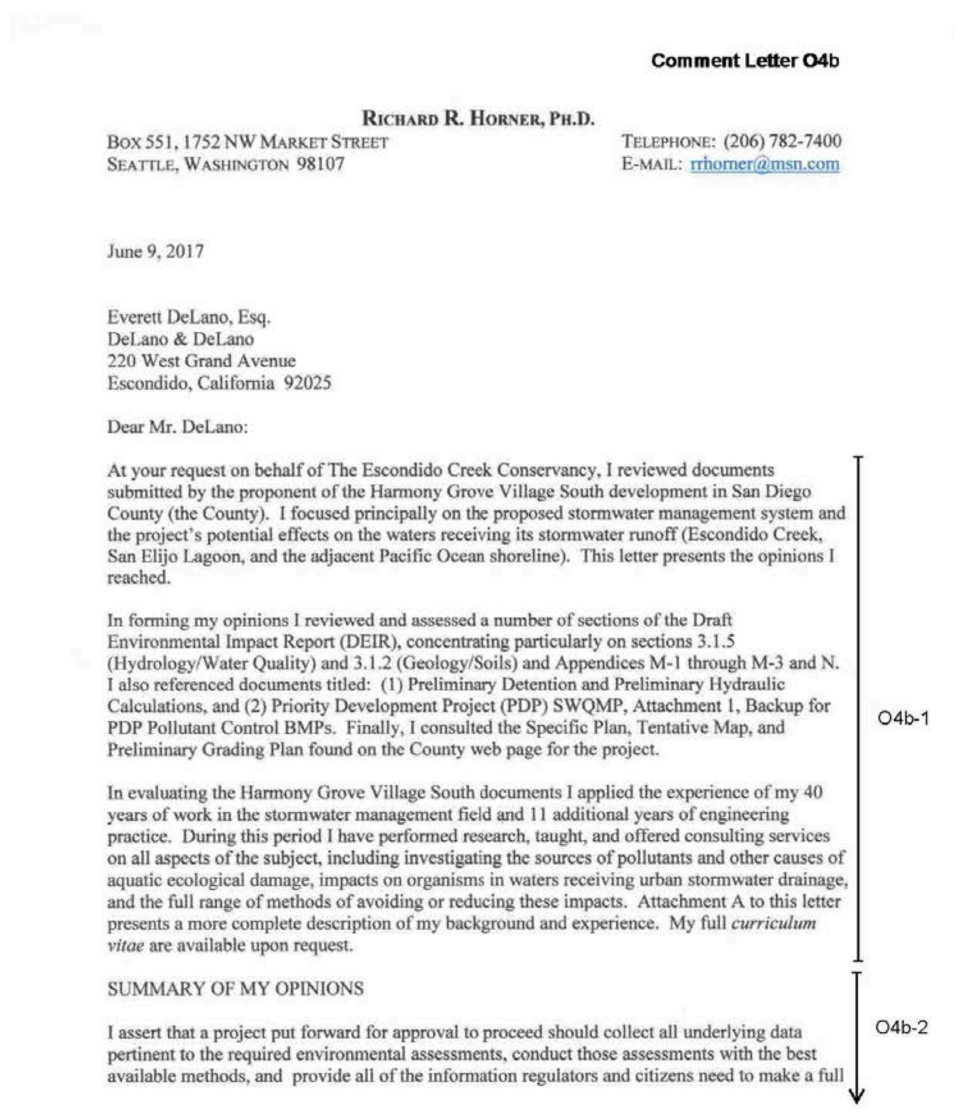
COMMENTS



Comment Letter O4b

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June 9, 2017

Everett DeLano, Esq.
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Dear Mr. DeLano:

At your request on behalf of The Escondido Creek Conservancy, I reviewed documents submitted by the proponent of the Harmony Grove Village South development in San Diego County (the County). I focused principally on the proposed stormwater management system and the project's potential effects on the waters receiving its stormwater runoff (Escondido Creek, San Elijo Lagoon, and the adjacent Pacific Ocean shoreline). This letter presents the opinions I reached.

In forming my opinions I reviewed and assessed a number of sections of the Draft Environmental Impact Report (DEIR), concentrating particularly on sections 3.1.5 (Hydrology/Water Quality) and 3.1.2 (Geology/Soils) and Appendices M-1 through M-3 and N. I also referenced documents titled: (1) Preliminary Detention and Preliminary Hydraulic Calculations, and (2) Priority Development Project (PDP) SWQMP, Attachment 1, Backup for PDP Pollutant Control BMPs. Finally, I consulted the Specific Plan, Tentative Map, and Preliminary Grading Plan found on the County web page for the project.

In evaluating the Harmony Grove Village South documents I applied the experience of my 40 years of work in the stormwater management field and 11 additional years of engineering practice. During this period I have performed research, taught, and offered consulting services on all aspects of the subject, including investigating the sources of pollutants and other causes of aquatic ecological damage, impacts on organisms in waters receiving urban stormwater drainage, and the full range of methods of avoiding or reducing these impacts. Attachment A to this letter presents a more complete description of my background and experience. My full *curriculum vitae* are available upon request.

O4b-1

SUMMARY OF MY OPINIONS

I assert that a project put forward for approval to proceed should collect all underlying data pertinent to the required environmental assessments, conduct those assessments with the best available methods, and provide all of the information regulators and citizens need to make a full

O4b-2

RESPONSES

Response to Comment O4b-1

These are conclusion comments. They do not raise specific issues regarding the content of the DEIR, but will be included as part of the administrative record and made available to the decision makers prior to a final decision on the Proposed Project.

Response to Comment O4b-2

This is a summary of the following more specific comments, which are addressed in the responses below.

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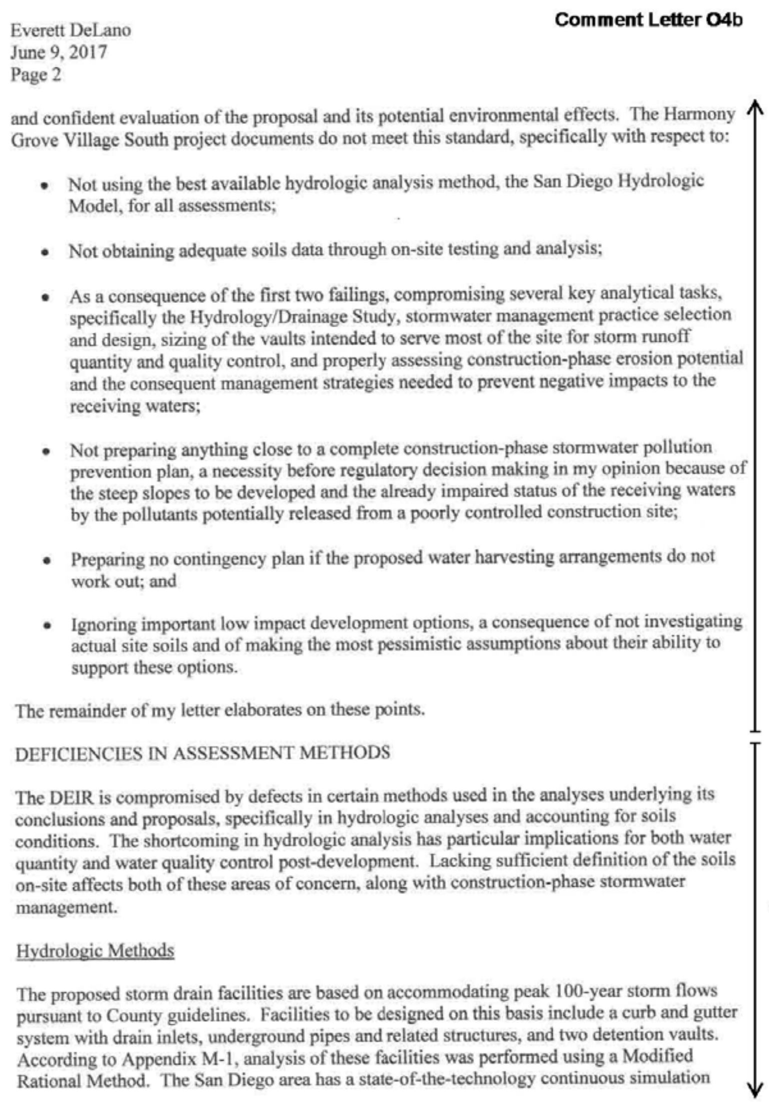

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and confident evaluation of the proposal and its potential environmental effects. The Harmony Grove Village South project documents do not meet this standard, specifically with respect to:

- Not using the best available hydrologic analysis method, the San Diego Hydrologic Model, for all assessments;
- Not obtaining adequate soils data through on-site testing and analysis;
- As a consequence of the first two failings, compromising several key analytical tasks, specifically the Hydrology/Drainage Study, stormwater management practice selection and design, sizing of the vaults intended to serve most of the site for storm runoff quantity and quality control, and properly assessing construction-phase erosion potential and the consequent management strategies needed to prevent negative impacts to the receiving waters;
- Not preparing anything close to a complete construction-phase stormwater pollution prevention plan, a necessity before regulatory decision making in my opinion because of the steep slopes to be developed and the already impaired status of the receiving waters by the pollutants potentially released from a poorly controlled construction site;
- Preparing no contingency plan if the proposed water harvesting arrangements do not work out; and
- Ignoring important low impact development options, a consequence of not investigating actual site soils and of making the most pessimistic assumptions about their ability to support these options.

The remainder of my letter elaborates on these points.

O4b-2

DEFICIENCIES IN ASSESSMENT METHODS

The DEIR is compromised by defects in certain methods used in the analyses underlying its conclusions and proposals, specifically in hydrologic analyses and accounting for soils conditions. The shortcoming in hydrologic analysis has particular implications for both water quantity and water quality control post-development. Lacking sufficient definition of the soils on-site affects both of these areas of concern, along with construction-phase stormwater management.

Hydrologic Methods

The proposed storm drain facilities are based on accommodating peak 100-year storm flows pursuant to County guidelines. Facilities to be designed on this basis include a curb and gutter system with drain inlets, underground pipes and related structures, and two detention vaults. According to Appendix M-1, analysis of these facilities was performed using a Modified Rational Method. The San Diego area has a state-of-the-technology continuous simulation

O4b-3

RESPONSES

Response to Comment O4b-3

The County agrees that data are required to support environmental assessments. The majority of the comments address the hydrological analyses. The information required to address hydrological analyses is specified in County documents.

The San Diego County Hydrology Manual outlines the methodology for preparing hydrology studies in accordance with the Rational Method and the Modified Rational Method and governs the flow calculations for flood control facilities for large storms such as the 100-year storm event. The County of San Diego BMP Design Manual (BMP Design Manual) outlines the methodology for continuous simulation modeling to meet hydromodification requirements in accordance with the Municipal Separate Storm Sewer System (MS4) permit requirements. The BMP Design Manual governs the requirements for water quality and hydromodification impacts due to smaller storm events, including the 2-year to 10-year storm events which are much more frequent and therefore have a higher potential impact to water quality and hydromodification.

Project reports apply each of the methodologies as required and as appropriate for the current timeframe of Project design.

Specific to on-site soils testing, as described in Project documentation (the EIR and EIR Appendix I), soils characterizations were made based on on-site review, and supplemented by on-site borings. Adequate information was gathered to provide recommendations for steps during final design in conjunction with routine building standards and requirements. Similarly, the request for complete detail as to construction specifics and final design at this time is too early in the process. The Storm Water Pollution Prevention Plan (SWPPP) is a requirement that must be completed, but, consistent with timing noted in the comment, will be prepared prior to obtaining regulatory permits on the Project. Detailed construction-phase data are not required prior to knowing if the Project is even approved given the level of construction and implementation controls already identified in FEIR Table 1-2, Chapter 7.0, and Section 3.1.2.

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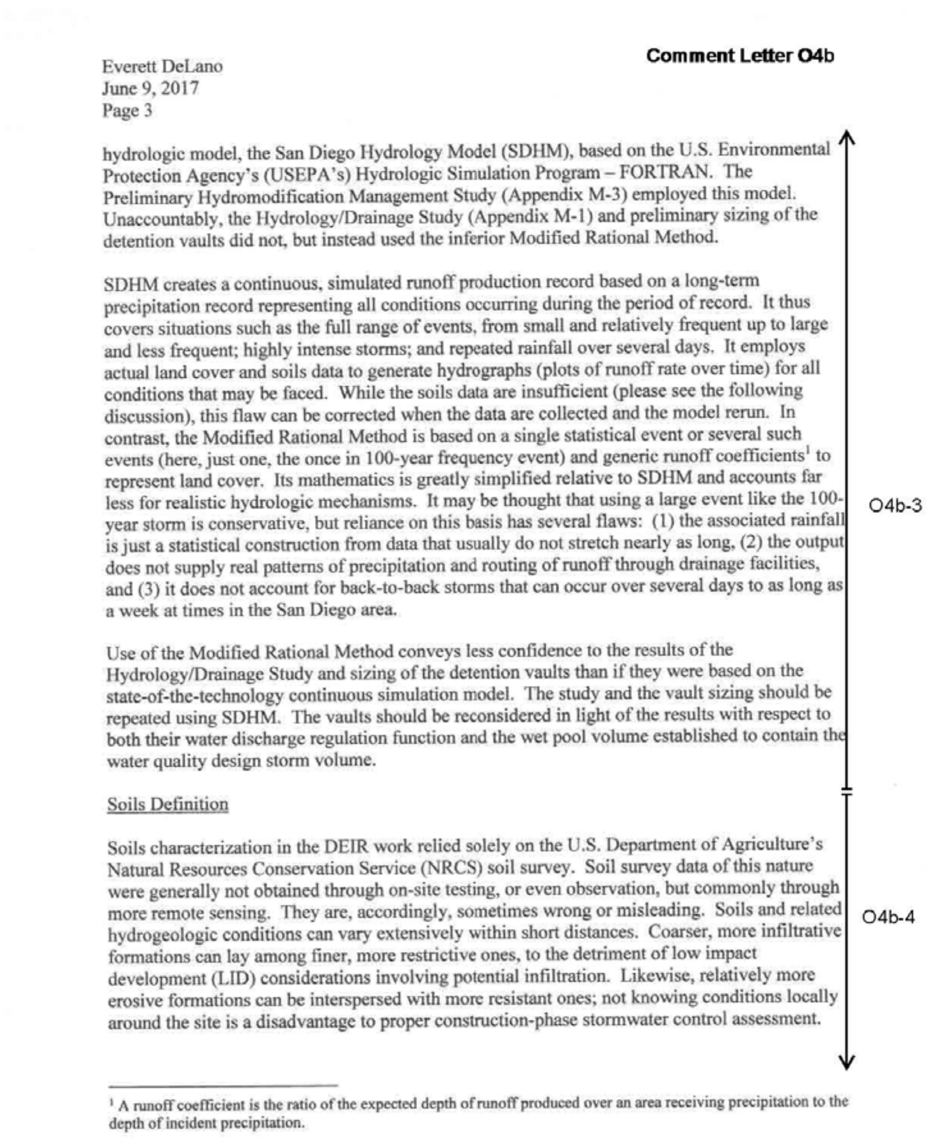

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hydrologic model, the San Diego Hydrology Model (SDHM), based on the U.S. Environmental Protection Agency's (USEPA's) Hydrologic Simulation Program – FORTRAN. The Preliminary Hydromodification Management Study (Appendix M-3) employed this model. Unaccountably, the Hydrology/Drainage Study (Appendix M-1) and preliminary sizing of the detention vaults did not, but instead used the inferior Modified Rational Method.

SDHM creates a continuous, simulated runoff production record based on a long-term precipitation record representing all conditions occurring during the period of record. It thus covers situations such as the full range of events, from small and relatively frequent up to large and less frequent; highly intense storms; and repeated rainfall over several days. It employs actual land cover and soils data to generate hydrographs (plots of runoff rate over time) for all conditions that may be faced. While the soils data are insufficient (please see the following discussion), this flaw can be corrected when the data are collected and the model rerun. In contrast, the Modified Rational Method is based on a single statistical event or several such events (here, just one, the once in 100-year frequency event) and generic runoff coefficients[1] to represent land cover. Its mathematics is greatly simplified relative to SDHM and accounts far less for realistic hydrologic mechanisms. It may be thought that using a large event like the 100-year storm is conservative, but reliance on this basis has several flaws: (1) the associated rainfall is just a statistical construction from data that usually do not stretch nearly as long, (2) the output does not supply real patterns of precipitation and routing of runoff through drainage facilities, and (3) it does not account for back-to-back storms that can occur over several days to as long as a week at times in the San Diego area.

Use of the Modified Rational Method conveys less confidence to the results of the Hydrology/Drainage Study and sizing of the detention vaults than if they were based on the state-of-the-technology continuous simulation model. The study and the vault sizing should be repeated using SDHM. The vaults should be reconsidered in light of the results with respect to both their water discharge regulation function and the wet pool volume established to contain the water quality design storm volume.

O4b-3

Soils Definition

Soils characterization in the DEIR work relied solely on the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) soil survey. Soil survey data of this nature were generally not obtained through on-site testing, or even observation, but commonly through more remote sensing. They are, accordingly, sometimes wrong or misleading. Soils and related hydrogeologic conditions can vary extensively within short distances. Coarser, more infiltrative formations can lay among finer, more restrictive ones, to the detriment of low impact development (LID) considerations involving potential infiltration. Likewise, relatively more erosive formations can be interspersed with more resistant ones; not knowing conditions locally around the site is a disadvantage to proper construction-phase stormwater control assessment.

O4b-4

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[1] A runoff coefficient is the ratio of the expected depth of runoff produced over an area receiving precipitation to the depth of incident precipitation.

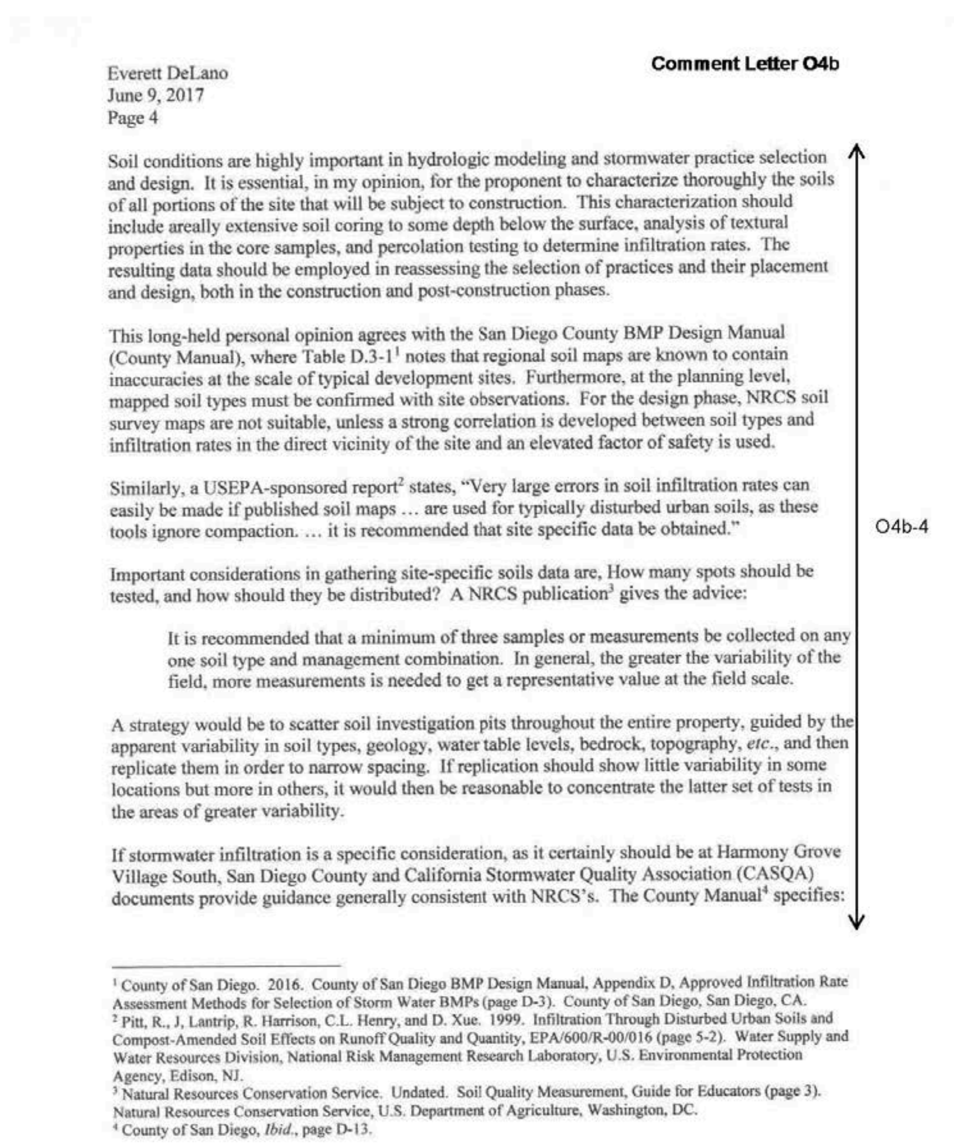
RESPONSES

Response to Comment O4b-4

The Project is proposing Harvest and Use BMPs, not infiltration BMPs. The EIR work does not rely solely on the U.S. Department of Agriculture's Natural Resources Conservation Service soil survey, but also on the research, multiple site checks, and approximately 60 trenches and borings completed by the geotechnical engineers. Please refer to the site-specific geotechnical report prepared by Geocon Inc. under Technical Appendix I of the EIR. The Geotechnical investigation performed for the site does not recommend infiltration due to underlying dense granitic bedrock that could cause water to perch. Please see Response to Comment O4b-3 regarding data used to support the Hydrology/Drainage Study.

COMMENTS

RESPONSES



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Soil conditions are highly important in hydrologic modeling and stormwater practice selection and design. It is essential, in my opinion, for the proponent to characterize thoroughly the soils of all portions of the site that will be subject to construction. This characterization should include areally extensive soil coring to some depth below the surface, analysis of textural properties in the core samples, and percolation testing to determine infiltration rates. The resulting data should be employed in reassessing the selection of practices and their placement and design, both in the construction and post-construction phases.

This long-held personal opinion agrees with the San Diego County BMP Design Manual (County Manual), where Table D.3-1[1] notes that regional soil maps are known to contain inaccuracies at the scale of typical development sites. Furthermore, at the planning level, mapped soil types must be confirmed with site observations. For the design phase, NRCS soil survey maps are not suitable, unless a strong correlation is developed between soil types and infiltration rates in the direct vicinity of the site and an elevated factor of safety is used.

Similarly, a USEPA-sponsored report[2] states, "Very large errors in soil infiltration rates can easily be made if published soil maps … are used for typically disturbed urban soils, as these tools ignore compaction. … it is recommended that site specific data be obtained."

O4b-4

Important considerations in gathering site-specific soils data are, How many spots should be tested, and how should they be distributed? A NRCS publication[3] gives the advice:

> It is recommended that a minimum of three samples or measurements be collected on any one soil type and management combination. In general, the greater the variability of the field, more measurements is needed to get a representative value at the field scale.

A strategy would be to scatter soil investigation pits throughout the entire property, guided by the apparent variability in soil types, geology, water table levels, bedrock, topography, *etc*., and then replicate them in order to narrow spacing. If replication should show little variability in some locations but more in others, it would then be reasonable to concentrate the latter set of tests in the areas of greater variability.

If stormwater infiltration is a specific consideration, as it certainly should be at Harmony Grove Village South, San Diego County and California Stormwater Quality Association (CASQA) documents provide guidance generally consistent with NRCS's. The County Manual[4] specifies:

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[1] County of San Diego. 2016. County of San Diego BMP Design Manual, Appendix D, Approved Infiltration Rate Assessment Methods for Selection of Storm Water BMPs (page D-3). County of San Diego, San Diego, CA.

[2] Pitt, R., J, Lantrip, R. Harrison, C.L. Henry, and D. Xue. 1999. Infiltration Through Disturbed Urban Soils and Compost-Amended Soil Effects on Runoff Quality and Quantity, EPA/600/R-00/016 (page 5-2). Water Supply and Water Resources Division, National Risk Management Research Laboratory, U.S. Environmental Protection Agency, Edison, NJ.

[3] Natural Resources Conservation Service. Undated. Soil Quality Measurement, Guide for Educators (page 3). Natural Resources Conservation Service, U.S. Department of Agriculture, Washington, DC.

[4] County of San Diego, *Ibid*., page D-13.

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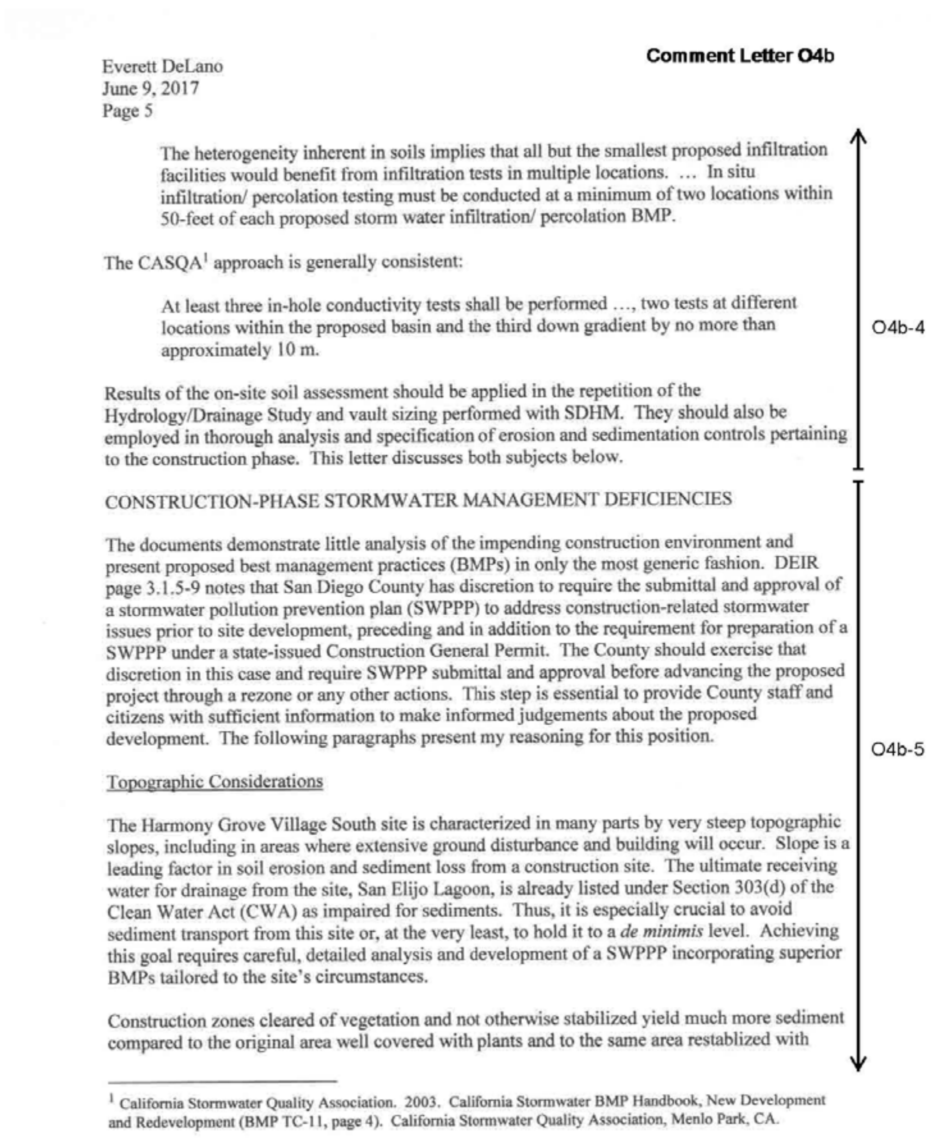

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> The heterogeneity inherent in soils implies that all but the smallest proposed infiltration facilities would benefit from infiltration tests in multiple locations. … In situ infiltration/ percolation testing must be conducted at a minimum of two locations within 50-feet of each proposed storm water infiltration/ percolation BMP.

The CASQA[1] approach is generally consistent:

> At least three in-hole conductivity tests shall be performed …, two tests at different locations within the proposed basin and the third down gradient by no more than approximately 10 m.

Results of the on-site soil assessment should be applied in the repetition of the Hydrology/Drainage Study and vault sizing performed with SDHM. They should also be employed in thorough analysis and specification of erosion and sedimentation controls pertaining to the construction phase. This letter discusses both subjects below. O4b-4

CONSTRUCTION-PHASE STORMWATER MANAGEMENT DEFICIENCIES

The documents demonstrate little analysis of the impending construction environment and present proposed best management practices (BMPs) in only the most generic fashion. DEIR page 3.1.5-9 notes that San Diego County has discretion to require the submittal and approval of a stormwater pollution prevention plan (SWPPP) to address construction-related stormwater issues prior to site development, preceding and in addition to the requirement for preparation of a SWPPP under a state-issued Construction General Permit. The County should exercise that discretion in this case and require SWPPP submittal and approval before advancing the proposed project through a rezone or any other actions. This step is essential to provide County staff and citizens with sufficient information to make informed judgements about the proposed development. The following paragraphs present my reasoning for this position.

O4b-5

Topographic Considerations

The Harmony Grove Village South site is characterized in many parts by very steep topographic slopes, including in areas where extensive ground disturbance and building will occur. Slope is a leading factor in soil erosion and sediment loss from a construction site. The ultimate receiving water for drainage from the site, San Elijo Lagoon, is already listed under Section 303(d) of the Clean Water Act (CWA) as impaired for sediments. Thus, it is especially crucial to avoid sediment transport from this site or, at the very least, to hold it to a *de minimis* level. Achieving this goal requires careful, detailed analysis and development of a SWPPP incorporating superior BMPs tailored to the site's circumstances.

Construction zones cleared of vegetation and not otherwise stabilized yield much more sediment compared to the original area well covered with plants and to the same area restablized with

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[1] California Stormwater Quality Association. 2003. California Stormwater BMP Handbook, New Development and Redevelopment (BMP TC-11, page 4). California Stormwater Quality Association, Menlo Park, CA.

RESPONSES

Response to Comment O4b-5

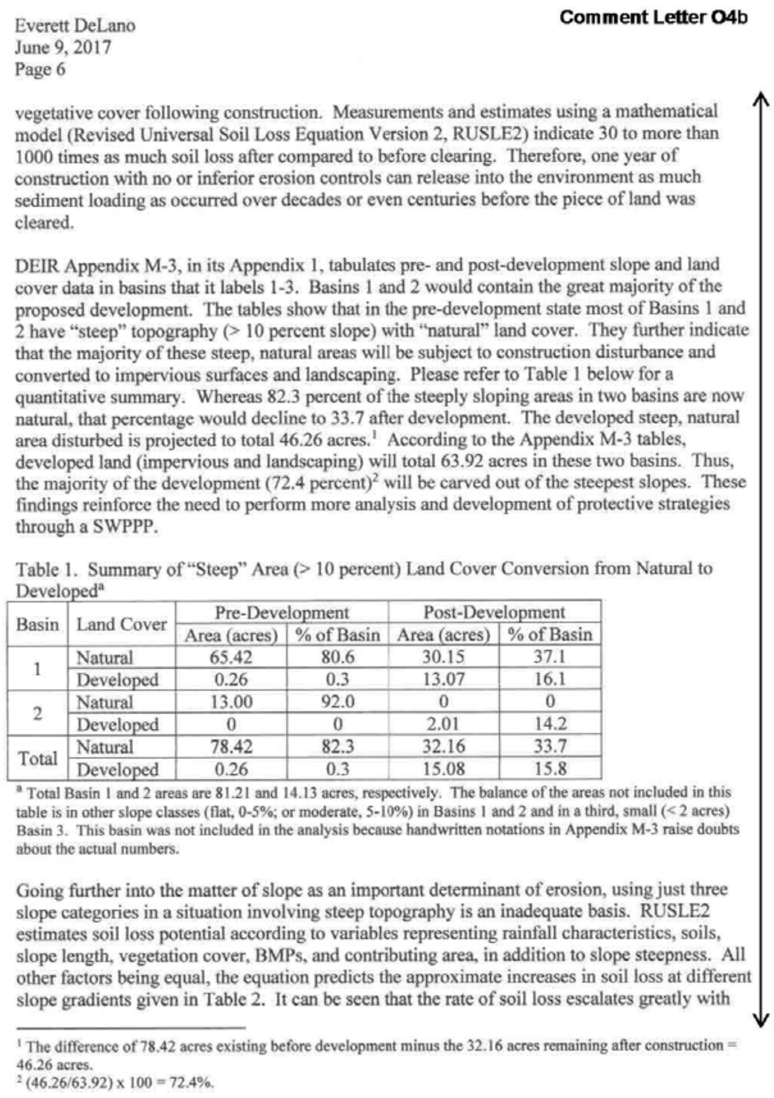
This Project will disturb more than 1 acre and is thus subject to the Statewide General Construction Storm Water permit. The Project will be required to file a Notice of Intent and develop and implement an SWPPP and Monitoring Program to address potential erosion and sediment transport during the final engineering phase of the Project.

The topographic realities of the site (including mapped steep slopes) and the proximity to Escondido Creek are evaluated throughout the FEIR, including in Section 3.1.4, *Hydrology and Water Quality*. The level of information provided in the EIR is appropriate and sufficient to understand the kinds of issues that would rise during construction of the Project, and also the routine nature of these issues, including control of runoff (both volumes and quality) and erosion control. Project requirements include the Construction Site Monitoring Plan (CSMP), a Risk Assessment to determine the Project's Risk Level (1, 2, or 3), and appropriate Risk Level Requirements as outlined in the Construction General Permit and the SWPPP, as noted in Response to Comment O4b-3. The SWPPP and CSMP would be prepared by a qualified SWPPP preparer, with this plan to be located on-site at all times during construction.

The types of erosion and sediment controls applicable to the Project are enumerated, as requirements for containment of construction debris distance from storm drain inlets/water courses and disposal so as not to allow runoff into surrounding waters. Prior to and after storm events, BMP function and efficiency would be checked by construction contractor and implementation monitors. Sampling/analysis, monitoring/reporting, and post-construction management programs would be implemented per National Pollutant Discharge Elimination System and/or County requirements, along with additional BMPs as necessary to ensure adequate erosion and sediment control. All of these, as well as numerous other relevant BMPs, are detailed in EIR Table 1-2 and Chapter 7.0. Their discussion and required implementation not only demonstrate an understanding of potential adverse impacts without their use, but also

COMMENTS	RESPONSES
	ensure that proper actions would be taken to render impacts less than significant.

COMMENTS	RESPONSES



vegetative cover following construction. Measurements and estimates using a mathematical model (Revised Universal Soil Loss Equation Version 2, RUSLE2) indicate 30 to more than 1000 times as much soil loss after compared to before clearing. Therefore, one year of construction with no or inferior erosion controls can release into the environment as much sediment loading as occurred over decades or even centuries before the piece of land was cleared.

DEIR Appendix M-3, in its Appendix 1, tabulates pre- and post-development slope and land cover data in basins that it labels 1-3. Basins 1 and 2 would contain the great majority of the proposed development. The tables show that in the pre-development state most of Basins 1 and 2 have "steep" topography (> 10 percent slope) with "natural" land cover. They further indicate that the majority of these steep, natural areas will be subject to construction disturbance and converted to impervious surfaces and landscaping. Please refer to Table 1 below for a quantitative summary. Whereas 82.3 percent of the steeply sloping areas in two basins are now natural, that percentage would decline to 33.7 after development. The developed steep, natural area disturbed is projected to total 46.26 acres.[1] According to the Appendix M-3 tables, developed land (impervious and landscaping) will total 63.92 acres in these two basins. Thus, the majority of the development (72.4 percent)[2] will be carved out of the steepest slopes. These findings reinforce the need to perform more analysis and development of protective strategies through a SWPPP.

O4b-5

Table 1. Summary of "Steep" Area (> 10 percent) Land Cover Conversion from Natural to Developed[a]

Basin	Land Cover	Pre-Development		Post-Development	
		Area (acres)	% of Basin	Area (acres)	% of Basin
1	Natural	65.42	80.6	30.15	37.1
	Developed	0.26	0.3	13.07	16.1
2	Natural	13.00	92.0	0	0
	Developed	0	0	2.01	14.2
Total	Natural	78.42	82.3	32.16	33.7
	Developed	0.26	0.3	15.08	15.8

[a] Total Basin 1 and 2 areas are 81.21 and 14.13 acres, respectively. The balance of the areas not included in this table is in other slope classes (flat, 0-5%; or moderate, 5-10%) in Basins 1 and 2 and in a third, small (< 2 acres) Basin 3. This basin was not included in the analysis because handwritten notations in Appendix M-3 raise doubts about the actual numbers.

Going further into the matter of slope as an important determinant of erosion, using just three slope categories in a situation involving steep topography is an inadequate basis. RUSLE2 estimates soil loss potential according to variables representing rainfall characteristics, soils, slope length, vegetation cover, BMPs, and contributing area, in addition to slope steepness. All other factors being equal, the equation predicts the approximate increases in soil loss at different slope gradients given in Table 2. It can be seen that the rate of soil loss escalates greatly with

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[1] The difference of 78.42 acres existing before development minus the 32.16 acres remaining after construction = 46.26 acres.

[2] (46.26/63.92) x 100 = 72.4%.

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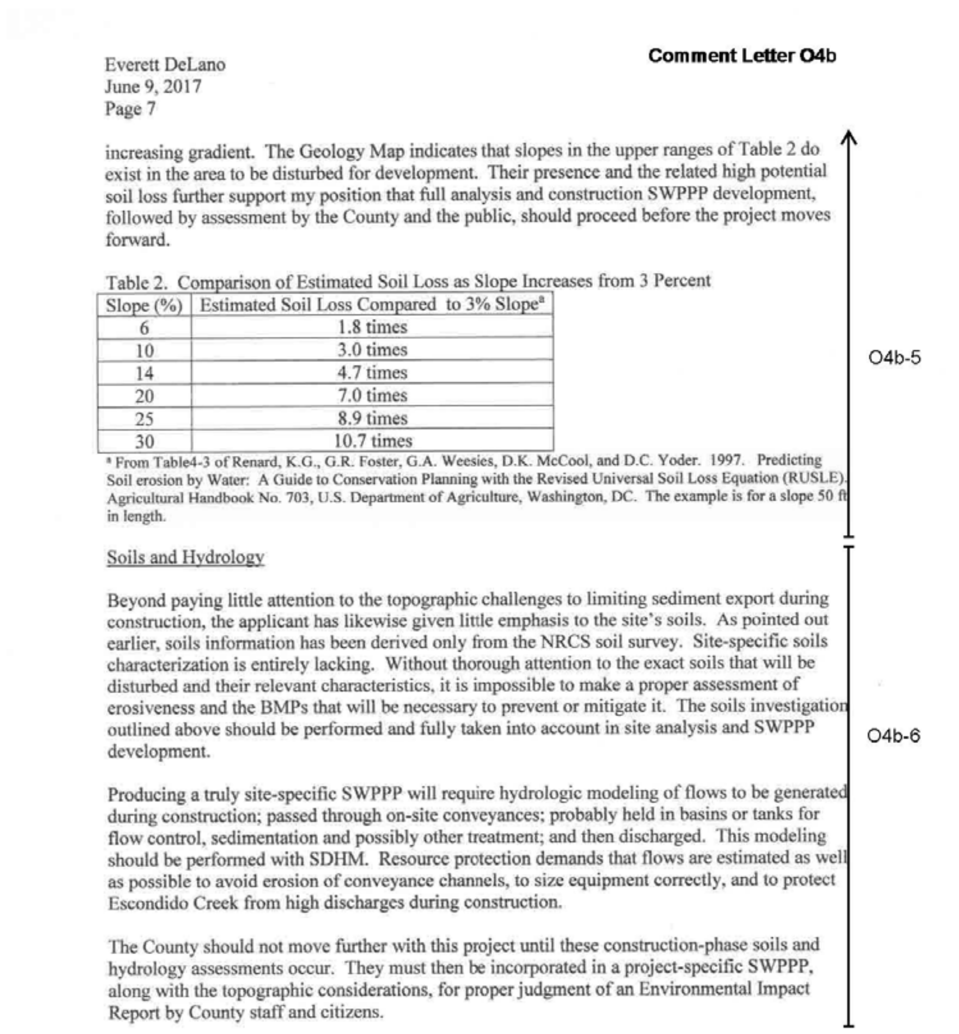

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increasing gradient. The Geology Map indicates that slopes in the upper ranges of Table 2 do exist in the area to be disturbed for development. Their presence and the related high potential soil loss further support my position that full analysis and construction SWPPP development, followed by assessment by the County and the public, should proceed before the project moves forward.

Table 2. Comparison of Estimated Soil Loss as Slope Increases from 3 Percent

Slope (%)	Estimated Soil Loss Compared to 3% Slope[a]
6	1.8 times
10	3.0 times
14	4.7 times
20	7.0 times
25	8.9 times
30	10.7 times

[a] From Table4-3 of Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder. 1997. Predicting Soil erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE). Agricultural Handbook No. 703, U.S. Department of Agriculture, Washington, DC. The example is for a slope 50 ft in length.

O4b-5

Soils and Hydrology

Beyond paying little attention to the topographic challenges to limiting sediment export during construction, the applicant has likewise given little emphasis to the site's soils. As pointed out earlier, soils information has been derived only from the NRCS soil survey. Site-specific soils characterization is entirely lacking. Without thorough attention to the exact soils that will be disturbed and their relevant characteristics, it is impossible to make a proper assessment of erosiveness and the BMPs that will be necessary to prevent or mitigate it. The soils investigation outlined above should be performed and fully taken into account in site analysis and SWPPP development.

Producing a truly site-specific SWPPP will require hydrologic modeling of flows to be generated during construction; passed through on-site conveyances; probably held in basins or tanks for flow control, sedimentation and possibly other treatment; and then discharged. This modeling should be performed with SDHM. Resource protection demands that flows are estimated as well as possible to avoid erosion of conveyance channels, to size equipment correctly, and to protect Escondido Creek from high discharges during construction.

The County should not move further with this project until these construction-phase soils and hydrology assessments occur. They must then be incorporated in a project-specific SWPPP, along with the topographic considerations, for proper judgment of an Environmental Impact Report by County staff and citizens.

O4b-6

RESPONSES

Response to Comment O4b-6

This statement mis-characterizes the Project geotechnical evaluation. Please see Response to Comment O4b-4 and refer to the site specific geotechnical report prepared by Geocon Inc. under Technical Appendix I of the EIR. Please refer to Responses to Comments O4b-3 and O4b-5 regarding the full understanding and timing of the site-specific SWPPP.

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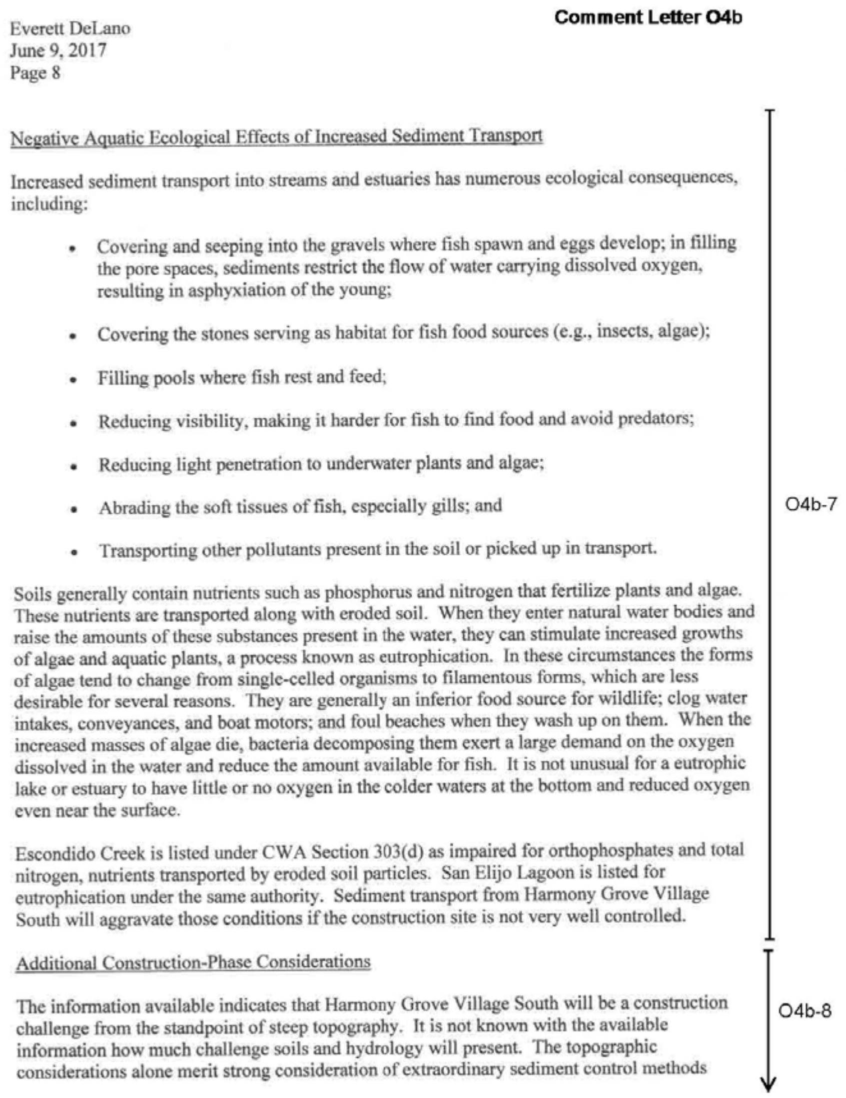

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Negative Aquatic Ecological Effects of Increased Sediment Transport

Increased sediment transport into streams and estuaries has numerous ecological consequences, including:

- Covering and seeping into the gravels where fish spawn and eggs develop; in filling the pore spaces, sediments restrict the flow of water carrying dissolved oxygen, resulting in asphyxiation of the young;
- Covering the stones serving as habitat for fish food sources (e.g., insects, algae);
- Filling pools where fish rest and feed;
- Reducing visibility, making it harder for fish to find food and avoid predators;
- Reducing light penetration to underwater plants and algae;
- Abrading the soft tissues of fish, especially gills; and
- Transporting other pollutants present in the soil or picked up in transport.

Soils generally contain nutrients such as phosphorus and nitrogen that fertilize plants and algae. These nutrients are transported along with eroded soil. When they enter natural water bodies and raise the amounts of these substances present in the water, they can stimulate increased growths of algae and aquatic plants, a process known as eutrophication. In these circumstances the forms of algae tend to change from single-celled organisms to filamentous forms, which are less desirable for several reasons. They are generally an inferior food source for wildlife; clog water intakes, conveyances, and boat motors; and foul beaches when they wash up on them. When the increased masses of algae die, bacteria decomposing them exert a large demand on the oxygen dissolved in the water and reduce the amount available for fish. It is not unusual for a eutrophic lake or estuary to have little or no oxygen in the colder waters at the bottom and reduced oxygen even near the surface.

Escondido Creek is listed under CWA Section 303(d) as impaired for orthophosphates and total nitrogen, nutrients transported by eroded soil particles. San Elijo Lagoon is listed for eutrophication under the same authority. Sediment transport from Harmony Grove Village South will aggravate those conditions if the construction site is not very well controlled.

O4b-7

Additional Construction-Phase Considerations

The information available indicates that Harmony Grove Village South will be a construction challenge from the standpoint of steep topography. It is not known with the available information how much challenge soils and hydrology will present. The topographic considerations alone merit strong consideration of extraordinary sediment control methods

O4b-8

RESPONSES

Response to Comment O4b-7

The general sediment concerns listed in this comment are noted. Please note, however, that this comment does not distinguish between fine sediments, which can have detrimental effects on downstream aquatic life, and coarse sediment, which is valuable to replenish downstream watercourses and beaches. A Project-specific SWPPP will be prepared during the Final Engineering/Design stage of the Project, to address fine sediment transport during construction phase of the Project. Also, modular wetland systems will be employed to remove fine sediments in the post construction phase. Please note that the Project-specific Priority Development Project Priority Development Project Storm Water Quality Management Plan (SWQMP) also addresses Critical Coarse Sediment Yield Areas that need to be preserved, avoided, and bypassed in order to maintain the integrity of downstream facilities that require coarse sediment to stabilize downstream watercourses and replenish area beaches.

Response to Comment O4b-8

A Project-specific SWPPP will be prepared during the Final Engineering/Design stage of the Project, which will address sediment and erosion prevention measures and monitoring requirements during the construction phase of the Project in accordance with the Statewide General Construction Storm Water Permit requirements.

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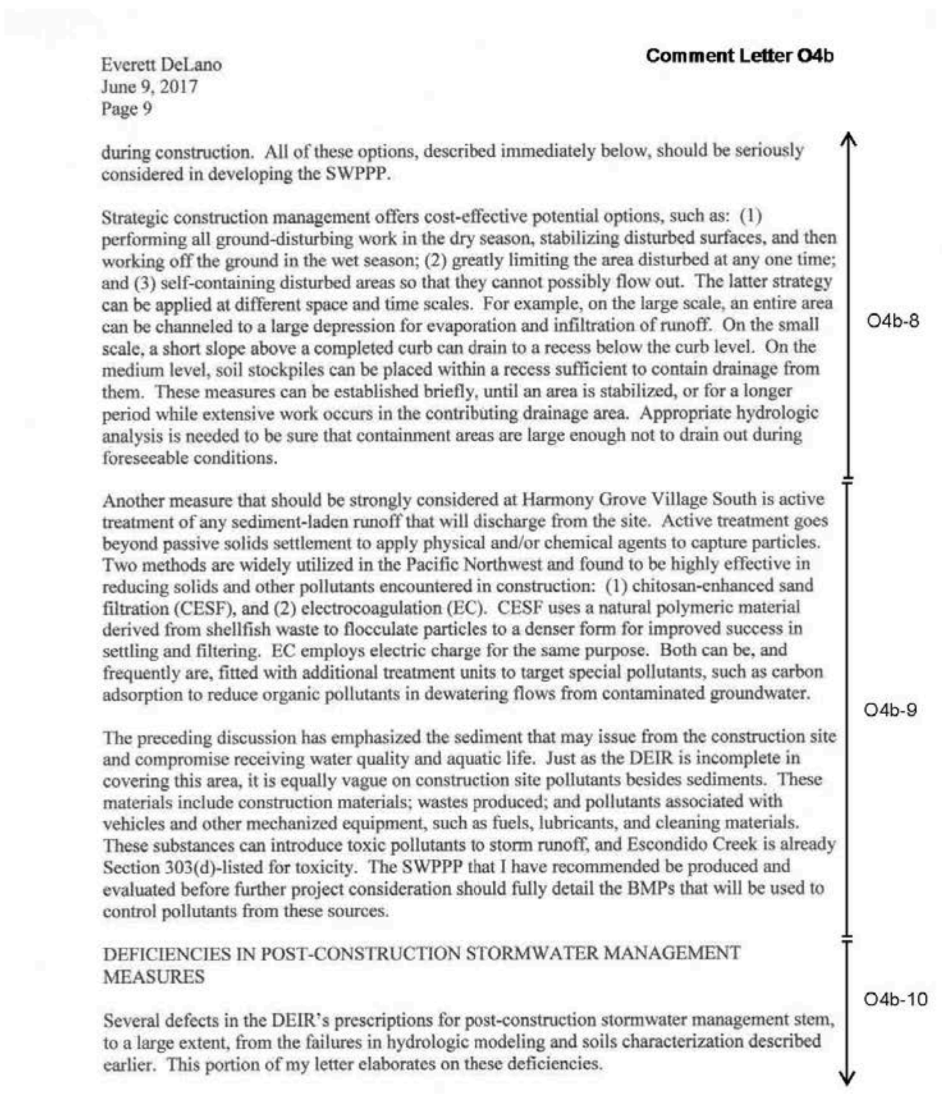

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during construction. All of these options, described immediately below, should be seriously considered in developing the SWPPP.

Strategic construction management offers cost-effective potential options, such as: (1) performing all ground-disturbing work in the dry season, stabilizing disturbed surfaces, and then working off the ground in the wet season; (2) greatly limiting the area disturbed at any one time; and (3) self-containing disturbed areas so that they cannot possibly flow out. The latter strategy can be applied at different space and time scales. For example, on the large scale, an entire area can be channeled to a large depression for evaporation and infiltration of runoff. On the small scale, a short slope above a completed curb can drain to a recess below the curb level. On the medium level, soil stockpiles can be placed within a recess sufficient to contain drainage from them. These measures can be established briefly, until an area is stabilized, or for a longer period while extensive work occurs in the contributing drainage area. Appropriate hydrologic analysis is needed to be sure that containment areas are large enough not to drain out during foreseeable conditions. O4b-8

Another measure that should be strongly considered at Harmony Grove Village South is active treatment of any sediment-laden runoff that will discharge from the site. Active treatment goes beyond passive solids settlement to apply physical and/or chemical agents to capture particles. Two methods are widely utilized in the Pacific Northwest and found to be highly effective in reducing solids and other pollutants encountered in construction: (1) chitosan-enhanced sand filtration (CESF), and (2) electrocoagulation (EC). CESF uses a natural polymeric material derived from shellfish waste to flocculate particles to a denser form for improved success in settling and filtering. EC employs electric charge for the same purpose. Both can be, and frequently are, fitted with additional treatment units to target special pollutants, such as carbon adsorption to reduce organic pollutants in dewatering flows from contaminated groundwater.

The preceding discussion has emphasized the sediment that may issue from the construction site and compromise receiving water quality and aquatic life. Just as the DEIR is incomplete in covering this area, it is equally vague on construction site pollutants besides sediments. These materials include construction materials; wastes produced; and pollutants associated with vehicles and other mechanized equipment, such as fuels, lubricants, and cleaning materials. These substances can introduce toxic pollutants to storm runoff, and Escondido Creek is already Section 303(d)-listed for toxicity. The SWPPP that I have recommended be produced and evaluated before further project consideration should fully detail the BMPs that will be used to control pollutants from these sources. O4b-9

DEFICIENCIES IN POST-CONSTRUCTION STORMWATER MANAGEMENT MEASURES

Several defects in the DEIR's prescriptions for post-construction stormwater management stem, to a large extent, from the failures in hydrologic modeling and soils characterization described earlier. This portion of my letter elaborates on these deficiencies. O4b-10

RESPONSES

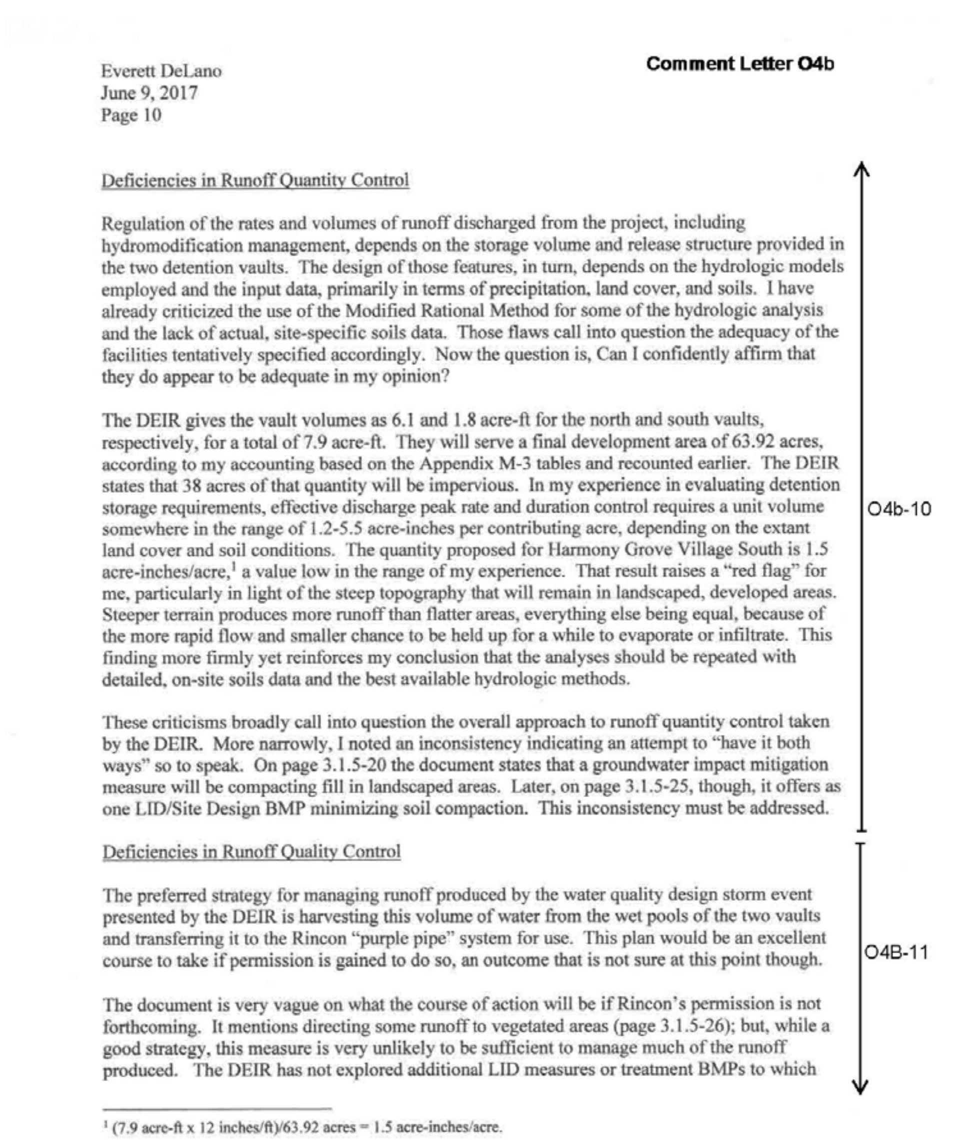
Response to Comment O4b-9

The Project-specific SWPPP prepared during final engineering will evaluate construction BMPs to address sediment and erosion control during construction and will also evaluate BMPs to address construction materials, wastes, and pollutants associated with vehicles, trash, debris, portable toilets, etc. Additionally, the General Construction Permit requires projects to implement a wet-weather Monitoring and Reporting protocol, which includes sampling of stormwater discharges during significant storm events and having the samples tested for specific visible and nonvisible pollutants, such as volatile organic compounds, metals, oil and grease, and total suspended solids by a certified testing laboratory. The results of this monitoring program are reported to the Regional Water Quality Control Board.

Response to Comment O4b-10

This comment mis-characterizes the Project studies relative to flow control and flow duration control. The proposed vaults have been designed using continuous simulation modeling in accordance with the San Diego Hydrology Model not the Modified Rational Method. This model takes into account historic rainfall data and runs continuous simulation modeling accounting for slope, land cover, vegetation, and soil conditions. It is noted that the Project modeling provided a number within the range the commenter said is typical for the area. Please refer to the Preliminary Hydromodification Management Study, EIR Technical Appendix M-3. The Preliminary Hydromodification Management Study will be further refined and updated at the Final Engineering/Design phase of the Project.

COMMENTS



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Deficiencies in Runoff Quantity Control

Regulation of the rates and volumes of runoff discharged from the project, including hydromodification management, depends on the storage volume and release structure provided in the two detention vaults. The design of those features, in turn, depends on the hydrologic models employed and the input data, primarily in terms of precipitation, land cover, and soils. I have already criticized the use of the Modified Rational Method for some of the hydrologic analysis and the lack of actual, site-specific soils data. Those flaws call into question the adequacy of the facilities tentatively specified accordingly. Now the question is, Can I confidently affirm that they do appear to be adequate in my opinion?

The DEIR gives the vault volumes as 6.1 and 1.8 acre-ft for the north and south vaults, respectively, for a total of 7.9 acre-ft. They will serve a final development area of 63.92 acres, according to my accounting based on the Appendix M-3 tables and recounted earlier. The DEIR states that 38 acres of that quantity will be impervious. In my experience in evaluating detention storage requirements, effective discharge peak rate and duration control requires a unit volume somewhere in the range of 1.2-5.5 acre-inches per contributing acre, depending on the extant land cover and soil conditions. The quantity proposed for Harmony Grove Village South is 1.5 acre-inches/acre,[1] a value low in the range of my experience. That result raises a "red flag" for me, particularly in light of the steep topography that will remain in landscaped, developed areas. Steeper terrain produces more runoff than flatter areas, everything else being equal, because of the more rapid flow and smaller chance to be held up for a while to evaporate or infiltrate. This finding more firmly yet reinforces my conclusion that the analyses should be repeated with detailed, on-site soils data and the best available hydrologic methods.

These criticisms broadly call into question the overall approach to runoff quantity control taken by the DEIR. More narrowly, I noted an inconsistency indicating an attempt to "have it both ways" so to speak. On page 3.1.5-20 the document states that a groundwater impact mitigation measure will be compacting fill in landscaped areas. Later, on page 3.1.5-25, though, it offers as one LID/Site Design BMP minimizing soil compaction. This inconsistency must be addressed. O4b-10

Deficiencies in Runoff Quality Control

The preferred strategy for managing runoff produced by the water quality design storm event presented by the DEIR is harvesting this volume of water from the wet pools of the two vaults and transferring it to the Rincon "purple pipe" system for use. This plan would be an excellent course to take if permission is gained to do so, an outcome that is not sure at this point though. O4B-11

The document is very vague on what the course of action will be if Rincon's permission is not forthcoming. It mentions directing some runoff to vegetated areas (page 3.1.5-26); but, while a good strategy, this measure is very unlikely to be sufficient to manage much of the runoff produced. The DEIR has not explored additional LID measures or treatment BMPs to which

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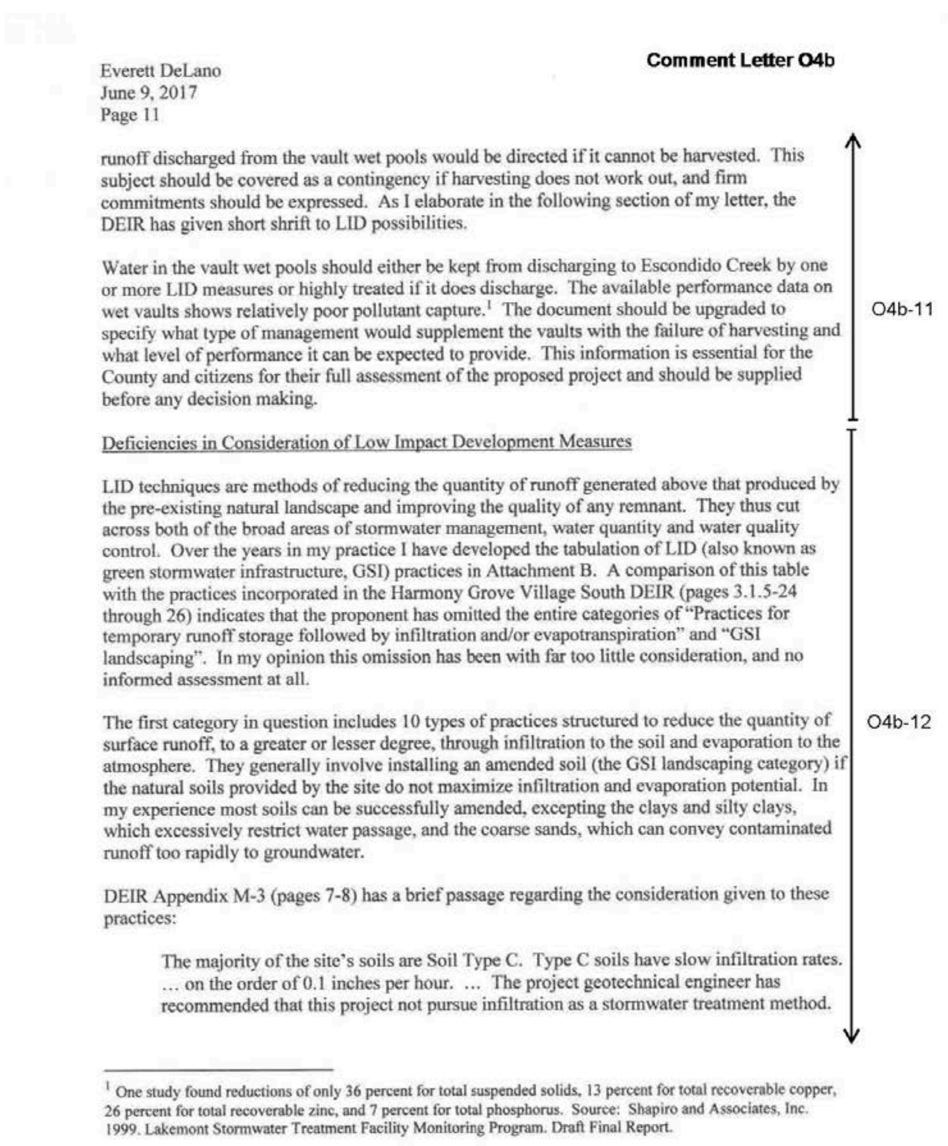
[1] (7.9 acre-ft x 12 inches/ft)/63.92 acres = 1.5 acre-inches/acre.

RESPONSES

Response to Comment O4b-11

Refer to page 23 of the Project *Storm Water Quality Management Plan*, technical Appendix N of the EIR. Should the concept of harvest and reuse not be viable for the Project, a series of biofiltration basins will be incorporated within the Project's graded footprint (via the reconfiguration of residential pads) to meet the County's BMP Design Manual requirements for detention, water quality, and hydromodification management controls.

COMMENTS	RESPONSES



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runoff discharged from the vault wet pools would be directed if it cannot be harvested. This subject should be covered as a contingency if harvesting does not work out, and firm commitments should be expressed. As I elaborate in the following section of my letter, the DEIR has given short shrift to LID possibilities.

Water in the vault wet pools should either be kept from discharging to Escondido Creek by one or more LID measures or highly treated if it does discharge. The available performance data on wet vaults shows relatively poor pollutant capture.[1] The document should be upgraded to specify what type of management would supplement the vaults with the failure of harvesting and what level of performance it can be expected to provide. This information is essential for the County and citizens for their full assessment of the proposed project and should be supplied before any decision making. O4b-11

Deficiencies in Consideration of Low Impact Development Measures

LID techniques are methods of reducing the quantity of runoff generated above that produced by the pre-existing natural landscape and improving the quality of any remnant. They thus cut across both of the broad areas of stormwater management, water quantity and water quality control. Over the years in my practice I have developed the tabulation of LID (also known as green stormwater infrastructure, GSI) practices in Attachment B. A comparison of this table with the practices incorporated in the Harmony Grove Village South DEIR (pages 3.1.5-24 through 26) indicates that the proponent has omitted the entire categories of "Practices for temporary runoff storage followed by infiltration and/or evapotranspiration" and "GSI landscaping". In my opinion this omission has been with far too little consideration, and no informed assessment at all.

The first category in question includes 10 types of practices structured to reduce the quantity of surface runoff, to a greater or lesser degree, through infiltration to the soil and evaporation to the atmosphere. They generally involve installing an amended soil (the GSI landscaping category) if the natural soils provided by the site do not maximize infiltration and evaporation potential. In my experience most soils can be successfully amended, excepting the clays and silty clays, which excessively restrict water passage, and the coarse sands, which can convey contaminated runoff too rapidly to groundwater. O4b-12

DEIR Appendix M-3 (pages 7-8) has a brief passage regarding the consideration given to these practices:

> The majority of the site's soils are Soil Type C. Type C soils have slow infiltration rates. … on the order of 0.1 inches per hour. … The project geotechnical engineer has recommended that this project not pursue infiltration as a stormwater treatment method.

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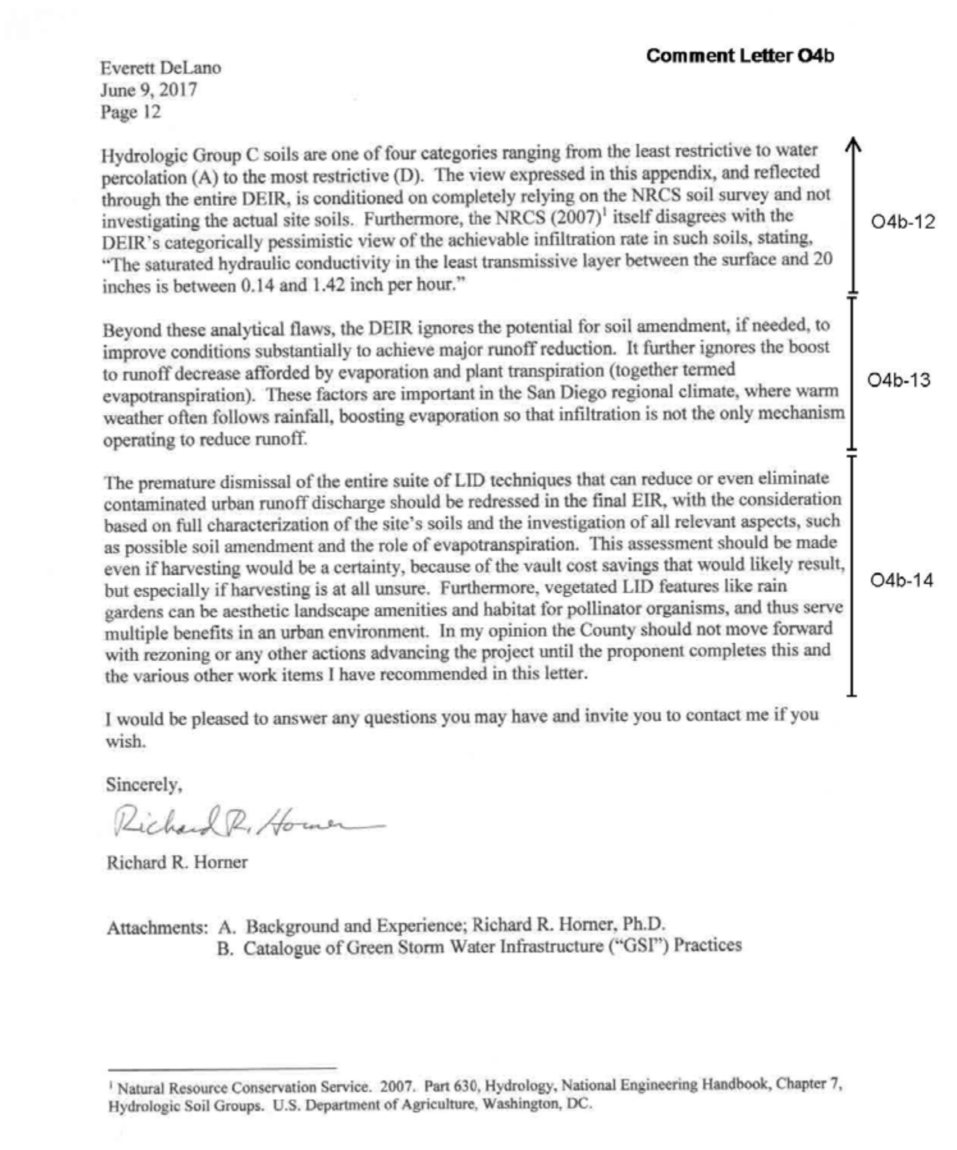
[1] One study found reductions of only 36 percent for total suspended solids, 13 percent for total recoverable copper, 26 percent for total recoverable zinc, and 7 percent for total phosphorus. Source: Shapiro and Associates, Inc. 1999. Lakemont Stormwater Treatment Facility Monitoring Program. Draft Final Report.

Response to Comment O4b-12

A site-specific geotechnical report (see Appendix I to EIR) was prepared for the Project and the recommendations of this report were followed for the design of the stormwater treatment facilities. Again, this comment mischaracterizes the report soils data; please refer to Response to Comment O4b-4 for clarification. Harvest and reuse is proposed for the Project, in addition to site design and source control measures to minimize pollutants in stormwater runoff. The Catalogue of Green Storm Water Infrastructure (GSI) Practices shown in Attachment B to the letter are noted. A number of these practices are already part of Project design (e.g., under "Conservation site design," "Conservation construction," and Practices for temporary runoff storage followed by infiltration."

COMMENTS



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Hydrologic Group C soils are one of four categories ranging from the least restrictive to water percolation (A) to the most restrictive (D). The view expressed in this appendix, and reflected through the entire DEIR, is conditioned on completely relying on the NRCS soil survey and not investigating the actual site soils. Furthermore, the NRCS (2007)[1] itself disagrees with the DEIR's categorically pessimistic view of the achievable infiltration rate in such soils, stating, "The saturated hydraulic conductivity in the least transmissive layer between the surface and 20 inches is between 0.14 and 1.42 inch per hour." O4b-12

Beyond these analytical flaws, the DEIR ignores the potential for soil amendment, if needed, to improve conditions substantially to achieve major runoff reduction. It further ignores the boost to runoff decrease afforded by evaporation and plant transpiration (together termed evapotranspiration). These factors are important in the San Diego regional climate, where warm weather often follows rainfall, boosting evaporation so that infiltration is not the only mechanism operating to reduce runoff. O4b-13

The premature dismissal of the entire suite of LID techniques that can reduce or even eliminate contaminated urban runoff discharge should be redressed in the final EIR, with the consideration based on full characterization of the site's soils and the investigation of all relevant aspects, such as possible soil amendment and the role of evapotranspiration. This assessment should be made even if harvesting would be a certainty, because of the vault cost savings that would likely result, but especially if harvesting is at all unsure. Furthermore, vegetated LID features like rain gardens can be aesthetic landscape amenities and habitat for pollinator organisms, and thus serve multiple benefits in an urban environment. In my opinion the County should not move forward with rezoning or any other actions advancing the project until the proponent completes this and the various other work items I have recommended in this letter. O4b-14

I would be pleased to answer any questions you may have and invite you to contact me if you wish.

Sincerely,

Richard R. Horner

Richard R. Horner

Attachments: A. Background and Experience; Richard R. Horner, Ph.D.
B. Catalogue of Green Storm Water Infrastructure ("GSI") Practices

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[1] Natural Resource Conservation Service. 2007. Part 630, Hydrology, National Engineering Handbook, Chapter 7, Hydrologic Soil Groups. U.S. Department of Agriculture, Washington, DC.

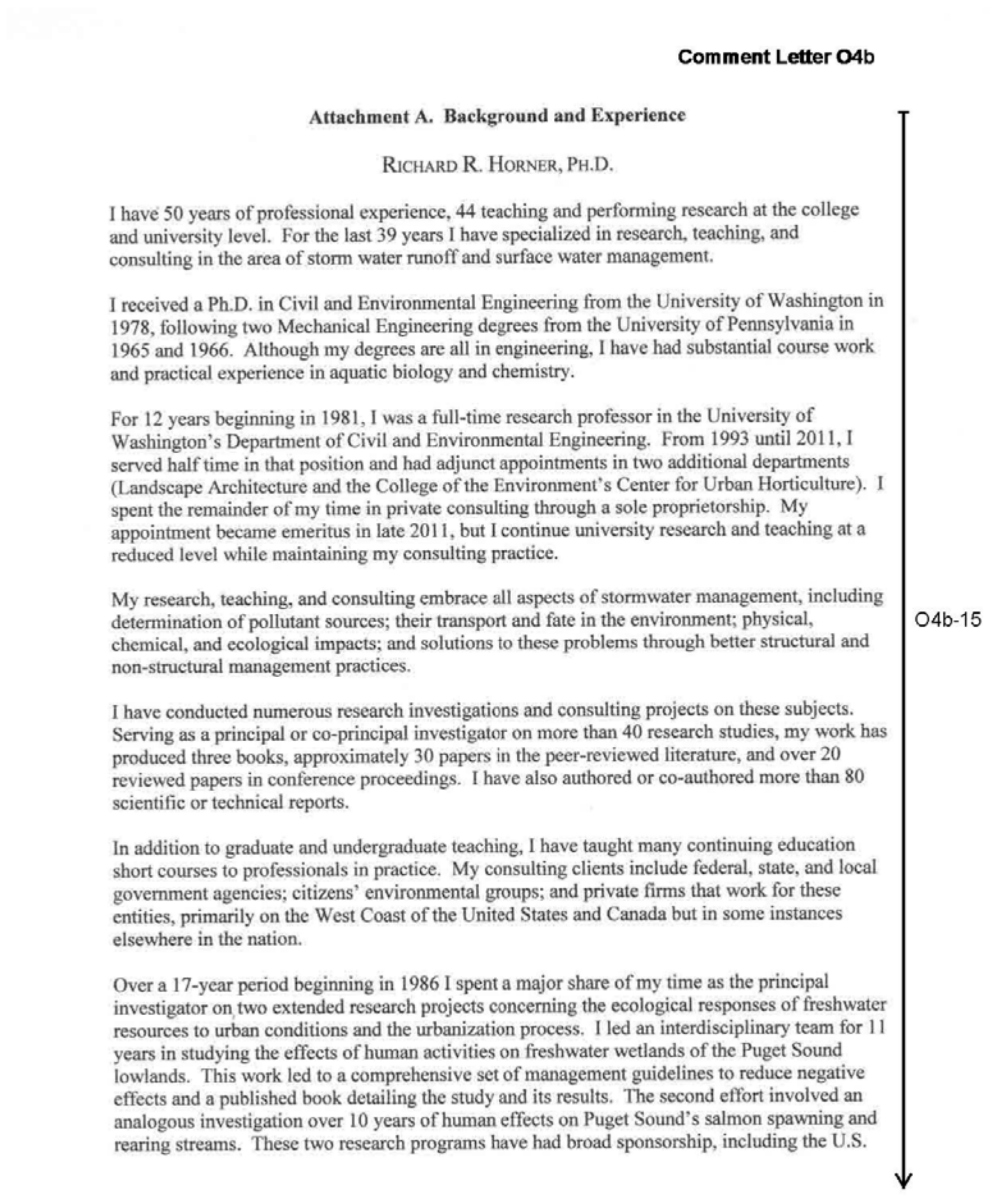
RESPONSES

Response to Comment O4b-13

Drainage facilities designs are analyzed in the Project's technical reports; refer to technical Appendices M-1 through M-4 and N (CEQA Preliminary Hydrology/Drainage Report, Preliminary Hydromodification Screening Analysis, Preliminary Hydromodification Management Study, Hydraulic Floodplain Analysis, and Priority Development Project SWQMP, respectively). These reports have been prepared and approved in accordance with County of San Diego regulations. Refer to the approved SWQMP for documentation of mitigative measures employed to address water quality concerns as part of Project design. Also refer to the FEIR Section 3.1.4, *Hydrology/Water Quality*. The Project has also met the landscaping and open space requirements per County regulations, which will result in providing the benefits of evapotranspiration for water quality. Soil amendments will likely be used in on-site landscape areas as well.

Response to Comment O4b-14

The design of the drainage facilities is analyzed in the Project's County-approved technical reports (refer to EIR Appendices M-1 through M-4 and N as listed and described in Response to Comment O4b-13). Also refer to the FEIR Section 3.1.4, *Hydrology/Water Quality*.

COMMENTS	RESPONSES
 **Comment Letter O4b** **Attachment A. Background and Experience** RICHARD R. HORNER, PH.D. I have 50 years of professional experience, 44 teaching and performing research at the college and university level. For the last 39 years I have specialized in research, teaching, and consulting in the area of storm water runoff and surface water management. I received a Ph.D. in Civil and Environmental Engineering from the University of Washington in 1978, following two Mechanical Engineering degrees from the University of Pennsylvania in 1965 and 1966. Although my degrees are all in engineering, I have had substantial course work and practical experience in aquatic biology and chemistry. For 12 years beginning in 1981, I was a full-time research professor in the University of Washington's Department of Civil and Environmental Engineering. From 1993 until 2011, I served half time in that position and had adjunct appointments in two additional departments (Landscape Architecture and the College of the Environment's Center for Urban Horticulture). I spent the remainder of my time in private consulting through a sole proprietorship. My appointment became emeritus in late 2011, but I continue university research and teaching at a reduced level while maintaining my consulting practice. My research, teaching, and consulting embrace all aspects of stormwater management, including determination of pollutant sources; their transport and fate in the environment; physical, chemical, and ecological impacts; and solutions to these problems through better structural and non-structural management practices. I have conducted numerous research investigations and consulting projects on these subjects. Serving as a principal or co-principal investigator on more than 40 research studies, my work has produced three books, approximately 30 papers in the peer-reviewed literature, and over 20 reviewed papers in conference proceedings. I have also authored or co-authored more than 80 scientific or technical reports. In addition to graduate and undergraduate teaching, I have taught many continuing education short courses to professionals in practice. My consulting clients include federal, state, and local government agencies; citizens' environmental groups; and private firms that work for these entities, primarily on the West Coast of the United States and Canada but in some instances elsewhere in the nation. Over a 17-year period beginning in 1986 I spent a major share of my time as the principal investigator on two extended research projects concerning the ecological responses of freshwater resources to urban conditions and the urbanization process. I led an interdisciplinary team for 11 years in studying the effects of human activities on freshwater wetlands of the Puget Sound lowlands. This work led to a comprehensive set of management guidelines to reduce negative effects and a published book detailing the study and its results. The second effort involved an analogous investigation over 10 years of human effects on Puget Sound's salmon spawning and rearing streams. These two research programs have had broad sponsorship, including the U.S. O4b-15	**Response to Comment O4b-15** This attachment is the resume for the author of Response to Comment Letter O4-b. It is not further addressed.

COMMENTS

RESPONSES

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Environmental Protection Agency, the Washington Department of Ecology, and a number of local governments.

I have helped to develop stormwater management programs in Washington State, California, and British Columbia and studied such programs around the nation. I was one of four principal participants in a U.S. Environmental Protection Agency-sponsored assessment of 32 state, regional, and local programs spread among 14 states in arid, semi-arid, and humid areas of the West and Southwest, as well as the Midwest, Northeast, and Southeast. This evaluation led to the 1997 publication of "Institutional Aspects of Urban Runoff Management: A Guide for Program Development and Implementation" (subtitled "A Comprehensive Review of the Institutional Framework of Successful Urban Runoff Management Programs").

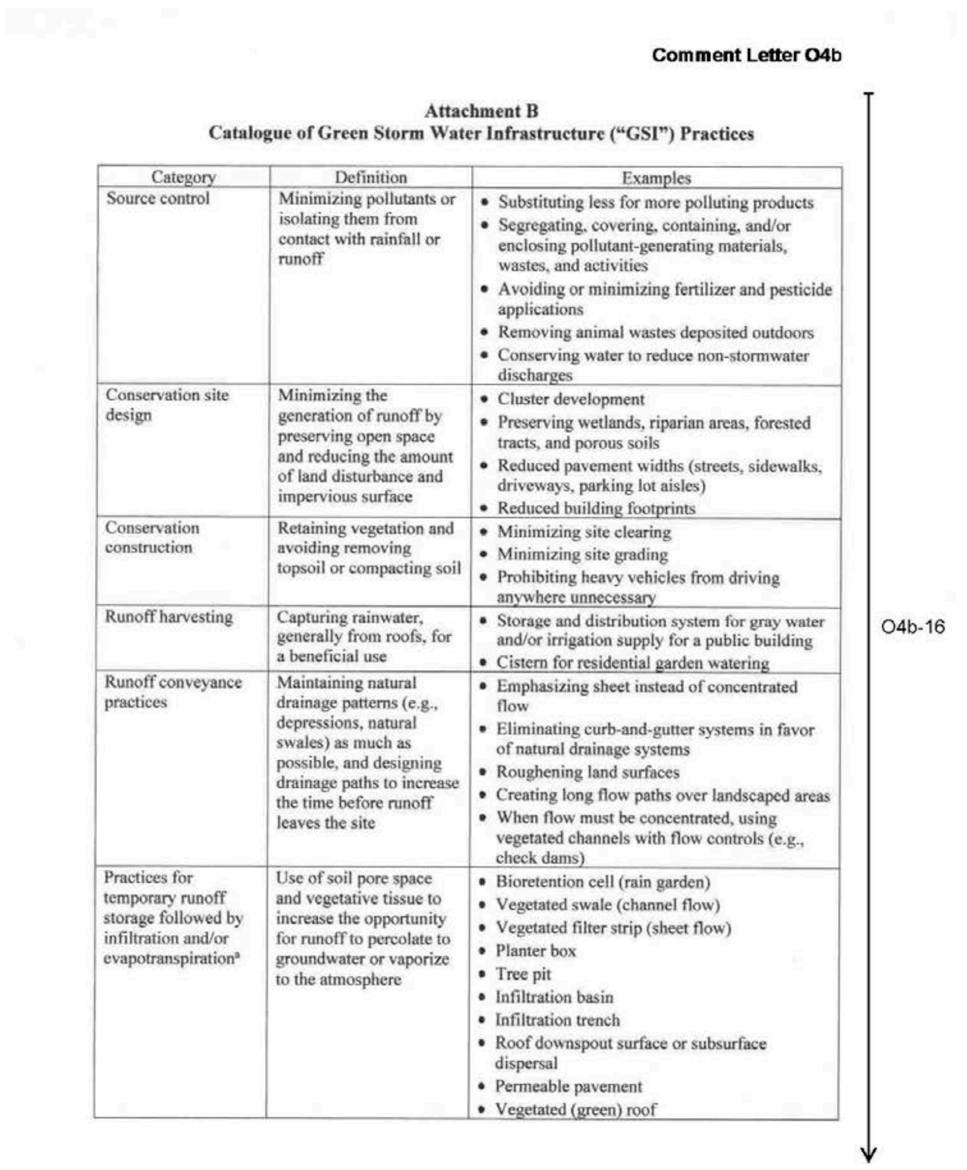
My background includes 23 years of work in California, where I have been a federal court-appointed overseer of stormwater program development and implementation at the city and county level and for two California Department of Transportation districts. I was directly involved in the process of developing the 13 volumes of Los Angeles County's Stormwater Program Implementation Manual, working under the terms of a settlement agreement in federal court as the plaintiffs' technical representative. My role was to provide quality-control review of multiple drafts of each volume and contribute to bringing the program and all of its elements to an adequate level. I have also evaluated the stormwater programs in San Diego, Orange, Riverside, San Bernardino, Ventura, Santa Barbara, San Luis Obispo, and Monterey Counties, as well as a regional program for the San Francisco Bay Area. At the recommendation of San Diego Baykeeper, I have been a consultant on stormwater issues to the City of San Diego, the San Diego Unified Port District, and the San Diego County Regional Airport Authority.

O4b-15

I was a member of the National Academy of Sciences-National Research Council ("NAS-NRC") committee on Reducing Stormwater Discharge Contributions to Water Pollution. NAS-NRC committees bring together experts to address broad national issues and give unbiased advice to the federal government. The present panel was the first ever to be appointed on the subject of stormwater. Its broad goals were to understand better the links between stormwater discharges and impacts on water resources, to assess the state of the science of stormwater management, and to apply the findings to make policy recommendations to the U.S. Environmental Protection Agency relative to municipal, industrial, and construction stormwater permitting. My principal contribution to the committee's final report, issued in October 2008, was the chapter presenting the committee's recommendations for broadly revamping the nation's stormwater program.

COMMENTS	RESPONSES

COMMENTS



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Attachment B
Catalogue of Green Storm Water Infrastructure ("GSI") Practices

Category	Definition	Examples
Source control	Minimizing pollutants or isolating them from contact with rainfall or runoff	• Substituting less for more polluting products • Segregating, covering, containing, and/or enclosing pollutant-generating materials, wastes, and activities • Avoiding or minimizing fertilizer and pesticide applications • Removing animal wastes deposited outdoors • Conserving water to reduce non-stormwater discharges
Conservation site design	Minimizing the generation of runoff by preserving open space and reducing the amount of land disturbance and impervious surface	• Cluster development • Preserving wetlands, riparian areas, forested tracts, and porous soils • Reduced pavement widths (streets, sidewalks, driveways, parking lot aisles) • Reduced building footprints
Conservation construction	Retaining vegetation and avoiding removing topsoil or compacting soil	• Minimizing site clearing • Minimizing site grading • Prohibiting heavy vehicles from driving anywhere unnecessary
Runoff harvesting	Capturing rainwater, generally from roofs, for a beneficial use	• Storage and distribution system for gray water and/or irrigation supply for a public building • Cistern for residential garden watering
Runoff conveyance practices	Maintaining natural drainage patterns (e.g., depressions, natural swales) as much as possible, and designing drainage paths to increase the time before runoff leaves the site	• Emphasizing sheet instead of concentrated flow • Eliminating curb-and-gutter systems in favor of natural drainage systems • Roughening land surfaces • Creating long flow paths over landscaped areas • When flow must be concentrated, using vegetated channels with flow controls (e.g., check dams)
Practices for temporary runoff storage followed by infiltration and/or evapotranspiration[a]	Use of soil pore space and vegetative tissue to increase the opportunity for runoff to percolate to groundwater or vaporize to the atmosphere	• Bioretention cell (rain garden) • Vegetated swale (channel flow) • Vegetated filter strip (sheet flow) • Planter box • Tree pit • Infiltration basin • Infiltration trench • Roof downspout surface or subsurface dispersal • Permeable pavement • Vegetated (green) roof

O4b-16

RESPONSES

Response to Comment O4b-16

This attachment consists of storm water infrastructure common practices and is addressed in Response to Comment O4b-12.

COMMENTS

RESPONSES

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(continued)

Category	Definition	Examples
GSI landscaping[b]	Soil amendment and/or plant selection to increase storage, infiltration, and evapotranspiration	• Organic compost soil amendment • Native, drought-tolerant plantings • Reforestation • Turf conversion to meadow, shrubs, and/or trees

[a] Some of these practices are also conventional storm water BMPs but are GSI practices when GSI landscaping methods are employed as necessary to maximize storage, infiltration, and evapotranspiration. The first five examples can be constructed with an impermeable liner and an underdrain connection to a storm sewer, if there is a good reason to do so (see further discussion later). Vegetated roofs store and evapotranspire water but offer no infiltration opportunity, unless their discharge is directed to a secondary, ground-based facility.

[b] Selection of landscaping methods depends on the GSI practice to which it applies and the storm water management objectives, but amending soils unless they are highly infiltrative and planting several vegetation canopy layers (e.g., herbaceous growth, shrubs, and trees) are generally conducive to increasing storage, infiltration, and evapotranspiration.

O4b-16