed for an allowable soil bearing pressure of 2,000 pounds per square foot (psf) (dead plus live load) for footings founded in properly compacted fill. This soil bearing pressure may be increased by 500 psf for each additional foot of foundation width and depth up to a maximum allowable soil bearing pressure of 3,500 psf. The allowable bearing pressure may also be increased by up to one-third for transient loads such as those due to wind or seismic forces.

7.7.4 The minimum foundation dimensions and steel reinforcement recommendations presented above are based on soil characteristics only and are not intended to replace reinforcement required for structural considerations.

7.7.5 We expect settlement due to footing loads conforming to the above recommended allowable soil bearing pressures are expected to be less than 1-inch total and ¾-inch differential over a span of 40 feet.

7.7.6 No special subgrade presaturation is deemed necessary prior to placing concrete, however, the exposed foundation and slab subgrade soils should be sprinkled to maintain a moist condition as would be expected in any such concrete placement.

7.7.7 Interior concrete slabs-on-grade should be at least 5 inches thick and reinforced with No. 3 bars spaced 12 inches on center in both directions placed at the slab midpoint. The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting planned loading. Thicker concrete slabs may be required for heavier loads.

7.7.8 A vapor retarder should underlie slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials (ACI 302.2R-06). The membrane should be installed in a manner that prevents puncture in accordance with manufacturer's recommendations and ASTM requirements. The project architect or developer should specify the type of vapor retarder used based on the type of floor covering that will be installed and if the structure will possess a humidity controlled environment.

7.7.9 The project foundation engineer, architect, and/or developer should determine the thickness of bedding sand below the slab. Generally, a 3-to 4-inch sand cushion is used. However, Geocon should be contacted to provide recommendations if the bedding sand is thicker than 6 inches.

7.7.10 The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the specifications presented on the foundation plans.

7.7.11 As an alternative to the conventional foundation recommendations, consideration could be given to the use of post-tensioned concrete slab and foundation systems for the support of the proposed structures. The post-tensioned systems should be designed by a structural engineer experienced in post-tensioned slab design and design criteria of the Post-Tensioning Institute (PTI), Third Edition, as required by the 2013 California Building Code (CBC Section 1808.6). Although this procedure was developed for expansive soil conditions, it can also be used to reduce the potential for foundation distress due to differential fill settlement. The post-tensioned design should incorporate the geotechnical parameters presented on Table 7.7.1. The parameters presented in Table 7.7.1 are based on the guidelines presented in the PTI, Third Edition design manual.

TABLE 7.7.1
POST-TENSIONED FOUNDATION SYSTEM DESIGN PARAMETERS

Post-Tensioning Institute (PTI), Third Edition Design Parameters	Foundation Category
Thornthwaite Index	-20
Equilibrium Suction	3.9
Edge Lift Moisture Variation Distance, e_M (feet)	4.9
Edge Lift, y_M (inches)	1.58
Center Lift Moisture Variation Distance, e_M (feet)	9.0
Center Lift, y_M (inches)	0.66

7.7.12 The foundations for the post-tensioned slab should be embedded in accordance with the recommendations of the structural engineer. If a post-tensioned mat foundation system is planned, the slab should possess a thickened edge with a minimum width of 12 inches and extend at least 6 inches below the clean sand or crushed rock layer.

7.7.13 If the structural engineer proposes a post-tensioned foundation design method other than PTI, Third Edition:

- The deflection criteria presented in Table 7.7.1 are still applicable.
- Interior stiffener beams should be used for the foundation system.
- The width of the perimeter foundations should be at least 12 inches.
- The perimeter footing embedment depths should be at least 24 inches. The embedment depths should be measured from the lowest adjacent pad grade.

7.7.14 Our experience indicates post-tensioned slabs are susceptible to excessive edge lift, regardless of the underlying soil conditions. Placing reinforcing steel at the bottom of the perimeter footings and the interior stiffener beams may mitigate this potential. The placement of the reinforcing tendons in the top of the slab and the resulting eccentricity after tensioning could reduce the ability of the system to mitigate edge lift. The structural engineer should design the foundation system to reduce the potential of edge lift occurring for the proposed structures.

7.7.15 During the construction of the post-tension foundation system, the concrete should be placed monolithically. Under no circumstances should cold joints form between the footings/grade beams and the slab during the construction of the post-tension foundation system.

7.7.16 The use of isolated spread footings located beyond the perimeter of the building that support structural elements connected to the building, are not recommended. Where this condition cannot be avoided, the isolated spread footings should be connected to the building foundation system via tie beams.

7.7.17 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. The project structural engineer should provide dowelling details.

7.7.18 A representative of Geocon Incorporated should observe the foundation excavations prior to the placement of reinforcing steel to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. If unexpected soil conditions are encountered, modifications to the foundation may be required.

7.7.19 Exterior slabs not subject to vehicular traffic should be at least 4 inches thick. All slabs with horizontal dimensions exceeding 8 feet should be reinforced with 6x6-6/6 welded wire mesh to reduce the potential for cracking. Proper mesh positioning is critical to future performance of the slab. The mesh should be placed within the upper one-third of the slab. The contractor should take extra measures to provide proper mesh placement. Prior to construction of slabs, the subgrade should be moisture conditioned to at least optimum moisture content and compacted to a dry density of at least 90 percent of the laboratory maximum dry density.

7.7.20 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisture conditioned, as necessary, to maintain a moist condition as would be expected in any such concrete placement.

7.7.21 Where buildings or other improvements are planned near the top of a slope steeper than 3:1 (horizontal:vertical), special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- For fill slopes less than 20 feet high or cut slopes regardless of height, building footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

- When located next to a descending 3:1 (horizontal:vertical) fill slope or steeper, the foundations should be extended to a depth where the minimum horizontal distance is equal to H/3 (where H equals the vertical distance from the top of the fill slope to the base of the fill soil) with a minimum of 7 feet but need not exceed 40 feet. The horizontal distance is measured from the outer, deepest edge of the footing to the face of the slope. A post-tensioned slab and foundation system or mat foundation system can be used to help reduce potential foundation distress associated with slope creep and lateral fill extension. Specific design parameters or recommendations for either of these alternatives can be provided if desired.

- Swimming pools located within 7 feet of the top of cut or fill slopes are not recommended. Where such a condition cannot be avoided, the portion of the swimming pool wall within 7 feet of the slope face be designed assuming that the adjacent soil provides no lateral support. This recommendation applies to fill slopes up to 30 feet in height, and cut slopes regardless of height. For swimming pools located near the top of fill slopes greater than 30 feet in height, additional recommendations may be required and Geocon Incorporated should be contacted for a review of specific site conditions.

- Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures which would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

7.7.22 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. The occurrence may be reduced and/or controlled by: limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.8 Retaining Walls and Lateral Loads

7.8.1 Retaining walls that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 35 pcf. Where the backfill will be inclined at 2:1 (horizontal:vertical), an active soil pressure of 50 pcf is recommended. Expansive soil should not be used as backfill material behind retaining walls. Soil placed for retaining wall backfill should have an Expansion Index less than 50.

7.8.2 Where walls are restrained from movement at the top, an additional uniform pressure of 8H psf (where H equals the height of the retaining wall portion of the wall in feet) should be added to the active soil pressure where the wall possesses a height of 8 feet or less and 12H where the wall is greater than 8 feet. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to two feet of fill soil should be added.

7.8.3 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil or import soil to be used as backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be consulted to assess the suitability of the on-site soil or import soil for use as wall backfill if standard wall designs will be used.

7.8.4 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The wall designer should provide appropriate lateral deflection quantities for planned retaining walls structures, if applicable. These lateral values should be considered when planning types of improvements above retaining wall structures.

7.8.5 Retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and should be waterproofed as required by the project architect. The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The above recommendations assume a properly compacted granular (EI $\leq$50) free-draining backfill material with no hydrostatic forces or imposed surcharge load. A typical retaining wall drainage detail is presented on Figure 7. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

7.8.6 In general, wall foundations having a minimum embedment depth and width of 12 inches may be designed for an allowable soil bearing pressure of 2,000 psf. The values presented above are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

7.8.7 The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, Geocon Incorporated should be consulted where such a condition is anticipated. As a minimum, wall footings should be deepened such that the bottom outside edge of the footing is at least seven feet from the face of slope when located adjacent and/or at the top of descending slopes.

7.8.8 The structural engineer should determine the seismic design category for the project in accordance with Section 1613 of the CBC. If the project possesses a seismic design category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 18.3.5.12 of the 2013 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. A seismic load of 22H should be used for design. We used the peak ground acceleration adjusted for Site Class effects, PGA_M, of 0.466g calculated from ASCE 7-10 Section 11.8.3 and applied a pseudo-static coefficient of 0.33.

7.8.9 For resistance to lateral loads, a passive earth pressure equivalent to a fluid density of 300 pcf is recommended for footings or shear keys poured neat against properly compacted granular fill soils or undisturbed formation materials. The passive pressure assumes a horizontal surface extending away from the base of the wall at least five feet or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material not protected by floor slabs or pavement should not be included in the design for lateral resistance. Where walls are planned adjacent to and/or on descending slopes, a passive pressure of 150 pcf should be used in design.

7.8.10 An allowable friction coefficient of 0.35 may be used for resistance to sliding between soil and concrete. This friction coefficient may be combined with the passive earth pressure when determining resistance to lateral loads.

7.9 Slope Maintenance

7.9.1 Slopes that are steeper than 3:1 (horizontal:vertical) may, under conditions which are both difficult to prevent and predict, be susceptible to near surface (surficial) slope instability. The instability is typically limited to the outer three feet of a portion of the slope and usually does not directly impact the improvements on the pad areas above or below the slope. The occurrence of surficial instability is more prevalent on fill slopes and is generally preceded by a period of heavy rainfall, excessive irrigation, or the migration of subsurface seepage. The disturbance and/or loosening of the surficial soils, as might result from root growth, soil expansion, or excavation for irrigation lines and slope planting, may also be a significant contributing factor to surficial instability. It is, therefore, recommended that, to the maximum extent practical: (a) disturbed/loosened surficial soils be either removed or properly recompacted, (b) irrigation systems be periodically inspected and maintained to eliminate leaks and excessive irrigation, and (c) surface drains on and adjacent to slopes be periodically maintained to preclude ponding or erosion. It should be noted that although the incorporation of the above recommendations should reduce the potential for surficial slope instability, it will not eliminate the possibility, and, therefore, it may be necessary to rebuild or repair a portion of the project's slopes in the future.

7.10 Storm Water Management

7.10.1 If storm water management devices are not properly designed and constructed, there is a risk for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water being detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff into the subsurface occurs, downstream improvements may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

7.10.2 We performed an infiltration study on the property. A summary of our study and storm water management recommendations are provided in Appendix C. Based on the results of our study, full or partial infiltration is considered infeasible.

7.11 Site Drainage and Moisture Protection

7.11.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2013 CBC 1804.3 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.11.2 In the case of basement walls or building walls retaining landscaping areas, a waterproofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

7.11.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.11.4 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that subdrains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material.

7.12 Grading and Foundation Plan Review

7.12.1 Geocon Incorporated should review the grading and foundation plans for the project prior to final design submittal to determine if additional analysis and/or recommendations are required.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

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N

NO SCALE

VICINITY MAP

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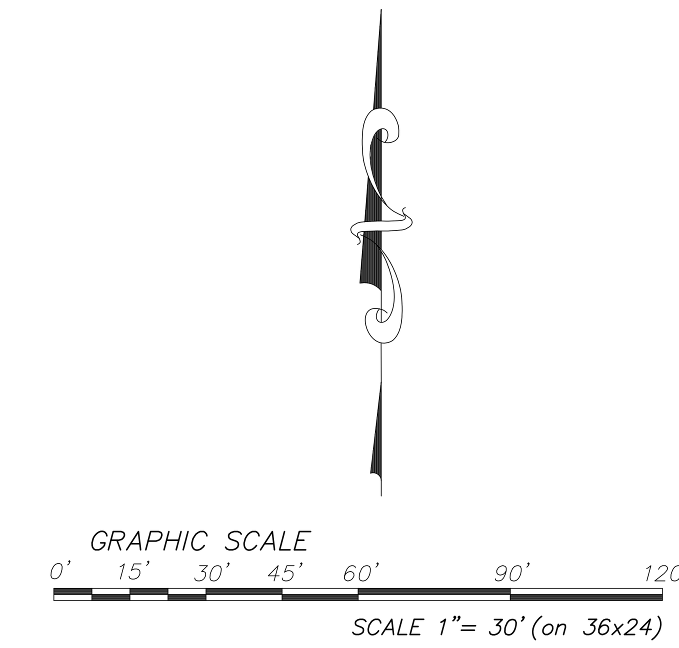
DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 06 - 24 - 2016	PROJECT NO. 05439 - 42 - 95	FIG. 1



GEOCON LEGEND

Qcf ....COMPACTED FILL
Quc........COMPACTED FILL IN UNDERCUT AREA
Qal........ALLUVIUM (Dotted Where Buried)
Qt........TERRACE DEPOSITS (Dotted Where Buried)
........APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
A-6 ....APPROX. LOCATION OF INFILTRATION TEST
T-12 ....APPROX. LOCATION OF EXPLORATORY TRENCH
........APPROX. LOCATION OF EXISTING SUBDRAIN
93 ....APPROX. ELEVATION AT BASE OF FILL

GEOLOGIC MAP

DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

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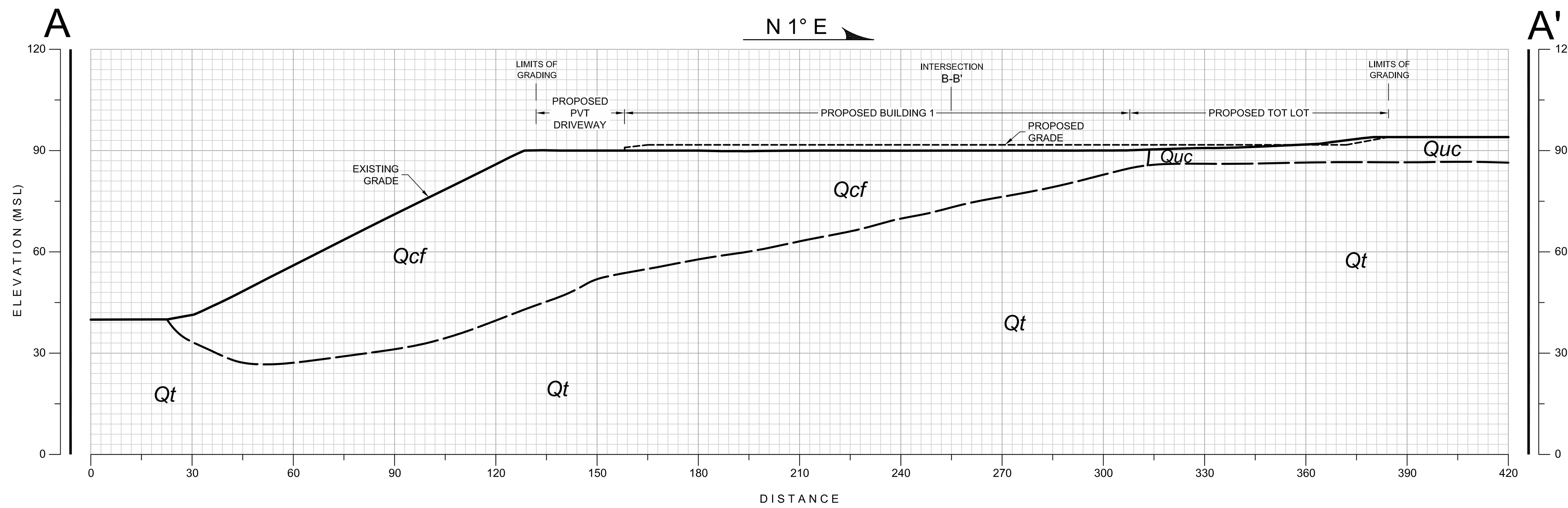
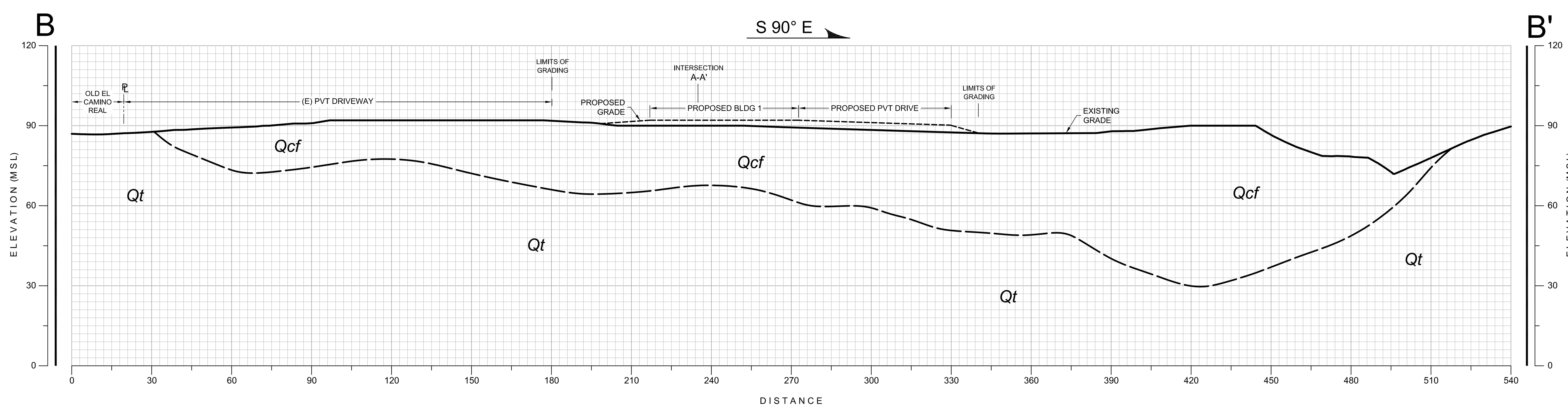
SCALE 1" = 30'	DATE 06 - 24 - 2016
PROJECT NO. 05439 - 42 - 95	FIGURE 2
SHEET 1 OF 1	

Plotted:06/24/2016 9:31AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\05439-42-95 (Del Mar Highlands)\SHEETS\05439-42-95 Geo Map.dwg



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 30' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 30' (Vert. = Horiz.)

GEOCON LEGEND

Qcf ......COMPACTED FILL

Quc ......COMPACTED FILL IN UNDERCUT AREA

Qt ......TERRACE DEPOSITS

......APPROX. LOCATION OF GEOLOGIC CONTACT

GEOLOGIC CROSS SECTION

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SCALE 1" = 30	DATE 06 - 24 - 2016
PROJECT NO. 05439 - 42 -95	FIGURE 3
SHEET 1 OF 1	

LADRILLONO

Plotted:06/24/2016 9:40AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\05439-42-95 (Del Mar Highlands)\SHEETS\05439-42-95 XSection.dwg

Del Mar Highlands Estates - Affordable Housing
Project No. 05439-42-95
Section A-A'
Name: A-A'_Fig. 4 Static.gsz
Date: 6/24/2016
MATERIAL PROPERTIES:
Name: Qcf - Compacted Fill Unit Weight: 125 pcf Cohesion: 300 psf Phi: 28 °
Name: Qt - Terrace Deposits Unit Weight: 125 pcf Cohesion: 300 psf Phi: 30 °

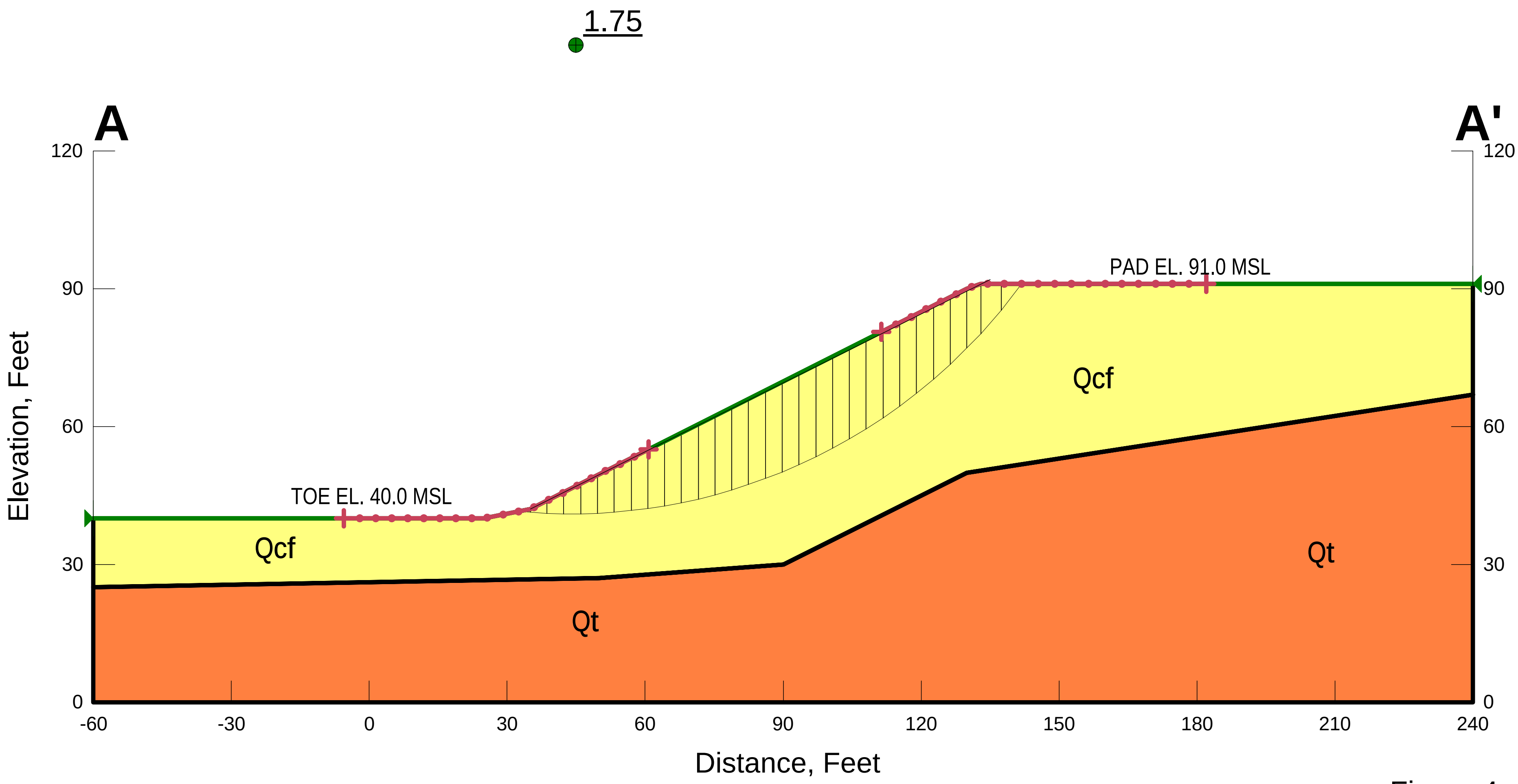

Figure 4

ASSUMED CONDITIONS :

SLOPE HEIGHT	H	= Infinite
DEPTH OF SATURATION	Z	= 3 feet
SLOPE INCLINATION	2 : 1	(Horizontal : Vertical)
SLOPE ANGLE	i	= 26.6 degrees
UNIT WEIGHT OF WATER	γ_w	= 62.4 pounds per cubic foot
TOTAL UNIT WEIGHT OF SOIL	γ_t	= 125 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ	= 28 degrees
APPARENT COHESION	C	= 300 pounds per square foot

SLOPE SATURATED TO VERTICAL DEPTH Z BELOW SLOPE FACE

SEEPAGE FORCES PARALLEL TO SLOPE FACE

ANALYSIS :

$$FS = \frac{C + (\gamma_t - \gamma_w)\ Z\ cos^2\ i\ tan\ \phi}{\gamma_t\ Z\ sin\ i\ cos\ i} = 2.5$$

REFERENCES :

1......Haefeli, R. *The Stability of Slopes Acted Upon by Parallel Seepage*, Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62

2......Skempton, A. W., and F.A. Delory, *Stability of Natural Slopes in London Clay*, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81

SURFICIAL SLOPE STABILITY ANALYSIS

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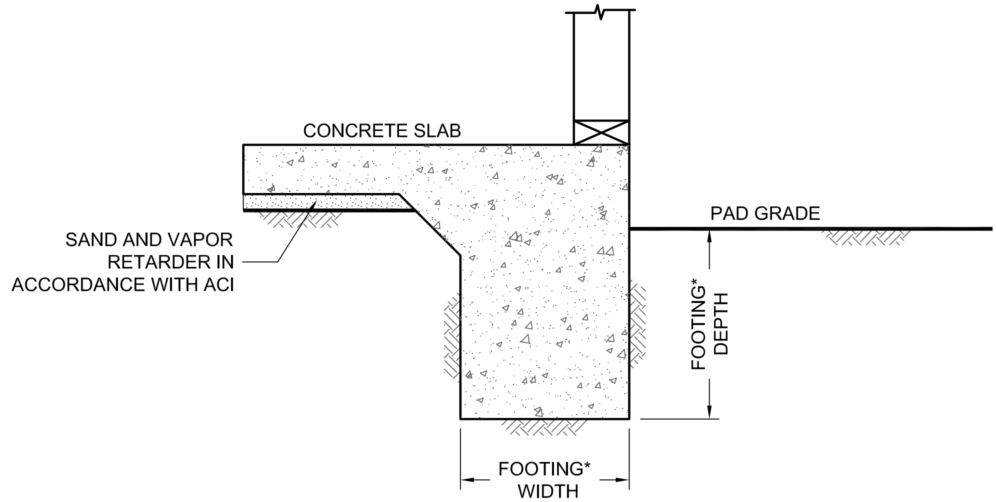
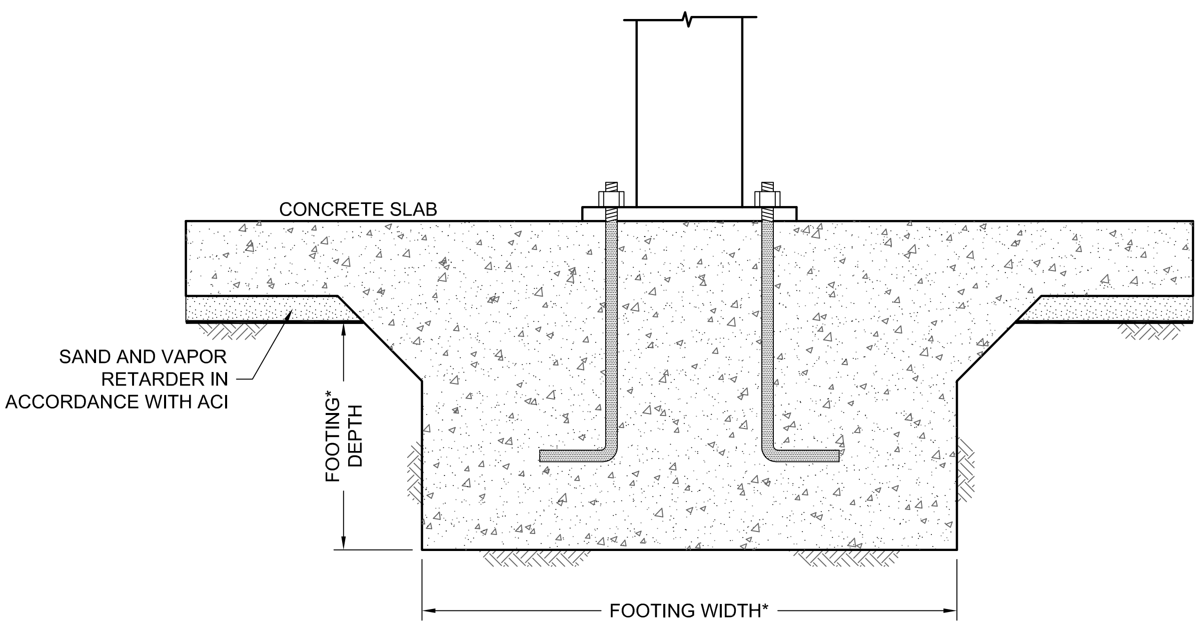
RM / AML		DSK/GTYPD	DATE 06 - 24 - 2016	PROJECT NO. 05439 - 42 - 95	FIG. 5





*....SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

NO SCALE

WALL / COLUMN FOOTING DIMENSION DETAIL

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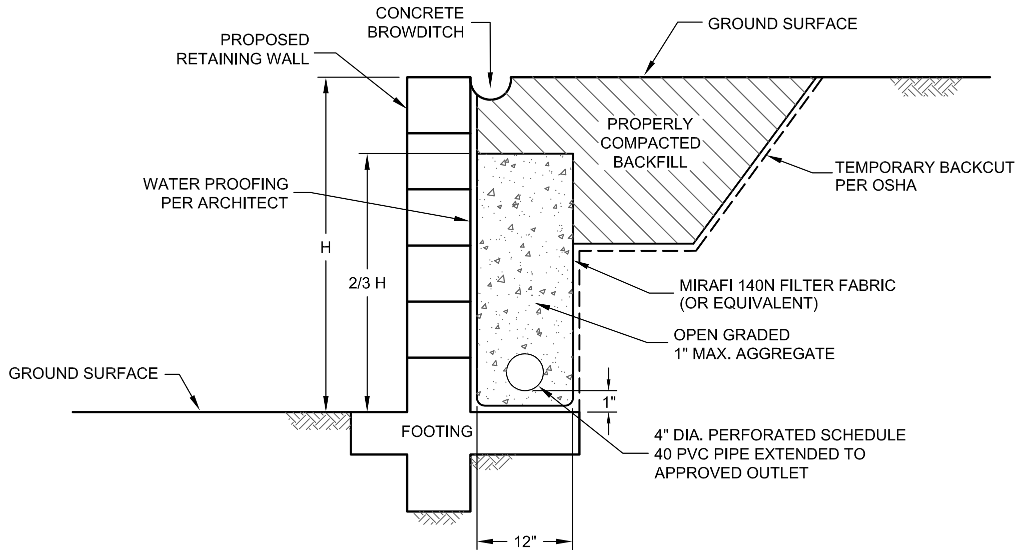
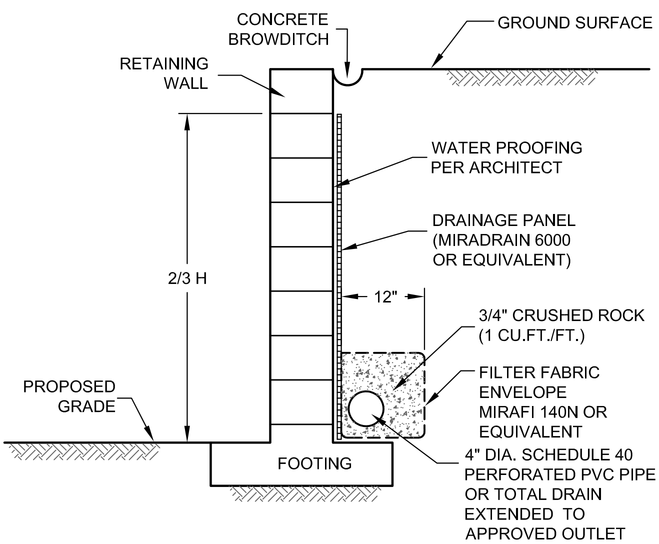
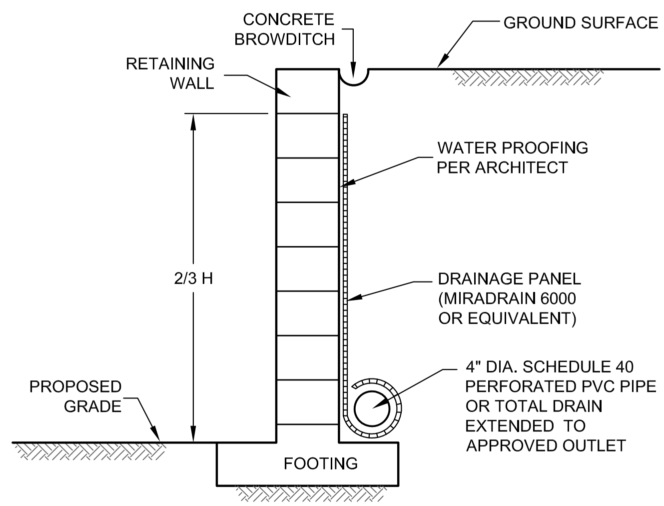
RM / AML		DSK/GTYPD	DATE 06 - 24 - 2016	PROJECT NO. 05439 - 42 - 95	FIG. 6







NOTE :

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET
OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

NO SCALE

TYPICAL RETAINING WALL DRAIN DETAIL

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RM / AML		DSK/GTYPD	DATE 06 - 24 - 2016	PROJECT NO. 05439 - 42 - 95	FIG. 7

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

Fieldwork for our investigation included excavating 12 exploratory trenches and performing 6 Aardvark infiltration tests. The exploratory trenches were excavated on June 20, 2016, using a John Deere 410 backhoe equipped with a 2-foot-wide bucket. The approximate locations of the exploratory trenches are shown on the Geologic Map, Figure 2. The trenches were located in the field based on visual reference points. Therefore, actual trench locations may deviate slightly. Logs of our trenches are presented as Figures A-1 through A-12. The logs depict the soil and geologic conditions encountered.

The soil encountered in the borings were visually examined, classified, and logged in general accordance with American Society for Testing and Materials (ASTM) practice for Description and Identification of Soils (Visual-Manual Procedure D 2488). The logs depict the soil and geologic conditions observed and the depth at which samples were obtained.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 1 ELEV. (MSL.) 93' DATE COMPLETED 06-20-2016 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COMPACTED FILL (Qcf)** Loose, dry, dark olive brown to brown, Silty, fine to medium SAND, few gravel; severely weathered in upper 2 feet			
2					-Medium dense, dry to damp, brown and white, Silty, fine to medium SAND; interbedded lense of fine to medium SAND with trace silt			
					-Medium dense, damp, mottled brown and light brown, Silty, fine to medium SAND; trace gravel			
4								
					TRENCH TERMINATED AT 5 FEET			

Figure A-1,
Log of Trench T 1, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 05439-42-95

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**TRENCH T 2** ELEV. (MSL.) **90'** DATE COMPLETED **06-20-2016** EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COMPACTED FILL (Qcf)** Loose, dry, dark olive brown to brown, Silty, fine to medium SAND, few gravel; severely weathered in upper 2 feet			
2					-Medium dense, dry to damp, brown and white, Silty, fine to medium SAND; interbedded lense of fine to medium SAND with trace silt			
					-Medium dense, damp, mottled brown and light brown, Silty, fine to medium SAND; trace gravel			
4								
					TRENCH TERMINATED AT 5 FEET			

Figure A-2,
Log of Trench T 2, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 05439-42-95

TRENCH T 3

ELEV. (MSL.) 93' DATE COMPLETED 06-20-2016

EQUIPMENT JD 410 BACKHOE BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**COMPACTED FILL (Qcf)** Loose to medium dense, dry, brown to light brown, Silty, fine to medium SAND; severely weathered in upper 3 feet; few gravel			
2								
					-Becomes medium dense			
4								
				SM	**TERRACE DEPOSITS (Qt)** Medium dense, damp, brown, Silty, fine to medium SAND			
6								
8					TRENCH TERMINATED AT 8 FEET			

Figure A-3,
Log of Trench T 3, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 4 ELEV. (MSL.) 92' DATE COMPLETED 06-20-2016 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COMPACTED FILL (Qcf)** Medium dense, damp, brown and light gray, Silty, fine to medium SAND; trace gravel			
2								
4				SM	**TERRACE DEPOSITS (Qt)** Medium dense, damp, brown to light brown, Silty, fine to medium SAND			
					TRENCH TERMINATED AT 5 FEET			

Figure A-4,
Log of Trench T 4, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

TRENCH T 5

ELEV. (MSL.) **92'** DATE COMPLETED **06-20-2016**

EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**COMPACTED FILL (Qcf)** Medium dense, damp, brown and light gray, Silty, fine to medium SAND; trace gravel			
2								
4				SM	**TERRACE DEPOSITS (Qt)** Medium dense, damp, brown to light brown, Silty, fine to medium SAND			
					TRENCH TERMINATED AT 5 FEET			

Figure A-5,
Log of Trench T 5, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

TRENCH T 6

ELEV. (MSL.) **93'** DATE COMPLETED **06-20-2016**

EQUIPMENT **JD 410 BACKHOE** BY: **N. BORJA**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry to damp, brown, Silty, fine to medium SAND; few gravel			
2								
4								
				SP	Medium dense, dry to damp, light gray to white, fine to medium SAND; few silt			
					TRENCH TERMINATED AT 5 FEET			

Figure A-6,
Log of Trench T 6, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

TRENCH T 7

ELEV. (MSL.) 93' DATE COMPLETED 06-20-2016

EQUIPMENT JD 410 BACKHOE BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry to damp, brown, Silty, fine to medium SAND; few gravel			
2								
4								
				SP	Medium dense, dry to damp, light gray to white, fine to medium SAND; few silt			
6					TRENCH TERMINATED AT 6 FEET			

Figure A-7,
Log of Trench T 7, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 8 ELEV. (MSL.) 91' DATE COMPLETED 06-20-2016 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry to damp, mottled brown and light gray, Silty, fine to medium SAND; little gravel			
2								
					-Becomes light gray			
4								
					TRENCH TERMINATED AT 4.5 FEET			

Figure A-8,
Log of Trench T 8, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 05439-42-95

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 9 ELEV. (MSL.) 90' DATE COMPLETED 06-20-2016 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry to damp, brown, Silty, fine to medium SAND; few gravel and cobble			
2					-Becomes yellowish brown and light brown			
4					TRENCH TERMINATED AT 4 FEET			

Figure A-9,
Log of Trench T 9, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. 05439-42-95

TRENCH T 10

ELEV. (MSL.) 86' DATE COMPLETED 06-20-2016

EQUIPMENT JD 410 BACKHOE BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry to damp, light brown to brown, Silty, fine to medium SAND; few gravel and cobble			
2								
4								
					TRENCH TERMINATED AT 5 FEET			

Figure A-10,
Log of Trench T 10, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

TRENCH T 11

ELEV. (MSL.) 88' DATE COMPLETED 06-20-2016

EQUIPMENT JD 410 BACKHOE BY: N. BORJA

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry, brown, Silty, fine to medium SAND; trace gravel			
2				SP	Medium dense, damp, light gray and light yellowish brown, fine to medium SAND; little silt; trace gravel			
					TRENCH TERMINATED AT 3.5 FEET			

Figure A-11,
Log of Trench T 11, Page 1 of 1

05439-42-95.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 12 ELEV. (MSL.) 90' DATE COMPLETED 06-20-2016 EQUIPMENT JD 410 BACKHOE BY: N. BORJA	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**COMPACTED FILL (Qcf)** Medium dense, dry, brown, Silty, fine to medium SAND; trace gravel			
					-Becomes light gray and light brown			
2								
					TRENCH TERMINATED AT 3 FEET			

Figure A-12,
Log of Trench T 12, Page 1 of 1

05439-42-95.GPJ

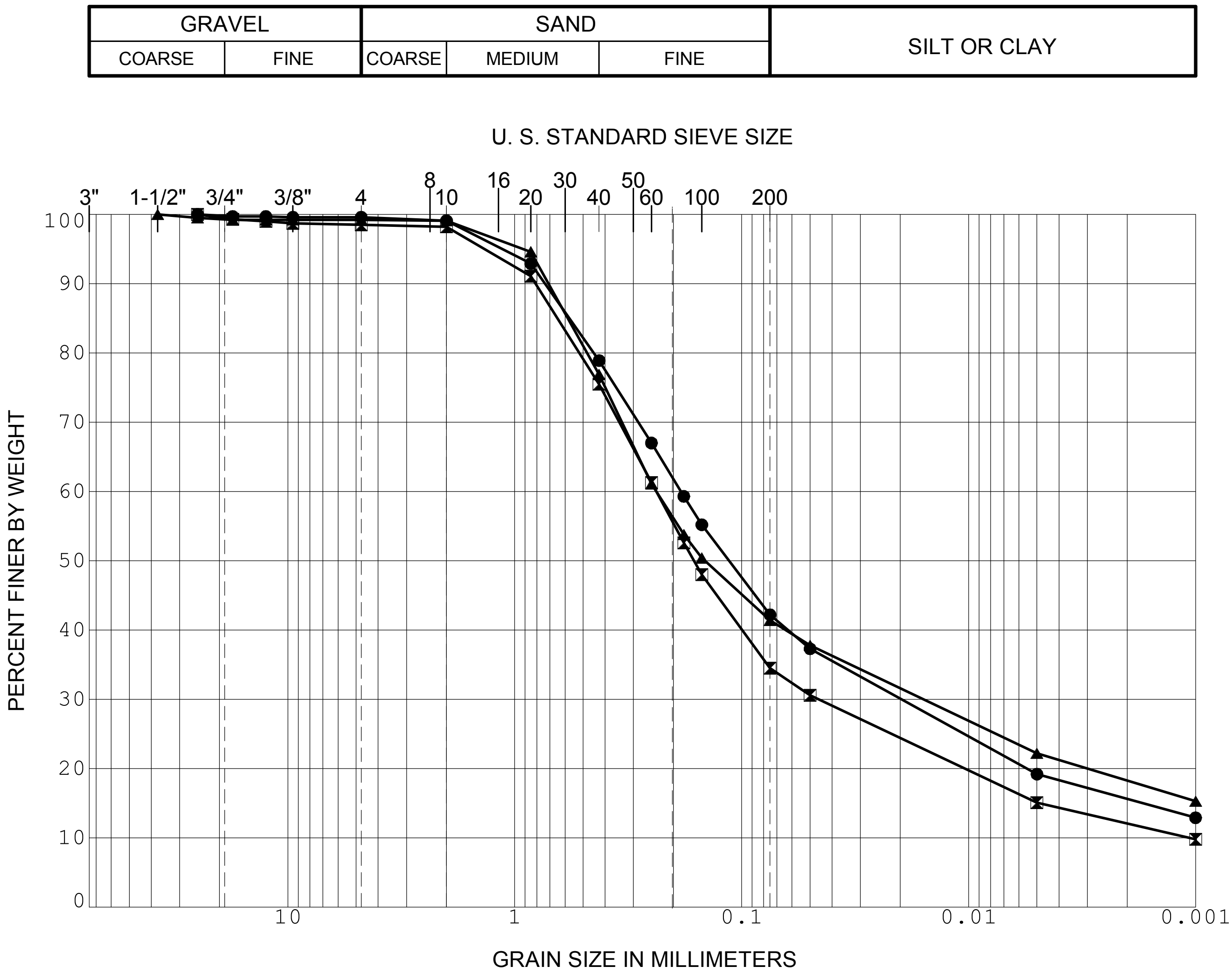
SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

APPENDIX B

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected samples to evaluate gradation characteristics. Results of the laboratory tests are summarized in the following figures.



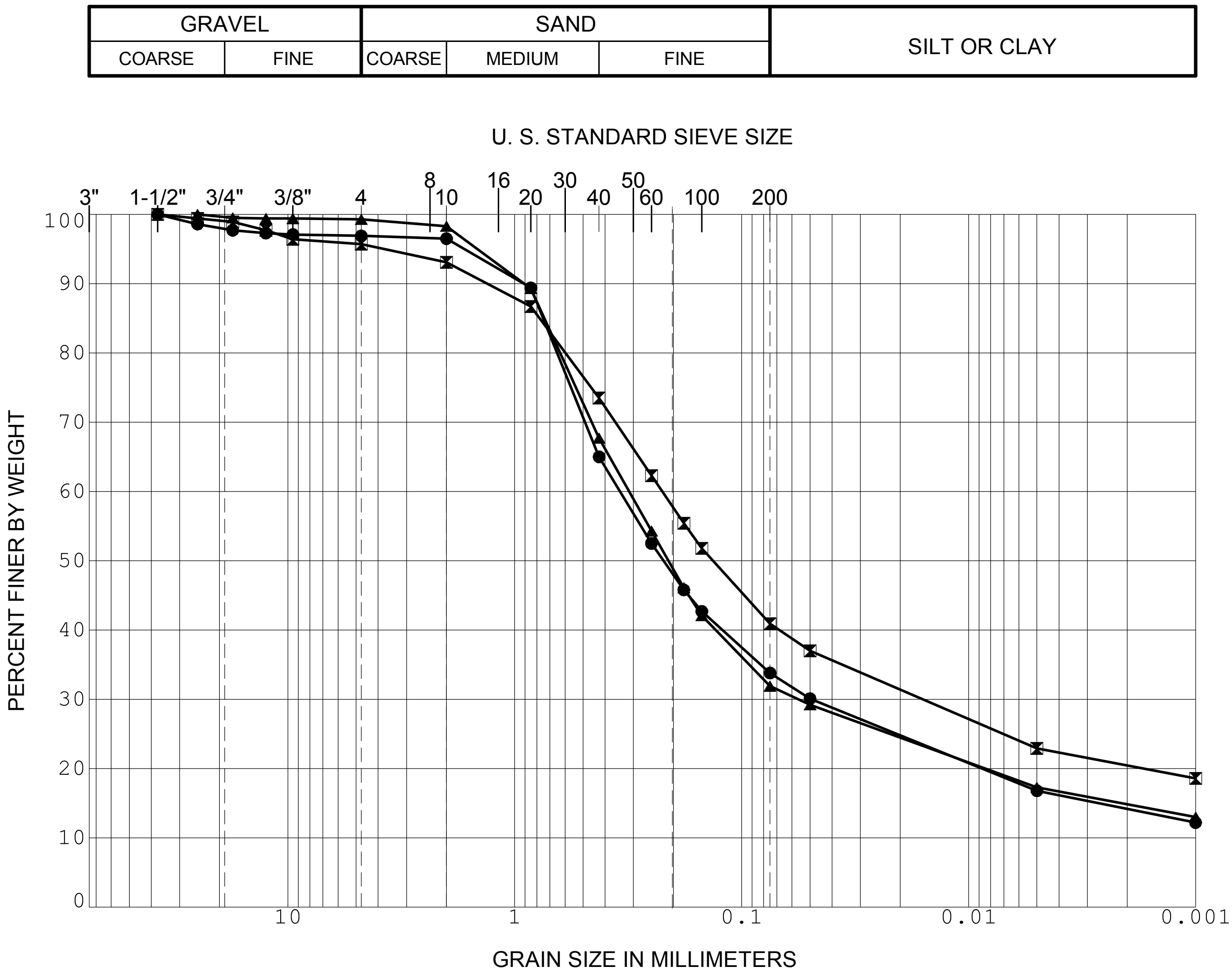
	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	A1 @ 2'	2.0	(SM) Silty SAND				
⧗	A2 @ 2'	2.0	(SM) Silty SAND				
▲	A3 @ 4'	4.0	(SC) Clayey SAND				

GRADATION CURVE

DEL MAR HIGHLANDS ESTATES

SAN DIEGO, CALFORNIA

PROJECT NO. 05439-42-95



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	A4 @ 4'	4.0	(SC) Clayey SAND				
⧗	A5 @ 5'	5.0	(SC) Clayey SAND				
▲	A6 @ 3'	3.0	(SC) Clayey SAND				

GRADATION CURVE

DEL MAR HIGHLANDS ESTATES

SAN DIEGO, CALFORNIA

05439-42-95.GPJ

Figure B-2

GEOCON

APPENDIX C

APPENDIX C

STORM WATER MANAGEMENT

If storm water management devices are not properly designed and constructed, there is a risk for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water being detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff into the subsurface occurs, downstream improvements may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

Hydrologic Soil Group

The United States Department of Agriculture (USDA), Natural Resources Conservation Services, provides general information regarding soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table C-1 presents the descriptions of the hydrologic soil groups. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

TABLE C-1
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The subject property is underlain by: compacted fill and terrace deposits. The subject site falls within Hydraulic Soil Group D, which has a very slow infiltration rating. Table C-2 presents the information from the USDA website for the property.

TABLE C-2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP

Map Unit Name	Map Unit Symbol	Approximate Percentage of Property	Hydrologic Soil Group
Huerhuero loam, 15 to 30 percent slopes, eroded	HrE2	100	D

In-Situ Testing

We performed 6 field-saturated, hydraulic conductivity tests, A-1 through A-6, at depths of approximately 2 to 5 feet below the existing ground surface using a Soil Moisture Corp Aardvark Permeameter at the locations presented on the Geologic Map, Figure 2. All of the borings, except P5, were drilled with a small-diameter drill rig using an 8-inch auger. Table C-3 presents the results of the saturated hydraulic conductivity testing.

We used the guidelines presented in the Riverside County Low Impact Development BMP Design Handbook which references the United States Bureau of Reclamation Well Permeameter Test Method (USBR 7300-89). Based on this widely accepted guideline, the saturated hydraulic conductivity (Ksat) is equal to the infiltration rate. Therefore, the Ksat value determined from the Aardvark Permeameter test is the unfactored infiltration rate. The Ksat (infiltration rate) equation provided in the Riverside County Handbook was used to compute the unfactored infiltration rate.

TABLE C-3
UNFACTORED, FIELD-SATURATED, INFILTRATION TEST RESULTS
USING THE SOILMOISTURE CORP AARDVARK PERMEAMETER

Test No.	Depth (inches)	Geologic Unit	Field Infiltration Rate, I (inches/hour)
A-1	24	Compacted Fill	0.03
A-2	24	Compacted Fill	0.01
A-3	55	Compacted Fill	0.08
A-4	46	Compacted Fill	0.16
A-5	63	Compacted Fill	0.22
A-6	49	Compacted Fill	0.74

Soil permeability values from in-situ tests can vary significantly from one location to another due to the non-homogeneous characteristics inherent to most soil. However, if a sufficient amount of field and laboratory test data is obtained, a general trend of soil permeability can usually be evaluated. For this project and for storm water purposes, the test results presented herein should be considered approximate values.

STORM WATER MANAGEMENT CONCLUSIONS

Soil Types

Compacted Fill – Compacted fill exists throughout the property. The compacted fill was placed during previous grading and consists predominately of a fine to medium grained, silty to clean, sand matrix. The fills vary from approximately 4 to 70 feet across the site. The deepest fills are located at the south and southeast portion of the site. Water that is allowed to infiltrate into the compacted fill could cause saturation and settlement to proposed improvements founded on the compacted fill. Additionally, infiltrating into the compacted fill could cause saturation of the fill slope along the south and southeast sides of the property. It is our opinion, considering the limited site area and the presence of relatively deep fills and high fill slopes that support existing buildings and improvements, that full or partial infiltration is not feasible on this site.

Terrace Deposits – Old Terrace Deposits underlie the compacted fill. Based on the referenced as-graded report and our observations during the original grading, the terrace deposits are very dense and can be highly variable due layers of sandstone, siltstone, and occasional lenses of conglomerates. Because of the dense and variable nature of the terrace deposits, this geologic unit has a potential for lateral water migration. Therefore, infiltration should not be allowed within the terrace deposits in areas adjacent to existing improvements and compacted fill.

Infiltration Rates

The results of the testing show infiltration rates ranging from approximately 0.01 to 0.74 inches per hour. The rates are not high enough to support full infiltration, however, considering the presence of compacted fill and the adjacent 50-foot-high fill slope that supports existing buildings and improvements, it is our opinion that full and partial infiltration is not feasible.

Existing Improvements and Proposed Foundations

The existing multi-family complex and associated surface improvements that abuts the property to the west as well as the proposed Building 1 the east half of the site are underlain by compacted fill. Infiltration into the compacted fill could cause settlement and distress to the existing and proposed improvements. Saturation of the fill slope can also cause slope instability for both the existing development and the proposed new building. Infiltration is considered infeasible because of existing improvements.

Groundwater

Groundwater was not encountered during our geotechnical investigation. We expect groundwater is at a depth greater than 70 feet below current grades. Groundwater is not a constraint for storm water infiltration.

Existing and New Utilities

Existing utilities are located in several areas on the property within existing streets and parking lots. Therefore, infiltration near these utilities is considered infeasible. We also expect new utilities will be constructed for the proposed building. Infiltration near proposed new utilities is not recommended.

Soil or Groundwater Contamination

We are unaware of contaminated soil or groundwater on the property. Therefore, infiltration associated with this risk is considered feasible.

Slopes

A 50-foot-high fill slope has been constructed on the south side of the property. Infiltrating into the compacted fill can cause saturation of the fill slope. We performed a slope stability analysis to assess impacts as a result of saturated soil within the slope zone. Figure C-1 presents the analysis. Under saturated conditions, the factor of safety for deep seated failure is less than 1.5. This indicates that infiltration into the compacted fill can cause adverse impacts with respect to slope stability. Infiltration is considered infeasible.

Storm Water Management Devices

Liners and subdrains are recommended in the design and construction of the planned storm water devices. The liners should be impermeable (e.g. High-density polyethylene, HDPE, with a thickness of about 30 mil or equivalent Polyvinyl Chloride**,** PVC) to prevent water migration. The subdrains should be perforated within the liner area, installed at the base and above the liner, be at least 3 inches in diameter and consist of Schedule 40 PVC pipe. The subdrains outside of the liner should consist of solid pipe. The penetration of the liners at the subdrains should be properly waterproofed. The subdrains should be connected to a proper outlet. The devices should also be installed in accordance with the manufacturer's recommendations.

Storm Water Standard Worksheets

The SWS requests the geotechnical engineer complete the *Categorization of Infiltration Feasibility Condition* (Worksheet C.4-1 or I-8) worksheet information to help evaluate the potential for infiltration on the property. The attached Worksheet C.4-1 presents the completed information for the submittal process.

The regional storm water standards also have a worksheet (Worksheet D.5-1 or Form I-9) that helps the project civil engineer estimate the factor of safety based on several factors. Table C-4 describes the suitability assessment input parameters related to the geotechnical engineering aspects for the factor of safety determination.

TABLE C-4
SUITABILITY ASSESSMENT RELATED CONSIDERATIONS FOR INFILTRATION FACILITY SAFETY FACTORS

Consideration	High Concern – 3 Points	Medium Concern – 2 Points	Low Concern – 1 Point
Assessment Methods	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates. Use of well permeameter or borehole methods without accompanying continuous boring log. Relatively sparse testing with direct infiltration methods	Use of well permeameter or borehole methods with accompanying continuous boring log. Direct measurement of infiltration area with localized infiltration measurement methods (e.g., infiltrometer). Moderate spatial resolution	Direct measurement with localized (i.e. small-scale) infiltration testing methods at relatively high resolution or use of extensive test pit infiltration measurement methods.
Predominant Soil Texture	Silty and clayey soils with significant fines	Loamy soils	Granular to slightly loamy soils
Site Soil Variability	Highly variable soils indicated from site assessment or unknown variability	Soil boring/test pits indicate moderately homogenous soils	Soil boring/test pits indicate relatively homogenous soils
Depth to Groundwater/ Impervious Layer	<5 feet below facility bottom	5-15 feet below facility bottom	>15 feet below facility bottom

Table C-5 presents the estimated factor values for the evaluation of the factor of safety. The factor of safety is determined using the information contained in Table C-4 and the results of our geotechnical investigation. Table C-5 only presents the suitability assessment safety factor (Part A) of the worksheet. The project civil engineer should evaluate the safety factor for design (Part B of Worksheet D.5-1) and use the combined safety factor for the design infiltration rate.

TABLE C-5
FACTOR OF SAFETY WORKSHEET D.5-1 DESIGN VALUES – PART A[1]

Suitability Assessment Factor Category	Assigned Weight (w)	Factor Value (v)	Product (p = w x v)
Assessment Methods	0.25	3	0.75
Predominant Soil Texture	0.25	2	0.5
Site Soil Variability	0.25	3	0.75
Depth to Groundwater/Impervious Layer	0.25	1	0.25
Suitability Assessment Safety Factor, $S_A = \Sigma p$			2.25

[1] The project civil engineer should complete Worksheet D.5-1 or Form I-9 to determine the overall factor of safety.

CONCLUSIONS

Our results indicate the site has highly variable sub-surface conditions and relatively low infiltration characteristics. Because of these site conditions, it is our opinion that there is a high probability for lateral water migration. Considering the presence of compacted fill and nearby fill slopes, it is our opinion that full and partial infiltration is infeasible on this site. Our evaluation included the soil and geologic conditions, estimated settlement and volume change of the underlying soil, slope stability, utility considerations, groundwater mounding, retaining walls, foundations and existing groundwater elevations. Liners and subdrains should be installed within BMP areas. If water is allowed to infiltrate the soil, water could migrate away from the property into the adjacent apartment complex soils and supporting fill slopes and cause settlement and distress to existing and proposed improvements and structures.

Del Mar Highlands Estates - Affordable Housing
Project No. 05439-42-95
Section A-A'
Name: A-A'_Fig. C-1 Piezo.gsz
Date: 6/24/2016
MATERIAL PROPERTIES:
Name: Qcf - Compacted Fill   Unit Weight: 125 pcf   Cohesion: 300 psf   Phi: 28 °   Piezometric Line: 1
Name: Qt - Terrace Deposits   Unit Weight: 125 pcf   Cohesion: 300 psf   Phi: 30 °   Piezometric Line: 1

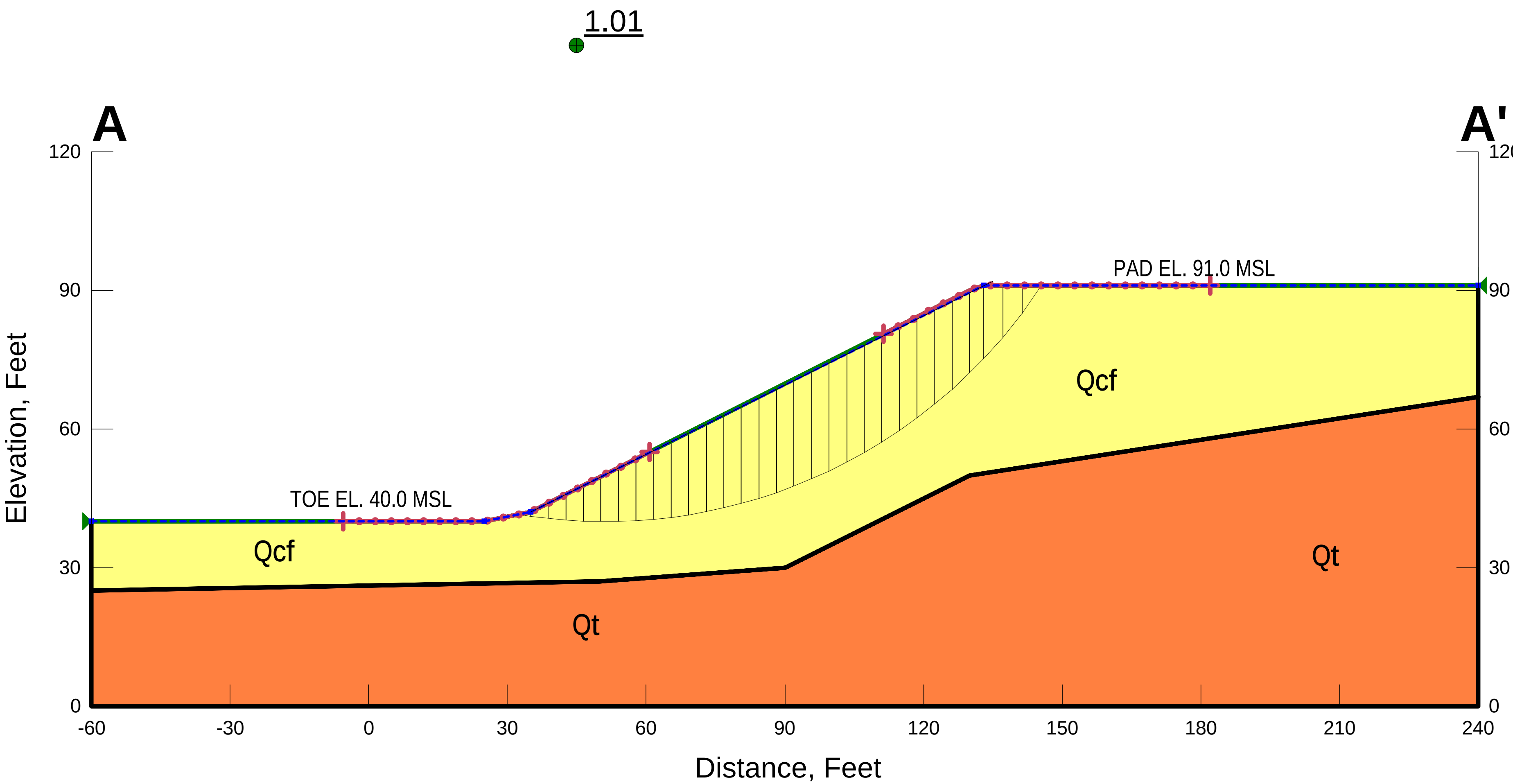


Figure C-1

Categorization of Infiltration Feasibility Condition			Worksheet C.4-1
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: We performed 6 infiltration tests in the previously placed fill and the Old Paralic Deposits. The results of the infiltration rates range from 0.01 to 0.74 inches per hour with an average rate of 0.2 inches per hour. This shows the soil is variable and a reliable design infiltration rate for an area could not be accurate. Additionally, using a feasibility factor of safety of 2, the infiltration rates are not high enough to support full infiltration. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: The site in underlain by compacted fill and Terrace Deposits. Based on the comprehensive study presented in the geotechnical report, infiltration could not be incorporated without increasing the risk of geotechnical hazards including uncontrolled water lateral migration, settlement, and slope instability. Slope stability analysis under saturated conditions indicate a factor of safety less than 1.5 for deep seated failure. Infiltrating into the compacted fill could saturate the fill slope supporting adjacent existing buildings and improvements causing adverse settlement and slope failure. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 2 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>3</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:

Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</td></tr>
<tr><td>4</td><td>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:

Infiltration is not anticipated to have a negative impact on nearby water balance or discharge of contaminated groundwater to surface waters.</td></tr>
<tr><td>Part 1 Result*</td><td colspan="2">If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration

If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2</td><td>No</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

The unfactored infiltration rates are:

A-1: 0.03 in/hr
A-2: 0.01 in/hr
A-3: 0.08 in/hr
A-4: 0.16 in/hr
A-5: 0.22 in/hr
A-6: 0.74 in/hr

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

The site in underlain by compacted fill and Terrace Deposits. Based on the comprehensive study presented in the geotechnical report, infiltration could not be incorporated without increasing the risk of geotechnical hazards including uncontrolled water lateral migration, settlement, and slope instability. Slope stability analysis under saturated conditions indicate a factor of safety less than 1.5 for deep seated failure. Infiltrating into the compacted fill could saturate the fill slope supporting adjacent existing buildings and improvements causing adverse settlement and slope failure.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Infiltration is not anticipated to have a negative impact on nearby water balance or discharge of contaminated groundwater to surface waters. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	No Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

APPENDIX D

APPENDIX D

RECOMMENDED GRADING SPECIFICATIONS

FOR

DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

PROJECT NO. 05439-42-95

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

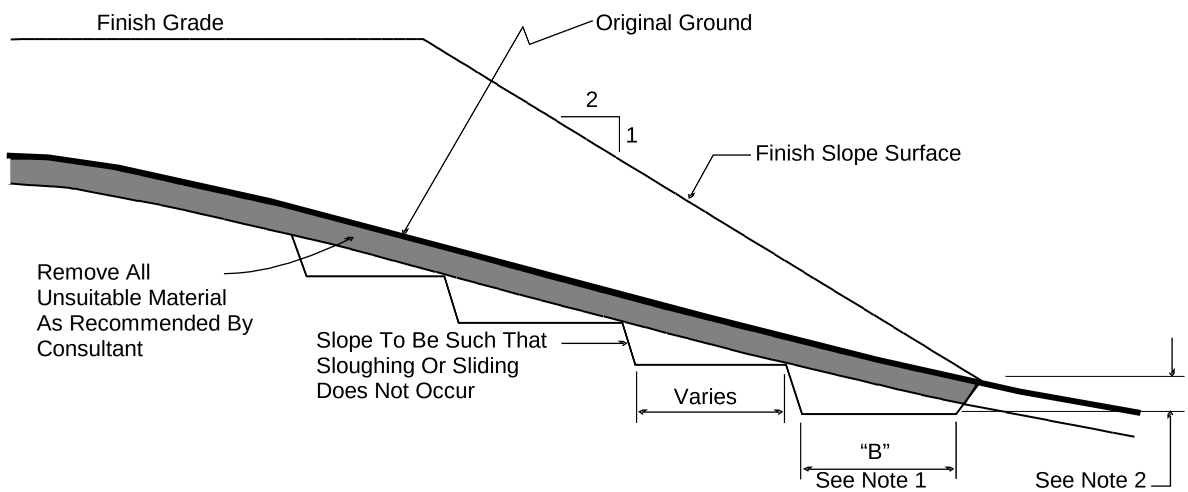
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of “passes” have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

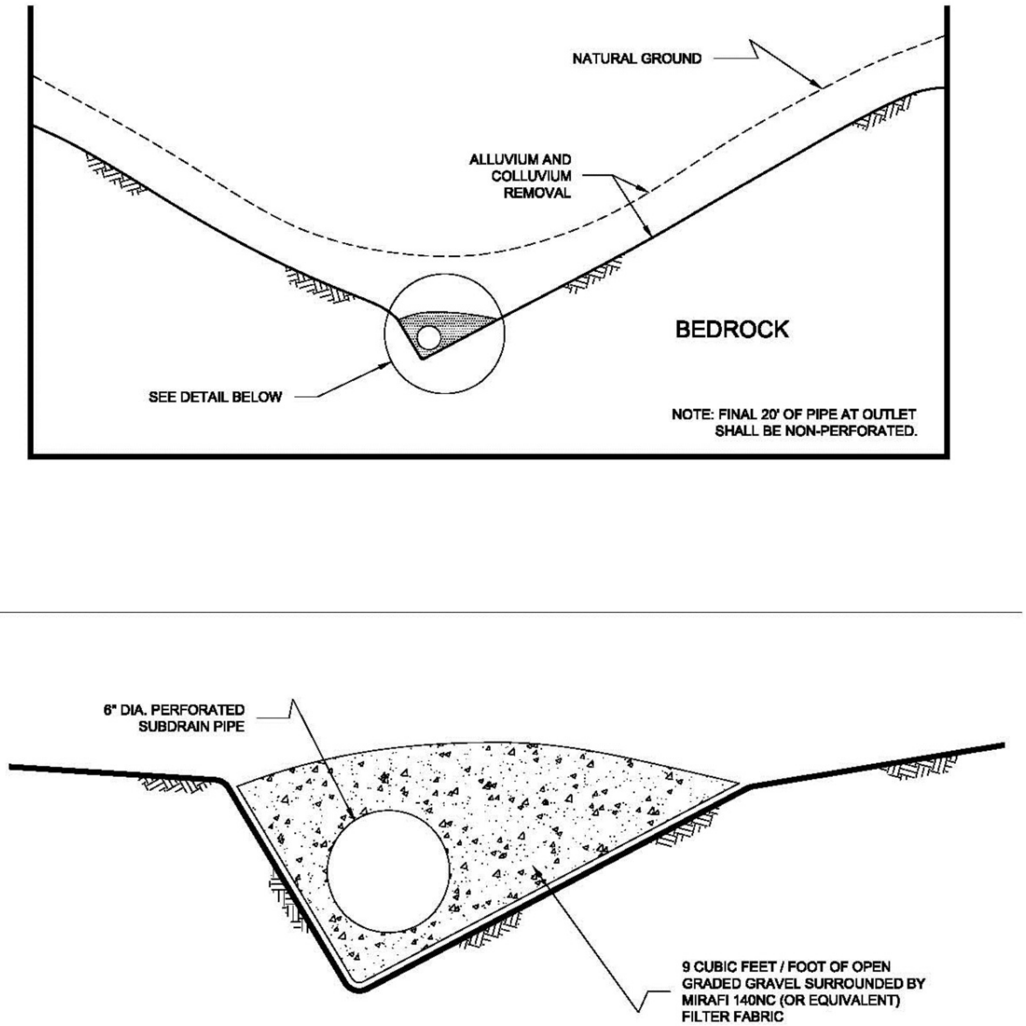
6.3.6 To reduce the potential for “piping” of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL



NOTES:

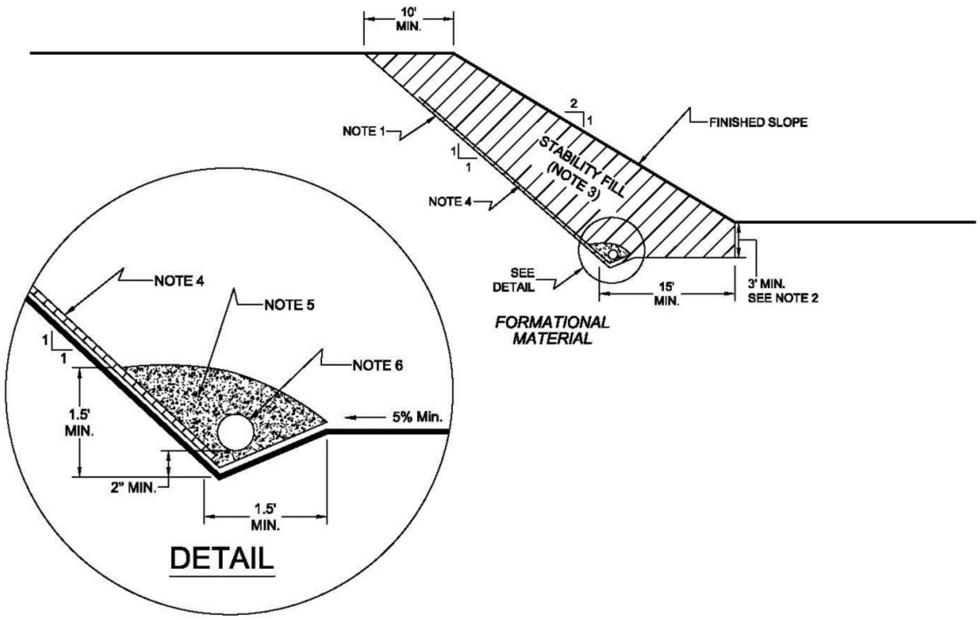
1......6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2......6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

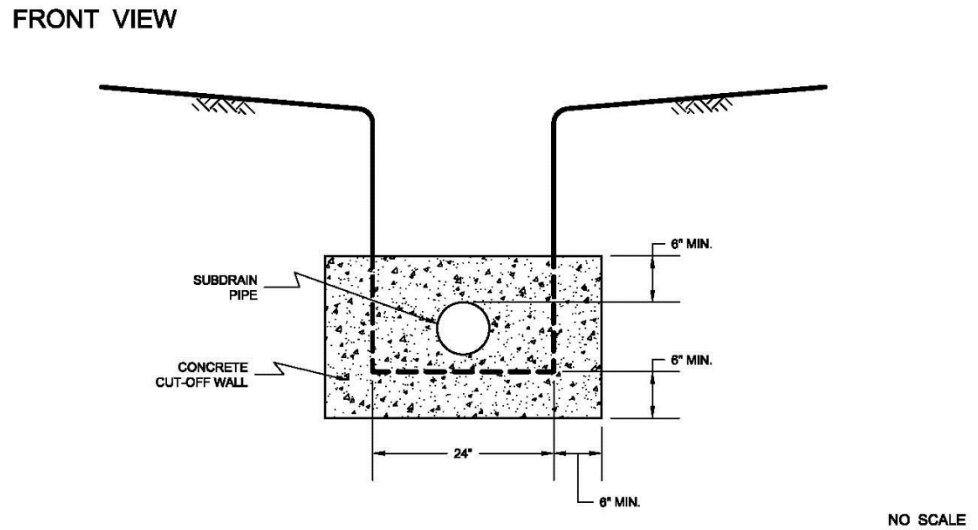
NO SCALE

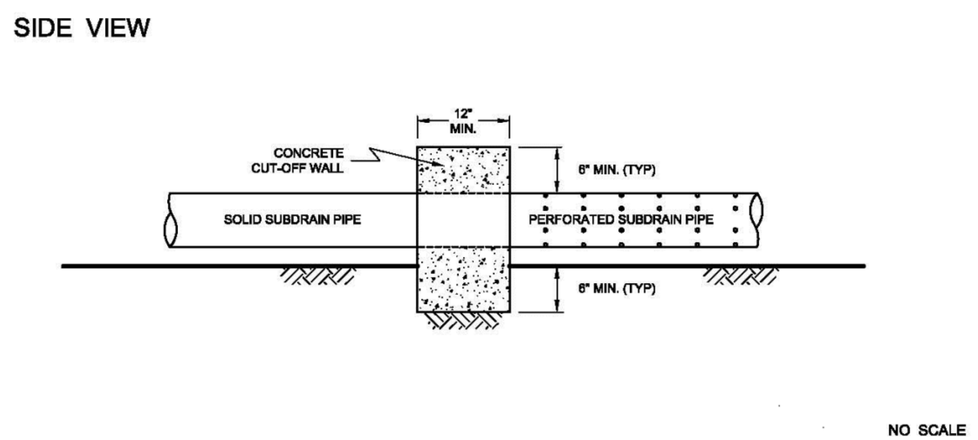
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

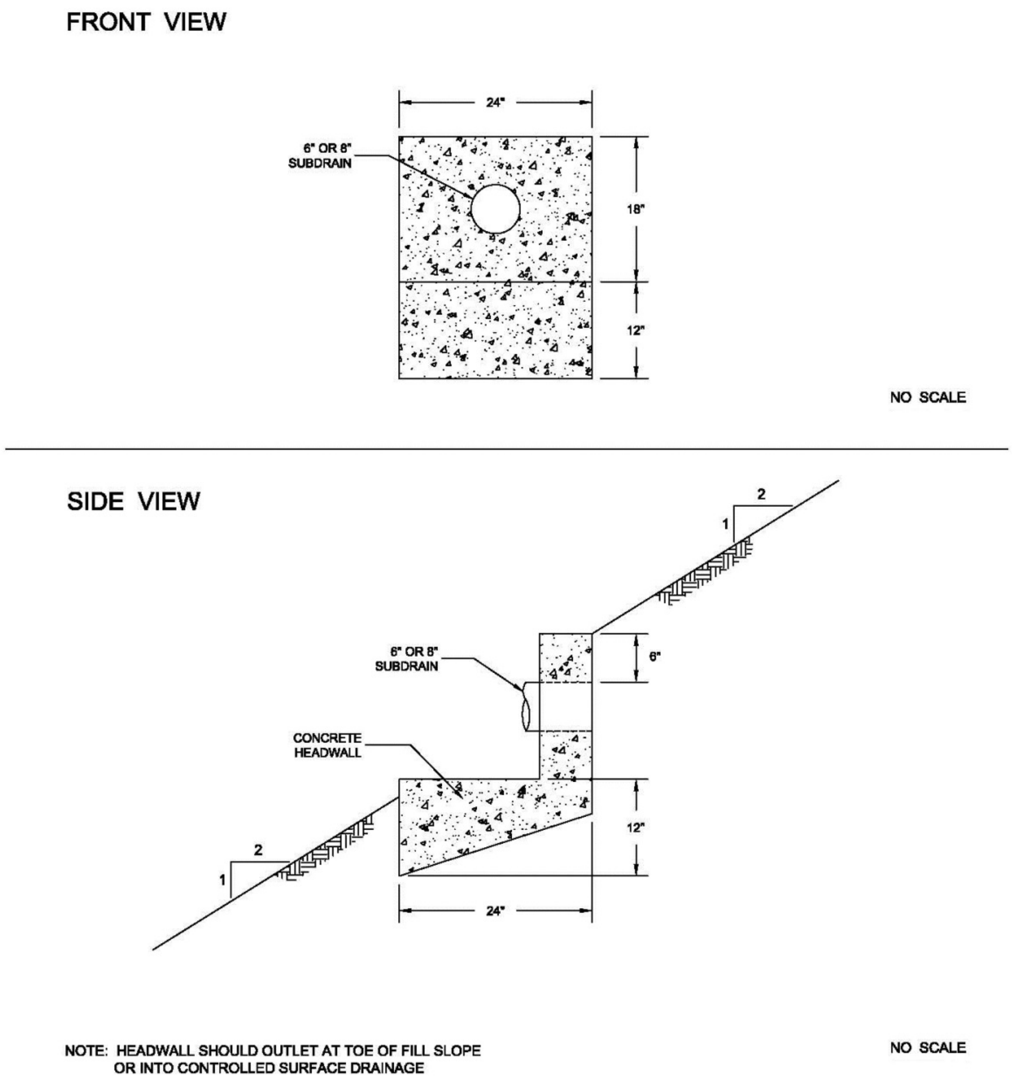
TYPICAL CUT OFF WALL DETAIL





7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

TYPICAL HEADWALL DETAIL



7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)*.

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

City of San Diego, 2008, *Seismic Safety Study, Geologic Hazards and Faults*, Grid Tile 2;

Kennedy, M. P., and S. S. Tan, 2008, *Geologic Map of the San Diego 30' x 60' Quadrangle, California*, USGS Regional Geologic Map Series, 1:100,000 Scale, Map No. 3;

Risk Engineering, 2016, *EZ-FRISK (Version 7.65)*.

Project No. 05439-42-95
August 11, 2016

Pardee Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, California 92128

Attention: Mr. Allen Kashani

Subject: RESPONSE TO CITY REVIEW COMMENTS
DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING
TENTATIVE MAP AMENDMENT
SAN DIEGO, CALIFORNIA

References:

1. *City of San Diego Review Comments, Cycle 1 Preliminary Review,* LDR-Geology, dated July 26, 2016.
2. *Update Geotechnical Report, Del Mar Highlands Estates Affordable Housing, San Diego, California,* prepared by Geocon Incorporated, dated June 24, 2016 (Project No. 05439-42-95).

Dear Mr. Kashani:

In accordance with your request, we have prepared this letter to respond to City of San Diego review comments (Reference 1). The review comments specific to geotechnical engineering aspects are provided below followed by our responses.

Comment No. 3: *Submit an addendum geotechnical report or update letter that specifically addresses the proposed development for the purposes of environmental review and the following:*

Response: Reference 2 is the requested geotechnical report that addresses the proposed development.

Comment No. 4: *The project's geotechnical consultant should provide a conclusion regarding if the proposed development will destabilize or result in settlement of adjacent property.*

Response: It is our opinion that the proposed development will not destabilize or result in settlement of adjacent properties.

Comment No. 5: *Based on the City's Seismic Safety Study maps, the subject site is located within geologic hazard category 53, level or sloping terrain, unfavorable* *geologic structure. The geotechnical consultant must provide a statement as to whether or not the geologic structure is favorable.*

Response: Previous grading has resulted the site being underlain by compacted fill overlying Terrace Deposits, which has resulted in an overall very low geologic risk. In our opinion, the geologic structure is favorable with respect to the proposed development.

Comment No. 6: *The projects geotechnical consultant must indicate if the site is suitable for the currently proposed development.*

Response: As indicated in Section 7.1.1 of Reference 2, the site is suitable for the proposed development provided the recommendations presented in our geotechnical report are implemented in design and construction of the project.

Comment No. 7: *Provide the logs of the permeameter tests (A-1 through A-6).*

Response: The permeameter tests were performed by hand auguring to the test depth. No logs were generated. Logs of the trenches, which were performed adjacent to the test locations, are provided in Reference 2.

Comment No. 8: *The project's geotechnical consultant has indicated 'No' in their responses to Criteria 2 and 6 on Worksheet C.4-1. The project's geotechnical consultant must address the specific geologic or geotechnical hazard associated with any amount of storm water infiltration that cannot be mitigated to an acceptable level for each proposed storm water BMP at the subject site. The analyses and supporting documentation should be submitted for review.*

Response: The specific geotechnical hazards associated with any amount of storm water infiltration is the potential for lateral migration of infiltration water to the 50-foot-high fill slope along the south side of the property and adverse settlement in the existing compacted fill.

The fills were placed during grading of the Del Mar Highlands Estates project which was completed in 1999. The fills are comprised of silty to clayey sand and sandy to silty clay. The compacted fills were not engineered for infiltration. The fills are heterogeneous and anisotropic, and as such, infiltration of storm water is expected to perch on less permeable layers and migrate laterally. Therefore, it is our opinion that the site has a high potential for lateral migration of infiltrated water.

Based on our slope stability analysis (see Figure C-1 in Appendix C of Reference 2), when considering saturated conditions, the factor of safety is near 1.0 indicating there is a high potential for adverse slope instability under saturated conditions. Additionally, seepage to the slope face could cause surficial instability. With respect to settlement of fill as a result of saturation, it is our experience that settlement will occur as a result of infiltration.

Because of the potential for slope instability and fill settlement, it is our opinion that the site is not feasible for infiltration of storm water.

Comment No. 9: *If geologic or geotechnical hazards are demonstrated (i.e. slope instability), describe the measures available to mitigate the hazard to an acceptable level of risk and recommended specifications for each storm water basin.*

Response: With respect to slope instability, there are no reasonable methods available to mitigate other than prevent storm water from infiltrating into the slope zone. We looked at the potential for using deep dry wells to get the infiltration zone deeper where impacts to the compacted fill slope would be mitigated. However, to get the infiltration zone to a depth of at least 10 feet below the level of the compacted fill, the top of the infiltration zone would need to be near an elevation of 10 to 20 feet Mean Sea Level (MSL). Groundwater is near an elevation of 14 feet in the drainage area west of the project site. A groundwater monitoring well located approximately 0.6 miles north of the site also shows groundwater elevations varying from 13 feet to 17 feet over a monitoring period of 5 years. Therefore, we would not have a 10-foot separation between the top of the infiltration zone and the groundwater. Because of this, deep dry wells are not feasible.

We also discussed moving the basin to other locations on the property. Based on discussions with Latitude 33 (the project civil engineer), the basin location is set to maintain the existing drainage patterns. Also the basin location is at the low point on the property. The basin also needs to be kept within the proposed limits of grading. Therefore, moving the basin is not feasible.

Comment No. 10: *If geologic or geotechnical hazards can be demonstrated for each site that cannot be mitigated to an acceptable level, the project's geotechnical consultant should clarify if, in their professional opinion and based on their site specific investigation, there are no areas of the site where any amount of storm water infiltration is feasible.*

Response: In our professional opinion, and based on our geotechnical investigation, there are no areas of the site where any amount of storm water infiltration is feasible.

Comment No. 11: *The geologic map of the site indicates an existing canyon subdrain. Clarify if the slope will become saturated with the existing subdrain already in place.*

Response: The subdrain is located at the base of cleanout on the contact between the compacted fill and the native terrace deposits. In our opinion the slope will not become saturated due to the existing subdrain.

Comment No. 12: *Clarify if storm water infiltration will result in complete saturation of the slope(s).*

Response: There is a high probability that lateral migration of infiltration will reach the slope face. However, the exact location where seepage will occur at the slope face is unknown.

We performed additional slope stability analysis to determine the depth of saturation where the factor of safety drops below 1.5 (see attached Figure 1). At a depth of 38 feet (elevation of 52 MSL), the factor of safety drops below

1.5. This indicates that if saturation of the slope occurs anywhere between the top of the slope and a depth of 38 feet, the factor of safety falls below the standard 1.5 minimum value.

Should you have any questions regarding this letter, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rodney C. Mikesell
GE 2533

Ali Sadr
CEG 1778

RCM:AS:ejc

(e-mail) Addressee
(e-mail) Latitude 33
Attention: Mr. Tadd Dolfo

Del Mar Highlands Estates - Affordable Housing
Project No. 05439-42-95
Section A-A'
Name: A-A'_Fig. C-1 Piezo for F.S. = 1.5.gsz
Date: 8/11/2016
MATERIAL PROPERTIES:

Name: Qcf - Compacted Fill	**Unit Weight: 125 pcf**	**Cohesion: 300 psf**	**Phi: 28 °**	**Piezometric Line: 1**
Name: Qt - Terrace Deposits	**Unit Weight: 125 pcf**	**Cohesion: 300 psf**	**Phi: 30 °**	**Piezometric Line: 1**

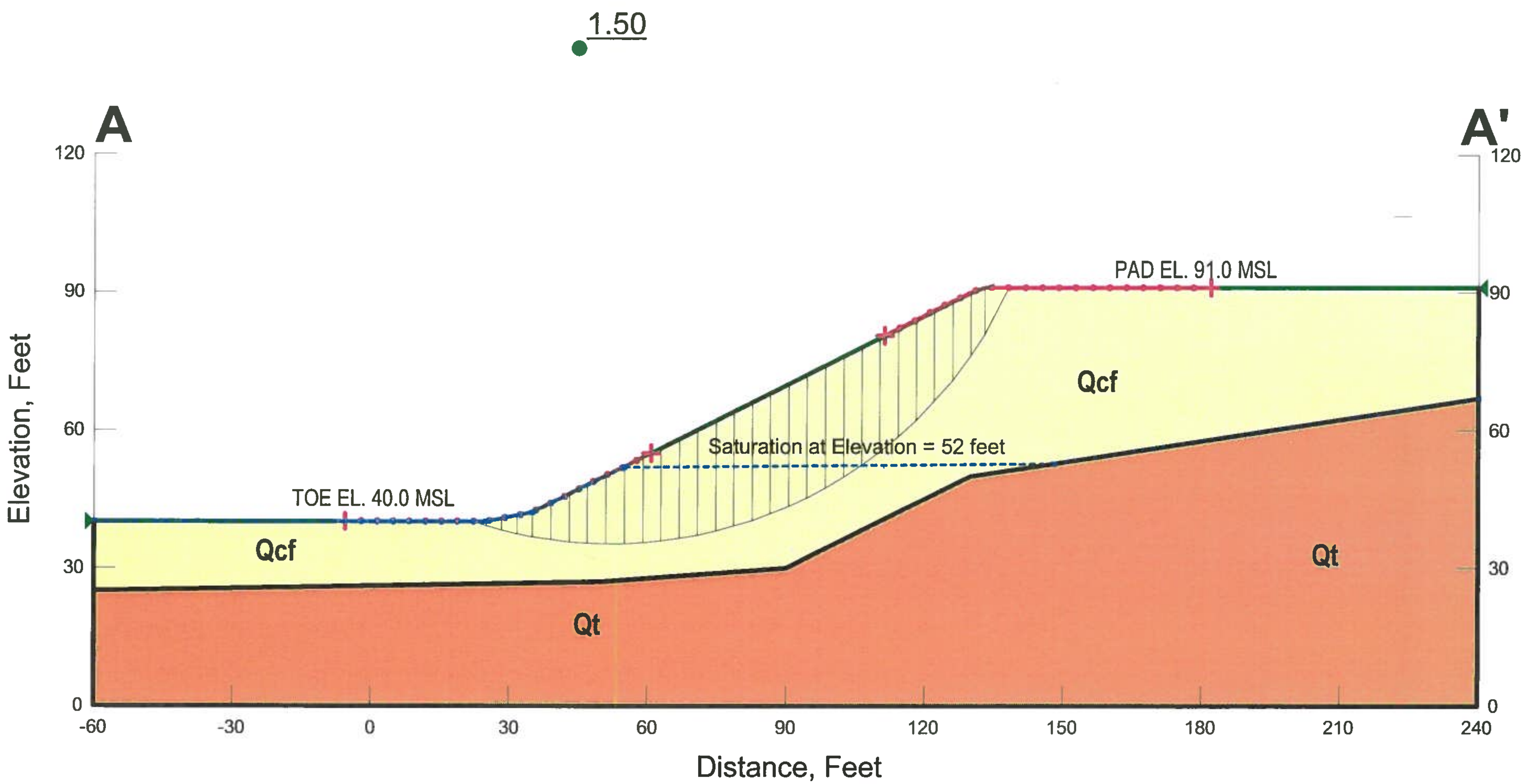


Figure 1

RESPONSE TO
CITY REVIEW COMMENTS

DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

PARDEE HOMES
SAN DIEGO, CALIFORNIA

OCTOBER 6, 2016
PROJECT NO. 05439-42-95

Project No. 05439-42-95
October 6, 2016

Pardee Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, California 92128

Attention: Mr. Allen Kashani

Subject: RESPONSE TO CITY REVIEW COMMENTS
DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

References:
1. *City of San Diego Review Comments,* LDR-Geology, Mr. Jacobe Washburn reviewer, dated September 20, 2016.

2. *Update Geotechnical Report, Del Mar Highlands Estates Affordable Housing, San Diego, California,* prepared by Geocon Incorporated, dated June 24, 2016 (Project No. 05439-42-95).

Dear Mr. Kashani:

In accordance with your request, we have prepared this letter to respond to City of San Diego review comments (Reference 1). The review comments specific to geotechnical engineering aspects are provided below followed by our responses.

Comment No. 14: *Submit an addendum geotechnical report or update letter that specifically addresses the following comments and an updated C.4-1 Worksheet (if necessary):*

Response: Reponses to the comments are provided herein. We have also appended an updated C.4-1 Worksheet. The information on the worksheet is based on additional infiltration tests performed within the proposed BMP basin located at the southeast corner of the site. The locations of the tests are provided on the appended geologic map. The test results specific to the basin area are provided on the following table and attached figures. Based on the test results, it is our opinion the basin area is infeasible for infiltration. The proposed basin should be lined with a minimum 30 mil HDPE or PVC liner to prevent lateral water seepage on the adjacent slope face.

TABLE 1
UNFACTORED, FIELD-SATURATED, INFILTRATION TEST RESULTS
USING THE SOILMOISTURE CORP AARDVARK PERMEAMETER

Test No.	Depth (inches)	Geologic Unit	Field Infiltration Rate, I (inches/hour)
A-1	24	Compacted Fill	0.03
A-2	24	Compacted Fill	0.01
A-7	43	Compacted Fill	0.01
A-8	49	Compacted Fill	0.01

Comment No. 15: *In the referenced report dated August 11, 2016, the project's geotechnical consultant has indicated (in response to Comment 11) that the existing slope will not become saturated due to the presence of an existing canyon subdrain. However, in response to Comment 12, they indicate the slope will have a factor-of-safety less than 1.5 in a condition with saturation occurring between top of slope and a depth of 38 feet. Clarify how the slope will become saturated if the existing subdrain prevents this condition.*

Response: The analysis was performed to show that saturation of the slope face will cause the slope to have a factor of safety less than 1.5. Saturation of the slope from an infiltration basin will occur from top down, which is a worse case condition. The attached Figure 1 shows that the factor of safety for the slope drops to less than 1.5 when the wetting front reaches a depth of approximately 24 feet below the slope top. The subdrain at the base of the canyon drainage will help reduce water build-up from the bottom up, but will not stop saturation from the top of the slope down, as a result of infiltration.

Comment No. 16: *In the report dated June 24, 2016, the project's geotechnical consultant provides percolation test rates in both the central and northern portion of the site showing partial infiltration conditions. Clarify why storm water infiltration is not feasible in these locations. Note that a geotechnical condition created by the proposed (after the fact) grading may not be considered a valid geotechnical hazard).*

Response: From a geotechnical engineering standpoint, infiltration into the central portion of the site is not feasible due to deep compacted fills (30 feet and greater). Infiltrating into the compacted fill can cause soil settlement and/or soil heave. Infiltrating at the northern end of the property is considered feasible, provided the infiltration basins are deepened through the compacted fill into the native formational soil.

The project civil engineer can address the feasibility or infeasibility of infiltration basins in these areas based on existing site surface drainage patterns.

Comment No. 17: *Provide an updated geologic map with the currently proposed development.*

Response: An updated geologic map is appended.

Should you have any questions regarding this letter, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rodney C. Mikesell
GE 2533

RCM:dmc

(e-mail) Addressee
(2/del) Latitude 33
Attention: Mr. Tadd Dolfo

Del Mar Highlands Estates - Affordable Housing
Project No. 05439-42-95
Section A-A'
Name: A-A' Piezo for F.S. = 1.5 (top down).gsz
Date: 10/5/2016

MATERIAL PROPERTIES:
Name: Qcf(1) - Compacted Fill (Saturated) Unit Weight: 125 pcf Cohesion: 300 psf Phi: 28 ° Piezometric Line: 1
Name: Qt - Terrace Deposits Unit Weight: 125 pcf Cohesion: 300 psf Phi: 30 °
Name: Qcf(2) - Compacted Fill (non saturated) Unit Weight: 125 pcf Cohesion: 300 psf Phi: 28 °

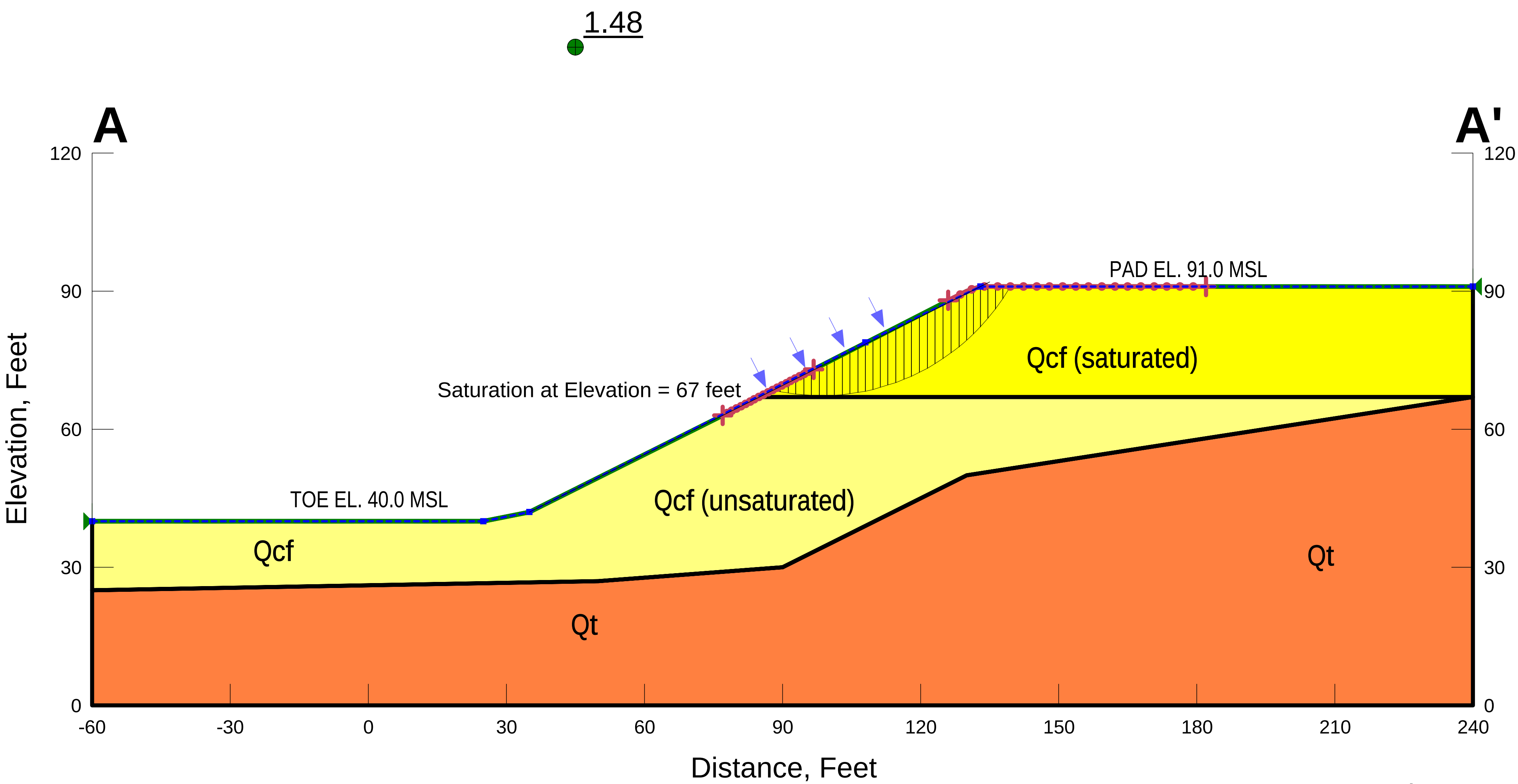
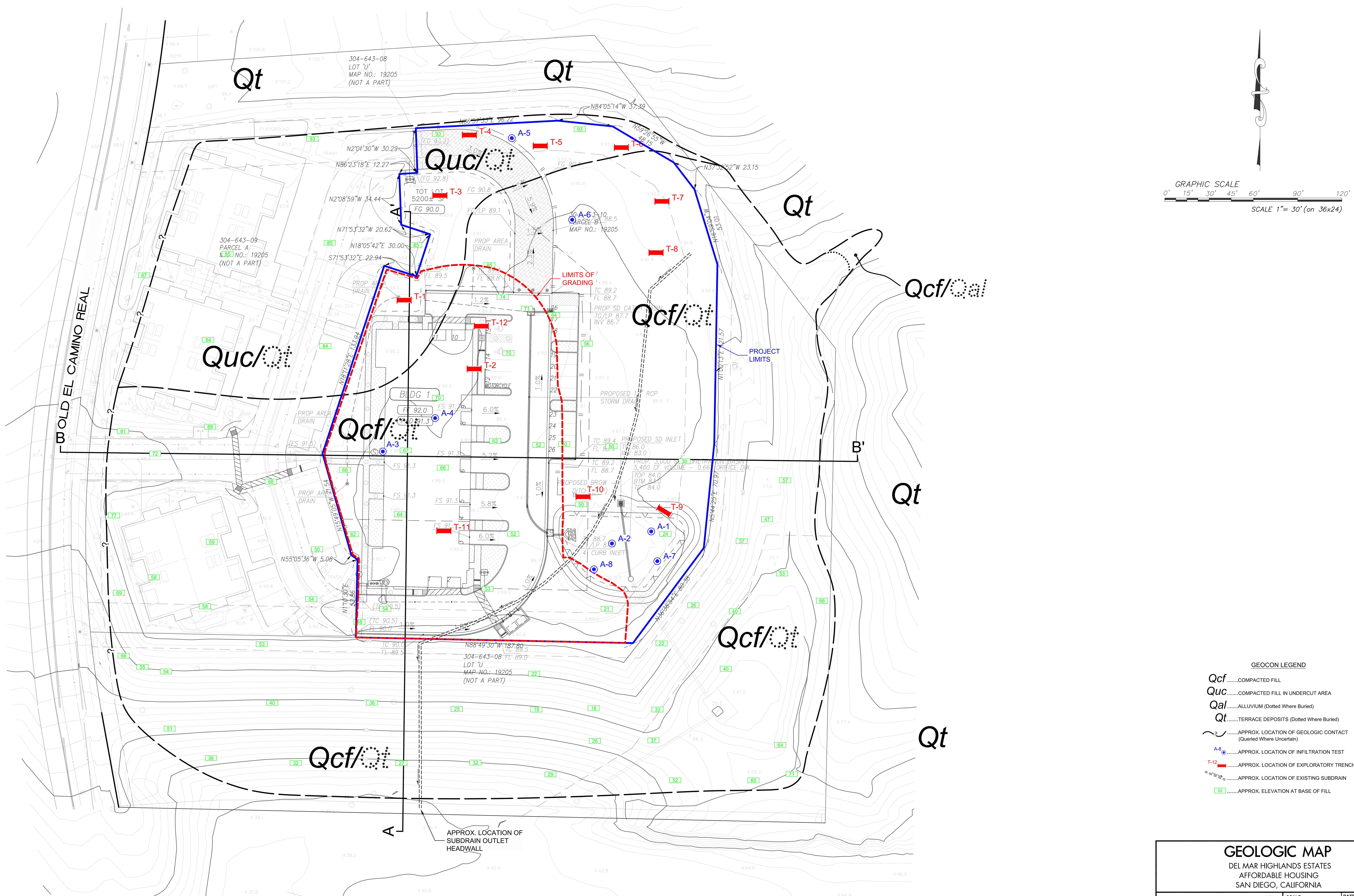


Figure 1



GEOLOGIC MAP

DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 30'
DATE	10 - 06 - 2016
PROJECT NO.	05439 - 42 - 95
FIGURE	2
SHEET	1 OF 1

Categorization of Infiltration Feasibility Condition			Worksheet C.4-1
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: We performed 4 infiltration tests in the previously placed fill within the proposed basin area. The results of the infiltration rates are the following: A-1: 0.03 in/hr; A-7: 0.01 in/hr A-2: 0.01 in/hr A-8: 0.01 in/hr This shows the soil does not have an estimated reliable infiltration rate greater than 0.5 inches per hour.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: The site in underlain by compacted fill and Terrace Deposits. Based on the comprehensive study presented in the geotechnical report, infiltration could not be incorporated without increasing the risk of geotechnical hazards including uncontrolled water lateral migration, settlement, and slope instability. Slope stability analysis under saturated conditions indicate a factor of safety less than 1.5 for deep seated failure. Infiltrating into the compacted fill could saturate the fill slope supporting adjacent existing buildings and improvements causing adverse settlement and slope failure.			

Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Infiltration is not anticipated to have a negative impact on nearby water balance or discharge of contaminated groundwater to surface waters.			
Part 1 Result*	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria **Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	**Yes**	**No**
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The unfactored infiltration rates are: A-1: 0.03 in/hr A-2: 0.01 in/hr A-7: 0.01 in/hr A-8: 0.01 in/hr Using a factor of safety of 2.0, with the exception of A-1, the infiltration rates are less than 0.01. Therefore, the site is not feasible for infiltration.			
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: The site in underlain by compacted fill and Terrace Deposits. Based on the comprehensive study presented in the geotechnical report, infiltration could not be incorporated without increasing the risk of geotechnical hazards including uncontrolled water lateral migration, settlement, and slope instability. Slope stability analysis under saturated conditions indicate a factor of safety less than 1.5 for deep seated failure. Infiltrating into the compacted fill could saturate the fill slope supporting adjacent existing buildings and improvements causing adverse settlement and slope failure.			

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: We are unaware of any downstream water rights that could be impacted from infiltration. The project civil engineer should confirm.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	No Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

no PN
Affordable Housing
6/14/2016
NGB

A1

Dia_{hole}	4	inches
$Depth_{hole}$	24	inches
$Depth_{inst}$	21.75	inches
Ht_{res}	30	inches
$Depth_{valve}$	14.5	inches

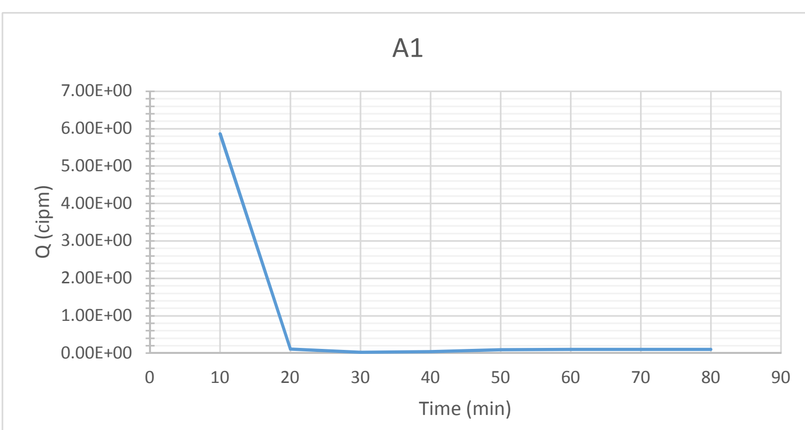
Wt_0	20.1476	lbs

D = 44.5 inches
h = 5.9 inches

t (min)	Δt (min)	Wt (lbs)	ΔWt (lbs)	Δvol (ft^3)	Δvol (in^3)	Q (cipm)
10	10	18.03	2.12	3.39E-02	5.86E+01	5.86E+00
20	10	17.99	0.04	6.35E-04	1.10E+00	1.10E-01
30	10	17.98	0.01	1.41E-04	2.44E-01	2.44E-02
40	10	17.97	0.01	2.12E-04	3.66E-01	3.66E-02
50	10	17.94	0.03	4.94E-04	8.53E-01	8.53E-02
60	10	17.90	0.04	5.64E-04	9.75E-01	9.75E-02
70	10	17.87	0.04	5.64E-04	9.75E-01	9.75E-02
80	10	17.83	0.04	5.64E-04	9.75E-01	9.75E-02

Q (cipm)	h/r	$(h/r)^2$	$((h/r)^2+1)^{0.5}$
9.75E-02	2.95E+00	8.70E+00	3.11E+00

K_f	2.90E-02 iph



no PN
Affordable Housing
6/14/2016
JTL

A2

Dia_{hole}	4	inches
$Depth_{hole}$	24	inches
$Depth_{inst}$	24	inches
Ht_{res}	30	inches
$Depth_{valve}$	16.75	inches

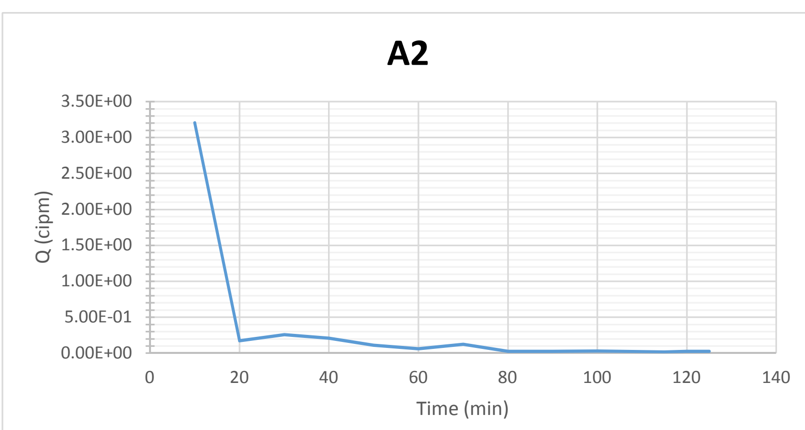
Wt_0	23.4432	lbs

D = 46.75 inches
h = 3.66 inches

t (min)	Δt (min)	Wt (lbs)	ΔWt (lbs)	Δvol (ft^3)	Δvol (in^3)	Q (cipm)
10	10	22.29	1.16	1.85E-02	3.20E+01	3.20E+00
20	10	22.22	0.06	9.87E-04	1.71E+00	1.71E-01
30	10	22.13	0.09	1.48E-03	2.56E+00	2.56E-01
40	10	22.06	0.07	1.20E-03	2.07E+00	2.07E-01
50	10	22.02	0.04	6.35E-04	1.10E+00	1.10E-01
60	10	22.00	0.02	3.53E-04	6.09E-01	6.09E-02
70	10	21.95	0.04	7.05E-04	1.22E+00	1.22E-01
80	10	21.94	0.01	1.41E-04	2.44E-01	2.44E-02
90	10	21.93	0.01	1.41E-04	2.44E-01	2.44E-02
100	10	21.79	0.01	1.60E-04	2.77E-01	2.77E-02
115	15	21.10	0.01	1.60E-04	2.77E-01	1.85E-02
120	5	21.10	0.00	7.05E-05	1.22E-01	2.44E-02
125	5	21.09	0.00	7.05E-05	1.22E-01	2.44E-02

Q (cipm)	h/r	$(h/r)^2$	$((h/r)^2+1)^{0.5}$
2.44E-02	1.83E+00	3.35E+00	2.09E+00

K_f	**1.34E-02 iph**



05439-42-95
Del Mar Highlands
9/30/2016
JTL

A-7

Dia_{hole}	4	inches
$Depth_{hole}$	43	inches
$Depth_{inst}$	41.5	inches
Ht_{res}	29	inches

Wt_0	20.835	lbs

D = 23.25 inches

h_{calc} = 5.08 inches

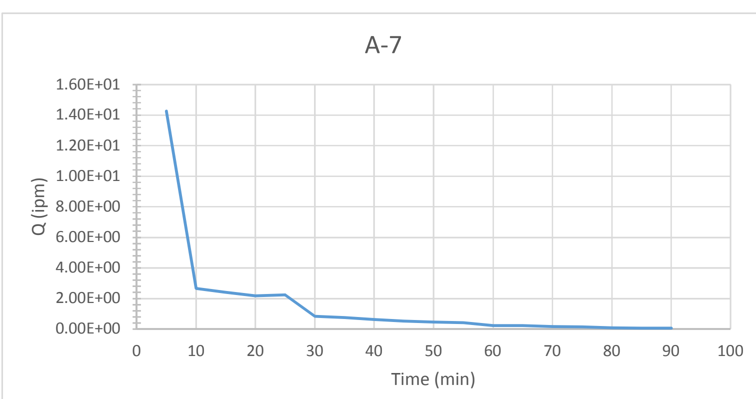
$h_{measured}$ = 5 inches

A_{wet} = 75.40 in^2

t (min)	Δt (min)	Wt (lbs)	ΔWt (lbs)	Δvol (ft^3)	Δvol (in^3)	Q (ipm)
5	5	18.260	2.575	4.13E-02	7.13E+01	1.43E+01
10	5	17.780	0.480	7.69E-03	1.33E+01	2.66E+00
15	5	17.345	0.435	6.97E-03	1.20E+01	2.41E+00
20	5	16.950	0.395	6.33E-03	1.09E+01	2.19E+00
25	5	16.545	0.405	6.49E-03	1.12E+01	2.24E+00
30	5	16.395	0.150	2.40E-03	4.15E+00	8.31E-01
35	5	16.260	0.135	2.16E-03	3.74E+00	7.48E-01
40	5	16.145	0.115	1.84E-03	3.18E+00	6.37E-01
45	5	16.050	0.095	1.52E-03	2.63E+00	5.26E-01
50	5	15.965	0.085	1.36E-03	2.35E+00	4.71E-01
55	5	15.890	0.075	1.20E-03	2.08E+00	4.15E-01
60	5	15.850	0.040	6.41E-04	1.11E+00	2.22E-01
65	5	15.810	0.040	6.41E-04	1.11E+00	2.22E-01
70	5	15.780	0.030	4.81E-04	8.31E-01	1.66E-01
75	5	15.755	0.025	4.01E-04	6.92E-01	1.38E-01
80	5	15.740	0.015	2.40E-04	4.15E-01	8.31E-02
85	5	15.730	0.010	1.60E-04	2.77E-01	5.54E-02
90	5	15.720	0.010	1.60E-04	2.77E-01	5.54E-02
95	5	15.715	0.005	8.01E-05	1.38E-01	2.77E-02
100	5	15.710	0.005	8.01E-05	1.38E-01	2.77E-02
105	5	15.705	0.005	8.01E-05	1.38E-01	2.77E-02

Q (ipm)	h/r	$(h/r)^2$	$((h/r)^2+1)^{0.5}$
2.77E-02	2.50E+00	6.25E+00	2.69E+00

K_{fs}	**1.03E-02 iph**



05439-42-95
Del Mar Highlands
9/30/2016
JTL

A-8

Dia_{hole}	4	inches
$Depth_{hole}$	30.5	inches
$Depth_{inst}$	29	inches
Ht_{res}	30	inches

Wt_0	24.005	lbs

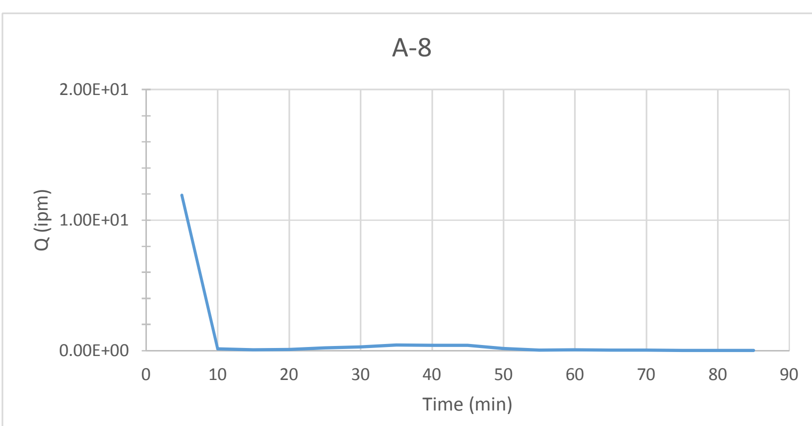
D =	24.25	inches
h_{calc} =	5.08	inches
$h_{measured}$ =	5	inches

A_{wet} = 75.40 in^2

t (min)	Δt (min)	Wt (lbs)	ΔWt (lbs)	Δvol (ft^3)	Δvol (in^3)	Q (ipm)
5	5	21.855	2.150	3.45E-02	5.95E+01	1.19E+01
10	5	21.830	0.025	4.01E-04	6.92E-01	1.38E-01
15	5	21.815	0.015	2.40E-04	4.15E-01	8.31E-02
20	5	21.795	0.020	3.21E-04	5.54E-01	1.11E-01
25	5	21.755	0.040	6.41E-04	1.11E+00	2.22E-01
30	5	21.700	0.055	8.81E-04	1.52E+00	3.05E-01
35	5	21.620	0.080	1.28E-03	2.22E+00	4.43E-01
40	5	21.545	0.075	1.20E-03	2.08E+00	4.15E-01
45	5	21.470	0.075	1.20E-03	2.08E+00	4.15E-01
50	5	21.440	0.030	4.81E-04	8.31E-01	1.66E-01
55	5	21.430	0.010	1.60E-04	2.77E-01	5.54E-02
60	5	21.415	0.015	2.40E-04	4.15E-01	8.31E-02
65	5	21.405	0.010	1.60E-04	2.77E-01	5.54E-02
70	5	21.395	0.010	1.60E-04	2.77E-01	5.54E-02
75	5	21.390	0.005	8.01E-05	1.38E-01	2.77E-02
80	5	21.385	0.005	8.01E-05	1.38E-01	2.77E-02
85	5	21.380	0.005	8.01E-05	1.38E-01	2.77E-02

Q (ipm)	h/r	$(h/r)^2$	$((h/r)^2+1)^{0.5}$
3.29E-02	2.50E+00	6.25E+00	2.69E+00

Kfs	1.22E-02	iph



GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

RESPONSE TO CITY REVIEW COMMENTS

DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING TENTATIVE MAP AMENDMENT SAN DIEGO, CALIFORNIA

PREPARED FOR

PARDEE HOMES
SAN DIEGO, CALIFORNIA

OCTOBER 27, 2016
PROJECT NO. 05439-42-95

Project No. 05439-42-95
October 27, 2016

Pardee Homes
13400 Sabre Springs Parkway, Suite 200
San Diego, California 92128

Attention: Mr. Allen Kashani

Subject: RESPONSE TO CITY REVIEW COMMENTS
DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING
TENTATIVE MAP AMENDMENT
SAN DIEGO, CALIFORNIA

References:

1. *City of San Diego Review Comments, Cycle 10,* LDR-Geology, dated October 24, 2016.

2. *Update Geotechnical Report, Del Mar Highlands Estates Affordable Housing, San Diego, California,* prepared by Geocon Incorporated, dated June 24, 2016 (Project No. 05439-42-95).

3. *Response to City Review Comments, Del Mar Highlands Estates Affordable Housing, San Diego, California*, prepared by Geocon Incorporated, dated October 6, 2016 (Project No. 05439-42-95).

4. *Response to City Review Comments, Del Mar Highlands Estates Affordable Housing, Tentative Map Amendment, San Diego, California*, prepared by Geocon Incorporated, dated August 11, (Project No. 05439-42-95).

Dear Mr. Kashani:

In accordance with your request, we have prepared this letter to respond to City of San Diego review comments (Reference 1). The review comments specific to geotechnical engineering aspects are provided below followed by our responses.

Comment No. 20-: *In the referenced report dated October 6, 2016, the project's geotechnical consultant indicates partial infiltration is feasible in the northern area. Provide an additional C.4-1 worksheet to reflect this condition.*

Response: Worksheet C.4-1, specific to the area where partial infiltration is feasible, is appended.

Comment No. 21: *The project's geotechnical consultant must delineate on the geologic map the areas where partial infiltration is feasible and where infiltration is non-feasible based on the site specific investigation.*

Response: Figure 1 (map pocket) delineates the area were partial infiltration is feasible. The remainder of the site is considered infeasible for infiltration for the reasons indicated in the referenced reports and letters.

Should you have any questions regarding this letter, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rodney C. Mikesell
GE 2533

RCM:dmc

(e-mail) Addressee
(2/del) Latitude 33
Attention: Mr. Tadd Dolfo

GRAPHIC SCALE

0' 15' 30' 45' 60' 90' 120'

SCALE 1"= 30' (on 36x24)

GEOCON LEGEND

Qcf ....COMPACTED FILL

Quc ....COMPACTED FILL IN UNDERCUT AREA

Qal ....ALLUVIUM (Dotted Where Buried)

Qt ....TERRACE DEPOSITS (Dotted Where Buried)

........APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

A-8 ....APPROX. LOCATION OF INFILTRATION TEST

T-12 ....APPROX. LOCATION OF EXPLORATORY TRENCH

........APPROX. LOCATION OF EXISTING SUBDRAIN

93 ....APPROX. ELEVATION AT BASE OF FILL

........AREA FEASIBLE FOR INFILTRATION

GEOLOGIC MAP

DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE 1" = 30'	DATE 10 - 27 - 2016		
PROJECT NO. 05439 - 42 - 95		FIGURE 1	
SHEET 1 OF 1			

Plotted:10/27/2016 9:59AM | By:ALVIN LADRILLONO | File Location:Y:\1_GEOTECH\05000\05400\05439-42-95\2016-10-27\SHEETS\05439-42-95 Geo Map (2016-10-27).dwg

Categorization of Infiltration Feasibility Condition			Worksheet C.4-1
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: This worksheet is specific to the northern portion of the property. We performed 1 infiltration test in the northern portion of the property considered feasible for infiltration. The test result was: A-5: 0.22 in/hr, or 0.11 in/hr using a factor of safety of 2.0 for feasibility determination. This shows the soil does not have an estimated reliable infiltration rate greater than 0.5 inches per hour.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	
Provide basis: Provided the bottom of the basin is extended through the fill into the native terrace deposits, it is our opinion infiltration is feasible without increasing geotechnical hazards.			

Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Infiltration is not anticipated to have a negative impact on nearby water balance or discharge of contaminated groundwater to surface waters.			
Part 1 Result*	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

The unfactored infiltration rate for the area at the northern end of the site is:

A-5: 0.22 in/hr (unfactored) and 0.11 in/hr (using a safety factor of 2.0).

The northern portion of the site identified on the geologic map dated October 27, 2016 is considered to have geologic conditions that would allow for an appreciable rate for infiltration.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

The northern portion of the site identified on the geologic map dated October 27, 2016 is considered to have soil and geologic conditions that would allow for an appreciable rate for infiltration without increasing the risk of geotechnical hazards (slope stability, groundwater mounding, utilities). This area is considered suitable for partial infiltration.

Basins in this area should be deepened through the fill and extend into the native terrace deposits. The basins should have impermeable side liners and a subsurface drainage system near the base of the basins.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: We are unaware of any downstream water rights that could be impacted from infiltration. The project civil engineer should confirm.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		Partial Infiltration Feasible

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

2016

DRAINGE STUDY

DEL MAR HIGHLANDS ESTATES

October 10, 2016

PREPARED BY: LATITUDE 33 PLANNING & ENGINEERING
PREPARED FOR: PARDEE HOMES
JOB NUMBER: 1390.00

DRAINAGE STUDY FOR

DEL MAR HIGHLANDS ESTATES

CITY OF SAN DIEGO, CALIFORNIA

IO No. 24006829
PTS No. 500066

October 10, 2016

Prepared for:
PARDEE HOMES
13400 Sabre Springs Parkway, Suite 200
San Diego, CA 92128

Prepared by:
LATITUDE 33 PLANNING AND ENGINEERING
9968 Hibert Street, 2nd Floor
San Diego, California 92131
(858) 751-0633

C. John Eardensohn, RCE 34584

Prepared by: AB
Checked by: TD

TABLE OF CONTENTS

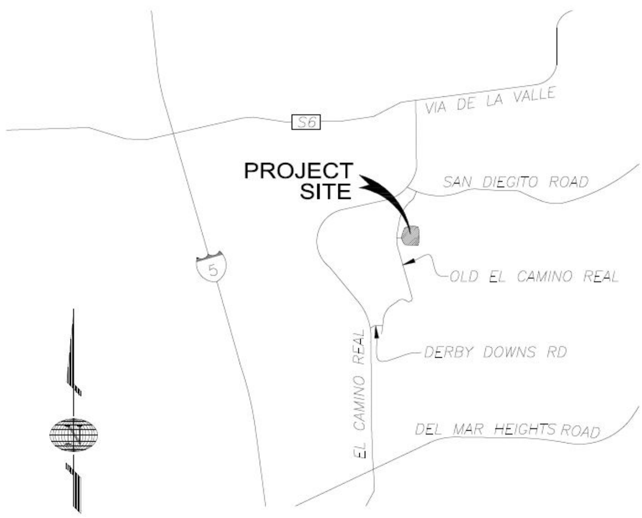
I. PROJECT DESCRIPTION

The subject property is located within the North City area within the City of San Diego, State of California. In particular, the project site is Parcel B of map 19205 filed in the Office of the County Recorder of San Diego County, file no. 2003-0401518, O.R., and located directly east of Interstate 5 and south of San Dieguito Road (see Vicinity Map below).

The project site lies within an undeveloped parcel approximately 1.8 acres in size. The adjacent parcel A of map 19205 currently consists of three multi-family residential buildings located along the westerly property line. To the north and east lies undisturbed open space, and to the south lies a horse training facility.

The project includes the construction of a 13-plex residential unit with accompanying parking. Refer to the proposed site plan included in Appendix E.

This report has been prepared in support of Latitude 33's final engineering design for Del Mar Highlands Estates. This report provides hydrologic and hydraulic analyses of the proposed condition 100-year flow rates as well as drainage facility sizing.



VICINITY MAP

NTS

II. EXISTING SITE CONDITION DRAINAGE

In its existing condition, the project site and adjacent hillside to the north act as a single basin, Basin E.1. The project site is comprised of undeveloped land with gradual slopes ranging from 1%-3%. Drainage sheet flows from north to south to a desilting basin located at the southeast corner of the site. Once in the basin, runoff is collected in an existing riser and enters into the existing storm drain located to the south.

To the west of the project site lies Basin E.2, a residential development comprised of 3 multi-family residential buildings and associated improvements. Drainage from Basin E.2 is collected within an existing 18-

inch storm drain and conveyed to the east towards the desilting basin described above. Point of Compliance (POC) 1 on the Existing Hydrology Map included in Appendix E represents the point at which runoff from Basins E.1 and E.2 confluence. Runoff from E.1 and E.2 ultimately discharge into an existing detention basin located to the south of the project site.

III. DEVELOPED SITE CONDITION DRAINAGE

In the post construction condition, the site is divided into seven drainage basins. Drainage from basin P.1 and P.2 will be captured via roof drain and outlet onto the adjacent landscaped areas to the west. From here runoff sheet flows to nearby area drains where it is collected and conveyed via storm drain to the proposed bio-filtration basin located at the southeast corner of the site. Here runoff is treated, stored, and as in the existing condition, discharged into the existing storm drain system identified as POC 1. Refer to the Proposed Hydrology Map included in Appendix E for area drain and POC locations.

Similarly, drainage from basins P.3 and P.4 sheet flows to the north and to the south, respectively, where it is captured via area drain and conveyed southeasterly within the proposed storm drain to the bio-filtration basin at POC 1.

Drainage from basin P.5 sheet flows to the north and enters into the proposed storm drain system through the proposed catch basin located at the northeast corner of the site. From here, drainage is conveyed to the south to the proposed bio-filtration basin at POC 1.

Drainage from basin P.6 sheet flows to the east and enters into the proposed inlet structure located at the southeast corner of the site where it discharges directly into the adjacent bio-filtration basin located at POC 1.

Basin P.7 remains mostly undeveloped, retaining drainage characteristics similar to that of the existing condition. Drainage generated from this basin is considered to be self-mitigating or self-treating and therefore does not enter into to the proposed bio-filtration basin. Drainage is instead collected via brow ditch/catch basin and bypasses the proposed bio-filtration basin entering directly into the existing storm drain system to the south.

To mitigate for the increase in impervious area due to the proposed building structure and accompanying improvements, the delta between the existing and proposed runoff will be collected and stored in the proposed bio-filtration basin. As such, the basin will be sized to attenuate the 100-year storm event. More information will be provided in the analysis and conclusion portions of this report.

IV. HYDROLOGIC METHODOLOGY

The proposed development was analyzed in conformance with the City of San Diego Drainage Design Manual, dated April 1984. In the hydrology study, all basins analyzed are less than one square mile. The Rational Method module within the Autodesk Storm and Sanitary Analysis (SSA) software was utilized to calculate storm runoff for a 100-year frequency storm. The criteria used for this analysis are described as follows:

- For existing conditions, runoff coefficients of 0.45 were assumed for open space.

- Post construction runoff coefficients of 0.45 and 0.70 were assumed for open space and multi-unit areas respectively as consistent with Table 2 of the Drainage Design Manual (included in Appendix A).

- Initial travel time values were computed using the Overland Time of Flow Nomograph, as shown on Page 86 in the City of San Diego Drainage Design Manual.

- “Gutter and Roadway Discharge - Velocity Chart” and Manning’s Equation were used to determine the flow velocity for concentrated flows in curb and gutters, drainage channels and conduits. Travel times were then determined by dividing the flow distance by the velocity of flow.

- Final times of concentration values for each basin were calculated by adding the initial and final travel times; with a minimum time of 5 minutes.

- The rainfall intensity was obtained from the “Intensity-Duration-Frequency Curves” from the City of San Diego Drainage Manual, included in Appendix A.

- Drainage Area: The existing condition drainage basins were delineated from the base topographic map as shown on the Existing Hydrology Map provided in Appendix E. The proposed condition drainage basins were delineated using the grading plan as show on the Proposed Hydrology Map provided in Appendix E. The overall boundaries for the existing and proposed conditions were set equal to allow for a comparison of the results.

The existing and proposed hydrologic calculations are included in Appendix B and C, respectively, and summarized in the tables below.

Table 1 - Summary of Existing Condition Flows

Drainage Basin	Drainage Area (AC)	Runoff Coefficient (C)	Time of Concentration (hh:mm:ss)	Intensity (I_{100})	100-year Peak Flow (CFS)
E.1	2.12	0.45	00:19:17	2.62	2.50
E.2	1.33	0.70	00:06:37	4.09	3.81
Total	**3.45**	**-**	**-**	**-**	**6.31**

Table 2 - Summary of Developed Condition Flows

Drainage Basin	Drainage Area (AC)	Runoff Coefficient (C)	Time of Concentration (hh:mm:ss)	Intensity (I_{100})	100-year Peak Flow (CFS)
P.1	0.10	0.70	00:14:59	2.97	0.20
P.2	0.11	0.70	00:20:34	2.52	0.20
P.3	0.03	0.70	00:09:33	3.54	0.08
P.4	0.13	0.70	00:25:53	2.19	0.19
P.5	0.27	0.70	00:05:00	4.38	0.84
P.6	0.25	0.70	00:05:00	4.38	0.77
P.7	1.23	0.45	00:18:31	2.68	1.48
E.2	1.33	0.70	00:06:37	4.09	3.81
Total	**3.45**	**-**	**-**	**-**	**7.57**

VII. DISCUSSION AND RESULTS

The Rational Method for the 100-year peak storm event was used in the design of the proposed drainage facilities. The hydraulic analysis of this system was evaluated using the Autodesk Storm and Sanitary Analysis (SSA) software.

Based on the supporting calculations contained herein, it is anticipated that the project will result in a 1.26 CFS increase in peak flow. Based on these results and the hydrograph analysis included in Appendix D, the required storage volume for the 100-year storm event was calculated to be approximately 500 CF. The proposed bio-filtration basin was sized to effectively attenuate the 100-year storm event by providing 5,400 CF of storage. An appropriately sized orifice will control discharge rates from the proposed bio-filtration basin with impacts on the existing storm drain system expected to be negligible. For more on our implemented flow control measures, refer to the Storm Water Quality Management Plan.

There is no proposed dredge, fill, excavation, or grading in any waters of the state, approval from the Regional Water Quality Control Board need not be pursued. Additionally, no drainage diversion is proposed for this project.

VIII. CONCLUSION

The hydrologic and hydraulic analysis confirms the proposed development and associated storm drain system effectively conveys and attenuates the 100-year storm event. As such, no adverse impacts on the existing storm drain system or detention basin located to the south are anticipated.

APPENDIX A: REFERENCES

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
Residential:	D
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

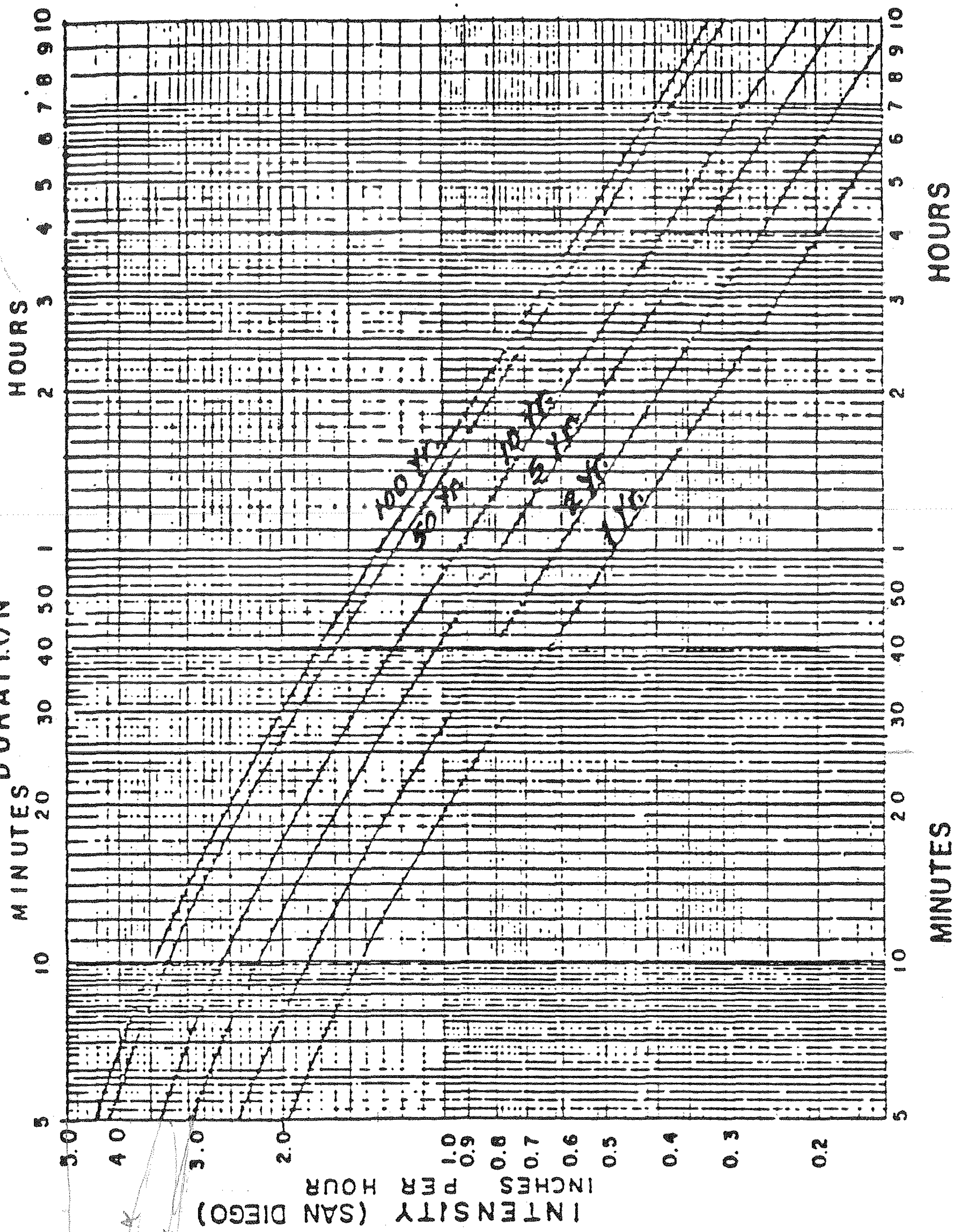
(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

$$\text{Revised C} = \frac{50}{80} \times 0.85 = 0.53$$



ELEV.	FACTOR
0–1500	1.00
1500–3000	1.25
3000–4000	1.42
4000–5000	1.60
5000–6000	1.70
DESERT	1.25

To obtain correct intensity, multiply intensity on chart by factor for design elevation.

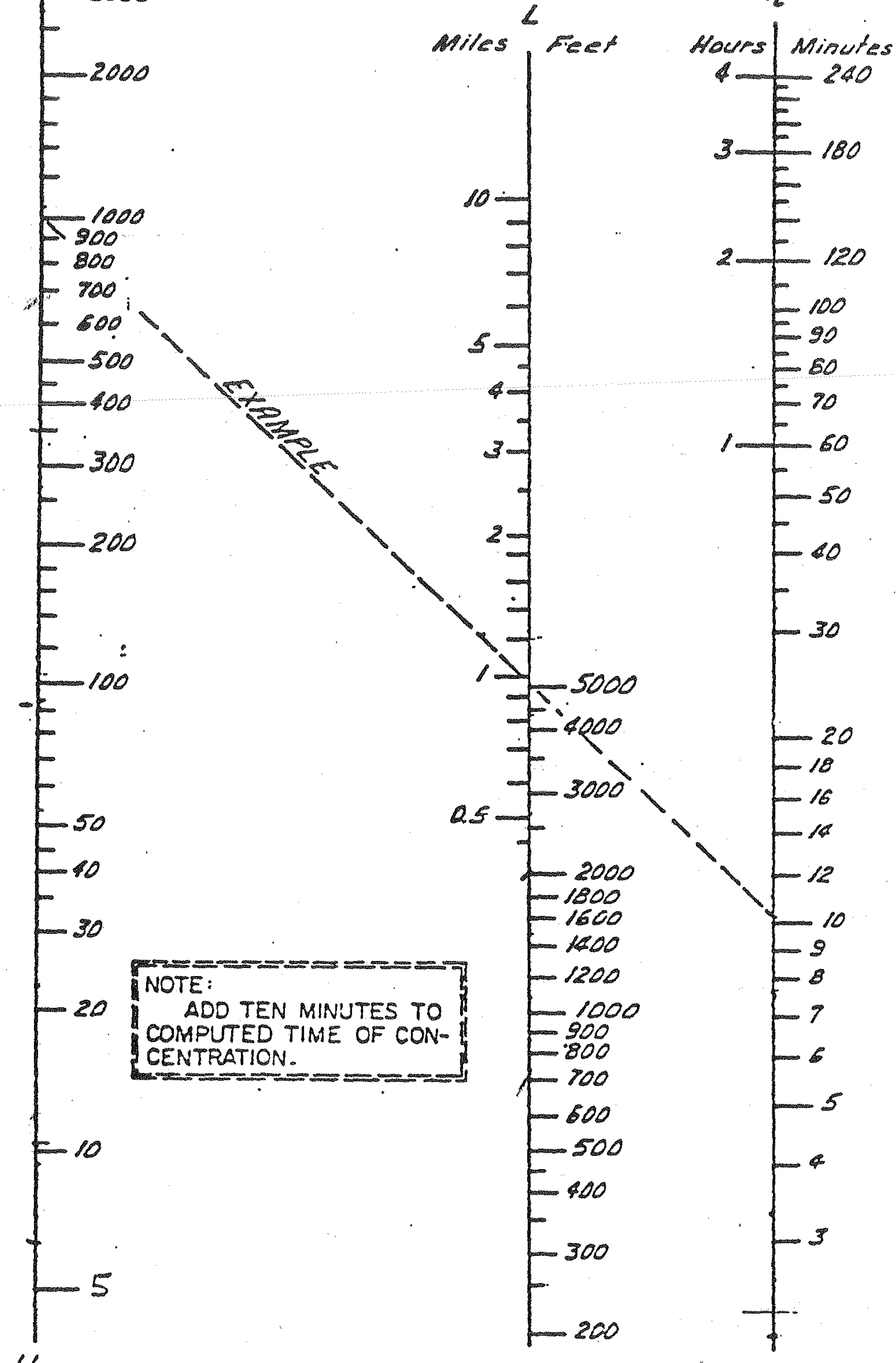
RAINFALL INTENSITY - DURATION - FREQUENC CURVES for COUNTY OF SAN DIEGO

APPENDIX I

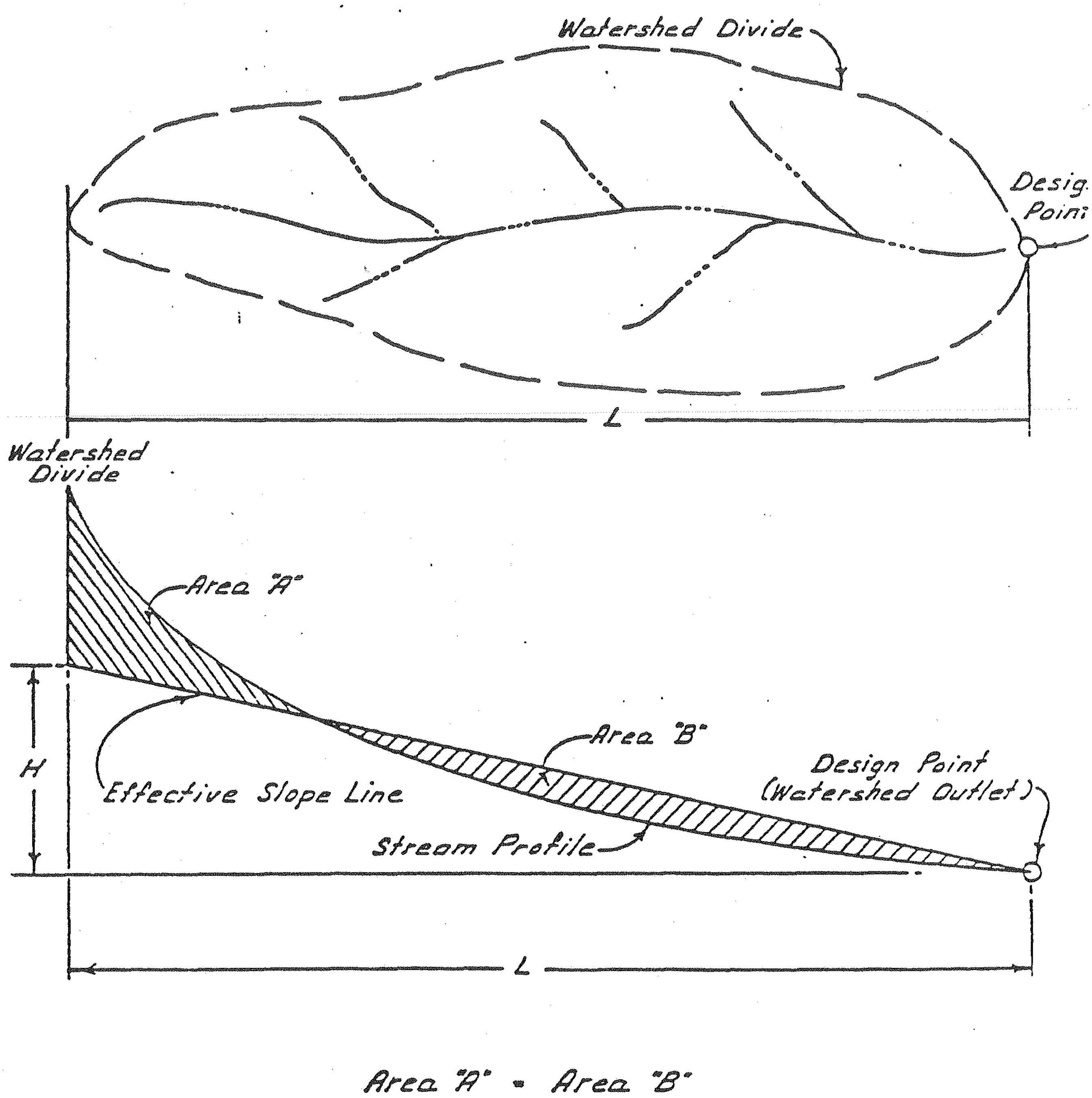
EQUATION

$$T_c = \left(\frac{11.9L^3}{H}\right)^{.385}$$

T_c = Time of concentration (in hours)
L = Length of watershed (in miles)
H = Difference in elevation along (in feet) effective slope line (See Appendix X-B)

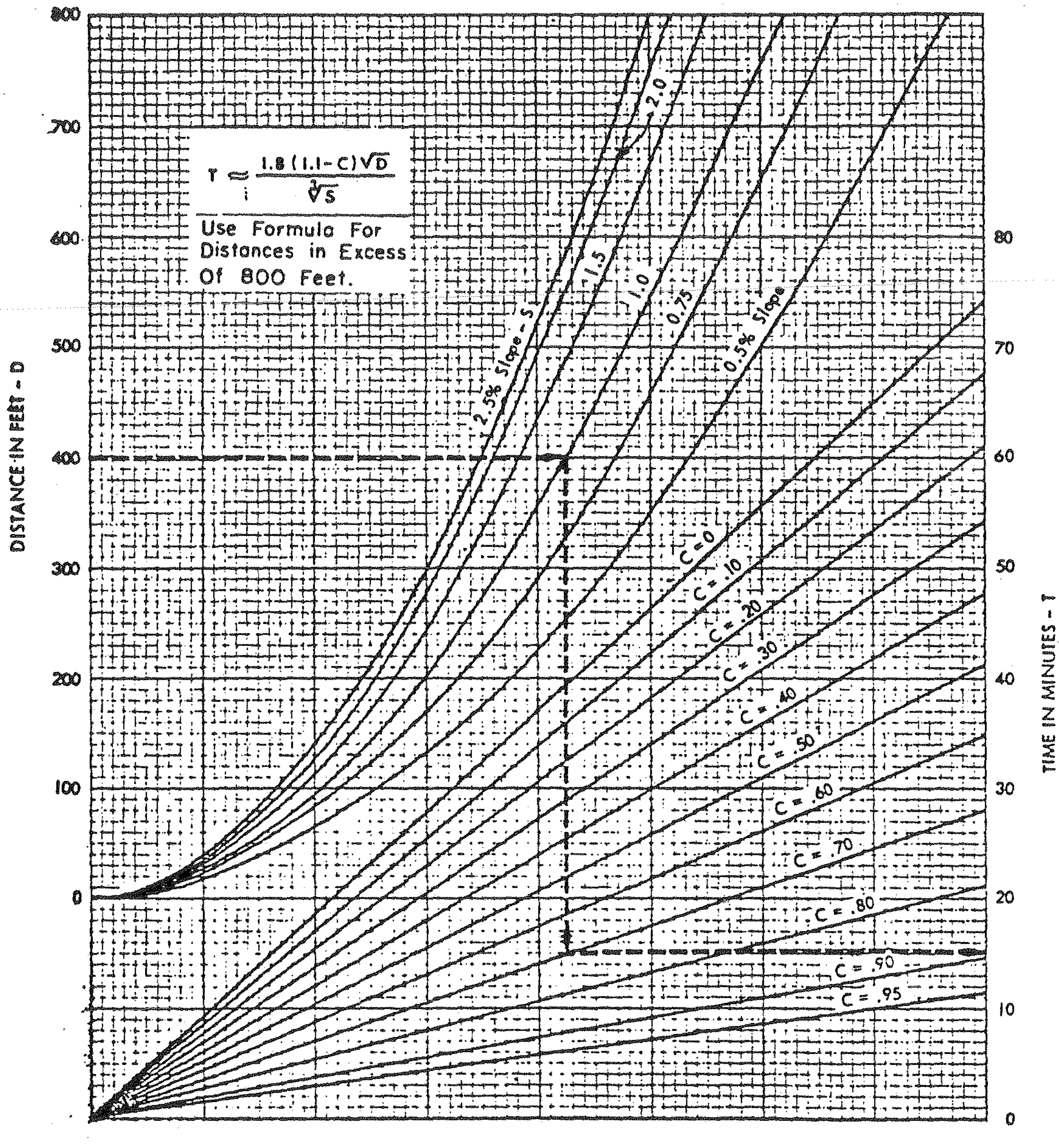


SAN DIEGO COUNTY DEPARTMENT OF SPECIAL DISTRICT SERVICES DESIGN MANUAL	NOMOGRAPH FOR DETERMINATION OF TIME OF CONCENTRATION (Tc) FOR NATURAL WATERSHEDS	
APPROVED ________	DATE ________	APPENDIX



SAN DIEGO COUNTY DEPARTMENT OF SPECIAL DISTRICT SERVICES DESIGN MANUAL APPROVED *B. Y. [illegible]*	COMPUTATION OF EFFECTIVE SLOPE FOR NATURAL WATERSHEDS DATE [illegible] — APPENDIX

URBAN AREAS OVERLAND TIME OF FLOW CURVES



Surface Flow Time Curves

EXAMPLE:

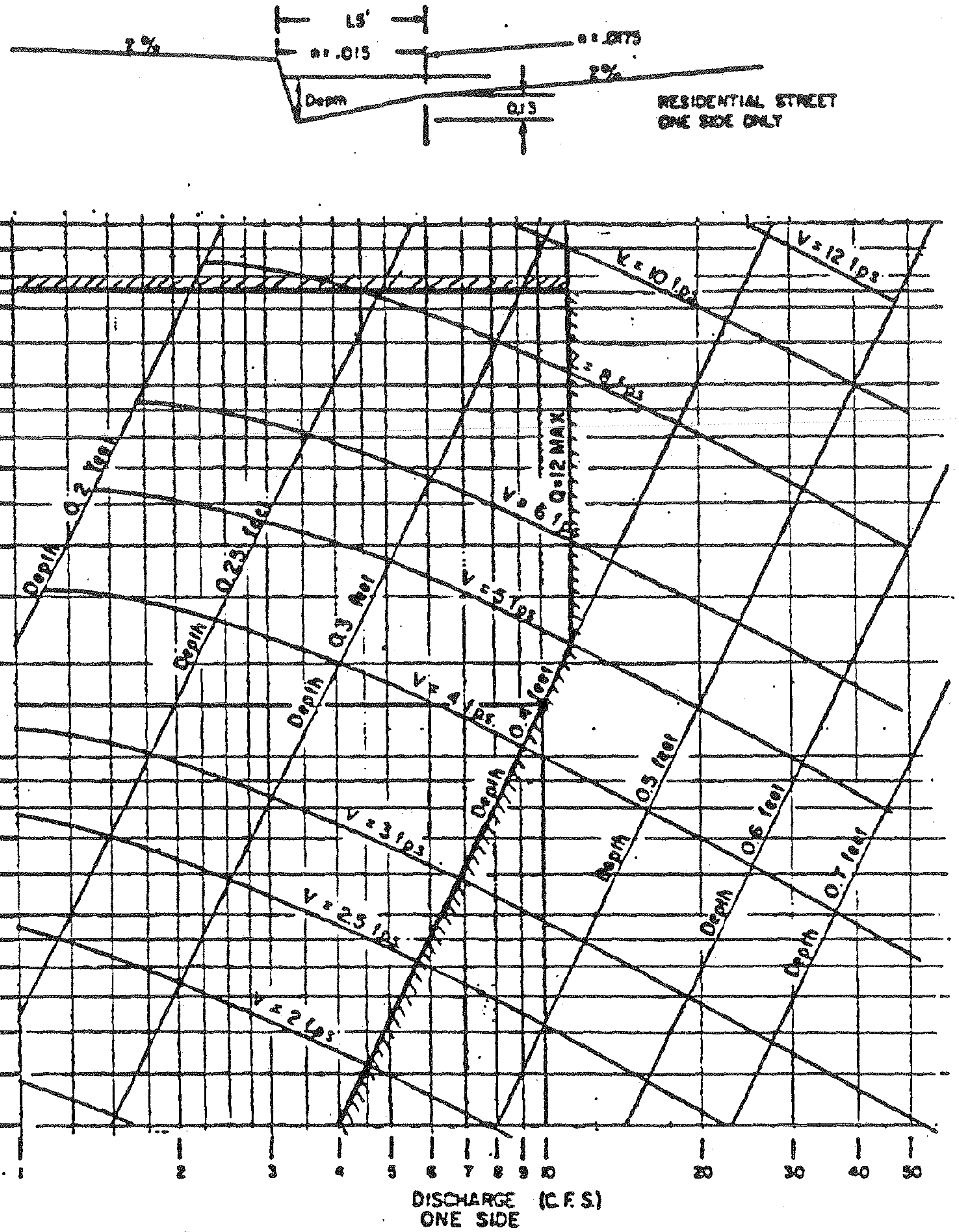
GIVEN: LENGTH OF FLOW = 400 FT.

SLOPE = 1.0 %

COEFFICIENT OF RUNOFF C = .70

READ: OVERLAND FLOWTIME = 15 MINUTES

CHART I-104.12

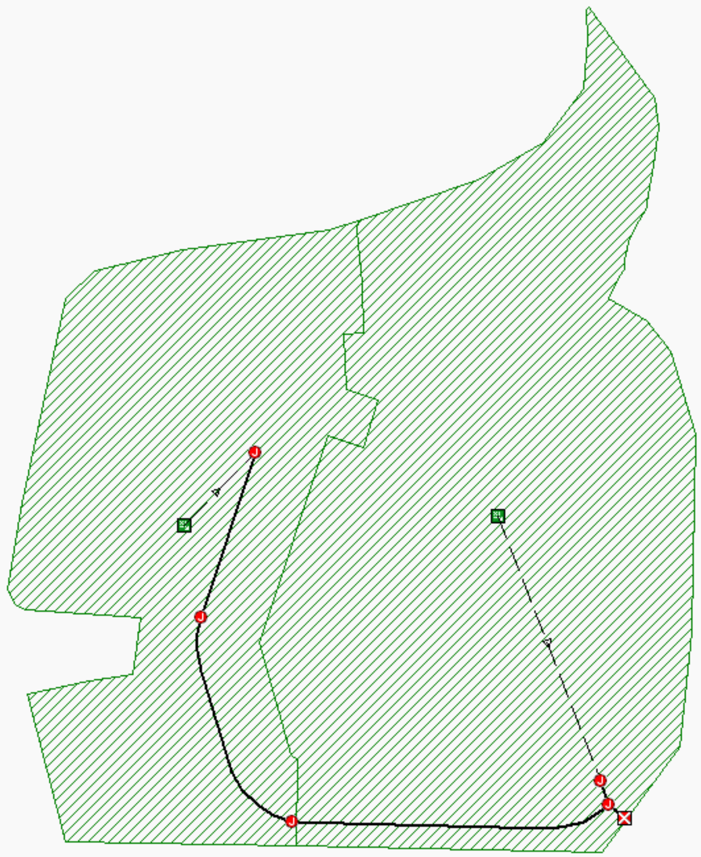


EXAMPLE:

Given: Q = 10 S = 2.5 %
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

REV.		CITY OF SAN DIEGO - DESIGN GUIDE	SHT. NO.
		GUTTER AND ROADWAY DISCHARGE - VELOCITY CHART	

APPENDIX B: EXISTING HYDROLOGIC CALCULATIONS



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Autodesk® Storm and Sanitary Analysis 2015 - Version 9.1.140 (Build 1)
-----------------------------------------------------------------------------------------

*******************
Project Description
*******************
File Name ................. 1390.00 AFFORDABLE - EXIST.SPF
Description ............... H:\1300\1390.00 - Pardee - PHR VTM-SDP Amendment Units 8\Engineering\Reports\Drainage\Affordable Site\SSA
\_SSA_WORKING_1390.0 AFFORDABLE SITE - EXISITNG DRAINAGE.dwg


****************
Analysis Options
****************
Flow Units ................ cfs
Subbasin Hydrograph Method. Rational
Time of Concentration...... SCS TR-55
Return Period.............. 100 years
Link Routing Method ....... Hydrodynamic
Storage Node Exfiltration.. Constant flow
Starting Date ............. OCT-06-2016 00:00:00
Ending Date ............... OCT-06-2016 01:00:00
Report Time Step .......... 00:00:10


*************
Element Count
*************
Number of subbasins ....... 2
Number of nodes ........... 6
Number of links ........... 5


****************
Subbasin Summary
****************
Subbasin                 Total
                          Area
ID                       acres
------------------------------
{_}.E.1                   2.12
{_}.E.2                   1.33


************
```

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
J.09	JUNCTION	83.86	92.30	0.00	
J.10	JUNCTION	82.50	91.20	0.00	
J.11	JUNCTION	80.00	89.70	0.00	
J.POC	JUNCTION	76.42	87.67	0.00	
J.RISER	JUNCTION	77.10	79.60	0.00	
POC1	OUTFALL	72.93	74.43	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
L.09	J.09	J.10	CONDUIT	103.3	1.3172	0.0130
L.10	J.10	J.11	CONDUIT	143.9	1.7374	0.0130
L.11	J.11	J.POC	CONDUIT	194.8	1.8376	0.0130
L.POC1	J.POC	POC1	CONDUIT	7.7	45.6209	0.0130
L.RISER	J.RISER	J.POC	CONDUIT	11.6	5.8671	0.0150

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft²	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
L.09	CIRCULAR	1.50	1.50	1	1.77	0.38	12.06
L.10	CIRCULAR	1.50	1.50	1	1.77	0.38	13.85
L.11	CIRCULAR	1.50	1.50	1	1.77	0.38	14.24
L.POC1	CIRCULAR	1.50	1.50	1	1.77	0.38	70.95
L.RISER	CIRCULAR	1.50	1.50	1	1.77	0.38	22.05

****
Runoff Quantity Continuity
****

	Volume acre-ft	Depth inches
Total Precipitation	0.200	0.694

```
Continuity Error (%) .....         0.491

**************************        Volume        Volume
Flow Routing Continuity          acre-ft      Mgallons
**************************     ---------     ---------
External Inflow ..........         0.000         0.000
External Outflow .........         0.102         0.033
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


**************************************
Runoff Coefficient Computations Report
**************************************

-------------------
Subbasin {_}.E.1
-------------------
                                                         Area          Soil       Runoff
Soil/Surface Description                               (acres)         Group       Coeff.
-------------------------------------------------------------------------------------------
-                                                        2.12             D         0.45
Composite Area & Weighted Runoff Coeff.                  2.12                       0.45

-------------------
Subbasin {_}.E.2
-------------------
                                                         Area          Soil       Runoff
Soil/Surface Description                               (acres)         Group       Coeff.
-------------------------------------------------------------------------------------------
-                                                        1.33             D         0.70
Composite Area & Weighted Runoff Coeff.                  1.33                       0.70


***************************************************
SCS TR-55 Time of Concentration Computations Report
***************************************************

Sheet Flow Equation
-------------------

        Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

        Where:
```

```
        Tc = Time of Concentration (hrs)
        n  = Manning's Roughness
        Lf = Flow Length (ft)
        P  = 2 yr, 24 hr Rainfall (inches)
        Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation
----------------------------------

        V  = 16.1345 * (Sf^0.5) (unpaved surface)
        V  = 20.3282 * (Sf^0.5) (paved surface)
        V  = 15.0 * (Sf^0.5) (grassed waterway surface)
        V  = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
        V  = 9.0 * (Sf^0.5) (cultivated straight rows surface)
        V  = 7.0 * (Sf^0.5) (short grass pasture surface)
        V  = 5.0 * (Sf^0.5) (woodland surface)
        V  = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)

Channel Flow Equation
---------------------

        V  = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
        R  = Aq / Wp
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        R  = Hydraulic Radius (ft)
        Aq = Flow Area (ft²)
        Wp = Wetted Perimeter (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)
        n  = Manning's Roughness

-------------------
```

Subbasin {_}.E.1

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.45	0.00	0.00
Flow Length (ft):	100.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.11	0.00	0.00
Computed Flow Time (minutes):	15.09	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	74.50	315.98	0.00
Slope (%):	29.50	3.80	0.00
Surface Type:	Grass pasture	Grass pasture	Unpaved
Velocity (ft/sec):	3.80	1.36	0.00
Computed Flow Time (minutes):	0.33	3.87	0.00
Total TOC (minutes):	19.29		

Subbasin {_}.E.2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.13	0.00	0.00
Flow Length (ft):	53.70	0.00	0.00
Slope (%):	25.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.34	0.00	0.00
Computed Flow Time (minutes):	2.62	0.00	0.00

Channel Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	107.80	0.00	0.00
Channel Slope (%):	0.80	0.00	0.00

Cross Section Area (ft²):	0.03	0.00	0.00
Wetted Perimeter (ft):	3.00	0.00	0.00
Velocity (ft/sec):	0.45	0.00	0.00
Computed Flow Time (minutes):	4.01	0.00	0.00
Total TOC (minutes):	6.62		

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
{_}.E.1	0.84	2.62	0.38	2.50	0.450	0	00:19:17
{_}.E.2	0.45	4.09	0.32	3.81	0.700	0	00:06:37

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
J.09	0.19	0.65	84.51	0	00:06	0	0	0:00:00
J.10	0.18	0.57	83.07	0	00:07	0	0	0:00:00
J.11	0.20	0.58	80.58	0	00:07	0	0	0:00:00
J.POC	0.27	0.42	76.84	0	00:07	0	0	0:00:00
J.RISER	0.33	0.48	77.58	0	00:19	0	0	0:00:00
POC1	0.18	0.26	73.19	0	00:07	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	hh:mm
J.09	JUNCTION	3.81	3.81	0	00:06	0.00		
J.10	JUNCTION	0.00	3.79	0	00:07	0.00		
J.11	JUNCTION	0.00	3.75	0	00:07	0.00		
J.POC	JUNCTION	0.00	4.67	0	00:07	0.00		
J.RISER	JUNCTION	2.50	2.50	0	00:19	0.00		
POC1	OUTFALL	0.00	4.65	0	00:07	0.00		

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
POC1	94.23	2.64	4.65
System	94.23	2.64	4.65

****
Link Flow Summary
****

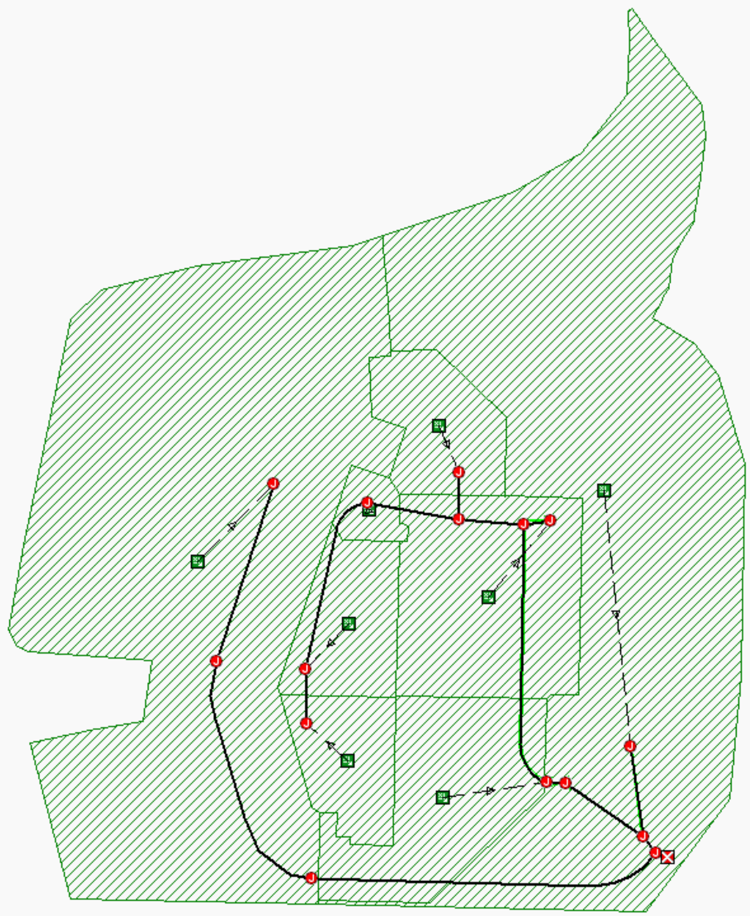
Link ID	Element Type	Time of Peak Flow Occurrence days	hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
L.09	CONDUIT	0	00:07	5.64	1.00	3.79	12.06	0.31	0.41	0	Calculated
L.10	CONDUIT	0	00:07	6.06	1.00	3.75	13.85	0.27	0.38	0	Calculated
L.11	CONDUIT	0	00:07	7.23	1.00	3.70	14.24	0.26	0.33	0	Calculated
L.POC1	CONDUIT	0	00:07	15.30	1.00	4.65	70.95	0.07	0.23	0	Calculated
L.RISER	CONDUIT	0	00:19	7.10	1.00	2.50	22.05	0.11	0.25	0	Calculated

****
Highest Flow Instability Indexes

```
*********************************
All links are stable.


Analysis began on:  Thu Oct 06 10:35:55 2016
Analysis ended on:  Thu Oct 06 10:35:55 2016
Total elapsed time: < 1 sec
```

APPENDIX C: PROPOSED HYDROLOGIC CALCULATIONS



```
  Autodesk® Storm and Sanitary Analysis 2015 - Version 9.1.140 (Build 1)
  ----------------------------------------------------------------------------------------

  *******************
  Project Description
  *******************
  File Name ................. 1390.00 AFFORDABLE - PROPOSED.SPF
  Description ............... H:\1300\1390.00 - Pardee - PHR VTM-SDP Amendment Units 8\Engineering\Reports\Drainage\Affordable Site\SSA
\SSA_WORKING_1390.0 AFFORDABLE SITE - PROPOSED.dwg
                              H:\1300\1390.00 - Pardee - PHR VTM-SDP Amendment Units 8\Engineering\Reports\Drainage\Affordable Site\SSA
\SSA_WORKING_1390.0 AFFORDABLE SITE - PROPOSED.dwg
                              H:\1300\1390.00 - Pardee - PHR VTM-SDP Amendment Units 8\Engineering\Reports\Drainage\Affordable Site\SSA
\SSA_WORKING_1390.0 AFFORDABLE SITE - EXISITNG DRAINAGE.dwg


  ****************
  Analysis Options
  ****************
  Flow Units ................ cfs
  Subbasin Hydrograph Method. Rational
  Time of Concentration...... SCS TR-55
  Return Period.............. 100 years
  Link Routing Method ....... Hydrodynamic
  Storage Node Exfiltration.. Constant flow
  Starting Date ............. AUG-12-2016 00:00:00
  Ending Date ............... AUG-12-2016 01:00:00
  Report Time Step .......... 00:00:10


  *************
  Element Count
  *************
  Number of subbasins ....... 8
  Number of nodes ........... 16
  Number of links ........... 15


  ****************
  Subbasin Summary
  ****************
  Subbasin                Total
                           Area
  ID                      acres
  ------------------------------
  {_}.E.2                  1.33
```

{_}.P.1	0.10
{_}.P.2	0.11
{_}.P.3	0.03
{_}.P.4	0.13
{_}.P.5	0.27
{_}.P.6	0.25
{_}.P.7	1.23

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft^2	External Inflow
J.01	JUNCTION	88.90	90.90	0.00	
J.02	JUNCTION	88.60	90.90	0.00	
J.03	JUNCTION	87.60	90.90	0.00	
J.04	JUNCTION	85.90	88.10	0.00	
J.05	JUNCTION	83.12	87.90	0.00	
J.06	JUNCTION	87.30	89.00	0.00	
J.07	JUNCTION	86.00	88.00	0.00	
J.08	JUNCTION	77.60	86.00	0.00	
J.09	JUNCTION	83.86	92.30	0.00	
J.10	JUNCTION	82.50	91.20	0.00	
J.11	JUNCTION	80.00	89.70	0.00	
J.3-4	JUNCTION	87.00	90.10	0.00	
J.BASIN	JUNCTION	78.50	84.00	0.00	
J.POC	JUNCTION	76.42	87.67	0.00	
J.RISER	JUNCTION	77.10	84.00	0.00	
POC1	OUTFALL	72.93	74.43	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
L.01	J.01	J.02	CONDUIT	28.9	1.0370	0.0130
L.02	J.02	J.03	CONDUIT	105.3	0.9501	0.0130
L.04	J.04	J.05	CONDUIT	153.2	1.8144	0.0130
L.05	J.05	J.BASIN	CONDUIT	11.4	40.7048	0.0130
L.06	J.06	J.3-4	CONDUIT	24.1	1.2438	0.0130
L.07	J.07	J.04	CONDUIT	9.9	1.0091	0.0130

L.08	J.08	J.RISER	CONDUIT	48.4	1.0331	0.0130
L.09	J.09	J.10	CONDUIT	103.3	1.3172	0.0130
L.10	J.10	J.11	CONDUIT	143.9	1.7378	0.0130
L.11	J.11	J.POC	CONDUIT	194.8	1.8376	0.0130
L.3.1	J.03	J.3-4	CONDUIT	48.8	1.2288	0.0130
L.3.2	J.3-4	J.04	CONDUIT	38.5	2.8579	0.0130
L.BASIN	J.BASIN	J.RISER	CONDUIT	54.1	2.5854	0.0130
L.POC	J.POC	POC1	CONDUIT	7.7	45.6209	0.0130
L.RISER	J.RISER	J.POC	CONDUIT	11.6	5.8671	0.0130

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft^2	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
L.01	CIRCULAR	0.50	0.50	1	0.20	0.13	0.57
L.02	CIRCULAR	0.50	0.50	1	0.20	0.13	0.55
L.04	CIRCULAR	1.00	1.00	1	0.79	0.25	4.80
L.05	CIRCULAR	1.00	1.00	1	0.79	0.25	22.73
L.06	CIRCULAR	0.50	0.50	1	0.20	0.13	0.63
L.07	CIRCULAR	0.50	0.50	1	0.20	0.13	0.56
L.08	CIRCULAR	0.50	0.50	1	0.20	0.13	0.57
L.09	CIRCULAR	1.50	1.50	1	1.77	0.38	12.06
L.10	CIRCULAR	1.50	1.50	1	1.77	0.38	13.85
L.11	CIRCULAR	1.50	1.50	1	1.77	0.38	14.24
L.3.1	CIRCULAR	0.50	0.50	1	0.20	0.13	0.62
L.3.2	CIRCULAR	0.50	0.50	1	0.20	0.13	0.95
L.BASIN	CIRCULAR	1.00	1.00	1	0.79	0.25	5.73
L.POC	CIRCULAR	1.50	1.50	1	1.77	0.38	70.95
L.RISER	CIRCULAR	1.50	1.50	1	1.77	0.38	25.44

************************** Runoff Quantity Continuity **************************	Volume acre-ft	Depth inches
Total Precipitation	0.177	0.613
Continuity Error (%)	0.425	

************************** Flow Routing Continuity **************************	Volume acre-ft	Volume Mgallons

External Inflow	0.000	0.000
External Outflow	0.101	0.033
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Runoff Coefficient Computations Report
****

Subbasin {_}.E.2

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.33	D	0.70
Composite Area & Weighted Runoff Coeff.	1.33		0.70

Subbasin {_}.P.1

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.10	D	0.70
Composite Area & Weighted Runoff Coeff.	0.10		0.70

Subbasin {_}.P.2

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.11	D	0.70
Composite Area & Weighted Runoff Coeff.	0.11		0.70

Subbasin {_}.P.3

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.03	D	0.70
Composite Area & Weighted Runoff Coeff.	0.03		0.70

Subbasin {_}.P.4

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.13	-	0.70
Composite Area & Weighted Runoff Coeff.	0.13		0.70

Subbasin {_}.P.5

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.27	-	0.70
Composite Area & Weighted Runoff Coeff.	0.27		0.70

Subbasin {_}.P.6

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.25	-	0.70
Composite Area & Weighted Runoff Coeff.	0.25		0.70

Subbasin {_}.P.7

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.23	D	0.45
Composite Area & Weighted Runoff Coeff.	1.23		0.45

****
SCS TR-55 Time of Concentration Computations Report
****

Sheet Flow Equation

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

```
        Where:

        Tc = Time of Concentration (hrs)
        n  = Manning's Roughness
        Lf = Flow Length (ft)
        P  = 2 yr, 24 hr Rainfall (inches)
        Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation
----------------------------------

        V  = 16.1345 * (Sf^0.5) (unpaved surface)
        V  = 20.3282 * (Sf^0.5) (paved surface)
        V  = 15.0 * (Sf^0.5) (grassed waterway surface)
        V  = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
        V  = 9.0 * (Sf^0.5) (cultivated straight rows surface)
        V  = 7.0 * (Sf^0.5) (short grass pasture surface)
        V  = 5.0 * (Sf^0.5) (woodland surface)
        V  = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)

Channel Flow Equation
---------------------

        V  = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
        R  = Aq / Wp
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        R  = Hydraulic Radius (ft)
        Aq = Flow Area (ft²)
        Wp = Wetted Perimeter (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)
        n  = Manning's Roughness
```

Subbasin {_}.E.2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.13	0.00	0.00
Flow Length (ft):	53.70	0.00	0.00
Slope (%):	25.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.34	0.00	0.00
Computed Flow Time (minutes):	2.62	0.00	0.00

Channel Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	107.80	0.00	0.00
Channel Slope (%):	0.80	0.00	0.00
Cross Section Area (ft^2):	0.03	0.00	0.00
Wetted Perimeter (ft):	3.00	0.00	0.00
Velocity (ft/sec):	0.45	0.00	0.00
Computed Flow Time (minutes):	4.01	0.00	0.00

===

Total TOC (minutes): 6.62

===

Subbasin {_}.P.1

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.35	0.00	0.00
Flow Length (ft):	50.00	0.00	0.00
Slope (%):	2.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	14.99	0.00	0.00

===

Total TOC (minutes): 14.99

===

```
------------------
Subbasin {_}.P.2
------------------

Sheet Flow Computations
-----------------------
                                              Subarea A          Subarea B          Subarea C
        Manning's Roughness:                       0.35               0.00               0.00
        Flow Length (ft):                         74.32               0.00               0.00
        Slope (%):                                 2.00               0.00               0.00
        2 yr, 24 hr Rainfall (in):                 1.75               1.75               1.75
        Velocity (ft/sec):                         0.06               0.00               0.00
        Computed Flow Time (minutes):             20.58               0.00               0.00
===============================================================================================
        Total TOC (minutes):                      20.58
===============================================================================================


------------------
Subbasin {_}.P.3
------------------

Sheet Flow Computations
-----------------------
                                              Subarea A          Subarea B          Subarea C
        Manning's Roughness:                       0.35               0.00               0.00
        Flow Length (ft):                         28.51               0.00               0.00
        Slope (%):                                 2.00               0.00               0.00
        2 yr, 24 hr Rainfall (in):                 1.75               1.75               1.75
        Velocity (ft/sec):                         0.05               0.00               0.00
        Computed Flow Time (minutes):              9.56               0.00               0.00
===============================================================================================
        Total TOC (minutes):                       9.56
===============================================================================================


------------------
Subbasin {_}.P.4
------------------

Sheet Flow Computations
-----------------------
                                              Subarea A          Subarea B          Subarea C
        Manning's Roughness:                       0.35               0.00               0.00
```

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	70.00	0.00	0.00
Slope (%):	1.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.05	0.00	0.00
Computed Flow Time (minutes):	25.89	0.00	0.00
Total TOC (minutes):	25.89		

Subbasin {_}.P.5

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	50.90	0.00	0.00
Slope (%):	6.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	1.21	0.00	0.00
Computed Flow Time (minutes):	0.70	0.00	0.00

Channel Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	94.30	0.00	0.00
Channel Slope (%):	1.00	0.00	0.00
Cross Section Area (ft^2):	0.09	0.00	0.00
Wetted Perimeter (ft):	1.64	0.00	0.00
Velocity (ft/sec):	2.15	0.00	0.00
Computed Flow Time (minutes):	0.73	0.00	0.00
Total TOC (minutes):	1.43		

Subbasin {_}.P.6

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C

Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	47.38	0.00	0.00
Slope (%):	2.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.77	0.00	0.00
Computed Flow Time (minutes):	1.03	0.00	0.00

Channel Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	164.80	0.00	0.00
Channel Slope (%):	1.00	0.00	0.00
Cross Section Area (ft²):	0.09	0.00	0.00
Wetted Perimeter (ft):	1.64	0.00	0.00
Velocity (ft/sec):	2.15	0.00	0.00
Computed Flow Time (minutes):	1.28	0.00	0.00
Total TOC (minutes):	2.31		

Subbasin {_}.P.7

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.45	0.00	0.00
Flow Length (ft):	100.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	0.00	0.00
Velocity (ft/sec):	0.11	0.00	0.00
Computed Flow Time (minutes):	15.09	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	74.50	253.00	0.00
Slope (%):	29.50	3.80	0.00
Surface Type:	Grass pasture	Grass pasture	Unpaved
Velocity (ft/sec):	3.80	1.36	0.00
Computed Flow Time (minutes):	0.33	3.10	0.00
Total TOC (minutes):	18.52		

==

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
{_}.E.2	0.45	4.09	0.32	3.81	0.700	0	00:06:37
{_}.P.1	0.74	2.97	0.52	0.20	0.700	0	00:14:59
{_}.P.2	0.86	2.52	0.60	0.20	0.700	0	00:20:34
{_}.P.3	0.56	3.54	0.39	0.08	0.700	0	00:09:33
{_}.P.4	0.94	2.19	0.66	0.19	0.700	0	00:25:53
{_}.P.5	0.36	4.38	0.26	0.84	0.700	0	00:05:00
{_}.P.6	0.36	4.38	0.26	0.77	0.700	0	00:05:00
{_}.P.7	0.83	2.68	0.37	1.48	0.450	0	00:18:31

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
J.01	0.13	0.22	89.12	0	00:15	0	0	0:00:00
J.02	0.20	0.30	88.90	0	00:16	0	0	0:00:00
J.03	0.21	0.30	87.90	0	00:16	0	0	0:00:00
J.04	0.24	0.34	86.24	0	00:05	0	0	0:00:00
J.05	0.11	0.20	83.32	0	00:05	0	0	0:00:00
J.06	0.13	0.21	87.51	0	00:26	0	0	0:00:00
J.07	0.25	0.83	86.83	0	00:05	0	0	0:00:00
J.08	1.53	4.42	82.02	0	00:18	0	0	0:00:00
J.09	0.23	0.65	84.51	0	00:06	0	0	0:00:00
J.10	0.21	0.58	83.08	0	00:07	0	0	0:00:00
J.11	0.22	0.56	80.56	0	00:07	0	0	0:00:00
J.3-4	0.20	0.29	87.29	0	00:17	0	0	0:00:00
J.BASIN	0.22	0.42	78.92	0	00:05	0	0	0:00:00

J.POC	0.26	0.48	76.90	0	00:07	0	0	0:00:00
J.RISER	0.31	0.41	77.51	0	00:18	0	0	0:00:00
POC1	0.18	0.28	73.21	0	00:07	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	hh:mm
J.01	JUNCTION	0.20	0.20	0	00:15	0.00		
J.02	JUNCTION	0.20	0.35	0	00:15	0.00		
J.03	JUNCTION	0.08	0.38	0	00:15	0.00		
J.04	JUNCTION	0.00	0.98	0	00:05	0.00		
J.05	JUNCTION	0.77	1.68	0	00:05	0.00		
J.06	JUNCTION	0.19	0.19	0	00:26	0.00		
J.07	JUNCTION	0.84	0.84	0	00:05	0.00		
J.08	JUNCTION	1.48	1.48	0	00:18	0.00		
J.09	JUNCTION	3.81	3.81	0	00:06	0.00		
J.10	JUNCTION	0.00	3.79	0	00:07	0.00		
J.11	JUNCTION	0.00	3.75	0	00:07	0.00		
J.3-4	JUNCTION	0.00	0.49	0	00:16	0.00		
J.BASIN	JUNCTION	0.00	1.68	0	00:05	0.00		
J.POC	JUNCTION	0.00	5.46	0	00:07	0.00		
J.RISER	JUNCTION	0.00	2.10	0	00:05	0.00		
POC1	OUTFALL	0.00	5.44	0	00:07	0.00		

****
Outfall Loading Summary
****

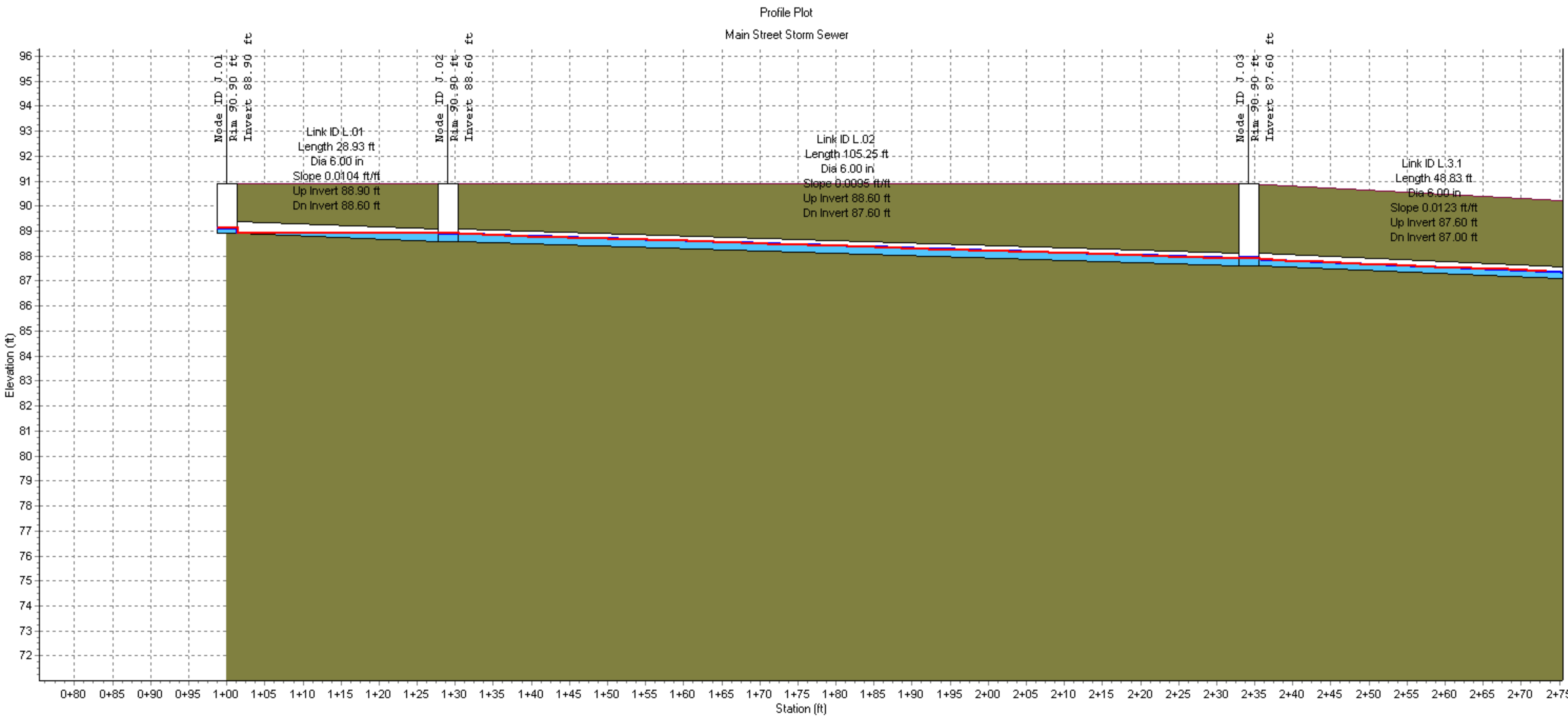
Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
POC1	99.60	2.51	5.44
System	99.60	2.51	5.44

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
L.01	CONDUIT	0 00:15	1.99	1.00	0.20	0.57	0.35	0.51	0	Calculated
L.02	CONDUIT	0 00:16	2.84	1.00	0.35	0.55	0.64	0.61	0	Calculated
L.04	CONDUIT	0 00:05	5.67	1.00	0.95	4.80	0.20	0.27	0	Calculated
L.05	CONDUIT	0 00:05	8.24	1.00	1.68	22.73	0.07	0.31	0	Calculated
L.06	CONDUIT	0 00:26	2.25	1.00	0.19	0.63	0.30	0.46	0	Calculated
L.07	CONDUIT	0 00:05	4.81	1.00	0.84	0.56	1.49	0.84	0	> CAPACITY
L.08	CONDUIT	0 00:18	7.93	1.00	1.48	0.57	2.60	0.91	0	> CAPACITY
L.09	CONDUIT	0 00:07	5.62	1.00	3.79	12.06	0.31	0.41	0	Calculated
L.10	CONDUIT	0 00:07	6.15	1.00	3.75	13.85	0.27	0.38	0	Calculated
L.11	CONDUIT	0 00:07	6.81	1.00	3.69	14.24	0.26	0.35	0	Calculated
L.3.1	CONDUIT	0 00:16	3.11	1.00	0.37	0.62	0.60	0.59	0	Calculated
L.3.2	CONDUIT	0 00:17	4.61	1.00	0.49	0.95	0.52	0.54	0	Calculated
L.BASIN	CONDUIT	0 00:05	5.63	1.00	1.68	5.73	0.29	0.41	0	Calculated
L.POC	CONDUIT	0 00:07	15.58	1.00	5.44	70.95	0.08	0.25	0	Calculated
L.RISER	CONDUIT	0 00:05	7.05	1.00	2.09	25.44	0.08	0.28	0	Calculated

****
Highest Flow Instability Indexes
****
Link L.POC (2)

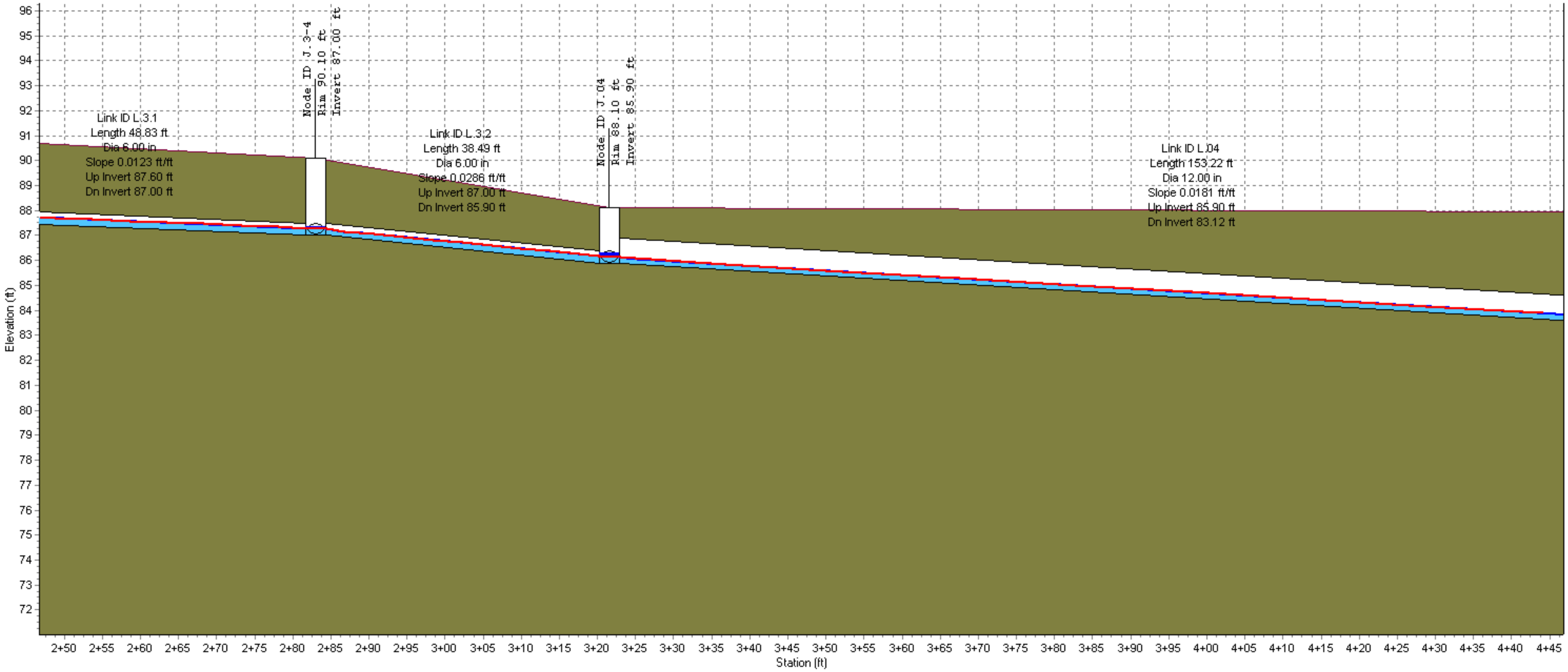
Analysis began on: Thu Oct 06 16:58:54 2016
Analysis ended on: Thu Oct 06 16:58:54 2016
Total elapsed time: < 1 sec



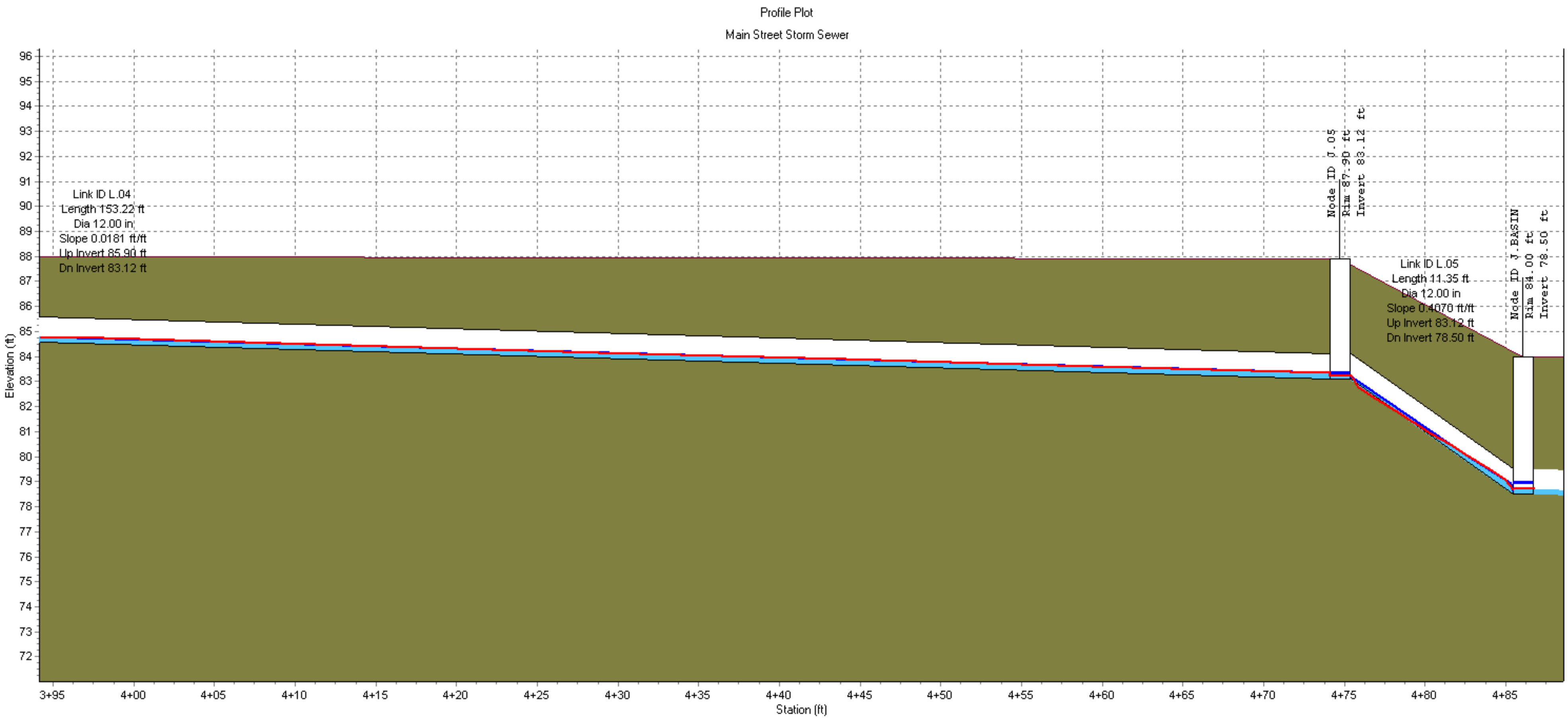
Autodesk Storm and Sanitary Analysis

Profile Plot

Main Street Storm Sewer



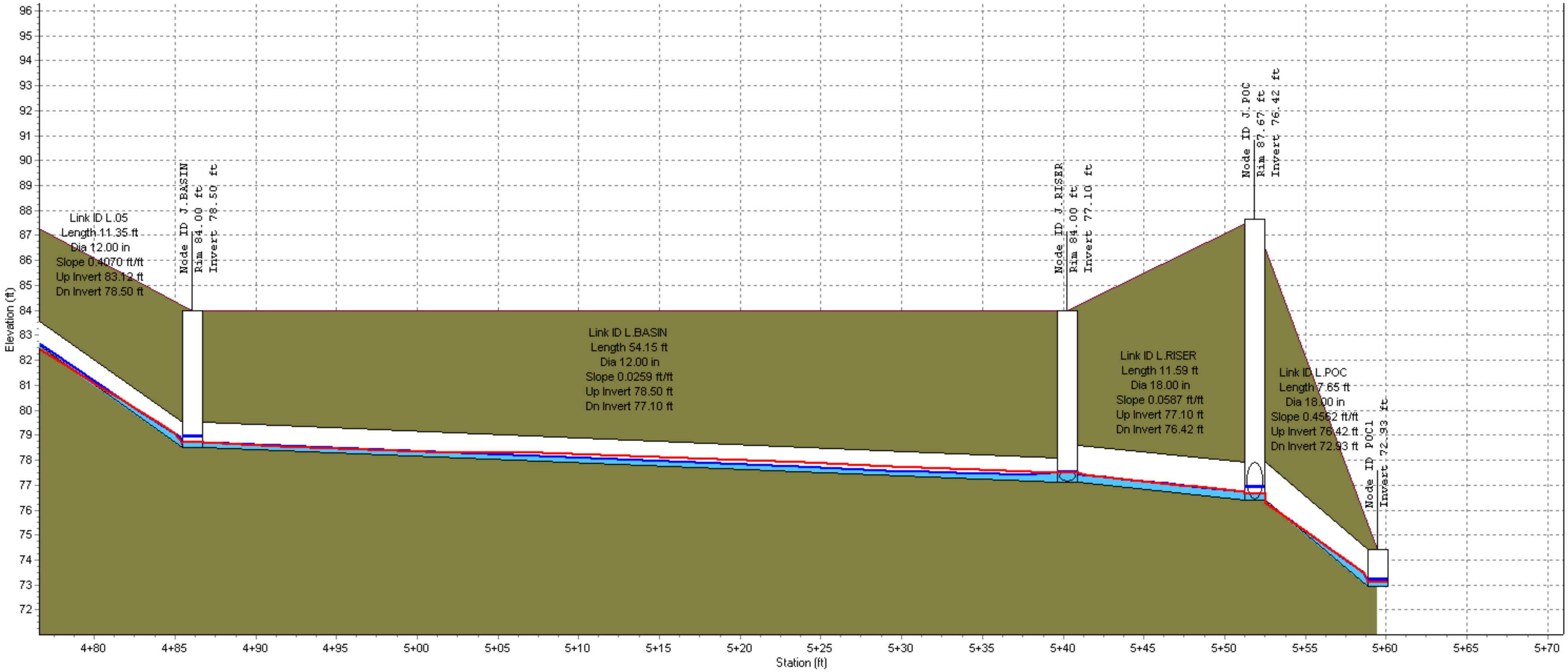
Autodesk Storm and Sanitary Analysis



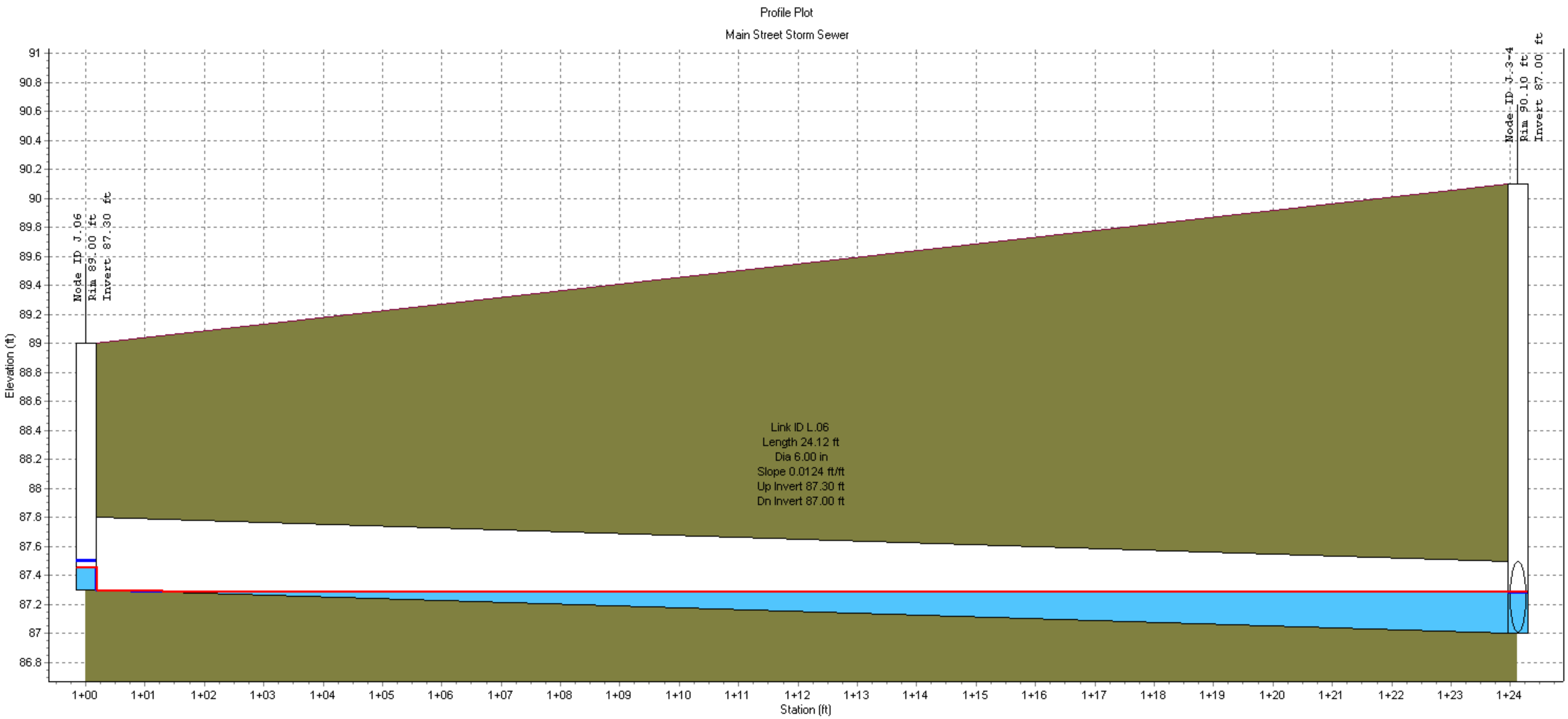
Autodesk Storm and Sanitary Analysis

Profile Plot

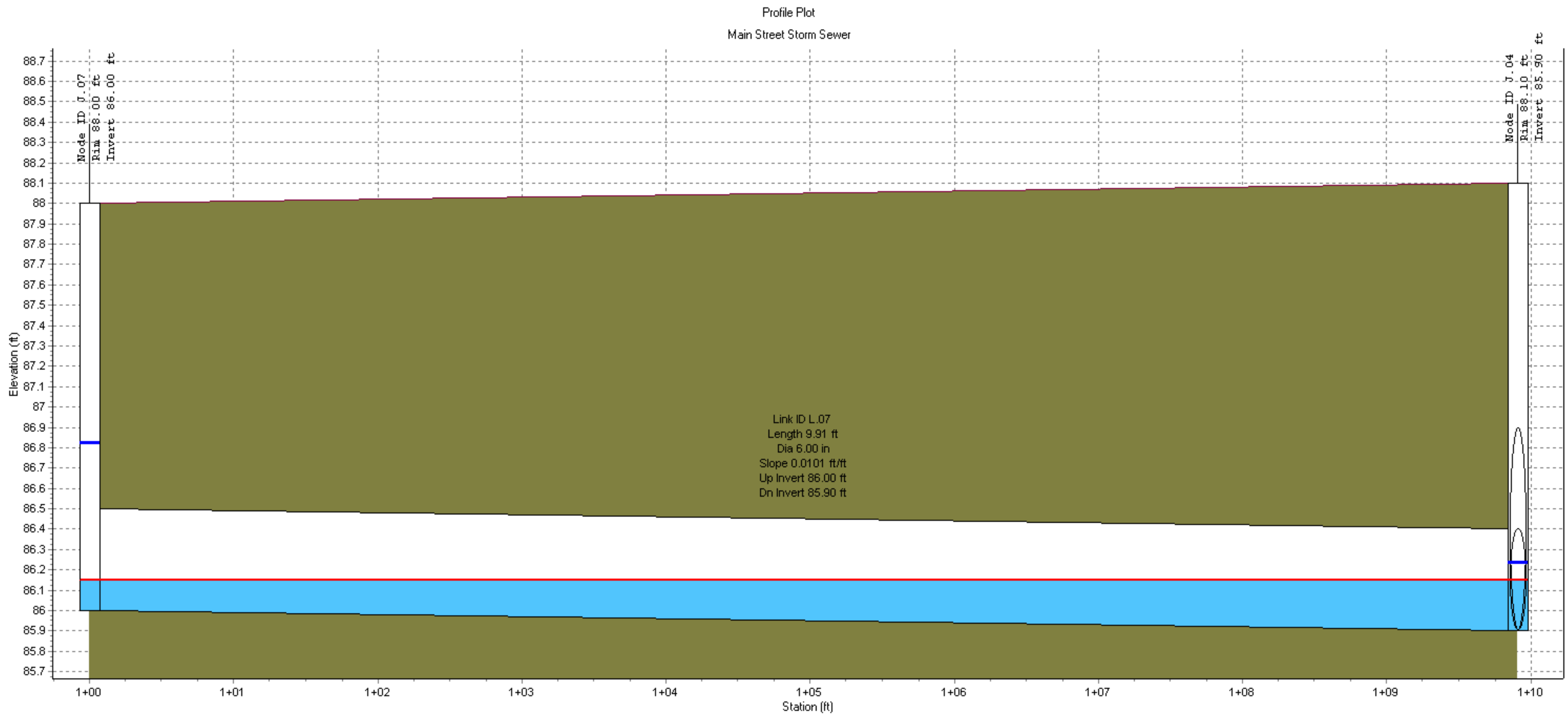
Main Street Storm Sewer



Autodesk Storm and Sanitary Analysis



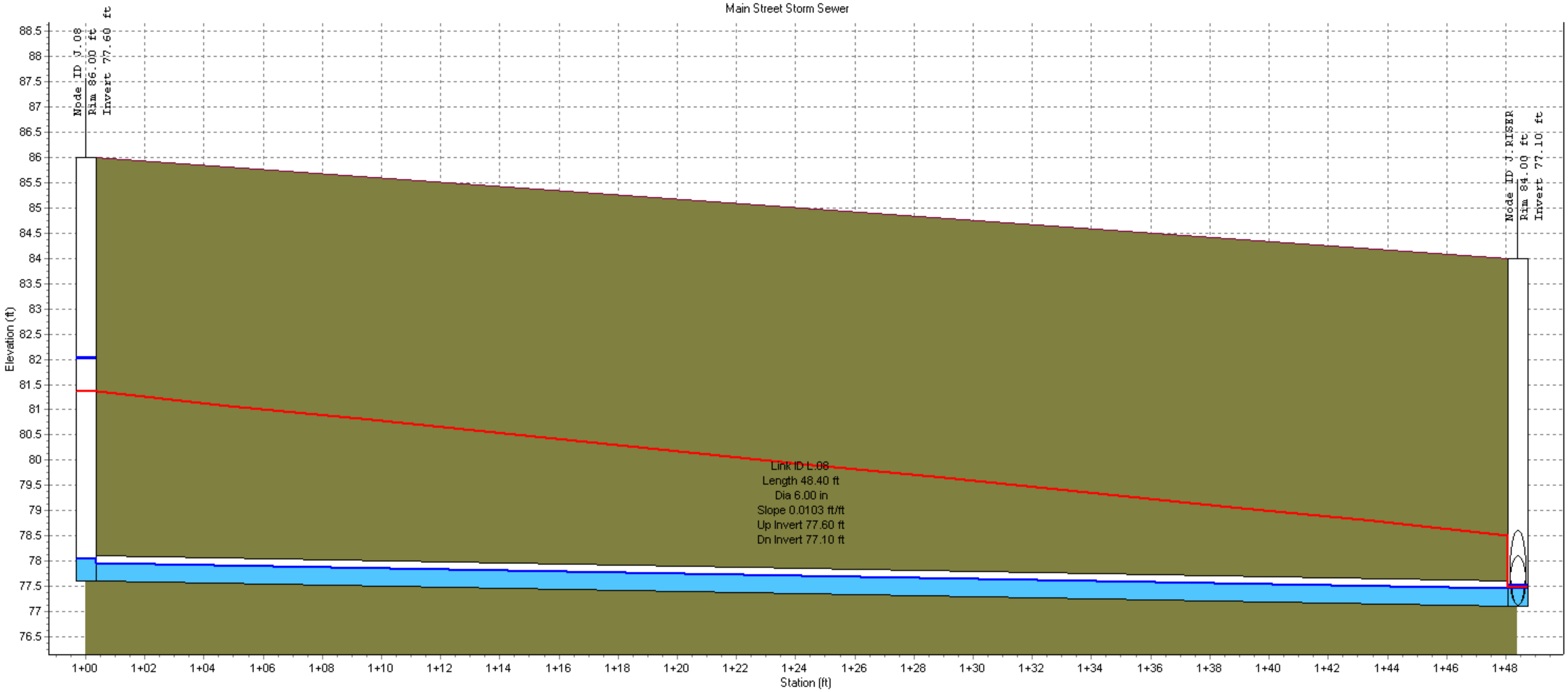
Autodesk Storm and Sanitary Analysis



Autodesk Storm and Sanitary Analysis

Profile Plot

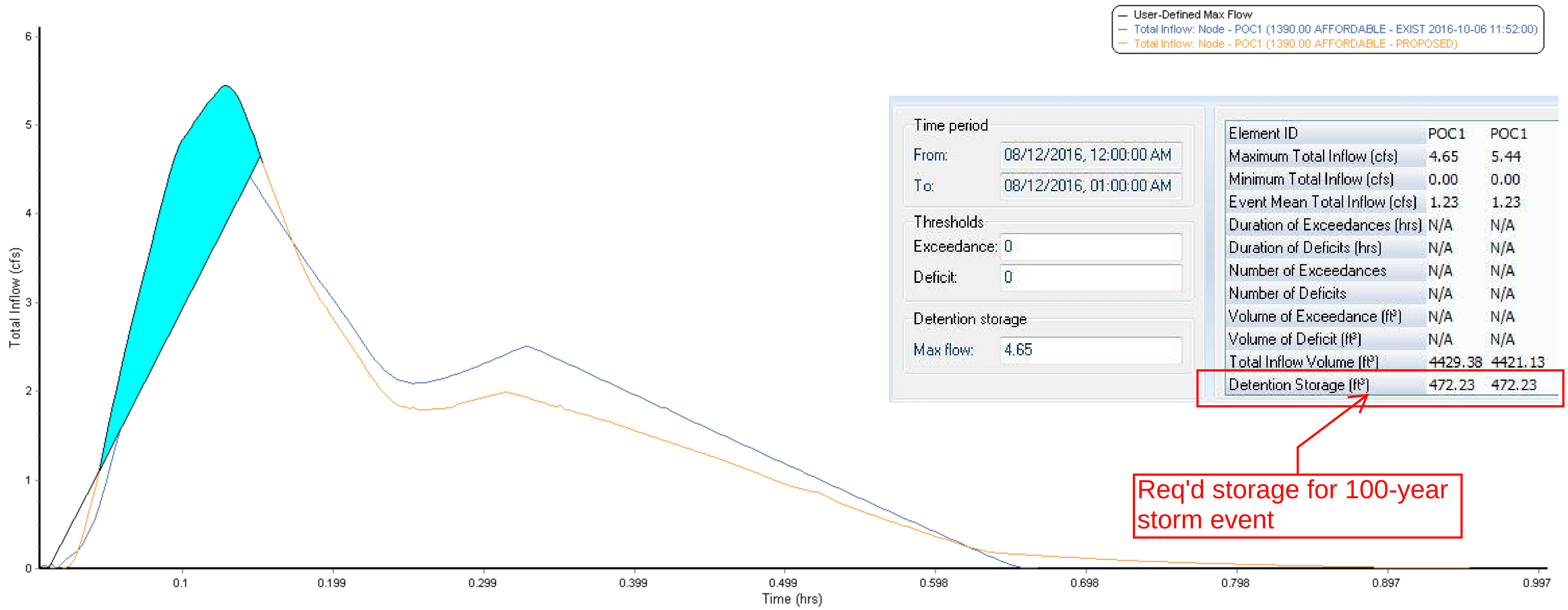
Main Street Storm Sewer



Autodesk Storm and Sanitary Analysis

APPENDIX D: HYDROGRAPH AND STORAGE ANALYSIS

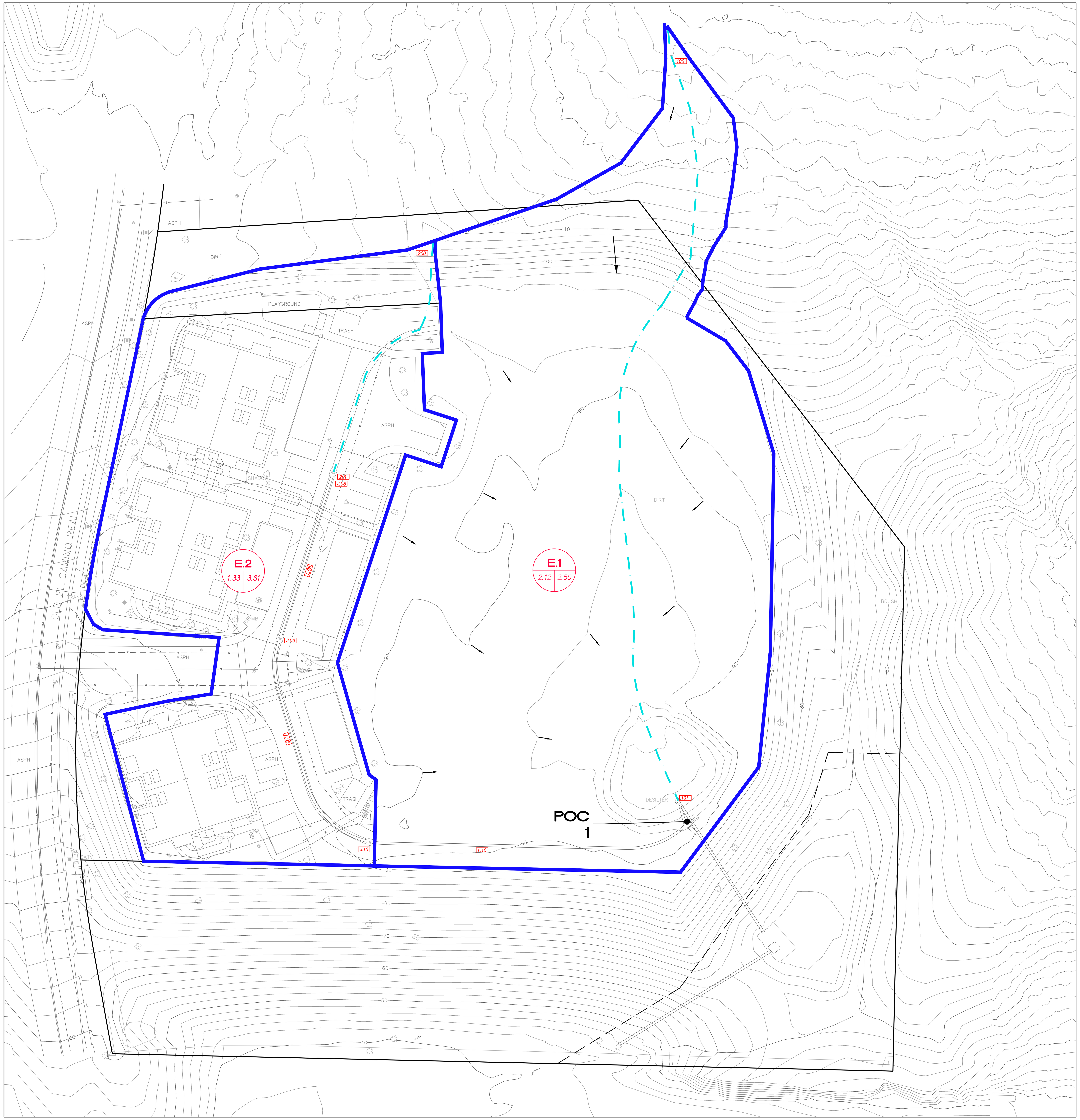
HYDROGRAPH: PROPOSED AND EXISTING



Time period	
From:	08/12/2016, 12:00:00 AM
To:	08/12/2016, 01:00:00 AM
Thresholds	
Exceedance:	0
Deficit:	0
Detention storage	
Max flow:	4.65

Element ID	POC1	POC1
Maximum Total Inflow (cfs)	4.65	5.44
Minimum Total Inflow (cfs)	0.00	0.00
Event Mean Total Inflow (cfs)	1.23	1.23
Duration of Exceedances (hrs)	N/A	N/A
Duration of Deficits (hrs)	N/A	N/A
Number of Exceedances	N/A	N/A
Number of Deficits	N/A	N/A
Volume of Exceedance (ft³)	N/A	N/A
Volume of Deficit (ft³)	N/A	N/A
Total Inflow Volume (ft³)	4429.38	4421.13
Detention Storage (ft³)	472.23	472.23

APPENDIX E: REFERENCE DRAWINGS



LEGEND

BASIN — BASIN, AC | Q_{100}

POINT OF COMPLIANCE — POC 1

FLOW PATH

FLOW DIRECTION

DRAINAGE NODE — 101

N

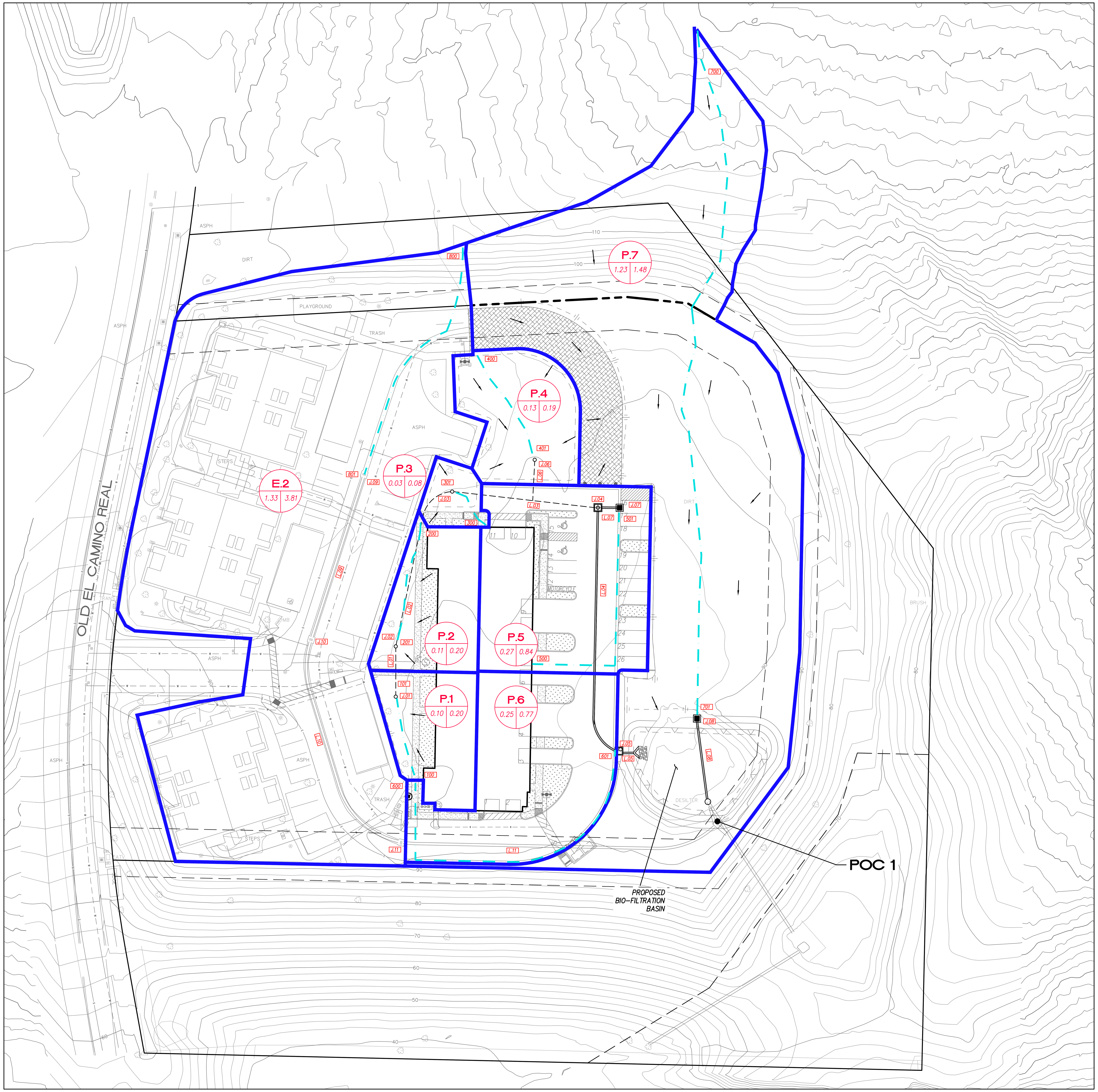
0 15 30 60 90

(IN FEET)
1 inch = 30 ft.

EXISTING HYDROLOGY

SCALE:	1"=30'	JOB NO.:	1390.00
DATE:	2016-10-10	SHEET:	1 OF 1

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633



LEGEND

BASIN	BASIN AC Q_{100}
POINT OF COMPLIANCE	POC 1
FLOW PATH	
FLOW DIRECTION	
DRAINAGE NODE	101
JUNCTION NODE	J1
LINK NODE	L1

N

0 15 30 60 90
(IN FEET)
1 inch = 30 ft.

PROPOSED HYDROLOGY

SCALE: 1"=30' JOB NO.: 1390.00
DATE: 2016-10-10 SHEET: 1 OF 1

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

DEVELOPMENT SUMMARY

1. SUMMARY OF REQUEST:

   RESIDENTIAL DEVELOPMENT PERMIT AMENDMENT FOR A PLANNED PERMIT NO. 94-0576 PROPOSING AN ADDITIONAL 13 MULTI FAMILY AFFORDABLE DWELLING UNITS.

2. STREET ADDRESS

   14163 OLD EL CAMINO REAL SAN DIEGO, CA 92130

3. SITE AREA:

   TOTAL SITE AREA (GROSS): 1.80 ACRES (78,273 SQ. FT.)
   NET SITE AREA: 1.80 ACRES (78,273 SQ. FT.)
   (NET SITE AREA EXCLUDES REQUIRED STREETS AND PUBLIC DEDICATIONS)

4. ZONING: AR-1-1
5. COMMUNITY PLANNING AREA: PACIFIC HIGHLANDS RANCH
6. EXISTING USE: VACANT
   PROPOSED USE: MULTI-FAMILY DU
7. COVERAGE DATA

   TOTAL LANDSCAPE/OPEN SPACE AREA: 14,963 SF
   TOTAL HARDSCAPE/PAVED AREA: 27,385 SF
   MIN GROSS FLOOR AREA (GFA): 650 SF NOT INCLUDING GARAGE
   MAX LOT COVERAGE PER ZONE: 10%

8. DENSITY

   MAXIMUM DWELLING UNITS ALLOWED PER ZONE: 1 DU PER 10 ACRE LOT
   NUMBER OF EXISTING UNITS TO REMAIN ON SITE: NONE
   NUMBER OF PROPOSED DWELLING UNITS ON SITE: 13
   TOTAL NUMBER OF UNITS PROVIDED ON THE SITE: 13

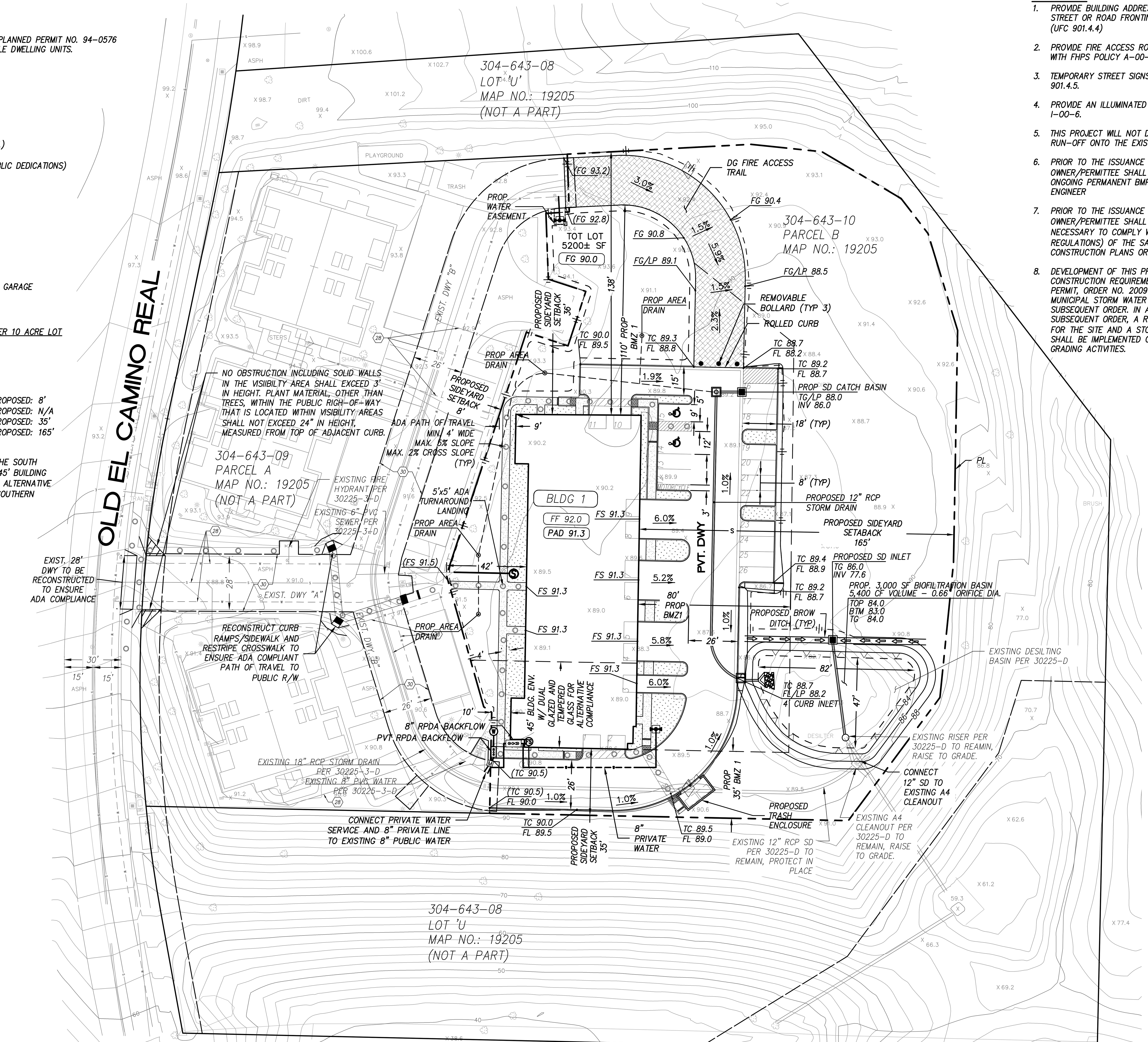
9. YARD/SETBACK:

FRONT YARD:	REQUIRED: 25'	PROPOSED: 8'
STREET SIDE YARD:	REQUIRED: N/A	PROPOSED: N/A
SIDE YARD(S):	REQUIRED: 20'	PROPOSED: 35'
REAR YARD:	REQUIRED: 25'	PROPOSED: 165'

10. EXISTING BRUSH MANAGEMENT ZONE 1 IS 20'
    PROPOSED BRUSH MANAGEMENT ZONE 1 IS 80' MINIMUM. THE SOUTH SIDE OF THE BUILDING HAS A PROPOSED 35' BMZ AND A 45' BUILDING ENVELOPE WITH DUAL TEMPERED/DUAL GLAZED GLASS FOR ALTERNATIVE COMPLIANCE WITH A 6' FIRE RATED BLOCK WALL ON THE SOUTHERN PROPERTY LINE.

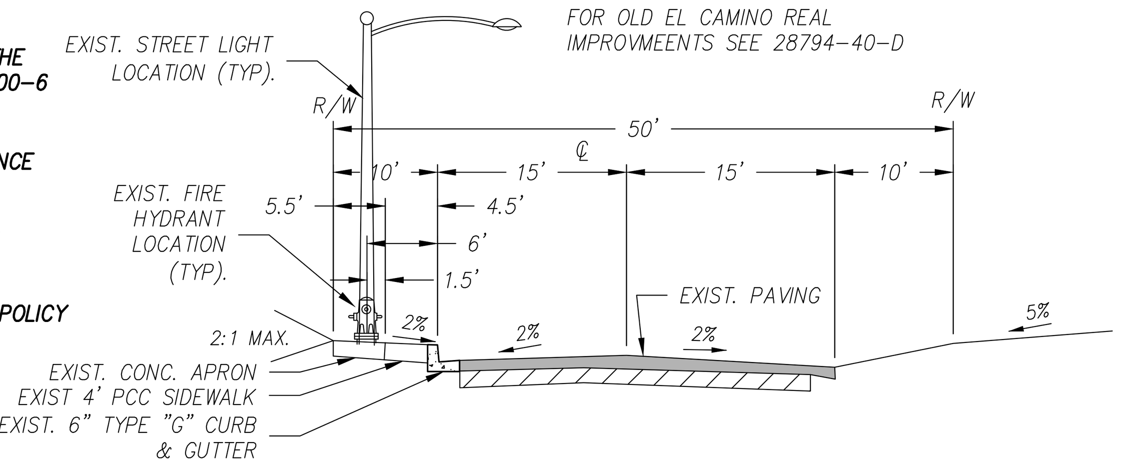
LEGEND:

SLOPES	2:1 MAX. (TYP.)
DAYLIGHT LINE	
PROPERTY LINE	
SIDEWALK	
CURB AND GUTTER	
BRUSH MANAGEMENT ZONE	
STORM DRAIN	
PROPOSED WATER	—W—W—W—W
FIRE HYDRANT ASSY.	
LOT NUMBER	2
PAD ELEV.	XXX.XXPAD
SEWER SERVICE	
FIRE SERVICE	
WATER SERVICE	
BACKFLOW PREVENTION DEVICES	
WATER METER	M
ADA PATH OF TRAVEL	
SIGHT VISIBILITY TRIANGLE	



NOTE:

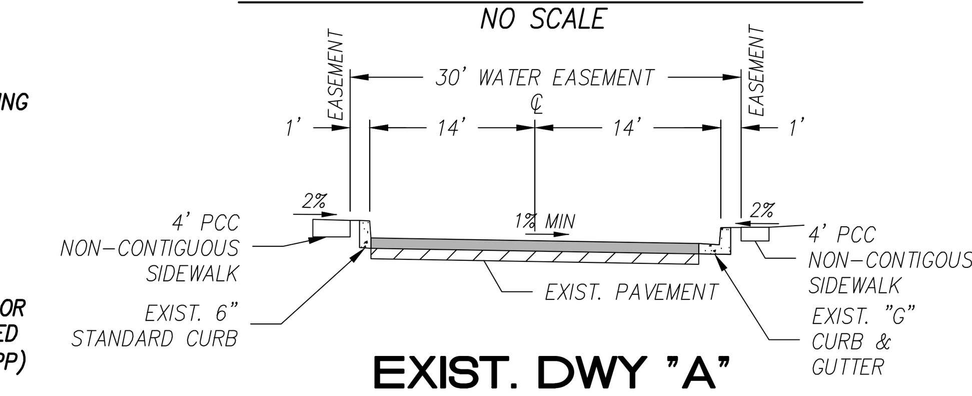
1. PROVIDE BUILDING ADDRESS NUMBERS, VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY PER FHPS POLICY P-00-6 (UFC 901.4.4)
2. PROVIDE FIRE ACCESS ROADWAY SIGNS OR RED CURBS IN ACCORDANCE WITH FHPS POLICY A-00-1.
3. TEMPORARY STREET SIGNS ARE REQUIRED IN ACCORDANCE WITH UFS 901.4.5.
4. PROVIDE AN ILLUMINATED DIRECTORY IN ACCORDANCE WITH FHPS POLICY I-00-6.
5. THIS PROJECT WILL NOT DISCHARGE ANY INCREASE IN STORM WATER RUN-OFF ONTO THE EXISTING HILLSIDE AREAS.
6. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE, SATISFACTORY TO THE CITY ENGINEER
7. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL INCORPORATE ANY CONSTRUCTION BMPs NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
8. DEVELOPMENT OF THIS PROJECT SHALL COMPLY WITH ALL STORM WATER CONSTRUCTION REQUIREMENTS OF THE STATE CONSTRUCTION GENERAL PERMIT, ORDER NO. 2009-0009DWQ, OR SUBSEQUENT ORDER, AND THE MUNICIPAL STORM WATER PERMIT, ORDER NO. R9-2013-0001, OR SUBSEQUENT ORDER. IN ACCORDANCE WITH ORDER NO. 2009-0009DWQ, OR SUBSEQUENT ORDER, A RISK LEVEL DETERMINATION SHALL BE CALCULATED FOR THE SITE AND A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE IMPLEMENTED CONCURRENTLY WITH THE COMMENCEMENT OF GRADING ACTIVITIES.



EXIST. OLD EL CAMINO REAL

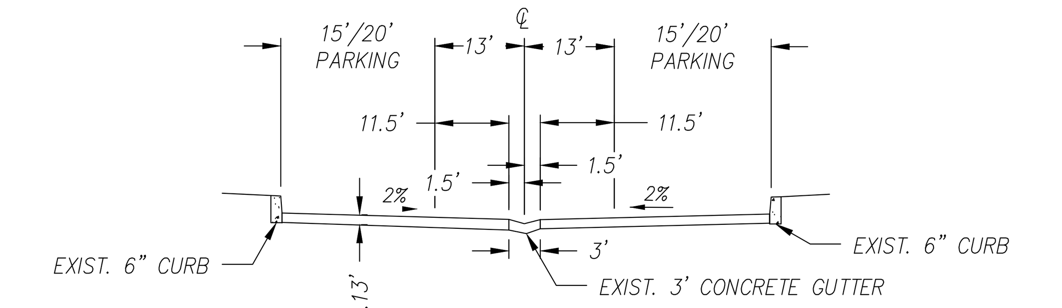
(SEE REFERENCE DWG. NO 28794-D)

NO SCALE



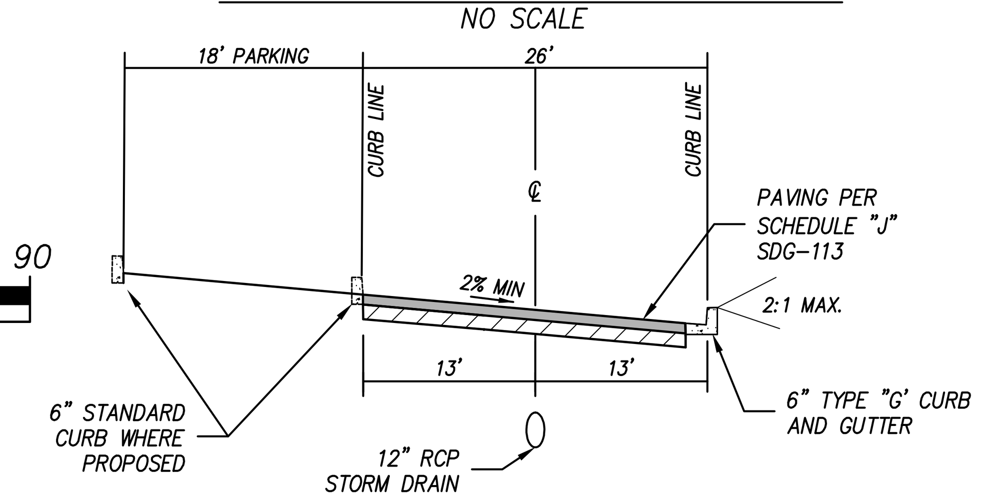
EXIST. DWY "A"

NO SCALE



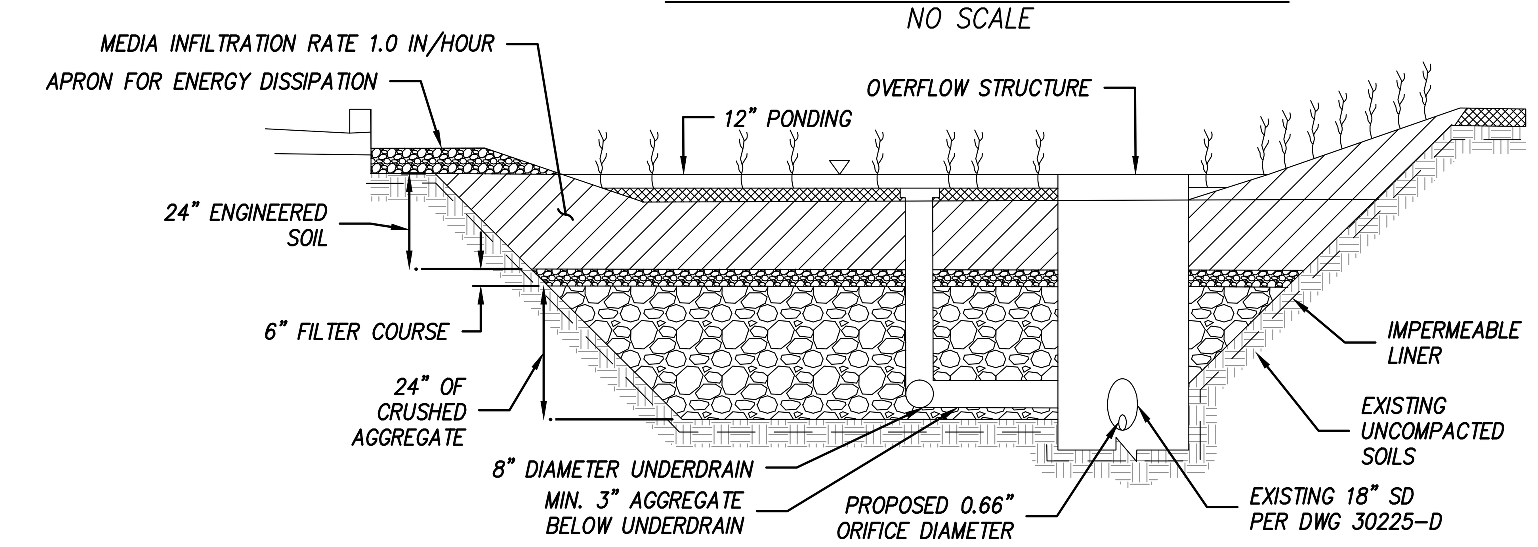
EXIST. DWY "B"

NO SCALE



PVT. DWY

NO SCALE



BIOFILTRATION

NO SCALE

GRADING

1. TOTAL AMOUNT OF SITE TO BE GRADED: 1.1 AC
2. PERCENT OF TOTAL SITE GRADED: 61%
3. AMOUNT OF SITE WITH 25% SLOPES OR GREATER: 0.08 AC
4. PERCENT OF THE EXIST. SLOPES STEEPER THAN 25% PROPOSED TO BE GRADED: 100%
5. PERCENT OF TOTAL SITE WITH 25% SLOPES OR GREATER: 4.4%
6. MAXIMUM DEPTH OF CUT: 4 FEET, AMOUNT OF CUT: 750 CY
7. MAXIMUM DEPTH OF FILL: 1 FEET, AMOUNT OF FILL: 1600 CY
8. MAXIMUM HEIGHT OF FILL SLOPE(S): 0 FEET 2:1 SLOPE RATIO
9. MAXIMUM HEIGHT OF CUT SLOPE(S): 4 FEET 2:1 SLOPE RATIO
10. AMOUNT OF EXPORT SOIL: 0
11. RETAINING/CRIB WALLS: HOW MANY: 0

    NOTE: ADDITIONAL WALLS UNDER 3' IN EIGHT MAY BE REQUIRED IN RESIDENTIAL PAD AREAS BASED ON FINAL HOUSE PLOTTING
    ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY OF SAN DIEGO STREET DESIGN MANUAL

EASEMENT INFORMATION

TITLE REPORT BY: CHICAGO TITLE INSURANCE COMPANY
ORDER NO.: 12205554-996-SDI

PARCELS AFFECTED	ITEM NO.	
B	28	AN AGREEMENT RELATING TO THE INSTALLATION, MAINTENANCE AND POSSIBLE REMOVAL OF PRIVATE WATER, SEWER AND STORM DRAIN BETWEEN THE CITY OF SAN DIEGO AND OWNER PER DOC. RECORDED MAY 01, 2000 AS FILE NO.: 2000-0224134 OF O.R. UTILITIES PER DWG. NO.: 30225-3-D
B	30	AN EASEMENT GRANTED TO THE CITY OF SAN DIEGO FOR WATER FACILITIES PER DOC. RECORDED JULY 7, 2000 AS FILE NO.: 2000-358753 OF O.R.

NON PLOTTABLE EASEMENTS

AN EASEMENT FOR PUBLIC UTILITIES, INGRESS AND EGRESS GRANTED TO SAN DIEGO GAS AND ELECTRIC PER DOC. RECORDED DECEMBER 19, 200 AS FILE NO.: 2000-0690567 OF O.R.

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN
RCE 34584

DATE

Name:	LATITUDE 33 PLANNING & ENGINEERING
Address:	9968 HIBERT ST. 2ND FLR SAN DIEGO, CA 92131
Phone #:	(858) 751-0633
Fax #:	(858) 751-0634

Project Address:
14163 OLD EL CAMINO REAL

Project Name:
DEL MAR HIGHLANDS ESTATES AFFORDABLE SITE PDP/SDP FOR AMENDMENT TO PRD/RPO

Sheet Title:
GRADING, UTILITY, AND SITE PLAN

Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
Revision 4:	
Revision 3:	
Revision 2:	10/07/16
Revision 1:	08/19/16
Original Date:	07/06/16
Sheet	3 of 8
DEP#	

The City of San Diego

PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) FOR

Del Mar Highlands Estates Affordable Housing Site
PTS# 500066
IO# 24006829

ENGINEER OF WORK:

C. John Eardensohn, RCE 34584

PREPARED FOR:

Pardee Homes
13400 Sabre Springs Parkway. Suite 200
San Diego, CA 92128
(858) 794-2500

PREPARED BY:

Latitude 33 Planning & Engineering
9968 Hibert Street 2nd Floor
San Diego, CA 92131
(858) 751-0633

Prepared by: ANM
Checked by: TD

DATE:
October 7, 2016

Approved by: City of San Diego Date

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TABLE OF CONTENTS

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ACRONYMS

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

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CERTIFICATION PAGE

Project Name: Del Mar Highlands Estates Affordable Housing Site
Permit Application Number: **TBD**

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Standards. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

____
Engineer of Work's Signature, PE Number & Expiration Date

C. John Eardensohn
Print Name

Latitude 33 Planning & Engineering
Company

____
Date

Engineer's Stamp

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SUBMITTAL RECORD

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments.

Submittal Number	Date	Project Status	Changes
1	6/21/16	◉ Preliminary Design/Planning/CEQA ○ Final Design	Initial Submittal
2	8/12/16	◉ Preliminary Design/Planning/CEQA ○ Final Design	Removed BMP#1-3, BMP#4 used for water quality & HMP for entire site.
3	10/7/16	◉ Preliminary Design/Planning/CEQA ○ Final Design	Increased bio-filtration footprint and updated calcs.
4		○ Preliminary Design/Planning/CEQA ◉ Final Design	

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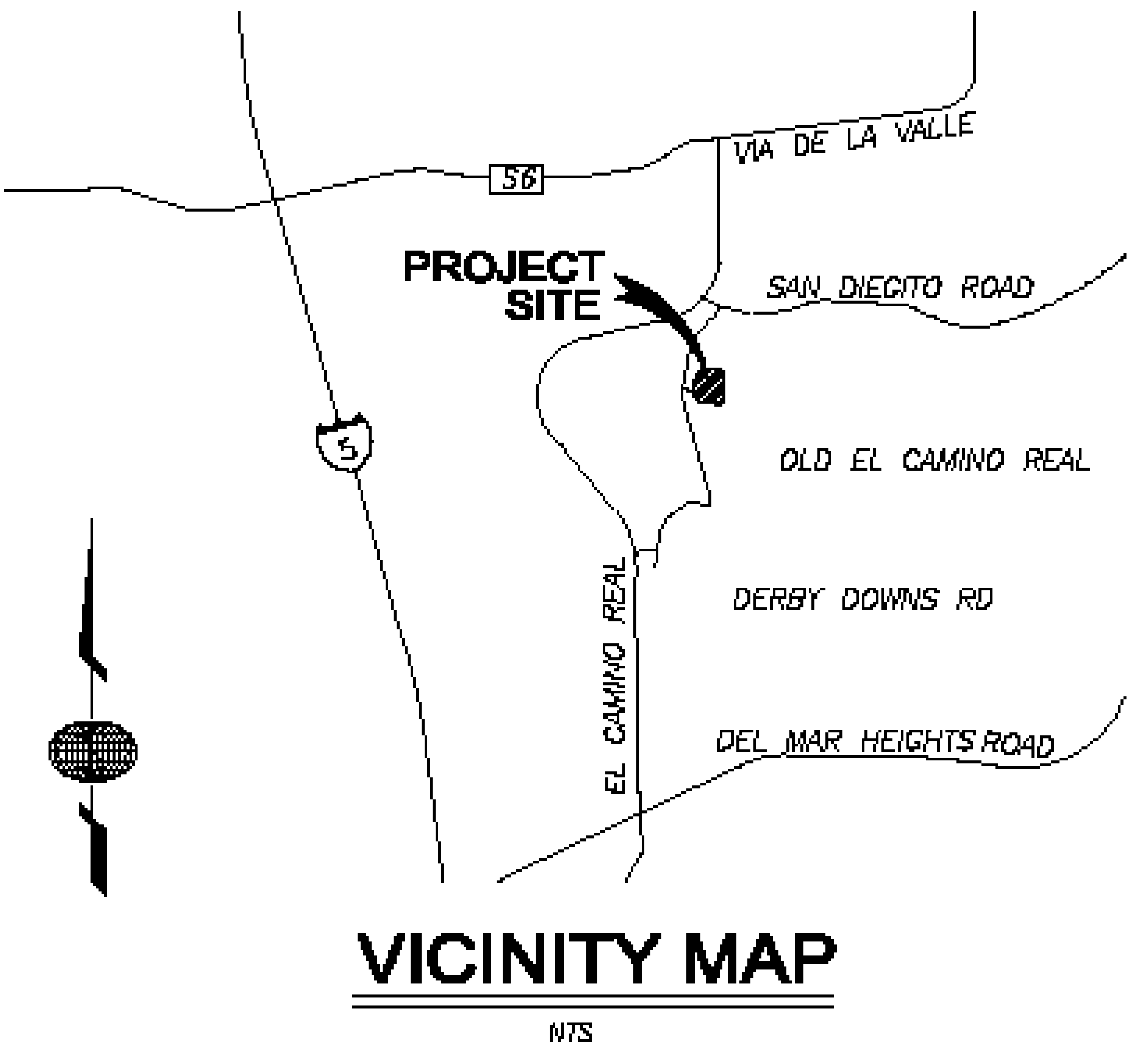
PROJECT VICINITY MAP

Project Name: Del Mar Highlands Estates Affordable Housing Site
Permit Application Number: **TBD**



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Project Name: Del Mar Highlands Estates Affordable Housing Site

City of San Diego **Development Services** 1222 First Ave., MD-302 San Diego, CA 92101 (619) 446-5000	**Storm Water Requirements Applicability Checklist**	FORM **DS-560** February 2016

THE CITY OF SAN DIEGO

Project Address: Old El Camino Real San Diego, CA 92130	Project Number *(for the City Use Only)*: Click here to enter project number

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1], which is administrated by the State Water Resources Control Board.

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with construction activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

   ◉ Yes; SWPPP required, skip questions 2-4 ○ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity that results in ground disturbance and contact with storm water runoff?

   ○ Yes; WPCP required, skip questions 3-4 ○ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (projects such as pipeline/utility replacement)

   ○ Yes; WPCP required, skip questions 4 ○ No; next question

4. Does the project only include the following Permit types listed below?
   - Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
   - Individual Right of Way Permits that exclusively include one of the following activities and associated curb/ sidewalk repair: water services, sewer lateral, storm drain lateral, or dry utility service.
   - Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, curb and gutter replacement, and retaining wall encroachments.

   ☐ Yes; no document required

Check one of the boxes to the right, and continue to PART B:

☒ If you checked "Yes" for question 1,
a SWPPP is REQUIRED. Continue to PART B

☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3,
a WPCP is REQUIRED. If the project processes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

☐ If you checked "No" for all question 1-3, and checked "Yes" for question 4
PART B **does not apply and no document is required. Continue to Section 2.**

More information on the City's construction BMP requirements as well as CGP requirements can be found at:
www.sandiego.gov/stormwater/regulations/swguide/constructing.shtml

PART B: Determine Construction Site Priority.
This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk. Determination approach of the Stat e Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ **ASBS**
   a. Projects located in the ASBS watershed. A map of the ASBS watershed can he found here http://www.swrcb.ca.gov/water_issues/programs/ocean/asbs_map.shtmlk

2. ☒ **High Priority**
   a. Projects 1 acre or more determined to be Risk Level 2 or Risk Level 3 per the Construction General Permit and not located in the ASBS watershed.
   b. Projects 1 acre or more determined to be LUP Type 2 or LUP Type 3 per the Construction General Permit and not located in the ASBS watershed.

3. ☐ **Medium Priority**
   a. Projects 1 acre or more but not subject to an ASBS or high priority designation.
   b. Projects determined to be Risk Level 1 or LUP Type 1 per the Construction General Permit and not located in the ASBS watershed.

4. ☐ **Low Priority**
   a. Projects not subject to ASBS, high or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

PART C: Determine if Not Subject to Permanent Storm Water Requirements.
Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	○ Yes ◉ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	○ Yes ◉ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	○ Yes ◉ No

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."
If "no" was checked for all questions in Part D, continue to Part E.

1. Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:

   • Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;
   • Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;
   • Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?

   ○ Yes; PDP exempt requirements apply ⦿ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

   ○ Yes; PDP exempt requirements apply ⦿ No; PDP not exempt. PDP requirements apply.

PART E: Determine if Project is a Priority Development Project (PDP). Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".
If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Project".

1.	**New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	⦿ Yes ○ No
2.	**Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	○ Yes ⦿ No
3.	**New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	○ Yes ⦿ No
4.	**New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	○ Yes ⦿ No

Page 4 of 4 City of San Diego • Development Services Department • Storm Water Requirements Applicability Checklist	
5. **New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).**	◉ Yes ○ No
6. **New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	○ Yes ◉ No
7. **New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging- directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).	○ Yes ◉ No
8. **New development or redevelopment projects of a retail gasoline outlet that creates and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic of 100 or more vehicles per day.	○ Yes ◉ No
9. **New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	○ Yes ◉ No
10. **Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces.	○ Yes ◉ No
PART F: Select the appropriate category based on the outcomes of PART C through PART E.	
1. The project is **NOT SUBJECT TO STORM WATER REQUIREMENTS**.	☐
2. The project is a **STANDARD PROJECT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
3. The project is **PDP EXEMPT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
4. The project is a **PRIORITY DEVELOPMENT PROJECT**. Site design, source control, and structural pollutant control BMP requirements apply. See the [Storm Water Standards Manual]() for guidance on determining if project requires hydromodification management.	☒
Name of Owner or Agent *(Please Print)*: Tadd Dolfo, PE	Title: Sr. Project Engineer
Signature:	Date:

Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)		**Form I-1**
Project Identification		
Project Name: Del Mar Highlands Estates Affordable Housing Site		
Permit Application Number: TBD		Date: 8/12/16
Determination of Requirements		
The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short <u>summary</u> of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements. Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Refer to Part 1 of Storm Water Standards sections and/or separate forms referenced in each step below.		
Step	**Answer**	**Progression**
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	Go to Step 2.
	○ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is <u>not</u> a "development project" (e.g., the project includes <u>only</u> interior remodels within an existing building):		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual (Part 1 of Storm Water Standards) <u>in its entirety</u> for guidance, AND complete Storm Water Requirements Applicability Checklist.	○ Standard Project	Stop. Standard Project requirements apply.
	◉ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	○ PDP Exempt	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		

Form I-1 Page 2		
Step	Answer	Progression
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	◉ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (<u>not required if prior lawful approval does not apply</u>):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	○ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply:		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	◉ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply: There are no Course Sediement Yield Areas (CCYAs) onsite or upstream of site. (See WMMA Map)		

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	Del Mar Highlands Estates Affordable Housing Site
Project Address	14163 Old El Camino Real, San Diego, CA 92130
Assessor's Parcel Number(s) (APN(s))	304-643-10
Permit Application Number	TBD
Project Watershed	Select One: ◉ San Dieguito River ○ Penasquitos ○ Mission Bay ○ San Diego River ○ San Diego Bay ○ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal paces (9XX.XX)	Rancho Santa Fe 905.11
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	1.80 Acres (78,273 Square Feet)
Area to be disturbed by the project (Project Footprint)	1.10 Acres (47,782 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	0.62 Acres (27,164 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	0.48 Acres (20,618 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	+34%

Form I-3B Page 2 of 11
Description of Existing Site Condition and Drainage Patterns
Current Status of the Site (select all that apply): ☐ Existing development ☒ Previously graded but not built out ☐ Agricultural or other non-impervious use ☐ Vacant, undeveloped/natural Description / Additional Information: Existing lot was perviously graded with a desilting basin at the south east corner. The basin outlets to an existing storm drain system.
Existing Land Cover Includes (select all that apply): ☐ Vegetative Cover ☒ Non-Vegetated Pervious Areas ☐ Impervious Areas Description / Additional Information: Existing land cover is mostly dirt with random weeds throughout.
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐ NRCS Type A ☐ NRCS Type B ☐ NRCS Type C ☒ NRCS Type D
Approximate Depth to Groundwater (GW): ○ GW Depth < 5 feet ○ 5 feet < GW Depth < 10 feet ○ 10 feet < GW Depth < 20 feet ◉ GW Depth > 20 feet
Existing Natural Hydrologic Features (select all that apply): ☐ Watercourses ☐ Seeps ☐ Springs ☐ Wetlands ☒ None Description / Additional Information: The subject site does not appear to include any natural hydrologic features..

Form I-3B Page 3 of 11
Description of Existing Site Topography and Drainage:
How is storm water runoff conveyed from the site? At a minimum, this description should answer: 1. Whether existing drainage conveyance is natural or urban; 2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site; 3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels; 4. Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.
Description / Additional Information:
The existing lot, approximately 1.80 acres, was previously cleared and graded during the construction of Parcel A of the Del Mar Highlands Estates. The site is generally flat and drains from the north west to an existing desilting basin at the south east corner of the lot. The basin outlets to an existing 18" storm drain. The existing drainage from the Del Mar Highlands Estates development, to the west, is conveyed by an existing 18" storm drain to the same storm drain outlet system. Runoff from the self mitigating area shown in the proposed DMA map will be diverted around the bio-filtration via a drainage ditch. Runoff produced by the new development will overland flow, as shown in the DMA map in attachment 1, to proposed inlets and storm drains that will convey the water to the bio-filtration basin for treatment and HMP compliance.

Form I-3B Page 4 of 11
Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The proposed development will include the construction of 13 multi-family affordable dwelling units. The development will exetend the existing private drive as well as construct landscape/hardscape areas adjacent to the proposed structure. Private storm drain facilities & a bio-filtration basins will be installed to collect and treat run-off prior to discharge into the existing 18" storm drain. Any increase in runoff created by the proposed development will be stored in the bio-filtration basin prior to disrcharge. Runoff from the self mitigating area shown in the proposed DMA map will be diverted around the bio-filtration via a drainage ditch.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): Project impervious features include the following: - Multi family dwelling units - Asphalt private road - Concrete walkways - Asphalt parking
List/describe proposed pervious features of the project (e.g., landscape areas): Project pervious features include the following: -Landscaped areas -Bio-filtration basin
Does the project include grading and changes to site topography? ◉ Yes ○ No Description / Additional Information: The proposed project will construct a private drive with an approximate 1% slope draining toward the desilting basin which will be converted into a bio-filtration basin.

Form I-3B Page 5 of 11

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

- ◉ Yes
- ○ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Description / Additional Information:

The proposed project will construct a large bio-filtration basin to treat storm water runoff and comply with water quality and hydromodification (HMP) requirements. Runoff from the developed site will sheet flow to brooks boxes and be piped via a 12" storm drain system to the large bio-filtration basin at the outfall. The bio-filtration basin will outlet to the existing 18" RCP. Runoff from the self mitigating area shown in the proposed DMA map will be diverted around the bio-filtration via a drainage ditch.

Form I-3B Page 6 of 11
Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply): ☒ On-site storm drain inlets ☐ Interior floor drains and elevator shaft sump pumps ☐ Interior parking garages ☐ Need for future indoor & structural pest control ☒ Landscape/Outdoor Pesticide Use ☐ Pools, spas, ponds, decorative fountains, and other water features ☐ Food service ☐ Refuse areas ☐ Industrial processes ☐ Outdoor storage of equipment or materials ☐ Vehicle and Equipment Cleaning ☐ Vehicle/Equipment Repair and Maintenance ☐ Fuel Dispensing Areas ☐ Loading Docks ☐ Fire Sprinkler Test Water ☐ Miscellaneous Drain or Wash Water ☒ Plazas, sidewalks, and parking lots ☐ Large Trash Generating Facilities ☐ Animal Facilities ☐ Plant Nurseries and Garden Centers ☐ Automotive-related Uses
Description / Additional Information: This multi-family resdential development includes limited pollutant generating sources identified in the list above. All storm surface flows will drain to the proposed onsite bio-filtration unit for treatment prior to discharge.

Form I-3B Page 7 of 11

Identification and Narrative of Receiving Water

Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable)

After proposed onsite treatment, project related runoff will be discharged to the existing 18" RCP that eventually outlets approximately 1 mile west into the San Dieguito Lagoon and the Pacific Ocean .

Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations.

● Existing Beneficial Use ○ Potential Beneficial Use + Except from Municipal Use	Beneficial Use														
Receiving Water (Hydrologic Unit Code)	IND	NAV	REC1	REC2	COMM	BIOL	EST	WILD	RARE	MAR	AQUA	MIGR	SPWN	WARM	SHELL
San Dieguito (905.00)	●		●	●		●		●	●					●	
Pacific Ocean	●	●	●	●	●	●		●	●	●	●	●	●		●

Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations.

No areas of ASBS have been identified for this project.

Provide distance from project outfall location to impaired or sensitive receiving waters.

The San Dieguito Lagoon lies approximately 1 mile west of the project outfall location.

Sumarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands

There are no existing MHPA and open space areas within the subject property however, there is a multi-habitat planning area that borders the south east property boundary. Runoff will bypass this area via the existing 18" RCP as it does in the existing condition.

Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern		
List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:		
303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs/ WQIP Highest Priority Pollutant
San Dieguito River	Enterococcus	TMDL Required list
	Fecal Coliform	TMDL Required list
	Nitrogen	TMDL Required list
	Phosphorus	TMDL Required list
	Total Dissolved Solids	TMDL Required list
	Toxicity	TMDL Required list

Identification of Project Site Pollutants*			
*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated) Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see BMP Design Manual (Part 1 of Storm Water Standards) Appendix B.6):			
Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	○	◉	○
Nutrients	○	◉	○
Heavy Metals	○	◉	○
Organic Compounds	○	◉	○
Trash & Debris	○	◉	○
Oxygen Demanding Substances	○	◉	○
Oil & Grease	○	◉	○
Bacteria & Viruses	○	◉	○
Pesticides	○	◉	○

Form I-3B Page 9 of 11
Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)? ◉ Yes, hydromodification management flow control structural BMPs required. ○ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ○ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ○ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides. Description / Additional Information (to be provided if a 'No' answer has been selected above):
Critical Coarse Sediment Yield Areas* *This Section only required if hydromodification management requirements apply
Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint? ○ Yes ◉ No, No critical coarse sediment yield areas to be protected based on WMAA maps Discussion / Additional Information: See WMMA map in attachment 1.

Form I-3B Page 10 of 11
Flow Control for Post-Project Runoff* *This Section only required if hydromodification management requirements apply
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit. There is one Point of Compliance (POC) at the Del Mar Highlands Estates. The POC is located at the south east corner of the property, where runoff will be treated and collected in a large bio-filtration basin before discharging to an existing 18" RCP storm drain. The storm drain system eventually outlets to the San Dieguito Lagoon, approximately 1 mile west of the project site.
Has a geomorphic assessment been performed for the receiving channel(s)? ◉ No, the low flow threshold is 0.1Q2 (default low flow threshold) ○ Yes, the result is the low flow threshold is 0.1Q2 ○ Yes, the result is the low flow threshold is 0.3Q2 ○ Yes, the result is the low flow threshold is 0.5Q2 If a geomorphic assessment has been performed, provide title, date, and preparer:
Discussion / Additional Information: (optional)

Form I-3B Page 11 of 11
Other Site Requirements and Constraints
When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.
Optional Additional Information or Continuation of Previous Sections As Needed
This space provided for additional information or continuation of information from previous sections as needed.

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Source Control BMP Checklist for All Development Projects			Form I-4
Source Control BMPs			
All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.			
Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	◉ Yes	○ No	○ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	◉ Yes	○ No	○ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	○ Yes	○ No	◉ N/A
Discussion / justification if SC-3 not implemented: The proposed project does not include outdoor material storage.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	○ Yes	○ No	◉ N/A
Discussion / justification if SC-4 not implemented: The proposed project does not include outdoor work areas.			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A
Discussion / justification if SC-5 not implemented:			

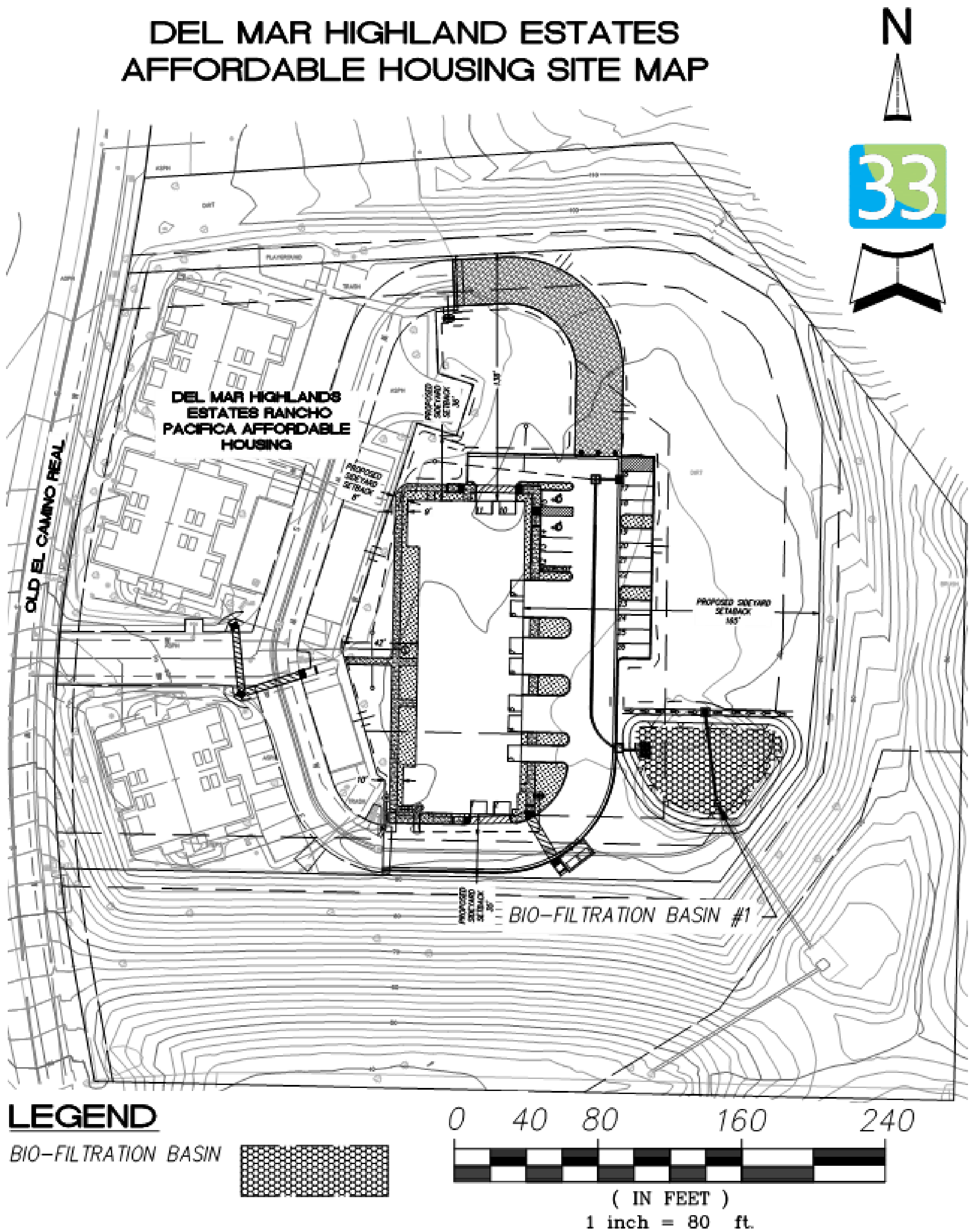
Form I-4 Page 2 of 2			
Source Control Requirement	Applied?		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	◉ Yes	○ No	○ N/A
Interior floor drains and elevator shaft sump pumps	○ Yes	○ No	◉ N/A
Interior parking garages	◉ Yes	○ No	○ N/A
Need for future indoor & structural pest control	◉ Yes	○ No	○ N/A
Landscape/Outdoor Pesticide Use	◉ Yes	○ No	○ N/A
Pools, spas, ponds, decorative fountains, and other water features	○ Yes	○ No	◉ N/A
Food service	○ Yes	○ No	◉ N/A
Refuse areas	○ Yes	○ No	◉ N/A
Industrial processes	○ Yes	○ No	◉ N/A
Outdoor storage of equipment or materials	○ Yes	○ No	◉ N/A
Vehicle/Equipment Repair and Maintenance	○ Yes	○ No	◉ N/A
Fuel Dispensing Areas	○ Yes	○ No	◉ N/A
Loading Docks	○ Yes	○ No	◉ N/A
Fire Sprinkler Test Water	○ Yes	○ No	◉ N/A
Miscellaneous Drain or Wash Water	○ Yes	○ No	◉ N/A
Plazas, sidewalks, and parking lots	◉ Yes	○ No	○ N/A
SC-6A: Large Trash Generating Facilities	○ Yes	○ No	◉ N/A
SC-6B: Animal Facilities	○ Yes	○ No	◉ N/A
SC-6C: Plant Nurseries and Garden Centers	○ Yes	○ No	◉ N/A
SC-6D: Automotive-related Uses	○ Yes	○ No	◉ N/A
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

Site Design BMP Checklist for All Development Projects			Form I-5
Site Design BMPs			
All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided. A site map with implemented site design BMPs must be included at the end of this checklist.			
Site Design Requirement	Applied?		
SD-1 Maintain Natural Draiange Pathways and Hydrologic Features	◉ Yes	○ No	○ N/A
Discussion / justification if SD-1 not implemented:			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	◉ Yes	○ No	○ N/A
1-2 Are street trees implemented? If yes, are they shown on the site map?	○ Yes	○ No	◉ N/A
1-3 Implemented street trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	○ Yes	○ No	◉ N/A
1-4 Is street tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A
SD-2 Have natural areas, soils and vegetation been conserved?	◉ Yes	○ No	○ N/A
Discussion / justification if SD-2 not implemented:			

Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	◉ Yes	○ No	○ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	◉ Yes	○ No	○ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	◉ Yes	○ No	○ N/A
Discussion / justification if SD-5 not implemented: Roof & walkway runoff will surface flow to bio-filtration area for water quality treatment before reaching the existing storm drain system.. See DMA map in attachment 1.			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	○ Yes	◉ No	
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	○ Yes	◉ No	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	○ Yes	◉ No	

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	◉ Yes	○ No	○ N/A
Discussion / justification if SD-6 not implemented: Landscape areas and the bio-filtration basin have been interspersed throughout the project site to reduce the transportation of pollutants to receiving waters.			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	○ Yes	◉ No	○ N/A
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	○ Yes	◉ No	○ N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	○ Yes	◉ No	○ N/A
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	○ Yes	◉ No	○ N/A
SD-7 Landscaping with Native or Drought Tolerant Species	◉ Yes	○ No	○ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	○ Yes	◉ No	○ N/A
Discussion / justification if SD-8 not implemented: Drought tolerant landscaping is used and it is infeasible to harvest and use precipitation.			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	○ Yes	◉ No	○ N/A
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	○ Yes	◉ No	○ N/A

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:



latitude 33
PLANNING & ENGINEERING

Summary of PDP Structural BMPs	Form I-6
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	
Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. **<u>Step 1:</u>** Sites were located for water pollutant control BMPs and DMA's were delineated and DCV's calculated. Self-mitigating DMA's have been identified and are shown on the DMA Map. **<u>Step 2:</u>** Per the included Harvest and Use feasibility screening the proposed project is considered to be infeasible for harvest and use. **<u>Step 3:</u>** Per the included Geotechnical Report by Geocon Incorporated, dated June 24th, 2016, the site is deemed not appropriate for implementing storm water infiltration systems due to the fact that the site is underlain by compacted fill and Terrace Deposits. Infiltration cannot be incorporated without increasing the risk of geotechnical hazards. Form I-8 "Categorization of Infiltration Feasibility Condition", has been filled out to reflect the geotechnical recommendations made by Geocon, Inc. Due to this recommendation, the selected bio-filtration basin will be lined with an impermeable layer. If the City of SD requires partial infiltration, the basin liner can be removed to accommodate the City's request.	

Form I-6 Page 2 of 4
(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)
(Continued from page 1) **<u>Step 4:</u>** A large bio-filtration basin will be constructed in place of the existing desilting basin. The "Simple Sizing Method for Biofiltration BMPs", Worksheet B.5-1 was used to determine the biofiltration footprint required for water quality for the entire site. This result indicate that the proposed biofiltration footprint satisfies the sizing requirements for water quality. **<u>Step 5:</u>** The San Diego Hyrology Model 3.0 (SDHM) software, developed by Clear Creek Solutions, was used to size the bio-filtration (BMP#1) basin for HMP storage. A low flow threshold of 0.1Q2 was used as the default low flow threshold, as there was no geomorphic assessment performed for the receiving waters. SDHM was also used to determine the orifice size and placement above the basin floor. BMP#1 paramaters used for the SDHM simulation are outlined on the BMP ID page 10 of Form I-6, as well as a basin volume calculation. No infiltration was implemented per the geotechnical recommendations.

Form I-6 Page 3 of 4	
Structural BMP Summary Information	
Structural BMP ID No. 1	
Construction Plan Sheet No. 3	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☒ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (Provide BMP type / Description in discussion section below ☐ Flow-thru treatment control included as pre-treatment / forebay for an onsite retention or biofiltration BMP (provide BMP type / description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type / description in discussion section below ☐ Detention pond of vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification control ☐ Pre-treatment / forebay for another structural BMP ☐ Other (describe in discussion section below	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Giovanni Posillico Latitude 33 Planning & Engineering 9968 Hibert Street 2nd Floor, San Diego, CA 92131
Who will be the final owner of this BMP?	Pardee Homes 3400 Sabre Springs Parkway Suite 200 San Diego, CA 92126
Who will maintain this BMP into perpetuity?	Pardee Homes
What is the funding mechanism for maintenance?	Pardee Homes

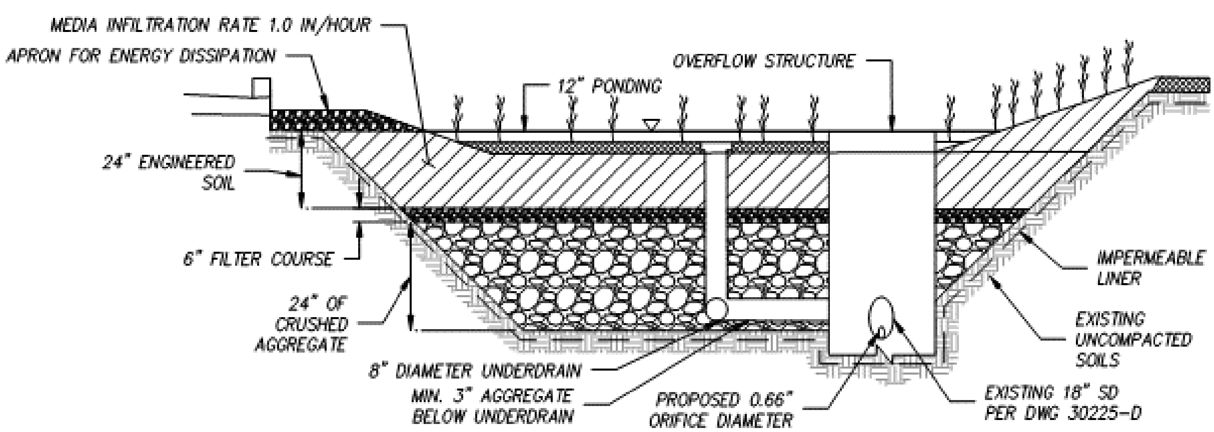
Form I-6 Page 4 of 4
Structural BMP ID No. 1
Construction Plan Sheet No. 3

Discussion (as needed):

BMP#1 will consist of a large BF-1 Bio-filtration Basin sized for pollutant control and HMP purposes. The basin is intended to serve as water quality treatment, as well as hydromidification control for the entire site. Site runoff will be routed to the bio-filtration as depicted in the DMA map included in attachment 1. The basin will consist of 12" of ponding depth, 18" of engineered soil, 24" of crushed aggregate, and an impermeable liner (see BMP typical detail from appendix E of the City's Storm Water Standards below). A minimum 6" perforated underdain was selected, as well as 0.69" orifice diameter. The overflow riser diameter will be 5". Provided volume calculations are as follows:

3,000 SF bottom basin area X 1' ponding depth = 3,000 CF
2' crushed rock X 0.4 porosity X 3,000 SF = 2,400 CF
Total Provided Volume = 3,000 CF + 2,400 CF = **5,400 CF**

The calculated drawdown time, provided in attachment 2, is 5.71 hours, which is well below the maximum drawdown time of 24 hours. Additionally, the calculated surface ponding drawdown time, provided in the Water Quality section of the SDHM Report, is less than 1 day.



BIOFILTRATION
NO SCALE

THE CITY OF SAN DIEGO

City of San Diego
Development Services
1222 First Ave., MD-302
San Diego, CA 92101
(619) 446-5000

Permanent BMP Construction

Self Certification Form

FORM
DS-563
January 2016

Date Prepared:	Project No.:
Project Applicant:	Phone:
Project Address:	
Project Engineer:	Phone:

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.

This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.

CERTIFICATION:

As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and structural BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: ________________________________

Date of Signature: _ ___

Printed Name: ___

Title: ___

Phone No. ___

Engineer's Stamp

DS-563 (12-15)

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ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

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Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	◉ Included on DMA Exhibit in Attachment 1a ○ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	◉ Included ○ Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	◉ Included ○ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations	☒ Included

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

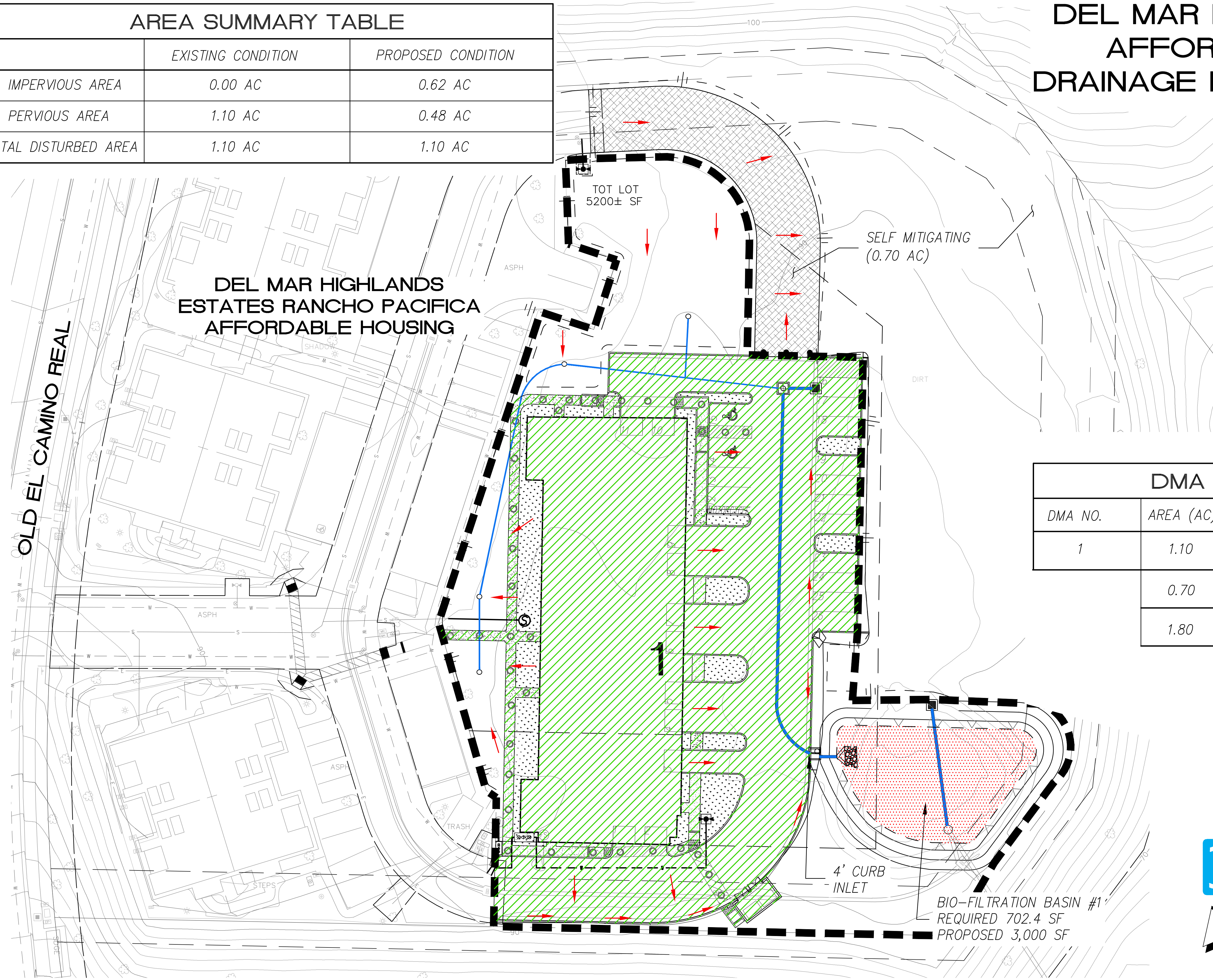
☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands) N/A
☐ Critical coarse sediment yield areas to be protected N/A
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
☐ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B) N/A
☒ Structural BMPs (identify location, type of BMP, and size/detail)

DEL MAR HIGHLAND ESTATES AFFORDABLE HOUSING DRAINAGE MANAGEMENT AREAS

AREA SUMMARY TABLE

	EXISTING CONDITION	PROPOSED CONDITION
IMPERVIOUS AREA	0.00 AC	0.62 AC
PERVIOUS AREA	1.10 AC	0.48 AC
TOTAL DISTURBED AREA	1.10 AC	1.10 AC

HYDROLOGIC SOIL GROUP: D
DEPTH OF GROUNDWATER: >20'



LEGEND

- DMA BOUNDARY
- STORM DRAIN SYSTEM
- IMPERVIOUS AREA
- BIO-FILTRATION BASIN
- SURFACE FLOW DIRECTION
- DMA # — 1

DMA SUMMARY TABLE

DMA NO.	AREA (AC)	DMA TYPE
1	1.10	ROOF/WALKWAY/ROAD/LANDSCAPE, DRAINS TO BMP
	0.70	SELF MITIGATING AREA, DRAINS TO EXISTING RCP AS IN PRE-PROJECT COINDITION
	1.80	TOTAL PROJECT AREA

SCALE: 1" = 40'
JOB NO.: 1390.0
SHEET: DMA EXHIBIT

Harvest and Use Feasibility Screening			Form I-7
1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season? ☒ Toilet and urinal flushing ☒ Landscape Irrigation ☐ Other: ________________			
2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2. Per Table B.3-1, Residential flushes per day amounts to 18.5/3.45 = 5.36 flushes/day. This is a new development which will employ the use of low-flow toilets. So, (5.36 flushes/day)x(1.6 gallons/flush)x(0.5 WEF) = (4.3 gallons/resident-day)*(30 residents) = (129 gallons/day) (103.2 gallons/day)*1.5 = 193.5 gallon 36 hour demand (193.5 gallons) * (1 cubic foot/7.48 gallons) => 36 Hour Demand = **<u>25.9 Cubic Feet</u>** Assumed Moderate Plant Water use per Table B 3-3. Landscape = (1,470 gallons/irrigated acre)*(0.41 Acres) = 602.7 gallons 36 hour demand (602.7 gallons)*(1 cubic foot/7.48 gallons) => 36 Hour Demand = **<u>80.6 Cubic Feet</u>** Total 36 Hour Demand = **<u>106.5 Cubic Feet</u>**			
3. Calculate the DCV using worksheet B-2.1. DCV=**1426.74 cubic feet > 106.5 cubic feet** 0.25 DCV= **356.69 cubic feet > 106.5 cubic feet**			
3a. Is the 36-hour demand greater than or equal to the DCV? Yes / No ⇒ ⇩	3b. Is the 36-hour demand greater than 0.25 DCV but less than the full DCV? Yes / No ⇒ ⇩	3c. Is the 36-hour demand less than 0.25DCV? Yes ⇩	
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.	
Is harvest and use feasible based on further evaluation? ☐ Yes, refer to appendix E to select and size harvest and use BMPs ☒ No, select alternate BMPs			

Del Mar Highlands Estates

DMA 1

DESIGN CAPTURE VOLUME

Use	Area (SF)	Area (ac)	C	C·A (ac)	% DCV
Roof	10539	0.24	0.90	0.217748	27.1%
landscape	10079	0.231382	0.10	0.023	2.9%
Walkway/road	27164	0.6236	0.90	0.56124	70.0%
TOTAL	**47782**	**1.10**	**0.73125**	**0.802126**	**100%**

B.1.1 Runoff Factor

Estimate the area weighted runoff factor for the tributary area to the BMP using runoff factor (from Table B.1-1) and area of each surface type in the tributary area and the following equation:

$$C = \frac{\sum C_x A_x}{\sum A_x}$$

Appendix B: Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods

Worksheet B.2-1. DCV

	Design Capture Volume	Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=		inches
2	Area tributary to BMP (s)	A=		acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=		unitless
4	Street trees volume reduction	TCV=		cubic-feet
5	Rain barrels volume reduction	RCV=		cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=		cubic-feet

	Design Capture Volume	Worksheet B-2.1		
1	85TH PERCENTILE 24-HR STORM	D=	0.49	inches
2	AREA TRIBUTARY TO BMP (s)	A=	1.10	acres
3	AREA WEIGHTED RUNOFF FACTOR (ESTIMATE USING APPENDIX B.1.1 AND B.2.1)	C=	0.73	unitless
4	STREET TREES VOLUME REDUCTION	TCV=	-	cubic-feet
5	RAIN BARRELS VOLUME REDUCTION	RCV=	-	cubic-feet
6	CALCULATE DCV=(3630 X C X D X A) - TCV - RCV	**DCV=**	**1,426.74**	**cubic-feet**

Categorization of Infiltration Feasibility Condition			**Form I-8**
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒
Provide basis: **The information provided in this form has been taken from the Geocon Incorporated "Response to City Comments" report dated October 6th, 2016:** We performed 4 infiltration tests in the previously placed fill within the proposed basin area. The results of the infiltration rates are the following: A-1: 0.03 in/hr; A-7: 0.01 in/hr A-2: 0.01 in/hr A-8: 0.01 in/hr This shows the soil does not have an estimated reliable infiltration rate greater than 0.5 inches per hour.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒
Provide basis: The site in underlain by compacted fill and Terrace Deposits. Based on the comprehensive study presented in the geotechnical report, infiltration could not be incorporated without increasing the risk of geotechnical hazards including uncontrolled water lateral migration, settlement, and slope instability. Slope stability analysis under saturated conditions indicate a factor of safety less than 1.5 for deep seated failure. Infiltrating into the compacted fill could saturate the fill slope supporting adjacent existing buildings and improvements causing adverse settlement and slope failure.			

Form I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface.			
4	Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: Infiltration is not anticipated to have a negative impact on nearby water balance or discharge of contaminated groundwater to surface waters.			
Part 1 Result *	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		**No**

Form I-8 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒
Provide basis: The unfactored infiltration rates are: A-1: 0.03 in/hr A-2: 0.01 in/hr A-7: 0.01 in/hr A-8: 0.01 in/hr Using a factor of safety of 2.0, with the exception of A-1, the infiltration rates are less than 0.01. Therefore, the site is not feasible for infiltration.			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒
Provide basis: The site in underlain by compacted fill and Terrace Deposits. Based on the comprehensive study presented in the geotechnical report, infiltration could not be incorporated without increasing the risk of geotechnical hazards including uncontrolled water lateral migration, settlement, and slope instability. Slope stability analysis under saturated conditions indicate a factor of safety less than 1.5 for deep seated failure. Infiltrating into the compacted fill could saturate the fill slope supporting adjacent existing buildings and improvements causing adverse settlement and slope failure.			

<table>
<tr><th colspan="4">Form I-8 Page 4 of 4</th></tr>
<tr><td>Criteria</td><td>Screening Question</td><td>Yes</td><td>No</td></tr>
<tr><td>7</td><td>Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="4">Provide basis:

Based on information obtained during previous grading, groundwater is expected to be at a depth of at least 70 feet below the existing ground surface.</td></tr>
<tr><td>8</td><td>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="4">Provide basis:

We are unaware of any downstream water rights that could be impacted from infiltration. The project civil engineer should confirm.</td></tr>
<tr><td>Part 2 Result *</td><td colspan="2">If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.
If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</td><td>No Infiltration</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City Engineer to substantiate findings

latitude 33 PLANNING & ENGINEERING

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (Overall)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	1426.74	cubic- feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0.00	inches
7	Assumed surface area of the biofiltration BMP	674	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	168.5	cubic- feet
10	DCV that requires biofiltration [Line 1 – Line 9]	1258.2	cubic- feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	30	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	24	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	1.0	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	6	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	28	inches
19	Total Depth Treated [Line 17 + Line 18]	34	inches

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (continued)			
Simple Sizing Method for Biofiltration BMPs		**Worksheet B.5-1 (Page 2 of 2)**	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	1887.4	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	674.1	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	943.7	cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12	410.3	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	47782	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.49	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	702.4	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	702.4	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.118101	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	N/A	N/A

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

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Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☒ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	◉ Not Performed ○ Included ○ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	◉ Included ○ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	○ Included ◉ Not required because BMPs will drain in less than 96 hours

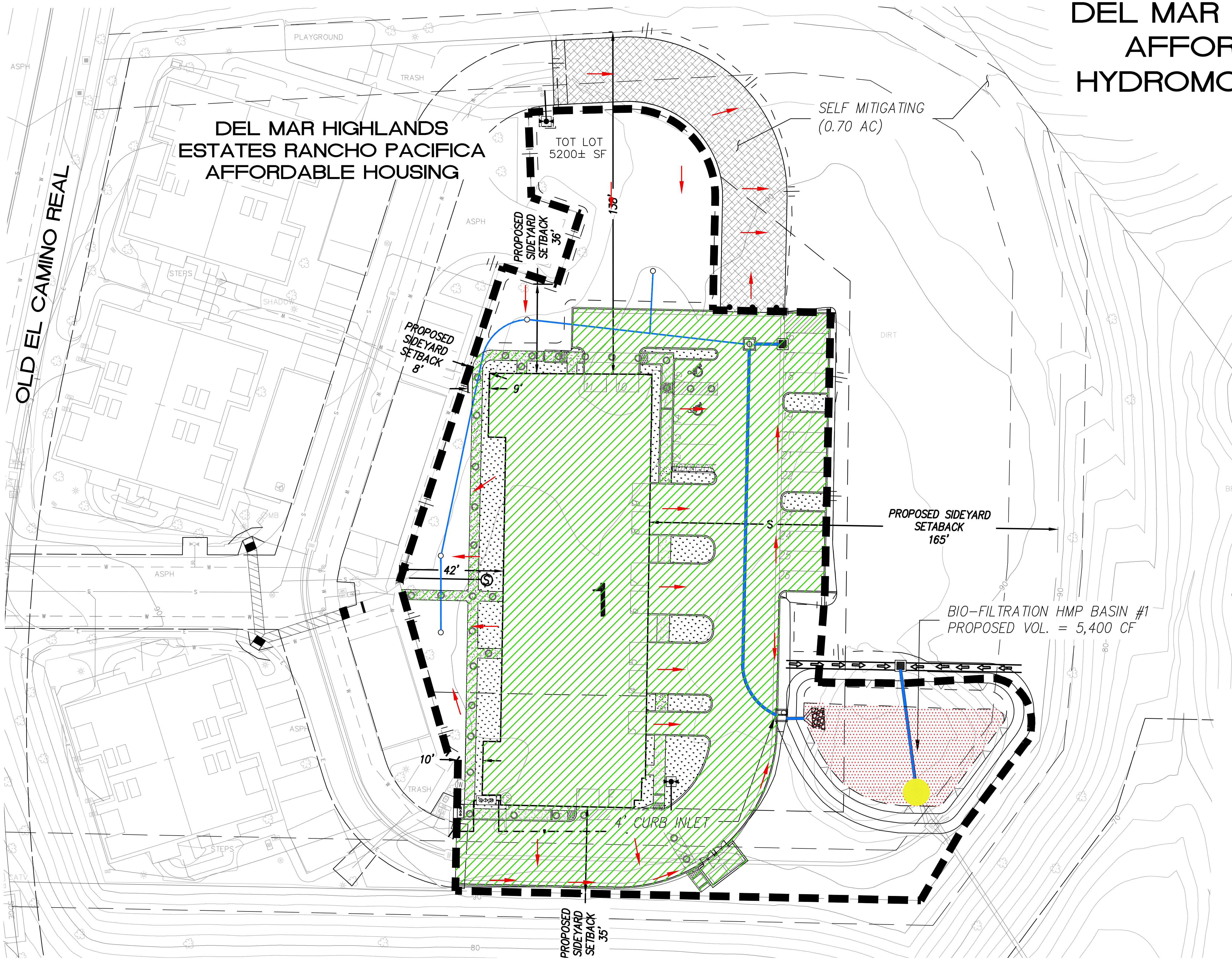
Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands) N/A
☐ Critical coarse sediment yield areas to be protected N/A
☒ Existing topography
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed grading
☒ Proposed impervious features
☐ Proposed design features and surface treatments used to minimize imperviousness N/A
☐ Point(s) of Compliance (POC) for Hydromodification Management
☒ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
☒ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

DEL MAR HIGHLAND ESTATES AFFORDABLE HOUSING HYDROMODIFICATION EXHIBIT

HYDROLOGIC SOIL GROUP: D
DEPTH OF GROUNDWATER: >20



LEGEND

- BASIN LIMITS
- STORM DRAIN SYSTEM
- IMPERVIOUS AREA
- BIO-FILTRATION HMP BASIN
- SURFACE FLOW DIRECTION
- BASIN # 1
- POINT OF COMPLIANCE

N

SCALE: 1" = 40'

JOB NO.: 1390.0

SHEET: HMP EXHIBIT


DEL MAR HIGHLANDS RANCH - WMMA CRITICAL COURSE SEDIMENT YIELD AREA MAP
SURFACE FLOW DIRECTION
PROJECT BOUNDARY
CRITICAL COARSE SEDIMENT YEILD AREAS

Bio-Filtration Drawdown Calculations

Given

Outlet Controlled Rate	1	in/hr

BMP ID	DCV (CF)	Effective Area (SF)	Drawdown Time (Hrs)
1	1426.74	3000	5.71

Drawdown = (DCV/EA) / (OCR/12)

Where:

DCV = Design Capture Volume

EA = Effective Area

OCR = Outlet Controlled Rate

12 = Conversion Ratio (12in = 1ft)

Surface ponding drawdown time greater than 24-hours but less than 96-hours is allowed at the discretion of the City Engineer when certified by a landscape architect or agronomist.

SWMM Model Flow Coefficient Calculation

PARAMETER	ABBREV.	Bio-Retention Cell LID BMP	
Ponding Depth	PD	12	in
Bioretention Soil Layer	S	30	in
Gravel Layer	G	24	in
TOTAL		5.5	ft
		66	in
Orifice Coefficient	c_g	0.614	--
Low Flow Orifice Diameter	D	0.66	in
Drain exponent	n	0.5	--
Flow Rate (volumetric)	Q	0.027	cfs
Ponding Depth Surface Area	A_{PD}	3679	ft^2
Bioretention Surface Area	$A_{S,} A_G$	3000	ft^2
	$A_{S,} A_G$	0.0689	ac
Porosity of Bioretention Soil	n	0.40	-
Flow Rate (per unit area)	q	0.986	in/hr
Effective Ponding Depth	PD_{eff}	**13.36**	in
Flow Coefficient	C	**0.1217**	--

Outlet Controlled Rate

SDHM 3.0

PROJECT REPORT

General Model Information

Project Name:	Affordable Housing SDHM 9-29-16
Site Name:	Del Mar Highland Estates Affordable Housing
Site Address:	14163 Old El Camino Real
City:	San DIego
Report Date:	10/7/2016
Gage:	OCEANSID
Data Start:	10/01/1959
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2016/06/28

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data
Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,Dirt,Flat	1.1
Pervious Total	1.1
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.1

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
D,NatVeg,Flat	0.48
Pervious Total	0.48
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.62
Impervious Total	0.62
Basin Total	1.1

Element Flows To:

Surface	Interflow	Groundwater
Surface Bio Swale 1	Surface Bio Swale 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bio Swale 1

Bottom Length:	54.77 ft.
Bottom Width:	54.77 ft.
Material thickness of first layer:	2
Material type for first layer:	Sandy loam
Material thickness of second layer:	0.5
Material type for second layer:	Gravel Loamy Sand
Material thickness of third layer:	2
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	0.67
Orifice Diameter (in.):	0.66
Offset (in.):	3
Flow Through Underdrain (ac-ft.):	19.77
Total Outflow (ac-ft.):	20.934
Percent Through Underdrain:	94.44

Discharge Structure

Riser Height:	1 ft.
Riser Diameter:	10 in.

Element Flows To:

Outlet 1	Outlet 2

Landscape Swale Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.0689	0.0000	0.0000	0.0000
0.0633	0.0696	0.0018	0.0000	0.0000
0.1267	0.0703	0.0035	0.0000	0.0000
0.1900	0.0710	0.0053	0.0000	0.0000
0.2533	0.0718	0.0072	0.0000	0.0000
0.3167	0.0725	0.0090	0.0000	0.0000
0.3800	0.0732	0.0109	0.0000	0.0000
0.4433	0.0740	0.0127	0.0000	0.0000
0.5067	0.0747	0.0146	0.0000	0.0000
0.5700	0.0754	0.0165	0.0000	0.0000
0.6333	0.0762	0.0185	0.0000	0.0000
0.6967	0.0769	0.0204	0.0000	0.0000
0.7600	0.0777	0.0224	0.0000	0.0000
0.8233	0.0785	0.0244	0.0000	0.0000
0.8867	0.0792	0.0264	0.0000	0.0000
0.9500	0.0800	0.0284	0.0000	0.0000
1.0133	0.0808	0.0304	0.0000	0.0000
1.0767	0.0815	0.0325	0.0000	0.0000
1.1400	0.0823	0.0346	0.0000	0.0000
1.2033	0.0831	0.0367	0.0000	0.0000
1.2667	0.0839	0.0388	0.0000	0.0000
1.3300	0.0846	0.0410	0.0000	0.0000
1.3933	0.0854	0.0431	0.0000	0.0000
1.4567	0.0862	0.0453	0.0000	0.0000
1.5200	0.0870	0.0475	0.0000	0.0000
1.5833	0.0878	0.0498	0.0000	0.0000
1.6467	0.0886	0.0520	0.0000	0.0000
1.7100	0.0894	0.0543	0.0000	0.0000
1.7733	0.0902	0.0566	0.0000	0.0000

1.8367	0.0910	0.0589	0.0000	0.0000
1.9000	0.0919	0.0612	0.0000	0.0000
1.9633	0.0927	0.0635	0.0000	0.0000
2.0267	0.0935	0.0656	0.0000	0.0000
2.0900	0.0943	0.0677	0.0000	0.0000
2.1533	0.0951	0.0698	0.0000	0.0000
2.2167	0.0960	0.0719	0.0000	0.0000
2.2800	0.0968	0.0740	0.0000	0.0000
2.3433	0.0977	0.0762	0.0000	0.0000
2.4067	0.0985	0.0784	0.0000	0.0000
2.4700	0.0993	0.0806	0.0000	0.0000
2.5333	0.1002	0.0832	0.0000	0.0000
2.5967	0.1010	0.0858	0.0000	0.0000
2.6600	0.1019	0.0885	0.0000	0.0000
2.7233	0.1027	0.0912	0.0000	0.0000
2.7867	0.1036	0.0939	0.0000	0.0000
2.8500	0.1045	0.0966	0.0000	0.0000
2.9133	0.1053	0.0994	0.0000	0.0000
2.9767	0.1062	0.1022	0.0000	0.0000
3.0400	0.1071	0.1050	0.0000	0.0000
3.1033	0.1080	0.1078	0.0000	0.0000
3.1667	0.1088	0.1106	0.0000	0.0000
3.2300	0.1097	0.1135	0.0000	0.0000
3.2933	0.1106	0.1164	0.0000	0.0000
3.3567	0.1115	0.1193	0.0000	0.0000
3.4200	0.1124	0.1223	0.0000	0.0000
3.4833	0.1133	0.1252	0.0000	0.0000
3.5467	0.1142	0.1282	0.0000	0.0000
3.6100	0.1151	0.1312	0.0000	0.0000
3.6733	0.1160	0.1343	0.0000	0.0000
3.7367	0.1169	0.1373	0.0000	0.0000
3.8000	0.1178	0.1404	0.0000	0.0000
3.8633	0.1188	0.1435	0.0000	0.0000
3.9267	0.1197	0.1467	0.0000	0.0000
3.9900	0.1206	0.1498	0.0000	0.0000
4.0533	0.1215	0.1530	0.0000	0.0000
4.1167	0.1225	0.1562	0.0000	0.0000
4.1800	0.1234	0.1594	0.0000	0.0000
4.2433	0.1243	0.1627	0.0000	0.0000
4.3067	0.1253	0.1660	0.0000	0.0000
4.3700	0.1262	0.1693	0.0000	0.0000
4.4333	0.1272	0.1726	0.0000	0.0000
4.4967	0.1281	0.1760	0.0000	0.0000
4.5600	0.1291	0.1841	0.0000	0.0000
4.6233	0.1300	0.1923	0.0000	0.0000
4.6867	0.1310	0.2006	0.0000	0.0000
4.7500	0.1319	0.2089	0.0000	0.0000
4.8133	0.1329	0.2173	0.0000	0.0000
4.8767	0.1339	0.2257	0.0000	0.0000
4.9400	0.1349	0.2343	0.0000	0.0000
5.0033	0.1358	0.2428	0.0000	0.0000
5.0667	0.1368	0.2515	0.0000	0.0000
5.1300	0.1378	0.2602	0.0000	0.0000
5.1933	0.1388	0.2689	0.0000	0.0000
5.2567	0.1398	0.2777	0.0000	0.0000
5.3200	0.1408	0.2866	0.0000	0.0000
5.3833	0.1418	0.2956	0.0000	0.0000
5.4467	0.1428	0.3046	0.0000	0.0000

5.5100	0.1438	0.3136	0.0000	0.0000
5.5733	0.1448	0.3228	0.0000	0.0000

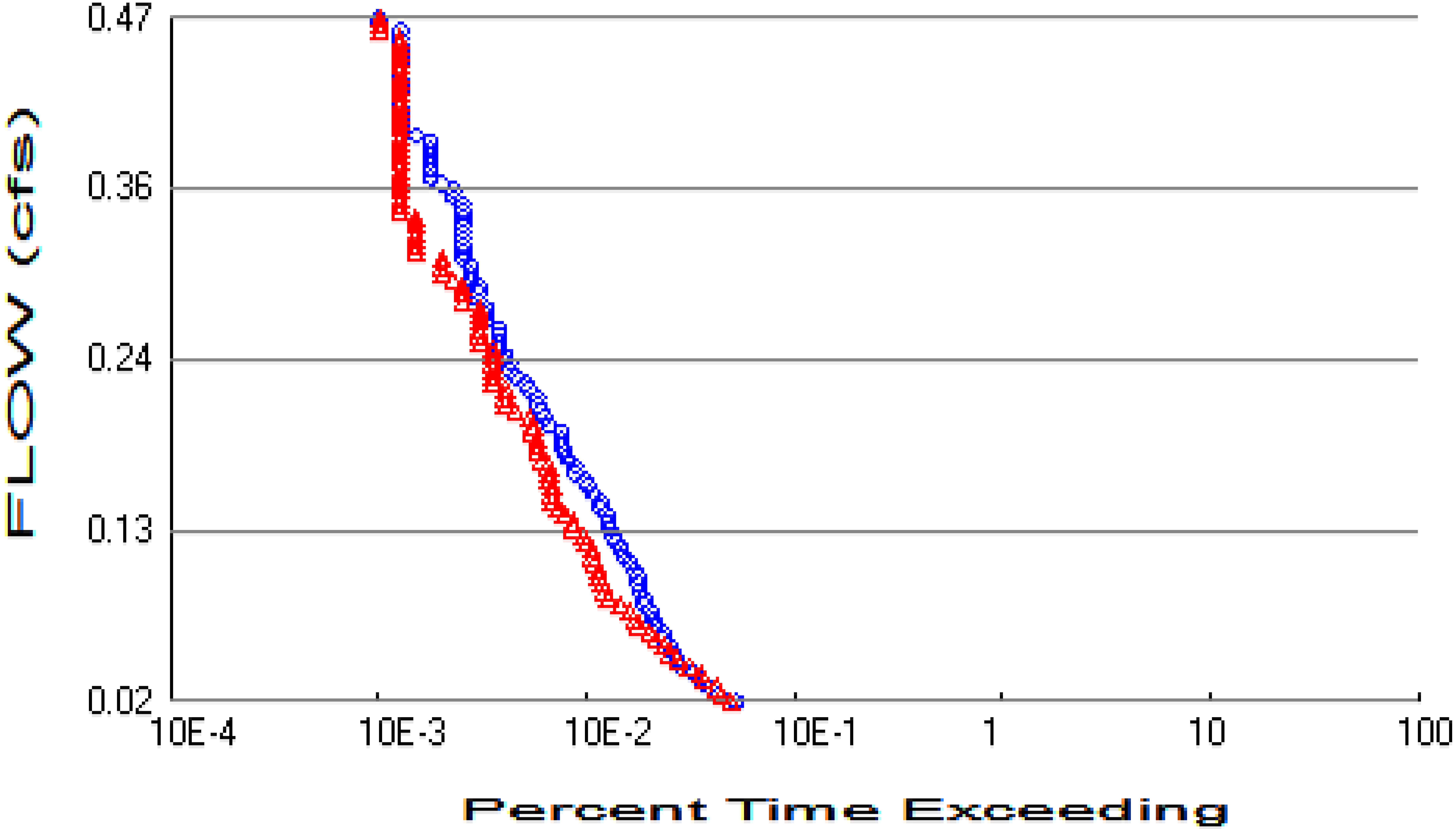
Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
5.5733	0.0689	0.3228	0.0000	0.0000	0.0000
5.6367	0.1458	0.3320	0.0000	0.0000	0.0000
5.7000	0.1468	0.3412	0.0000	0.0000	0.0000
5.6901	0.0880	0.2177	0.0000	0.2608	0.0000
5.7000	0.0882	0.2186	0.0000	0.2616	0.0000

Surface Bio Swale 1

Element Flows To:

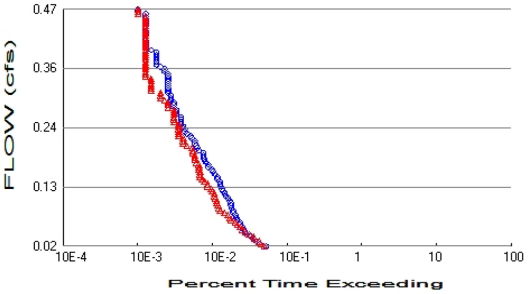
Outlet 1	Outlet 2
	Bio Swale 1

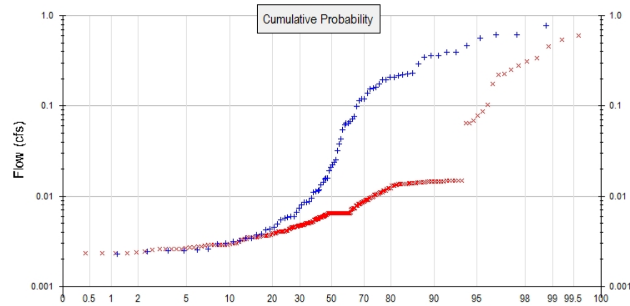


FLOW (cfs)
0.47
0.36
0.24
0.13
0.02
10E-4
10E-3
10E-2
10E-1
1
10
100
Percent Time Exceeding

Cumulative Probability
Flow (cfs)
1.0
0.1
0.01
0.001
0
0.5
1
2
5
10
20
30
50
70
80
90
95
98
99
99.5
100
501
801

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.1
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.48
Total Impervious Area: 0.62

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.155643
5 year	0.353995
10 year	0.470941
25 year	0.613742

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.014677
5 year	0.200784
10 year	0.311497
25 year	0.517652

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0156	206	195	94	Pass
0.0202	172	177	102	Pass
0.0248	156	166	106	Pass
0.0294	138	145	105	Pass
0.0340	129	140	108	Pass
0.0386	112	123	109	Pass
0.0432	107	109	101	Pass
0.0478	104	99	95	Pass
0.0524	98	92	93	Pass
0.0570	93	85	91	Pass
0.0616	91	80	87	Pass
0.0662	86	71	82	Pass
0.0708	82	67	81	Pass
0.0754	80	63	78	Pass
0.0800	75	57	76	Pass
0.0846	74	50	67	Pass
0.0892	71	48	67	Pass
0.0938	70	47	67	Pass
0.0984	69	45	65	Pass
0.1030	67	45	67	Pass
0.1076	64	44	68	Pass
0.1122	60	42	70	Pass
0.1168	58	42	72	Pass
0.1214	55	39	70	Pass
0.1260	53	38	71	Pass
0.1306	51	34	66	Pass
0.1352	50	34	68	Pass
0.1398	49	31	63	Pass
0.1444	46	29	63	Pass
0.1490	46	27	58	Pass
0.1536	43	27	62	Pass
0.1582	40	27	67	Pass
0.1628	39	26	66	Pass
0.1674	35	26	74	Pass
0.1720	35	26	74	Pass
0.1766	33	24	72	Pass
0.1812	31	23	74	Pass
0.1858	30	23	76	Pass
0.1904	30	23	76	Pass
0.1950	30	22	73	Pass
0.1996	26	22	84	Pass
0.2042	25	21	84	Pass
0.2088	24	18	75	Pass
0.2134	23	16	69	Pass
0.2180	23	16	69	Pass
0.2226	21	16	76	Pass
0.2272	20	14	70	Pass
0.2318	18	14	77	Pass
0.2364	17	14	82	Pass
0.2410	17	14	82	Pass
0.2456	16	14	87	Pass
0.2502	15	14	93	Pass
0.2548	15	12	80	Pass

0.2594	15	12	80	Pass
0.2640	15	12	80	Pass
0.2686	13	12	92	Pass
0.2732	13	12	92	Pass
0.2778	13	12	92	Pass
0.2824	12	10	83	Pass
0.2870	12	10	83	Pass
0.2916	12	10	83	Pass
0.2961	11	9	81	Pass
0.3007	11	8	72	Pass
0.3053	11	8	72	Pass
0.3099	10	8	80	Pass
0.3145	10	6	60	Pass
0.3191	10	6	60	Pass
0.3237	10	6	60	Pass
0.3283	10	6	60	Pass
0.3329	10	6	60	Pass
0.3375	10	6	60	Pass
0.3421	10	5	50	Pass
0.3467	10	5	50	Pass
0.3513	9	5	55	Pass
0.3559	9	5	55	Pass
0.3605	8	5	62	Pass
0.3651	7	5	71	Pass
0.3697	7	5	71	Pass
0.3743	7	5	71	Pass
0.3789	7	5	71	Pass
0.3835	7	5	71	Pass
0.3881	7	5	71	Pass
0.3927	6	5	83	Pass
0.3973	5	5	100	Pass
0.4019	5	5	100	Pass
0.4065	5	5	100	Pass
0.4111	5	5	100	Pass
0.4157	5	5	100	Pass
0.4203	5	5	100	Pass
0.4249	5	5	100	Pass
0.4295	5	5	100	Pass
0.4341	5	5	100	Pass
0.4387	5	5	100	Pass
0.4433	5	5	100	Pass
0.4479	5	5	100	Pass
0.4525	5	5	100	Pass
0.4571	5	5	100	Pass
0.4617	5	4	80	Pass
0.4663	4	4	100	Pass
0.4709	4	4	100	Pass

Water Quality

Model Default Modifications

Total of 0 changes have been made.

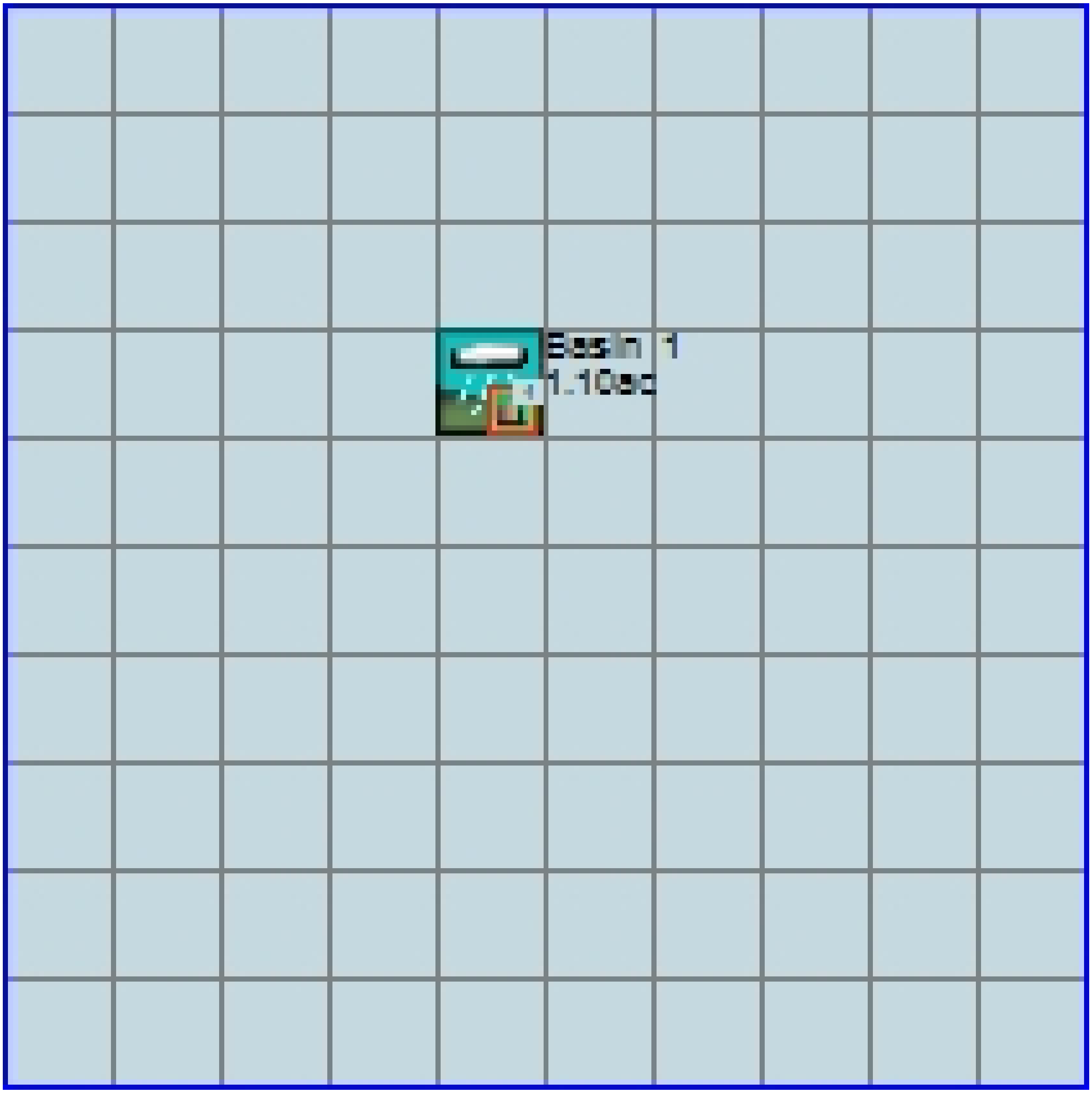
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
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WDM        26   Affordable Housing SDHM 9-29-16.wdm
MESSU      25   PreAffordable Housing SDHM 9-29-16.MES
           27   PreAffordable Housing SDHM 9-29-16.L61
           28   PreAffordable Housing SDHM 9-29-16.L62
           30   POCAffordable Housing SDHM 9-29-161.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      31
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                    MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                            User  t-series Engl Metr ***
                                             in  out           ***
   31      D,Dirt,Flat            1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   31         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   31         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   31         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   31              0       4.8     0.045       200      0.05       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   31              0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                    ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   31              0       0.6       0.2       1.5       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   31       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   31       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   31              0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                      in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2
```

```
  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  31                        1.1     COPY   501     12
PERLND  31                        1.1     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES
```

```
SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   Affordable Housing SDHM 9-29-16.wdm
MESSU      25   MitAffordable Housing SDHM 9-29-16.MES
           27   MitAffordable Housing SDHM 9-29-16.L61
           28   MitAffordable Housing SDHM 9-29-16.L62
           30   POCAffordable Housing SDHM 9-29-161.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      28
      IMPLND       1
      GENER        2
      RCHRES       1
      RCHRES       2
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Surface Bio Swale  1        MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1        1    1
  501        1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    2        24
  END OPCODE
  PARM
    #    #         K ***
    2             0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   28      D,NatVeg,Flat          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   28         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   28         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   28         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   28              0       4.8      0.04       200      0.05       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   28              0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                    ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   28              0       0.6       0.2       1.5       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   28       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   28              0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out          ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO
```

```
  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05      0.05       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  28                        0.48     RCHRES   1      2
PERLND  28                        0.48     RCHRES   1      3
IMPLND   1                        0.62     RCHRES   1      5

******Routing******
PERLND  28                        0.48     COPY     1     12
IMPLND   1                        0.62     COPY     1     15
PERLND  28                        0.48     COPY     1     13
RCHRES   1                           1     RCHRES   2      8
RCHRES   2                           1     COPY   501     16
RCHRES   1                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1
GENER    2 OUTPUT TIMSER      .0002778     RCHRES   1     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
    1     Surface Bio Swal-004    3    1    1    1   28    0    1
    2     Bio Swale  1            1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
```

```
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1       4    0    0    0    0    0    0    0    0    0    1    9
    2       4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    2        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1             1      0.01       0.0       0.0       0.5       0.0
    2             2      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                        <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol2   RCHRES   2 VOL             4
  UVQUAN v2m2   GLOBAL     WORKSP  1       3
  UVQUAN vpo2   GLOBAL     WORKSP  2       3
  UVQUAN v2d2   GENER    2 K       1       3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <-->    <----><-><-><-> <---> <-->
  UVNAME  v2m2    1 WORKSP  1         1.0 QUAN
  UVNAME  vpo2    1 WORKSP  2         1.0 QUAN
  UVNAME  v2d2    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   2                              v2m2            =  5094.
*** Compute remaining available pore space
  GENER   2                              vpo2            =  v2m2
  GENER   2                              vpo2           -=  vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
  GENER   2                              vpo2            =  0.0
END IF
*** Infiltration volume
  GENER   2                              v2d2            =  vpo2
END SPEC-ACTIONS
FTABLES
  FTABLE      2
   73    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
```

0.000000	0.068865	0.000000	0.000000
0.062637	0.068865	0.001734	0.000000
0.125275	0.068865	0.003468	0.000000
0.187912	0.068865	0.005202	0.000000
0.250549	0.068865	0.006936	0.000000
0.313187	0.068865	0.008670	0.000000
0.375824	0.068865	0.010404	0.000000
0.438462	0.068865	0.012138	0.000000
0.501099	0.068865	0.013872	0.000000
0.563736	0.068865	0.015606	0.000000
0.626374	0.068865	0.017340	0.000000
0.689011	0.068865	0.019074	0.000000
0.751648	0.068865	0.020808	0.000000
0.814286	0.068865	0.022542	0.000000
0.876923	0.068865	0.024276	0.000000
0.939560	0.068865	0.026010	0.000000
1.002198	0.068865	0.027745	0.000000
1.064835	0.068865	0.029479	0.000000
1.127473	0.068865	0.031213	0.000000
1.190110	0.068865	0.032947	0.000000
1.252747	0.068865	0.034681	0.000000
1.315385	0.068865	0.036415	0.000000
1.378022	0.068865	0.038149	0.000000
1.440659	0.068865	0.039883	0.000686
1.503297	0.068865	0.041617	0.001029
1.565934	0.068865	0.043351	0.001774
1.628571	0.068865	0.045085	0.002146
1.691209	0.068865	0.046819	0.002716
1.753846	0.068865	0.048553	0.003001
1.816484	0.068865	0.050287	0.003453
1.879121	0.068865	0.052021	0.003679
1.941758	0.068865	0.053755	0.004058
2.004396	0.068865	0.055265	0.004248
2.067033	0.068865	0.056774	0.004580
2.129670	0.068865	0.058284	0.004746
2.192308	0.068865	0.059794	0.005045
2.254945	0.068865	0.061304	0.005195
2.317582	0.068865	0.062813	0.005469
2.380220	0.068865	0.064323	0.005607
2.442857	0.068865	0.065833	0.005862
2.505495	0.068865	0.067623	0.005990
2.568132	0.068865	0.069413	0.006230
2.630769	0.068865	0.071203	0.006350
2.693407	0.068865	0.072993	0.006576
2.756044	0.068865	0.074783	0.006372
2.818681	0.068865	0.076573	0.006421
2.881319	0.068865	0.078364	0.006445
2.943956	0.068865	0.080154	0.006457
3.006593	0.068865	0.081944	0.006463
3.069231	0.068865	0.083734	0.006466
3.131868	0.068865	0.085524	0.006663
3.194505	0.068865	0.087314	0.007070
3.257143	0.068865	0.089104	0.007558
3.319780	0.068865	0.090894	0.008068
3.382418	0.068865	0.092684	0.008573
3.445055	0.068865	0.094475	0.009062
3.507692	0.068865	0.096265	0.009533
3.570330	0.068865	0.098055	0.009984
3.632967	0.068865	0.099845	0.010417
3.695604	0.068865	0.101635	0.010833
3.758242	0.068865	0.103425	0.011234
3.820879	0.068865	0.105215	0.011621
3.883516	0.068865	0.107005	0.011996
3.946154	0.068865	0.108795	0.012359
4.008791	0.068865	0.110586	0.012712
4.071429	0.068865	0.112376	0.013056
4.134066	0.068865	0.114166	0.013391
4.196703	0.068865	0.115956	0.013718
4.259341	0.068865	0.117746	0.014038
4.321978	0.068865	0.119536	0.014352

```
  4.384615  0.068865  0.121326  0.014660
  4.447253  0.068865  0.123116  0.014964
  4.500000  0.068865  0.261710  0.024330
  END FTABLE  2
  FTABLE      1
   21    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.068865  0.000000  0.000000  0.000000  0.000000
  0.062637  0.069813  0.004343  0.000000  0.168602  0.000000
  0.125275  0.070768  0.008746  0.000000  0.173722  0.000000
  0.187912  0.071729  0.013209  0.000000  0.178842  0.000000
  0.250549  0.072697  0.017732  0.000000  0.183962  0.000000
  0.313187  0.073671  0.022316  0.000000  0.189082  0.000000
  0.375824  0.074652  0.026961  0.000000  0.194202  0.000000
  0.438462  0.075639  0.031668  0.000000  0.199322  0.000000
  0.501099  0.076633  0.036437  0.000000  0.204442  0.000000
  0.563736  0.077633  0.041269  0.000000  0.209562  0.000000
  0.626374  0.078640  0.046163  0.000000  0.214682  0.000000
  0.689011  0.079653  0.051121  0.000000  0.219802  0.000000
  0.751648  0.080673  0.056142  0.000000  0.224922  0.000000
  0.814286  0.081699  0.061227  0.000000  0.230042  0.000000
  0.876923  0.082732  0.066377  0.000000  0.235162  0.000000
  0.939560  0.083771  0.071591  0.000000  0.240282  0.000000
  1.002198  0.084816  0.076871  0.000912  0.245402  0.000000
  1.064835  0.085868  0.082217  0.145509  0.250522  0.000000
  1.127473  0.086927  0.087629  0.394383  0.255643  0.000000
  1.190110  0.087992  0.093107  0.686412  0.260763  0.000000
  1.200000  0.088161  0.093978  0.968497  0.261571  0.000000
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1              RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7            RCHRES   2     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   2 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1002 STAG     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1003 FLOW     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
```

```
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 1962/ 6/30 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-5.201E-02     0.00000  0.0000E+00     0.00000  1.3019E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1969/ 2/25 15: 0

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB().  To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows.  This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS         V1          V2         VOL
21 4.0557E+03 4093.7      4105.8
```

```
ERROR/WARNING ID:   341   5

DATE/TIME: 1969/ 2/25 15: 0

RCHRES:     1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated.  If extrapolation was small, no problem.
Remedy; extend ftable.  Relevant data are:

A          B          C      RDEP1      RDEP2  COUNT
7.3618E+00 7665.9     -1.013E+04    1.3198     1.3192       2
```

```
ERROR/WARNING ID:   341   6

DATE/TIME: 1980/ 2/20 22: 0

RCHRES:     1

The volume of water in this reach/mixed reservoir is greater than the value
```

in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
21 4055.7	4093.7	4096.9	

ERROR/WARNING ID: 341 5

DATE/TIME: 1980/ 2/20 22: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
7.3618E+00	7665.9	-8.334E+03	1.0863	1.0860E+00	2

Disclaimer

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Clear Creek Solutions, Inc.
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Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

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Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒ Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Maintenance Agreement (Form DS-3247) (when applicable)	○ Included ◉ Not Applicable

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

Typical Maintenance Indicator(s) for Non-Vegetated Infiltration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris in infiltration basin, pre-treatment device, or on permeable pavement surface	Remove and properly dispose accumulated materials.
Standing water in infiltration basin without subsurface infiltration gallery for longer than 96 hours following a storm event	Remove and replace clogged surface soils.
Standing water in subsurface infiltration gallery for longer than 96 hours following a storm event	This condition requires investigation of why infiltration is not occurring. If feasible, corrective action shall be taken to restore infiltration (e.g. flush fine sediment or remove and replace clogged soils). BMP may require retrofit if infiltration cannot be restored. If retrofit is necessary, the City Engineer shall be contacted prior to any repairs or
Standing water in permeable paving area	Flush fine sediment from paving and subsurface gravel. Provide routine vacuuming of permeable paving areas to prevent clogging.
Damage to permeable paving surface	Repair or replace damaged surface as appropriate.
Note: When inspection or maintenance indicates sediment is accumulating in an infiltration BMP, the DMA draining to the infiltration BMP should be examined to determine the source of the sediment, and corrective measures should be made as applicable to minimize the sediment	

latitude 33
PLANNING & ENGINEERING

Typical Maintenance Indicator(s) for Filtration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose accumulated materials.
Obstructed inlet or outlet structure	Clear obstructions.
Clogged filter media	Remove and properly dispose filter media, and replace with fresh media.
Damage to components of the filtration system	Repair or replace as applicable.
Note: For proprietary media filters, refer to the manufacturer's maintenance guide.	

Typical Maintenance Indicator(s) for Detention Basins	Maintenance Actions
Poor vegetation establishment	Re-seed, re-establish vegetation.
Overgrown vegetation	Mow or trim as appropriate.
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or re-grading where
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials.
Standing water	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, or minor re-grading for proper drainage.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet	Repair or replace as applicable.

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Preliminary Design / Planning / CEQA level submittal:

- Attachment 3a must identify:

  ☒ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
☐ How to access the structural BMP(s) to inspect and perform maintenance
☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐ When applicable, frequency of bioretention soil media replacement
☐ Recommended equipment to perform maintenance
☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

☐ Vicinity map
☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
☐ BMP and HMP location and dimensions
☐ BMP and HMP specifications/cross section/model
☐ Maintenance recommendations and frequency
☐ LID features such as (permeable paver and LS location, dim, SF).

<table>
<tr><td>

THE CITY OF SAN DIEGO
RECORDING REQUESTED BY:
THE CITY OF SAN DIEGO
AND WHEN RECORDED MAIL TO:
Pardee Homes
13400 Sabre Springs Pkwy, Ste.200
San Diego, CA 92128</td><td>(THIS SPACE IS FOR THE RECORDER'S USE ONLY)</td></tr>
</table>

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSOR'S PARCEL NUMBER:	PROJECT NUMBER:
	604-643-10-00	500066

This agreement is made by and between the City of San Diego, a municipal corporation [City] and PARDEE HOMES

the owner or duly authorized representative of the owner [Property Owner] of property located at:
14163 OLD EL CAMINO REAL, SAN DIEGO, CA 92130

(PROPERTY ADDRESS)

and more particularly described as:
PARCEL B OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY APRIL 9, 2003.

(LEGAL DESCRIPTION OF PROPERTY)

in the City of San Diego, County of San Diego, State of California.

Property Owner is required pursuant to the City of San Diego Municipal Code, Chapter 4, Article 3, Division 3, Chapter 14, Article 2, Division 2, and the Land Development Manual, Storm Water Standards to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Storm Water Best Management Practices [Permanent Storm Water BMP's] prior to the issuance of construction permits. The Maintenance Agreement is intended to ensure the establishment and maintenance of Permanent Storm Water BMP's onsite, as described in the attached exhibit(s), the project's Storm Water Quality Management Plan [SWQMP] and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s): Click or tap here to enter text.

Property Owner wishes to obtain a building or engineering permit according to the Grading and/or Improvement Plan Drawing No(s) or Building Plan Project No(s):

Continued on Page 2

Page 2 of 2	City of San Diego • Development Services Department • Storm Water Requirements Applicability Checklist

NOW, THEREFORE, the parties agree as follows:

1. Property Owner shall have prepared, or if qualified, shall prepare an Operation and Maintenance Procedure [OMP] for Permanent Storm Water BMP's, satisfactory to the City, according to the attached exhibit(s), consistent with the Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s):.

2. Property Owner shall install, maintain and repair or replace all Permanent Storm Water BMP's within their property, according to the OMP guidelines as described in the attached exhibit(s), the project's WQTR and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s).

3. Property Owner shall maintain operation and maintenance records for at least five (5) years. These records shall be made available to the City for inspection upon request at any time.

This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of San Diego and by Property Owner in San Diego, California.

See Attached Exhibits(s):Click or tap here to enter text.

(Owner Signature)

Jimmy Ayala, Div. President – San Diego
(Print Name and Title)

PARDEE HOMES
(Company/Organization Name)

(Date)

THE CITY OF SAN DIEGO

APPROVED:

(City Control engineer Signature

(Print Name)

(Date)

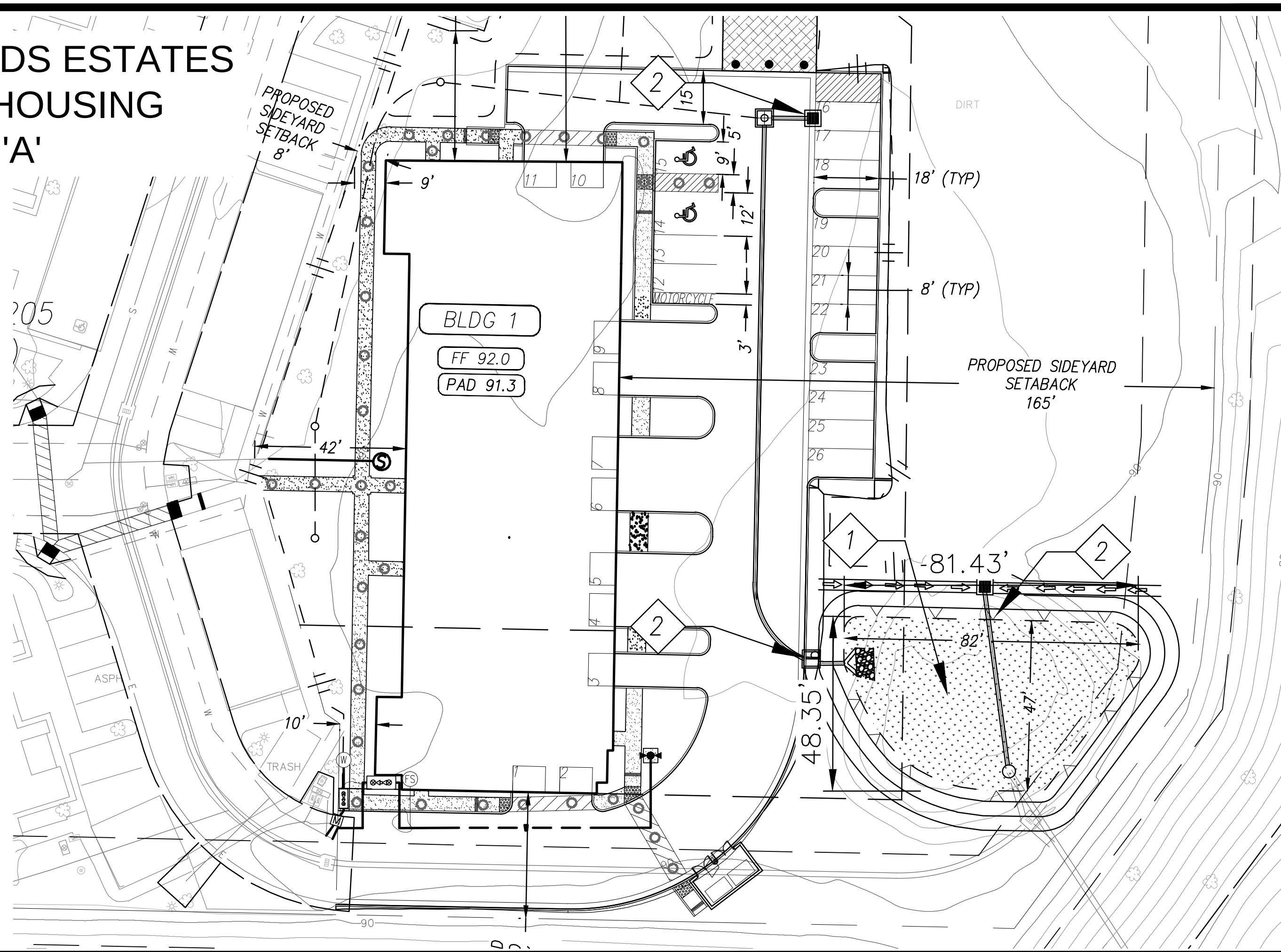
NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDMENTS PER CIVIL CODE SEC. 1180 ET.SEQ

DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING
EXHIBIT 'A'

N

SCALE: 1"=50'

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633



POST-CONSTRUCTION PERMANENT BMP FOR DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING
OPERATION & MAINTENANCE PROCEDURE DETAILS

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO.: XXXXXX

O&M RESPONSIBLE PARTY DESIGNEE: PARDEE/HOA

BMP DESCRIPTION	INSPECTION FREQUENCY	MAINTENANCE FREQUENCY	MAINTENANCE METHOD	QUANTITY	SHEET NUMBER(S)
1. BIO-FILTRATION BASIN	EVERY 6 MONTHS	ANNUAL	REMOVE MULCH, TRASH AND DEBRIS FROM BASIN. EVALUATE PLANT HEALTH, REPLACE AS NEEDED.	1	–
1. INLET STENCILING/TILING	EVERY 6 MONTHS	ANNUAL	REPAINT OR REPLACE TILE AS NEEDED	3	–

H:\1300\1390.00 - Pardee - PHR VTM-SDP Amendment Units 8\Engineering\Reports\Water Quality\DMA MAP\SWMDCMA.dwg

ATTACHMENT 4
COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

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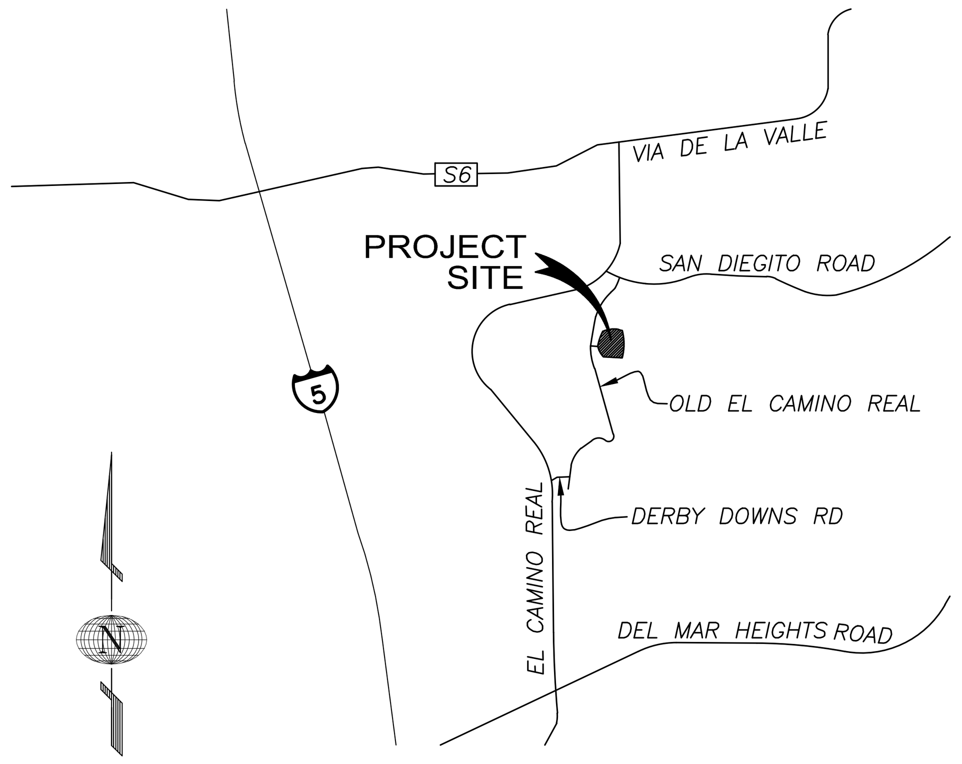
DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING SITE
PLANNED DEVELOPMENT PERMIT/SITE DEVELOPMENT PERMIT FOR AN AMENDMENT TO PLANNED RESIDENTIAL DEVELOPMENT/RESOURCE PROTECTION ORDINANCE (NO. 94-0576)
CITY OF SAN DIEGO



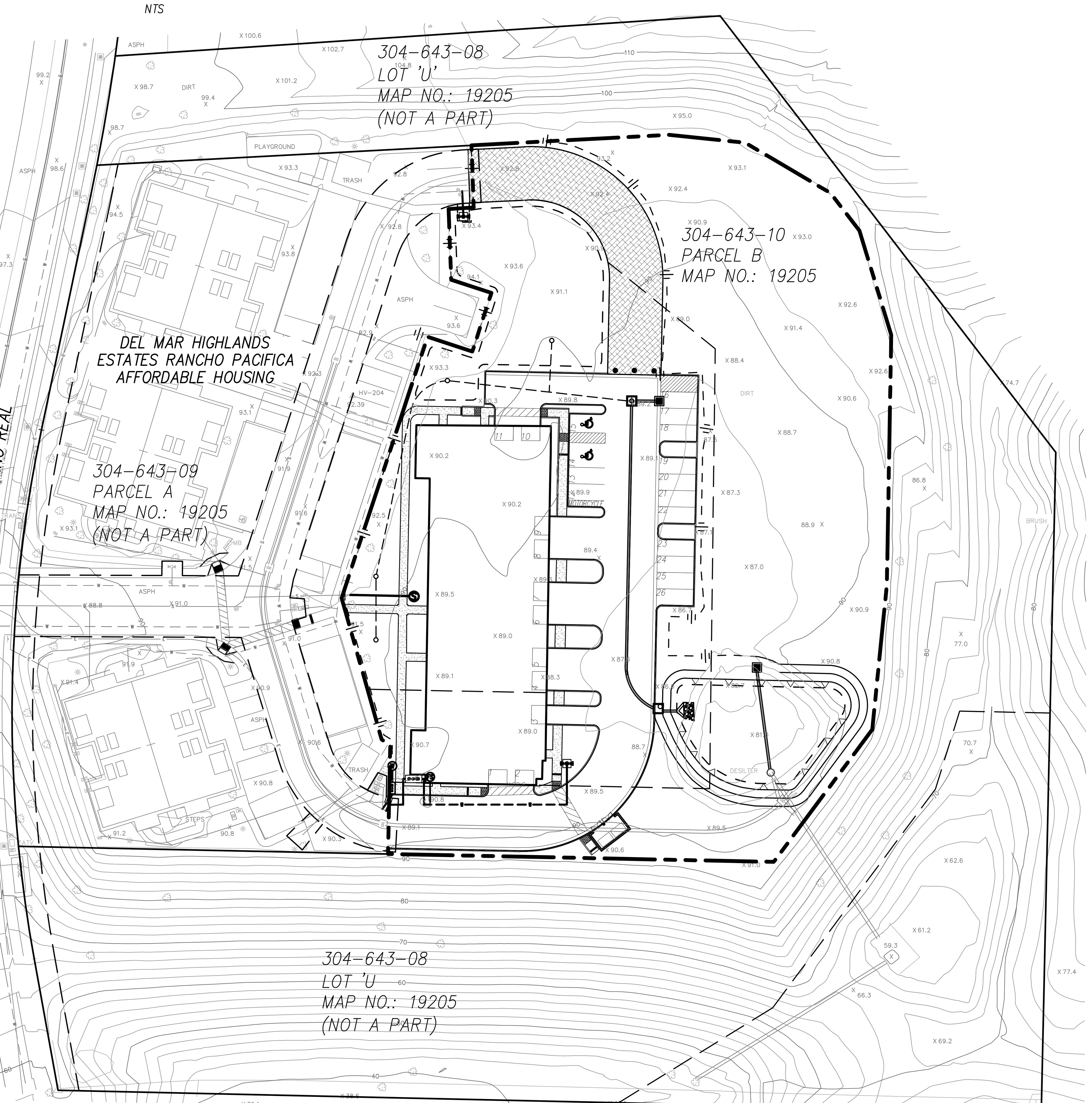
VICINITY MAP

NTS

BENCHMARK

LOCATION: OLD EL CAMINO REAL/SAN DIEGUITO ROAD
*SEBP (SOUTHEAST CORNER BRASS PLUG) TOP INLET
REFERENCE: CITY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK/OCTOBER 04, 2011
INDEX: NORTHING 295499 EASTING 1699630
ELEVATION: 22.473 DATUS IS: M.S.L

*ELEVATION UP-DATED PER U.S.C.G.S. ADJUSTMENT OF 1970, MAY DIFFER FROM PREVIOUS ELEVATION



GRADING

1. TOTAL AMOUNT OF SITE TO BE GRADED: 1.10 AC
2. PERCENT OF TOTAL SITE GRADED: 61%
3. AMOUNT OF SITE WITH 25% SLOPES OR GREATER: 0.08 AC
4. PERCENT OF THE EXIST. SLOPES STEEPER THAN 25% PROPOSED TO BE GRADED: 100%
5. PERCENT OF TOTAL SITE WITH 25% SLOPES OR GREATER: 4.4%
6. AMOUNT OF CUT: 750 CUBIC YARDS
7. AMOUNT OF FILL: 1600 CUBIC YARDS
8. MAXIMUM HEIGHT OF FILL SLOPE(S): 0 FEET 2:1 SLOPE RATIO
9. MAXIMUM HEIGHT OF CUT SLOPE(S): 4 FEET 2:1 SLOPE RATIO
10. AMOUNT OF EXPORT SOIL: 0
11. RETAINING/CRIB WALLS: HOW MANY: 0
    MAXIMUM LENGTH: 0
    MAXIMUM HEIGHT: 0

NOTE: ADDITIONAL WALLS UNDER 3' IN HEIGHT MAY BE REQUIRED IN RESIDENTIAL PAD AREAS BASED ON FINAL HOUSE PLOTTING
ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY OF SAN DIEGO STREET DESIGN MANUAL

DEVELOPMENT SUMMARY

1. SUMMARY OF REQUEST:

   RESIDENTIAL DEVELOPMENT PERMIT AMENDMENT FOR A PLANNED PERMIT NO. 94-0576 PROPOSING AN ADDITIONAL 13 MULTI FAMILY AFFORDABLE DWELLING UNITS.

2. STREET ADDRESS

   14163 OLD EL CAMINO REAL SAN DIEGO, CA 92130

3. SITE AREA:

   TOTAL SITE AREA (GROSS): 1.80 ACRES (78,273 SQ. FT.)
   NET SITE AREA: 1.80 ACRES (78,273 SQ. FT.)
   (NET SITE AREA EXCLUDES REQUIRED STREETS AND PUBLIC DEDICATIONS)

4. ZONING: AR-1-1
5. COMMUNITY PLANNING AREA: PACIFIC HIGHLANDS RANCH
6. EXISTING USE: VACANT
   PROPOSED USE: MULTI-FAMILY DU
7. COVERAGE DATA

   TOTAL LANDSCAPE/OPEN SPACE AREA: 14,963 SF
   TOTAL HARDSCAPE/PAVED AREA: 27,385 SF
   MIN GROSS FLOOR AREA (GFA): 650 SF NOT INCLUDING GARAGE

8. DENSITY

   MAXIMUM DWELLING UNITS ALLOWED PER ZONE: 1 DU PER 10 ACRE LOT
   NUMBER OF EXISTING UNITS TO REMAIN ON SITE: NONE
   NUMBER OF PROPOSED DWELLING UNITS ON SITE: 13
   TOTAL NUMBER OF UNITS PROVIDED ON THE SITE: 13

9. YARD/SETBACK:

FRONT YARD:	REQUIRED: 25'	PROPOSED: N/A
STREET SIDE YARD:	REQUIRED: N/A	PROPOSED: N/A
SIDE YARD(S):	REQUIRED: 20'	PROPOSED: 8'
REAR YARD:	REQUIRED: 25'	PROPOSED: N/A

10. EXISTING BRUSH MANAGEMENT ZONE 1 IS 20'
    PROPOSED BRUSH MANAGEMENT ZONE 1 IS 80' MINIMUM. THE SOUTH SIDE OF THE BUILDING HAS A PROPOSED 35' BMZ AND A 45' BUILDING ENVELOPE WITH DUAL TEMPERED/DUAL GLAZED GLASS FOR ALTERNATIVE COMPLIANCE.

GEOLOGIC HAZARD CATEGORY

53 - LEVEL OR SLOPING TERRAIN, UNFAVORABLE GEOLOGIC STRUCTURE, LOW TO MODERATE RISK.

PARKING RESUME

REQUIRED PARKING CALCULATIONS:

UNIT INFORMATION			PARKING		ACCESSORY PARKING				MOTORCYCLE PARKING		BICYCLE PARKING	
FLOOR PLAN	# OF BEDROOMS	# OF UNITS	PARKING RATIO	REQUIRED FAMILY HOUSING PARKING	ACCESSIBLE PARKING	VISITOR	STAFF	ASSIGNED SPACES	RATIO	REQUIRED SPACES	RATIO	REQUIRED SPACES
A1	1	2	1	2	1	1.8	0.6	2.1	0.1	0.2	0.4	0.8
B1	2	5	1.3	6.5					0.1	0.5	0.5	2.5
B2	2	2	1.3	2.6					0.1	0.2	0.5	1
C1	3	4	1.75	7					0.1	0.4	0.6	2.4
			18		1	2	1	2	1 MOTORCYCLE SPACE REQUIRED		7 BICYCLE SPACES REQUIRED	

PROVIDED PARKING:

26 AUTOMOBILE SPACE
11 GARAGE SPACES*
13 STANDARD AUTOMOBILE SPACES
1 VAN ACCESSIBLE AUTOMOBILE SPACE
1 ACCESSIBLE AUTOMOBILE SPACE
1 MOTORCYCLE STALL

*NOTE: GARAGE SPACES SATISFY REQUIREMENT FOR BICYCLE SPACES.

N

0 20 40 80 120
(IN FEET)
1 inch = 40 ft.

LEGAL DESCRIPTION

PARCEL 3: APN 304-643-10

PARCEL B OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY APRIL 9, 2003.

PARCEL 4:

AN EASEMENT FOR GENERAL UTILITY PURPOSES, TOGETHER WITH THE RIGHT TO REPLACE, MAINTAIN AND ALTERATION OF ANY UTILITY EQUIPMENT OR FACILITY, AND FOR VEHICULAR AND PEDESTRIAN INGRESS, EGRESS ON AND OVER THE DRIVEWAY ON PARCEL A OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 9, 2003, DELINEATED ON SAID PARCEL MAP AS 'GENERAL UTILITY AND ACCESS EASEMENT GRANTED HEREON'.

PROFESSIONAL SELF-CERTIFICATION STATEMENT

I HEREBY ACKNOWLEDGE AND CERTIFY THAT:
1. I AM ACCOUNTABLE FOR KNOWING AND COMPLYING WITH THE GOVERNING POLICIES, REGULATIONS AND SUBMITTAL REQUIREMENTS APPLICABLE TO THIS PROPOSED DEVELOPMENT;
2. I HAVE PERFORMED REASONABLE RESEARCH TO DETERMINE THE REQUIRED APPROVALS AND DECISION PROCESS FOR THE PROPOSED PROJECT, AND THAT FAILURE TO ACCURATELY IDENTIFY AN APPROVAL OR DECISION PROCESS COULD SIGNIFICANTLY DELAY THE PERMITTING PROCESS;
3. I HAVE TAKEN THE PROFESSIONAL CERTIFICATION FOR DEVELOPMENT PERMIT COMPLETENESS REVIEW TRAINING AND AM ON THE APPROVED LIST FOR PROFESSIONAL CERTIFICATION;
4. MAINTAINING MY PROFESSIONAL CERTIFICATION FOR DEVELOPMENT PERMIT COMPLETENESS REVIEW PRIVILEGE REQUIRES ACCURATE SUBMITTALS ON A CONSISTENT BASIS;
5. SUBMITTING INCOMPLETE DOCUMENTS AND PLANS ON A CONSISTENT BASIS MAY RESULT IN THE REVOCATION OF MY PROFESSIONAL CERTIFICATION FOR DEVELOPMENT PERMIT COMPLETENESS REVIEW;
6. IF REQUIRED DOCUMENTS OR PLAN CONTENT IS MISSING, PROJECT REVIEW WILL BE DELAYED; AND
7. THIS SUBMITTAL PACKAGE MEETS ALL OF THE MINIMUM SUBMITTAL REQUIREMENTS CONTAINED IN LAND DEVELOPMENT MANUAL, VOLUME 1, CHAPTER 1, SECTION 4.

RESPONSIBLE CERTIFIED PROFESSIONAL NAME:

SIGNATURE: Brad Sonnenburg DATE: 07/06/2016
BRAD SONNENBURG

OWNER/DEVELOPER: PARDEE HOMES
13400 SABRE SPRINGS PARKWAY, SUITE 200
SAN DIEGO, CA 92128
(858)794-2500 FAX(858)794-2599

PLANNING: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

CIVIL ENGINEER: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

LANDSCAPE ARCHITECT: RICK ENGINEERING
5620 FRIARS RD.
SAN DIEGO, CA 92110
(619) 291-0707

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN DATE
RCE 34584

GENERAL NOTES

LOT SUMMARY

1. TOTAL AREA WITHIN SUBDIVISION IS 1.80 ACRES GROSS.
2. GAS AND ELECTRIC: SAN DIEGO GAS & ELECTRIC
3. TELEPHONE: TIME WARNER CABLE
4. CABLE TELEVISION: TIME WARNER CABLE
5. SEWER AND WATER: CITY OF SAN DIEGO
6. DRAINAGE SYSTEM: AS REQUIRED BY CITY ENGINEER
7. FIRE: CITY OF SAN DIEGO
8. SCHOOL DISTRICT: SAN DIEGUITO UNION H.S./SOLANA BEACH ELEMENTARY SCHOOL DISTRICT
9. ALL NEW UTILITIES WILL BE LOCATED UNDERGROUND
10. CONTOUR INTERVAL: 2 FEET
    DATUM: GPS PT. NP. 542 – N 1,927,136.68, E 6,267,611.17, ELEV. = 190.83
    SOURCE: SAN-LO AERIAL SURVEYS
    DATE: 1-5-99
11. ALL PROPOSED SLOPES ARE 2:1 UNLESS NOTED OTHERWISE GRADING SHOWN HEREON IS PRELIMINARY AND IS SUBJECT TO MODIFICATION IN FINAL DESIGN
12. LOT DIMENSIONS AND SETBACK DIMENSIONS SHOWN HEREON ARE PRELIMINARY AND ARE SUBJECT TO MODIFICATION IN FINAL DESIGN
13. OPEN SPACE LOTS TO BE MAINTAINED BY THE HOME OWNERS ASSOCIATION
14. OCCUPANCY CLASSIFICATION / ZONING DESIGNATION / TYPE OF CONSTRUCTION
    MULTI-FAMILY / R-1 / TYPE V / RATED
15. ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH A GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY STREET DESIGN MANUAL.
16. ALL PUBLIC WATER FACILITIES AND ASSOCIATED EASEMENTS WILL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE CITY OF SAN DIEGO WATER FACILITY DESIGN GUIDELINES AND REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO.
17. PROJECT IS NOT ADJACENT TO TRANSIT STOPS
18. THIS PROJECT WILL BE SUBJECT TO THE IMPLEMENTATION OF THE PUBLIC FACILITIES AND SERVICES MITIGATION, MONITORING AND REPORTING PROGRAM. PROPOSED UTILITIES ARE TO BE INSTALLED UNDERGROUND
19. THIS PROJECT WILL BE SUBJECT TO THE IMPLEMENTATION OF THE WATER CONSERVATION MITIGATION, MONITORING AND REPORTING PROGRAM.

REQUESTED DEVIATIONS

MUNICIPAL CODE REGULATION	SDMC LANGUAGE	DEVIATION	REQUESTED PERMIT
SECTION 131.0331, TABLE 131-03C	MAX RESIDENTIAL DENSITY: 1 DU/LOT	PROPOSED: 13 DU/LOT	SDP
SECTION 131.0331, TABLE 131-03C	MIN SIDE SETBACK: 20 FEET	PROPOSED MIN: 8 FEET	SDP
SECTION 131.0331, TABLE 131-03C	MAX LOT COVERAGE: 10%	PROPOSED: 13%	SDP

SOLAR ACCESS NOTE

THIS IS TO AFFIRM THAT THE DESIGN OF THIS SUBDIVISION PROVIDES, TO THE EXTENT FEASIBLE, FOR FUTURE PASSIVE OR NATURAL HEATING AND COOLING OPPORTUNITIES IN ACCORDANCE WITH THE PROVISION OF SECTION 66473.1 OF THE STATE SUBDIVISION MAP ACT.

ASSESSOR'S PARCEL NO.

304-643-10, 304-643-09, 304-643-08

LAMBERT COORDINATES

288-1705

STRUCTURE HEIGHT

PROPOSED: 29' - 5" REQUIRED: 30' - 0"

SHEET INDEX

SHEET NUMBER	DESCRIPTION
1	COVER SHEET
2	EXISTING CONDITIONS
3	GRADING, UTILITY, SITE PLAN, AND DESIGN GUIDELINES
4	FIRE ACCESS PLAN
5	CONCEPTUAL LANDSCAPE PLAN / BRUSH MANAGEMENT PLAN
6	BRUSH MANAGEMENT NOTES AND DIAGRAMS
7	LANDSCAPE AREA CALCULATIONS
8	IRRIGATION CALCULATIONS

Name: LATITUDE 33 PLANNING & ENGINEERING
Address: 9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
Phone #: (858) 751-0633
Fax #: (858) 751-0634

Project Address:
14163 OLD EL CAMINO REAL

Project Name:
DEL MAR HIGHLANDS ESTATES
AFFORDABLE SITE PDP/SDP
FOR AMENDMENT TO PRD/RPO

Sheet Title:
COVER SHEET

DEP#

Revision 14:
Revision 13:
Revision 12:
Revision 11:
Revision 10:
Revision 9:
Revision 8:
Revision 7:
Revision 6:
Revision 5:
Revision 4:
Revision 3:
Revision 2: 10/07/16
Revision 1: 08/19/16

Original Date: 07/06/16

Sheet 1 of 8

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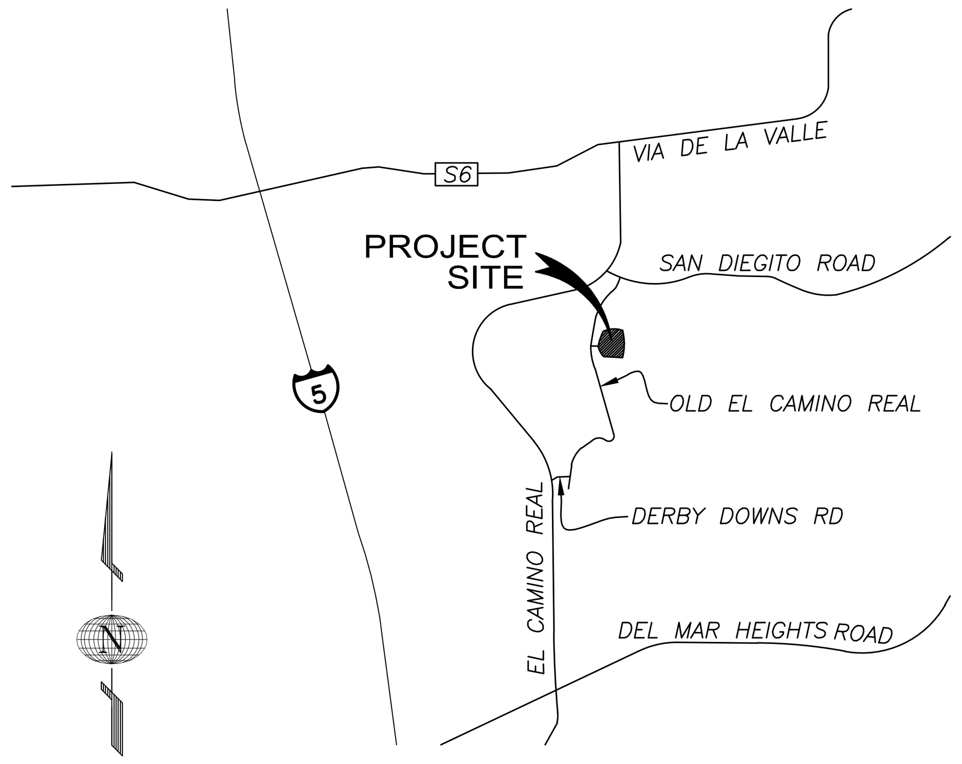

VICINITY MAP

NTS

LEGAL DESCRIPTION:

PARCEL 3: APN 304-643-10

PARCEL B OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY APRIL 9, 2003.

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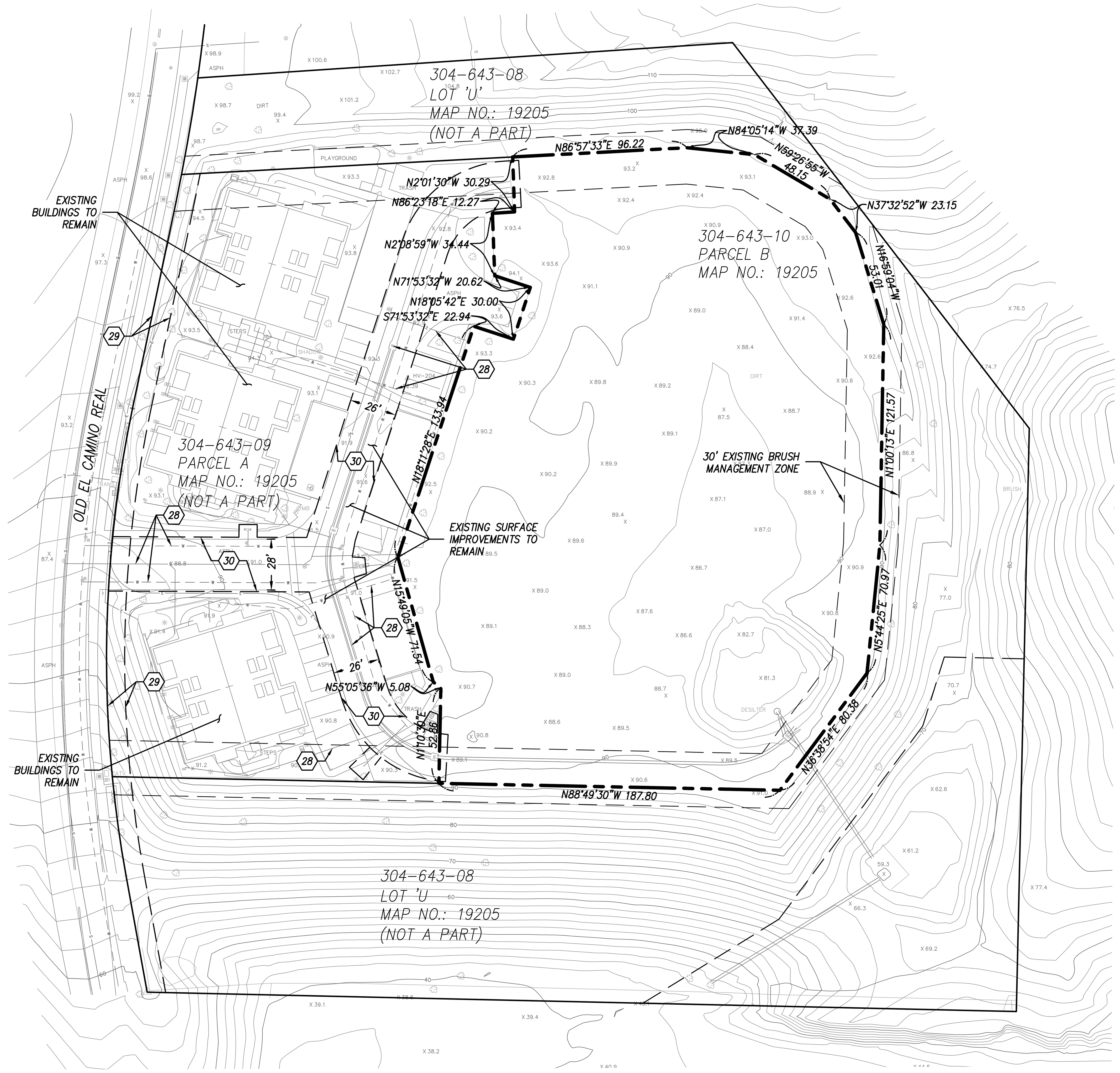
BENCHMARK

LOCATION: OLD EL CAMINO REAL/SAN DIEGUITO ROAD
*SEBP (SOUTHEAST CORNER BRASS PLUG) TOP INLET
REFERENCE: CITY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK/OCTOBER 04, 2011
INDEX: NORTHING 295499 EASTING 1699630
ELEVATION: 22.473 DATUS IS: M.S.L

*ELEVATION UP-DATED PER U.S.C.G.S. ADJUSTMENT OF 1970, MAY DIFFER FROM PREVIOUS ELEVATION



LEGEND:

AFFORDABLE SITE BOUNDARY
EASEMENT LINE
LOT LINE
EASEMENT NOTE NUMBER 9

EASEMENT INFORMATION

TITLE REPORT BY: CHICAGO TITLE INSURANCE COMPANY
ORDER NO.: 12205554-996-SDI

PARCELS AFFECTED	ITEM NO.	
B	28	AN AGREEMENT RELATING TO THE INSTALLATION, MAINTENANCE AND POSSIBLE REMOVAL OF PRIVATE WATER, SEWER AND STORM DRAIN BETWEEN THE CITY OF SAN DIEGO AND OWNER PER DOC. RECORDED MAY 01, 2000 AS FILE NO.: 2000-0224134 OF O.R. UTILITIES PER DWG. NO.: 30225-3-D
B	29	AN EASEMENT FOR PUBLIC UTILITIES, INGRESS AND EGRESS GRANTED TO SAN DIEGO GAS AND ELECTRIC PER DOC. RECORDED JUNE 29, 2000 AS FILE NO.: 2000-343220 OF O.R.
B	30	AN EASEMENT GRANTED TO THE CITY OF SAN DIEGO FOR WATER FACILITIES PER DOC. RECORDED JULY 7, 2000 AS FILE NO.: 2000-358753 OF O.R.

NON PLOTTABLE EASEMENTS

AN EASEMENT FOR PUBLIC UTILITIES, INGRESS AND EGRESS GRANTED TO SAN DIEGO GAS AND ELECTRIC PER DOC. RECORDED DECEMBER 19, 200 AS FILE NO.: 2000-0690567 OF O.R.

N

0 20 40 80 120
(IN FEET)
1 inch = 40 ft.

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN
RCE 34584
DATE

Name: LATITUDE 33 PLANNING & ENGINEERING
Address: 9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
Phone #: (858) 751-0633
Fax #: (858) 751-0634

Project Address:
14163 OLD EL CAMINO REAL

Project Name:
DEL MAR HIGHLANDS ESTATES
AFFORDABLE SITE PDP/SDP
FOR AMENDMENT TO PRD/RPO

Sheet Title:
EXISTING CONDITIONS

Revision 14:
Revision 13:
Revision 12:
Revision 11:
Revision 10:
Revision 9:
Revision 8:
Revision 7:
Revision 6:
Revision 5:
Revision 4:
Revision 3:
Revision 2: 10/07/16
Revision 1: 08/19/16

Original Date: 07/06/16

Sheet 2 of 8

DEP#

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DEVELOPMENT SUMMARY

1. SUMMARY OF REQUEST:

   RESIDENTIAL DEVELOPMENT PERMIT AMENDMENT FOR A PLANNED PERMIT NO. 94-0576 PROPOSING AN ADDITIONAL 13 MULTI FAMILY AFFORDABLE DWELLING UNITS.

2. STREET ADDRESS

   14163 OLD EL CAMINO REAL SAN DIEGO, CA 92130

3. SITE AREA:

   TOTAL SITE AREA (GROSS): 1.80 ACRES (78,273 SQ. FT.)
   NET SITE AREA: 1.80 ACRES (78,273 SQ. FT.)
   (NET SITE AREA EXCLUDES REQUIRED STREETS AND PUBLIC DEDICATIONS)

4. ZONING: AR-1-1
5. COMMUNITY PLANNING AREA: PACIFIC HIGHLANDS RANCH
6. EXISTING USE: VACANT
   PROPOSED USE: MULTI-FAMILY DU
7. COVERAGE DATA

   TOTAL LANDSCAPE/OPEN SPACE AREA: 14,963 SF
   TOTAL HARDSCAPE/PAVED AREA: 27,385 SF
   MIN GROSS FLOOR AREA (GFA): 650 SF NOT INCLUDING GARAGE
   MAX LOT COVERAGE PER ZONE: 10%

8. DENSITY

   MAXIMUM DWELLING UNITS ALLOWED PER ZONE: 1 DU PER 10 ACRE LOT
   NUMBER OF EXISTING UNITS TO REMAIN ON SITE: NONE
   NUMBER OF PROPOSED DWELLING UNITS ON SITE: 13
   TOTAL NUMBER OF UNITS PROVIDED ON THE SITE: 13

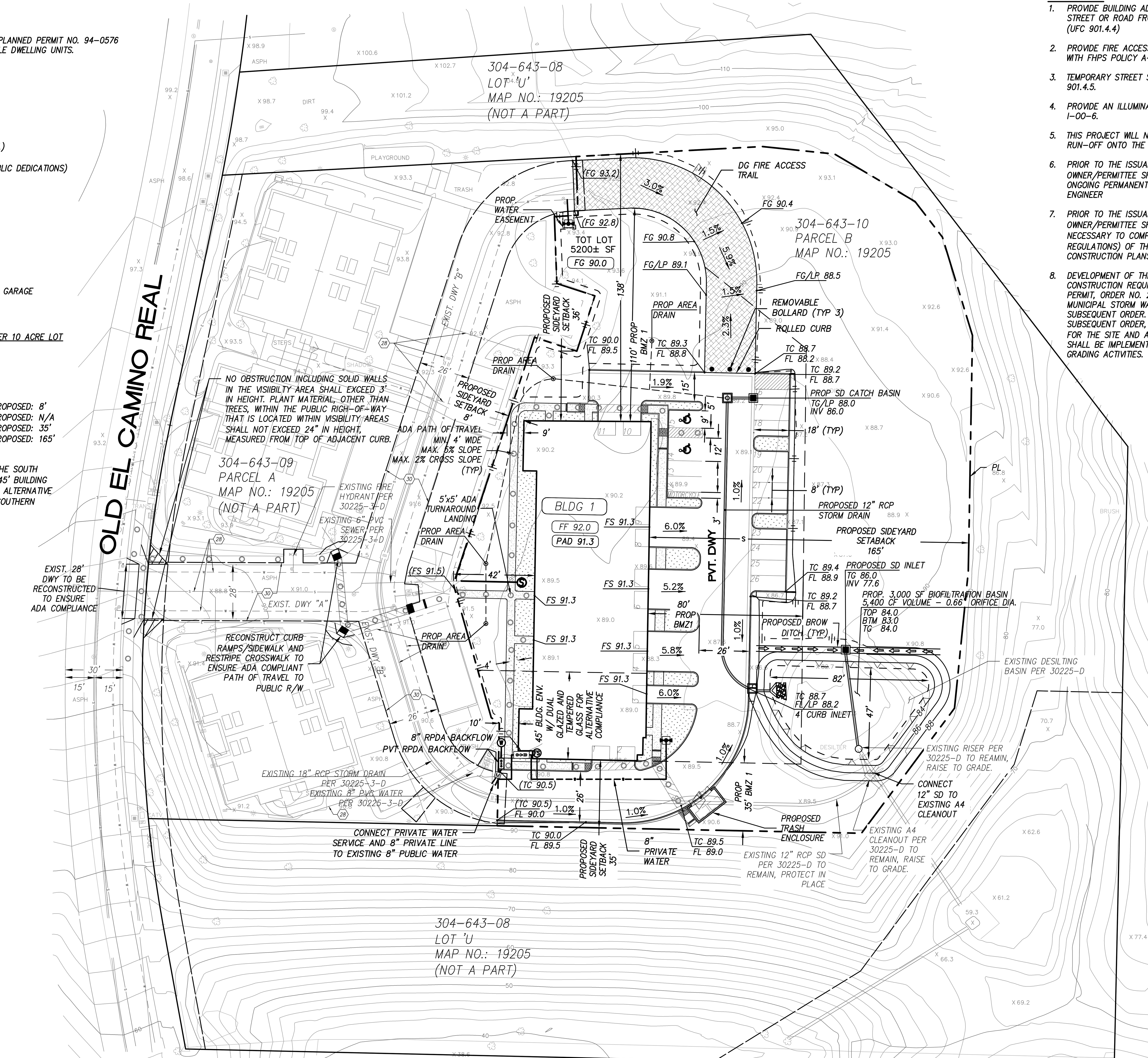
9. YARD/SETBACK:

FRONT YARD:	REQUIRED: 25'	PROPOSED: 8'
STREET SIDE YARD:	REQUIRED: N/A	PROPOSED: N/A
SIDE YARD(S):	REQUIRED: 20'	PROPOSED: 35'
REAR YARD:	REQUIRED: 25'	PROPOSED: 165'

10. EXISTING BRUSH MANAGEMENT ZONE 1 IS 20'
    PROPOSED BRUSH MANAGEMENT ZONE 1 IS 80' MINIMUM. THE SOUTH SIDE OF THE BUILDING HAS A PROPOSED 35' BMZ AND A 45' BUILDING ENVELOPE WITH DUAL TEMPERED/DUAL GLAZED GLASS FOR ALTERNATIVE COMPLIANCE WITH A 6' FIRE RATED BLOCK WALL ON THE SOUTHERN PROPERTY LINE.

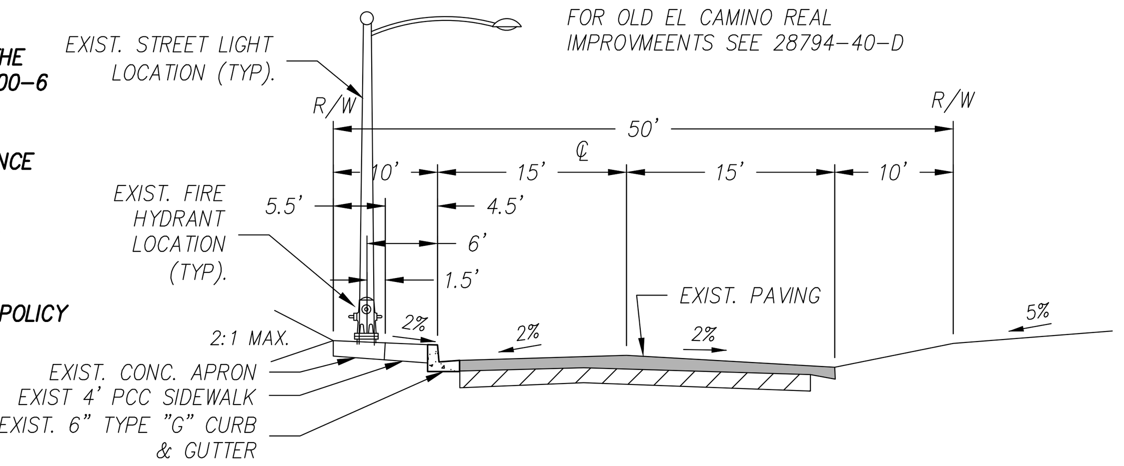
LEGEND:

- SLOPES 2:1 MAX. (TYP.)
- DAYLIGHT LINE
- PROPERTY LINE
- SIDEWALK
- CURB AND GUTTER
- BRUSH MANAGEMENT ZONE
- STORM DRAIN
- PROPOSED WATER —W—W—W—W
- FIRE HYDRANT ASSY.
- LOT NUMBER 2
- PAD ELEV. XXX.XXPAD
- SEWER SERVICE
- FIRE SERVICE
- WATER SERVICE
- BACKFLOW PREVENTION DEVICES
- WATER METER
- ADA PATH OF TRAVEL
- SIGHT VISIBILITY TRIANGLE



NOTE:

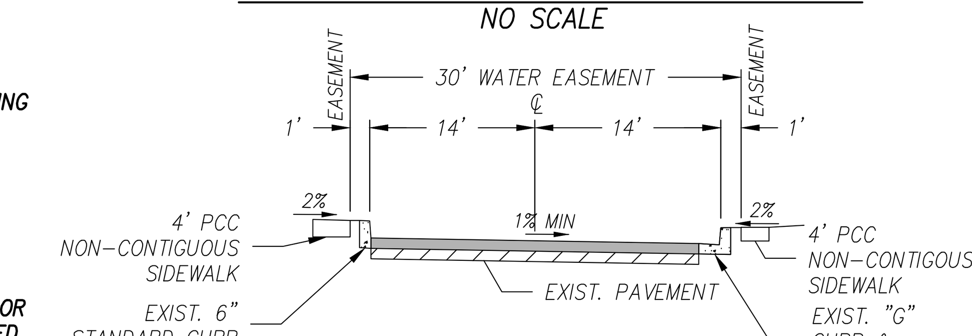
1. PROVIDE BUILDING ADDRESS NUMBERS, VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY PER FHPS POLICY P-00-6 (UFC 901.4.4)
2. PROVIDE FIRE ACCESS ROADWAY SIGNS OR RED CURBS IN ACCORDANCE WITH FHPS POLICY A-00-1.
3. TEMPORARY STREET SIGNS ARE REQUIRED IN ACCORDANCE WITH UFS 901.4.5.
4. PROVIDE AN ILLUMINATED DIRECTORY IN ACCORDANCE WITH FHPS POLICY I-00-6.
5. THIS PROJECT WILL NOT DISCHARGE ANY INCREASE IN STORM WATER RUN-OFF ONTO THE EXISTING HILLSIDE AREAS.
6. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE, SATISFACTORY TO THE CITY ENGINEER
7. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL INCORPORATE ANY CONSTRUCTION BMPs NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
8. DEVELOPMENT OF THIS PROJECT SHALL COMPLY WITH ALL STORM WATER CONSTRUCTION REQUIREMENTS OF THE STATE CONSTRUCTION GENERAL PERMIT, ORDER NO. 2009-0009DWQ, OR SUBSEQUENT ORDER, AND THE MUNICIPAL STORM WATER PERMIT, ORDER NO. R9-2013-0001, OR SUBSEQUENT ORDER. IN ACCORDANCE WITH ORDER NO. 2009-0009DWQ, OR SUBSEQUENT ORDER, A RISK LEVEL DETERMINATION SHALL BE CALCULATED FOR THE SITE AND A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE IMPLEMENTED CONCURRENTLY WITH THE COMMENCEMENT OF GRADING ACTIVITIES.



EXIST. OLD EL CAMINO REAL

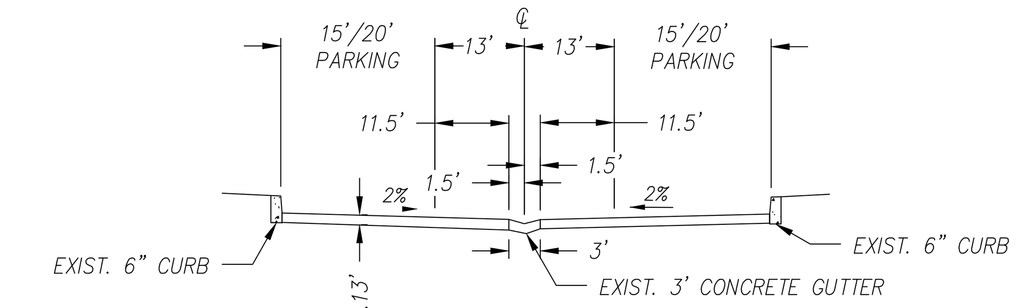
(SEE REFERENCE DWG. NO 28794-D)

NO SCALE



EXIST. DWY "A"

NO SCALE



EXIST. DWY "B"

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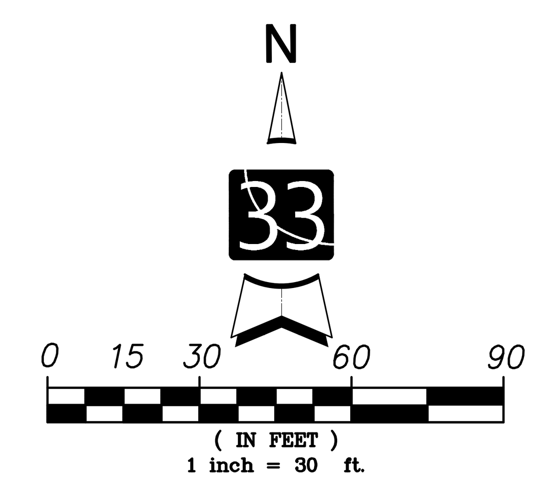
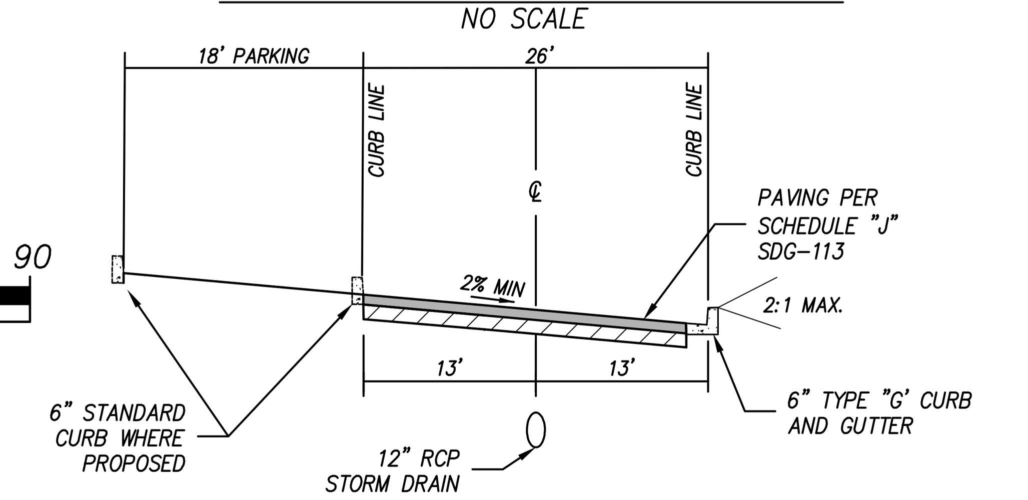
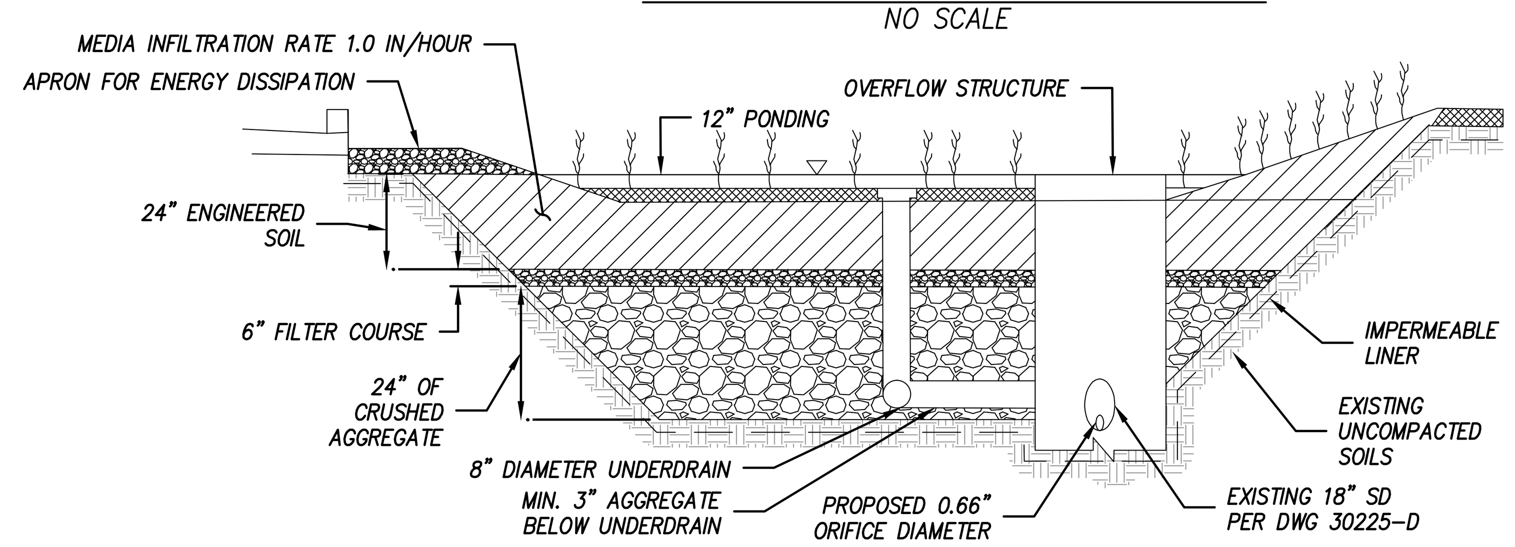




PVT. DWY

NO SCALE



BIOFILTRATION

NO SCALE

GRADING

1. TOTAL AMOUNT OF SITE TO BE GRADED: 1.1 AC
2. PERCENT OF TOTAL SITE GRADED: 61%
3. AMOUNT OF SITE WITH 25% SLOPES OR GREATER: 0.08 AC
4. PERCENT OF THE EXIST. SLOPES STEEPER THAN 25% PROPOSED TO BE GRADED: 100%
5. PERCENT OF TOTAL SITE WITH 25% SLOPES OR GREATER: 4.4%
6. MAXIMUM DEPTH OF CUT: 4 FEET, AMOUNT OF CUT: 750 CY
7. MAXIMUM DEPTH OF FILL: 1 FEET, AMOUNT OF FILL: 1600 CY
8. MAXIMUM HEIGHT OF FILL SLOPE(S): 0 FEET 2:1 SLOPE RATIO
9. MAXIMUM HEIGHT OF CUT SLOPE(S): 4 FEET 2:1 SLOPE RATIO
10. AMOUNT OF EXPORT SOIL: 0
11. RETAINING/CRIB WALLS: HOW MANY: 0

    NOTE: ADDITIONAL WALLS UNDER 3' IN EIGHT MAY BE REQUIRED IN RESIDENTIAL PAD AREAS BASED ON FINAL HOUSE PLOTTING
    ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY OF SAN DIEGO STREET DESIGN MANUAL

EASEMENT INFORMATION

TITLE REPORT BY: CHICAGO TITLE INSURANCE COMPANY
ORDER NO.: 12205554-996-SDI

PARCELS AFFECTED	ITEM NO.	
B	28	AN AGREEMENT RELATING TO THE INSTALLATION, MAINTENANCE AND POSSIBLE REMOVAL OF PRIVATE WATER, SEWER AND STORM DRAIN BETWEEN THE CITY OF SAN DIEGO AND OWNER PER DOC. RECORDED MAY 01, 2000 AS FILE NO.: 2000-0224134 OF O.R. UTILITIES PER DWG. NO.: 30225-3-D
B	30	AN EASEMENT GRANTED TO THE CITY OF SAN DIEGO FOR WATER FACILITIES PER DOC. RECORDED JULY 7, 2000 AS FILE NO.: 2000-358753 OF O.R.

NON PLOTTABLE EASEMENTS

AN EASEMENT FOR PUBLIC UTILITIES, INGRESS AND EGRESS GRANTED TO SAN DIEGO GAS AND ELECTRIC PER DOC. RECORDED DECEMBER 19, 200 AS FILE NO.: 2000-0690567 OF O.R.

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN
RCE 34584
DATE

Name: LATITUDE 33 PLANNING & ENGINEERING
Address: 9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
Phone #: (858) 751-0633
Fax #: (858) 751-0634

Project Address:
14163 OLD EL CAMINO REAL

Project Name:
DEL MAR HIGHLANDS ESTATES AFFORDABLE SITE PDP/SDP FOR AMENDMENT TO PRD/RPO

Sheet Title:
GRADING, UTILITY, AND SITE PLAN

Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
Revision 4:	
Revision 3:	
Revision 2:	10/07/16
Revision 1:	08/19/16

Original Date: 07/06/16

Sheet 3 of 8

DEP#

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
☒ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
☐ Details and specifications for construction of structural BMP(s)
☐ Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
☐ How to access the structural BMP(s) to inspect and perform maintenance
☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐ Recommended equipment to perform maintenance
☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
☐ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
☐ All BMPs must be fully dimensioned on the plans
☐ When propritery BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

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ATTACHMENT 5
DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

2016

DRAINGE STUDY

DEL MAR HIGHLANDS ESTATES

October 10, 2016

PREPARED BY: LATITUDE 33 PLANNING & ENGINEERING
PREPARED FOR: PARDEE HOMES
JOB NUMBER: 1390.00

DRAINAGE STUDY FOR

DEL MAR HIGHLANDS ESTATES

CITY OF SAN DIEGO, CALIFORNIA

IO No. 24006829
PTS No. 500066

October 10, 2016

Prepared for:
PARDEE HOMES
13400 Sabre Springs Parkway, Suite 200
San Diego, CA 92128

Prepared by:
LATITUDE 33 PLANNING AND ENGINEERING
9968 Hibert Street, 2nd Floor
San Diego, California 92131
(858) 751-0633

C. John Eardensohn, RCE 34584

Prepared by: AB
Checked by: TD

TABLE OF CONTENTS

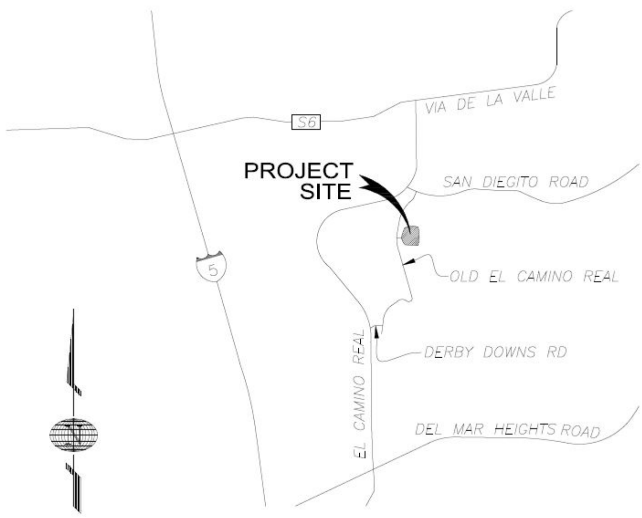
I. PROJECT DESCRIPTION

The subject property is located within the North City area within the City of San Diego, State of California. In particular, the project site is Parcel B of map 19205 filed in the Office of the County Recorder of San Diego County, file no. 2003-0401518, O.R., and located directly east of Interstate 5 and south of San Dieguito Road (see Vicinity Map below).

The project site lies within an undeveloped parcel approximately 1.8 acres in size. The adjacent parcel A of map 19205 currently consists of three multi-family residential buildings located along the westerly property line. To the north and east lies undisturbed open space, and to the south lies a horse training facility.

The project includes the construction of a 13-plex residential unit with accompanying parking. Refer to the proposed site plan included in Appendix E.

This report has been prepared in support of Latitude 33's final engineering design for Del Mar Highlands Estates. This report provides hydrologic and hydraulic analyses of the proposed condition 100-year flow rates as well as drainage facility sizing.



VICINITY MAP

NTS

II. EXISTING SITE CONDITION DRAINAGE

In its existing condition, the project site and adjacent hillside to the north act as a single basin, Basin E.1. The project site is comprised of undeveloped land with gradual slopes ranging from 1%-3%. Drainage sheet flows from north to south to a desilting basin located at the southeast corner of the site. Once in the basin, runoff is collected in an existing riser and enters into the existing storm drain located to the south.

To the west of the project site lies Basin E.2, a residential development comprised of 3 multi-family residential buildings and associated improvements. Drainage from Basin E.2 is collected within an existing 18-

inch storm drain and conveyed to the east towards the desilting basin described above. Point of Compliance (POC) 1 on the Existing Hydrology Map included in Appendix E represents the point at which runoff from Basins E.1 and E.2 confluence. Runoff from E.1 and E.2 ultimately discharge into an existing detention basin located to the south of the project site.

III. DEVELOPED SITE CONDITION DRAINAGE

In the post construction condition, the site is divided into seven drainage basins. Drainage from basin P.1 and P.2 will be captured via roof drain and outlet onto the adjacent landscaped areas to the west. From here runoff sheet flows to nearby area drains where it is collected and conveyed via storm drain to the proposed bio-filtration basin located at the southeast corner of the site. Here runoff is treated, stored, and as in the existing condition, discharged into the existing storm drain system identified as POC 1. Refer to the Proposed Hydrology Map included in Appendix E for area drain and POC locations.

Similarly, drainage from basins P.3 and P.4 sheet flows to the north and to the south, respectively, where it is captured via area drain and conveyed southeasterly within the proposed storm drain to the bio-filtration basin at POC 1.

Drainage from basin P.5 sheet flows to the north and enters into the proposed storm drain system through the proposed catch basin located at the northeast corner of the site. From here, drainage is conveyed to the south to the proposed bio-filtration basin at POC 1.

Drainage from basin P.6 sheet flows to the east and enters into the proposed inlet structure located at the southeast corner of the site where it discharges directly into the adjacent bio-filtration basin located at POC 1.

Basin P.7 remains mostly undeveloped, retaining drainage characteristics similar to that of the existing condition. Drainage generated from this basin is considered to be self-mitigating or self-treating and therefore does not enter into to the proposed bio-filtration basin. Drainage is instead collected via brow ditch/catch basin and bypasses the proposed bio-filtration basin entering directly into the existing storm drain system to the south.

To mitigate for the increase in impervious area due to the proposed building structure and accompanying improvements, the delta between the existing and proposed runoff will be collected and stored in the proposed bio-filtration basin. As such, the basin will be sized to attenuate the 100-year storm event. More information will be provided in the analysis and conclusion portions of this report.

IV. HYDROLOGIC METHODOLOGY

The proposed development was analyzed in conformance with the City of San Diego Drainage Design Manual, dated April 1984. In the hydrology study, all basins analyzed are less than one square mile. The Rational Method module within the Autodesk Storm and Sanitary Analysis (SSA) software was utilized to calculate storm runoff for a 100-year frequency storm. The criteria used for this analysis are described as follows:

- For existing conditions, runoff coefficients of 0.45 were assumed for open space.

- Post construction runoff coefficients of 0.45 and 0.70 were assumed for open space and multi-unit areas respectively as consistent with Table 2 of the Drainage Design Manual (included in Appendix A).

- Initial travel time values were computed using the Overland Time of Flow Nomograph, as shown on Page 86 in the City of San Diego Drainage Design Manual.

- "Gutter and Roadway Discharge - Velocity Chart" and Manning's Equation were used to determine the flow velocity for concentrated flows in curb and gutters, drainage channels and conduits. Travel times were then determined by dividing the flow distance by the velocity of flow.

- Final times of concentration values for each basin were calculated by adding the initial and final travel times; with a minimum time of 5 minutes.

- The rainfall intensity was obtained from the "Intensity-Duration-Frequency Curves" from the City of San Diego Drainage Manual, included in Appendix A.

- Drainage Area: The existing condition drainage basins were delineated from the base topographic map as shown on the Existing Hydrology Map provided in Appendix E. The proposed condition drainage basins were delineated using the grading plan as show on the Proposed Hydrology Map provided in Appendix E. The overall boundaries for the existing and proposed conditions were set equal to allow for a comparison of the results.

The existing and proposed hydrologic calculations are included in Appendix B and C, respectively, and summarized in the tables below.

Table 1 - Summary of Existing Condition Flows

Drainage Basin	Drainage Area (AC)	Runoff Coefficient (C)	Time of Concentration (hh:mm:ss)	Intensity (I_{100})	100-year Peak Flow (CFS)
E.1	2.12	0.45	00:19:17	2.62	2.50
E.2	1.33	0.70	00:06:37	4.09	3.81
Total	**3.45**	**-**	**-**	**-**	**6.31**

Table 2 - Summary of Developed Condition Flows

Drainage Basin	Drainage Area (AC)	Runoff Coefficient (C)	Time of Concentration (hh:mm:ss)	Intensity (I_{100})	100-year Peak Flow (CFS)
P.1	0.10	0.70	00:14:59	2.97	0.20
P.2	0.11	0.70	00:20:34	2.52	0.20
P.3	0.03	0.70	00:09:33	3.54	0.08
P.4	0.13	0.70	00:25:53	2.19	0.19
P.5	0.27	0.70	00:05:00	4.38	0.84
P.6	0.25	0.70	00:05:00	4.38	0.77
P.7	1.23	0.45	00:18:31	2.68	1.48
E.2	1.33	0.70	00:06:37	4.09	3.81
Total	**3.45**	**-**	**-**	**-**	**7.57**

VII. DISCUSSION AND RESULTS

The Rational Method for the 100-year peak storm event was used in the design of the proposed drainage facilities. The hydraulic analysis of this system was evaluated using the Autodesk Storm and Sanitary Analysis (SSA) software.

Based on the supporting calculations contained herein, it is anticipated that the project will result in a 1.26 CFS increase in peak flow. Based on these results and the hydrograph analysis included in Appendix D, the required storage volume for the 100-year storm event was calculated to be approximately 500 CF. The proposed bio-filtration basin was sized to effectively attenuate the 100-year storm event by providing 5,400 CF of storage. An appropriately sized orifice will control discharge rates from the proposed bio-filtration basin with impacts on the existing storm drain system expected to be negligible. For more on our implemented flow control measures, refer to the Storm Water Quality Management Plan.

There is no proposed dredge, fill, excavation, or grading in any waters of the state, approval from the Regional Water Quality Control Board need not be pursued. Additionally, no drainage diversion is proposed for this project.

VIII. CONCLUSION

The hydrologic and hydraulic analysis confirms the proposed development and associated storm drain system effectively conveys and attenuates the 100-year storm event. As such, no adverse impacts on the existing storm drain system or detention basin located to the south are anticipated.

APPENDIX A: REFERENCES

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
Residential:	D
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

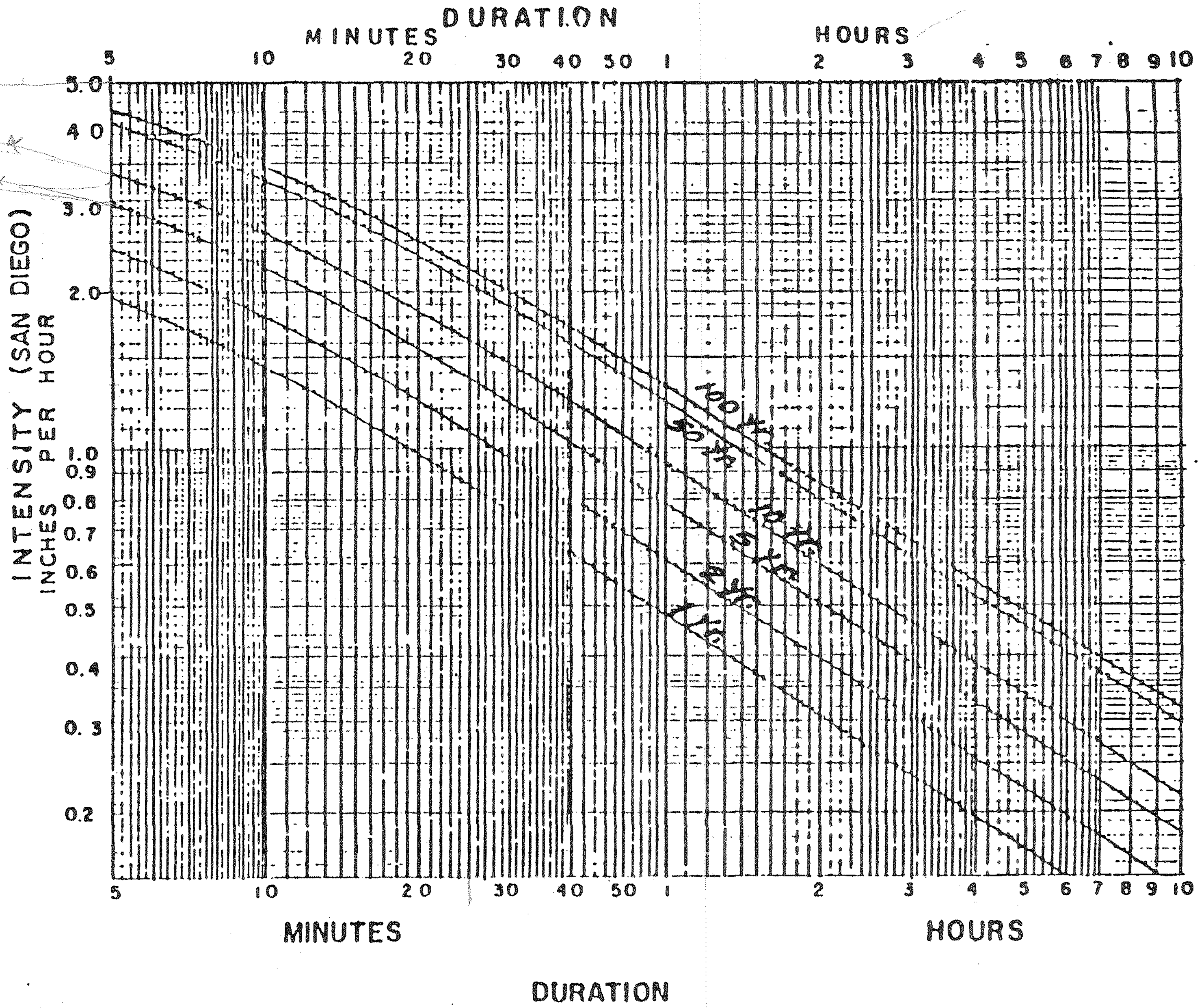
Actual imperviousness = 50%

Tabulated imperviousness = 80%

$$\text{Revised C} = \frac{50}{80} \times 0.85 = 0.53$$

ELEV.	FACTOR
0–1500	1.00
1500–3000	1.25
3000–4000	1.42
4000–5000	1.60
5000–6000	1.70
DESERT	1.25

To obtain correct intensity, multiply intensity on chart by factor for design elevation.



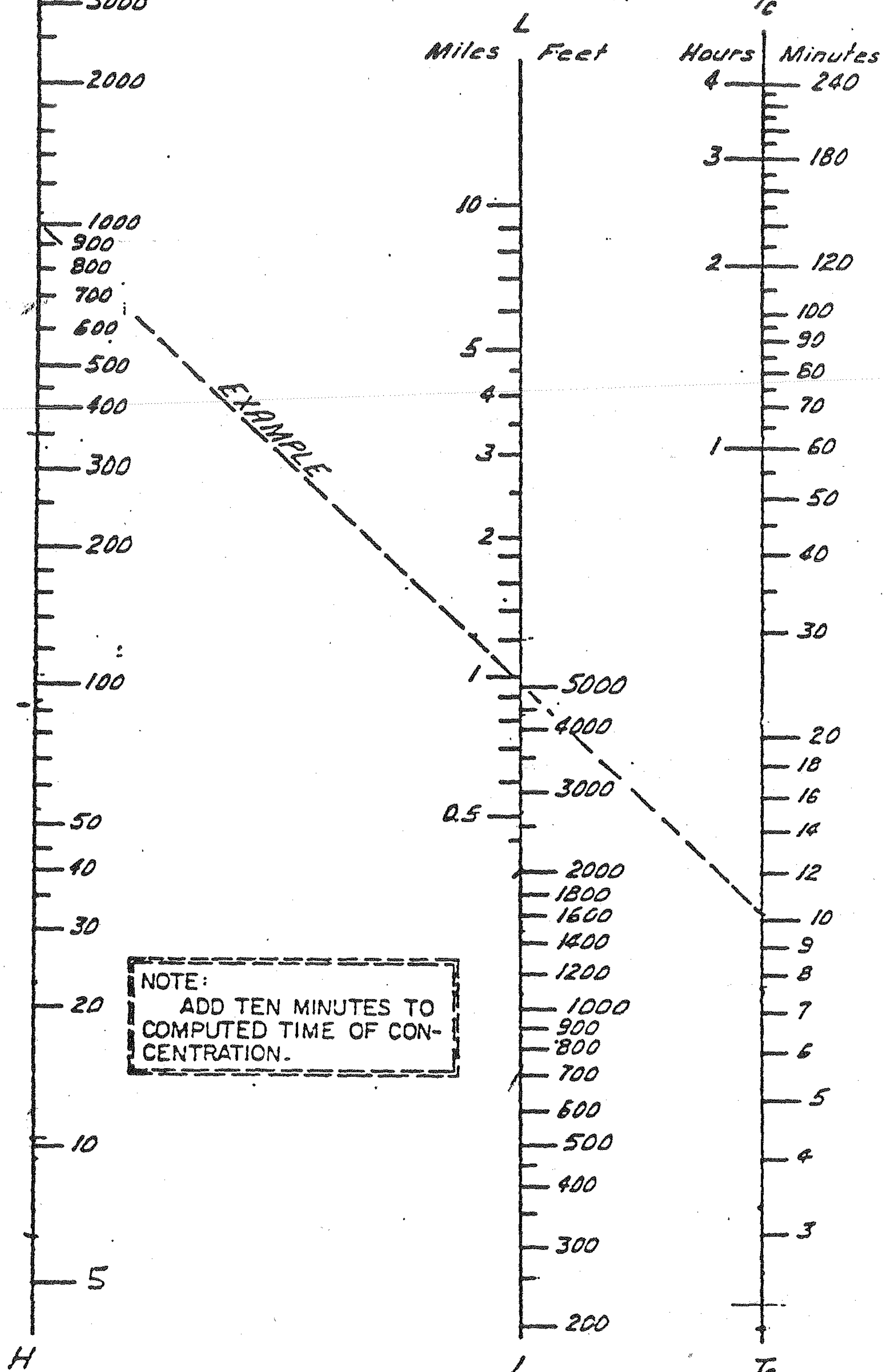
RAINFALL
INTENSITY - DURATION - FREQUENC
CURVES
for
COUNTY OF SAN DIEGO

APPENDIX I

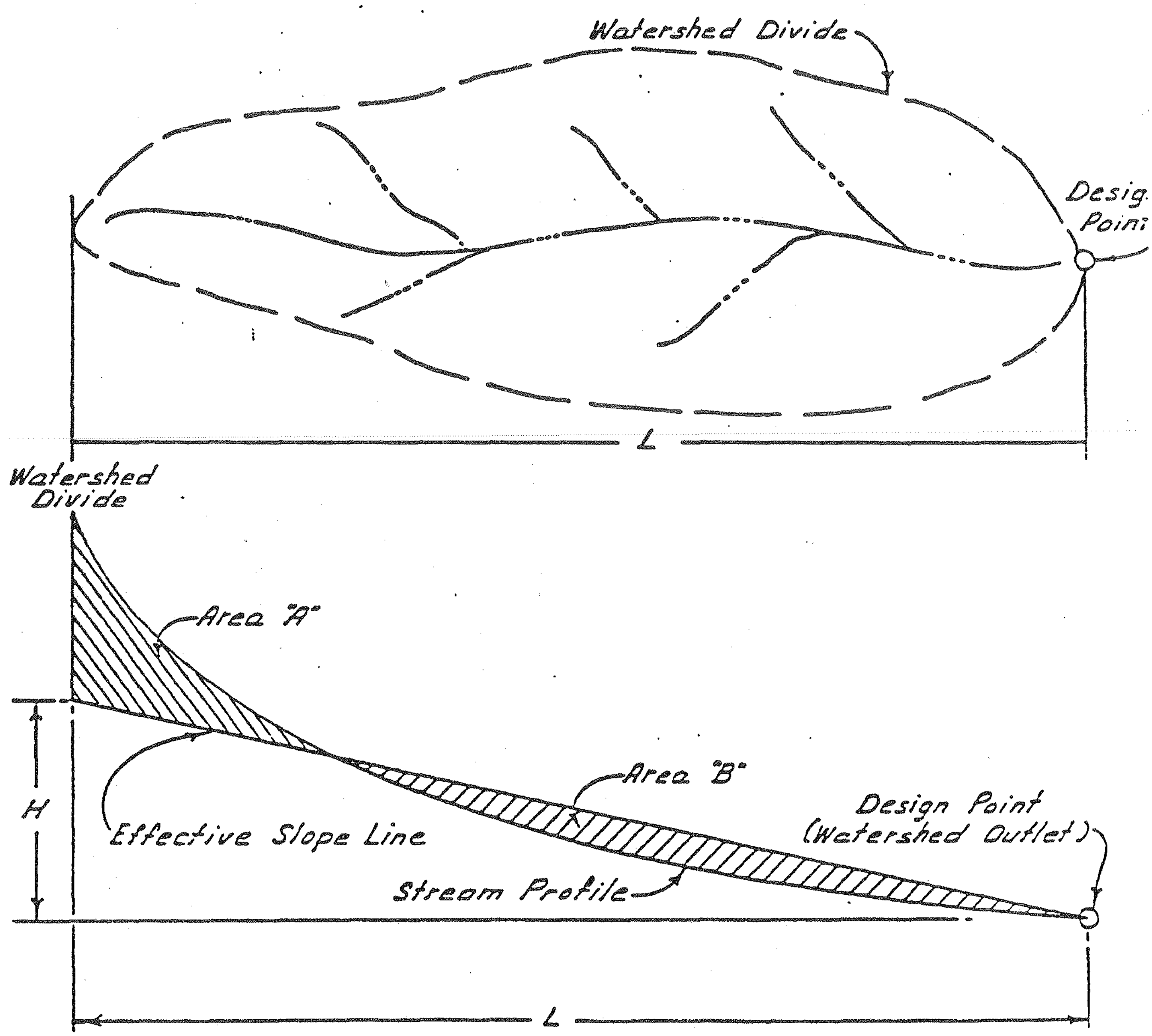
EQUATION

$$T_c = \left(\frac{11.9L^3}{H}\right)^{.385}$$

T_c = Time of concentration (in hours)
L = Length of watershed (in miles)
H = Difference in elevation along effective slope line (See Appendix X-B) (in feet)



SAN DIEGO COUNTY DEPARTMENT OF SPECIAL DISTRICT SERVICES DESIGN MANUAL	NOMOGRAPH FOR DETERMINATION OF TIME OF CONCENTRATION (Tc) FOR NATURAL WATERSHEDS
APPROVED	DATE ______ APPENDIX



Area "A" = Area "B"

SAN DIEGO COUNTY
DEPARTMENT OF SPECIAL DISTRICT SERVICES
DESIGN MANUAL

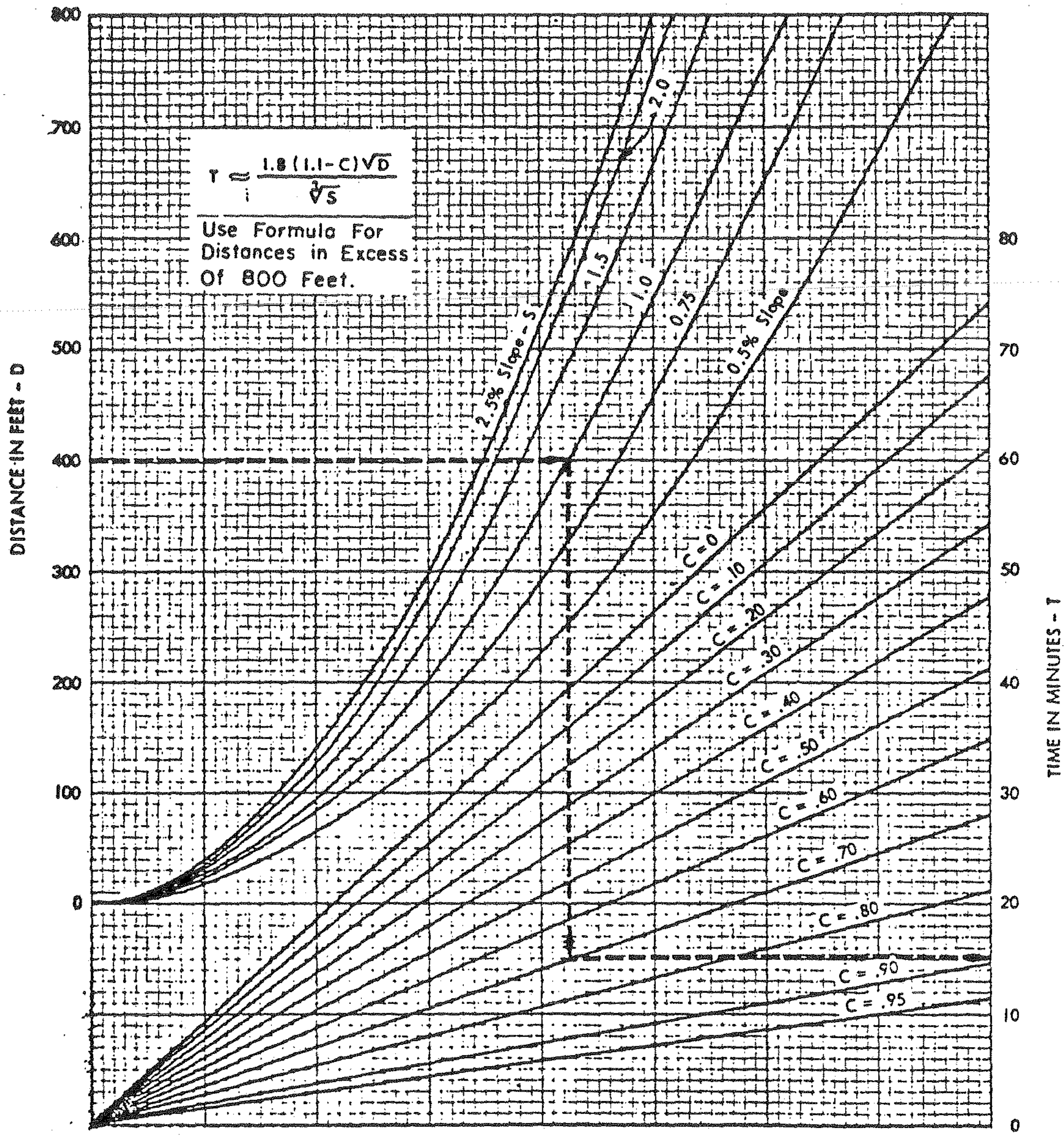
APPROVED B. V. [illegible]

COMPUTATION OF EFFECTIVE SLOPE FOR NATURAL WATERSHEDS

DATE [illegible]

APPENDIX

URBAN AREAS OVERLAND TIME OF FLOW CURVES



Surface Flow Time Curves

EXAMPLE:

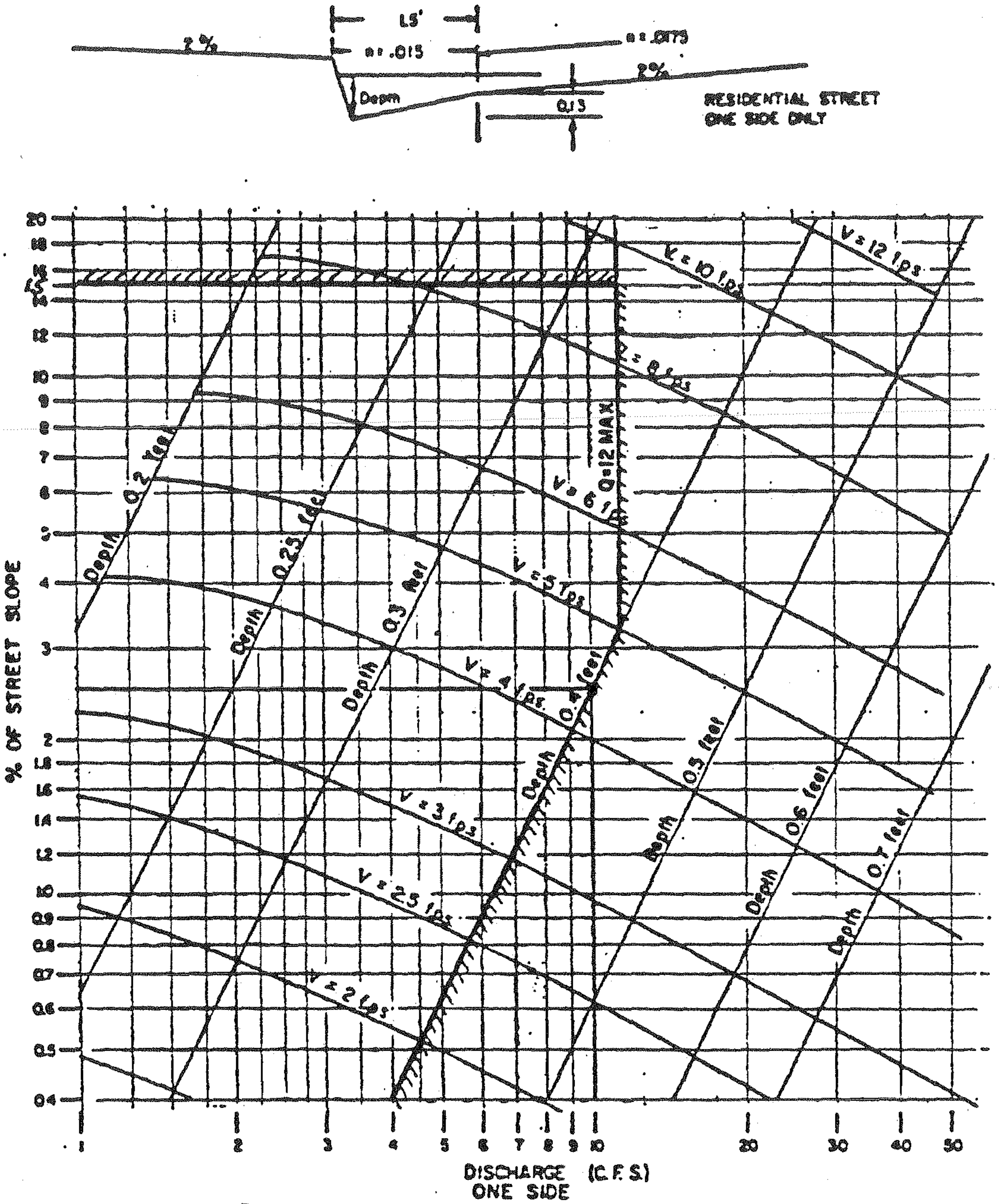
GIVEN: LENGTH OF FLOW = 400 FT.

SLOPE = 1.0 %

COEFFICIENT OF RUNOFF C = .70

READ: OVERLAND FLOWTIME = 15 MINUTES

CHART 1-104.12

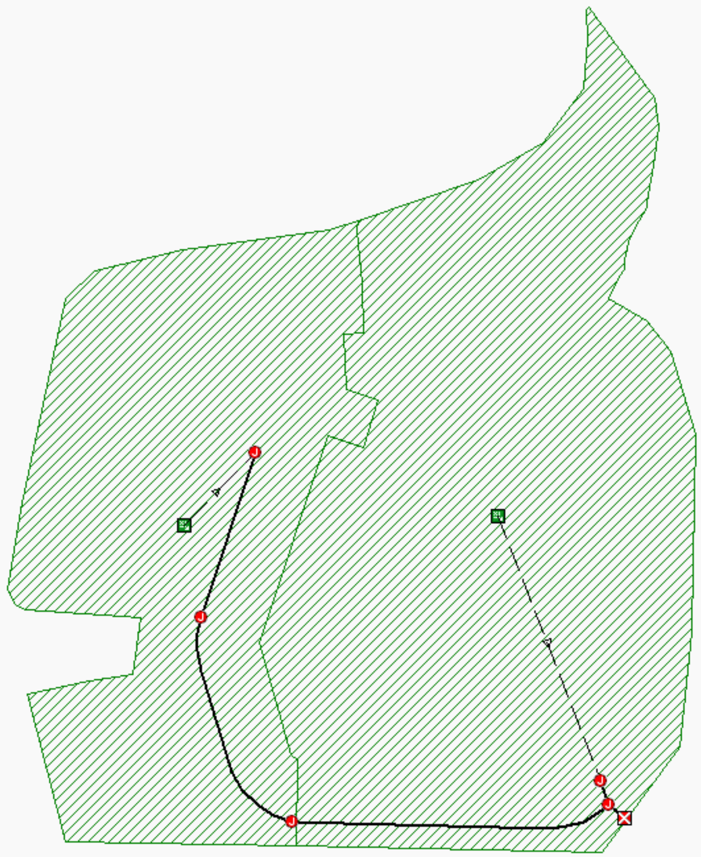


EXAMPLE:

Given: Q = 10 S = 2.5 %
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

REV.		CITY OF SAN DIEGO - DESIGN GUIDE	SHT. NO.
		GUTTER AND ROADWAY DISCHARGE - VELOCITY CHART	

APPENDIX B: EXISTING HYDROLOGIC CALCULATIONS



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Autodesk® Storm and Sanitary Analysis 2015 - Version 9.1.140 (Build 1)
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\_SSA_WORKING_1390.0 AFFORDABLE SITE - EXISITNG DRAINAGE.dwg


****************
Analysis Options
****************
Flow Units ................ cfs
Subbasin Hydrograph Method. Rational
Time of Concentration...... SCS TR-55
Return Period.............. 100 years
Link Routing Method ....... Hydrodynamic
Storage Node Exfiltration.. Constant flow
Starting Date ............. OCT-06-2016 00:00:00
Ending Date ............... OCT-06-2016 01:00:00
Report Time Step .......... 00:00:10


*************
Element Count
*************
Number of subbasins ....... 2
Number of nodes ........... 6
Number of links ........... 5


****************
Subbasin Summary
****************
Subbasin                 Total
                          Area
ID                       acres
------------------------------
{_}.E.1                   2.12
{_}.E.2                   1.33


************
```

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
J.09	JUNCTION	83.86	92.30	0.00	
J.10	JUNCTION	82.50	91.20	0.00	
J.11	JUNCTION	80.00	89.70	0.00	
J.POC	JUNCTION	76.42	87.67	0.00	
J.RISER	JUNCTION	77.10	79.60	0.00	
POC1	OUTFALL	72.93	74.43	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
L.09	J.09	J.10	CONDUIT	103.3	1.3172	0.0130
L.10	J.10	J.11	CONDUIT	143.9	1.7374	0.0130
L.11	J.11	J.POC	CONDUIT	194.8	1.8376	0.0130
L.POC1	J.POC	POC1	CONDUIT	7.7	45.6209	0.0130
L.RISER	J.RISER	J.POC	CONDUIT	11.6	5.8671	0.0150

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft²	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
L.09	CIRCULAR	1.50	1.50	1	1.77	0.38	12.06
L.10	CIRCULAR	1.50	1.50	1	1.77	0.38	13.85
L.11	CIRCULAR	1.50	1.50	1	1.77	0.38	14.24
L.POC1	CIRCULAR	1.50	1.50	1	1.77	0.38	70.95
L.RISER	CIRCULAR	1.50	1.50	1	1.77	0.38	22.05

****
Runoff Quantity Continuity
****

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.200	0.694

```
Continuity Error (%) .....         0.491

**************************        Volume        Volume
Flow Routing Continuity          acre-ft      Mgallons
**************************     ---------     ---------
External Inflow ..........         0.000         0.000
External Outflow .........         0.102         0.033
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000

**************************************
Runoff Coefficient Computations Report
**************************************

-------------------
Subbasin {_}.E.1
-------------------
                                                         Area          Soil       Runoff
Soil/Surface Description                               (acres)        Group       Coeff.
-------------------------------------------------------------------------------------------
-                                                         2.12            D         0.45
Composite Area & Weighted Runoff Coeff.                   2.12                      0.45

-------------------
Subbasin {_}.E.2
-------------------
                                                         Area          Soil       Runoff
Soil/Surface Description                               (acres)        Group       Coeff.
-------------------------------------------------------------------------------------------
-                                                         1.33            D         0.70
Composite Area & Weighted Runoff Coeff.                   1.33                      0.70

***************************************************
SCS TR-55 Time of Concentration Computations Report
***************************************************

Sheet Flow Equation
-------------------

        Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

        Where:
```

```
        Tc = Time of Concentration (hrs)
        n  = Manning's Roughness
        Lf = Flow Length (ft)
        P  = 2 yr, 24 hr Rainfall (inches)
        Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation
----------------------------------

        V  = 16.1345 * (Sf^0.5) (unpaved surface)
        V  = 20.3282 * (Sf^0.5) (paved surface)
        V  = 15.0 * (Sf^0.5) (grassed waterway surface)
        V  = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
        V  = 9.0 * (Sf^0.5) (cultivated straight rows surface)
        V  = 7.0 * (Sf^0.5) (short grass pasture surface)
        V  = 5.0 * (Sf^0.5) (woodland surface)
        V  = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)

Channel Flow Equation
---------------------

        V  = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
        R  = Aq / Wp
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        R  = Hydraulic Radius (ft)
        Aq = Flow Area (ft²)
        Wp = Wetted Perimeter (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)
        n  = Manning's Roughness

-------------------
```

Subbasin {_}.E.1

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.45	0.00	0.00
Flow Length (ft):	100.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.11	0.00	0.00
Computed Flow Time (minutes):	15.09	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	74.50	315.98	0.00
Slope (%):	29.50	3.80	0.00
Surface Type:	Grass pasture	Grass pasture	Unpaved
Velocity (ft/sec):	3.80	1.36	0.00
Computed Flow Time (minutes):	0.33	3.87	0.00

Total TOC (minutes): 19.29

Subbasin {_}.E.2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.13	0.00	0.00
Flow Length (ft):	53.70	0.00	0.00
Slope (%):	25.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.34	0.00	0.00
Computed Flow Time (minutes):	2.62	0.00	0.00

Channel Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	107.80	0.00	0.00
Channel Slope (%):	0.80	0.00	0.00

Cross Section Area (ft²):	0.03	0.00	0.00
Wetted Perimeter (ft):	3.00	0.00	0.00
Velocity (ft/sec):	0.45	0.00	0.00
Computed Flow Time (minutes):	4.01	0.00	0.00
Total TOC (minutes):	6.62		

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
{_}.E.1	0.84	2.62	0.38	2.50	0.450	0	00:19:17
{_}.E.2	0.45	4.09	0.32	3.81	0.700	0	00:06:37

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
J.09	0.19	0.65	84.51	0	00:06	0	0	0:00:00
J.10	0.18	0.57	83.07	0	00:07	0	0	0:00:00
J.11	0.20	0.58	80.58	0	00:07	0	0	0:00:00
J.POC	0.27	0.42	76.84	0	00:07	0	0	0:00:00
J.RISER	0.33	0.48	77.58	0	00:19	0	0	0:00:00
POC1	0.18	0.26	73.19	0	00:07	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days hh:mm
J.09	JUNCTION	3.81	3.81	0 00:06	0.00	
J.10	JUNCTION	0.00	3.79	0 00:07	0.00	
J.11	JUNCTION	0.00	3.75	0 00:07	0.00	
J.POC	JUNCTION	0.00	4.67	0 00:07	0.00	
J.RISER	JUNCTION	2.50	2.50	0 00:19	0.00	
POC1	OUTFALL	0.00	4.65	0 00:07	0.00	

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
POC1	94.23	2.64	4.65
System	94.23	2.64	4.65

****
Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
L.09	CONDUIT	0 00:07	5.64	1.00	3.79	12.06	0.31	0.41	0	Calculated
L.10	CONDUIT	0 00:07	6.06	1.00	3.75	13.85	0.27	0.38	0	Calculated
L.11	CONDUIT	0 00:07	7.23	1.00	3.70	14.24	0.26	0.33	0	Calculated
L.POC1	CONDUIT	0 00:07	15.30	1.00	4.65	70.95	0.07	0.23	0	Calculated
L.RISER	CONDUIT	0 00:19	7.10	1.00	2.50	22.05	0.11	0.25	0	Calculated

****
Highest Flow Instability Indexes

```
********************************
All links are stable.


Analysis began on:  Thu Oct 06 10:35:55 2016
Analysis ended on:  Thu Oct 06 10:35:55 2016
Total elapsed time: < 1 sec
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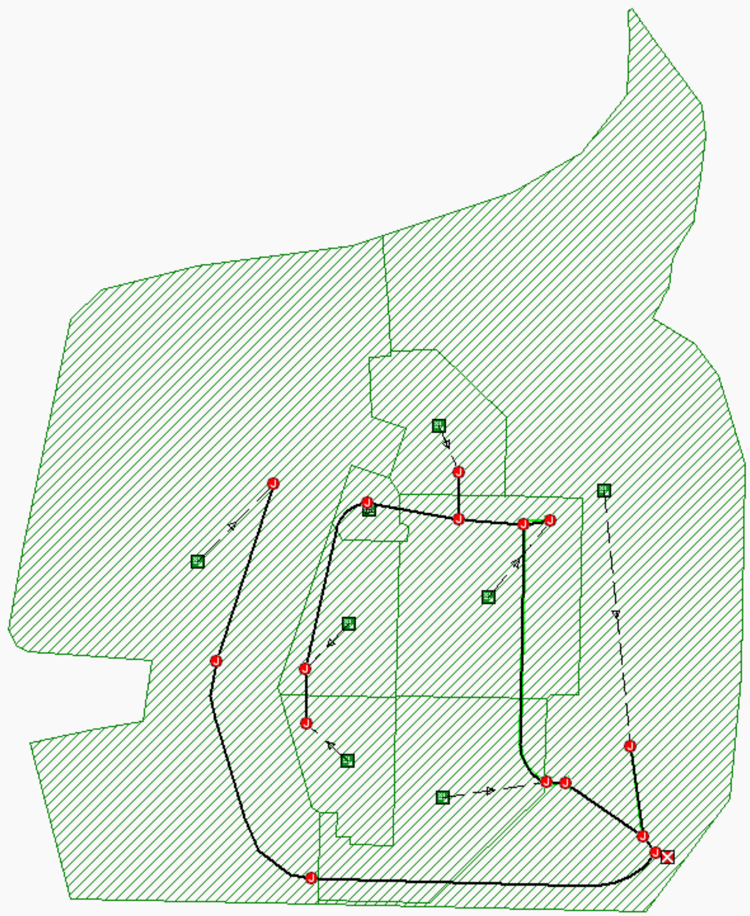
APPENDIX C: PROPOSED HYDROLOGIC CALCULATIONS



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  Autodesk® Storm and Sanitary Analysis 2015 - Version 9.1.140 (Build 1)
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  ****************
  Analysis Options
  ****************
  Flow Units ................ cfs
  Subbasin Hydrograph Method. Rational
  Time of Concentration...... SCS TR-55
  Return Period.............. 100 years
  Link Routing Method ....... Hydrodynamic
  Storage Node Exfiltration.. Constant flow
  Starting Date ............. AUG-12-2016 00:00:00
  Ending Date ............... AUG-12-2016 01:00:00
  Report Time Step .......... 00:00:10


  *************
  Element Count
  *************
  Number of subbasins ....... 8
  Number of nodes ........... 16
  Number of links ........... 15


  ****************
  Subbasin Summary
  ****************
  Subbasin                Total
                           Area
  ID                      acres
  ------------------------------
  {_}.E.2                  1.33
```

{_}.P.1	0.10
{_}.P.2	0.11
{_}.P.3	0.03
{_}.P.4	0.13
{_}.P.5	0.27
{_}.P.6	0.25
{_}.P.7	1.23

****
Node Summary
****

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft^2	External Inflow
J.01	JUNCTION	88.90	90.90	0.00	
J.02	JUNCTION	88.60	90.90	0.00	
J.03	JUNCTION	87.60	90.90	0.00	
J.04	JUNCTION	85.90	88.10	0.00	
J.05	JUNCTION	83.12	87.90	0.00	
J.06	JUNCTION	87.30	89.00	0.00	
J.07	JUNCTION	86.00	88.00	0.00	
J.08	JUNCTION	77.60	86.00	0.00	
J.09	JUNCTION	83.86	92.30	0.00	
J.10	JUNCTION	82.50	91.20	0.00	
J.11	JUNCTION	80.00	89.70	0.00	
J.3-4	JUNCTION	87.00	90.10	0.00	
J.BASIN	JUNCTION	78.50	84.00	0.00	
J.POC	JUNCTION	76.42	87.67	0.00	
J.RISER	JUNCTION	77.10	84.00	0.00	
POC1	OUTFALL	72.93	74.43	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
L.01	J.01	J.02	CONDUIT	28.9	1.0370	0.0130
L.02	J.02	J.03	CONDUIT	105.3	0.9501	0.0130
L.04	J.04	J.05	CONDUIT	153.2	1.8144	0.0130
L.05	J.05	J.BASIN	CONDUIT	11.4	40.7048	0.0130
L.06	J.06	J.3-4	CONDUIT	24.1	1.2438	0.0130
L.07	J.07	J.04	CONDUIT	9.9	1.0091	0.0130

L.08	J.08	J.RISER	CONDUIT	48.4	1.0331	0.0130
L.09	J.09	J.10	CONDUIT	103.3	1.3172	0.0130
L.10	J.10	J.11	CONDUIT	143.9	1.7378	0.0130
L.11	J.11	J.POC	CONDUIT	194.8	1.8376	0.0130
L.3.1	J.03	J.3-4	CONDUIT	48.8	1.2288	0.0130
L.3.2	J.3-4	J.04	CONDUIT	38.5	2.8579	0.0130
L.BASIN	J.BASIN	J.RISER	CONDUIT	54.1	2.5854	0.0130
L.POC	J.POC	POC1	CONDUIT	7.7	45.6209	0.0130
L.RISER	J.RISER	J.POC	CONDUIT	11.6	5.8671	0.0130

****
Cross Section Summary
****

Link ID	Shape	Depth/ Diameter ft	Width ft	No. of Barrels	Cross Sectional Area ft²	Full Flow Hydraulic Radius ft	Design Flow Capacity cfs
L.01	CIRCULAR	0.50	0.50	1	0.20	0.13	0.57
L.02	CIRCULAR	0.50	0.50	1	0.20	0.13	0.55
L.04	CIRCULAR	1.00	1.00	1	0.79	0.25	4.80
L.05	CIRCULAR	1.00	1.00	1	0.79	0.25	22.73
L.06	CIRCULAR	0.50	0.50	1	0.20	0.13	0.63
L.07	CIRCULAR	0.50	0.50	1	0.20	0.13	0.56
L.08	CIRCULAR	0.50	0.50	1	0.20	0.13	0.57
L.09	CIRCULAR	1.50	1.50	1	1.77	0.38	12.06
L.10	CIRCULAR	1.50	1.50	1	1.77	0.38	13.85
L.11	CIRCULAR	1.50	1.50	1	1.77	0.38	14.24
L.3.1	CIRCULAR	0.50	0.50	1	0.20	0.13	0.62
L.3.2	CIRCULAR	0.50	0.50	1	0.20	0.13	0.95
L.BASIN	CIRCULAR	1.00	1.00	1	0.79	0.25	5.73
L.POC	CIRCULAR	1.50	1.50	1	1.77	0.38	70.95
L.RISER	CIRCULAR	1.50	1.50	1	1.77	0.38	25.44

Runoff Quantity Continuity	Volume acre-ft	Depth inches
Total Precipitation	0.177	0.613
Continuity Error (%)	0.425	

Flow Routing Continuity	Volume acre-ft	Volume Mgallons

```
External Inflow ..........         0.000         0.000
External Outflow .........         0.101         0.033
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000
```

```
**************************************
Runoff Coefficient Computations Report
**************************************

-------------------
Subbasin {_}.E.2
-------------------
                                                        Area          Soil        Runoff
Soil/Surface Description                               (acres)        Group       Coeff.
-----------------------------------------------------------------------------------------
-                                                        1.33            D          0.70
Composite Area & Weighted Runoff Coeff.                  1.33                       0.70

-------------------
Subbasin {_}.P.1
-------------------
                                                        Area          Soil        Runoff
Soil/Surface Description                               (acres)        Group       Coeff.
-----------------------------------------------------------------------------------------
-                                                        0.10            D          0.70
Composite Area & Weighted Runoff Coeff.                  0.10                       0.70

-------------------
Subbasin {_}.P.2
-------------------
                                                        Area          Soil        Runoff
Soil/Surface Description                               (acres)        Group       Coeff.
-----------------------------------------------------------------------------------------
-                                                        0.11            D          0.70
Composite Area & Weighted Runoff Coeff.                  0.11                       0.70

-------------------
Subbasin {_}.P.3
-------------------
                                                        Area          Soil        Runoff
Soil/Surface Description                               (acres)        Group       Coeff.
-----------------------------------------------------------------------------------------
-                                                        0.03            D          0.70
Composite Area & Weighted Runoff Coeff.                  0.03                       0.70
```

```
-------------------
Subbasin {_}.P.4
-------------------
                                                        Area          Soil       Runoff
Soil/Surface Description                               (acres)        Group      Coeff.
-----------------------------------------------------------------------------------------
-                                                        0.13           -          0.70
Composite Area & Weighted Runoff Coeff.                  0.13                      0.70

-------------------
Subbasin {_}.P.5
-------------------
                                                        Area          Soil       Runoff
Soil/Surface Description                               (acres)        Group      Coeff.
-----------------------------------------------------------------------------------------
-                                                        0.27           -          0.70
Composite Area & Weighted Runoff Coeff.                  0.27                      0.70

-------------------
Subbasin {_}.P.6
-------------------
                                                        Area          Soil       Runoff
Soil/Surface Description                               (acres)        Group      Coeff.
-----------------------------------------------------------------------------------------
-                                                        0.25           -          0.70
Composite Area & Weighted Runoff Coeff.                  0.25                      0.70

-------------------
Subbasin {_}.P.7
-------------------
                                                        Area          Soil       Runoff
Soil/Surface Description                               (acres)        Group      Coeff.
-----------------------------------------------------------------------------------------
-                                                        1.23           D          0.45
Composite Area & Weighted Runoff Coeff.                  1.23                      0.45

***************************************************
SCS TR-55 Time of Concentration Computations Report
***************************************************

Sheet Flow Equation
-------------------

        Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))
```

```
        Where:

        Tc = Time of Concentration (hrs)
        n  = Manning's Roughness
        Lf = Flow Length (ft)
        P  = 2 yr, 24 hr Rainfall (inches)
        Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation
----------------------------------

        V  = 16.1345 * (Sf^0.5) (unpaved surface)
        V  = 20.3282 * (Sf^0.5) (paved surface)
        V  = 15.0 * (Sf^0.5) (grassed waterway surface)
        V  = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
        V  = 9.0 * (Sf^0.5) (cultivated straight rows surface)
        V  = 7.0 * (Sf^0.5) (short grass pasture surface)
        V  = 5.0 * (Sf^0.5) (woodland surface)
        V  = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)

Channel Flow Equation
---------------------

        V  = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
        R  = Aq / Wp
        Tc = (Lf / V) / (3600 sec/hr)

        Where:

        Tc = Time of Concentration (hrs)
        Lf = Flow Length (ft)
        R  = Hydraulic Radius (ft)
        Aq = Flow Area (ft²)
        Wp = Wetted Perimeter (ft)
        V  = Velocity (ft/sec)
        Sf = Slope (ft/ft)
        n  = Manning's Roughness
```

Subbasin {_}.E.2

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.13	0.00	0.00
Flow Length (ft):	53.70	0.00	0.00
Slope (%):	25.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.34	0.00	0.00
Computed Flow Time (minutes):	2.62	0.00	0.00

Channel Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	107.80	0.00	0.00
Channel Slope (%):	0.80	0.00	0.00
Cross Section Area (ft^2):	0.03	0.00	0.00
Wetted Perimeter (ft):	3.00	0.00	0.00
Velocity (ft/sec):	0.45	0.00	0.00
Computed Flow Time (minutes):	4.01	0.00	0.00
Total TOC (minutes):	6.62		

Subbasin {_}.P.1

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.35	0.00	0.00
Flow Length (ft):	50.00	0.00	0.00
Slope (%):	2.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.06	0.00	0.00
Computed Flow Time (minutes):	14.99	0.00	0.00
Total TOC (minutes):	14.99		

```
-------------------
Subbasin {_}.P.2
-------------------

Sheet Flow Computations
-----------------------
                                         Subarea A          Subarea B          Subarea C
        Manning's Roughness:                  0.35               0.00               0.00
        Flow Length (ft):                    74.32               0.00               0.00
        Slope (%):                            2.00               0.00               0.00
        2 yr, 24 hr Rainfall (in):            1.75               1.75               1.75
        Velocity (ft/sec):                    0.06               0.00               0.00
        Computed Flow Time (minutes):        20.58               0.00               0.00
================================================================================================
        Total TOC (minutes):                 20.58
================================================================================================


-------------------
Subbasin {_}.P.3
-------------------

Sheet Flow Computations
-----------------------
                                         Subarea A          Subarea B          Subarea C
        Manning's Roughness:                  0.35               0.00               0.00
        Flow Length (ft):                    28.51               0.00               0.00
        Slope (%):                            2.00               0.00               0.00
        2 yr, 24 hr Rainfall (in):            1.75               1.75               1.75
        Velocity (ft/sec):                    0.05               0.00               0.00
        Computed Flow Time (minutes):         9.56               0.00               0.00
================================================================================================
        Total TOC (minutes):                  9.56
================================================================================================


-------------------
Subbasin {_}.P.4
-------------------

Sheet Flow Computations
-----------------------
                                         Subarea A          Subarea B          Subarea C
        Manning's Roughness:                  0.35               0.00               0.00
```

```
        Flow Length (ft):                          70.00              0.00              0.00
        Slope (%):                                  1.00              0.00              0.00
        2 yr, 24 hr Rainfall (in):                  1.75              1.75              1.75
        Velocity (ft/sec):                          0.05              0.00              0.00
        Computed Flow Time (minutes):              25.89              0.00              0.00
================================================================================================
        Total TOC (minutes):                       25.89
================================================================================================


-------------------
Subbasin {_}.P.5
-------------------

Sheet Flow Computations
-----------------------
                                               Subarea A         Subarea B         Subarea C
        Manning's Roughness:                        0.01              0.00              0.00
        Flow Length (ft):                          50.90              0.00              0.00
        Slope (%):                                  6.00              0.00              0.00
        2 yr, 24 hr Rainfall (in):                  1.75              1.75              1.75
        Velocity (ft/sec):                          1.21              0.00              0.00
        Computed Flow Time (minutes):               0.70              0.00              0.00

Channel Flow Computations
-------------------------
                                               Subarea A         Subarea B         Subarea C
        Manning's Roughness:                        0.01              0.00              0.00
        Flow Length (ft):                          94.30              0.00              0.00
        Channel Slope (%):                          1.00              0.00              0.00
        Cross Section Area (ft²):                   0.09              0.00              0.00
        Wetted Perimeter (ft):                      1.64              0.00              0.00
        Velocity (ft/sec):                          2.15              0.00              0.00
        Computed Flow Time (minutes):               0.73              0.00              0.00
================================================================================================
        Total TOC (minutes):                        1.43
================================================================================================


-------------------
Subbasin {_}.P.6
-------------------

Sheet Flow Computations
-----------------------
                                               Subarea A         Subarea B         Subarea C
```

Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	47.38	0.00	0.00
Slope (%):	2.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	1.75	1.75
Velocity (ft/sec):	0.77	0.00	0.00
Computed Flow Time (minutes):	1.03	0.00	0.00

Channel Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.01	0.00	0.00
Flow Length (ft):	164.80	0.00	0.00
Channel Slope (%):	1.00	0.00	0.00
Cross Section Area (ft²):	0.09	0.00	0.00
Wetted Perimeter (ft):	1.64	0.00	0.00
Velocity (ft/sec):	2.15	0.00	0.00
Computed Flow Time (minutes):	1.28	0.00	0.00
Total TOC (minutes):	2.31		

Subbasin {_}.P.7

Sheet Flow Computations

	Subarea A	Subarea B	Subarea C
Manning's Roughness:	0.45	0.00	0.00
Flow Length (ft):	100.00	0.00	0.00
Slope (%):	13.00	0.00	0.00
2 yr, 24 hr Rainfall (in):	1.75	0.00	0.00
Velocity (ft/sec):	0.11	0.00	0.00
Computed Flow Time (minutes):	15.09	0.00	0.00

Shallow Concentrated Flow Computations

	Subarea A	Subarea B	Subarea C
Flow Length (ft):	74.50	253.00	0.00
Slope (%):	29.50	3.80	0.00
Surface Type:	Grass pasture	Grass pasture	Unpaved
Velocity (ft/sec):	3.80	1.36	0.00
Computed Flow Time (minutes):	0.33	3.10	0.00
Total TOC (minutes):	18.52		

==

****
Subbasin Runoff Summary
****

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Concentration hh:mm:ss
{_}.E.2	0.45	4.09	0.32	3.81	0.700	0	00:06:37
{_}.P.1	0.74	2.97	0.52	0.20	0.700	0	00:14:59
{_}.P.2	0.86	2.52	0.60	0.20	0.700	0	00:20:34
{_}.P.3	0.56	3.54	0.39	0.08	0.700	0	00:09:33
{_}.P.4	0.94	2.19	0.66	0.19	0.700	0	00:25:53
{_}.P.5	0.36	4.38	0.26	0.84	0.700	0	00:05:00
{_}.P.6	0.36	4.38	0.26	0.77	0.700	0	00:05:00
{_}.P.7	0.83	2.68	0.37	1.48	0.450	0	00:18:31

****
Node Depth Summary
****

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
J.01	0.13	0.22	89.12	0	00:15	0	0	0:00:00
J.02	0.20	0.30	88.90	0	00:16	0	0	0:00:00
J.03	0.21	0.30	87.90	0	00:16	0	0	0:00:00
J.04	0.24	0.34	86.24	0	00:05	0	0	0:00:00
J.05	0.11	0.20	83.32	0	00:05	0	0	0:00:00
J.06	0.13	0.21	87.51	0	00:26	0	0	0:00:00
J.07	0.25	0.83	86.83	0	00:05	0	0	0:00:00
J.08	1.53	4.42	82.02	0	00:18	0	0	0:00:00
J.09	0.23	0.65	84.51	0	00:06	0	0	0:00:00
J.10	0.21	0.58	83.08	0	00:07	0	0	0:00:00
J.11	0.22	0.56	80.56	0	00:07	0	0	0:00:00
J.3-4	0.20	0.29	87.29	0	00:17	0	0	0:00:00
J.BASIN	0.22	0.42	78.92	0	00:05	0	0	0:00:00

J.POC	0.26	0.48	76.90	0	00:07	0	0	0:00:00
J.RISER	0.31	0.41	77.51	0	00:18	0	0	0:00:00
POC1	0.18	0.28	73.21	0	00:07	0	0	0:00:00

****
Node Flow Summary
****

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	hh:mm
J.01	JUNCTION	0.20	0.20	0	00:15	0.00		
J.02	JUNCTION	0.20	0.35	0	00:15	0.00		
J.03	JUNCTION	0.08	0.38	0	00:15	0.00		
J.04	JUNCTION	0.00	0.98	0	00:05	0.00		
J.05	JUNCTION	0.77	1.68	0	00:05	0.00		
J.06	JUNCTION	0.19	0.19	0	00:26	0.00		
J.07	JUNCTION	0.84	0.84	0	00:05	0.00		
J.08	JUNCTION	1.48	1.48	0	00:18	0.00		
J.09	JUNCTION	3.81	3.81	0	00:06	0.00		
J.10	JUNCTION	0.00	3.79	0	00:07	0.00		
J.11	JUNCTION	0.00	3.75	0	00:07	0.00		
J.3-4	JUNCTION	0.00	0.49	0	00:16	0.00		
J.BASIN	JUNCTION	0.00	1.68	0	00:05	0.00		
J.POC	JUNCTION	0.00	5.46	0	00:07	0.00		
J.RISER	JUNCTION	0.00	2.10	0	00:05	0.00		
POC1	OUTFALL	0.00	5.44	0	00:07	0.00		

****
Outfall Loading Summary
****

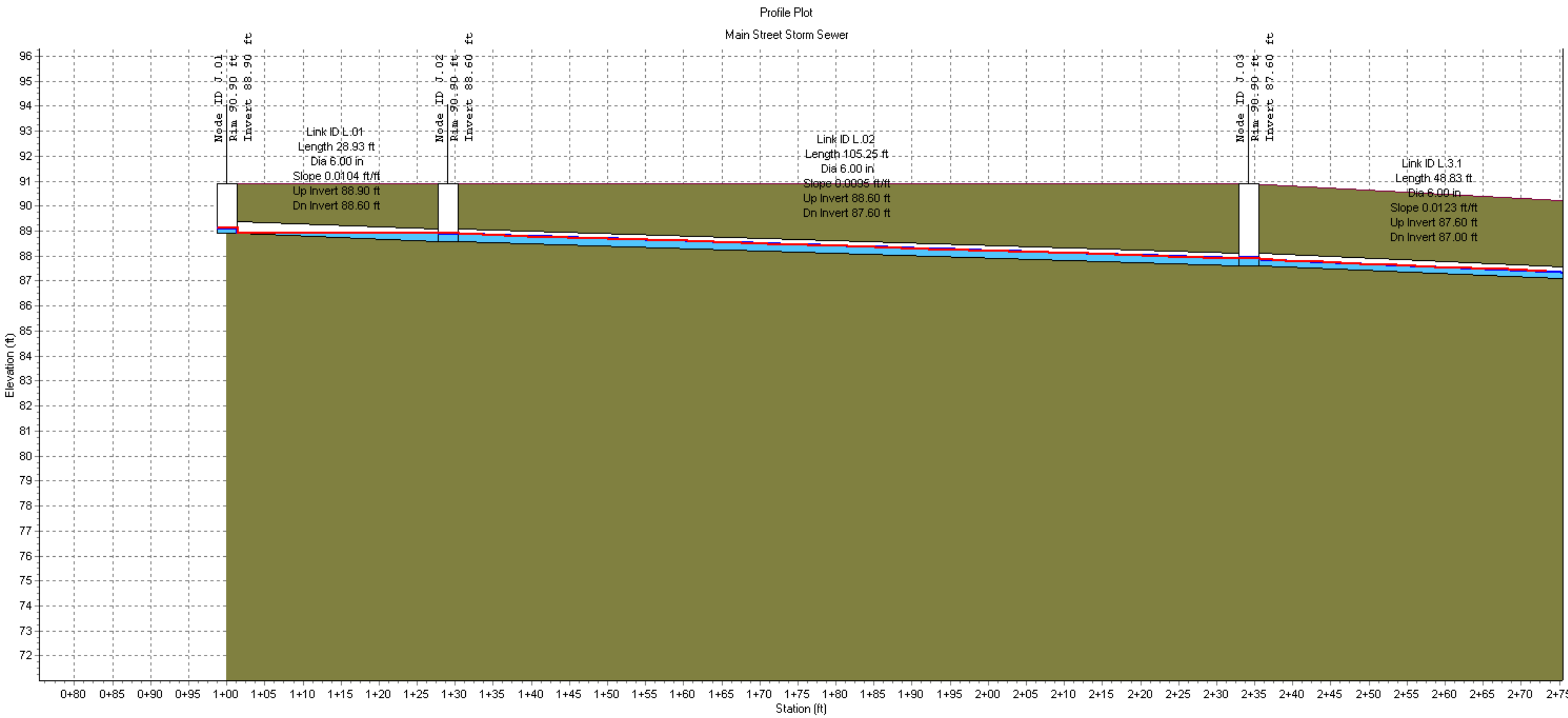
Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
POC1	99.60	2.51	5.44
System	99.60	2.51	5.44

****
Link Flow Summary
****

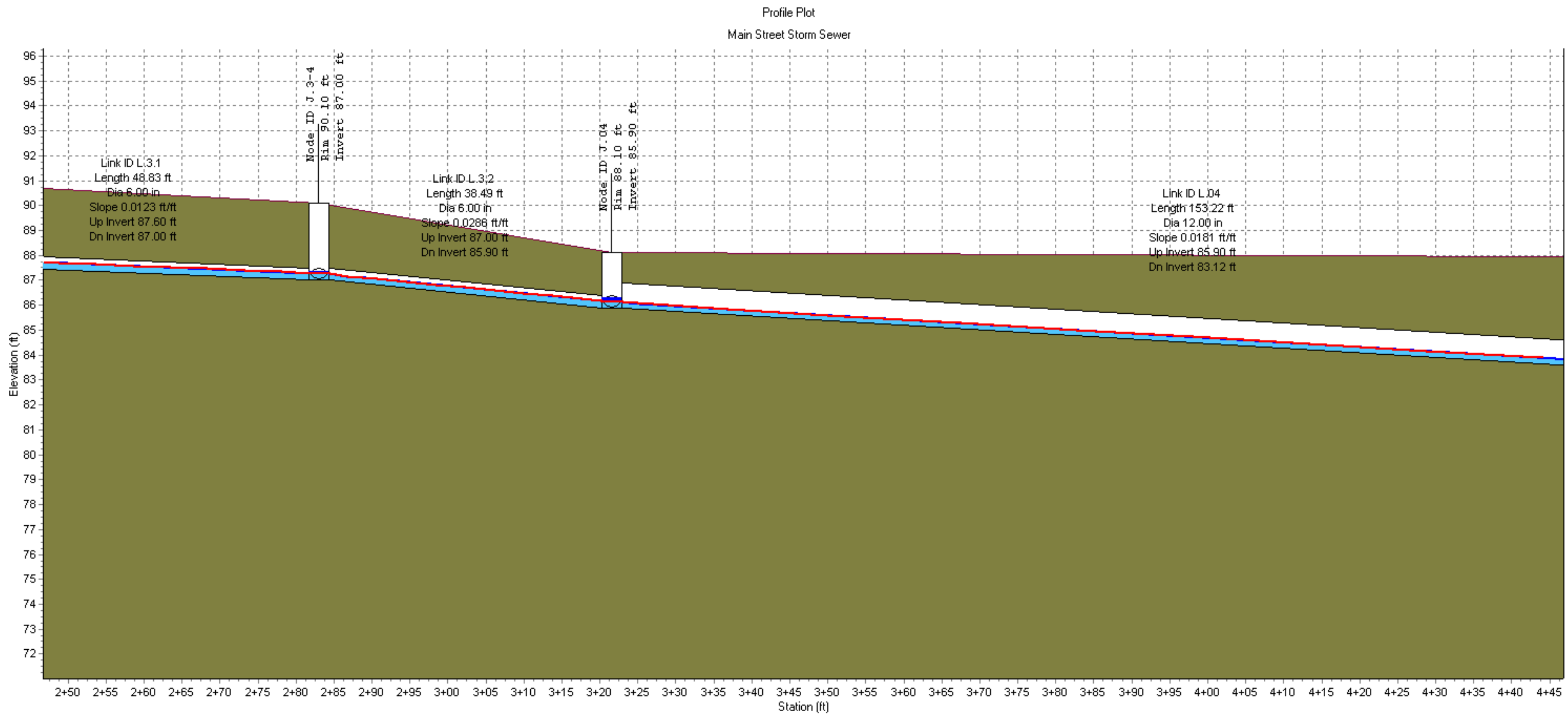
Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Flow Depth	Total Time Surcharged minutes	Reported Condition
L.01	CONDUIT	0 00:15	1.99	1.00	0.20	0.57	0.35	0.51	0	Calculated
L.02	CONDUIT	0 00:16	2.84	1.00	0.35	0.55	0.64	0.61	0	Calculated
L.04	CONDUIT	0 00:05	5.67	1.00	0.95	4.80	0.20	0.27	0	Calculated
L.05	CONDUIT	0 00:05	8.24	1.00	1.68	22.73	0.07	0.31	0	Calculated
L.06	CONDUIT	0 00:26	2.25	1.00	0.19	0.63	0.30	0.46	0	Calculated
L.07	CONDUIT	0 00:05	4.81	1.00	0.84	0.56	1.49	0.84	0	> CAPACITY
L.08	CONDUIT	0 00:18	7.93	1.00	1.48	0.57	2.60	0.91	0	> CAPACITY
L.09	CONDUIT	0 00:07	5.62	1.00	3.79	12.06	0.31	0.41	0	Calculated
L.10	CONDUIT	0 00:07	6.15	1.00	3.75	13.85	0.27	0.38	0	Calculated
L.11	CONDUIT	0 00:07	6.81	1.00	3.69	14.24	0.26	0.35	0	Calculated
L.3.1	CONDUIT	0 00:16	3.11	1.00	0.37	0.62	0.60	0.59	0	Calculated
L.3.2	CONDUIT	0 00:17	4.61	1.00	0.49	0.95	0.52	0.54	0	Calculated
L.BASIN	CONDUIT	0 00:05	5.63	1.00	1.68	5.73	0.29	0.41	0	Calculated
L.POC	CONDUIT	0 00:07	15.58	1.00	5.44	70.95	0.08	0.25	0	Calculated
L.RISER	CONDUIT	0 00:05	7.05	1.00	2.09	25.44	0.08	0.28	0	Calculated

****
Highest Flow Instability Indexes
****
Link L.POC (2)

Analysis began on: Thu Oct 06 16:58:54 2016
Analysis ended on: Thu Oct 06 16:58:54 2016
Total elapsed time: < 1 sec



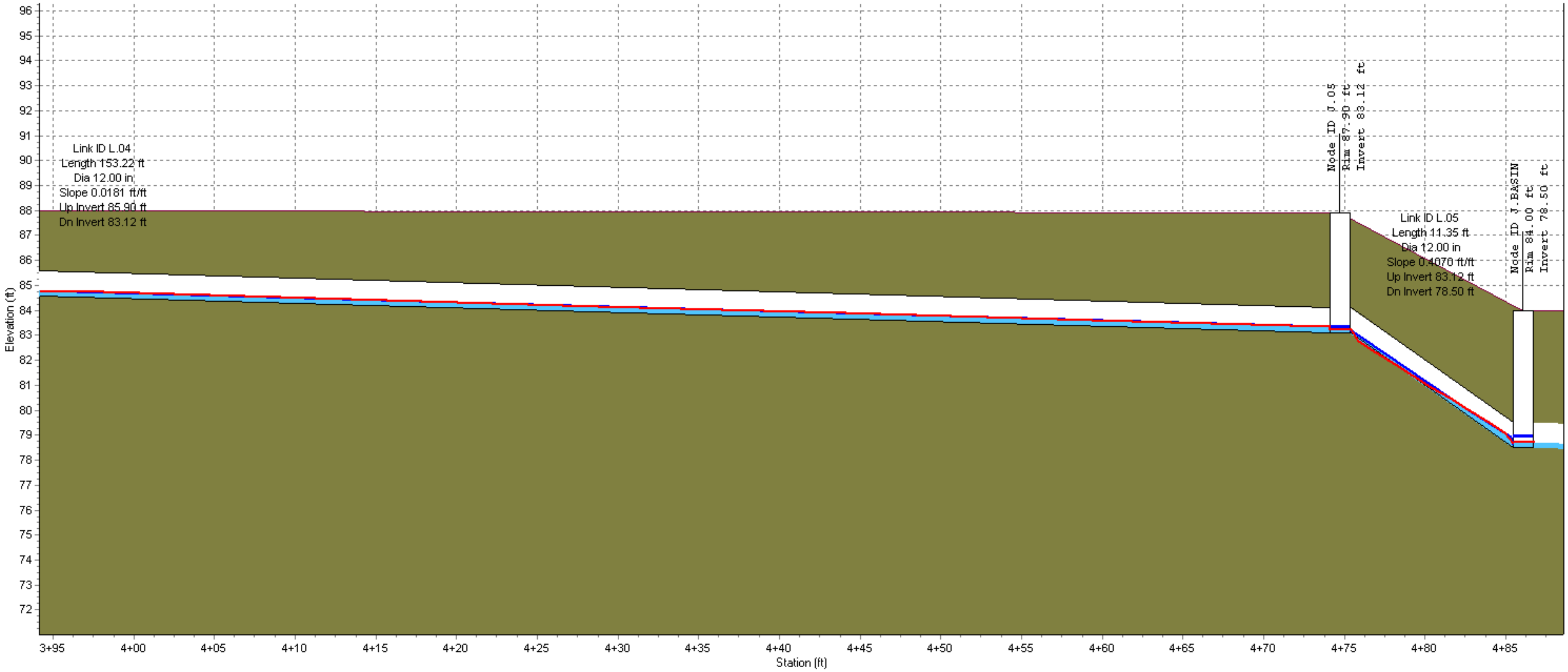
Autodesk Storm and Sanitary Analysis



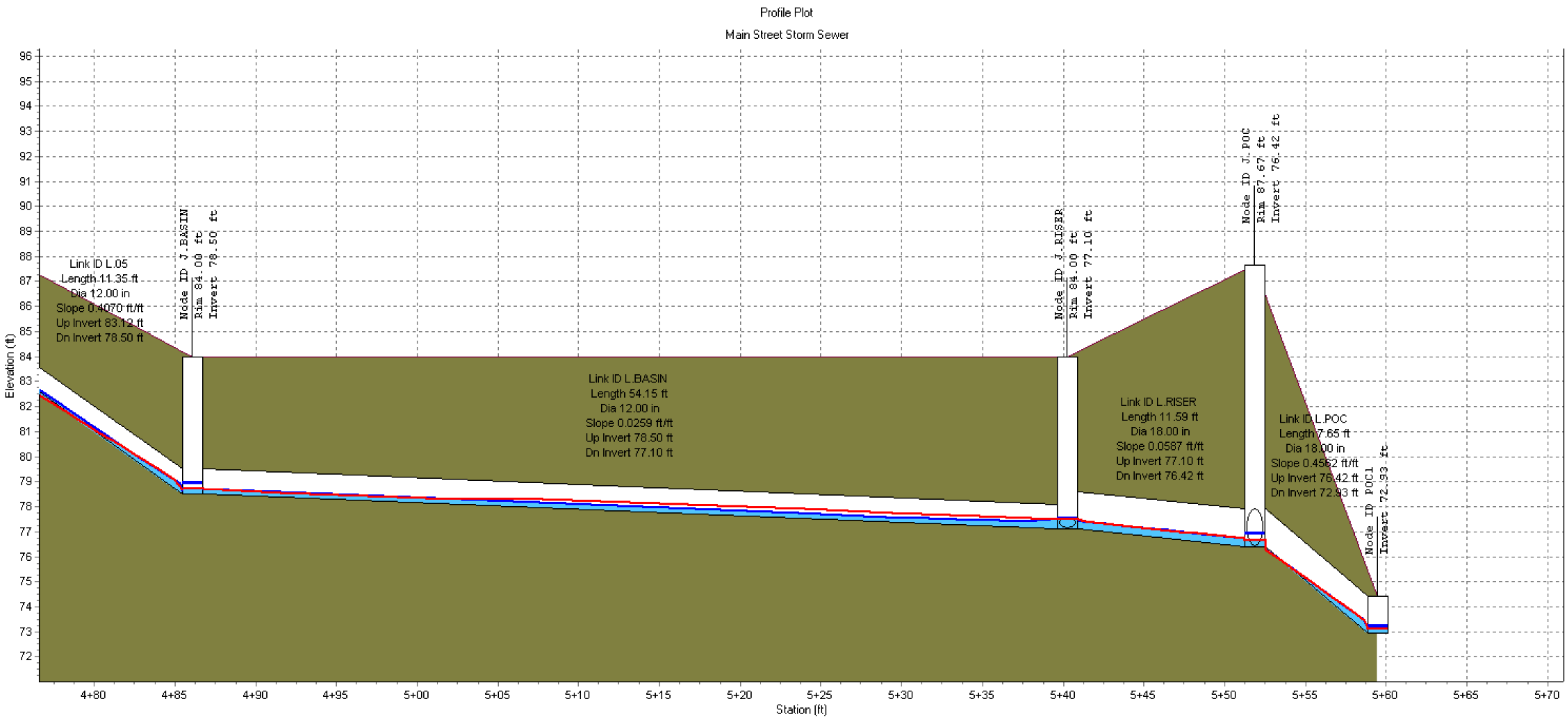
Autodesk Storm and Sanitary Analysis

Profile Plot

Main Street Storm Sewer



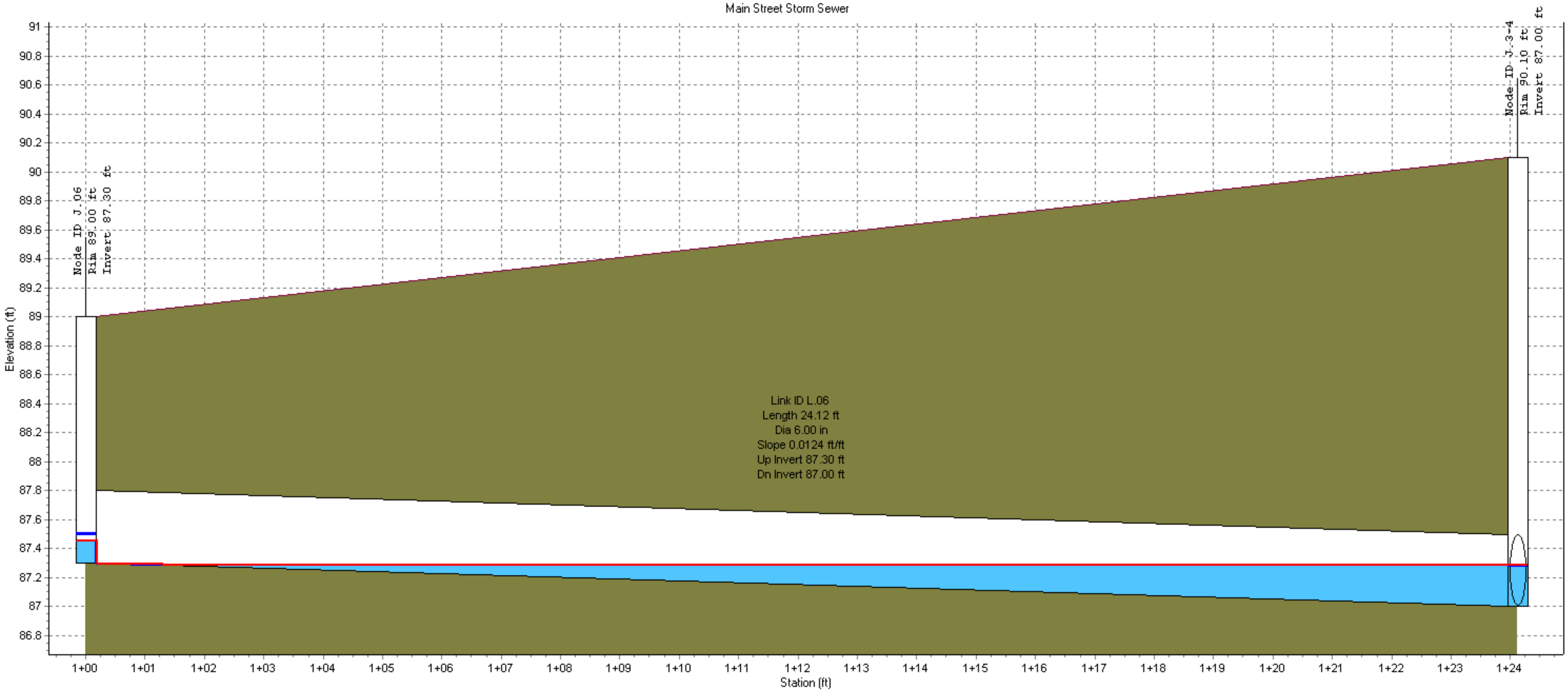
Autodesk Storm and Sanitary Analysis



Autodesk Storm and Sanitary Analysis

Profile Plot

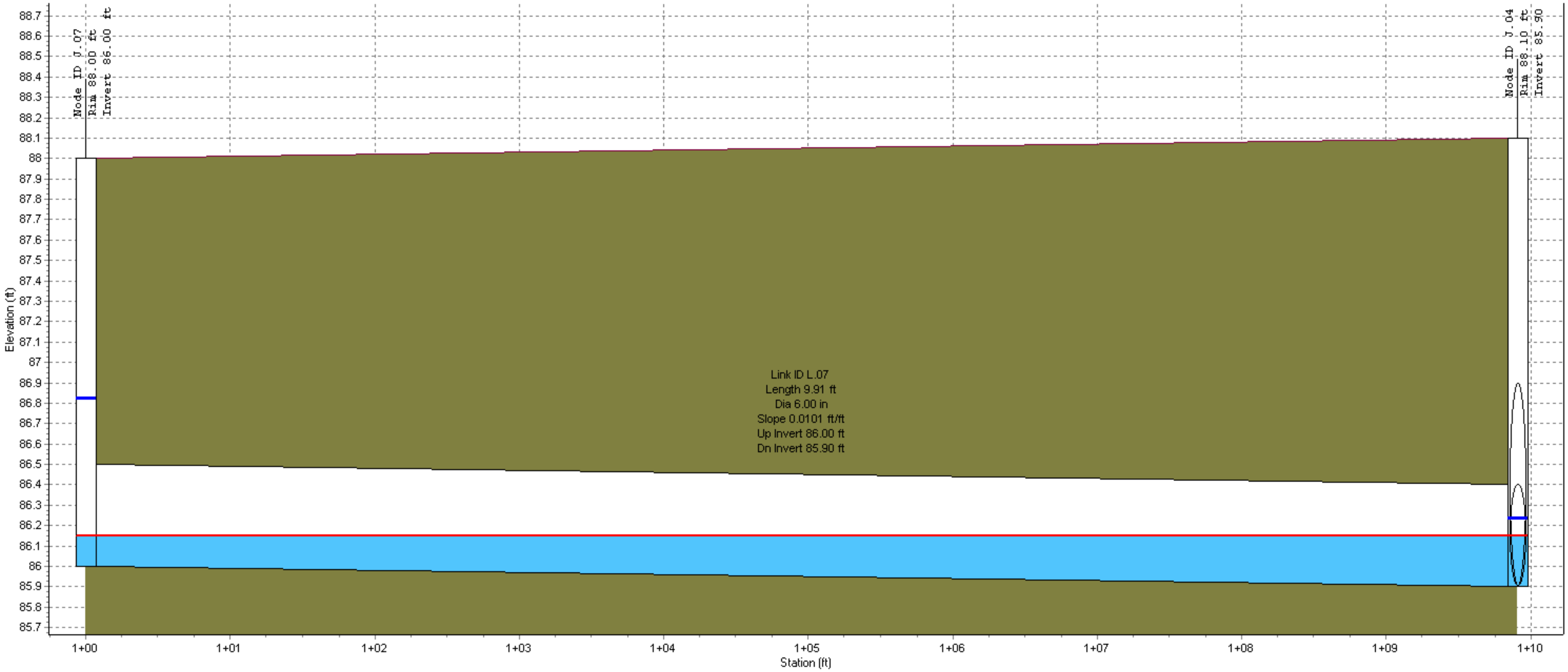
Main Street Storm Sewer

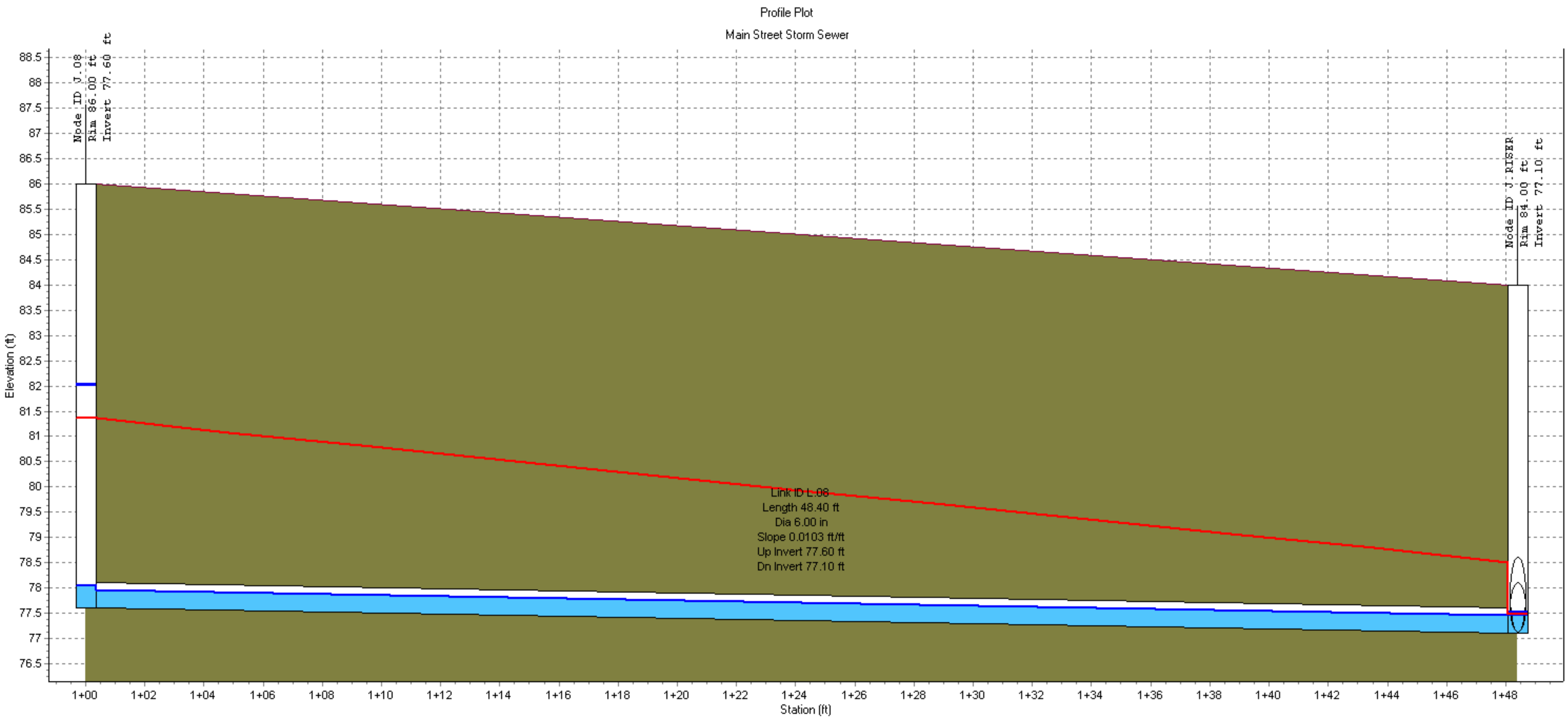


Autodesk Storm and Sanitary Analysis

Profile Plot

Main Street Storm Sewer

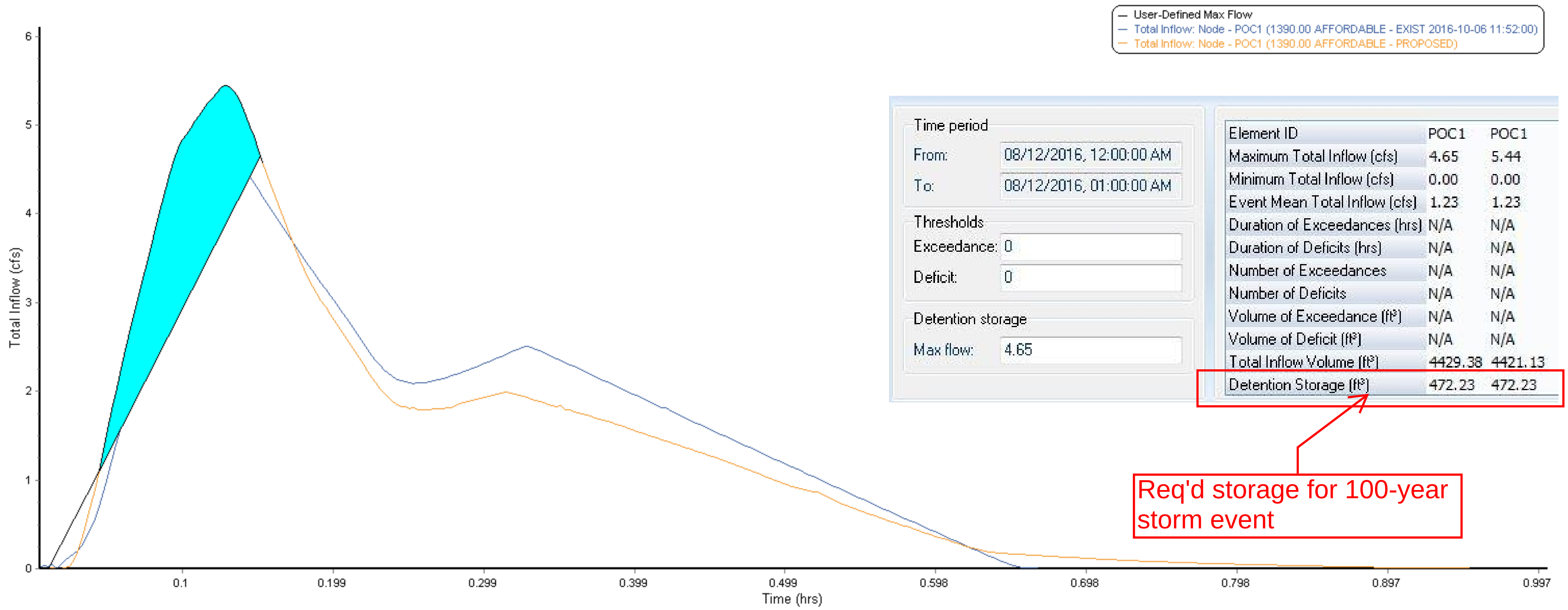




Autodesk Storm and Sanitary Analysis

APPENDIX D: HYDROGRAPH AND STORAGE ANALYSIS

HYDROGRAPH: PROPOSED AND EXISTING



Time period

From: 08/12/2016, 12:00:00 AM

To: 08/12/2016, 01:00:00 AM

Thresholds

Exceedance: 0

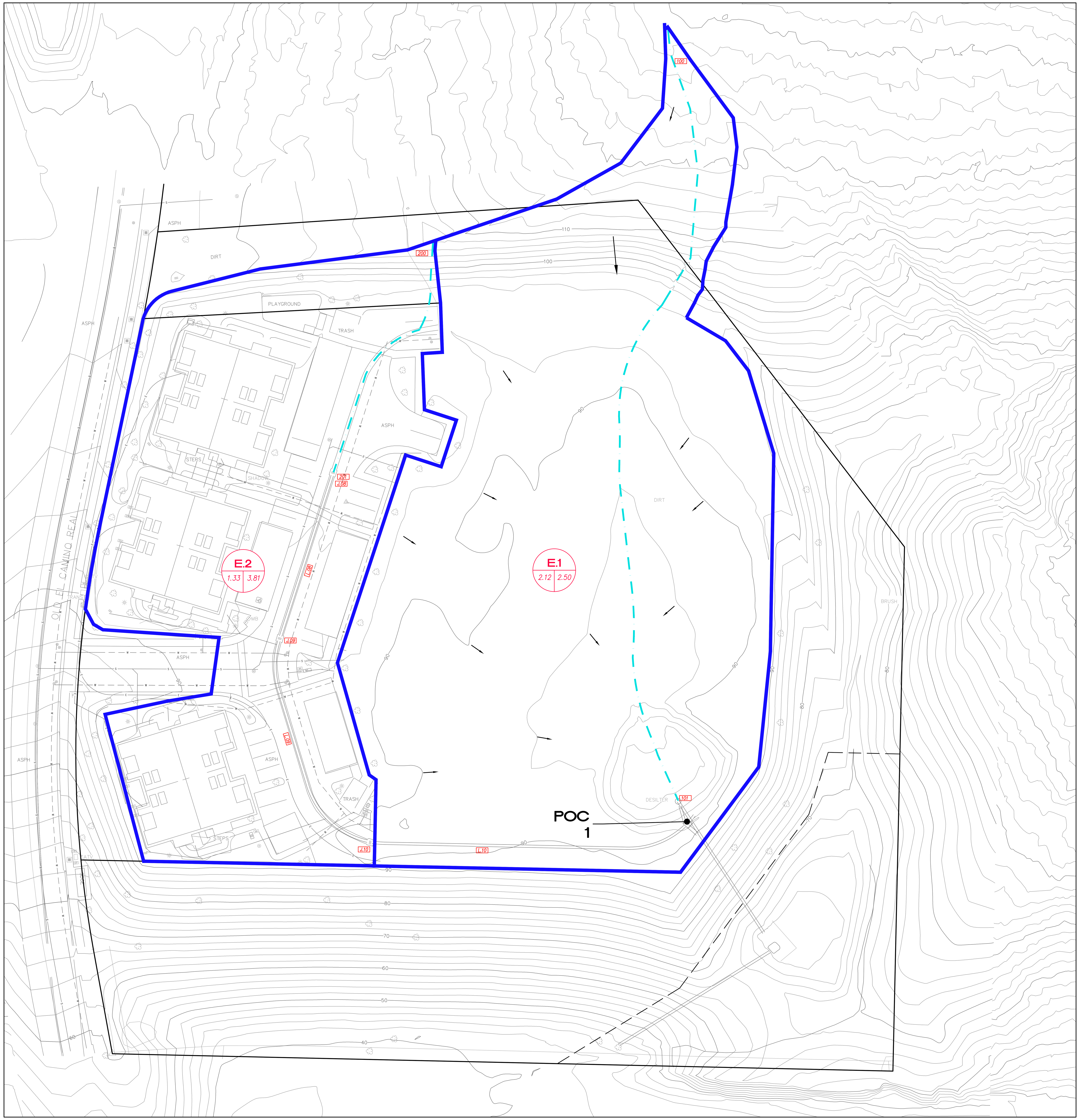
Deficit: 0

Detention storage

Max flow: 4.65

Element ID	POC1	POC1
Maximum Total Inflow (cfs)	4.65	5.44
Minimum Total Inflow (cfs)	0.00	0.00
Event Mean Total Inflow (cfs)	1.23	1.23
Duration of Exceedances (hrs)	N/A	N/A
Duration of Deficits (hrs)	N/A	N/A
Number of Exceedances	N/A	N/A
Number of Deficits	N/A	N/A
Volume of Exceedance (ft³)	N/A	N/A
Volume of Deficit (ft³)	N/A	N/A
Total Inflow Volume (ft³)	4429.38	4421.13
Detention Storage (ft³)	472.23	472.23

APPENDIX E: REFERENCE DRAWINGS



LEGEND

BASIN	BASIN AC Q_{100}
POINT OF COMPLIANCE	POC 1
FLOW PATH	
FLOW DIRECTION	
DRAINAGE NODE	101

N

0 15 30 60 90

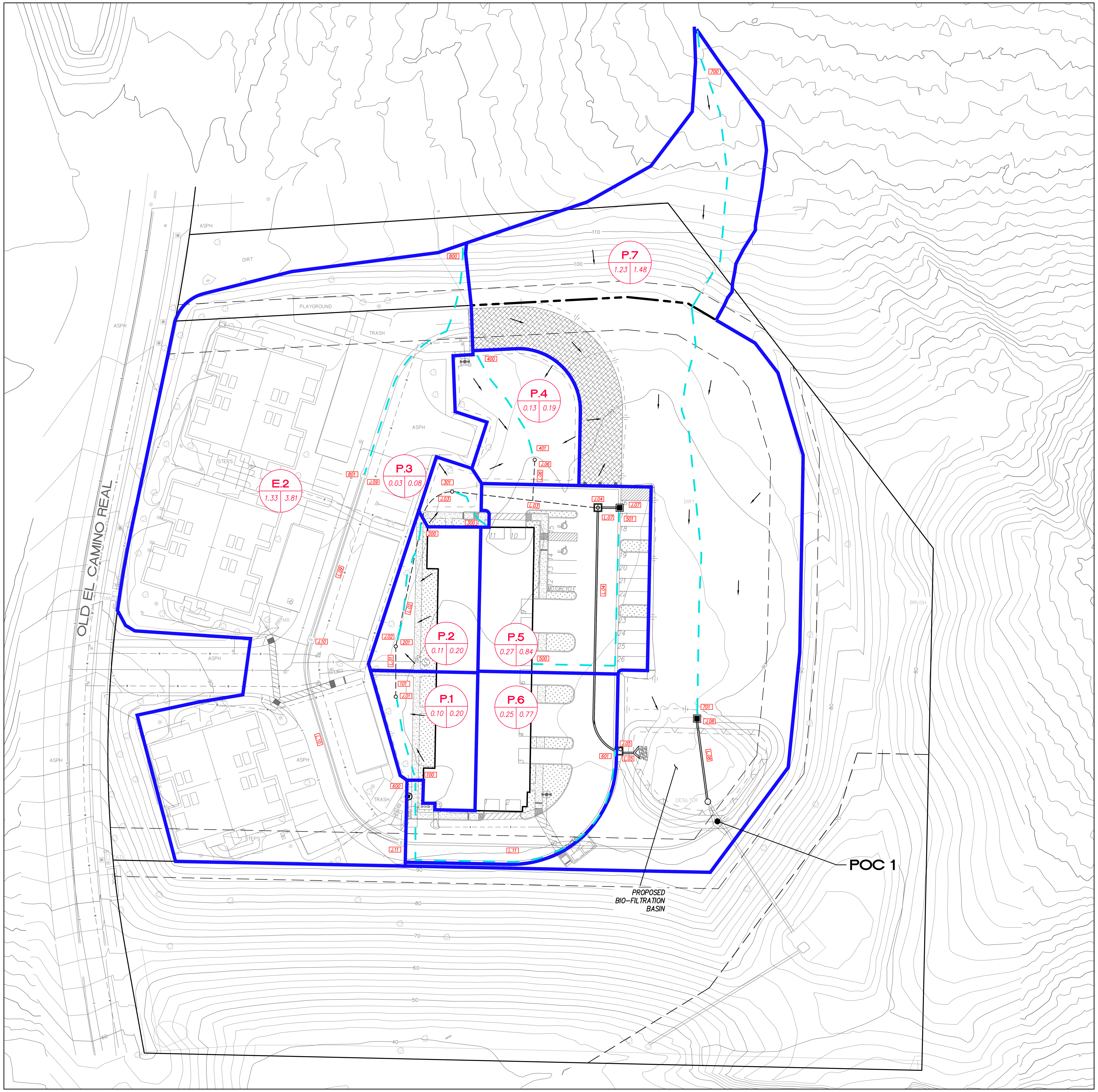
(IN FEET)
1 inch = 30 ft.

EXISTING HYDROLOGY

SCALE: 1"=30' JOB NO.: 1390.00

DATE: 2016-10-10 SHEET: 1 OF 1

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633



LEGEND

BASIN — BASIN, AC | Q_{100}

POINT OF COMPLIANCE — POC 1

FLOW PATH

FLOW DIRECTION

DRAINAGE NODE — 101

JUNCTION NODE — J1

LINK NODE — L1

N

0 15 30 60 90

(IN FEET)
1 inch = 30 ft.

PROPOSED HYDROLOGY

SCALE: 1"=30'
JOB NO.: 1390.00
DATE: 2016-10-10
SHEET: 1 OF 1

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

DEVELOPMENT SUMMARY

1. SUMMARY OF REQUEST:

   RESIDENTIAL DEVELOPMENT PERMIT AMENDMENT FOR A PLANNED PERMIT NO. 94-0576 PROPOSING AN ADDITIONAL 13 MULTI FAMILY AFFORDABLE DWELLING UNITS.

2. STREET ADDRESS

   14163 OLD EL CAMINO REAL SAN DIEGO, CA 92130

3. SITE AREA:

   TOTAL SITE AREA (GROSS): 1.80 ACRES (78,273 SQ. FT.)
   NET SITE AREA: 1.80 ACRES (78,273 SQ. FT.)
   (NET SITE AREA EXCLUDES REQUIRED STREETS AND PUBLIC DEDICATIONS)

4. ZONING: AR-1-1
5. COMMUNITY PLANNING AREA: PACIFIC HIGHLANDS RANCH
6. EXISTING USE: VACANT
   PROPOSED USE: MULTI-FAMILY DU
7. COVERAGE DATA

   TOTAL LANDSCAPE/OPEN SPACE AREA: 14,963 SF
   TOTAL HARDSCAPE/PAVED AREA: 27,385 SF
   MIN GROSS FLOOR AREA (GFA): 650 SF NOT INCLUDING GARAGE
   MAX LOT COVERAGE PER ZONE: 10%

8. DENSITY

   MAXIMUM DWELLING UNITS ALLOWED PER ZONE: 1 DU PER 10 ACRE LOT
   NUMBER OF EXISTING UNITS TO REMAIN ON SITE: NONE
   NUMBER OF PROPOSED DWELLING UNITS ON SITE: 13
   TOTAL NUMBER OF UNITS PROVIDED ON THE SITE: 13

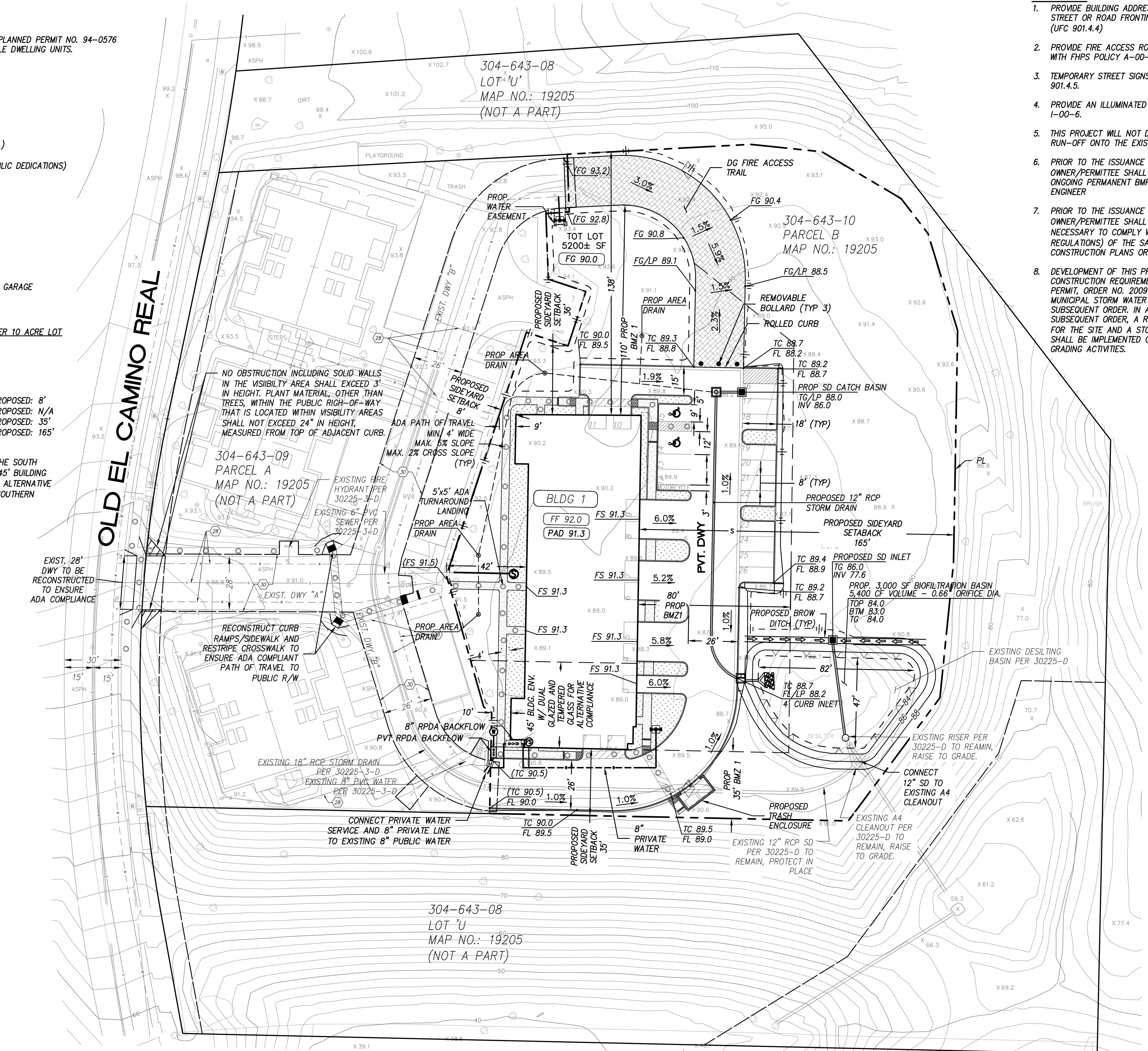
9. YARD/SETBACK:

FRONT YARD:	REQUIRED: 25'	PROPOSED: 8'
STREET SIDE YARD:	REQUIRED: N/A	PROPOSED: N/A
SIDE YARD(S):	REQUIRED: 20'	PROPOSED: 35'
REAR YARD:	REQUIRED: 25'	PROPOSED: 165'

10. EXISTING BRUSH MANAGEMENT ZONE 1 IS 20'
    PROPOSED BRUSH MANAGEMENT ZONE 1 IS 80' MINIMUM. THE SOUTH SIDE OF THE BUILDING HAS A PROPOSED 35' BMZ AND A 45' BUILDING ENVELOPE WITH DUAL TEMPERED/DUAL GLAZED GLASS FOR ALTERNATIVE COMPLIANCE WITH A 6' FIRE RATED BLOCK WALL ON THE SOUTHERN PROPERTY LINE.

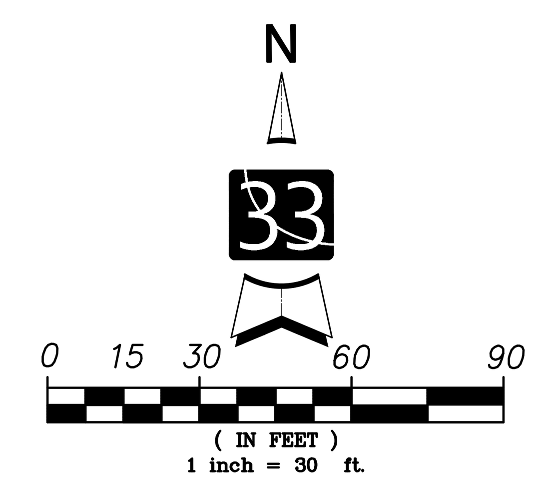
LEGEND:

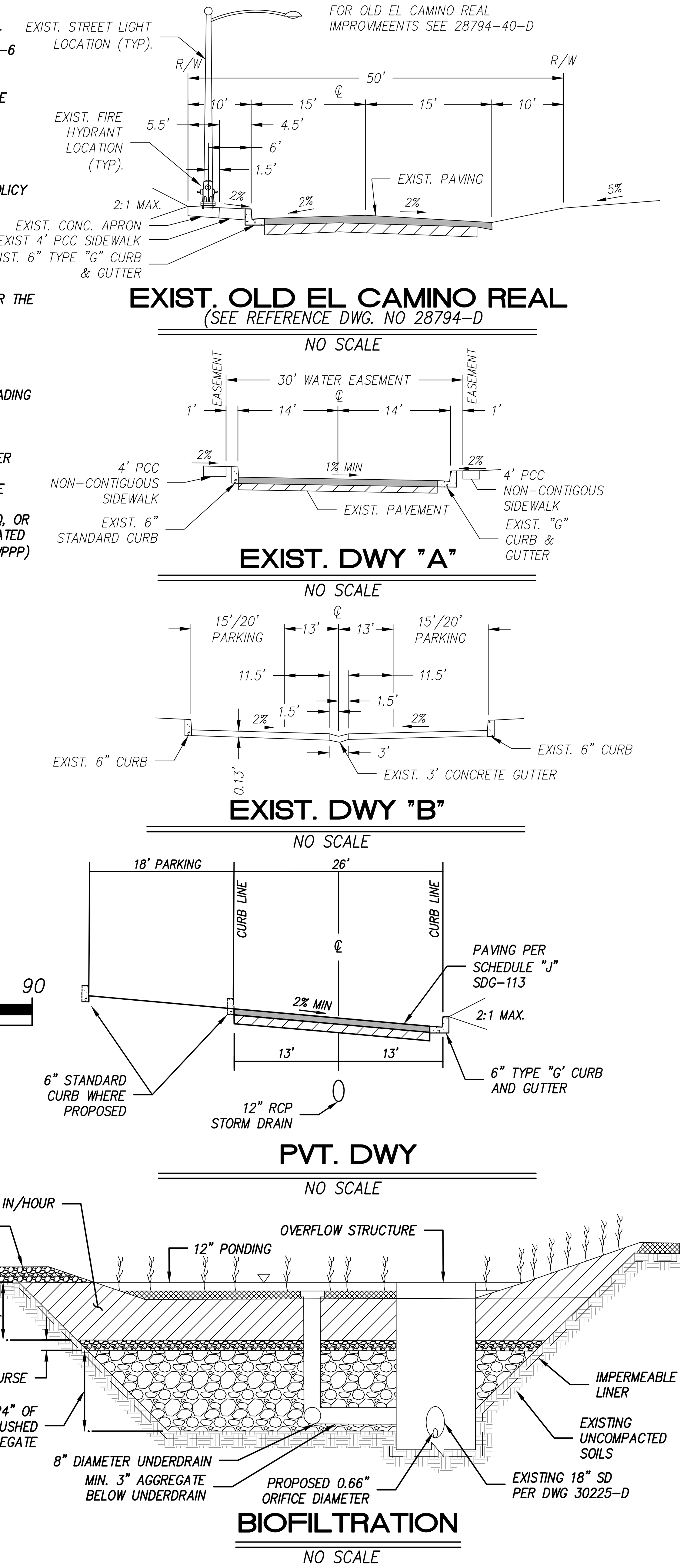
SLOPES 2:1 MAX. (TYP.)
DAYLIGHT LINE
PROPERTY LINE
SIDEWALK
CURB AND GUTTER
BRUSH MANAGEMENT ZONE
STORM DRAIN
PROPOSED WATER —W—W—W—W
FIRE HYDRANT ASSY.
LOT NUMBER 2
PAD ELEV. XXX.XXPAD
SEWER SERVICE
FIRE SERVICE
WATER SERVICE
BACKFLOW PREVENTION DEVICES
WATER METER M
ADA PATH OF TRAVEL
SIGHT VISIBILITY TRIANGLE



NOTE:

1. PROVIDE BUILDING ADDRESS NUMBERS, VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY PER FHPS POLICY P-00-6 (UFC 901.4.4)
2. PROVIDE FIRE ACCESS ROADWAY SIGNS OR RED CURBS IN ACCORDANCE WITH FHPS POLICY A-00-1.
3. TEMPORARY STREET SIGNS ARE REQUIRED IN ACCORDANCE WITH UFS 901.4.5.
4. PROVIDE AN ILLUMINATED DIRECTORY IN ACCORDANCE WITH FHPS POLICY I-00-6.
5. THIS PROJECT WILL NOT DISCHARGE ANY INCREASE IN STORM WATER RUN-OFF ONTO THE EXISTING HILLSIDE AREAS.
6. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE, SATISFACTORY TO THE CITY ENGINEER
7. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITTEE SHALL INCORPORATE ANY CONSTRUCTION BMPs NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
8. DEVELOPMENT OF THIS PROJECT SHALL COMPLY WITH ALL STORM WATER CONSTRUCTION REQUIREMENTS OF THE STATE CONSTRUCTION GENERAL PERMIT, ORDER NO. 2009-0009DWQ, OR SUBSEQUENT ORDER, AND THE MUNICIPAL STORM WATER PERMIT, ORDER NO. R9-2013-0001, OR SUBSEQUENT ORDER. IN ACCORDANCE WITH ORDER NO. 2009-0009DWQ, OR SUBSEQUENT ORDER, A RISK LEVEL DETERMINATION SHALL BE CALCULATED FOR THE SITE AND A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE IMPLEMENTED CONCURRENTLY WITH THE COMMENCEMENT OF GRADING ACTIVITIES.





GRADING

1. TOTAL AMOUNT OF SITE TO BE GRADED: 1.1 AC
2. PERCENT OF TOTAL SITE GRADED: 61%
3. AMOUNT OF SITE WITH 25% SLOPES OR GREATER: 0.08 AC
4. PERCENT OF THE EXIST. SLOPES STEEPER THAN 25% PROPOSED TO BE GRADED: 100%
5. PERCENT OF TOTAL SITE WITH 25% SLOPES OR GREATER: 4.4%
6. MAXIMUM DEPTH OF CUT: 4 FEET, AMOUNT OF CUT: 750 CY
7. MAXIMUM DEPTH OF FILL: 1 FEET, AMOUNT OF FILL: 1600 CY
8. MAXIMUM HEIGHT OF FILL SLOPES(S): 0 FEET 2:1 SLOPE RATIO
9. MAXIMUM HEIGHT OF CUT SLOPE(S): 4 FEET 2:1 SLOPE RATIO
10. AMOUNT OF EXPORT SOIL: 0
11. RETAINING/CRIB WALLS: HOW MANY: 0

    NOTE: ADDITIONAL WALLS UNDER 3' IN EIGHT MAY BE REQUIRED IN RESIDENTIAL PAD AREAS BASED ON FINAL HOUSE PLOTTING
    ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY OF SAN DIEGO STREET DESIGN MANUAL

EASEMENT INFORMATION

TITLE REPORT BY: CHICAGO TITLE INSURANCE COMPANY
ORDER NO.: 12205554-996-SDI

PARCELS AFFECTED	ITEM NO.	
B	28	AN AGREEMENT RELATING TO THE INSTALLATION, MAINTENANCE AND POSSIBLE REMOVAL OF PRIVATE WATER, SEWER AND STORM DRAIN BETWEEN THE CITY OF SAN DIEGO AND OWNER PER DOC. RECORDED MAY 01, 2000 AS FILE NO.: 2000-0224134 OF O.R. UTILITIES PER DWG. NO.: 32225-3-D
B	30	AN EASEMENT GRANTED TO THE CITY OF SAN DIEGO FOR WATER FACILITIES PER DOC. RECORDED JULY 7, 2000 AS FILE NO.: 2000-358753 OF O.R.

NON PLOTTABLE EASEMENTS

AN EASEMENT FOR PUBLIC UTILITIES, INGRESS AND EGRESS GRANTED TO SAN DIEGO GAS AND ELECTRIC PER DOC. RECORDED DECEMBER 19, 200 AS FILE NO.: 2000-0690567 OF O.R.

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN
RCE 34584
DATE

Name: LATITUDE 33 PLANNING & ENGINEERING
Address: 9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
Phone #: (858) 751-0633
Fax #: (858) 751-0634

Project Address:
14163 OLD EL CAMINO REAL

Project Name:
DEL MAR HIGHLANDS ESTATES AFFORDABLE SITE PDP/SDP FOR AMENDMENT TO PRD/RPO

Sheet Title:
GRADING, UTILITY, AND SITE PLAN

Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
Revision 4:	
Revision 3:	
Revision 2:	10/07/16
Revision 1:	08/19/16

Original Date: 07/06/16
Sheet 3 of 8
DEP#

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DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

WATER SYSTEM ANALYSIS
FOR THE DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING PROJECT
IN THE CITY OF SAN DIEGO

August 19, 2016

2234 FARADAY AVENUE • CARLSBAD, CA • (760) 438-4422

WATER SYSTEM ANALYSIS
FOR THE DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING PROJECT
IN THE CITY OF SAN DIEGO

August 19, 2016

REGISTERED PROFESSIONAL ENGINEER
ANDREW M. OVEN
C 41015
EXP. 3/31/17
CIVIL
STATE OF CALIFORNIA

8-19-2016

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
(760) 438-4422

Job No. 598-007

DEXTER WILSON ENGINEERING, INC.

DEXTER S. WILSON, P.E.
ANDREW M. OVEN, P.E.
STEPHEN M. NIELSEN, P.E.
NATALIE J. FRASCHETTI, P.E.

August 19, 2016 598-007

Latitude 33 Planning and Engineering
9968 Hibert Street 2nd Floor
San Diego, CA 92131

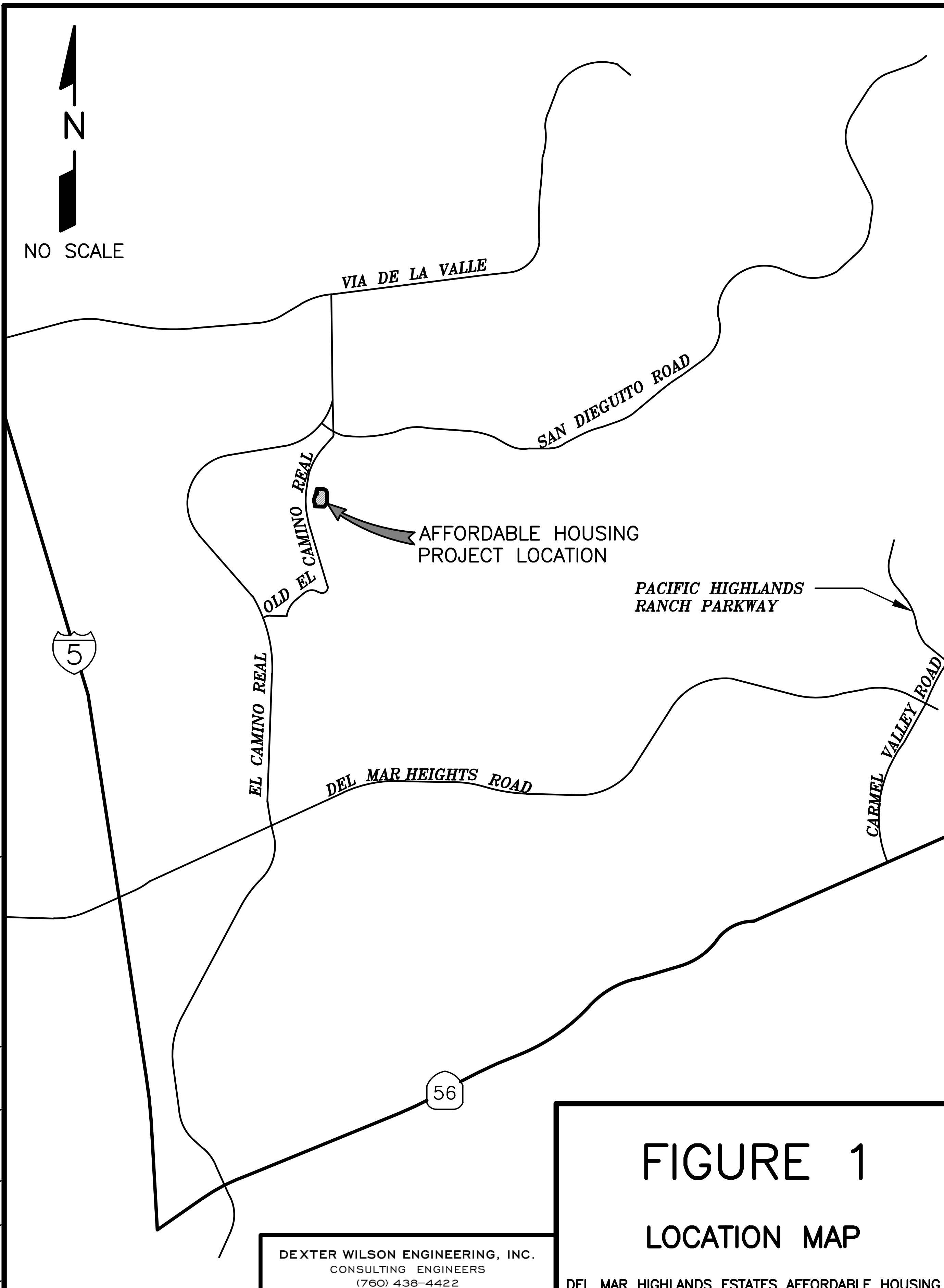
Attention: John Eardensohn, P.E., Senior Principal

Subject: Water System Analysis for the Del Mar Highlands Estates Affordable Housing Project in the City of San Diego

Introduction

This report provides a water system analysis for the Del Mar Highlands Estates Affordable Housing project in the City of San Diego. The Affordable Housing site is located east of Old El Camino Real approximately a quarter mile south of San Dieguito Road. The Affordable Housing project proposes to add 12 dwelling units to an existing site which includes 24 dwelling units. Figure 1 provides a location map for the project and a tentative development plan for the site is attached as Appendix A.

2234 FARADAY AVENUE • CARLSBAD, CA 92008 • (760) 438-4422 • FAX (760) 438-0173



ARTIC\DWG\598007\WATER\AFFORDABLE HOUSING\DHEAH_FIGURE 1.DWG 07-05-16 11:34:06 LAYOUT: LAYOUT1

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422

FIGURE 1

LOCATION MAP

DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING

Purpose of Study

The purpose of this study is to confirm the recommended water system improvements for the Affordable Housing site expansion project along Old El Camino Real. These improvements include the extension of a private fire protection water line within the existing Affordable Housing site to ensure that the proposed building will have adequate fire protection service. This report will verify that any recommended public improvements comply with the City of San Diego Water Department water system design standards.

Study Area

The Affordable Housing project encompasses approximately 1.8 acres. The project proposes to construct 12 Affordable Housing residential units on an existing site which has 24 dwelling units in three existing buildings. The pad elevation for the proposed building on the project is 91.3 feet.

The study area for this report is the boundary of the Affordable Housing project. The extent of the existing water system which was incorporated into the analysis of the project site was based on the existing Rancho Valley 360 Zone distribution system that serves the area. A water study titled "Water System Analysis for the Rancho Valley Farms Project in the City of San Diego" prepared by Dexter Wilson Engineering, Inc. on February 27, 2014, describes the proposed parameters and infrastructure in the Rancho Valley 360 Zone. The analysis of the Affordable Housing project assumes that the proposed improvements relating to the Rancho Valley 360 Zone described in the 2014 report have been installed and placed into operation.

Adjacent water mains up to the nearest sources were included in the computer model to ensure that the dynamics of the existing water system were analyzed as closely as possible. The nearest water sources for the Affordable Housing site are pressure reducing stations which feed the Rancho Valley 360 Zone from the North City 610 Zone and from the Lusk 470 Zone.

Affordable Housing Project Water Demands

The water demands and corresponding proposed public water facilities were developed in accordance with the City of San Diego Design Guidelines and Standards. Residential water demand at densities less than nine dwelling units per acre is estimated based on 3.5 persons per dwelling unit and a unit water demand of 150 gpd/person which results in a water demand rate of 525 gpd per single family dwelling unit.

Table 1 presents the projected potable water demand for the Affordable Housing project.

TABLE 1
DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING SITE
POTABLE WATER DEMAND

Land Use	Quantity	Demand Factor	Average Water Use, gpd
Residential (<9 DUs/acre)	12 Units	525 gpd/SF DU	6,300
TOTAL			**6,300 gpd = 4.4 gpm**

From the City of San Diego Guidelines and Standards, Figure 2-2, the maximum day demand to average annual demand ratio is approximately 2.4 based on the Coastal/Downtown peaking curve, resulting in an estimated maximum day demand of 15,120 gpd (10.5 gpm).

From the City of San Diego Guidelines and Standards, Figure 2-1, the peak hour demand to average annual demand ratio is approximately 6.1 based on the Coastal/Downtown peaking curve, resulting in an estimated peak hour demand of 38,430 gpd (26.7 gpm). Appendix B of this report presents the backup data for determining these peaking factors.

City of San Diego Design Criteria

Book 2 of the City of San Diego Guidelines and Standards was used to analyze and layout the proposed water system. A summary of the design criteria from Book 2 is presented as Table 2.

TABLE 2
DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING SITE
WATER SYSTEM DESIGN CRITERIA

Criteria	Design Requirement
Minimum Static Pressure	65 psi
Maximum Static Pressure	120 psi
Maximum Pressure Drop – Reservoir Out of Service	40 psi
Maximum Pressure Drop – Peak Hour & Max Day plus Fire	25 psi
Minimum Pressure – Peak Hour	40 psi
Minimum Pressure – Max Day plus Fire	20 psi
Maximum Pipeline Velocity (Fire Flow)[1]	15 fps
Maximum Pipeline Velocity (Normal Operating Conditions)[2]	5 fps

[1] Section 3.3.1 E
[2] Section 3.10.1

Fire Flow

The fire flow requirement for the Affordable Housing site was estimated based on the 2013 California Fire Code. The fire code takes into account building area and construction type. The single building proposed for the Affordable Housing site is estimated to be 16,019 square feet. For construction type, the worst case, Type V-B, was assumed. This results in an estimated fire flow requirement of 3,500 gpm. After the expected reduction of 50% for an NFPA approved fire sprinkler system, the final fire flow requirement for the Affordable Housing site equates to 1,750 gpm. The excerpt from the 2013 California Fire Code pertaining to fire flow requirements is shown in Appendix C.

Existing Water System

There are existing public water facilities directly adjacent to the Del Mar Highlands Estates Affordable Housing site. The existing facilities are part of the Rancho Valley 360 Zone. There is a 12-inch public water line in Old El Camino Real and two 8-inch public water lines extended into the Affordable Housing site. The existing potable water facilities in the vicinity of the project are shown on Figure 2 and a Hydraulic Control Map is presented on Figure 3. The Hydraulic Control Map shows existing pressure zones in the vicinity of the proposed Del Mar Highlands Estates Affordable Housing project.

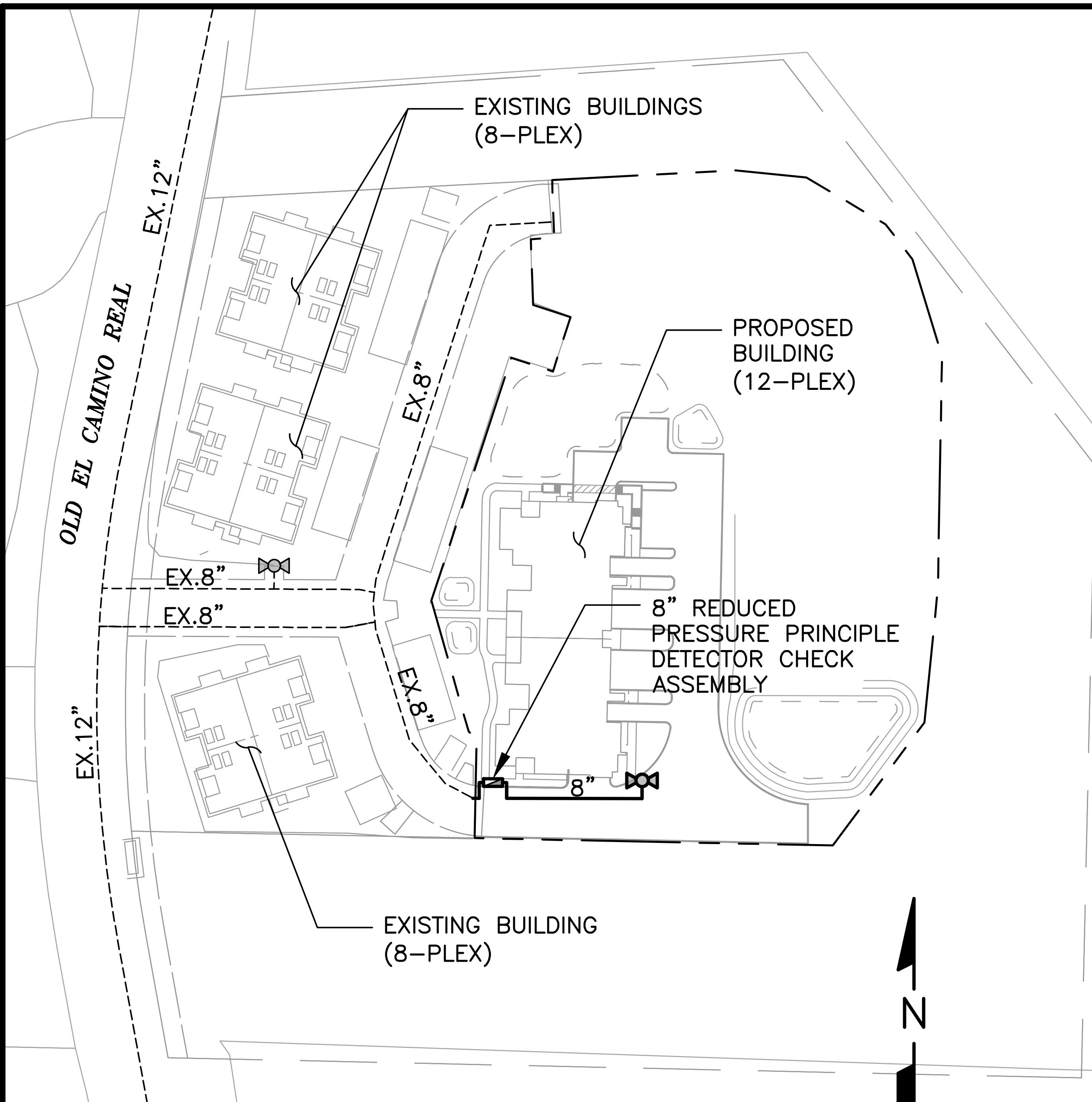
Water System Computer Model

The University of Kentucky KYPIPE computer program was used to conduct a hydraulic model of the proposed water system within the study area. This computer program utilizes the Hazen-Williams equation for determining headloss in pipes; the Hazen-Williams "C" value used for all pipes is 120.

The model for this analysis includes existing public and proposed public lines in the near vicinity of the project site. The two existing PRVs that serve the 360 Zone were inputted as sources for the computer model. One PRV feeds a 12-inch public water line in Rancho Las Brisas Trail and the other PRV in the 360 Zone feeds an 8-inch public water line in Modena Place. These locations were entered as the sources ("0" Nodes) of the water model. The same HGL, 350 feet, from the 2014 report for the two PRVs serving the 360 Zone was used in the computer model.

Water Service Overview

The Del Mar Highlands Estates Affordable Housing project will obtain water through the existing 8-inch public water line within the property. This line and all other public water lines inside the existing Affordable Housing property are within the Rancho Valley 360 Zone. The pad elevation for the proposed 12-unit building, 91.3 psi, results in a static pressure of 117 psi.



LEGEND

- PROJECT BOUNDARY
- EXISTING PUBLIC WATER
- PROPOSED PRIVATE FIRE SYSTEM
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT

SCALE: 1" = 80'

0 80

FEET

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422

FIGURE 2

WATER SYSTEM

DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING

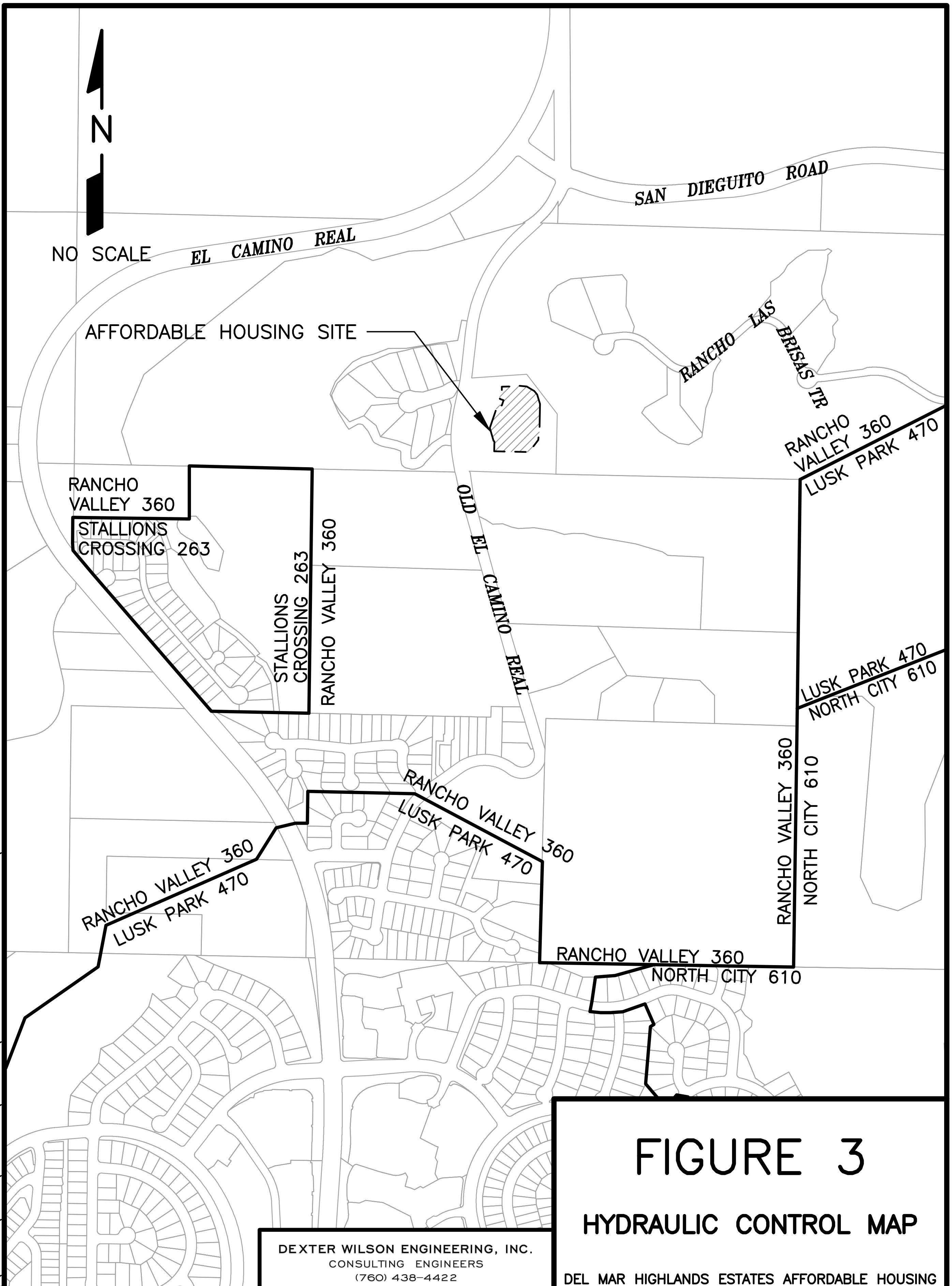


FIGURE 3

HYDRAULIC CONTROL MAP

DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422

ARTIC\DWG\598007\WATER\AFFORDABLE HOUSING\DHEAH_FIGURE 3.DWG 07-05-16 11:31:39 LAYOUT: LAYOUT1

To supply domestic water to the new 12-unit building, a domestic water meter will be connected to the existing public 8-inch water line in the Affordable Housing site. Fire protection will be provided by extending a private fire protection water main connected to the existing public water main with a reduced pressure principle detector check assembly. The private fire protection system water main will be extended east to a new private fire hydrant at the south end of the proposed Affordable Housing building.

Water System Analysis and Results

Appendix D presents the computer modeling results for the Affordable Housing site. The fire flow requirement of 1,750 gpm was split between the two fire hydrants within the Affordable Housing site. A pipe break scenario was also modeled. Under all cases the fire flow requirement is being met with greater than 20 psi residual pressure. Minimum residual pressures onsite are greater than 111 psi under normal operating conditions and 85 psi under a pipe break scenario.

The results of the computer hydraulic analysis indicate that the proposed water system for the project can achieve greater than 20 psi residual pressure under a maximum day demand plus 1,750 gpm fire flow scenario by extending a private fire protection main from the end of the existing public water system to a new private fire hydrant as shown on Figure 2.

Conclusions and Recommendations

The following conclusions and recommendations are summarized based on the water system analysis prepared for the Affordable Housing project.

1. The Del Mar Highlands Estates Affordable Housing project will be supplied from the Rancho Valley 360 Zone system.

2. Maximum static pressure within the Affordable Housing site will be 117 psi.

3. A maximum day demand plus 1,750 gpm fire flow can be met at the project site with all residual pressures greater than 20 psi and pipeline velocities less than 15 fps under an all pipes open scenario as well as under a pipe break scenario.

4. No new public water mains are being proposed for service to the Affordable Housing building.

5. The existing 8-inch 360 Zone public water main within the existing affordable housing site will be extended as a private fire protection main to a new private fire hydrant to provide service to the Del Mar Highlands Estates Affordable Housing building.

6. An 8" reduced pressure principle detector check assembly must be installed off of the existing public 8" water main to separate the public water system from the private fire protection system proposed for the 12 Affordable Housing units.

7. Figure 2 provides the recommended public water system improvements for the Del Mar Highlands Estates Affordable Housing project.

8. An individual pressure regulator must be installed on the proposed 12-unit building supply in order to comply with the California Plumbing Code which limits pressure inside a dwelling unit to a maximum of 80 psi.

9. New piping to be installed as part of the public water system outlined in this report shall conform to AWWA C900 DR18 Class 235 for pipe sizes 12-inch diameter and smaller.

10. If any water lines to be constructed by this development are metallic, a California Licensed Corrosion Engineer will be required to perform a soil corrosivity study and to design a Corrosion Control System.

If you have any questions regarding the information or conclusions and recommendations presented in this report, please do not hesitate to call.

Dexter Wilson Engineering, Inc.

Andrew Oven, P.E.

AO:SH:sm

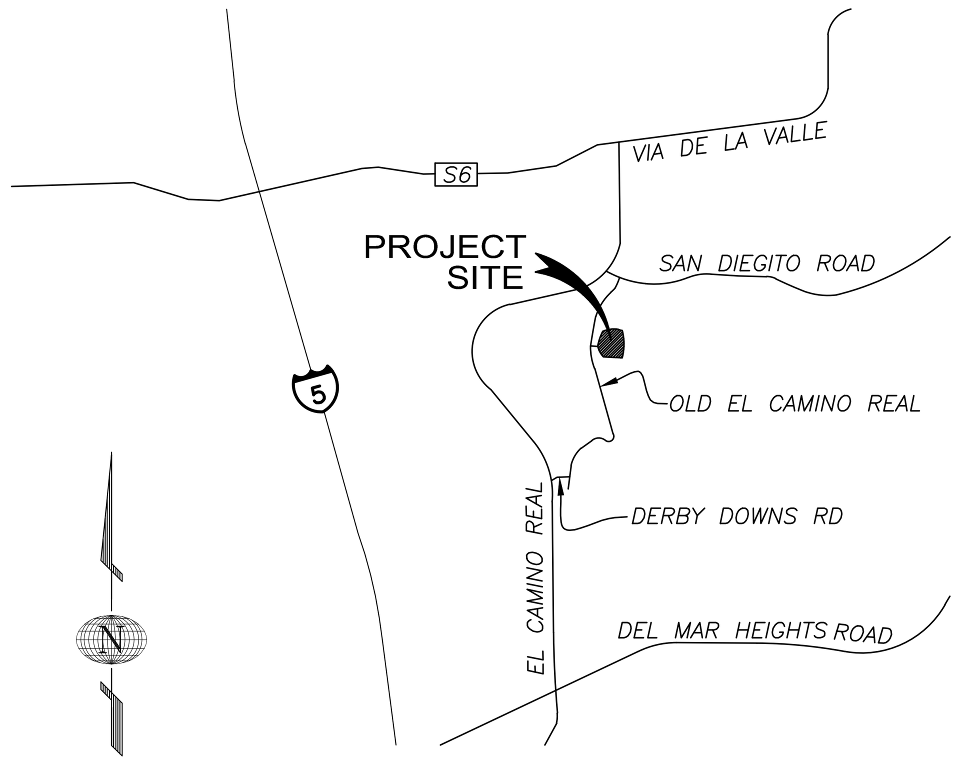
Attachments

APPENDIX A

PRELIMINARY DEVELOPMENT PLAN

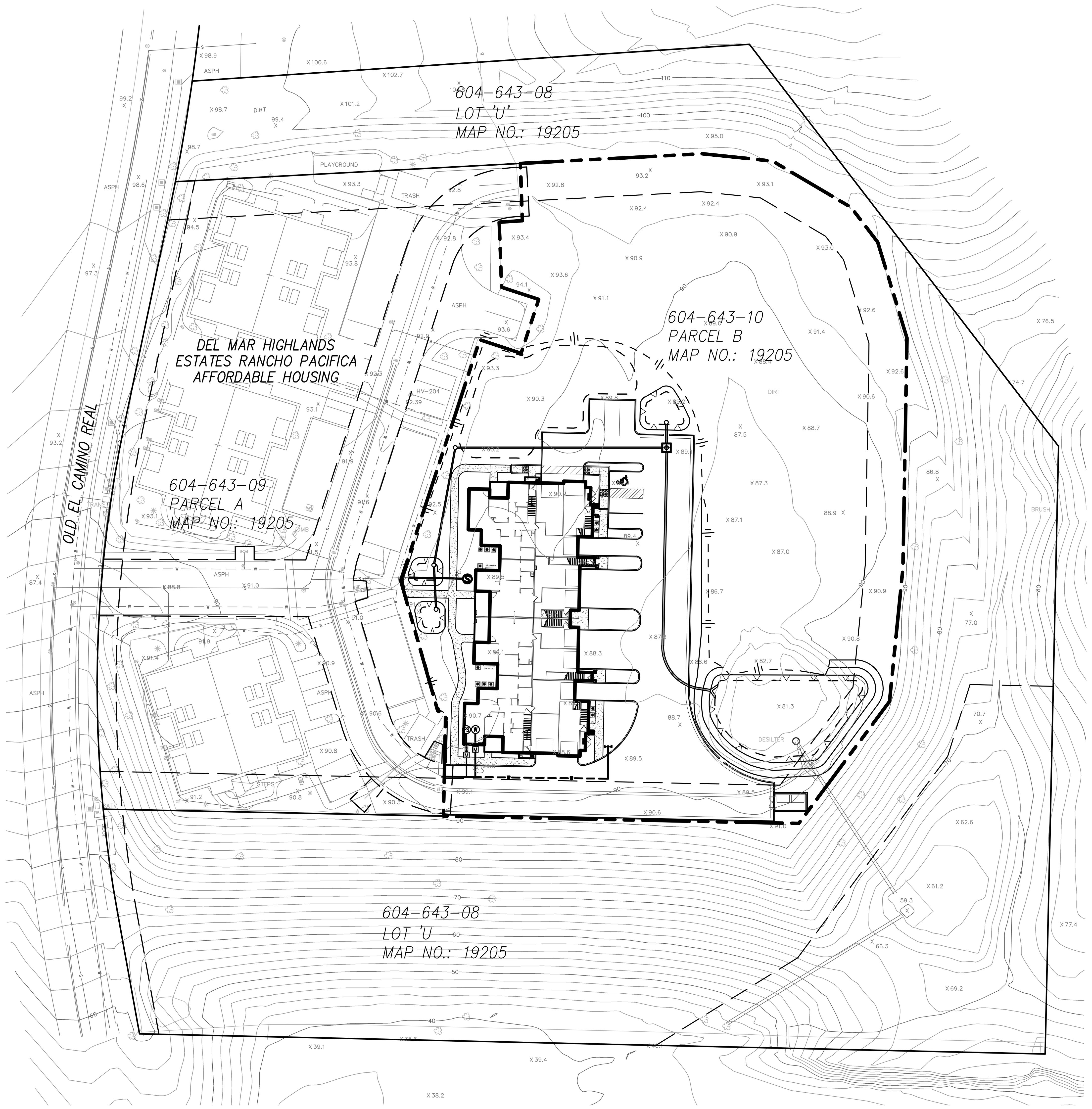
DEL MAR HIGHLANDS ESTATES AFFORDABLE SITE PLANNED DEVELOPMENT PERMIT NO. XX-XXXX

CITY OF SAN DIEGO



VICINITY MAP

NTS



N

0 20 40 80 120

(IN FEET)
1 inch = 40 ft.

GRADING

1. TOTAL AMOUNT OF SITE TO BE GRADED: 0.96 AC
2. PERCENT OF TOTAL SITE GRADED: 53%
3. AMOUNT OF SITE WITH 25% SLOPES OR GREATER: 0.08 AC
4. PERCENT OF THE EXIST. SLOPES STEEPER THAN 25% PROPOSED TO BE GRADED: 100%
5. PERCENT OF TOTAL SITE WITH 25% SLOPES OR GREATER: 4.4%
6. AMOUNT OF CUT: 400 CUBIC YARDS
7. AMOUNT OF FILL: 1600 CUBIC YARDS
8. MAXIMUM HEIGHT OF FILL SLOPES(S): 4 FEET 2:1 SLOPE RATIO
9. MAXIMUM HEIGHT OF CUT SLOPE(S): 0 FEET 2:1 SLOPE RATIO
10. AMOUNT OF EXPORT SOIL: 0
11. RETAINING/CRIB WALLS: HOW MANY: 0
    MAXIMUM LENGTH: 0
    MAXIMUM HEIGHT: 0

NOTE: ADDITIONAL WALLS UNDER 3' IN EIGHT MAY BE REQUIRED IN RESIDENTIAL PAD AREAS BASED ON FINAL HOUSE PLOTTING

ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY OF SAN DIEGO STREET DESIGN MANUAL

DEVELOPMENT SUMMARY

1. SUMMARY OF REQUEST:

   RESIDENTIAL DEVELOPMENT PERMIT AMENDMENT FOR A PLANNED PERMIT NO. 94-0576 PROPOSING AN ADDITIONAL 12 MULTI FAMILY AFFORDABLE DWELLING UNITS.

2. STREET ADDRESS

   14163 OLD EL CAMINO REAL SAN DIEGO, CA 92130

3. SITE AREA:

   TOTAL SITE AREA (GROSS): 1.80 ACRES (78,273 SQ. FT.)
   NET SITE AREA: __________ (__________ SQ. FT.)
   (NET SITE AREA EXCLUDES REQUIRED STREETS AND PUBLIC DEDICATIONS)

4. ZONING: AR-1-1

4. COMMUNITY PLANNING AREA: PACIFIC HIGHLANDS RANCH

6. COVERAGE DATA

   TOTAL LANDSCAPE/OPEN SPACE AREA: ___________
   TOTAL HARDSCAPE/PAVED AREA: ___________
   MIN GROSS FLOOR AREA (GFA): 650 SF NOT INCLUDING GARAGE
   MAX LOT COVERAGE: 10%

7. DENSITY

   MAXIMUM DWELLING UNITS ALLOWED PER ZONE: 1 DU PER LOT
   NUMBER OF EXISTING UNITS TO REMAIN ON SITE: NONE
   NUMBER OF PROPOSED DWELLING UNITS ON SITE: 12
   TOTAL NUMBER OF UNITS PROVIDED ON THE SITE: 12

8. YARD/SETBACK:

FRONT YARD:	REQUIRED: 25'
STREET SIDE YARD:	REQUIRED: N/A
SIDE YARD(S):	REQUIRED: 20'
REAR YARD:	REQUIRED: 25'

9. BRUSH MANAGEMENT ZONE 1 IS 20'

LEGAL DESCRIPTION

PARCEL 1: APN 304-643-09

PARCEL A OF PARCEL MAP 19205 IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 9, 2003.

PARCEL 2: APN 304-643-08

LOT U OF DEL MAR HIGHLANDS ESTATES, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 13818, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 2, 1999.

EXCEPTING THEREFROM, UNTIL DECEMBER 31, 2044, AS A MINERAL INTEREST AND NOT AS A ROYALTY INTEREST, ALL OF THE MINERALS OF EVERY KIND, INCLUDING, BUT NOT LIMITED TO, ALL OIL, GAS, HYDROCARBONS AND ASSOCIATED SUBSTANCES IN, UNDER OR THAT MAY BE EXTRACTED, PRODUCED AND SAVED FROM SAID REAL PROPERTY BUT WITHOUT THE RIGHT OF ENTRY TO THE SURFACE OF SAID REAL PROPERTY OR THE TOP 500 FEET OF THE SUBSURFACE OF SAID REAL PROPERTY FOR THE PURPOSES OF EXPLORING FOR, DEVELOPING AND REMOVING SUCH MATERIALS.

PARCEL 3: APN 304-643-10

PARCEL B OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY APRIL 9, 2003.

PARCEL 4:

AN EASEMENT FOR GENERAL UTILITY PURPOSES, TOGETHER WITH THE RIGHT TO REPLACE, MAINTAIN AND ALTERATION OF ANY UTILITY EQUIPMENT OR FACILITY, AND FOR VEHICULAR AND PEDESTRIAN INGRESS, EGRESS ON AND OVER THE DRIVEWAY ON PARCEL A OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 9, 2003, DELINEATED ON SAID PARCEL MAP AS "GENERAL UTILITY AND ACCESS EASEMENT GRANTED HEREON".

SHEET INDEX

OWNER/DEVELOPER: PARDEE HOMES
13400 SABRE SPRINGS PARKWAY, SUITE 200
SAN DIEGO, CA 92128
(858)794-2500 FAX(858)794-2599

PLANNING: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

CIVIL ENGINEER: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

LANDSCAPE ARCHITECT: RICK ENGINEERING
5620 FRIARS RD.
SAN DIEGO, CA 92110
(619) 291-0707

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN
RCE 34584 EXP. 9-30-2003

DATE

GENERAL NOTES

LOT SUMMARY

1. RESIDENTIAL LOTS:	1	TOTAL AREA: ______
WATER QUALITY BASIN LOTS:	4	TOTAL AREA: 0.07 AC
HOA:	1	TOTAL AREA: ______
MONUMENT SIGN LOTS:	X	TOTAL AREA: ______
PUBLIC RIGHT OF WAY:		TOTAL AREA: ______

2. TOTAL AREA WITHIN SUBDIVISION IS 1.80 ACRES GROSS.
4. GAS AND ELECTRIC: SAN DIEGO GAS & ELECTRIC
5. TELEPHONE: TIME WARNER CABLE
6. CABLE TELEVISION: TIME WARNER CABLE
7. SEWER AND WATER: CITY OF SAN DIEGO
8. DRAINAGE SYSTEM: AS REQUIRED BY CITY ENGINEER
9. FIRE: CITY OF SAN DIEGO
10: SCHOOL DISTRICT: SAN DIGUITO UNION H.S./SOLANA BEACH ELEMENTARY SCHOOL DISTRICT
11. ALL NEW UTILITIES WILL BE LOCATED UNDERGROUND
12. CONTOUR INTERVAL: 2 FEET
    DATUM: GPS PT. NP. 542 - N 1,927,136.68, E 6,267,611.17, ELEV. = 190.83
    SOURCE: SAN-LO AERIAL SURVEYS
    DATE: 1-5-99
13. ALL PROPOSED SLOPES ARE 2:1 UNLESS NOTED OTHERWISE
14. GRADING SHOWN HEREON IS PRELIMINARY AND IS SUBJECT TO MODIFICATION IN FINAL DESIGN
15. LOT DIMENSIONS AND SETBACK DIMENSIONS SHOWN HEREON ARE PRELIMINARY AND ARE SUBJECT TO MODIFICATION IN FINAL DESIGN
17. OPEN SPACE LOTS TO BE MAINTAINED BY THE HOME OWNERS ASSOCIATION

OCCUPANCY CLASSIFICATION	ZONING DESIGNATION	TYPE OF CONSTRUCTION
MULTI-FAMILY	R-1	TYPE V / RATED

18. ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH A GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY STREET DESIGN MANUAL.
19. ALL PUBLIC WATER FACILITIES AND ASSOCIATED EASEMENTS WILL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE CITY OF SAN DIEGO WATER FACILITY DESIGN GUIDELINES AND REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO.
20. THIS TENTATIVE MAP INCLUDES MULTIPLE MAP UNITS WHICH MAY BE FILED AS INDIVIDUAL FINAL MAPS AS PERMITTED BY THE CALIFORNIA STATE SUBDIVISION MAP ACT. THE DEVELOPER RESERVES THE RIGHT TO FILE THE FINAL MAPS OUT OF NUMERICAL SEQUENCE. THE CITY ENGINEER SHALL REVIEW SUCH MAP UNITS AND IMPOSE REASONABLE CONDITIONS RELATING TO THE FILING OF SAID MAP UNITS

SOLAR ACCESS NOTE

THIS IS TO AFFIRM THAT THE DESIGN OF THIS SUBDIVISION PROVIDES, TO THE EXTENT FEASIBLE, FOR FUTURE PASSIVE OR NATURAL HEATING AND COOLING OPPORTUNITIES IN ACCORDANCE WITH THE PROVISION OF SECTION 66473.1 OF THE STATE SUBDIVISION MAP ACT.

ASSESSOR'S PARCEL NO.

304-643-10, 304-643-09, 304-643-08

LAMBERT COORDINATES

288-1705

DESITY

MAXIMUM NUMBER OF DWELLING UNITS ALLOWED PER ZONE: _______
MAXIMUM NUMBER OF DWELLING UNITS ON SITE: _______

BENCHMARK

LOCATION: OLD EL CAMINO REAL/SAN DIEGUITO ROAD
*SEBP (SOUTHEAST CORNER BRASS PLUG) TOP INLET
REFERENCE: CITY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK/OCTOBER 04, 2011
INDEX: NORTHING 295499 EASTING 1699630
ELEVATION: 22.473 DATUS IS: M.S.L

*ELEVATION UP-DATED PER U.S.C.G.S. ADJUSTMENT OF 1970, MAY DIFFER FROM PREVIOUS ELEVATION

GEOLOGIC HAZARD CATEGORY

53 - LEVEL OR SLOPING TERRAIN, UNFAVORABLE GEOLOGIC STRUCTURE, LOW TO MODERATE RISK.

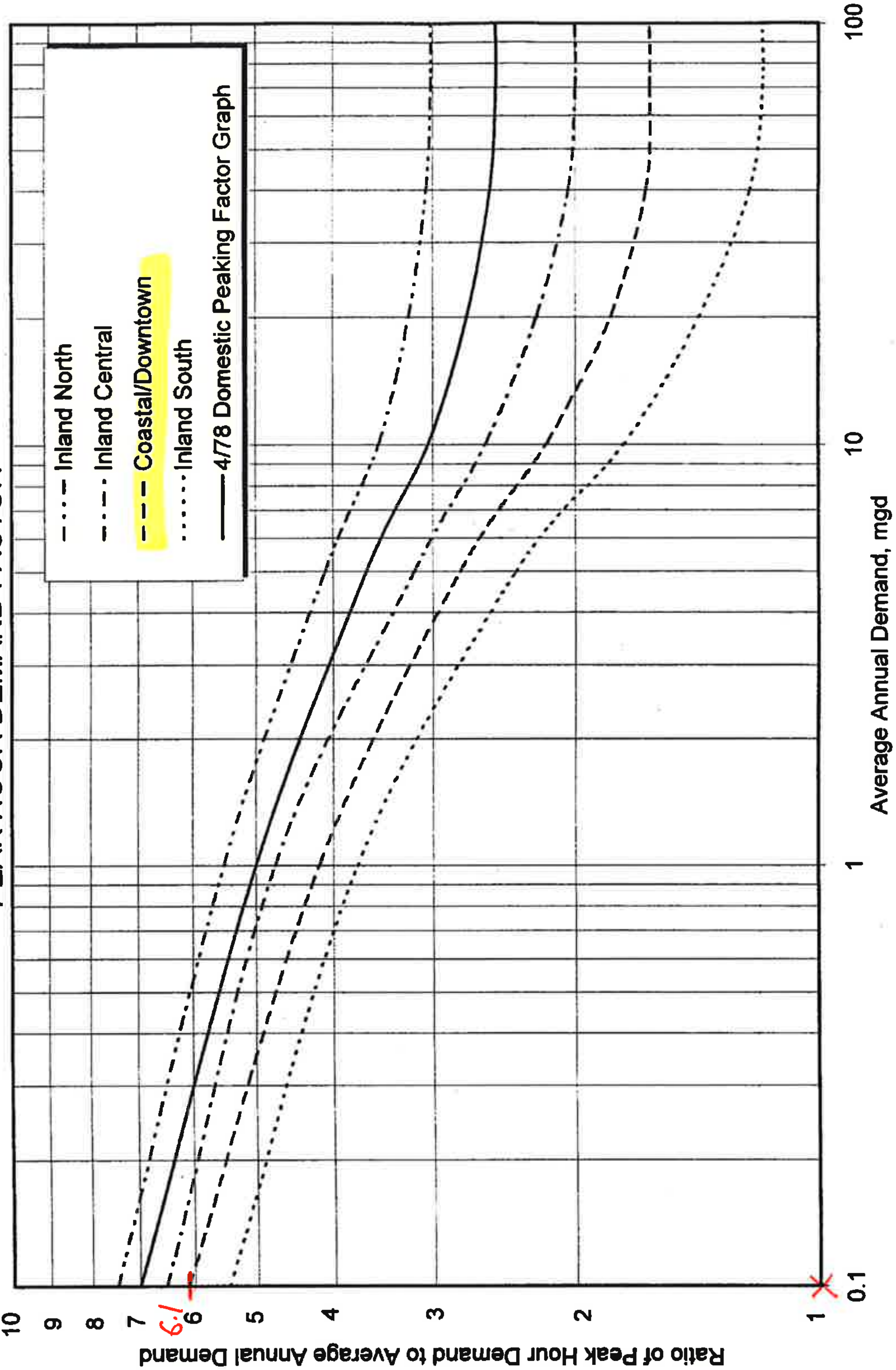
Name:	LATITUDE 33 PLANNING & ENGINEERING	Revision 14:
		Revision 13:
Address:	9968 HIBERT ST. 2ND FLR	Revision 12:
	SAN DIEGO, CA 92131	Revision 11:
Phone #:	(858) 751-0633	Revision 10:
Fax #:	(858) 751-0634	Revision 9:
		Revision 8:
Project Address:	14163 OLD EL CAMINO REAL	Revision 7:
		Revision 6:
		Revision 5:
		Revision 4:
		Revision 3:
Project Name:	DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING	Revision 2:
		Revision 1:
		Original Date:
Sheet Title:	SITE DEVELOPMENT PERMIT COVER SHEET	Sheet 1 of XXX
		DEP#

APPENDIX B

PEAKING FACTOR TABLES

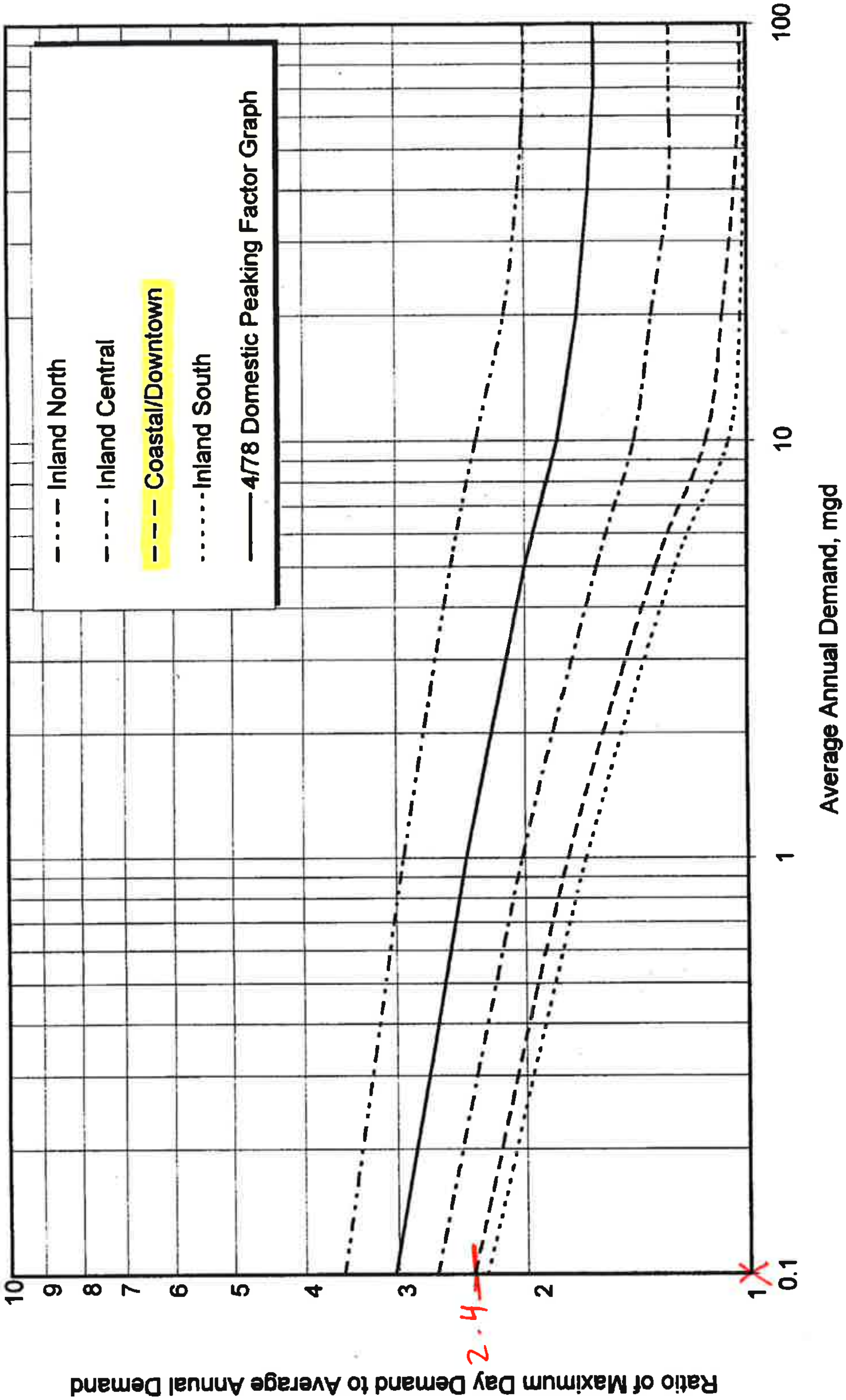
AFFORDABLE HOUSING

FIGURE 2-1
PEAK HOUR DEMAND FACTOR



AFFORDABLE HOUSING

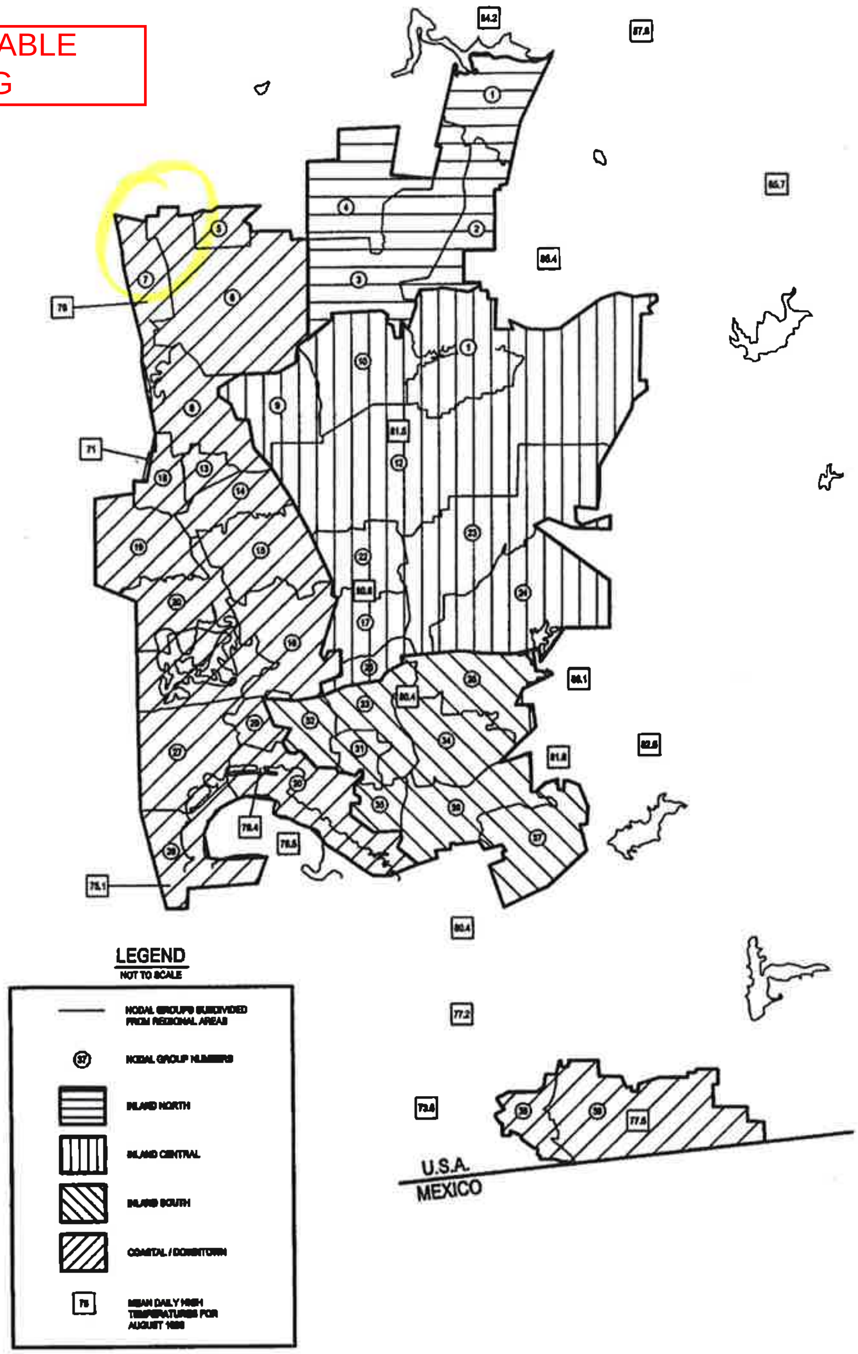
FIGURE 2-2
MAXIMUM DAY DEMAND FACTOR



PEAKING FACTOR ZONES
(BOUNDARIES BASED ON LAND USE GROUPINGS)

FIGURE 2-3

AFFORDABLE HOUSING



July 1999

APPENDIX C

2013 CALIFORNIA FIRE CODE
FIRE FLOW REQUIREMENTS

dwellings having a fire-flow calculation area that does not xceed 3,600 square feet (344.5 m^2) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet (344.5m^2) shall not be less than that specified in Table B105.1.

Exception: A reduction in required fire-flow of 50 percent, as approved, is allowed when the building is equipped with an approved automatic sprinkler system.

B105.2 Buildings other than one- and two-family dwellings. The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table B105.1.

Exceptions:

1. A reduction in required fire-flow of up to 75 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1.
2. *[SFM] Group B, S-2 and U occupancies having a floor area not exceeding 1,000 square feet, primarily constructed of noncombustible exterior walls with wood or steel roof framing, having a Class A roof assembly, with uses limited to the following or similar uses:*
   - *2.1. California State Parks buildings of an accessory nature (restrooms).*
   - *2.2. Safety roadside rest areas, (SRRA), public restrooms.*
   - *2.3. Truck inspection facilities, (TIF), CHP office space and vehicle inspection bays.*
   - *2.4. Sand/salt storage buildings, storage of sand and salt.*

TABLE B105.1
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *California Building Code*.

b. Measured at 20 psi residual pressure.

APPENDIX D

COMPUTER MODELING OUTPUT

AFFORDABLE HOUSING SITE

Node and Pipe Diagram is presented as Exhibit A

The following conditions were modeled:

1. Average Day Demand
2. Maximum Day Demand plus 1,750 gpm Fire Flow split between Nodes 302 and 314
3. Peak Hour Demand
4. Maximum Day Demand plus 1,750 gpm Fire Flow split between Nodes 302 and 314, Pipe 301 Closed

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: All Pipes Open - Average Day Demand

Pipe No.	Pipe Size (inches)	Model Run Flow (gpm)	Model Run Velocity (fps)
202	8	14.89	0.1
203	12	14.89	0.04
204	12	14.89	0.04
205	12	14.89	0.04
211	12	-8.27	-0.02
214	12	14.89	0.04
216	12	8.21	0.02
217	12	8.21	0.02
220	12	8.21	0.02
223	8	8.21	0.05
226	8	8.21	0.05
301	8	6.62	0.04
305	8	6.62	0.04
309	8	6.48	0.04
313	8	0.82	0.01
317	8	4.4	0.03
321	8	0	0
323	8	0	0
325	8	0	0

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: All Pipes Open - Max Day Demand plus 1,750 gpm Fire Flow
Split betweem Nodes 302 and 314

Pipe No.	Pipe Size (inches)	Model Run Flow (gpm)	Model Run Velocity (fps)
202	8	1164.04	7.43
203	12	1164.04	3.3
204	12	1164.04	3.3
205	12	1164.04	3.3
211	12	-160.55	-0.46
214	12	1164.04	3.3
216	12	641.4	1.82
217	12	641.4	1.82
220	12	641.4	1.82
223	8	641.4	4.09
226	8	641.4	4.09
301	8	1003.49	6.4
305	8	128.49	0.82
309	8	777.95	4.97
313	8	114.57	0.73
317	8	885.56	5.65
321	8	875	5.58
323	8	875	5.58
325	8	875	5.58

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: All Pipes Open - Peak Hour Demand

Pipe No.	Pipe Size (inches)	Model Run Flow (gpm)	Model Run Velocity (fps)
202	8	90.81	0.58
203	12	90.81	0.26
204	12	90.81	0.26
205	12	90.81	0.26
211	12	-50.45	-0.14
214	12	90.81	0.26
216	12	50.1	0.14
217	12	50.1	0.14
220	12	50.1	0.14
223	8	50.1	0.32
226	8	50.1	0.32
301	8	40.36	0.26
305	8	40.36	0.26
309	8	39.55	0.25
313	8	4.98	0.03
317	8	26.84	0.17
321	8	0	0
232	8	0	0
325	8	0	0

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: Max Day Demand plus 1,750 gpm Fire Flow
Split betweem Nodes 302 and 314
Pipe 301 Closed

Pipe No.	Pipe Size (inches)	Model Run Flow (gpm)	Model Run Velocity (fps)
202	8	1162.47	7.42
203	12	1162.47	3.3
204	12	1162.47	3.3
205	12	1162.47	3.3
211	12	-1162.47	-3.3
214	12	1162.47	3.3
216	12	642.97	1.82
217	12	642.97	1.82
220	12	642.97	1.82
223	8	642.97	4.1
226	8	642.97	4.1
301	8	CLOSED	
305	8	-875	-5.58
309	8	1781.44	11.37
313	8	-888.92	-5.67
317	8	885.56	5.65
321	8	875	5.58
323	8	875	5.58
325	8	875	5.58

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: All Pipes Open - Average Day Demand

Node No.	Node El. Ft.	HGL Zone Ft. (Static)	Static P psi	Model Run P, psi	Delta P from Static
3	180	360	77.99	73.67	4.32
4	158	360	87.52	83.2	4.32
5	154	360	89.25	84.93	4.32
6	99	360	113.08	108.76	4.32
12	95	360	114.82	110.5	4.32
15	86	360	118.72	114.4	4.32
17	40	360	138.65	134.33	4.32
18	110	360	108.32	104	4.32
21	205	360	67.16	62.83	4.33
24	148	360	91.85	87.53	4.32
302	92	360	116.12	111.8	4.32
306	91	360	116.55	112.23	4.32
310	91	360	116.55	112.23	4.32
312	92	360	116.12	111.8	4.32
314	92	360	116.12	111.8	4.32
316	94	360	115.25	110.93	4.32
318	94	360	115.25	110.93	4.32

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: All Pipes Open - Max Day Demand plus 1,750 gpm Fire Flow
Split betweem Nodes 302 and 314

Node No.	Node El. Ft.	HGL Zone Ft. (Static)	Static P psi	Model Run P, psi	Delta P from Static
3	180	360	77.99	73.42	4.57
4	158	360	87.52	80.59	6.93
5	154	360	89.25	80.3	8.95
6	99	360	113.08	102.28	10.80
12	95	360	114.82	103.52	11.30
15	86	360	118.72	107.42	11.30
17	40	360	138.65	127.77	10.88
18	110	360	108.32	97.99	10.33
21	205	360	67.16	57.51	9.65
24	148	360	91.85	87.45	4.40
302	92	360	116.12	103.94	12.18
306	91	360	116.55	104.36	12.19
310	91	360	116.55	104.36	12.19
312	92	360	116.12	102.97	13.15
314	92	360	116.12	88.28	27.84
316	94	360	115.25	101.32	13.93
318	94	360	115.25	88.58	26.67

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: All Pipes Open - Peak Hour Demand

Node No.	Node El. Ft.	HGL Zone Ft. (Static)	Static P psi	Model Run P, psi	Delta P from Static
3	180	360	77.99	73.66	4.33
4	158	360	87.52	83.18	4.34
5	154	360	89.25	84.89	4.36
6	99	360	113.08	108.71	4.37
12	95	360	114.82	110.44	4.38
15	86	360	118.72	114.34	4.38
17	40	360	138.65	134.27	4.38
18	110	360	108.32	103.95	4.37
21	205	360	67.16	62.79	4.37
24	148	360	91.85	87.53	4.32
302	92	360	116.12	111.74	4.38
306	91	360	116.55	112.17	4.38
310	91	360	116.55	112.17	4.38
312	92	360	116.12	111.73	4.39
314	92	360	116.12	111.73	4.39
316	94	360	115.25	110.87	4.38
318	94	360	115.25	110.87	4.38

Project: Del Mar Highlands Estates Affordable Housing
Date: 8/19/16
Job Number: 598-007

Scenario: Max Day Demand plus 1,750 gpm Fire Flow
Split betweem Nodes 302 and 314
Pipe 301 Closed

Node No.	Node El. Ft.	HGL Zone Ft. (Static)	Static P psi	Model Run P, psi	Delta P from Static
3	180	360	77.99	73.42	4.57
4	158	360	87.52	80.6	6.92
5	154	360	89.25	80.31	8.94
6	99	360	113.08	102.29	10.79
12	95	360	114.82	103.54	11.28
15	86	360	118.72	107.39	11.33
17	40	360	138.65	127.74	10.91
18	110	360	108.32	97.97	10.35
21	205	360	67.16	57.48	9.68
24	148	360	91.85	87.45	4.40
302	92	360	116.12	99.99	16.13
306	91	360	116.55	100.85	15.70
310	91	360	116.55	101.07	15.48
312	92	360	116.12	99.69	16.43
314	92	360	116.12	85	31.12
316	94	360	115.25	98.03	17.22
318	94	360	115.25	85.3	29.95

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

PIPE NO.	NODE NOS.		LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
202	0	3	20.0	8.0	120.0	.00	350.00
203	3	4	1400.0	12.0	120.0	.00	
204	4	5	1200.0	12.0	120.0	.00	
205	5	6	1100.0	12.0	120.0	.00	
211	15	12	30.0	12.0	120.0	.00	
214	6	12	290.0	12.0	120.0	.00	
216	17	15	740.0	12.0	120.0	.00	
217	18	17	1000.0	12.0	120.0	.00	
220	21	18	1220.0	12.0	120.0	.00	
223	24	21	1300.0	8.0	120.0	.00	
226	0	24	20.0	8.0	120.0	.00	350.00
301	12	302	95.0	8.0	120.0	.00	
305	302	306	60.0	8.0	120.0	.00	
309	15	310	155.0	8.0	120.0	.00	
313	306	310	30.0	8.0	120.0	.00	
317	310	312	130.0	8.0	120.0	.00	
321	318	314	163.0	8.0	120.0	.00	
323	312	316	110.0	8.0	120.0	.00	
325	316	318	20.0	8.0	120.0	60.00	

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
3	.00	180.00	202	203	
4	.00	158.00	203	204	
5	.00	154.00	204	205	
6	.00	99.00	205	214	
12	.00	95.00	211	214	301
15	10.00	86.00	211	216	309
17	.00	40.00	216	217	
18	.00	110.00	217	220	
21	.00	205.00	220	223	
24	.00	148.00	223	226	
302	.00	92.00	301	305	
306	5.80	91.00	305	313	
310	2.90	91.00	309	313	317
312	4.40	92.00	317	323	
314	.00	92.00	321		
316	.00	94.00	323	325	
318	.00	94.00	321	325	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD

THIS SYSTEM HAS 19 PIPES WITH 17 JUNCTIONS , 1 LOOPS AND 2 FGNS

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00186

Del Mar Highlands Estates Affordable Housing **File: 598007B1**

Average Day Demands

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
202	0	3	14.89	.00	.00	.00	.10	.01
203	3	4	14.89	.00	.00	.00	.04	.00
204	4	5	14.89	.00	.00	.00	.04	.00
205	5	6	14.89	.00	.00	.00	.04	.00
211	15	12	-8.27	.00	.00	.00	-.02	.00
214	6	12	14.89	.00	.00	.00	.04	.00
216	17	15	8.21	.00	.00	.00	.02	.00
217	18	17	8.21	.00	.00	.00	.02	.00
220	21	18	8.21	.00	.00	.00	.02	.00
223	24	21	8.21	.00	.00	.00	.05	.00
226	0	24	8.21	.00	.00	.00	.05	.00
301	12	302	6.62	.00	.00	.00	.04	.00
305	302	306	6.62	.00	.00	.00	.04	.00
309	15	310	6.48	.00	.00	.00	.04	.00
313	306	310	.82	.00	.00	.00	.01	.00
317	310	312	4.40	.00	.00	.00	.03	.00
321	318	314	.00	.00	.00	.00	.00	.00
323	312	316	.00	.00	.00	.00	.00	.00
325	316	318	.00	.00	.00	.00	.00	.00

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
3	.00	350.00	180.00	73.67
4	.00	350.00	158.00	83.20
5	.00	350.00	154.00	84.93
6	.00	350.00	99.00	108.76
12	.00	349.99	95.00	110.50
15	10.00	349.99	86.00	114.40
17	.00	350.00	40.00	134.33
18	.00	350.00	110.00	104.00
21	.00	350.00	205.00	62.83
24	.00	350.00	148.00	87.53
302	.00	349.99	92.00	111.80
306	5.80	349.99	91.00	112.23
310	2.90	349.99	91.00	112.23
312	4.40	349.99	92.00	111.80
314	.00	349.99	92.00	111.80
316	.00	349.99	94.00	110.93
318	.00	349.99	94.00	110.93

THE NET SYSTEM DEMAND = 23.10

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
202	14.89
226	8.21

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 23.10
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.40

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
302	875.00
314	875.00

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00007

Del Mar Highlands Estates Affordable Housing
Max Day Demand plus Fire Flow of 1750 gpm
Fire FLow split between Nodes 302 and 314

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
202	0	3	1164.04	.56	.00	.00	7.43	28.07
203	3	4	1164.04	5.46	.00	.00	3.30	3.90
204	4	5	1164.04	4.68	.00	.00	3.30	3.90
205	5	6	1164.04	4.29	.00	.00	3.30	3.90
211	15	12	-160.55	.00	.00	.00	-.46	-.10
214	6	12	1164.04	1.13	.00	.00	3.30	3.90
216	17	15	641.40	.96	.00	.00	1.82	1.29
217	18	17	641.40	1.29	.00	.00	1.82	1.29
220	21	18	641.40	1.58	.00	.00	1.82	1.29
223	24	21	641.40	12.10	.00	.00	4.09	9.31
226	0	24	641.40	.19	.00	.00	4.09	9.31
301	12	302	1003.49	2.03	.00	.00	6.40	21.32
305	302	306	128.49	.03	.00	.00	.82	.47
309	15	310	777.95	2.06	.00	.00	4.97	13.31
313	306	310	114.57	.01	.00	.00	.73	.38
317	310	312	885.56	2.20	.00	.00	5.65	16.92
321	318	314	875.00	2.70	.00	.00	5.58	16.55
323	312	316	875.00	1.82	.00	.00	5.58	16.55
325	316	318	875.00	.33	.00	29.05	5.58	16.55

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
3	.00	349.44	180.00	73.42
4	.00	343.98	158.00	80.59
5	.00	339.31	154.00	80.30
6	.00	335.02	99.00	102.28
12	.00	333.89	95.00	103.52
15	24.00	333.89	86.00	107.42
17	.00	334.84	40.00	127.77
18	.00	336.14	110.00	97.99
21	.00	337.71	205.00	57.51
24	.00	349.81	148.00	87.45
302	875.00	331.87	92.00	103.94
306	13.92	331.84	91.00	104.36
310	6.96	331.83	91.00	104.36
312	10.56	329.63	92.00	102.97
314	875.00	295.73	92.00	88.28
316	.00	327.81	94.00	101.32
318	.00	298.42	94.00	88.58

THE NET SYSTEM DEMAND = 1805.44

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
202	1164.04
226	641.40

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 1805.44
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 6.10

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00005

Del Mar Highlands Estates Affordable Housing
Peak Hour Demands

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
202	0	3	90.81	.00	.00	.00	.58	.25
203	3	4	90.81	.05	.00	.00	.26	.03
204	4	5	90.81	.04	.00	.00	.26	.03
205	5	6	90.81	.04	.00	.00	.26	.03
211	15	12	-50.45	.00	.00	.00	-.14	-.01

214	6	12	90.81	.01	.00	.00	.26	.03
216	17	15	50.10	.01	.00	.00	.14	.01
217	18	17	50.10	.01	.00	.00	.14	.01
220	21	18	50.10	.01	.00	.00	.14	.01
223	24	21	50.10	.11	.00	.00	.32	.08
226	0	24	50.10	.00	.00	.00	.32	.08
301	12	302	40.36	.01	.00	.00	.26	.06
305	302	306	40.36	.00	.00	.00	.26	.06
309	15	310	39.55	.01	.00	.00	.25	.05
313	306	310	4.98	.00	.00	.00	.03	.00
317	310	312	26.84	.00	.00	.00	.17	.03
321	318	314	.00	.00	.00	.00	.00	.00
323	312	316	.00	.00	.00	.00	.00	.00
325	316	318	.00	.00	.00	.00	.00	.00

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
3	.00	350.00	180.00	73.66
4	.00	349.95	158.00	83.18
5	.00	349.91	154.00	84.89
6	.00	349.87	99.00	108.71
12	.00	349.86	95.00	110.44
15	61.00	349.86	86.00	114.34
17	.00	349.87	40.00	134.27
18	.00	349.88	110.00	103.95
21	.00	349.89	205.00	62.79
24	.00	350.00	148.00	87.53
302	.00	349.85	92.00	111.74
306	35.38	349.85	91.00	112.17
310	17.69	349.85	91.00	112.17
312	26.84	349.84	92.00	111.73
314	.00	349.84	92.00	111.73
316	.00	349.84	94.00	110.87
318	.00	349.84	94.00	110.87

THE NET SYSTEM DEMAND = 140.91

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
202	90.81
226	50.10

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 140.91
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.40

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
302	875.00
314	875.00

THE FOLLOWING CHANGES IN PIPE DATA ARE SPECIFIED

PIPE NO.	NODE NOS.		LENGTH	DIAMETER	ROUGHNESS	MINOR LOSS K	FIXED GRADE
301	12	302	95.0	8.0	120.0	.00	.00

LINE 301 IS CLOSED

THE RESULTS ARE OBTAINED AFTER 2 TRIALS WITH AN ACCURACY = .00017

Del Mar Highlands Estates Affordable Housing
Max Day Demand Plus Fire Flow of 1750 gpm
Fire FLow split between Nodes 302 and 314 Pipe 301 Closed

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
202	0	3	1162.47	.56	.00	.00	7.42	28.00
203	3	4	1162.47	5.44	.00	.00	3.30	3.89
204	4	5	1162.47	4.66	.00	.00	3.30	3.89
205	5	6	1162.47	4.28	.00	.00	3.30	3.89
211	15	12	-1162.47	-.12	.00	.00	-3.30	-3.89
214	6	12	1162.47	1.13	.00	.00	3.30	3.89
216	17	15	642.97	.96	.00	.00	1.82	1.30
217	18	17	642.97	1.30	.00	.00	1.82	1.30
220	21	18	642.97	1.58	.00	.00	1.82	1.30
223	24	21	642.97	12.16	.00	.00	4.10	9.35
226	0	24	642.97	.19	.00	.00	4.10	9.35
LINE 301 IS CLOSED								
305	302	306	-875.00	-.99	.00	.00	-5.58	-16.55
309	15	310	1781.44	9.57	.00	.00	11.37	61.73
313	306	310	-888.92	-.51	.00	.00	-5.67	-17.04
317	310	312	885.56	2.20	.00	.00	5.65	16.92
321	318	314	875.00	2.70	.00	.00	5.58	16.55
323	312	316	875.00	1.82	.00	.00	5.58	16.55
325	316	318	875.00	.33	.00	29.05	5.58	16.55

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
3	.00	349.44	180.00	73.42
4	.00	344.00	158.00	80.60
5	.00	339.33	154.00	80.31
6	.00	335.06	99.00	102.29
12	.00	333.93	95.00	103.54
15	24.00	333.81	86.00	107.39
17	.00	334.78	40.00	127.74
18	.00	336.07	110.00	97.97
21	.00	337.66	205.00	57.48
24	.00	349.81	148.00	87.45
302	875.00	322.74	92.00	99.99

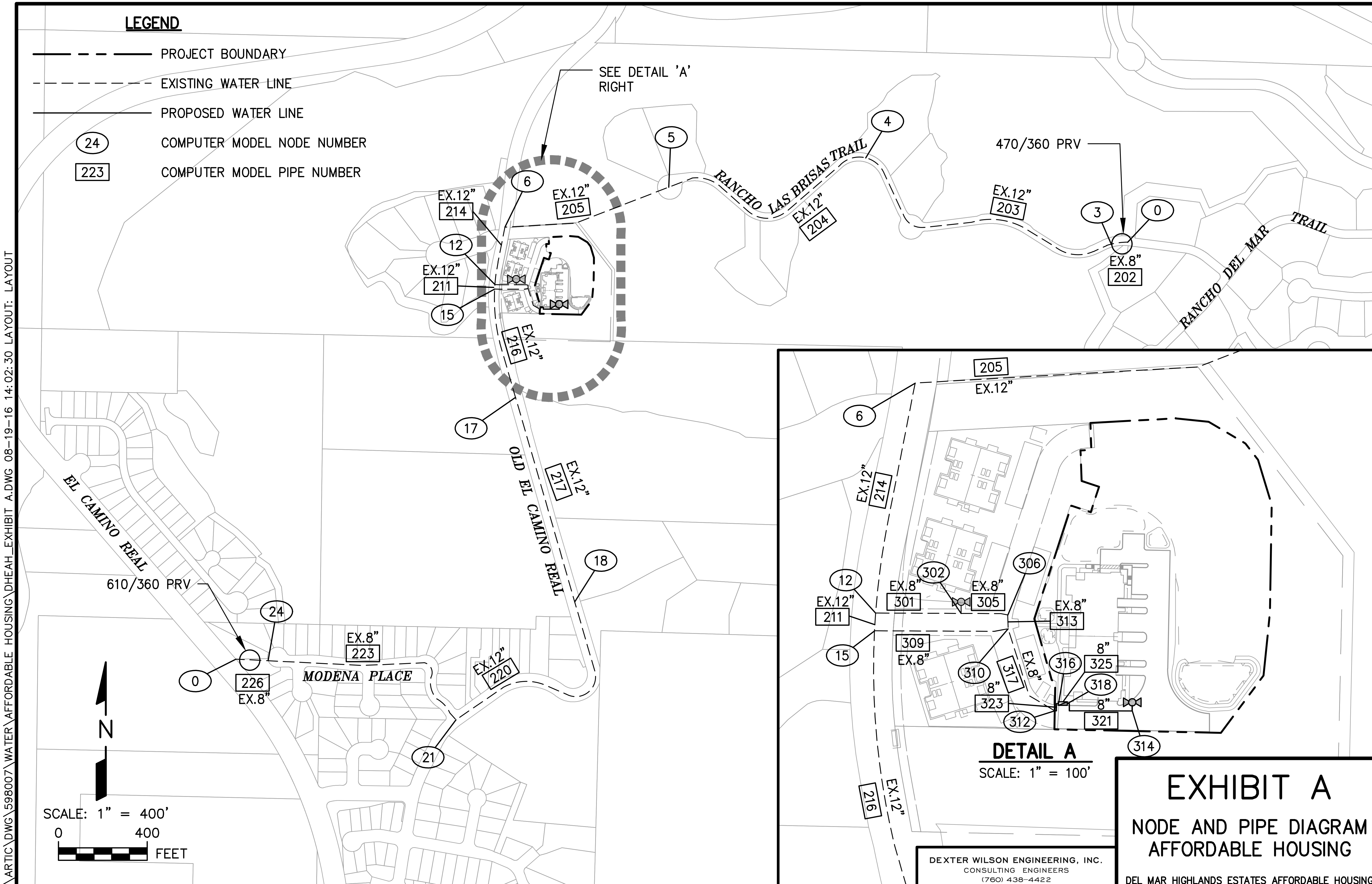
306	13.92	323.74	91.00	100.85
310	6.96	324.25	91.00	101.07
312	10.56	322.05	92.00	99.69
314	875.00	288.15	92.00	85.00
316	.00	320.23	94.00	98.03
318	.00	290.84	94.00	85.30

THE NET SYSTEM DEMAND = 1805.44

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
202	1162.47
226	642.97

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 1805.44
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00



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DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

SEWER SYSTEM ANALYSIS FOR THE PACIFIC HIGHLANDS RANCH UNITS 8 & 9 PROJECT AND DEL MAR HIGHLANDS ESTATES AFFORDABLE HOUSING SITE IN THE CITY OF SAN DIEGO

Revised October 5, 2016

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**SEWER SYSTEM ANALYSIS
FOR THE PACIFIC HIGHLANDS RANCH
UNITS 8 & 9 PROJECT
AND DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING SITE
IN THE CITY OF SAN DIEGO**

Revised October 5, 2016

REGISTERED PROFESSIONAL ENGINEER
ANDREW M. OVEN
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EXP. 3/31/17
CIVIL
STATE OF CALIFORNIA

10-5-2016

**Prepared by:
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2234 Faraday Avenue
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Job No. 598-007

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October 5, 2016

598-007

Latitude 33 Planning and Engineering
9968 Hibert Street 2nd Floor
San Diego, CA 92131

Attention: John Eardensohn, P.E., Senior Principal

Subject: Sewer System Analysis for the Pacific Highlands Ranch Units 8 & 9 Project and the Del Mar Highlands Estates Affordable Housing Site in the City of San Diego

Introduction

This report provides a sewer system analysis for the Pacific Highlands Ranch Units 8 & 9 and Del Mar Highlands Estates Affordable Housing project in the City of San Diego. This report was initially prepared on July 5, 2016; this revision includes minor changes in the number of EDUs connected to Pump Station 79 as well as updated sewer information within the PHR Units 8 & 9 project site.

PHR Units 8 & 9 are a part of the Pacific Highlands Ranch master planned community located at the north end of Pacific Highlands Ranch Parkway which connects to Carmel Valley Road just north of the Del Mar Heights Road intersection with Carmel Valley Road. Several portions of the Pacific Highlands Ranch community have been constructed and PHR Units 8 & 9 will be a continuation of the build-out of the Pacific Highlands Ranch community.

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The Del Mar Highlands Estates Affordable Housing site is located east of Old El Camino Real approximately a quarter mile south of San Dieguito Road. The Affordable Housing site is part of an existing multi-family housing site. Figure 1 provides a location map for the PHR Units 8 & 9 project and the Affordable Housing site; a tentative development plan for each project is provided in Appendix A of this report.

Purpose of Study

The purpose of the sewer study for PHR Units 8 & 9 and the Del Mar Highlands Estates Affordable Housing site is to provide an updated sewer study consistent with the land development modifications proposed for PHR Units 8 & 9 and the Affordable Housing site. There are three existing approved sewer studies associated with the Pacific Highlands Ranch development; these three studies are referenced within this report and are listed below.

Sewer Master Plan for the Pacific Highlands Ranch – Subarea III, John Powell & Associates, Inc., February 2000.

Pardee Homes, Pacific Highlands Ranch Phase II Sewer Study, Units 5 Through 11, PBS&J, May 2002.

Pardee Homes, Pacific Highlands Ranch Sewer Study, Units 17 Through 22, PBS&J, May 2003.

This updated sewer study for PHR Units 8 & 9 and the Del Mar Highlands Estates Affordable Housing site will address three primary topics all of which were addressed in the two previous reports. First is the sizing of the gravity sewer lines within Units 8 & 9; second is the capacity of the offsite gravity sewer system; and third is the pumping capacity of Pump Station 79.

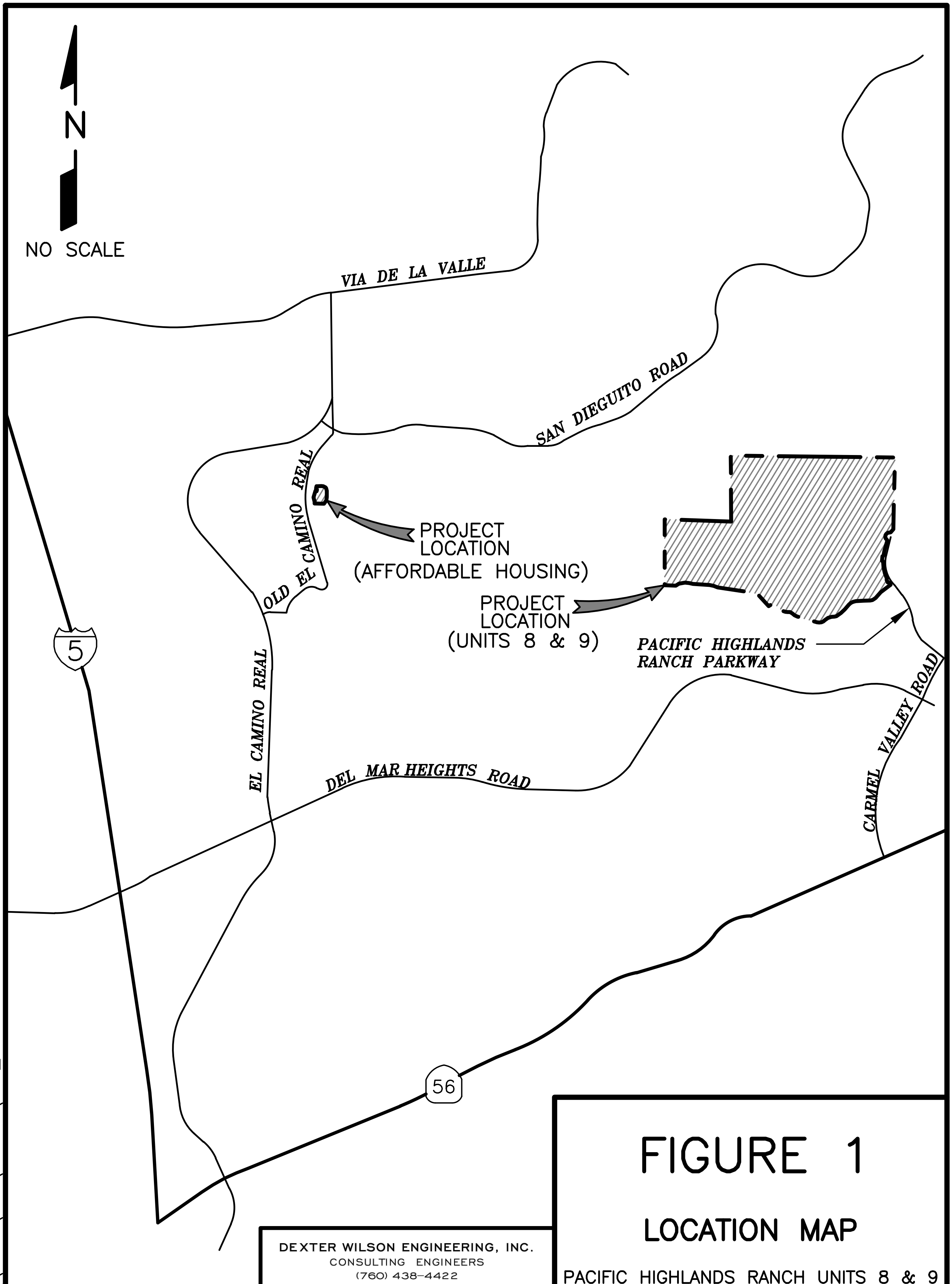

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FIGURE 1

LOCATION MAP

PACIFIC HIGHLANDS RANCH UNITS 8 & 9

Study Area

In general the study area for this sewer report is the sewer basin boundary for City of San Diego Sewer Pump Station 79 as presented in Figure 2. Sewer Pump Station 79 is located at the intersection of El Camino Real and San Dieguito Road. There are three major sub-basins which flow to Pump Station 79. The largest of these is the Gonzales Canyon drainage basin within which is located PHR Units 8 & 9 and the Affordable Housing site.

Within the overall study area encompassing the service area of Pump Station 79, this report will focus on the Pacific Highlands Ranch Units 8 & 9 project and the Del Mar Highlands Estates Affordable Housing site. The PHR Units 8 & 9 project encompasses approximately 254 acres. The project proposes to develop the site with 515 single family residential dwelling units. The Del Mar Highlands Estates Affordable Housing site proposes 12 new affordable housing dwelling units to be constructed in one new building located on an existing multi-family housing pad which currently has 24 multi-family dwelling units.

PHR Units 8 & 9 gravity drain to the existing Gonzales Canyon sewer line which flows west ultimately reaching El Camino Real and flowing north to Pump Station 79. At Old El Camino Real the gravity sewer line picks up the flow from the Affordable Housing site. As discussed in the previous sewer studies, a portion of the existing Gonzales Canyon Sewer immediately west of Pacific Highlands Parkway has been relocated into the southerly street of Unit 8. Except for this section of relocated sewer line, sewage from PHR Units 8 & 9, existing PHR units, and the existing plus proposed Affordable Housing units will flow into the existing Gonzales Canyon sewer line on its way to Pump Station 79.

Pump Station 79 Sewer Basin Sewage Flow Generation

Table 1 presents a summary of the Equivalent Dwelling Units (EDUs) tributary to Pump Station 79 in the Gonzales Canyon area. Figure 2 shows the sewer service basin boundary as well as the sub-basins which were defined based on where sewage enters the Gonzales Canyon sewer line. Included in Table 1 are the EDU values from the July 5, 2016 report as well as the updated numbers to show the changes made from the July 5, 2016 report to this revised report.

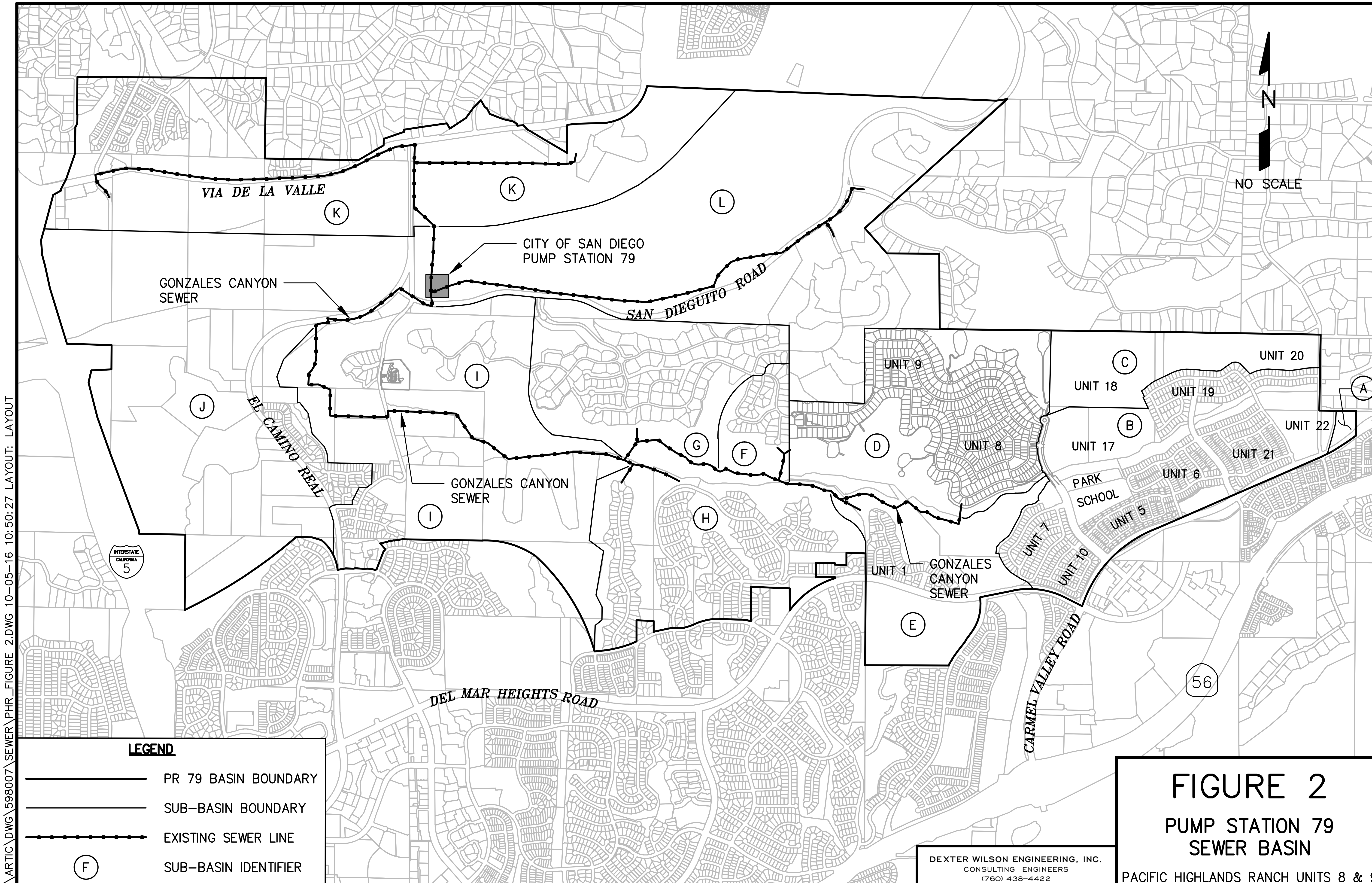


FIGURE 2

PUMP STATION 79 SEWER BASIN

PACIFIC HIGHLANDS RANCH UNITS 8 & 9

The majority of the data in Table 1 is obtained from the previous two sewer studies for Pacific Highlands Ranch (PHR Units 5-11 Sewer Study and PHR Units 17-22 Sewer Study); that data is referenced in the table. EDUs within sub-basins west of Pacific Highlands Ranch were estimated based on counting dwelling units using the assessor parcels which form the underlying background for Figure 2. Some of these EDU values are consistent with those in the previous reports and are noted as such in Table 1. Other EDU estimates for existing units connecting to the Gonzales Canyon sewer line are changed from the May 2002 and May 2003 reports and are based on the best available information at this time.

TABLE 1
PUMP STATION 79 SEWER SERVICE BASIN
EDU SUMMARY

Sub-Basin	July 5, 2016 Report EDUs	Updated EDUs	Data Source or Reference
A	**18**	**20**	Meadowood II Project by Hallmark Communities; previous studies showed this site as Unit 30 with 15 EDUs
B			
PHR Unit 5	169	185	Per Latitude 33 Correspondence
PHR Unit 6	147	147	PHR Unit 17 – 22 Sewer Study
PHR Unit 7	138	123	Per Latitude 33 Correspondence
PHR Unit 10	93	93	PHR Unit 17 – 22 Sewer Study
PHR Unit 11	93	108	Per Latitude 33 Correspondence
PHR Unit 17	164	164	PHR Unit 17 – 22 Sewer Study
PHR Unit 19	171	160	Per Latitude 33 Correspondence
PHR Unit 21	190	189	Per Latitude 33 Correspondence
PHR Unit 22	114	38	Per Latitude 33 Correspondence; the previous study double counted the school in this area
PHR School Site	71	71	PHR Unit 17 – 22 Sewer Study
Subtotal B	**1,350**	**1,278**	

TABLE 1 PUMP STATION 79 SEWER SERVICE BASIN EDU SUMMARY			
Sub-Basin	**July 5, 2016 Report EDUs**	**Updated EDUs**	**Data Source or Reference**
C			
PHR Unit 18	69	69	PHR Unit 17 – 22 Sewer Study
PHR Unit 20	56	56	PHR Unit 17 – 22 Sewer Study
Offsite EDUs	80	80	Per PHR Unit 17 – 22 Sewer Study
Subtotal C	**205**	**205**	
D			
PHR Units 8 & 9 West	254	254	PHR Unit 8 & 9 Proposed Project; May 2002 study had 240 EDUs
PHR Units 8 & 9 South	261	261	PHR Unit 8 & 9 Proposed Project; May 2002 study had 211 EDUs
Subtotal D	**515**	**515**	
E			
PHR Unit 1	97	97	PHR Unit 17 – 22 Sewer Study
PHR Cathedral Catholic High School	385	385	PHR Unit 17 – 22 Sewer Study
Subtotal E	**482**	**482**	
F	**41**	**41**	Del Mar Highland Estates – by counting units; consistent with PHR Units 17-22 Sewer Study
G	**101**	**101**	Del Mar Highland Estates – by counting units; consistent with PHR Unit 17-22 Sewer Study
H	**374**	**418**	Existing units by counting; 30 more EDUs than PHR Unit 17-22 Sewer Study; previous study did not include Congregation Beth Ann estimated based on net commercial acres @ 12.5 EDU/net acre

TABLE 1 PUMP STATION 79 SEWER SERVICE BASIN EDU SUMMARY			
Sub-Basin	**July 5, 2016 Report EDUs**	**Updated EDUs**	**Data Source or Reference**
I			
Westerly Lots of Del Mar Highlands Estates	6	6	Assessor Parcel Lots
Rancho Valley Farms Subdivision	10	10	Assessor Parcel Lots
Existing large lots	4	4	Assessor Parcel Lots
Existing Affordable Housing on Old El Camino Real	24	24	Affordable Housing website
Proposed Affordable Housing Units	12	12	Del Mar Highlands Estates Affordable Housing Proposed Project
Lots south of Derby Downs and east of El Camino Real – 80 SF and 88 MF	168	168	Assessor Parcel Lots
Subtotal I	**224**	**224**	
J			
Lots north of Derby Downs and east along El Camino Real; church on El Camino Real	105	105	Assessor Parcel Lots
Subtotal J	**105**	**105**	
K			
Residential at San Andres Drive	0	133	Assessor Parcel Lots
Commercial at Via De La Valle and San Andres Dr.	270	270	Estimated based on net commercial acres @ 12.5 EDU/net acre
Residential at Caminito Lorren and Santa Fe	45	45	Assessor Parcel Lots

TABLE 1 PUMP STATION 79 SEWER SERVICE BASIN EDU SUMMARY			
Sub-Basin	**July 5, 2016 Report EDUs**	**Updated EDUs**	**Data Source or Reference**
Downs Square			
Commercial at Via De La Valle and El Camino Real	90	90	Estimated based on net commercial acres @ 12.5 EDU/net acre
Residential at Caminito Barbuda	60	60	Assessor Parcel Lots
Subtotal K	**465**	**598**	
L			
Residential north of Camino Santa Fe	37	37	Assessor Parcel Lots
Residential at Derby Farms Road	251	251	Assessor Parcel Lots
Subtotal L	**288**	**288**	
TOTAL	**4,168**	**4,275**	

City of San Diego Sewer Design Criteria

Sewer system analyses criteria are based on the Sewer Design Guide, Revised May 2015, City of San Diego Public Utilities Department. This guideline is used for analysis and sizing of new gravity sewer lines and for analysis of existing gravity sewer lines. A summary of the design criteria from the Sewer Design Guide is presented in Table 2 below.

TABLE 2
CITY OF SAN DIEGO PUBLIC UTILITIES DEPARTMENT
SEWER SYSTEM DESIGN CRITERIA

Criterion	Design Requirement	Design Guide Reference
Sewage Flow Generation	80 gallons per capita	1.3.2.2
Persons per Dwelling Unit (Single Family Residential)	3.5	1.3.2.2
Dry Weather Peaking Factor	Figure 1-1 based on population	1.3.2.2
Wet Weather Peaking Factor	Basin specific – determined by City	1.3.2.2
Gravity Flow Hydraulic Formula	Manning's Equation	1.3.3.1
Manning's 'n'	0.013	1.3.3.1
Desirable Gravity Flow Velocity	3 fps to 5 fps	1.3.3.1
Minimum Gravity Flow Velocity	2 fps	1.3.3.1
Where 2 fps is not achievable	Set min. slope at 1%	1.3.3.1
Maximum Gravity Flow Velocity	10 fps	1.3.3.1
Maximum Depth of Flow at Peak Wet Weather		
For 15" Pipe and Smaller	d/D = 0.50	1.3.3.3
For 18" and Larger	d/D = 0.75	1.3.3.3
Minimum Acceptable Gravity Sewer Main Size		
For Residential Areas	8" diameter	1.3.3.4
For Commercial, Industrial, and High-Rise Bldgs.	10" diameter	1.3.3.4
Net Acreage	= 0.80 x Gross Acres	Table 1-1

PHR Units 8 & 9 Onsite Sewer System Analysis

The sewer system analyses presented in this report are divided into three parts. The first analysis is for the new onsite gravity sewer system within the PHR Units 8 & 9 development area. The second analysis will address the offsite gravity sewer system all the way to Pump Station 79 which will include the proposed units from PHR Units 8 & 9 and the proposed units from the Del Mar Highlands Estates Affordable Housing site. Finally, the capacity of Pump Station 79 will be discussed.

The onsite gravity sewer system for PHR Units 8 & 9 flows in two general directions. The majority of Unit 9 flows north and west and exits into an existing 8" gravity sewer at the southwestern corner of Unit 9. This existing 8" gravity sewer flows south and connects to the Gonzales Canyon sewer line.

The majority of Unit 8 flows south and exits to an existing 12 gravity sewer at the southernmost point of the Unit 8 development plan as shown in Exhibit A. The existing 12" gravity sewer is an upstream section of the Gonzales Canyon sewer line. A portion of this existing 12" sewer line that is immediately south of PHR Unit 8 and extends from Pacific Highlands Parkway west has been replaced with the new 12" gravity sewer line within the PHR Unit 8 subdivision.

Existing and future sewage flow from Pacific Highlands Ranch development areas to the east of Units 8 & 9 flow through Unit 8 as well. These flows connect to the gravity sewer system in the proposed extension of Pacific Highlands Parkway north of its current terminus. Exhibit A shows where these flows enter the PHR Unit 8 sewer and also identifies what existing and future flows are entering at these locations.

PHR Units 8 & 9 West Sewer Analysis. The analysis of the onsite gravity sewer system proposed for the lots in Units 8 & 9 which flow north and west is presented in Appendix B. A total of 254 single family dwelling units flow north and west and exit the project at its southwestern-most corner (Manhole G-8 on Exhibit A). All sewer lines are 8" diameter and the maximum depth-to-diameter ratio for any segment of new 8" piping is 0.34 d/D. Flow velocities range from a low of 0.76 fps for a short street tee with two lots connected to an 8" sewer line (min. 1 percent slope), up to 4.9 fps for an 8" sewer at 4.8 percent slope; this is segment 118 near the western boundary of Unit 9C.

The sewer lines in the PHR Units 8 & 9 West are proposed to be private. This is because Unit 9C through which all the sewage for this portion of the project flows has private drives instead of public streets.

PHR Units 8 & 9 South Sewer Analysis. Appendix C presents the results of the onsite gravity sewer analysis for the portion of PHR Units 8 & 9 which flow south. Exhibit A has the gravity sewer line numbering and the manhole numbering information which corresponds to the spreadsheet calculations in Appendix C. All the sewer system in this southern portion of the PHR Units 8 & 9 project will be public.

A total of 261 dwelling units from PHR Units 8 & 9 flow south and connect to the Gonzales Canyon Sewer at Manhole R-10. The analysis of the proposed gravity sewers within the PHR Unit 8 development include the existing and future offsite sewage flows from the east of PHR Unit 8 as identified on Exhibit A. As mentioned earlier in this report, the existing Gonzales Canyon Sewer located south of PHR Unit 8 has been replaced with a new 12" gravity sewer located in the southern street of PHR Unit 8. Sewer Lines 301, 323, 325, 327, 329, 415, 416, 417, 419, and 421 were sized as 12" diameter pipe by previous sewer studies to accommodate the existing and future flows from the east.

Flow velocities in the southern portion of PHR Units 8 & 9 range from a low of 0.76 fps for a short street tee with two lots connected to an 8" sewer line (min. 1 percent slope) up to 4.5 fps in an 8" line at 4.1 percent slope. Velocity in the 12" diameter replacement line for the Gonzales Canyon Sewer ranges from 3.5 fps to 4.2 fps. The 12" sewer line extending from the south of PHR Unit 8 and connecting to the existing Gonzales Canyon Sewer is at a slope of 9.2 percent; thus the flow velocity is 9.65 fps.

Depth-to-diameter ratios for the new 8" sewer lines range from very low to 0.47 d/D. For the new 12" replacement gravity sewer line, most of the reaches are at or below 0.50 d/D. The last two reaches before turning out of the project (Pipes 323 and 325) show the existing 12" line to be flowing at d/D of 0.51 which exceeds the design criterion of 0.50 for 12" pipe.

PHR Units 8 & 9 and Affordable Housing Offsite Sewer System Analysis

The second analysis completed for the PHR Units 8 & 9 development project is to calculate the new flows through the existing Gonzales Canyon Sewer from Pacific Highlands Ranch to Pump Station 79. This offsite sewer calculation/analysis was presented in the two previous sewer studies, the May 2002 study for Units 5 – 11 and the May 2003 study for Units 17 – 22.

The computer spreadsheet output for the offsite sewer analysis is presented in Appendix D. The sewer line and manhole numbering diagrams for the offsite sewer are divided between two exhibits. On Exhibit A at the back of this report is included the sewer line and manhole numbering from Unit 8 South (Manhole R-10) to Manhole DM-72 which is the connection point for the sewer from Units 8 & 9 West. Included within Appendix D is the sewer line and manhole numbering diagram copied from the PHR Units 17 – 22 Sewer Study, May 2003. This diagram follows the Gonzales Canyon Sewer west into El Camino Real and ultimately to Pump Station 79.

In the current analysis, the primary difference is that PHR Units 8 & 9 are proposing a total of 515 dwelling units whereas in the PHR Units 17 – 22 sewer study the estimated number of dwelling units for PHR Units 8 & 9 was 451. Thus the current analysis includes an increase of 64 dwelling units. However, the increase of 64 units is not significant because the unit count for other portions of the Pacific Highlands Ranch project have changed slightly since May 2003.

The result is that the increase of 64 dwelling units in PHR Units 8 & 9 does not modify the offsite sewer analysis. In the PHR Units 17 – 22 Sewer Study, there are 18 reaches which are flowing over half full:

Four segments of 12" pipe are at 0.51 d/D,
Nine segments of 12" pipe are at 0.54 d/D, and
Five segments of 15" pipe are at 0.55 d/D.

In the current analysis for PHR Units 8 & 9 with the greater number of dwelling units, there are the same number of reaches (18) of existing offsite sewer that are flowing over the

0.50 d/D design criterion. They are the same reaches as were shown flowing over the design criterion in the May 2003 study:

Four segments of 12" pipe are at 0.51 d/D,
Nine segments of 12" pipe are at 0.54 d/D, and
Five segments of 15" pipe are at 0.54 d/D.

Under the current analysis, the existing 15" gravity sewer is flowing at 0.54 d/D because there are fewer offsite EDUs in the western portion of the sewer basin estimated to contribute flow to the Gonzales Canyon Sewer than were forecast back when the May 2003 sewer study was being prepared.

The increase in flow in the existing 12" offsite sewer segments due to the 64 additional dwelling units in PHR Units 8 & 9 and the 12 affordable housing units on Old El Camino Real must be looked at in light of the current number of dwelling units actually constructed in other units of the Pacific Highlands Ranch project. The total dwelling units estimated in the May 2003 sewer study were not realized in all the PHR Units. The May 2003 estimated flows are nearly the same as the current flows with the addition of the 64 additional dwelling units. Thus, the impact of the larger number of dwelling units in PHR Units 8 & 9 and the 12 dwelling units in the Del Mar Highlands Estates Affordable Housing site is considered to be not significant.

Pump Station 79 Capacity

The final aspect of the PHR Units 8 & 9 and Del Mar Highlands Estates Affordable Housing sewer study is to review the pumping capacity of Pump Station 79 which receives the flow from Pacific Highlands Ranch as well as many other developments. Figure 2 shows the basin boundary, or the sewer service collection area for Pump Station 79. Also shown in Figure 2 are the sub-basins which have been identified by letter.

Table 1 summarizes the number of EDUs located within each sub-basin. The analyses performed for the offsite sewer, the Gonzales Canyon Sewer, considered Sub-Basins A through J which connect to the Gonzales Canyon Sewer. Together these sub-basins comprise a total of 3,389 EDUs. Two additional sub-basins contribute flow to Pump Station 79. These are Sub-Basins K and L which have an estimated 886 EDUs between them.

Thus the total estimated EDUs flowing to Pump Station 79 is 4,275 EDUs. Based on this estimate, the Average Flow influent to the pump station is:

4,275 EDUs x 3.5 persons/EDU x 80 gpcd = 1,197,000 gpd

The population is: 4,275 EDUs x 3.5 persons/EDU = 14,963 persons
Thus, the peaking factor for dry weather flow is 1.75

Peak Dry Weather Flow to Pump Station 79 is:
1,197,000 gpd x 1.75 = 2,094,750 gpd

Existing Pump Station 79 Capacity. Pump Station 79 was upgraded through a participation agreement between the City of San Diego and Pardee Homes. The project included upgrading pumping capacity at the lift station and constructing a new 12" force main in El Camino Real. The construction work was done in the 2008 to 2010 time frame.

Documentation from Pardee Homes (provided in Appendix E) indicates beneficial occupancy for the force main to be June 17, 2009, and for the pump station to be April 6, 2010. Recent correspondence with the City of San Diego Public Utilities Department provides data on the existing capacity of Pump Station 79 as well as some other information. A copy of this correspondence is included in Appendix F of this report.

Two pieces of data are interesting to consider. One is that the design capacity for Pump Station 79 is 2.5 mgd. Second is that the current pumping capacity is 2.8 mgd.

If we consider the estimated total EDUs influent to Pump Station 79 from Table 1, we get the following numbers:

Total build-out EDUs:	4,275 EDUs
Build-out Population:	4,275 x 3.5 = 14,963
Build-out Average Flow:	4,275 x 3.5 x 80 = 1,197,000 gpd
Dry Weather Peak Factor:	1.75
Dry Weather Peak Flow:	1,197,000 x 1.75 = 2,094,750 gpd

For a design pumping capacity of 2.5 mgd, the Wet Weather Peaking Factor calculates to be:

2.5 mgd ÷ 2.095 mgd = 1.19

For an actual pumping capacity of 2.8 mgd, the Wet Weather Peaking Factor calculates to be:

2.8 mgd ÷ 2.095 mgd = 1.34

If we consider the existing flow data provided by the City for Pump Station 79, we can calculate the Wet Weather Peaking Factor as follows.

Note that the City's data in Appendix F reports an existing average flow of 0.9 mgd and an existing peak flow of 1.2 mgd (assumed to be a dry weather peak).

Then the Dry Weather Peaking Factor is:

1.2 mgd ÷ 0.9 mgd = 1.33

This is a lower Dry Weather Peaking Factor than the design value in Figure 1-1 of the Sewer Design Guide, May 2015. For a flow of 0.9 mgd average, here is what the design Dry Weather Peak Factor would be:

900,000 gpd ÷ 80 gpcd = 11,250 population

For 11,250 people, Figure 1-1 Peaking Factor is: 1.8

If we apply the actual value peaking factor to the ultimate estimated flow we get the following results:

Total build-out EDUs:	4,275 EDUs
Build-out Population:	4,275 x 3.5 = 14,963
Build-out Average Flow:	4,275 x 3.5 x 80 = 1,197,000 gpd
Actual Peak Factor:	1.33
Dry Weather Peak Flow:	1,197,000 x 1.33 = 1,592,010 gpd

For a design pumping capacity of 2.5 mgd, the Wet Weather Peaking Factor calculates to be:

$$2.5 \text{ mgd} \div 1.592 \text{ mgd} = 1.57$$

For an actual pumping capacity of 2.8 mgd, the Wet Weather Peaking Factor calculates to be:

$$2.8 \text{ mgd} \div 1.592 \text{ mgd} = 1.76$$

These calculations lead to several observations/conclusions.

1. We do not know the Peak Wet Weather factor used for the design of Pump Station 79.

2. The Pump Station 79 design pumping capacity is greater than the ultimate Peak Dry Weather Flow for the service area by a factor of 19 percent.

3. When considering the actual Pump Station 79 pumping capacity of 2.8 mgd, the Peak Wet Weather Factor increases to 34 percent.

4. There is a likelihood that the Gonzales Canyon Sewer is experiencing infiltration which would result in reducing the dry weather peaking factor.

5. The estimate prepared in this report of ultimate EDUs in the Pump Station 79 service area may be conservative especially related to the commercial establishments along Villa De La Valle.

6. The calculations included in this report do not take into account water conservation features included in the new homes being constructed in Pacific Highlands Ranch. Reduction in per EDU sewage flow generated by the Pacific Highlands Ranch development will continue to influence the average and peak flows influent to Pump Station 79.

Conclusions and Recommendations

The following conclusions and recommendations are summarized based on the sewer system analysis prepared for the proposed Pacific Highlands Ranch Units 8 & 9 development project and the Del Mar Highlands Estates Affordable Housing site.

1. The Pacific Highlands Ranch Units 8 & 9 project consisting of 515 dwelling units will gravity sewer to the existing Gonzales Canyon Sewer near its upstream end.

2. The Del Mar Highlands Estates Affordable Housing project consisting of 12 multi-family dwelling units will gravity sewer into the existing Gonzales Canyon Sewer at Old El Camino Real.

3. Onsite gravity sewer mains within PHR Units 8 & 9 are 8" diameter except for those reaches along the south edge of Unit 8 which are the replacement segments of the Gonzales Canyon Sewer and carry flows from existing and future development to the east. Exhibit A at the back of this report indicates the necessary sewer line sizes within the PHR Units 8 & 9 project.

4. The Gonzales Canyon Sewer was analyzed using build-out EDUs for the Gonzales Canyon Sewer service area. No improvements to the Gonzales Canyon Sewer are needed in order to accommodate the proposed development of PHR Units 8 & 9. The results of this updated analysis are consistent with those of the May 2003 sewer study.

5. The proposed 12 Affordable Housing units being constructed on the east side of Old El Camino Real were included in the Gonzales Canyon Sewer analysis; these additional units do not create an impact to the Gonzales Canyon Sewer.

6. Pump Station 79 has capacity for the PHR Units 8 & 9 project and the Del Mar Highlands Estates Affordable Housing site. Improvements made to Pump Station 79 which were completed in 2010 provide pumping capacity for the build-out of the Pump Station 79 service area.

7. New sewer lines shall be designed to meet all requirements of the City of San Diego Public Utilities Department Sewer Design Guide, May 2015, or latest edition. Final design will be reflected on the improvement plans to be submitted for review and approval.

If you have any questions regarding the information or conclusions and recommendations presented in this report, please do not hesitate to contact the undersigned.

Dexter Wilson Engineering, Inc.

Andrew Oven

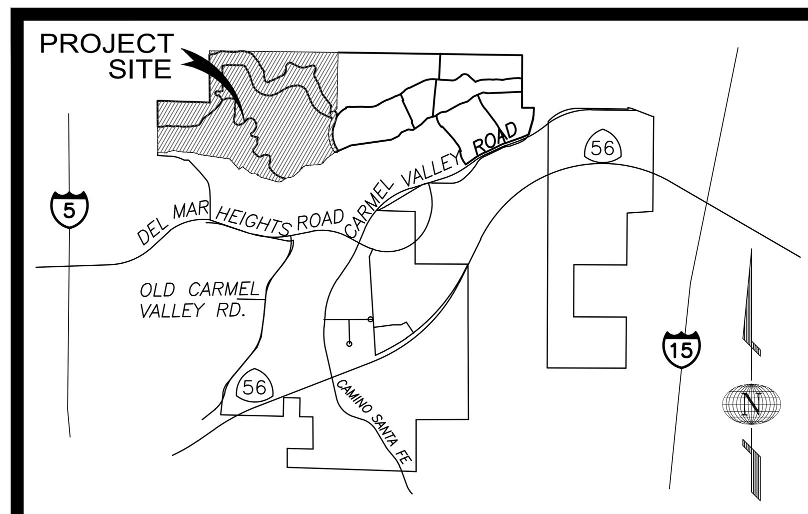
Andrew Oven, P.E.

AO:ps

Attachments

APPENDIX A

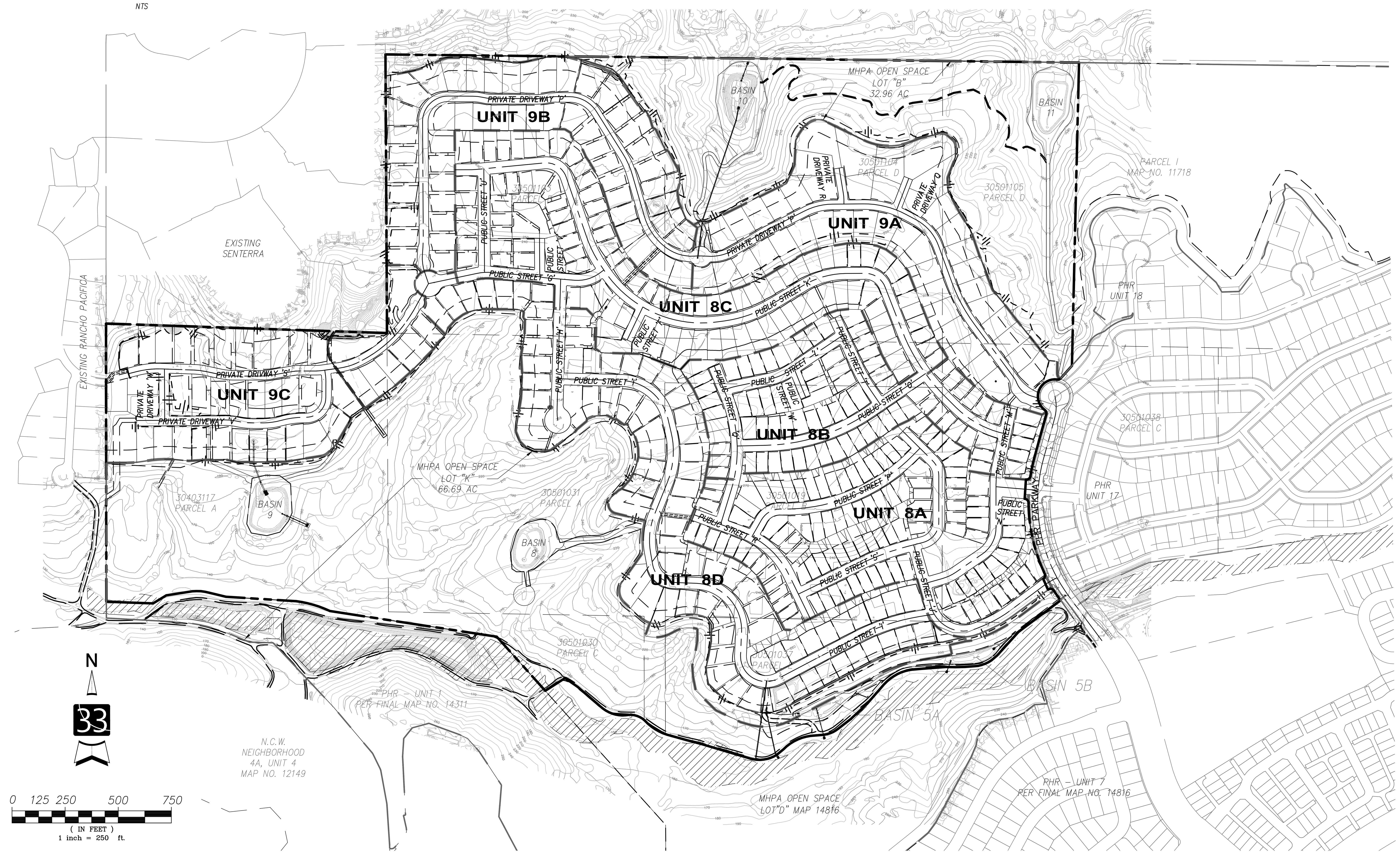
PHR UNITS 8 & 9 DEVELOPMENT PLAN



PACIFIC HIGHLANDS RANCH UNITS 8 & 9 VESTING TENTATIVE MAP (NO. 41-0185), SITE DEVELOPMENT PERMIT (N0. 7250), AND PLANNED DEVELOPMENT PERMIT (NO. 7250) AMENDMENTS AND REZONE CITY OF SAN DIEGO

VICINITY MAP

NTS



DEVELOPMENT SUMMARY

1. SUMMARY OF REQUEST:
   A VESTING TENTATIVE MAP NO. 41-0184 AMENDMENT, SITE DEVELOPMENT PERMIT NO. 7251 AMENDMENT, A PLANNED DEVELOPMENT PERMIT NO. 7250 AMENDMENT, AND REZONE FOR A 515 SINGLE-FAMILY DWELLING UNITS AND A COMMUNITY RECREATION CENTER.
2. STREET ADDRESS
   NORTHWEST CORNER OF PACIFIC HIGHLANDS RANCH PARKWAY AND CARMEL VALLEY ROAD
3. SITE AREA:
   TOTAL SITE AREA (GROSS): 254.15 ACRES (11,070,774 SQ. FT.)
   NET SITE AREA: 154.5 ACRES (67, SQ. FT.)
   (NET SITE AREA EXCLUDES MHPA AREAS)
4. ZONING:
   EXISTING: RS-1-11, RS-1-13, OC-1-1
   PROPOSED: RS-1-11, RS-1-12, RS-1-13, RS-1-14
5. COMMUNITY PLANNING AREA: PACIFIC HIGHLANDS RANCH
6. COVERAGE DATA:
   TOTAL LANDSCAPE/OPEN SPACE AREA (HOA LOTS ONLY): 1.53 ACRES (66,717 SF)
   TOTAL HARDSCAPE/PAVED AREA (PARKWAYS): 5.21 ACRES (227,124 SF)
   GROSS SITE AREA: 254.15 ACRES (11,070,774 SQ. FT.)
   FLOOR AREA RATIO PER ZONE (FAR): 0.60
   GROSS FLOOR AREA (GFA): PER DESIGN GUIDELINES
7. DENSITY:
   NUMBER OF EXISTING UNITS TO REMAIN ON SITE: NONE
   NUMBER OF PROPOSED DWELLING UNITS ON SITE: 515
8. YARD/SETBACK

REQUIRED PER ZONE:

RS-1-11	RS-1-12	RS-1-13
MIN. FRONT: 20'	MIN. FRONT: 15'	MIN. FRONT: 15'
MIN. SIDE: 6'	MIN. SIDE: 5'	MIN. SIDE: 5'
MIN. STREET SIDE: 10'	MIN. STREET SIDE: 10'	MIN. STREET SIDE: 10'
MIN. REAR: 10'	MIN. REAR: 10'	MIN. REAR: 10'

PROPOSED:

RS-1-11	RS-1-12	RS-1-13
MIN. FRONT: *10'/18'	MIN. FRONT: *10'/18'	MIN. FRONT: *10'/18'
MIN. SIDE: 6'	MIN. SIDE: 5'	MIN. SIDE: 5'
MIN. STREET SIDE: 10'	MIN. STREET SIDE: 10'	MIN. STREET SIDE: 10'
MIN. REAR: 10'	MIN. REAR: 10'	MIN. REAR: 10'

*10' MINIMUM TO SIDE LOADED GARAGE OR LIVING SPACE AND 18' MINIMUM TO ROLL UP GARAGE DOOR

9. PARKING (RESIDENTIAL):
   TOTAL NUMBER OF SPACES REQUIRED BY ZONE: 1,030 SPACES (MINIMUM 2 SPACES/DU)
   TOTAL NUMBER OF SPACES PROVIDED ON SITE: 1,030 SPACES
   *THE PROPOSED PROJECT PROVIDES 18' LONG DRIVEWAYS FROM GARAGE TO SIDEWALK THAT WILL ACCOMMODATE AN ADDITIONAL 2 PARKING SPACES FOR OFFSTREET PARKING.
10. PROPOSED BRUSH MANAGEMENT ZONES:

LOT NO.	ZONE 1	ZONE 2
1-9	65'	20'
298-316	35'	65'
317-342	60'(1)	
358-359	80'	
474-492	60'(1)	
504-514	20'	60'

396-400, 402-404, 407-409, 411-420, 455-473 ZONE 1 - 60'(1)

(1) NOTE: MHPA PERIMETER LOTS PER DEVELOPMENT AGREEMENT BETWEEN CITY OF SAN DIEGO AND PARDEE CONSTRUCTION COMPANY, PACIFIC HIGHLANDS RANCH SUBAREA III, NORTH CITY URBANIZING AREA DOCUMENT NO 00-18571 ARE REQUIRED TO PROVIDE BRUSH MANAGEMENT ZONES ON LOT WITH NO ZONE 2 ALLOWED WITHIN MHPA. THE DEVELOPMENT OF THESE LOTS (WHICH WERE APPROVED WITH 60' ZONE 1 AND NO ZONE 2 IN THE ORIGINAL VTM) WOULD BE SEVERELY COMPROMISED BY AN INCREASE TO AN 80' ZONE AS REQUIRED BY THE NEW CODE. ON THESE LOTS A 6' HIGH, 1-HR FIRE-RATED BLOCK GLASS WALL SHALL BE PROVIDED AS ALTERNATIVE TO FULL BRUSH MANAGEMENT ZONES TYP

11. LANDS USE

UNIT NO.	LAND USE*	NO. OF UNITS	NET AC.	DU/AC
8A	LD	110	16.95	6.49
8B	LD	82	12.59	6.51
8C	LD	105	18.57	5.66
8D	LD	80	22.33	3.53
9A	LD	44	16.99	2.59
9B	LD	52	17.42	3.04
9C	LD	42	16.06	2.62

*LD = LOW DENSITY

12. GEOLOGIC HAZARD CATEGORY: 53, 22, 32, 23, 21
13. YEAR CONSTRUCTED OF BUILDINGS ONSITE: N/A (VACANT)
14. EXISTING USE: VACANT LAND
    PROPOSED USE: SINGLE FAMILY HOMES
15.

OCCUPANCY CLASSIFICATION	ZONING DESIGNATION	TYPE OF CONSTRUCTION
SINGLE FAMILY	R-3	SAME AS BEFORE
RECREATION CENTER	A-3	SAME AS BEFORE

16. OPEN SPACE REQUIREMENTS:
    THE PROJECT WILL MEET THE SUPPLEMENTAL PDP REGULATIONS FOR MINIMUM OPEN SPACE REQUIREMENTS PER SDMC SECTION 143.0420.

ZONE	MIN. USABLE OPEN SPACE PER DWELLING UNIT	MIN. TOTAL OPEN SPACE PER DWELLING UNIT
RS-1-11	1,750 SQ FT	3,500 SQ FT
RS-1-12	1,200 SQ FT	2,400 SQ FT
RS-1-13	900 SQ FT	1,800 SQ FT
RS-1-14	750 SQ FT	1,500 SQ FT

GENERAL NOTES

LOT SUMMARY

1. RESIDENTIAL LOTS:	515	TOTAL AREA: 123.91 AC.
MHPA OPEN SPACE LOTS:	2	TOTAL AREA: 99.92 AC.
WATER QUALITY BASIN LOTS:	6	TOTAL AREA: 6.27 AC.
H.O.A./PARK LOTS:	13	TOTAL AREA: 3.46 AC.
UNIT 8 REC. CENTER LOT:	1	TOTAL AREA: 0.76 AC.
MHPA OPEN SPACE LOTS:	2	TOTAL AREA: 99.65 AC.
PUBLIC RIGHT OF WAY:		TOTAL AREA: 9.296 AC.
PRIVATE DRIVEWAY:		TOTAL AREA: 8.31 AC.

2. TOTAL AREA WITHIN SUBDIVISION IS 254.15 ACRES GROSS.
3. GAS AND ELECTRIC: SAN DIEGO GAS & ELECTRIC
4. TELEPHONE: TIME WARNER CABLE
5. CABLE TELEVISION: TIME WARNER CABLE
6. SEWER, WATER, AND RECYCLED WATER: CITY OF SAN DIEGO
7. DRAINAGE SYSTEM: AS REQUIRED BY CITY ENGINEER
8. FIRE: CITY OF SAN DIEGO
9: SCHOOL DISTRICT: SAN DIEGUITO UNION H.S./SOLANA BEACH ELEMENTARY SCHOOL DISTRICT
10. ALL NEW UTILITIES WILL BE LOCATED UNDERGROUND
11. CONTOUR INTERVAL: 2 FEET
    DATUM: GPS PT. NP. 542 - N 1,927,136.68, E 6,267,611.17, ELEV. = 190.83
    SOURCE: SAN-LO AERIAL SURVEYS
    DATE: 1-5-99
12. ALL PROPOSED SLOPES ARE 2:1 UNLESS NOTED OTHERWISE
13. GRADING SHOWN HEREON IS PRELIMINARY AND IS SUBJECT TO MODIFICATION IN FINAL DESIGN
14. LOT DIMENSIONS AND SETBACK DIMENSIONS SHOWN HEREON ARE PRELIMINARY AND ARE SUBJECT TO MODIFICATION IN FINAL DESIGN
15. ALL EXISTING BUILDINGS AND STRUCTURES SHALL BE REMOVED
16. OPEN SPACE LOTS TO BE MAINTAINED BY THE HOME OWNERS ASSOCIATION
17. ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH A GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY STREET DESIGN MANUAL.
18. ALL PUBLIC WATER FACILITIES AND ASSOCIATED EASEMENTS WILL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE CITY OF SAN DIEGO WATER FACILITY DESIGN GUIDELINES AND REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO.
19. THIS TENTATIVE MAP INCLUDES MULTIPLE MAP UNITS WHICH MAY BE FILED AS INDIVIDUAL FINAL MAPS AS PERMITTED BY THE CALIFORNIA STATE SUBDIVISION MAP ACT. THE DEVELOPER RESERVES THE RIGHT TO FILE THE FINAL MAPS OUT OF NUMERICAL SEQUENCE. THE CITY ENGINEER SHALL REVIEW SUCH MAP UNITS AND IMPOSE REASONABLE CONDITIONS RELATING TO THE FILING OF SAID MAP UNITS. A DEVELOPER MAY FILE UP TO A MAXIMUM OF 8 MAP UNITS.
20. PROJECT IS NOT ADJACENT TO TRANSIT STOPS.
21. ALL PRIVATE ENCROACHMENTS INTO THE PUBLIC RIGHT-OF-WAY OR PUBLIC EASEMENT WILL REQUIRE A ENCROACHMENT MAINTENANCE AND REMOVAL AGREEMENT
22. THIS PROJECT WILL BE SUBJECT TO THE IMPLEMENTATION OF THE PUBLIC FACILITIES AND SERVICES MITIGATION, MONITORING AND REPORTING PROGRAM. PROPOSED UTILITIES ARE TO BE INSTALLED UNDERGROUND

LEGAL DESCRIPTION:

PARCEL D: (305-011-03, 305-011-04 AND 305-011-05)

THOSE PORTIONS OF SECTION 9, TOWNSHIP 14 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, AS DESCRIBED IN THE FOLLOWING PARCELS 1, 2 AND 3.

PARCEL 1:

THE SOUTH HALF OF THE NORTHWEST QUARTER AND THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER.

PARCEL 2:

THE EASTERLY 100.00 FEET OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER.

PARCEL 3:

THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER.

EXCEPTING THEREFROM THE EASTERLY 24 ACRES.

PARCEL A: (305-010-31)

THOSE PORTIONS OF SECTION 9, TOWNSHIP 14 SOUTH, RANGE MARCH WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, AS DESCRIBED IN THE FOLLOWING PARCELS 1 AND 2.

PARCEL 1:

THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER.

PARCEL 2:

THE EASTERLY 100.00 FEET OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER. EXCEPTING THEREFROM THAT PORTION THEREOF LYING WITHIN PACIFIC HIGHLANDS RANCH UNIT NO. 1, ACCORDING TO MAP THEREOF NO. 14311, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

EXCEPTING THEREFROM THAT PORTION LYING WITHIN PACIFIC HIGHLANDS RANCH UNIT NO. 7, ACCORDING TO MAP THEREOF NO. 14816, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

PARCELS 1 OF PARCEL MAP NO. 11718, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 9, 1981.

PARCEL C: (305-010-30)

THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, TOGETHER WITH THAT PORTION OF THE WESTERLY 100.00 FEET OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 16 LYING NORTHERLY OF THE COUNTY ROAD - KNOWN AS BLACK MOUNTAIN ROAD -RUNNING EASTERLY AND WESTERLY THROUGH SAID NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 16, ACCORDING TO OLD SURVEY NO. 57 ON FILE IN THE OFFICE OF THE COUNTY SURVEYOR OF SAN DIEGO COUNTY, ALL BEING IN TOWNSHIP 14 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTING FROM SAID SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, THE EASTERLY 100.00 FEET THEREOF.

EXCEPT THEREFROM THAT PORTION LYING WITHIN PACIFIC HIGHLANDS RANCH UNIT NO. 1, ACCORDING TO MAP THEREOF NO. 14311 FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

PARCEL B: (305-010-19 AND PORTION OF 305-010-31)

THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, TOWNSHIP 14 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

PARCEL C: (APN 305-010-38)

THE WEST HALF OF THE SOUTHEAST QUARTER OF SECTION 9, TOWNSHIP 14 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTING THEREFROM THAT PORTION LYING WITHIN PACIFIC HIGHLANDS RANCH UNIT NO. 7, ACCORDING TO MAP THEREOF NO. 14816, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.
ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN PACIFIC HIGHLANDS RANCH UNIT NO. 10, ACCORDING TO MAP THEREOF NO. 14817, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN PACIFIC HIGHLANDS RANCH UNIT NO. 5, ACCORDING TO MAP THEREOF NO. 14754, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.
ALSO EXCEPT THEREFROM THAT PORTION THEREOF LYING WITHIN PARCEL MAP NO. 20703 FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY SEPTEMBER 1, 2009 AS FILE NO. 2009-0490632, OFFICIAL RECORDS.

PARCEL E: (305-010-36 AND 305-010-37)

PARCELS 1 AND 2 OF PARCEL MAP NO. 20703, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY ON SEPTEMBER 1, 2009.

PARCEL A: (304-031-17)
THE EASTERLY HALF OF THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 14 SOUTH, RANGE 3 WEST,SAN BERNARDINO MERIDIAN, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF.

EXCEPTING THEREFROM THOSE PORTIONS LYING WITHIN N. C. W. NEIGHBORHOOD 4A, UNIT 4, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO.12149, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, AUGUST 10, 1988.

ALSO EXCEPTING THEREFROM THAT PORTION THEREOF LYING WITHIN PACIFIC HIGHLANDS RANCH UNIT NO. 1, ACCORDING TO MAP THEREOF NO. 14311, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY.

SOLAR ACCESS NOTE

THIS IS TO AFFIRM THAT THE DESIGN OF THIS SUBDIVISION PROVIDES, TO THE EXTENT FEASIBLE, FOR FUTURE PASSIVE OR NATURAL HEATING AND COOLING OPPORTUNITIES IN ACCORDANCE WITH THE PROVISION OF SECTION 66473.1 OF THE STATE SUBDIVISION MAP ACT.

ASSESSOR'S PARCEL NO.

304-031-17, 305-010-19, 305-010-30, 305-010-31, 305-010-36, 305-010-37, 305-010-38, 305-011-03, 305-011-04, 305-011-05

LAMBERT COORDINATES

288-1705

CCS83 COORDINATES

1928-6265

BENCHMARK

LOCATION: CARMEL VALLEY ROAD/RANCHO SANTA FE FARMS ROAD
*3/4 IRON PIPE ON NW CORNER
REFERENCE: CITY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK/OCTOBER 04, 2011
INDEX: NORTHING 2928 EASTING 17155
ELEVATION: 321.10214 DATUM IS: M.S.L

*ELEVATION UP-DATED PER U.S.C.G.S. ADJUSTMENT OF 1970, MAY DIFFER FROM PREVIOUS ELEVATION

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM 1983 ZONE 6, EPOCH 1991.35. MEASUREMENTS TO POINTS 'A' AND 'B' ARE SHOWN ON SHEET 2 . 'A' AND 'B' ARE ADJUSTED TO GPS STATION 460 AND GPS STATION 542 PER ROS 14492. BEARING 'A' TO 'B': N53°11'37"E.

QUOTED BEARINGS FROM REFERENCE MAPS/DEEDS MAY OR MAY NOT BE IN TERMS OF SAID SYSTEM.

THE COMBINED GRID FACTOR AT STATION 'A' IS 0.999969905 GRID DISTANCE = GROUND DISTANCE X COMBINED GRID FACTOR

GRADING

1. TOTAL AMOUNT OF SITE TO BE GRADED: 151.19 AC.
2. PERCENT OF TOTAL SITE GRADED: 59.49 %.
3. AMOUNT OF SITE WITH 25 PERCENT SLOPES OR GREATER: 75.25 AC.
4. PERCENT OF THE EXIST. SLOPES STEEPER THAN 25% PROPOSED TO BE GRADED: 13.54%
5. PERCENT OF TOTAL SITE WITH 25 PERCENT SLOPES OR GREATER: 29.6%
6. AMOUNT OF CUT: 570,000 CUBIC YARDS.
7. AMOUNT OF FILL: 899,000 CUBIC YARDS.
8. MAXIMUM HEIGHT OF FILL SLOPE(S): 30 FEET 2:1 SLOPE RATIO.
9. MAXIMUM HEIGHT OF CUT SLOPE(S): 26 FEET 2:1 SLOPE RATIO.
10. AMOUNT OF IMPORT SOIL: 329,000 CUBIC YARDS. (IMPORT FROM PHR UNITS 17 & 18)
11. RETAINING/CRIB WALLS: HOW MANY: 17
    MAXIMUM LENGTH: 1,325 FEET
    MAXIMUM HEIGHT: 7 FEET.

NOTE: ADDITIONAL WALLS UNDER 3' IN HEIGHT MAY BE REQUIRED IN RESIDENTIAL PAD AREAS BASED ON FINAL HOUSE PLOTTING.
ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH A GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY OF SAN DIEGO STREET DESIGN MANUAL.

PROFESSIONAL SELF-CERTIFICATION STATEMENT

I HEREBY ACKNOWLEDGE AND CERTIFY THAT:
1. I AM ACCOUNTABLE FOR KNOWING AND COMPLYING WITH THE GOVERNING POLICIES, REGULATIONS AND SUBMITTAL REQUIREMENTS APPLICABLE TO THIS PROPOSED DEVELOPMENT;
2. I HAVE PERFORMED REASONABLE RESEARCH TO DETERMINE THE REQUIRED APPROVALS AND DECISION PROCESS FOR THE PROPOSED PROJECT, AND THAT FAILURE TO ACCURATELY IDENTIFY AN APPROVAL OR DECISION PROCESS COULD SIGNIFICANTLY DELAY THE PERMITTING PROCESS;
3. I HAVE TAKEN THE PROFESSIONAL CERTIFICATION FOR DEVELOPMENT PERMIT COMPLETENESS REVIEW TRAINING AND AM ON THE APPROVED LIST FOR PROFESSIONAL CERTIFICATION;
4. MAINTAINING MY PROFESSIONAL CERTIFICATION FOR DEVELOPMENT PERMIT COMPLETENESS REVIEW PRIVILEGE REQUIRES ACCURATE SUBMITTALS ON A CONSISTENT BASIS;
5. SUBMITTING INCOMPLETE DOCUMENTS AND PLANS ON A CONSISTENT BASIS MAY RESULT IN THE REVOCATION OF MY PROFESSIONAL CERTIFICATION FOR DEVELOPMENT PERMIT COMPLETENESS REVIEW;
6. IF REQUIRED DOCUMENTS OR PLAN CONTENT IS MISSING, PROJECT REVIEW WILL BE DELAYED; AND
7. THIS SUBMITTAL PACKAGE MEETS ALL OF THE MINIMUM SUBMITTAL REQUIREMENTS CONTAINED IN LAND DEVELOPMENT MANUAL, VOLUME 1, CHAPTER 1, SECTION 4.

RESPONSIBLE CERTIFIED PROFESSIONAL NAME:

SIGNATURE: ____________ DATE: 07/06/2016
BRAD SONNENBURG

REQUESTED DEVIATIONS

MUNICIPAL CODE REGULATION	SDMC LANGUAGE	DEVIATION	LOTS REQUESTING DEVIATION	REQUESTED PERMIT
SECTION 131.0431(B), TABLE 131-04D	REQUIRED FRONT SETBACKS: RS-1-11 = 20 FEET RS-1-12, RS-1-13, RS-1-14 = 15 FEET	PROPOSED FRONT SETBACKS: RS-1-11, RS-1-12, RS-1-13, RS-1-14 = 10 FEET FOR SIDE-LOADED GARAGE AND 18 FEET FOR FRONT-LOADED GARAGE	ALL LOTS	PDP

SHEET INDEX

SHEET NUMBER	DESCRIPTION
1	COVER SHEET
2	EXISTING TOPO AND EASEMENTS
3	SLOPE ANALYSIS
4	NOTES, STREET CROSS SECTIONS AND DETAILS
5-7	GRADING AND UTILITIES UNIT 8
8-10	GRADING AND UTILITIES UNIT 9
11	SITE CROSS SECTIONS
12	EARTHWORK EXHIBIT
13-15	SITE PLAN UNIT 8
16-18	SITE PLAN UNIT 9
19	FIRE PLAN
20	TRAIL PLAN
21-26	LANDSCAPE PLANTING PLANS
27	LANDSCAPE PLANTING LEGEND AND NOTES
28-31	LANDSCAPE ENLARGEMENTS AND DETAILS
32-37	BMZ PLANS
38	BMZ NOTES
39	ADJACENT OPEN SPACE/MHPA PLANT COMMUNITY EXHIBIT

OWNER/DEVELOPER: PARDEE HOMES
13400 SABRE SPRINGS PARKWAY, SUITE 200
SAN DIEGO, CA 92128
(858)794-2500 FAX(858)794-2599

PLANNING: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

CIVIL ENGINEER: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

LANDSCAPE ARCHITECT: RICK ENGINEERING
5620 FRIARS ROAD
SAN DIEGO, CA 92110
(619) 291-0707

PREPARED IN THE OFFICE OF:

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PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN ____________ DATE
RCE 34584

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Fax #: (858) 751-0634

Project Address:
NORTHWEST CORNER OF PACIFIC HIGHLANDS RANCH PKWY AND CARMEL VALLEY ROAD

Project Name:
PHR UNITS 8&9 VTM, SDP, AND PDP AMENDMENT & REZONE

Sheet Title:
COVER SHEET

Revision 14:
Revision 13:
Revision 12:
Revision 11:
Revision 10:
Revision 9:
Revision 8:
Revision 7:
Revision 6:
Revision 5:
Revision 4:
Revision 3:
Revision 2: 10-07-2016
Revision 1: 8-18-2016

Original Date: 7-6-2016

Sheet 1 of 39

DEP#

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LEGEND:

SLOPES 2:1 MAX. (TYP.)	
DAYLIGHT LINE	
RIGHT OF WAY	
T.M. BOUNDARY	
UNIT BOUNDARY	
MHPA BOUNDARY	
PROPERTY LINE	
SIDEWALK	
BRUSH MANAGEMENT ZONE	
RETAINING WALL	
PROPOSED GEOGRID WALL	
STORM DRAIN	
PROPOSED SEWER	—S—S—S—S—
PROPOSED WATER	—W—W—W—W—
PROPOSED RECYCLED WATER	-RW—RW—RW—RW—
PROPOSED FIRE SERVICE	- F — F — F — F —
PROPOSED FLOW DIRECTION	
DRIVEWAY LOCATION	
STREET LIGHT	
FIRE HYDRANT ASSY.	
PAD ELEV.	280
TRAIL	
LOT NUMBER	2
SEWER LATERAL	S
WATER LATERAL WITH METER BOX	M
BACKFLOW PREVENTION DEVICES	

KEY MAP
NOT TO SCALE

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
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PHR UNITS 8&9 VTM, SDP, AND PDP AMENDMENT & REZONE

Sheet Title:
GRADING AND UTILITIES
UNIT 8 SHEET 1 OF 3

Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
Revision 4:	
Revision 3:	
Revision 2:	10-07-2016
Revision 1:	8-18-2016

Original Date: 7-6-2016

Sheet 5 of 39

DEP#

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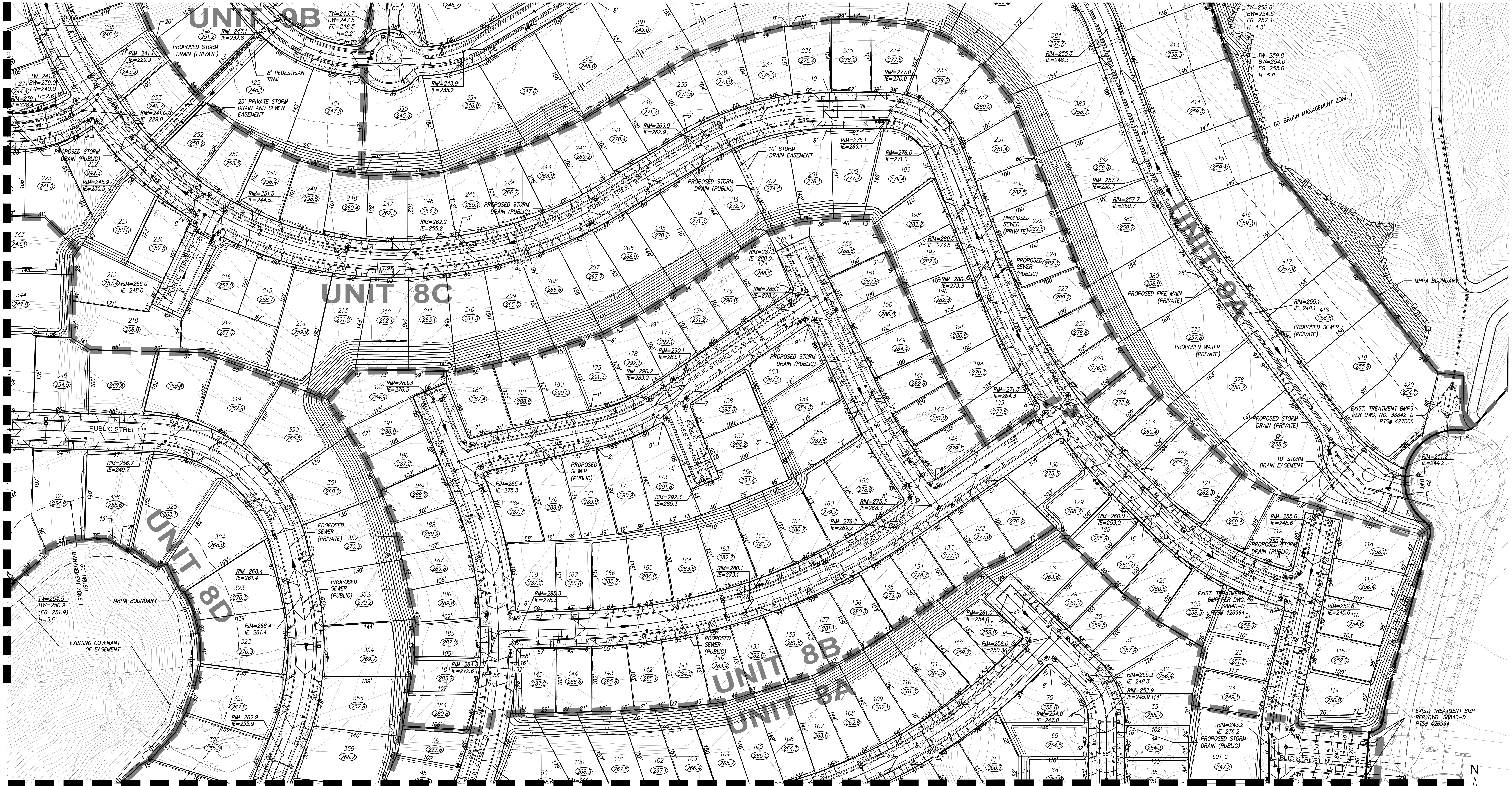

SEE SHEET 7

SEE SHEET 5

LEGEND:

SLOPES 2:1 MAX. (TYP.)	
DAYLIGHT LINE	
RIGHT OF WAY	
T.M. BOUNDARY	
UNIT BOUNDARY	
MHPA BOUNDARY	
PROPERTY LINE	
SIDEWALK	
BRUSH MANAGEMENT ZONE	
RETAINING WALL	
PROPOSED GEOGRID WALL	
STORM DRAIN	
PROPOSED SEWER	-S—S—S—S—
PROPOSED WATER	-W—W—W—W—
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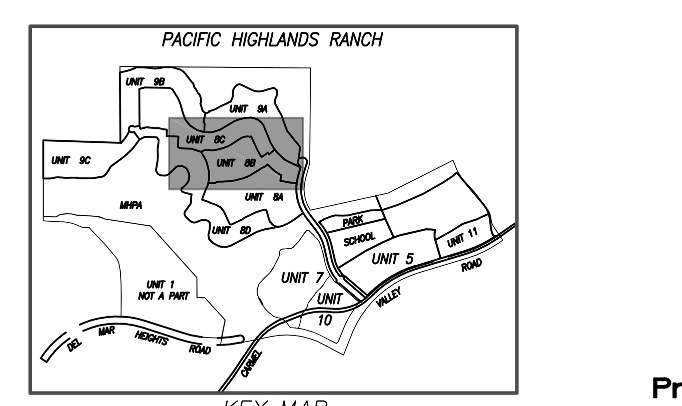
PAD ELEV.	280
TRAIL	
LOT NUMBER	2
SEWER LATERAL	S
WATER LATERAL WITH METER BOX	M
BACKFLOW PREVENTION DEVICES	



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C. JOHN EARDENSOHN
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DATE

0 30 60 120 180
(IN FEET)
1 inch = 60 ft.

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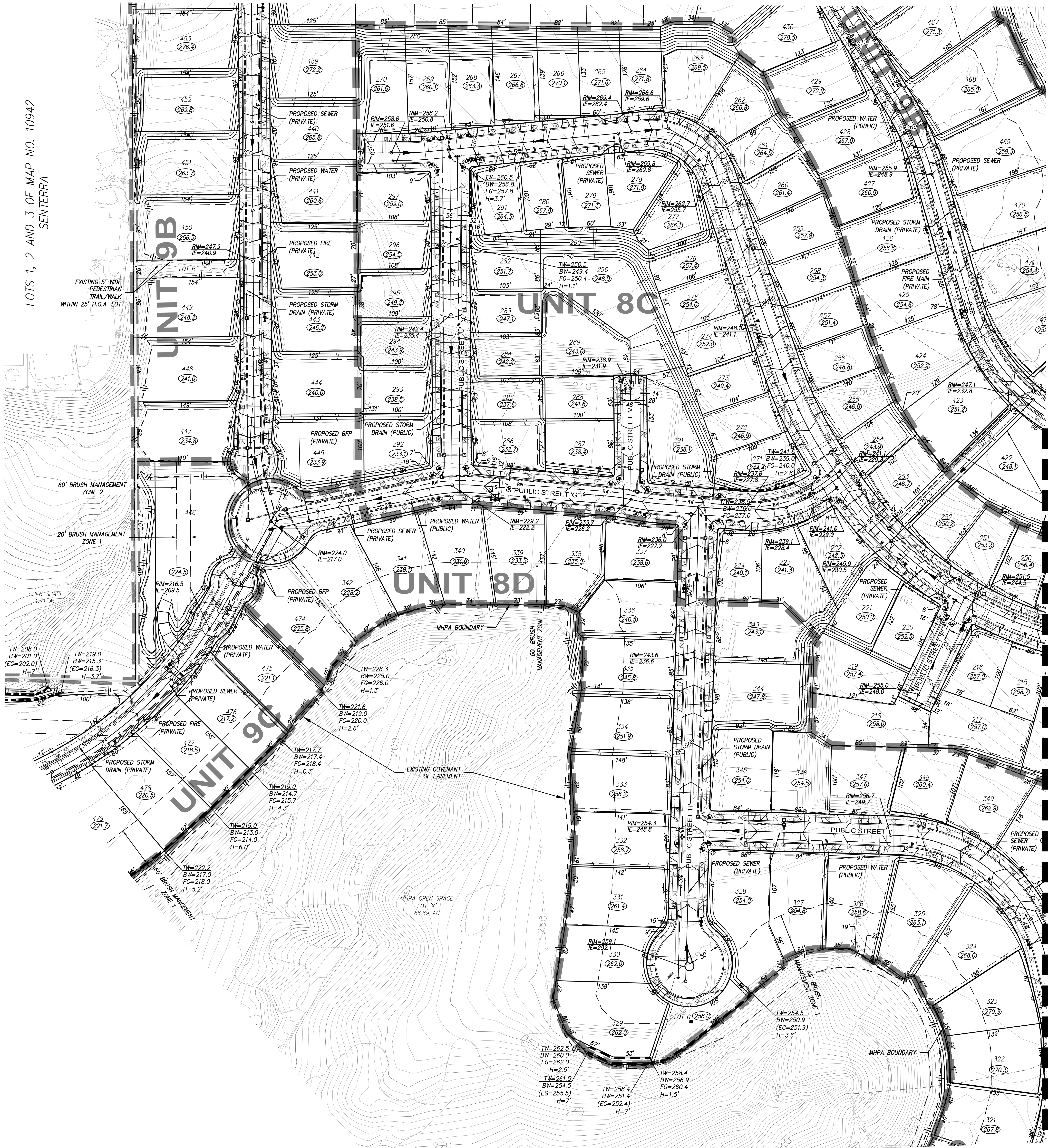
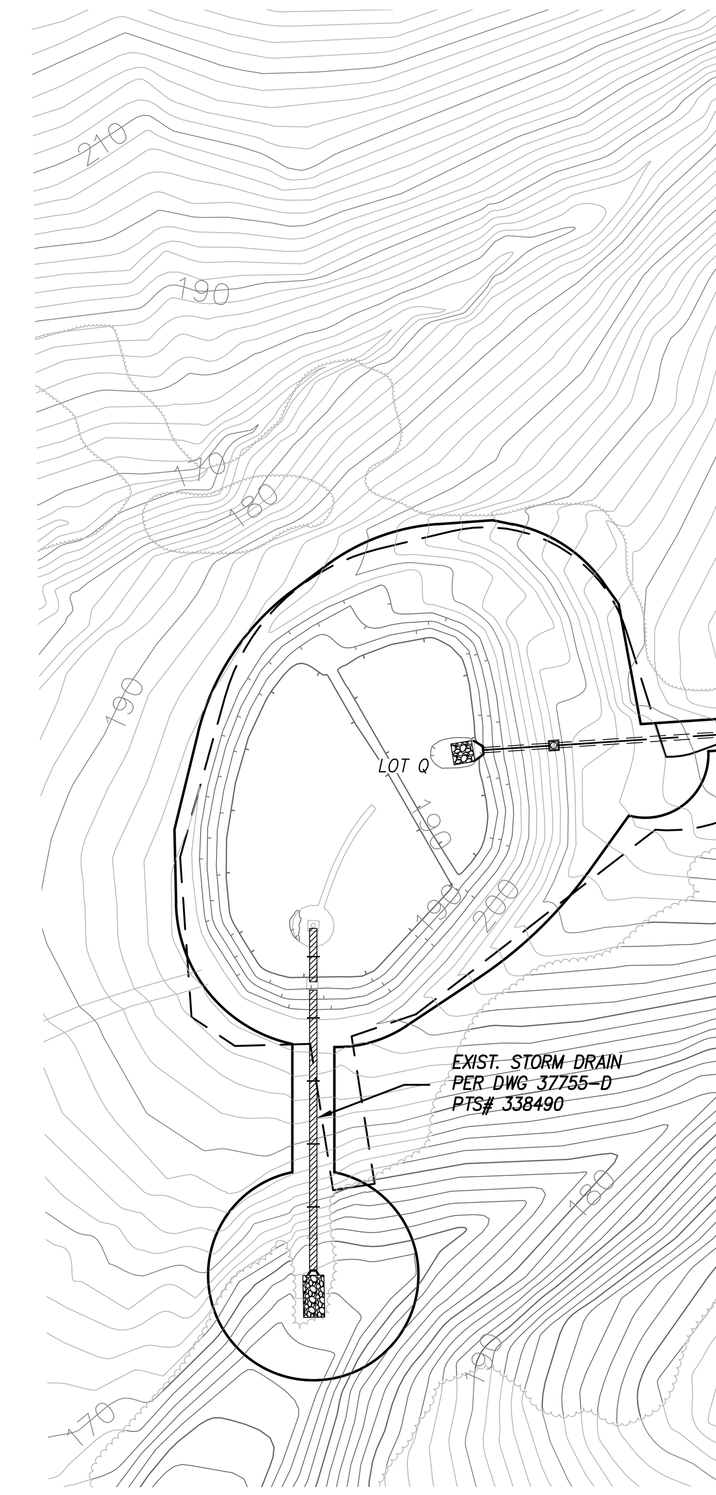
Sheet Title:
GRADING AND UTILITIES UNIT 8 SHEET 2 OF 3

Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
Revision 4:	
Revision 3:	
Revision 2:	10-07-2016
Revision 1:	8-18-2016

Original Date: 7-6-2016

DEP#





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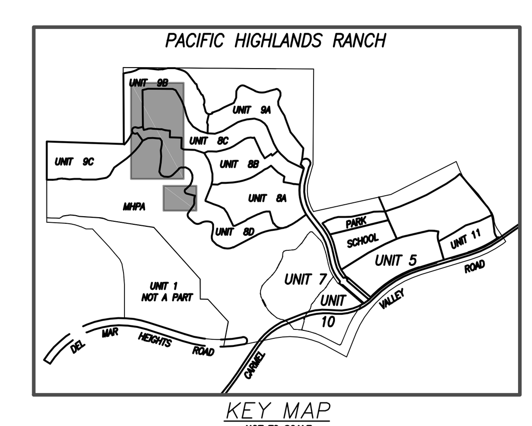
(IN FEET)
1 inch = 60 ft.



LEGEND:

SLOPES 2:1 MAX. (TYP.)	
DAYLIGHT LINE	
RIGHT OF WAY	
T.M. BOUNDARY	
UNIT BOUNDARY	
MHPA BOUNDARY	
PROPERTY LINE	
SIDEWALK	
BRUSH MANAGEMENT ZONE	
RETAINING WALL	
PROPOSED GEOGRID WALL	
STORM DRAIN	
PROPOSED SEWER	—S—S—S—
PROPOSED WATER	—W—W—W—
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PROPOSED FIRE SERVICE	— F — F — F —
PROPOSED FLOW DIRECTION	
DRIVEWAY LOCATION	
STREET LIGHT	
FIRE HYDRANT ASSY.	
PAD ELEV.	280
TRAIL	
LOT NUMBER	2
SEWER LATERAL	
WATER LATERAL WITH METER BOX	
BACKFLOW PREVENTION DEVICES	

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RCE 34584
DATE

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PKWY AND CARMEL VALLEY ROAD

Project Name:
PHR UNITS 8&9 VTM, SDP, AND
PDP AMENDMENT & REZONE

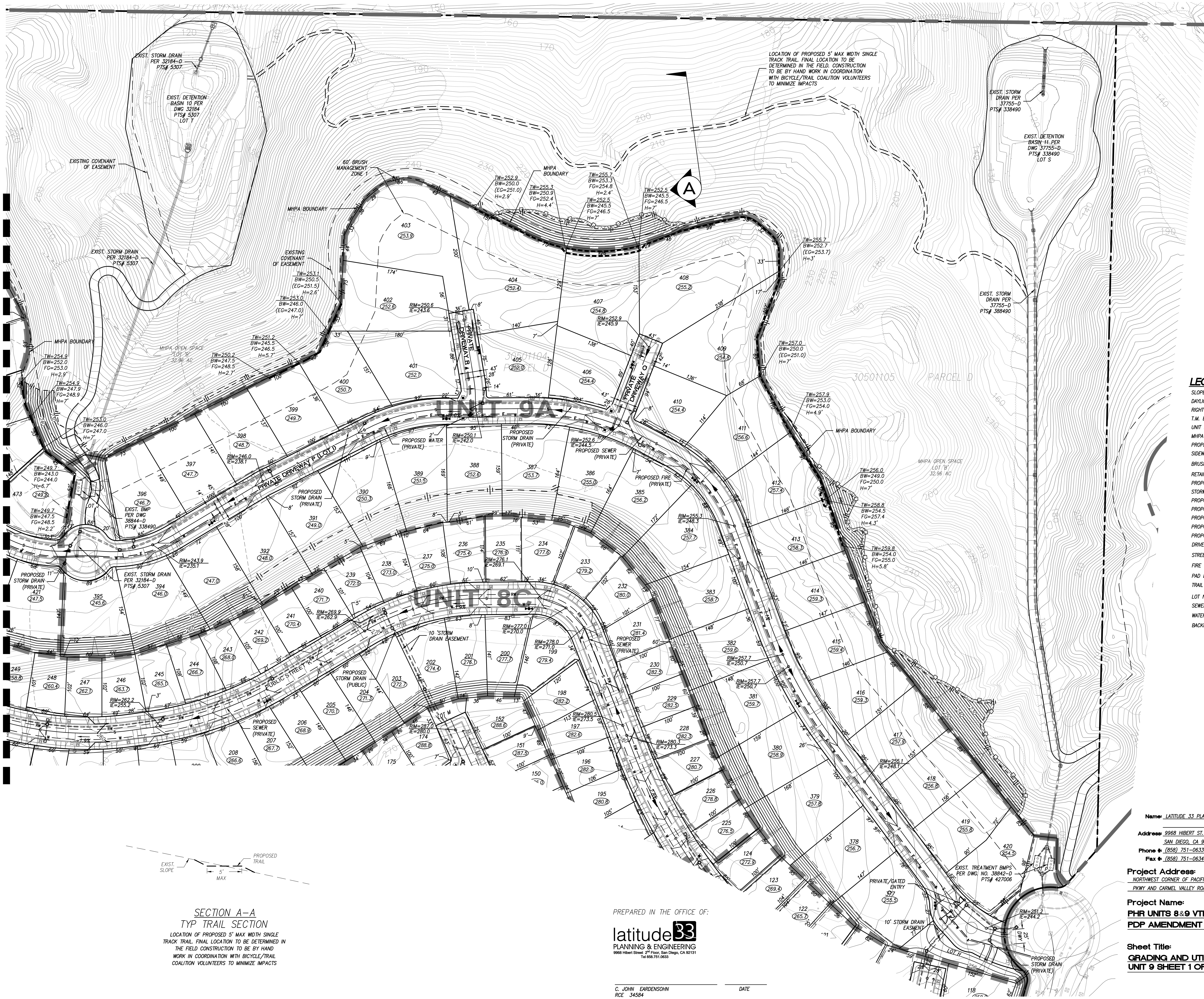
Sheet Title:
GRADING AND UTILITIES
UNIT 8 SHEET 3 OF 3

Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
Revision 4:	
Revision 3:	
Revision 2:	10-07-2016
Revision 1:	8-18-2016

Original Date: 7-6-2016

Sheet 7 of 39

DEP#



SECTION A–A
TYP TRAIL SECTION

LOCATION OF PROPOSED 5' MAX WIDTH SINGLE TRACK TRAIL. FINAL LOCATION TO BE DETERMINED IN THE FIELD CONSTRUCTION TO BE BY HAND WORK IN COORDINATION WITH BICYCLE/TRAIL COALITION VOLUNTEERS TO MINIMIZE IMPACTS

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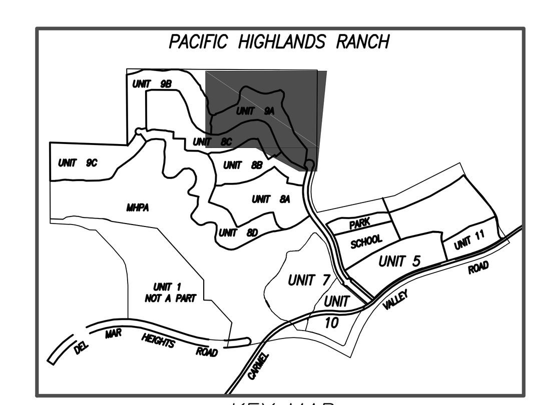
C. JOHN EARDENSOHN — DATE
RCE 34584

LEGEND:

- SLOPES 2:1 MAX. (TYP.)
- DAYLIGHT LINE
- RIGHT OF WAY
- T.M. BOUNDARY
- UNIT BOUNDARY
- MHPA BOUNDARY
- PROPERTY LINE
- SIDEWALK
- BRUSH MANAGEMENT ZONE
- RETAINING WALL
- PROPOSED GEOGRID WALL
- STORM DRAIN
- PROPOSED SEWER — S — S — S — S —
- PROPOSED WATER — W — W — W — W —
- PROPOSED RECYCLED WATER — RW — RW — RW — RW —
- PROPOSED FIRE SERVICE — F — F — F — F —
- PROPOSED FLOW DIRECTION
- DRIVEWAY LOCATION
- STREET LIGHT
- FIRE HYDRANT ASSY.
- PAD ELEV. (280)
- TRAIL
- LOT NUMBER 2
- SEWER LATERAL
- WATER LATERAL WITH METER BOX
- BACKFLOW PREVENTION DEVICES

N

0 30 60 120 180
(IN FEET)
1 inch = 60 ft.



KEY MAP
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Name:	LATITUDE 33 PLANNING & ENGINEERING	Revision 14:	
Address:	9968 HIBERT ST. 2ND FLR SAN DIEGO, CA 92131	Revision 13:	
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Fax #:	(858) 751-0634	Revision 11:	
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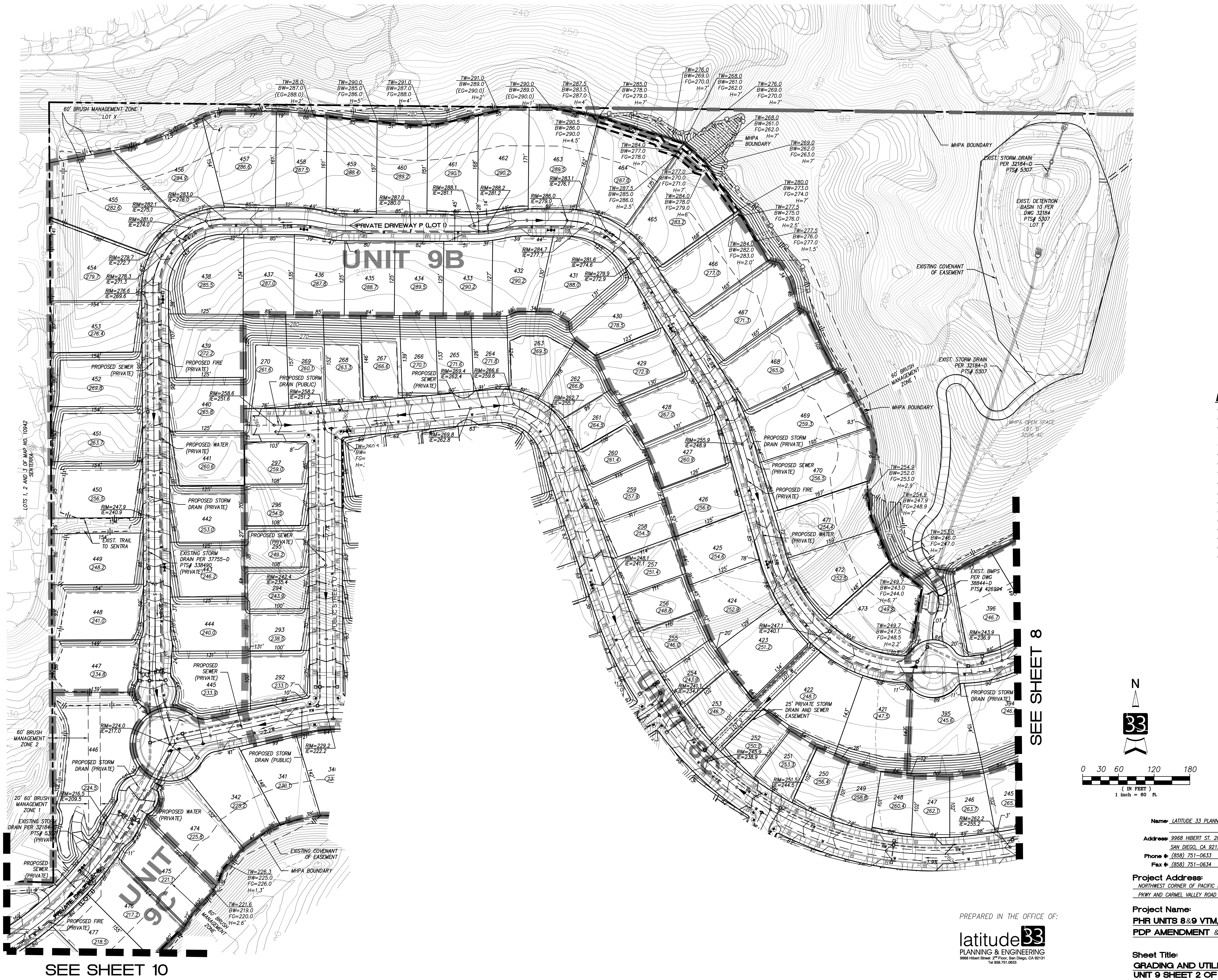
PHR UNITS 8&9 VTM, SDP, AND PDP AMENDMENT & REZONE

Sheet Title:
GRADING AND UTILITIES
UNIT 9 SHEET 1 OF 3

Original Date: 7-6-2016

Sheet 8 of 39

DEP#



LEGEND:

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- DRIVEWAY LOCATION
- STREET LIGHT
- FIRE HYDRANT ASSY.
- PAD ELEV. 280
- TRAIL
- LOT NUMBER 2
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- WATER LATERAL WITH METER BOX
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N

0 30 60 120 180

(IN FEET)
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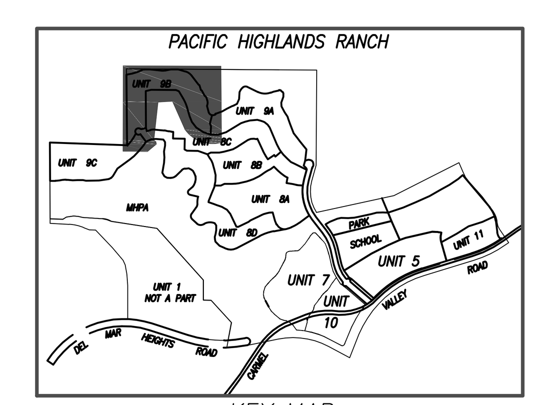

KEY MAP
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PREPARED IN THE OFFICE OF:

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C. JOHN EARDENSOHN
RCE 34584

DATE

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Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
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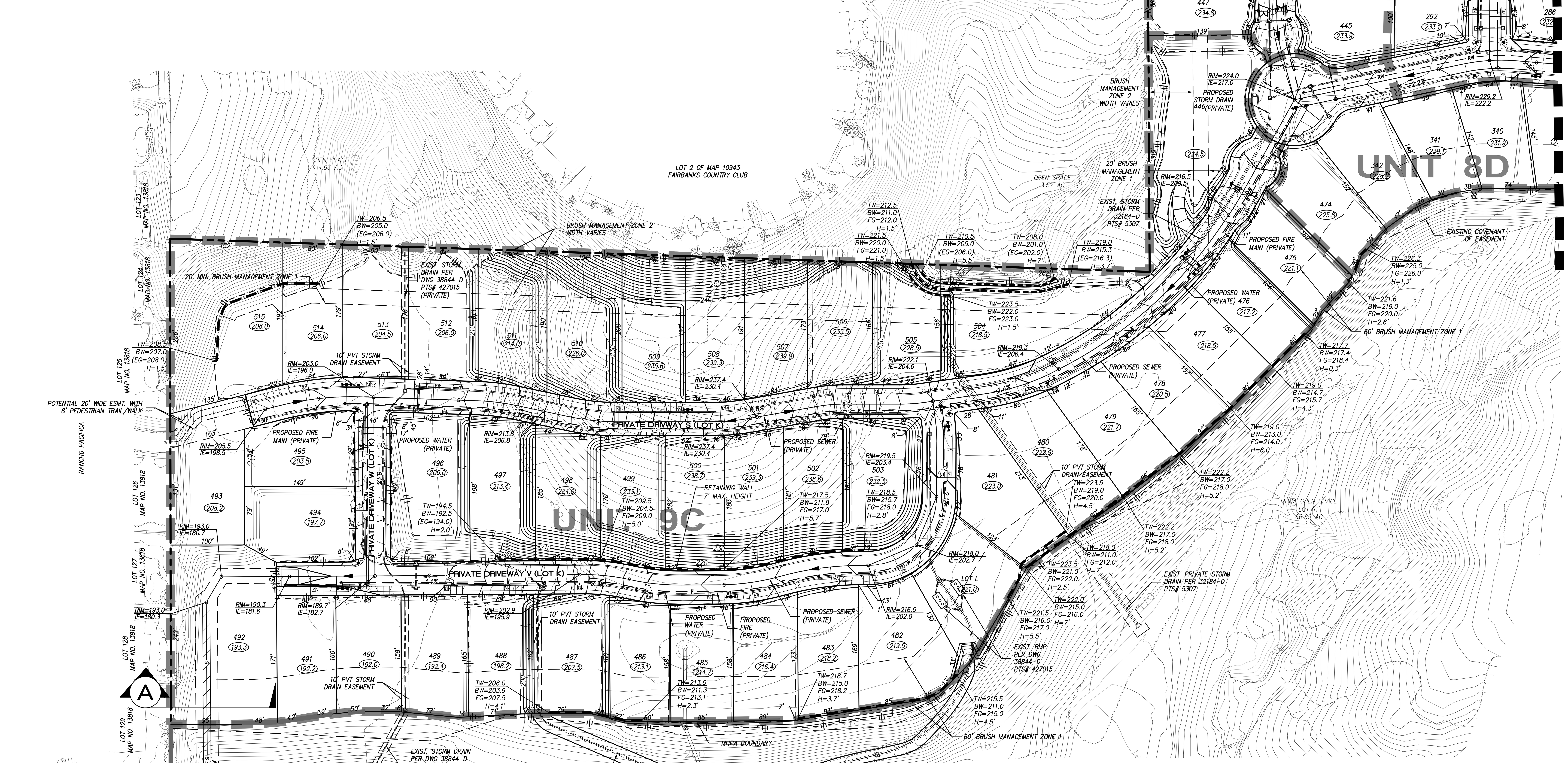
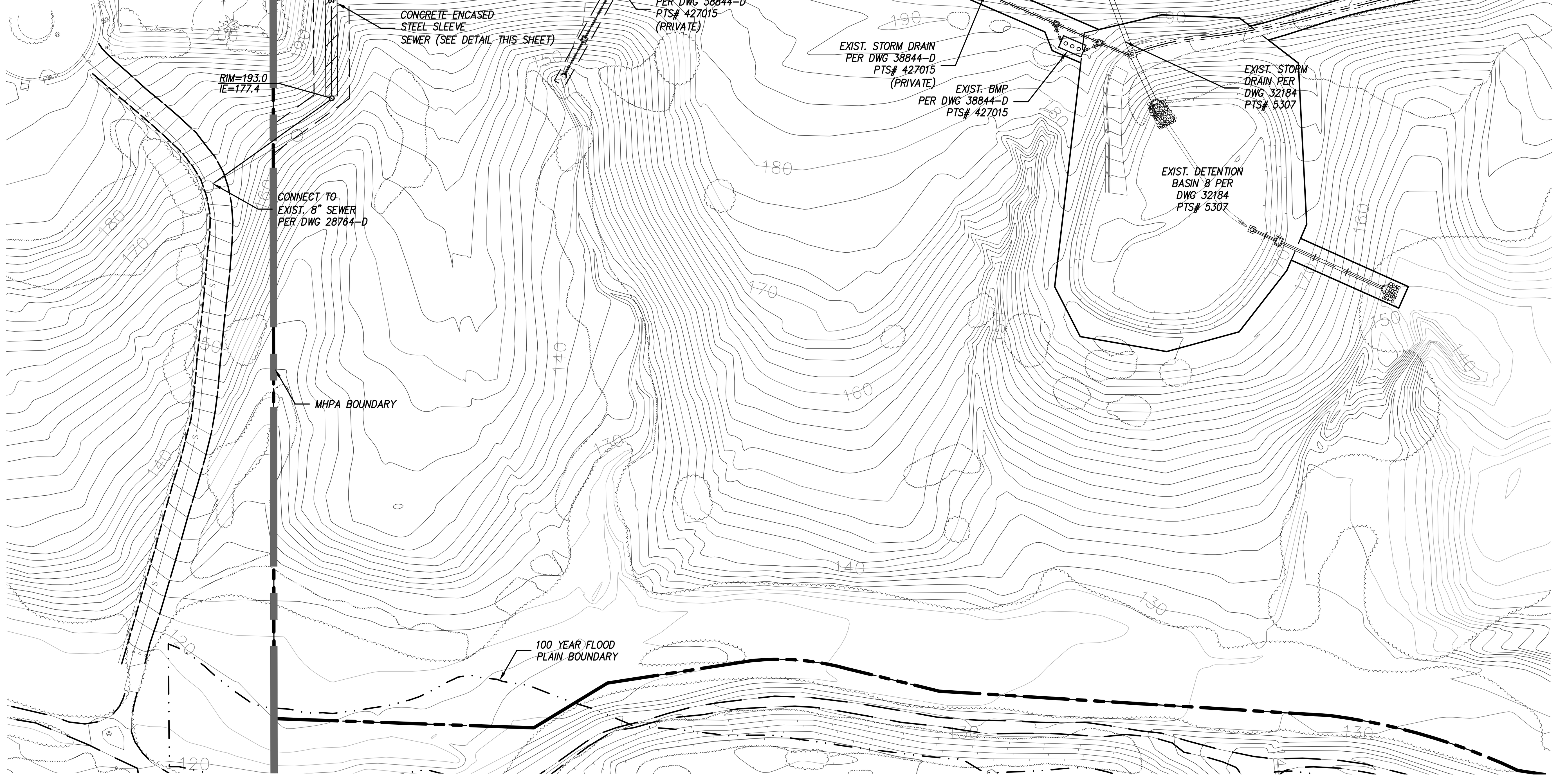
Sheet 9 of 39

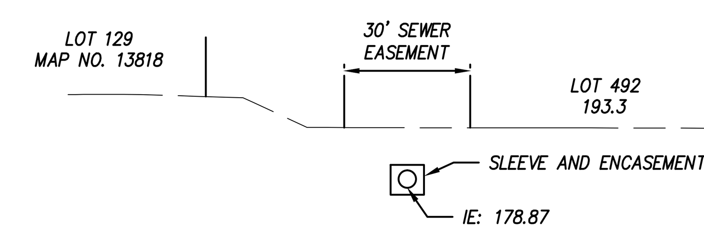
DEP#





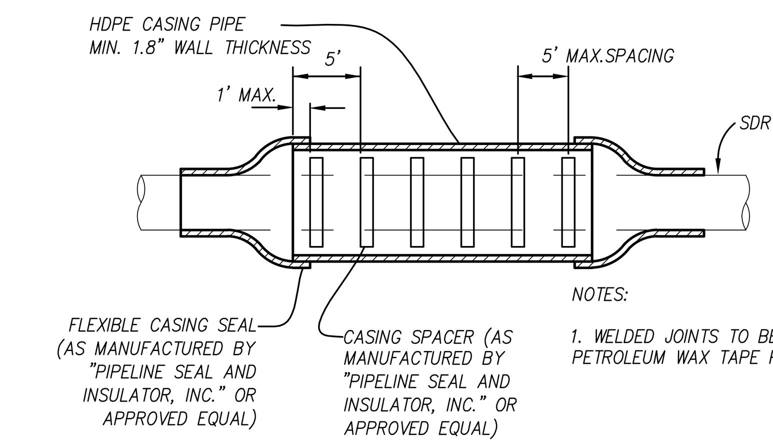
LEGEND:

SLOPES 2:1 MAX. (TYP.)	
DAYLIGHT LINE	
RIGHT OF WAY	
T.M. BOUNDARY	
UNIT BOUNDARY	
MHPA BOUNDARY	
PROPERTY LINE	
SIDEWALK	
BRUSH MANAGEMENT ZONE	
RETAINING WALL	
PROPOSED GEOGRID WALL	
STORM DRAIN	
PROPOSED SEWER	—S—
PROPOSED WATER	—W—
PROPOSED RECYCLED WATER	—RW—
PROPOSED FIRE SERVICE	—F—
PROPOSED FLOW DIRECTION	
DRIVEWAY LOCATION	
STREET LIGHT	
FIRE HYDRANT ASSY.	
PAD ELEV.	280
TRAIL	
LOT NUMBER	2
SEWER LATERAL	
WATER LATERAL WITH METER BOX	
BACKFLOW PREVENTION DEVICES	



SECTION A-A

NOT TO SCALE

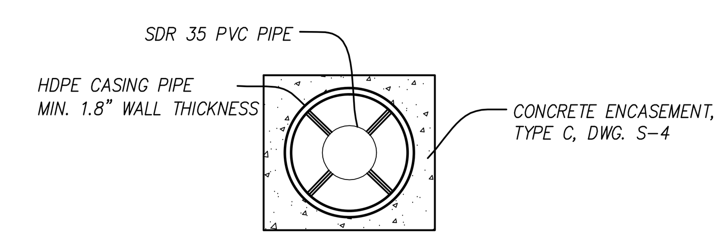


NOTES:

1. WELDED JOINTS TO BE COATED WITH PETROLEUM WAX TAPE PER AWWA C-217

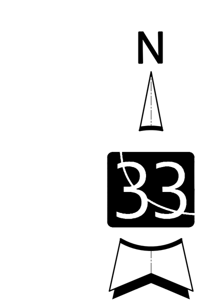
SEWER PIPE SLEEVE

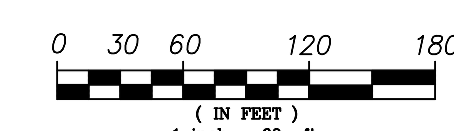
NOT TO SCALE

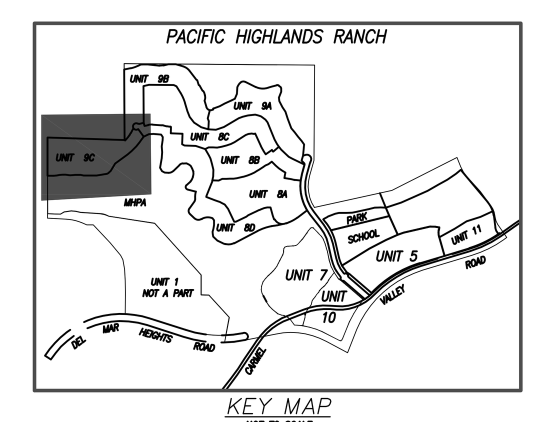


CROSS SECTION

NOT TO SCALE







KEY MAP

NOT TO SCALE

PREPARED IN THE OFFICE OF:

latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN DATE
RCE 34584

Name: LATITUDE 33 PLANNING & ENGINEERING
Address: 9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
Phone #: (858) 751-0633
Fax #: (858) 751-0634

Project Address:
NORTHWEST CORNER OF PACIFIC HIGHLANDS RANCH
PKWY AND CARMEL VALLEY ROAD

Project Name:
PHR UNITS 8&9 VTM, SDP, AND
PDP AMENDMENT & REZONE

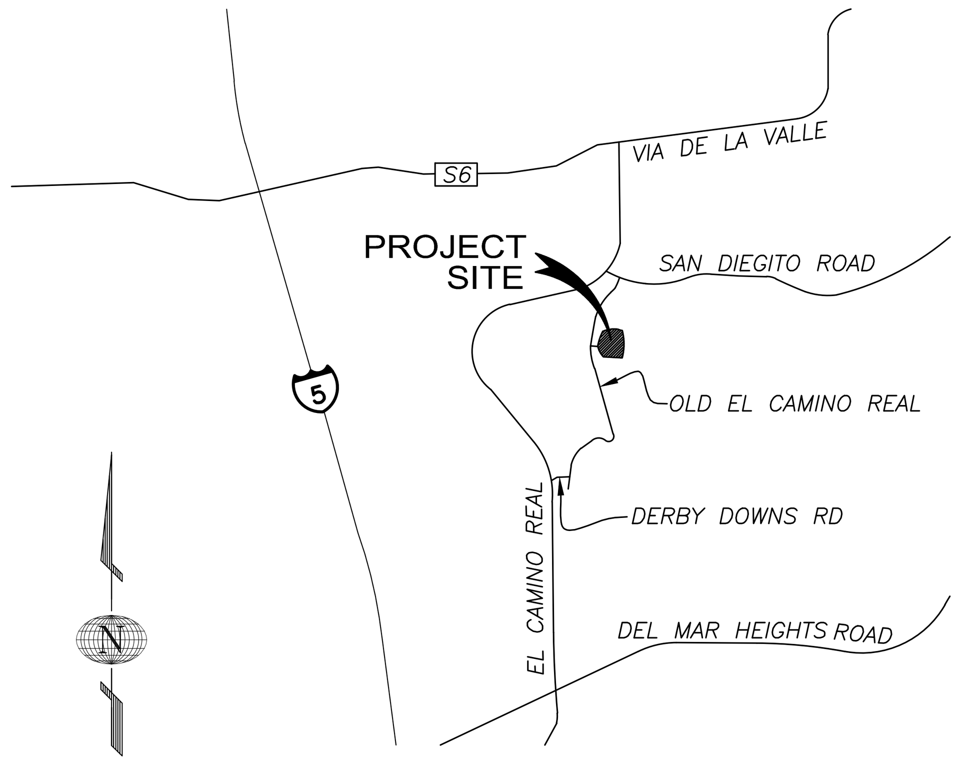
Sheet Title:
GRADING AND
UTILITIES UNIT 9
SHEET 3 OF 3

Revision	Date
Revision 14:	
Revision 13:	
Revision 12:	
Revision 11:	
Revision 10:	
Revision 9:	
Revision 8:	
Revision 7:	
Revision 6:	
Revision 5:	
Revision 4:	
Revision 3:	
Revision 2:	10-07-2016
Revision 1:	8-18-2016

Original Date: 7-6-2016

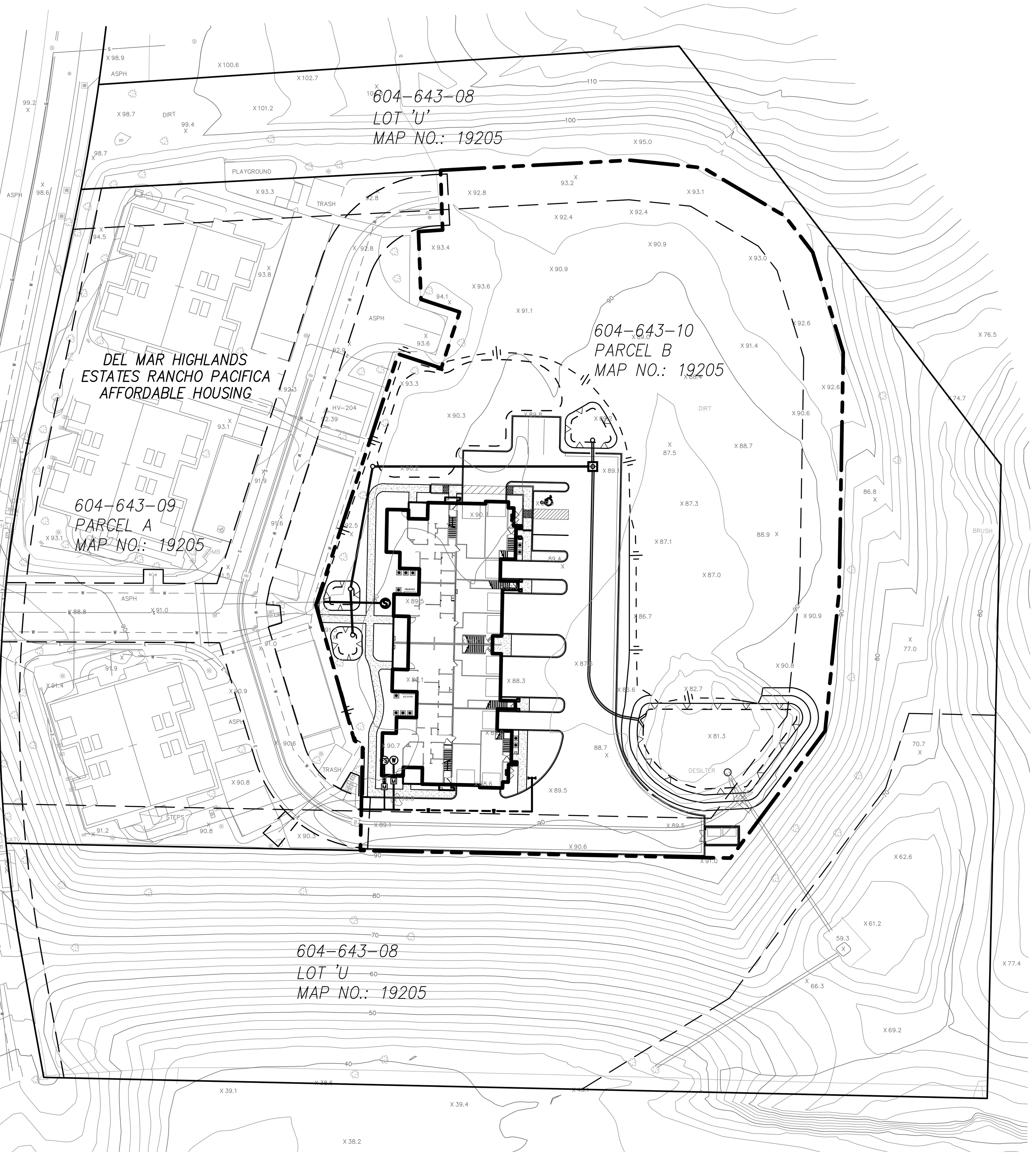
Sheet 10 of 39

DEP#



VICINITY MAP

NTS



DEL MAR HIGHLANDS ESTATES AFFORDABLE SITE PLANNED DEVELOPMENT PERMIT NO. XX-XXXX

CITY OF SAN DIEGO

GRADING

1. TOTAL AMOUNT OF SITE TO BE GRADED: 0.96 AC
2. PERCENT OF TOTAL SITE GRADED: 53%
3. AMOUNT OF SITE WITH 25% SLOPES OR GREATER: 0.08 AC
4. PERCENT OF THE EXIST. SLOPES STEEPER THAN 25% PROPOSED TO BE GRADED: 100%
5. PERCENT OF TOTAL SITE WITH 25% SLOPES OR GREATER: 4.4%
6. AMOUNT OF CUT: 400 CUBIC YARDS
7. AMOUNT OF FILL: 1600 CUBIC YARDS
8. MAXIMUM HEIGHT OF FILL SLOPES(S): 4 FEET 2:1 SLOPE RATIO
9. MAXIMUM HEIGHT OF CUT SLOPE(S): 0 FEET 2:1 SLOPE RATIO
10. AMOUNT OF EXPORT SOIL: 0
11. RETAINING/CRIB WALLS: HOW MANY: 0
    MAXIMUM LENGTH: 0
    MAXIMUM HEIGHT: 0

NOTE: ADDITIONAL WALLS UNDER 3' IN EIGHT MAY BE REQUIRED IN RESIDENTIAL PAD AREAS BASED ON FINAL HOUSE PLOTTING
ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY OF SAN DIEGO STREET DESIGN MANUAL

DEVELOPMENT SUMMARY

1. SUMMARY OF REQUEST:

   RESIDENTIAL DEVELOPMENT PERMIT AMENDMENT FOR A PLANNED PERMIT NO. 94-0576 PROPOSING AN ADDITIONAL 12 MULTI FAMILY AFFORDABLE DWELLING UNITS.

2. STREET ADDRESS

   14163 OLD EL CAMINO REAL SAN DIEGO, CA 92130

3. SITE AREA:

   TOTAL SITE AREA (GROSS): 1.80 ACRES (78,273 SQ. FT.)
   NET SITE AREA: ________ (________ SQ. FT.)
   (NET SITE AREA EXCLUDES REQUIRED STREETS AND PUBLIC DEDICATIONS)

4. ZONING: AR-1-1
4. COMMUNITY PLANNING AREA: PACIFIC HIGHLANDS RANCH
6. COVERAGE DATA

   TOTAL LANDSCAPE/OPEN SPACE AREA: __________
   TOTAL HARDSCAPE/PAVED AREA: __________
   MIN GROSS FLOOR AREA (GFA): 650 SF NOT INCLUDING GARAGE
   MAX LOT COVERAGE: 10%

7. DENSITY

   MAXIMUM DWELLING UNITS ALLOWED PER ZONE: 1 DU PER LOT
   NUMBER OF EXISTING UNITS TO REMAIN ON SITE: NONE
   NUMBER OF PROPOSED DWELLING UNITS ON SITE: 12
   TOTAL NUMBER OF UNITS PROVIDED ON THE SITE: 12

8. YARD/SETBACK:

FRONT YARD:	REQUIRED: 25'
STREET SIDE YARD:	REQUIRED: N/A
SIDE YARD(S):	REQUIRED: 20'
REAR YARD:	REQUIRED: 25'

9. BRUSH MANAGEMENT ZONE 1 IS 20'

LEGAL DESCRIPTION

PARCEL 1: APN 304-643-09

PARCEL A OF PARCEL MAP 19205 IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 9, 2003.

PARCEL 2: APN 304-643-08

LOT U OF DEL MAR HIGHLANDS ESTATES, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 13818, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 2, 1999.

EXCEPTING THEREFROM, UNTIL DECEMBER 31, 2044, AS A MINERAL INTEREST AND NOT AS A ROYALTY INTEREST, ALL OF THE MINERALS OF EVERY KIND, INCLUDING, BUT NOT LIMITED TO, ALL OIL, GAS, HYDROCARBONS AND ASSOCIATED SUBSTANCES IN, UNDER OR THAT MAY BE EXTRACTED, PRODUCED AND SAVED FROM SAID REAL PROPERTY BUT WITHOUT THE RIGHT OF ENTRY TO THE SURFACE OF SAID REAL PROPERTY OR THE TOP 500 FEET OF THE SUBSURFACE OF SAID REAL PROPERTY FOR THE PURPOSES OF EXPLORING FOR, DEVELOPING AND REMOVING SUCH MATERIALS.

PARCEL 3: APN 304-643-10

PARCEL B OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY APRIL 9, 2003.

PARCEL 4:

AN EASEMENT FOR GENERAL UTILITY PURPOSES, TOGETHER WITH THE RIGHT TO REPLACE, MAINTAIN AND ALTERATION OF ANY UTILITY EQUIPMENT OR FACILITY, AND FOR VEHICULAR AND PEDESTRIAN INGRESS, EGRESS ON AND OVER THE DRIVEWAY ON PARCEL A OF PARCEL MAP 19205 CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, APRIL 9, 2003, DELINEATED ON SAID PARCEL MAP AS "GENERAL UTILITY AND ACCESS EASEMENT GRANTED HEREON".

SHEET INDEX

GENERAL NOTES

LOT SUMMARY

1. RESIDENTIAL LOTS:	1	TOTAL AREA: ______
WATER QUALITY BASIN LOTS:	4	TOTAL AREA: 0.07 AC
HOA:	1	TOTAL AREA: ______
MONUMENT SIGN LOTS:	X	TOTAL AREA: ______
PUBLIC RIGHT OF WAY:		TOTAL AREA: ______

2. TOTAL AREA WITHIN SUBDIVISION IS 1.80 ACRES GROSS.
4. GAS AND ELECTRIC: SAN DIEGO GAS & ELECTRIC
5. TELEPHONE: TIME WARNER CABLE
6. CABLE TELEVISION: TIME WARNER CABLE
7. SEWER AND WATER: CITY OF SAN DIEGO
8. DRAINAGE SYSTEM: AS REQUIRED BY CITY ENGINEER
9. FIRE: CITY OF SAN DIEGO
10: SCHOOL DISTRICT: SAN DIGUITO UNION H.S./SOLANA BEACH ELEMENTARY SCHOOL DISTRICT
11. ALL NEW UTILITIES WILL BE LOCATED UNDERGROUND
12. CONTOUR INTERVAL: 2 FEET
    DATUM: GPS PT. NP. 542 - N 1,927,136.68, E 6,267,611.17, ELEV. = 190.83
    SOURCE: SAN-LO AERIAL SURVEYS
    DATE: 1-5-99
13. ALL PROPOSED SLOPES ARE 2:1 UNLESS NOTED OTHERWISE
14. GRADING SHOWN HEREON IS PRELIMINARY AND IS SUBJECT TO MODIFICATION IN FINAL DESIGN
15. LOT DIMENSIONS AND SETBACK DIMENSIONS SHOWN HEREON ARE PRELIMINARY AND ARE SUBJECT TO MODIFICATION IN FINAL DESIGN
17. OPEN SPACE LOTS TO BE MAINTAINED BY THE HOME OWNERS ASSOCIATION

OCCUPANCY CLASSIFICATION	ZONING DESIGNATION	TYPE OF CONSTRUCTION
MULTI-FAMILY	R-1	TYPE V / RATED

18. ALL RESIDENTIAL LOCAL AND PRIVATE STREETS, WITH A GRADE BREAK OF 1% OR GREATER, SHALL HAVE VERTICAL CURVES IN ACCORDANCE WITH THE CITY STREET DESIGN MANUAL.
19. ALL PUBLIC WATER FACILITIES AND ASSOCIATED EASEMENTS WILL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE CITY OF SAN DIEGO WATER FACILITY DESIGN GUIDELINES AND REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO.
20. THIS TENTATIVE MAP INCLUDES MULTIPLE MAP UNITS WHICH MAY BE FILED AS INDIVIDUAL FINAL MAPS AS PERMITTED BY THE CALIFORNIA STATE SUBDIVISION MAP ACT. THE DEVELOPER RESERVES THE RIGHT TO FILE THE FINAL MAPS OUT OF NUMERICAL SEQUENCE. THE CITY ENGINEER SHALL REVIEW SUCH MAP UNITS AND IMPOSE REASONABLE CONDITIONS RELATING TO THE FILING OF SAID MAP UNITS

SOLAR ACCESS NOTE

THIS IS TO AFFIRM THAT THE DESIGN OF THIS SUBDIVISION PROVIDES, TO THE EXTENT FEASIBLE, FOR FUTURE PASSIVE OR NATURAL HEATING AND COOLING OPPORTUNITIES IN ACCORDANCE WITH THE PROVISION OF SECTION 66473.1 OF THE STATE SUBDIVISION MAP ACT.

ASSESSOR'S PARCEL NO.

304-643-10, 304-643-09, 304-643-08

LAMBERT COORDINATES

288-1705

DESITY

MAXIMUM NUMBER OF DWELLING UNITS ALLOWED PER ZONE: _______
MAXIMUM NUMBER OF DWELLING UNITS ON SITE: _______

BENCHMARK

LOCATION: OLD EL CAMINO REAL/SAN DIEGUITO ROAD
*SEBP (SOUTHEAST CORNER BRASS PLUG) TOP INLET
REFERENCE: CITY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK/OCTOBER 04, 2011
INDEX: NORTHING 295499 EASTING 1699630
ELEVATION: 22.473 DATUS IS: M.S.L

*ELEVATION UP-DATED PER U.S.C.G.S. ADJUSTMENT OF 1970, MAY DIFFER FROM PREVIOUS ELEVATION

GEOLOGIC HAZARD CATEGORY

53 - LEVEL OR SLOPING TERRAIN, UNFAVORABLE GEOLOGIC STRUCTURE, LOW TO MODERATE RISK.

N

0 20 40 80 120
(IN FEET)
1 inch = 40 ft.

OWNER/DEVELOPER: PARDEE HOMES
13400 SABRE SPRINGS PARKWAY, SUITE 200
SAN DIEGO, CA 92128
(858)794-2500 FAX(858)794-2599

PLANNING: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

CIVIL ENGINEER: LATITUDE 33 PLANNING & ENGINEERING
9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
(858) 751-0633

LANDSCAPE ARCHITECT: RICK ENGINEERING
5620 FRIARS RD.
SAN DIEGO, CA 92110
(619) 291-0707

PREPARED IN THE OFFICE OF:
latitude 33
PLANNING & ENGINEERING
9968 Hibert Street 2nd Floor, San Diego, CA 92131
Tel 858.751.0633

C. JOHN EARDENSOHN
RCE 34584 EXP. 9-30-2003
DATE

Name: LATITUDE 33 PLANNING & ENGINEERING
Address: 9968 HIBERT ST. 2ND FLR
SAN DIEGO, CA 92131
Phone #: (858) 751-0633
Fax #: (858) 751-0634

Project Address:
14163 OLD EL CAMINO REAL

Project Name:
DEL MAR HIGHLANDS ESTATES
AFFORDABLE HOUSING

Sheet Title:
SITE DEVELOPMENT PERMIT
COVER SHEET

Revision 14: ______
Revision 13: ______
Revision 12: ______
Revision 11: ______
Revision 10: ______
Revision 9: ______
Revision 8: ______
Revision 7: ______
Revision 6: ______
Revision 5: ______
Revision 4: ______
Revision 3: ______
Revision 2: ______
Revision 1: ______

Original Date: ______

Sheet 1 of XXX

DEP# ______

APPENDIX B

ONSITE SEWER ANALYSIS

PHR UNITS 8 & 9 FLOWING NORTH AND WEST

(PRIVATE SEWER SYSTEM)

SEWER STUDY SUMMARY

DATE: 9/1/2016

JOB NUMBER: 598-007

FOR: Onsite Sewer Analysis - PHR Units 8 & 9 West

BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 2

REFER TO PLAN SHEET:

LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
						IN-LINE	TOTAL					M.G.D.	C.F.S.							
224	9A-8	9-A7		3.5	4.00	14.0	14.0	80	1,120	4.000	4,480	0.004	0.007	8	1.0	0.002657	0.03608	0.05	0.0166	0.94
222	9A-7	9A-6		3.5	4.00	14.0	28.0	80	2,240	4.000	8,960	0.009	0.014	8	1.4	0.004491	0.04636	0.07	0.0240	1.30
220	9A-5	9A-6		3.5	5.00	17.5	17.5	80	1,400	4.000	5,600	0.006	0.009	8	1.0	0.003321	0.04022	0.06	0.0194	1.01
218	9A-5	9A-4		3.5	3.00	10.5	56.0	80	4,480	4.000	17,920	0.018	0.028	8	1.0	0.010628	0.06966	0.10	0.0436	1.43
216	9A-3	9A-4		3.5	5.00	17.5	17.5	80	1,400	4.000	5,600	0.006	0.009	8	1.0	0.003321	0.04022	0.06	0.0194	1.01
214	9A-4	9A-2		3.5	6.00	21.0	94.5	80	7,560	4.000	30,240	0.030	0.047	8	1.0	0.017934	0.08961	0.13	0.0630	1.67
212	9A-2	9A-1		3.5	5.00	17.5	112.0	80	8,960	4.000	35,840	0.036	0.055	8	1.0	0.021256	0.09723	0.15	0.0710	1.76
210	9A-1	9B-10		3.5	4.00	14.0	126.0	80	10,080	4.000	40,320	0.040	0.062	8	1.0	0.023913	0.10294	0.15	0.0771	1.82
208	9B-17	9B-16		3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	1.7	0.001528	0.02784	0.04	0.0112	1.04
206	9B-16	9B-15		3.5	2.00	7.0	17.5	80	1,400	4.000	5,600	0.006	0.009	8	4.2	0.001621	0.02858	0.04	0.0117	1.67
204	9B-15	9B-14		3.5	0.00	0.0	17.5	80	1,400	4.000	5,600	0.006	0.009	8	5.2	0.001456	0.02727	0.04	0.0109	1.79
202	9B-14	9B-13		3.5	0.00	0.0	17.5	80	1,400	4.000	5,600	0.006	0.009	8	4.9	0.001500	0.02762	0.04	0.0111	1.76
200	9B-13	9B-12		3.5	1.00	3.5	21.0	80	1,680	4.000	6,720	0.007	0.010	8	5.3	0.001731	0.02945	0.04	0.0123	1.91
198	9B-12	9B-11		3.5	8.00	28.0	49.0	80	3,920	4.000	15,680	0.016	0.024	8	6.8	0.003566	0.04150	0.06	0.0203	2.69
196	9B-11	9B-10		3.5	7.00	24.5	73.5	80	5,880	4.000	23,520	0.024	0.036	8	4.5	0.006576	0.05542	0.08	0.0312	2.63
194	9B-10	8C-17		3.5	0.00	0.0	199.5	80	15,960	4.000	63,840	0.064	0.099	8	1.0	0.037861	0.12877	0.19	0.1064	2.09
238	8C-25	8C-24		3.5	5.00	17.5	17.5	80	1,400	4.000	5,600	0.006	0.009	8	1.4	0.002807	0.03702	0.06	0.0172	1.13
236	8C-24	8C-23		3.5	2.00	7.0	24.5	80	1,960	4.000	7,840	0.008	0.012	8	2.4	0.003001	0.03825	0.06	0.0180	1.51
234	8C-23	8C-22		3.5	1.00	3.5	28.0	80	2,240	4.000	8,960	0.009	0.014	8	2.2	0.003583	0.04159	0.06	0.0204	1.53
232	8C-22	8C-21		3.5	10.00	35.0	63.0	80	5,040	4.000	20,160	0.020	0.031	8	2.0	0.008454	0.06245	0.09	0.0372	1.89
230	8C-21	8C-20		3.5	12.00	42.0	105.0	80	8,400	4.000	33,600	0.034	0.052	8	2.0	0.014091	0.07970	0.12	0.0531	2.20
228	8C-20	8C-19		3.5	12.00	42.0	147.0	80	11,760	4.000	47,040	0.047	0.073	8	2.6	0.017302	0.08810	0.13	0.0615	2.66
227	8C-18	8C-19		3.5	5.00	17.5	17.5	80	1,400	4.000	5,600	0.006	0.009	8	1	0.003321	0.04022	0.06	0.0194	1.01
226	8C-19	8C-17		3.5	2.00	7.0	171.5	80	13,720	4.000	54,880	0.055	0.085	8	10.5	0.010044	0.06784	0.10	0.0420	4.55
192	8C-17	8C-12		3.5	1.00	3.5	374.5	80	29,960	3.418	102,413	0.102	0.158	8	1.0	0.060738	0.16304	0.24	0.1488	2.40
190	8C-16	8C-15		3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	5.7	0.000835	0.02099	0.03	0.0074	1.57
188	8C-15	8C-14		3.5	1.00	3.5	14.0	80	1,120	4.000	4,480	0.004	0.007	8	6.1	0.001076	0.02350	0.04	0.0088	1.77
187	8C-14	8C-13		3.5	9.00	31.5	45.5	80	3,640	4.000	14,560	0.015	0.023	8	5.3	0.003751	0.04247	0.06	0.0211	2.41
186	8C-13	8C-12		3.5	6.00	21.0	66.5	80	5,320	4.000	21,280	0.021	0.033	8	5.2	0.005534	0.05107	0.08	0.0276	2.68
184	8C-12	8C-11		3.5	0.00	0.0	441.0	80	35,280	3.197	112,778	0.113	0.175	8	1.0	0.066885	0.17113	0.26	0.1594	2.46

LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
						IN-LINE	TOTAL					M.G.D.	C.F.S.							
182	8C-11	8C-10		3.5	1.00	3.5	444.5	80	35,560	3.185	113,259	0.113	0.175	8	1.0	0.067170	0.17150	0.26	0.1599	2.47
180	8C-10	8C-9		3.5	1.00	3.5	448.0	80	35,840	3.173	113,732	0.114	0.176	8	1.0	0.067451	0.17186	0.26	0.1604	2.47
178	8C-9	8C-8		3.5	1.00	3.5	451.5	80	36,120	3.162	114,199	0.114	0.177	8	1.0	0.067728	0.17222	0.26	0.1608	2.47
176	8D-20	8D-19		3.5	8.00	28.0	28.0	80	2,240	4.000	8,960	0.009	0.014	8	3.2	0.002971	0.03805	0.06	0.0179	1.74
174	8D-19	8D-20		3.5	6.00	21.0	49.0	80	3,920	4.000	15,680	0.016	0.024	8	1.0	0.009299	0.06538	0.10	0.0398	1.37
172	8D-18	8D-17		3.5	5.00	17.5	17.5	80	1,400	4.000	5,600	0.006	0.009	8	2.4	0.002144	0.03273	0.05	0.0143	1.36
170	8D-17	8D-16		3.5	4.00	14.0	80.5	80	6,440	4.000	25,760	0.026	0.040	8	4.8	0.006973	0.05697	0.09	0.0325	2.76
168	8D-16	8C-8		3.5	3.00	10.5	91.0	80	7,280	4.000	29,120	0.029	0.045	8	4.6	0.008052	0.06105	0.09	0.0359	2.82
166	8C-8	8C-6		3.5	1.00	3.5	546.0	80	43,680	2.962	129,366	0.129	0.200	8	1.0	0.076723	0.18354	0.28	0.1758	2.56
164	8C-7	8C-6		3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	3.30	0.001097	0.02372	0.04	0.0089	1.31
162	8C-6	8C-1		3.5	3.00	10.5	567.0	80	45,360	2.944	133,547	0.134	0.207	8	1.50	0.064669	0.16829	0.25	0.1556	2.99
160	8C-5	8C-4		3.5	7.00	24.5	24.5	80	1,960	4.000	7,840	0.008	0.012	8	5.00	0.002079	0.03222	0.05	0.0140	1.95
158	8C-3	8C-4		3.5	2.00	7.0	7.0	80	560	4.000	2,240	0.002	0.003	8	1.00	0.001328	0.02613	0.04	0.0102	0.76
156	8C-4	8D-2		3.5	5.00	17.5	49.0	80	3,920	4.000	15,680	0.016	0.024	8	6.50	0.003647	0.04193	0.06	0.0206	2.64
154	8C-2	8C-1		3.5	6.00	21.0	70.0	80	5,600	4.000	22,400	0.022	0.035	8	5.40	0.005717	0.05189	0.08	0.0283	2.76
152	8C-1	8D-15		3.5	2.00	7.0	644.0	80	51,520	2.880	148,378	0.148	0.230	8	2.00	0.062224	0.16667	0.25	0.1535	3.37
150	9B-9	9B-8		3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	1.00	0.001993	0.03333	0.05	0.0147	0.80
148	9B-8	8B-7		3.5	7.00	24.5	35.0	80	2,800	4.000	11,200	0.011	0.017	8	1.30	0.005826	0.05333	0.08	0.0294	1.33
146	9B-7	9B-6		3.5	1.00	3.5	38.5	80	3,080	4.000	12,320	0.012	0.019	8	3.30	0.004022	0.04667	0.07	0.0242	1.77
144	9B-6	9B-5		3.5	1.00	3.5	42.0	80	3,360	4.000	13,440	0.013	0.021	8	4.10	0.003937	0.04667	0.07	0.0242	1.93
142	9B-5	9B-4		3.5	1.00	3.5	45.5	80	3,640	4.000	14,560	0.015	0.023	8	4.50	0.004071	0.04667	0.07	0.0242	2.09
140	9B-4	9B-3		3.5	0.00	0.0	45.5	80	3,640	4.000	14,560	0.015	0.023	8	4.90	0.003901	0.04667	0.07	0.0242	2.09
138	9B-3	9B-2		3.5	1.00	3.5	49.0	80	3,920	4.000	15,680	0.016	0.024	8	4.80	0.004245	0.04667	0.07	0.0242	2.26
136	9B-2	9B-1		3.5	8.00	28.0	77.0	80	6,160	4.000	24,640	0.025	0.038	8	7.20	0.005446	0.05333	0.08	0.0294	2.92
134	9B-1	8D-15		3.5	6.00	21.0	98.0	80	7,840	4.000	31,360	0.031	0.049	8	6.30	0.007410	0.06000	0.09	0.0350	3.12
132	8D-15	9C-17		3.5	2.00	7.0	749.0	80	59,920	2.793	167,327	0.167	0.259	8	5.50	0.042314	0.14000	0.21	0.1199	4.86
130	9C-17	9C-16		3.5	4.00	14.0	763.0	80	61,040	2.781	169,742	0.170	0.263	8	1.00	0.100669	0.21333	0.32	0.2167	2.73
128	9C-16	9C-15		3.5	1.00	3.5	766.5	80	61,320	2.778	170,342	0.170	0.264	8	1.50	0.082486	0.19333	0.29	0.1890	3.14
116	9C-14	9C-15		3.5	6.00	21.0	21.0	80	1,680	4.000	6,720	0.007	0.010	8	11.00	0.001202	0.02667	0.04	0.0105	2.23
126	9C-15	9C-9		3.5	1.00	3.5	791.0	80	63,280	2.758	174,495	0.174	0.270	8	1.00	0.103487	0.22000	0.33	0.2260	2.69
124	9C-9	9C-8		3.5	0.00	0.0	791.0	80	63,280	2.758	174,495	0.174	0.270	8	1.00	0.103487	0.22000	0.33	0.2260	2.69
123	9C-8	9C-7		3.5	1.00	3.5	794.5	80	63,560	2.755	175,081	0.175	0.271	8	1.00	0.103835	0.22000	0.33	0.2260	2.70

LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
						IN-LINE	TOTAL					M.G.D.	C.F.S.							
122	9C-7	9C-6		3.5	1.00	3.5	798.0	80	63,840	2.752	175,666	0.176	0.272	8	1.00	0.104182	0.22000	0.33	0.2260	2.71
120	9C-6	9C-5		3.5	4.00	14.0	812.0	80	64,960	2.732	177,471	0.177	0.275	8	1.60	0.083209	0.19333	0.29	0.1890	3.27
118	9C-5	9C-4		3.5	4.00	14.0	826.0	80	66,080	2.711	179,143	0.179	0.277	8	4.80	0.048494	0.14667	0.22	0.1281	4.87
114	9C-13	9C-12		3.5	6.00	21.0	21.0	80	1,680	4.000	6,720	0.007	0.010	8	8.50	0.001367	0.02667	0.04	0.0105	2.23
112	9C-12	9C-11		3.5	4.00	14.0	35.0	80	2,800	4.000	11,200	0.011	0.017	8	4.80	0.003032	0.04000	0.06	0.0192	2.03
110	9C-10	9C-11		3.5	4.00	14.0	14.0	80	1,120	4.000	4,480	0.004	0.007	8	1.40	0.002246	0.04000	0.06	0.0192	0.81
108	9C-11	9C-4		3.5	2.00	7.0	56.0	80	4,480	4.000	17,920	0.018	0.028	8	5.60	0.004491	0.04667	0.07	0.0242	2.58
106	9C-4	9C-3		3.5	1.00	3.5	885.5	80	70,840	2.622	185,725	0.186	0.287	8	1.00	0.110147	0.22667	0.34	0.2355	2.75
104	9C-3	9C-2		3.5	1.00	3.5	889.0	80	71,120	2.617	186,085	0.186	0.288	8	1.00	0.110361	0.22667	0.34	0.2355	2.75
102	9C-2	9C-1		3.5	0.00	0.0	889.0	80	71,120	2.617	186,085	0.186	0.288	8	1.00	0.110361	0.22667	0.34	0.2355	2.75
100	9C-1	G-8		3.5	0.00	0.0	889.0	80	71,120	2.617	186,085	0.186	0.288	8	1.00	0.110361	0.22667	0.34	0.2355	2.75

Total EDUS	Total Pop.	Min Slope	Max dn/D
254.0	889	1.00	0.34

APPENDIX C

ONSITE SEWER ANALYSIS

PHR UNITS 8 & 9 FLOWING SOUTH

(PUBLIC SEWER SYSTEM)

SEWER STUDY SUMMARY

DATE: 10/4/2016

JOB NUMBER: 598-007

FOR: Onsite Sewer Analysis - PHR Units 8 & 9 South

BY: Dexter Wilson Engineering, Inc.

SHT 1 OF 2

REFER TO PLAN SHEET:

LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED IN-LINE	POPULATION SERVED TOTAL	SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW) M.G.D.	PEAK FLOW (DESIGN FLOW) C.F.S.	LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' [1]	dn (feet)	dn/D [2]	C_a for Velocity [3]	VELOCITY (f.p.s.)
420	9A-109	9A-110		3.5	6.00	21.0	21.0	80	1,680	4.000	6,720	0.007	0.010	8	1.10	0.003800	0.04273	0.06	0.0212	1.10
421	9A-110	9A-111		3.5	5.00	17.5	38.5	80	3,080	4.000	12,320	0.012	0.019	8	1.20	0.006670	0.05579	0.08	0.0315	1.36
422	9A-111	8A-144		3.5	0.00	0.0	38.5	80	3,080	4.000	12,320	0.012	0.019	8	1.00	0.007307	0.05827	0.09	0.0335	1.28
423	8A-144	8A-143		3.5	0.00	0.0	38.5	80	3,080	4.000	12,320	0.012	0.019	8	1.00	0.007307	0.05827	0.09	0.0335	1.28
425	8A-143	8A-142		3.5	69.00	241.5	280.0	80	22,400	3.733	83,627	0.084	0.129	8	1.00	0.049596	0.14725	0.22	0.1288	2.26
427	8A-142	8A-141		3.5	0.00	0.0	280.0	80	22,400	3.733	83,627	0.084	0.129	8	1.00	0.049596	0.14725	0.22	0.1288	2.26
429	8A-141	8A-140		3.5	0.00	0.0	280.0	80	22,400	3.733	83,627	0.084	0.129	8	1.00	0.049596	0.14725	0.22	0.1288	2.26
431	8A-140	8A-100		3.5	460.00	1610.0	1890.0	80	151,200	2.308	348,970	0.349	0.540	8	1.00	0.206963	0.31226	0.47	0.3611	3.36
440	R-6	8A-100		3.5	974.00	3409.0	3409.0	80	272,720	2.109	575,194	0.575	0.890	12	1.00	0.115702	0.34062	0.34	0.2361	3.77
421	8A-100	8A-101		3.5	5.00	17.5	5316.5	80	425,320	1.982	843,083	0.843	1.305	12	0.60	0.218939	0.48377	0.48	0.3765	3.47
419	8A-101	8A-102		3.5	3.00	10.5	5327.0	80	426,160	1.982	844,450	0.844	1.307	12	0.60	0.219294	0.48422	0.48	0.3769	3.47
417	8A-102	8A-103		3.5	1.00	3.5	5330.5	80	426,440	1.981	844,906	0.845	1.307	12	0.61	0.217606	0.48206	0.48	0.3748	3.49
416	8A-103	8A-104		3.5	0.00	0.0	5330.5	80	426,440	1.981	844,906	0.845	1.307	12	1.00	0.169956	0.41924	0.42	0.3123	4.19
415	8A-104	8A-105		3.5	0.00	0.0	5330.5	80	426,440	1.981	844,906	0.845	1.307	12	1.00	0.169956	0.41924	0.42	0.3123	4.19
349	8C-126	8B-103		3.5	8.00	28.0	28.0	80	2,240	4.000	8,960	0.009	0.014	8	3.40	0.002882	0.03750	0.06	0.0175	1.78
357	8B-107	8B-105		3.5	4.00	14.0	14.0	80	1,120	4.000	4,480	0.004	0.007	8	2.00	0.001879	0.03062	0.05	0.0130	1.20
355	8B-106	8B-105		3.5	2.00	7.0	7.0	80	560	4.000	2,240	0.002	0.003	8	2.90	0.000780	0.02042	0.03	0.0071	1.09
353	8B-105	8B-104		3.5	8.00	28.0	49.0	80	3,920	4.000	15,680	0.016	0.024	8	2.70	0.005659	0.05163	0.08	0.0281	1.94
363	8B-110	8B-109		3.5	13.00	45.5	45.5	80	3,640	4.000	14,560	0.015	0.023	8	1.40	0.007298	0.05824	0.09	0.0335	1.51
361	8B-109	8B-108		3.5	9.00	31.5	77.0	80	6,160	4.000	24,640	0.025	0.038	8	1.50	0.011932	0.07370	0.11	0.0474	1.81
359	8B-108	8B-104		3.5	1.00	3.5	80.5	80	6,440	4.000	25,760	0.026	0.040	8	1.60	0.012078	0.07411	0.11	0.0477	1.88
351	8B-104	8B-103		3.5	2.00	7.0	136.5	80	10,920	4.000	43,680	0.044	0.068	8	1.60	0.020480	0.09551	0.14	0.0691	2.20
347	8B-103	8B-102		3.5	6.00	21.0	185.5	80	14,840	4.000	59,360	0.059	0.092	8	5.40	0.015150	0.08253	0.12	0.0559	3.70
345	8B-102	8B-100		3.5	6.00	21.0	206.5	80	16,520	3.978	65,722	0.066	0.102	8	2.80	0.023294	0.10165	0.15	0.0757	3.02
343	8B-101	8B-100		3.5	2.00	7.0	7.0	80	560	4.000	2,240	0.002	0.003	8	3.00	0.000767	0.02028	0.03	0.0071	1.11
341	8B-100	8A-110		3.5	7.00	24.5	238.0	80	19,040	3.873	73,748	0.074	0.114	8	3.70	0.022738	0.10050	0.15	0.0744	3.45
339	8B-110	8A-109		3.5	5.00	17.5	255.5	80	20,440	3.815	77,979	0.078	0.121	8	3.00	0.026701	0.10863	0.16	0.0833	3.26
337	8B-109	8A-108		3.5	3.00	10.5	266.0	80	21,280	3.780	80,438	0.080	0.124	8	3.00	0.027543	0.11028	0.17	0.0851	3.29

LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
						IN-LINE	TOTAL					M.G.D.	C.F.S.							
335	8B-108	8A-107		3.5	1.00	3.5	269.5	80	21,560	3.768	81,245	0.081	0.126	8	3.10	0.027367	0.10993	0.16	0.0847	3.34
333	8B-107	8A-106		3.5	6.00	21.0	290.5	80	23,240	3.698	85,949	0.086	0.133	8	2.40	0.032903	0.12035	0.18	0.0965	3.10
409	8B-113	8B-112		3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	1.00	0.001993	0.03153	0.05	0.0136	0.86
413	8B-115	8B-114		3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	1.50	0.001627	0.02863	0.04	0.0117	1.00
411	8B-114	8B-112		3.5	10.00	35.0	45.5	80	3,640	4.000	14,560	0.015	0.023	8	2.30	0.005694	0.05178	0.08	0.0282	1.80
407	8B-112	8B-111		3.5	4.00	14.0	70.0	80	5,600	4.000	22,400	0.022	0.035	8	1.00	0.013285	0.07746	0.12	0.0510	1.53
405	8B-111	8A-130		3.5	6.00	21.0	91.0	80	7,280	4.000	29,120	0.029	0.045	8	4.20	0.008427	0.06235	0.09	0.0371	2.73
403	8A-131	8A-130		3.5	3.00	10.5	10.5	80	840	4.000	3,360	0.003	0.005	8	1.00	0.001993	0.03153	0.05	0.0136	0.86
401	8A-130	8A-128		3.5	3.00	10.5	112.0	80	8,960	4.000	35,840	0.036	0.055	8	1.00	0.021256	0.09723	0.15	0.0710	1.76
399	8A-129	8A-128		3.5	2.00	7.0	7.0	80	560	4.000	2,240	0.002	0.003	8	3.70	0.000691	0.01923	0.03	0.0065	1.19
397	8A-128	8A-127		3.5	10.00	35.0	154.0	80	12,320	4.000	49,280	0.049	0.076	8	7.80	0.010465	0.06915	0.10	0.0432	3.97
395	8A-126	8A-127		3.5	2.00	7.0	7.0	80	560	4.000	2,240	0.002	0.003	8	1.00	0.001328	0.02613	0.04	0.0102	0.76
393	8A-127	8A-125		3.5	12.00	42.0	203.0	80	16,240	3.990	64,798	0.065	0.100	8	1.00	0.038429	0.12972	0.19	0.1075	2.10
391	8A-125	8A-111		3.5	9.00	31.5	234.5	80	18,760	3.885	72,883	0.073	0.113	8	1.00	0.043224	0.13750	0.21	0.1169	2.17
389	8A-124	8A-123		3.5	2.00	7.0	7.0	80	560	4.000	2,240	0.002	0.003	8	1.30	0.001165	0.02443	0.04	0.0093	0.84
387	8A-123	8A-122		3.5	13.00	45.5	52.5	80	4,200	4.000	16,800	0.017	0.026	8	1.30	0.008739	0.06343	0.10	0.0380	1.54
385	8A-122	8A-120		3.5	10.00	35.0	87.5	80	7,000	4.000	28,000	0.028	0.043	8	1.00	0.016606	0.08642	0.13	0.0598	1.63
383	8A-121	8A-120		3.5	2.00	6.0	6.0	80	480	4.000	1,920	0.002	0.003	8	3.30	0.000627	0.01825	0.03	0.0061	1.10
381	8A-120	8A-119		3.5	2.00	7.0	100.5	80	8,040	4.000	32,160	0.032	0.050	8	2.50	0.012063	0.07406	0.11	0.0477	2.35
379	8A-119	8A-118		3.5	2.00	7.0	107.5	80	8,600	4.000	34,400	0.034	0.053	8	3.40	0.011064	0.07103	0.11	0.0449	2.67
377	8A-118	8A-117		3.5	1.00	3.5	111.0	80	8,880	4.000	35,520	0.036	0.055	8	3.90	0.010667	0.06979	0.10	0.0438	2.83
375	8A-117	8A-116		3.5	8.00	28.0	139.0	80	11,120	4.000	44,480	0.044	0.069	8	6.50	0.010347	0.06879	0.10	0.0428	3.61
373	8A-116	8A-115		3.5	2.00	7.0	146.0	80	11,680	4.000	46,720	0.047	0.072	8	5.50	0.011815	0.07337	0.11	0.0470	3.46
372	8A-115	8A-114		3.5	0.00	0.0	146.0	80	11,680	4.000	46,720	0.047	0.072	8	6.00	0.011312	0.07181	0.11	0.0456	3.57
371	8A-114	8A-113		3.5	0.00	0.0	146.0	80	11,680	4.000	46,720	0.047	0.072	8	6.00	0.011312	0.07181	0.11	0.0456	3.57
369	8A-113	8A-112		3.5	0.00	0.0	146.0	80	11,680	4.000	46,720	0.047	0.072	8	5.70	0.011606	0.07273	0.11	0.0464	3.50
367	8A-112	8A-111		3.5	0.00	0.0	146.0	80	11,680	4.000	46,720	0.047	0.072	8	6.90	0.010548	0.06942	0.10	0.0434	3.75
365	8A-11	8A-106		3.5	0.00	0.0	380.5	80	30,440	3.398	103,445	0.103	0.160	8	1.50	0.050092	0.14799	0.22	0.1298	2.78
331	8A-106	8A-105		3.5	0.00	0.0	671.0	80	53,680	2.858	153,391	0.153	0.237	8	4.10	0.044927	0.14019	0.21	0.1201	4.45
329	8A-105	8D-114		3.5	6.00	21.0	6022.5	80	481,800	1.949	938,968	0.939	1.453	12	0.66	0.232491	0.50070	0.50	0.3937	3.69

LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)
						IN-LINE	TOTAL					M.G.D.	C.F.S.							
327	8D-114	8D-113		3.5	8.00	28.0	6050.5	80	484,040	1.947	942,656	0.943	1.459	12	0.65	0.235193	0.50456	0.50	0.3976	3.67
325	8D-113	8D-112		3.5	4.00	14.0	6064.5	80	485,160	1.947	944,497	0.944	1.461	12	0.65	0.235653	0.50522	0.51	0.3982	3.67
323	8D-112	8D-110		3.5	2.00	7.0	6071.5	80	485,720	1.946	945,418	0.945	1.463	12	0.65	0.235882	0.50555	0.51	0.3985	3.67
321	8D-111	8D-110		3.5	6.00	21.0	21.0	80	1,680	4.000	6,720	0.007	0.010	8	2.20	0.002687	0.03627	0.05	0.0167	1.40
319	8D-110	8D-109		3.5	6.00	21.0	42.0	80	3,360	4.000	13,440	0.013	0.021	8	2.40	0.005145	0.04933	0.07	0.0263	1.78
317	8D-109	8D-108		3.5	1.00	3.5	45.5	80	3,640	4.000	14,560	0.015	0.023	8	2.60	0.005355	0.05027	0.08	0.0270	1.88
315	8D-108	8D-107		3.5	1.00	3.5	49.0	80	3,920	4.000	15,680	0.016	0.024	8	2.40	0.006003	0.05317	0.08	0.0293	1.87
313	8D-107	8D-106		3.5	0.00	0.0	49.0	80	3,920	4.000	15,680	0.016	0.024	8	2.70	0.005659	0.05163	0.08	0.0281	1.94
311	8D-106	8D-105		3.5	3.00	10.5	59.5	80	4,760	4.000	19,040	0.019	0.029	8	3.20	0.006312	0.05440	0.08	0.0303	2.19
309	8D-105	8D-104		3.5	8.00	28.0	87.5	80	7,000	4.000	28,000	0.028	0.043	8	4.90	0.007502	0.05903	0.09	0.0342	2.85
307	8D-104	8D-103		3.5	1.00	3.5	91.0	80	7,280	4.000	29,120	0.029	0.045	8	6.30	0.006881	0.05661	0.08	0.0322	3.15
306	8D-103	8D-102		3.5	1.00	3.5	94.5	80	7,560	4.000	30,240	0.030	0.047	8	6.50	0.007034	0.05721	0.09	0.0327	3.22
305	8D-102	8D-101		3.5	1.00	3.5	98.0	80	7,840	4.000	31,360	0.031	0.049	8	6.60	0.007240	0.05801	0.09	0.0333	3.28
303	8D-101	8D-100		3.5	1.00	3.5	101.5	80	8,120	4.000	32,480	0.032	0.050	8	6.60	0.007498	0.05902	0.09	0.0342	3.31
301	8D-100	R-10		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	9.20	0.063589	0.25036	0.25	0.1538	9.65

Total EDUS	Total Pop.	Min Slope	Max dn/D
1,764.0	6,174	0.60	0.51

APPENDIX D

OFFSITE SEWER ANALYSIS

EXISTING GONZALES CANYON SEWER

DATE: 10/4/2016

SEWER STUDY SUMMARY

FOR: Offsite Sewer Analysis Basins A-J - PHR Units 8 & 9

SHT 1 OF 2

JOB NUMBER: 598-007

BY: Dexter Wilson Engineering, Inc.

REFER TO PLAN SHEET:

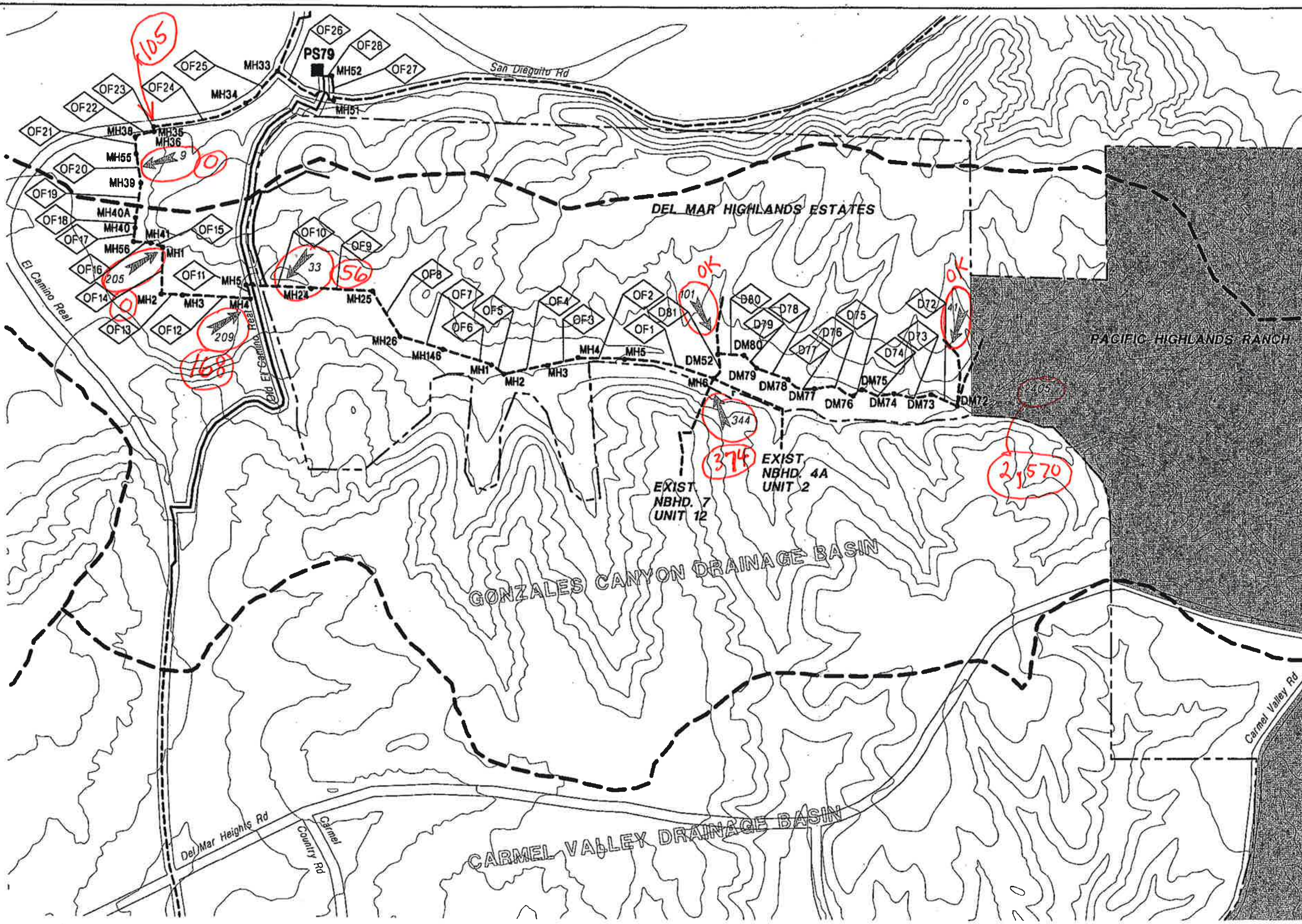
LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D (2)	C_a for Velocity (3)	VELOCITY (f.p.s.)
						IN-LINE	TOTAL					M.G.D.	C.F.S.							
55	8D-100	R-10		3.5	1,764.00	6174.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	9.20	0.063589	0.25	0.25	0.1538	9.65
177	R-10	R-11		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	2.30	0.127178	0.36	0.36	0.2528	5.87
178	R-11	R-12		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	2.80	0.115265	0.34	0.34	0.2354	6.30
179	R-12	R-13		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.70	0.230530	0.50	0.50	0.3912	3.79
180	R-13	R-14		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.70	0.230530	0.50	0.50	0.3912	3.79
181	R-14	R-15		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.70	0.230530	0.50	0.50	0.3912	3.79
182	R-15	R-16		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.70	0.230530	0.50	0.50	0.3912	3.79
183	R-16	R-17		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.70	0.230530	0.50	0.50	0.3912	3.79
184	R-17	R-18		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.70	0.230530	0.50	0.50	0.3912	3.79
185	R-18	MH15-3		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	4.50	0.090922	0.30	0.30	0.1985	7.47
	MH15-3	MH15-4		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.65	0.239233	0.51	0.51	0.4033	3.68
	MH15-4	MH15-5		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.65	0.239233	0.51	0.51	0.4033	3.68
	MH15-5	MH15-6		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.65	0.239233	0.51	0.51	0.4033	3.68
	MH15-6	MH15-7		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.65	0.239233	0.51	0.51	0.4033	3.68
	MH15-7	MH15-8		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	1.19	0.176809	0.43	0.43	0.3214	4.62
	MH15-8	MH15-9		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	0.80	0.215641	0.48	0.48	0.3722	3.99
	MH15-9	MH15		3.5	0.00	0.0	6174.0	80	493,920	1.941	958,847	0.959	1.484	12	11.10	0.057892	0.24	0.24	0.1438	10.31
	MH15	MH16		3.5	482.00	1687.0	7861.0	80	628,880	1.878	1,181,016	1.181	1.827	12	1.10	0.226510	0.49	0.49	0.3861	4.73
	MH16	MH17		3.5	0.00	0.0	7861.0	80	628,880	1.878	1,181,016	1.181	1.827	12	1.10	0.226510	0.49	0.49	0.3861	4.73
	MH17	DM72		3.5	0.00	0.0	7861.0	80	628,880	1.878	1,181,016	1.181	1.827	12	2.97	0.137850	0.37	0.37	0.2680	6.82
700	G-8	G-9		3.5	254.00	889.0	889.0	80	71,120	2.617	186,085	0.186	0.288	8	1.00	0.110361	0.22	0.33	0.2282	2.84
600	G-9	DM72		3.5	41.00	143.5	1032.5	80	82,600	2.490	205,695	0.206	0.318	8	10.80	0.037121	0.13	0.19	0.1049	6.82
D72	DM72	DM73		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D73	DM73	DM74		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D74	DM74	DM75		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D75	DM75	DM76		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D76	DM76	DM77		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D77	DM77	DM78		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D78	DM78	DM79		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D79	DM79	DM80		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D80	DM80	DM52		3.5	0.00	0.0	8893.5	80	711,480	1.846	1,313,321	1.313	2.032	12	1.00	0.264179	0.54	0.54	0.4345	4.68
D81	DM52	MH6		3.5	101.00	353.5	9247.0	80	739,760	1.837	1,358,984	1.359	2.103	12	1.55	0.219572	0.48	0.48	0.3773	5.57
OF1	MH6	MH5		3.5	418.00	1463.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.80	0.192416	0.56	0.45	0.3422	4.49
OF2	MH5	MH4		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.80	0.192416	0.56	0.45	0.3422	4.49
OF3	MH4	MH3		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.80	0.192416	0.56	0.45	0.3422	4.49
OF4	MH3	MH2		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.80	0.192416	0.56	0.45	0.3422	4.49
OF5	MH2	MH1		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.80	0.192416	0.56	0.45	0.3422	4.49
OF6	MH1	MH146		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.80	0.192416	0.56	0.45	0.3422	4.49
OF7	MH146	MH26		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	1.20	0.157107	0.50	0.40	0.2948	5.21
OF8	MH26	MH25		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	2.76	0.103594	0.40	0.32	0.2180	7.05
OF9	MH25	MH24		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.65	0.213467	0.60	0.48	0.3695	4.16
OF10	MH24	MH5		3.5	0.00	0.0	10710.0	80	856,800	1.811	1,551,265	1.551	2.400	15	0.80	0.192416	0.56	0.45	0.3422	4.49
OF11	MH5	MH4		3.5	56.00	196.0	10906.0	80	872,480	1.808	1,577,374	1.577	2.441	15	0.80	0.195655	0.57	0.45	0.3464	4.51
OF12	MH4	MH3		3.5	168.00	588.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	1.10	0.175089	0.53	0.43	0.3191	5.14
OF13	MH3	MH2		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.80	0.205310	0.58	0.47	0.3589	4.57
OF14	MH2	MH1		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.80	0.205310	0.58	0.47	0.3589	4.57

LINE	FROM	TO	LENGTH (ft)	POP. PER D.U.	IN-LINE EDUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K'[1]	dn (feet)	dn/D[2]	C_a for Velocity[3]	VELOCITY (f.p.s.)
						IN-LINE	TOTAL					M.G.D.	C.F.S.							
OF15	MH1	MH41		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.89	0.194652	0.57	0.45	0.3451	4.75
OF16	MH41	MH56		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.89	0.194652	0.57	0.45	0.3451	4.75
OF17	MH56	MH40		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.89	0.194652	0.57	0.45	0.3451	4.75
OF18	MH40	MH40A		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.50	0.259698	0.67	0.54	0.4289	3.82
OF19	MH40A	MH39		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.50	0.259698	0.67	0.54	0.4289	3.82
OF20	MH39	MH55		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.50	0.259698	0.67	0.54	0.4289	3.82
OF21	MH55	MH38		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.50	0.259698	0.67	0.54	0.4289	3.82
OF22	MH38	MH36		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.50	0.259698	0.67	0.54	0.4289	3.82
OF23	MH36	MH35		3.5	0.00	0.0	11494.0	80	919,520	1.800	1,655,210	1.655	2.561	15	0.76	0.210643	0.59	0.47	0.3658	4.48
OF24	MH35	MH34		3.5	105.00	367.5	11861.5	80	948,920	1.795	1,703,482	1.703	2.636	18	0.68	0.140940	0.57	0.38	0.2724	4.30
OF25	MH34	MH33		3.5	0.00	0.0	11861.5	80	948,920	1.795	1,703,482	1.703	2.636	18	0.40	0.183763	0.66	0.44	0.3306	3.54
OF26	MH33	MH51		3.5	0.00	0.0	11861.5	80	948,920	1.795	1,703,482	1.703	2.636	18	0.48	0.167752	0.62	0.42	0.3093	3.79
OF27	MH51	MH52		3.5	0.00	0.0	11861.5	80	948,920	1.795	1,703,482	1.703	2.636	18	0.50	0.164363	0.62	0.41	0.3046	3.85
OF28	MH52	PS79		3.5	0.00	0.0	11861.5	80	948,920	1.795	1,703,482	1.703	2.636	18	1.73	0.088362	0.44	0.30	0.1945	6.02

Total EDUS	Total Pop.	Min Slope	Max dn/D
3,389.0	11,862	0.40	0.54

Values in RED are adjustments made by Dexter Wilson Engineering, Inc. based on a review of existing and proposed development in the Pump Station 79 sewer service area.

June 30, 2016



N

SCALE: 1"=1000'

LEGEND

- DRAINAGE BASIN BOUNDARY
- EXISTING GRAVITY SEWER
- EXISTING FORCE MAIN
- SUBAREA BOUNDARY
- PACIFIC HIGHLANDS RANCH
- PIPE NUMBER
- 52 FLOW DIRECTION AND EDUS

OFFSITE SEWER SYSTEM

FIGURE 7

APPENDIX E

CORRESPONDENCE REGARDING ACCEPTANCE OF PUMP STATION 79 UPGRADE IMPROVEMENTS

Pardee Homes

6025 Edgewood Bend Court
San Diego, CA 92130
(858) 794-2571
(858) 794-2599

March 10, 2011

Mr. Allan Navarro
City of San Diego, MWWD
9191 Topaz Way, MS 901
San Diego, CA 92120

SUBJECT: SEWER PUMP STATION #79 FORCE MAIN AND PUMP STATION IMPROVEMENTS

Re: Final Acceptance

This letter documents the City of San Diego Metropolitan Waste Water Department's (MWWD's) Final Acceptance of Sewer Pump Station #79 Force Main and Pump Station Improvements, pursuant to the terms of the City/Pardee Homes Participation Agreement.

Reference is made to attached documentation associated with the Sewer Force Main Improvements constructed by Basile Construction and the Sewer Pump Station Improvements constructed by the Orion Corporation. A summary of relevant project milestones is furnished below:

Sewer Force Main Improvements:

Final Punchlist:	June 15, 2009
Beneficial Occupancy:	June 17, 2009
Notice of Completion:	July 23, 2010
Completion of Warranty Period:	June 17, 2010

Sewer Pump Station Improvements:

Final Punchlist:	June 15, 2010
Beneficial Occupancy:	April 6, 2010
Notice of Completion:	July 23, 2010
Completion of Warranty Period:	April 6, 2011

Reference is made to the attached email correspondence from PBS&J, dated March 10, 2011. Pardee Homes (Pardee) has worked with its consultants and City staff to successfully address the operational performance of the Air Release and Vacuum Valves within the station, pursuant to Paragraph 14 of the Participation Agreement. With MWWD's concurrence, this operational performance issue is resolved.

Pardee submits herein, its Final Invoice for reimbursement. With the submission of this invoice, Pardee has now fulfilled all of its obligations under the terms of the Participation Agreement.

Pursuant to Paragraph 6 of the Participation Agreement, Pardee is now entitled to a credit for 936 EDUs of sewer capacity. Also pursuant to Paragraph 6, Pardee requests MWWD to calculate a final calculation of the supplemental capacity fee based upon the actual cost of the work. Please share your preliminary supplemental capacity fee determination with Pardee for our review.

If you have any questions or require any additional information please feel free to contact me at (858) 794-2571.

ALLEN KASHANI, PE
Land Development Manager

cc: Mark Sullivan, MJS
File:

THE CITY OF SAN DIEGO

June 15, 2009

Pardee/Basile Construction
12626 High Bluff Drive, Suite 100
San Diego, CA 92130

Subject: Final walk thru and punch list items for Pump Station 79 Sewer Force Main Installation Project, WO 175981, Dwg 31341-D

Dear Mr. Sullivan:

On May 12, 2009, the final walkthrough was conducted on Pump Station 79 Sewer Force Main Installation Project. The following items need to be corrected before the project may be considered for final acceptance as directed by the Resident Engineer:

Walk Thru Punch List

1) Sewer Manhole #1 & Sewer Manhole #2: Perform final inspection of the interiors of both manholes and secure passing spark test.

2) Half Mile Drive Street Repairs: Complete Asphalt Concrete Street Repairs in accordance with RFP #2

3) Landscaping at SMH #1: Obtain Maintenance Assessment District release for landscape restoration adjacent to SMH #1, Station 85+80

4) F-Cap, Slurry Seal and Stripping: F-Cap, slurry seal and stripe all per contract.

5) Corporate Graffiti: Remove all corporate graffiti throughout the project.

6) Speed Limit Pavement Markings: Confirm appropriate speed limit at Station 82+75. Signage indicates 50 mph, while existing legends indicate 45 mph. Clarify with Jeff Vaca.

7) Trench Cap: Complete trench cap per SDW-107 at Sta. 78+50.

8) Traffic Loops (Half Mile Drive): Repair all primary and advance traffic signal loops at Half Mile Drive and Station 77+30.

9) Trench Cap: Complete trench cap per SDW-107 at Sta. 72+50.

10) Trench Cap: Complete trench cap per SDW-107 at Sta. 69+50. S.6 ECT.

11) Traffic Loops: Repair all primary and advance traffic signal loops at Derby Downs intersection.

Continued pg. 2
Walk Thru Punch List, WO #175981

12) Construction Materials: Pick up traffic control sign behind guardrail at approximate Station 69+00.

13) Trench Cap: Repair trench cap at sta. 66+20

14) Trench Cap: Repair trench cap at sta. 65+00

15) AC Berm: Repair ber at sta. 64+00

16) Construction Materials: Pick up traffic control devices and hoses at sta. 63+50

17) Unauthorized Staging Area: *Obtain appropriate releases from MWWD and DSD.*

18) AC Berm: Repair berm at sta. 56+00

19) Trench Cap: Repair trench cap at sta. 41+75

20) ARV Vent Lines: Construct ARV vent lines at STa. 13+50 ARV and Sta. 24+10

21) AC Spillways: *Repair and restore AC spillways at Station 18+00, Station 24+75 and Station 28+00*

22) AC Berm: Remove and replace damaged AC Berm at approximate Stations 26+00, 19+50, and 10+30

23) Traffic Signage: Restore all pre-existing traffic signage

24) Traffic Signal Pull Box: Replace damaged traffic signal pull box at Station 15+00

25) Finish Grading: Remove stockpiles and restore pre-existing grades on ECT shoulder from 10+00 to 20+00 and other various locations.3

26) Silt Fence: Maintain all silt fence until 70% coverage hydroseed coverage is obtained and then remove.

27) Silt Fence: Repair silt fences at Station 20+00 & in various locations

28) Signage and AC Berm: Restore signage, restore AC berm and hydroseed disturbed aaras at Station 8+50 upon direction from MWWD/DSD.

29) ATT Conduit: Obtain release from ATT with reference to the phone conduit purported to have been damaged by Basile within San Dieguito Road.

Continued pg. 3
Walk Thru Punch List, WO #175981

30) AC Berm: Remove and replace damaged AC Berm along staging yard frontage, approximate stations 3+00 to 4+00.

31) Staging Yard: Clean up staging area, demobilize staging yard

32) Pavement Restoration: Remove and Replace damaged/failed AC at entrance to staging yard and pumps station site.

33) Trench Resoration: Complete trench cap inside of pump station property in accordance with SDG-107 or to match pre-existing AC

34) ARV and Blow-off Risers: Complete ARV and Blow-off installations at Station 13+37, 18+00, 24+34 and 24+80.

35) *Restore damaged CTB at approximately Station 40+00 northbound at El Camino Real (new* placed CTB on Evangelical Formosan church property).

Any changes or deviation of the plans have to be approved by RE prior to construction.

This punch list is subject to revision and/or modification if not completed within forty-five (45) days.

Sincerely,

Igor Levin
Resident Engineer

cc: Allan Navarro-Project Manager
Hamid Yaghoubpoor-Area Supervisor, E&CP/Field Engineering Division

THE CITY OF SAN DIEGO

June 8, 2010

Orion Construction Corporation
1232 Keystone Way,
Vista CA92081

Attn: Ms. Heidi Andrews

Subject: Final Walkthrough and punch list items for Pump Station 79, W.O # 175981 (B-00338), Dwg 31341-D

Dear Ms Heidi Andrews:

On June 8, 2010, the final walkthrough was conducted on Sewer Pump Station 79 and the following punch list items were generated. These must be completed before the project may be considered for final acceptance.

1) PB "E": Install an acceptable rack or hook to secure power cables above grade.

2) Cathodic Protection: Provide and Submit Final Report from Corrosion Engineer.

3) Jib Crane Repairs: Complete crane repairs and perform operational test with MWWD.

4) Restore Staging Yard: Remove remaining silt fence. Police the site of all remaining AC, concrete debris and any other construction debris. Restore pre-existing wood chip mulch.

5) Well Pump Panel: Breaker is tripping in MS Band, Schedule operational test with MWWD upon completion.

6) Remove Abandoned Bracket: Remove abandoned bracket located at eye level inside the pump station and adjacent to the south-facing door.

7) Spare Parts Transmittals: Submit as one consolidated submittal all Spare Parts Transmittals. The transmittals shall be signed by the MWWD employee, who has received the spare parts on behalf of the City.

Final Walkthrough and punch list items for Pump Station 79, (continued)
W.O # 175981 (B-00338), Dwg 31341-D

8) Generator As-Builts: Confirm that As-built Drawings delineate work completed by Hawthorn. This would include control signals combined within the general alarms.

9) SCADA Schematic Drawings: Incorporate into As-built Drawings as appropriate. MWWD forces installed SCADA systems, review.

10) Notice of Completion: Pardee shall transmit NOC to MWWD for PS Upgrade and SFM Contracts.

11) Building Department Sign-off: Complete As-built Drawings and obtain final acceptance from Building Department.

12) Affidavit of Disposal: Submit and Affidavit of Disposal in accordance with the provisions of the Contract Documents.

13) APCD Log: Submit log required by APCD Operational Permit, which identifies when the wet well hatches were open.

Please do not hesitate to contact me at (858) 495-4720 if you need more information regarding this matter.

Very Truly Yours,

Jerry T. Borja
Resident Engineer

DH/jk

cc: Hamid Yaghoubpoor, Area Supervisor, Field Engineering Division
Allan Navarro, Project Manager, Metropolitan Wastewater

Certificate of Beneficial Occupancy/Use

Date: 6/17/2009 **Project Name: Pump Station 79 (Force Main).**

To: Allan Navarro

From: Igor Levin **CIP No.: 46-702.6** **W.O. No.: 175981**

Definition

The date of Beneficial Occupancy/Use of the Work or designated portion thereof is the date certified by the Construction Manager when construction is performed in accordance with applicable standards and is sufficiently complete so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

Project or Designated Portion Thereof, Included in this Certificate: Pump Station 79 Force Main.

The Work performed under this Contract has been reviewed and found to be sufficiently completed for the City to take Beneficial Occupancy. The date of Beneficial Occupancy of the Project or portion thereof designated above is hereby established as **06/17/09**.

This project has the following sewer linear footage

Rehabilitated	Replaced	Installed
		8400 LF

By: ______________________ Date: 6/23/09

George Osar
Senior Civil Engineer, Field Division

Acknowledged by:

______________________ Date: 6/26/09

Tung Phung
Senior Civil Engineer, Metropolitan Wastewater Dept.

cc: Hamid Yaghoubpoor MS 18
Igor Levin MS 18

Certificate of Beneficial Occupancy/Use

Date: March 17, 2010 **Project Name: Pump Station 79**

To: Allan Navarro

From: Jerry Borja **CIP No.: 46-702.6** **W.O. No.: 175981**

Definition

The date of Beneficial Occupancy/Use (BO/U) of the Work or designated portion thereof is the date certified by the Construction Manager when construction is performed in accordance with applicable standards and is sufficiently complete so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

Project or Designated Portion Thereof, Included in this Certificate: PUMP STATION 79

The Work performed under this Contract has been reviewed and found to be sufficiently completed for the City to take BO/U. The date of BO/U of the Project or portion thereof designated above is hereby established as ~~**03/17/2010**~~ 4/6/2010. TSP

This project has the following sewer linear footage

	Rehabilitated	Replaced	Installed
Portions Hereby Certified			
Portion Previously Certified			
Total Portions Certified			

By: George Qsar
Senior Civil Engineer/Construction Engineer
E&CP, Field Engineering

Date: 3-17-10

Acknowledged by:

By: Tung Phung
Senior Civil Engineer/Project Manager
E & CP, Right of Way Division

Date: 4/13/10

cc: Hamid Yaghoubpoor, MS 18
Jerry Borja, MS18

RECORDING REQUESTED BY:

Pardee Homes

AND WHEN RECORDED MAIL TO:

NAME: Allen Kashani c/o Mark Sullivan, MJS
STREET/ADDRESS: 1271 Missouri Street
CITY/STATE/ZIP: San Diego, CA 92024

DOC # 2010-0371979

JUL 23, 2010 1:58 PM

OFFICIAL RECORDS
SAN DIEGO COUNTY RECORDER'S OFFICE
DAVID L. BUTLER, COUNTY RECORDER
FEES: 2.00

PAGES: 1

NOTICE OF COMPLETION

Notice pursuant to Civil Code Section 3093, must be filed within 10 days after completion.

Notice is hereby given that:

1. The undersigned is OWNER or corporate officer of the OWNER of the interest or estate stated below in the property hereinafter described.
2. The full name of the OWNER is Pardee Homes and the City of San Diego, Metropolitan Waste Water Department
3. The full address of the OWNER is 6025 Edgewood Bend Court, San Diego, CA 92130
4. The nature of the interest or estate of the OWNER is; In fee.

   (If other than fee, strike "In fee" and insert, for example, "purchaser under contract of purchase," or "lessee")
5. The full names and full addresses of all persons, if any, who hold title with the undersigned as joint tenants or as tenants in common are:

   NAMES ADDRESSES

   NONE
6. A work of improvement on the property hereinafter described as completed on July 19, 2010. The work done was: Pump Station #79 Upgrade (City of San Diego Drawing #31341-D, Sheets #01 through #03 and Sheets #05 through #15)
7. The name of the contractor, if any, for such work of improvement was Basile Construction, Inc.

   (If no contractor for work of improvement as a whole, inset "none".)
8. The property on which said work of improvement was completed is in the City of San Diego, County of San Diego, State of California, and is described as follows: Install approximately 8,500 LF of new 12-inch PVC Sewer Force Main and complete appurtenant work in accordance with City of San Diego Drawing #31341-D
9. The street address of said property is San Dieguito Road and El Camino Real, San Diego, CA 92130

   (If no street address has been officially assigned, insert "none".)

PARDEE HOMES & CITY of SAN DIEGO MWWD

Dated: 7/23/10

Mark Sullivan

Signature of OWNER or corporate officer of OWNER named in Paragraph 2 or his agent.

VERIFICATION

I, the undersigned, say: I am Mark Sullivan the Agent
(Officer, Agent, etc.)

of the owner of the foregoing notice of completion; I have read said notice of completion and know the contents thereof; the same is true of my own knowledge. I declare under penalty of perjury that the foregoing is true and correct.

Executed on July ~~19~~, 23 ms 2010 (Date of Signature) at San Diego (City where Signed), California.

Mark Sullivan
(Personal Signature)

DM CA660-10/97

RECORDING REQUESTED BY:

Pardee Homes

AND WHEN RECORDED MAIL TO:

NAME: Allen Kashani c/o Mark Sullivan, MJS
STREET/ADDRESS: 1271 Missouri Street
CITY/STATE/ZIP: San Diego, CA 92024

DOC # 2010-0371978

JUL 23, 2010 1:58 PM

OFFICIAL RECORDS
SAN DIEGO COUNTY RECORDER'S OFFICE
DAVID L. BUTLER, COUNTY RECORDER
FEES: 2.00

PAGES: 1

NOTICE OF COMPLETION

Notice pursuant to Civil Code Section 3093, must be filed within 10 days after completion.

Notice is hereby given that:

1. The undersigned is OWNER or corporate officer of the OWNER of the interest or estate stated below in the property hereinafter described.
2. The full name of the OWNER is Pardee Homes and the City of San Diego, Metropolitan Waste Water Department
3. The full address of the OWNER is 6025 Edgewood Bend Court, San Diego, CA 92130
4. The nature of the interest or estate of the OWNER is; In fee.
   (If other than fee, strike "In fee" and insert, for example, "purchaser under contract of purchase," or "lessee")
5. The full names and full addresses of all persons, if any, who hold title with the undersigned as joint tenants or as tenants in common are:
   NAMES ADDRESSES
   NONE
6. A work of improvement on the property hereinafter described as completed on July 19, 2010. The work done was: Pump Station #79 Upgrade (City of San Diego Drawing #31341-D, Sheets #01 through #04 and Sheets #15 through #58)
7. The name of the contractor, if any, for such work of improvement was Orion Construction Corporation
   (If no contractor for work of improvement as a whole, inset "none".)
8. The property on which said work of improvement was completed is in the City of San Diego, County of San Diego, State of California, and is described as follows: Electrical and Mechanical Upgrades to the existing Sewer Pump Station #79 in accordance with City of San Diego Drawing #31341-D
9. The street address of said property is 10332 San Dieguito Road, San Diego, CA 92130
   (If no street address has been officially assigned, insert "none".)

Pardee Homes & City of San Diego, MWWD

Dated: 7/23/10 Mark Sullivan

Signature of OWNER or corporate officer of OWNER named in Paragraph 2 or his agent.

VERIFICATION

I, the undersigned, say: I am Mark Sullivan the Agent
(Officer, Agent, etc.)

of the owner of the foregoing notice of completion; I have read said notice of completion and know the contents thereof; the same is true of my own knowledge. I declare under penalty of perjury that the foregoing is true and correct.

Executed on July ~~19~~ 23 mS, 2010 at San Diego, California.
(Date of Signature) (City where Signed) (Personal Signature)

DM CA660-10/97

Kashani, Allen (Pardee Homes)

From: Mark Sullivan [mjsullivan@mjs-cm.com]
Sent: Thursday, March 10, 2011 11:36 AM
To: Kashani, Allen (Pardee Homes)
Cc: Mark Sullivan
Subject: Fwd: Pump Station 79 - March 8th Site Visit

Allen,

Here is the PBSJ correspondence.

Mark Sullivan, CE, ME
MJS Construction Management & Engineering, Inc.
1271 Missouri Street
San Diego, CA 92109
(858) 201-0027 (Mobile)
mjsullivan@mjs-cm.com

PS: Check out our Statement of Qualifications (SOQ) at:
https://www.onlinefilefolder.com/4suAt0LctJ5c3j

Begin forwarded message:

From: "Guirguis, Michael M" <MMGuirguis@pbsj.com>
Date: March 10, 2011 8:21:55 AM PST
To: Mark Sullivan <mjsullivan@mjs-cm.com>
Cc: "Navarro, Allan" <ANavarro@sandiego.gov>, Stew Harvey <stew@gsmrep.com>, Pat Michael <pat@gsmrep.com>, "Masutani, Gail K" <GKMasutani@pbsj.com>, "Guirguis, Michael M" <MMGuirguis@pbsj.com>
Subject: Pump Station 79 - March 8th Site Visit

Hello Mark,

GSM has indicated below that they are satisfied with the overall performance of the A.R.I. valves installed and PBS&J is satisfied with the overall operation and performance of the pump station.

Please let me know if there is anything else we can assist the City with.

Thanks,
Michael

Michael M. Guirguis, PE
Project Manager, Water Infrastructure

Please note!
Starting April 1st, My new email address is changing to michael.guirguis@atkinsglobal.com

PBS&J
an Atkins Company

625 The City Drive South, Suite 200, Orange, CA 92868 | Tel: 714.750.7275 ext. 405-1146 | Fax: 714.750-2501 | Cell: 626.705.2321
Email: mmguirguis@pbsj.com
Web: www.pbsj.com www.atkinsglobal.com

From: Stew Harvey [mailto:stew@gsmrep.com]
Sent: Wednesday, March 09, 2011 9:47 PM
To: Guirguis, Michael M
Subject: Pump Station 79 - March 8th

Michael,

I am writing to give you an update on my visit to the pump station yesterday. Herberto was kind to provide me access to the station. Non-slam devices were installed on the outlets of the air-valves on pumps #1 and #3. At the same time, new internals were installed on the same two air valves to insure that if there was any previous damage, it was eliminated from the station.

After cycling of the pumps, I am confident that the non-slam devices in conjunction with the revised pump start-up/shut-down has resolved the issues with the air valves.

I look forward to working with City personnel to make sure they understand the air valves and the maintenance required.

Please call me with any questions.

Sincerely,

Stew Harvey

GSM

Mob: 714-469-7077
Fax: 714-734-8667

APPENDIX F

CORRESPONDENCE FROM THE
CITY OF SAN DIEGO PUBLIC UTILITIES DEPARTMENT
REGARDING EXISTING CAPACITY OF PUMP STATION 79

From: Rastakhiz, Mehdi
To: Andrew Oven; Wilson, Leonard
Subject: RE: Sewer Pump Station 79 Capacity
Date: Wednesday, June 29, 2016 2:10:56 PM

Hi Andrew:

Here is a summary of what I have found on our side:

1. Current pumping capacity is about 2.8 MGD
2. Current average day flows to the pump station is about 0.9 MGD
3. Current peak flow to the pump station 1.2 MGD
4. Pump station has been designed for 2.5 MGD
5. Flow from the entire basin to PS 79 including the area to the west of El Camino Real 1.713 MGD
6. Population in line is 12,000 people which translates to 3,428 EDU's
7. Peak dry weather factor is 1.78.
8. Peak wet weather flow is 2.05 MGD.

I am not sure how population of 14,550 is obtained. I have to admit that something is still puzzling me since I know the station was designed for 2.5 MGD including a peak wet weather factor. I know if we consider that the flow will be 3.5 MGD not 2.5 MGD. I think PBS&J designed the station if you know someone there you may be able to obtain a copy of their design. I have also asked our modeling group to see if they can locate a copy since the employee who worked on the project has retired.

On the side note, I recommend that if you have a project and you are trying to find if there is enough capacity left to simply give us the desription of the project and our molding group will do the work for you.

If you like to come and meet in person, we will be availablel.

Thanks,
Mehdi

From: Andrew Oven [mailto:Andrew@dwilsoneng.com]
Sent: Wednesday, June 29, 2016 12:59 PM
To: Rastakhiz, Mehdi; Wilson, Leonard
Subject: RE: Sewer Pump Station 79 Capacity

Mehdi,

My most recent numbers (and these I am staying with for my PHR Units 8 & 9 sewer study report):

4,157 EDUs flowing to PS 79 at build-out of the drainage basin.
Population is 14,550
Peak dry weather factor is 1.76.
Peak dry weather flow is 2.05 MGD.

Andrew Oven, P.E.

Dexter Wilson Engineering, Inc.
(760) 438-4422

From: Andrew Oven
Sent: Wednesday, June 29, 2016 7:21 AM
To: 'Rastakhiz, Mehdi'; Wilson, Leonard
Subject: RE: Sewer Pump Station 79 Capacity

Mehdi,

Thank you for your thoroughness.

Here are the numbers I have estimated: total EDUs to PS 79 = 4,138 EDUs which at 3.5 persons per EDU and 80 gpcd and a peaking factor of 1.77 comes out to 2.05 MGD peak dry weather flow to PS 79.

This number is based on the build-out of Pacific Highlands Ranch.

Andrew Oven, P.E.
Dexter Wilson Engineering, Inc.
(760) 438-4422

From: Rastakhiz, Mehdi [mailto:MRastakhiz@sandiego.gov]
Sent: Tuesday, June 28, 2016 12:33 PM
To: Andrew Oven; Wilson, Leonard
Subject: RE: Sewer Pump Station 79 Capacity

Hi Andrew,

We have obtained these information for you and plan on verifying the information based upon the actual measurement and design documents. We will let you know as soon a the information is verified.

Thanks,
Mehdi

From: Andrew Oven [mailto:Andrew@dwilsoneng.com]
Sent: Monday, June 27, 2016 2:30 PM
To: Rastakhiz, Mehdi; Wilson, Leonard
Subject: RE: Sewer Pump Station 79 Capacity

Mehdi,

Thank you for this information. Can you let me know if you can provide the following:

1. What are the average and peak flows to PS 79 at present?
2. Do you know what wet weather peak factor was used for the design of PS 79?

Thank you.

Andrew Oven, P.E.
Dexter Wilson Engineering, Inc.
(760) 438-4422

From: Rastakhiz, Mehdi [mailto:MRastakhiz@sandiego.gov]
Sent: Thursday, June 23, 2016 4:45 PM
To: Andrew Oven; Wilson, Leonard
Subject: RE: Sewer Pump Station 79 Capacity

Hi Andrew,

The pump station has been designed and constructed to handle 2.5 MGD. Both the current peak flow and average daily flows are considerably less than 2.5 MGD but not all units and are constructed and occupied yet. Units 8 and 9 were already included in the equation that led us to design the station for 2.5 MGD.

Please let us know if you ended any additional information.

Thanks,
Mehdi

From: Andrew Oven [mailto:Andrew@dwilsoneng.com]
Sent: Thursday, June 23, 2016 4:29 PM
To: Wilson, Leonard
Cc: Rastakhiz, Mehdi
Subject: RE: Sewer Pump Station 79 Capacity

Leonard,

Pacific Highlands Ranch Units 8 and 9.

Andrew Oven, P.E.
Dexter Wilson Engineering, Inc.
(760) 438-4422

From: Wilson, Leonard [mailto:LLWilson@sandiego.gov]
Sent: Thursday, June 23, 2016 4:09 PM
To: Andrew Oven
Cc: Rastakhiz, Mehdi
Subject: FW: Sewer Pump Station 79 Capacity

Andrew,

During our telephone conversation the other day, you mentioned that the project you are working on that prompted the below questions was Pacific Highlands Ranch. What units in Pacific Highlands Ranch are you working on?

Thank you,
Leonard

Leonard L. Wilson, P.E.
Senior Civil Engineer
Development Services Department
Water and Sewer Development Review

(619) 446-5421
LLWilson@sandiego.gov

The City of SAN DIEGO

~ A world-class city for all ~

From: Andrew Oven [mailto:Andrew@dwilsoneng.com]
Sent: Wednesday, June 22, 2016 8:48 AM
To: Wilson, Leonard
Subject: FW: Sewer Pump Station 79 Capacity

Leonard,

I spoke with Mark Sullivan this morning and his recollection is that the upgrade which was completed in 2010 per the City acceptance letters, was the only upgrade design on the books. In other words, he is not aware of a second phase of capacity improvements for this lift station.

He also said he heard about a break in the 12" force main which occurred after the 1-year warranty period. He thought it was related to a fitting/elbow but did not have further details.

I asked him about the air-valve slamming topic which is noted in the Stew Harvey email at the back of the City acceptance letters, and he indicated that because the wet well is 50 feet deep (his words) when the pumps turn off there is column separation. Then when the pumps turn on the air needs to be released and the non-slam devices were added to reduce the slamming closed of the air release valves.

Andrew Oven, P.E.
Dexter Wilson Engineering, Inc.
(760) 438-4422

From: Andrew Oven
Sent: Tuesday, June 21, 2016 4:38 PM
To: 'Wilson, Leonard'
Subject: RE: Sewer Pump Station 79 Capacity

Leonard,

Here are the documents I received from John Eardensohn, Latitude 33, related to Sewer Pump Station 79.

I will let you know if I get any additional information. Thanks.

Andrew Oven, P.E.
Dexter Wilson Engineering, Inc.
(760) 438-4422

From: Wilson, Leonard [mailto:LLWilson@sandiego.gov]
Sent: Tuesday, June 21, 2016 9:40 AM
To: Andrew Oven
Subject: RE: Sewer Pump Station 79 Capacity

Andrew,

Let's discuss the below request. I should be available after 4 p.m. today and I'm pretty much open tomorrow (June 22nd).

Thank you,
Leonard

Leonard L. Wilson, P.E.
Senior Civil Engineer
Development Services Department
Water and Sewer Development Review

(619) 446-5421
LLWilson@sandiego.gov

The City of SAN DIEGO

~ A world-class city for all ~

From: Andrew Oven [mailto:Andrew@dwilsoneng.com]
Sent: Friday, June 17, 2016 9:02 AM
To: Wilson, Leonard
Subject: Sewer Pump Station 79 Capacity

Leonard,

I am requesting some information about the existing Pump Station 79 located at the intersection of San Dieguito Road and El Camino Real. I am interested in at least the following information.

9. Current pumping capacity.
10. Current average day flows to the pump station.
11. Current peak flow to the pump station.
12. Confirm that CIP Project 469999 scheduled to be completed in 2004 has been completed or if not what is the schedule for upgrading this pump station?

Call me if you would like to discuss my interest in this pump station or if you need additional information.

Thank you.

Andrew Oven, P.E.
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
(760) 438-4422

EXHIBIT A