4.8 HYDROLOGY and WATER QUALITY

This section analyzes the proposed ordinance revisions' potential to adversely affect hydrology and water quality. This analysis is partially based on a Conceptual Drainage and SUSMP (Water Quality) Report prepared by Hunsaker and Associates, LA Inc., dated May 6, 2011. The report is included as Appendix E of this EIR.

4.8.1 Setting

a. Hydrology and Storm Drain System. The project area is located on the Palos Verdes Peninsula. Since the Rancho Palos Verdes Peninsula is a single hill formation, a central ridge disperses drainage in a number of small watershed systems. However, no major watershed systems are completely confined within the boundaries of Rancho Palos Verdes. All surface waters originate from precipitation that falls on the peninsula (Rancho Palos Verdes General Plan, 1975). The drainage pattern flows in several directions as a result of the central ridge. The majority of the runoff flows directly south into the Pacific Ocean. The remaining runoff flows east through San Pedro, north through Rolling Hills and Rolling Hills Estates, or west through Palos Verdes Estates. All runoff, however, eventually flows into the Pacific Ocean.

The project area is part of an approximately 855-acre watershed that includes developed and undeveloped land. Offsite areas to the north of the project area include existing Tracts 27789, 31617 and 31714, as well as natural hillside and canyon open space areas. Altamira Canyon is the main natural drainage course that drains the project area and offsite tributary areas. Figure 4.8-1 shows the drainage pattern in the project area.

The existing drainage system in the project area was designed for the 111 lots within the 112-acre Portuguese Bend area (the Zone 2 area), including the 47 lots that could be developed as part of the project. Since the existing drainage system was designed for the entire Portuguese Bend development, including the 47 undeveloped lots, each lot is assumed to have a proportional share of the existing drainage capacity provided for the Portuguese Bend development. In other words, regardless of when the lots are constructed, each lot is allowed to drain into the existing drainage system based upon the size of the lot.

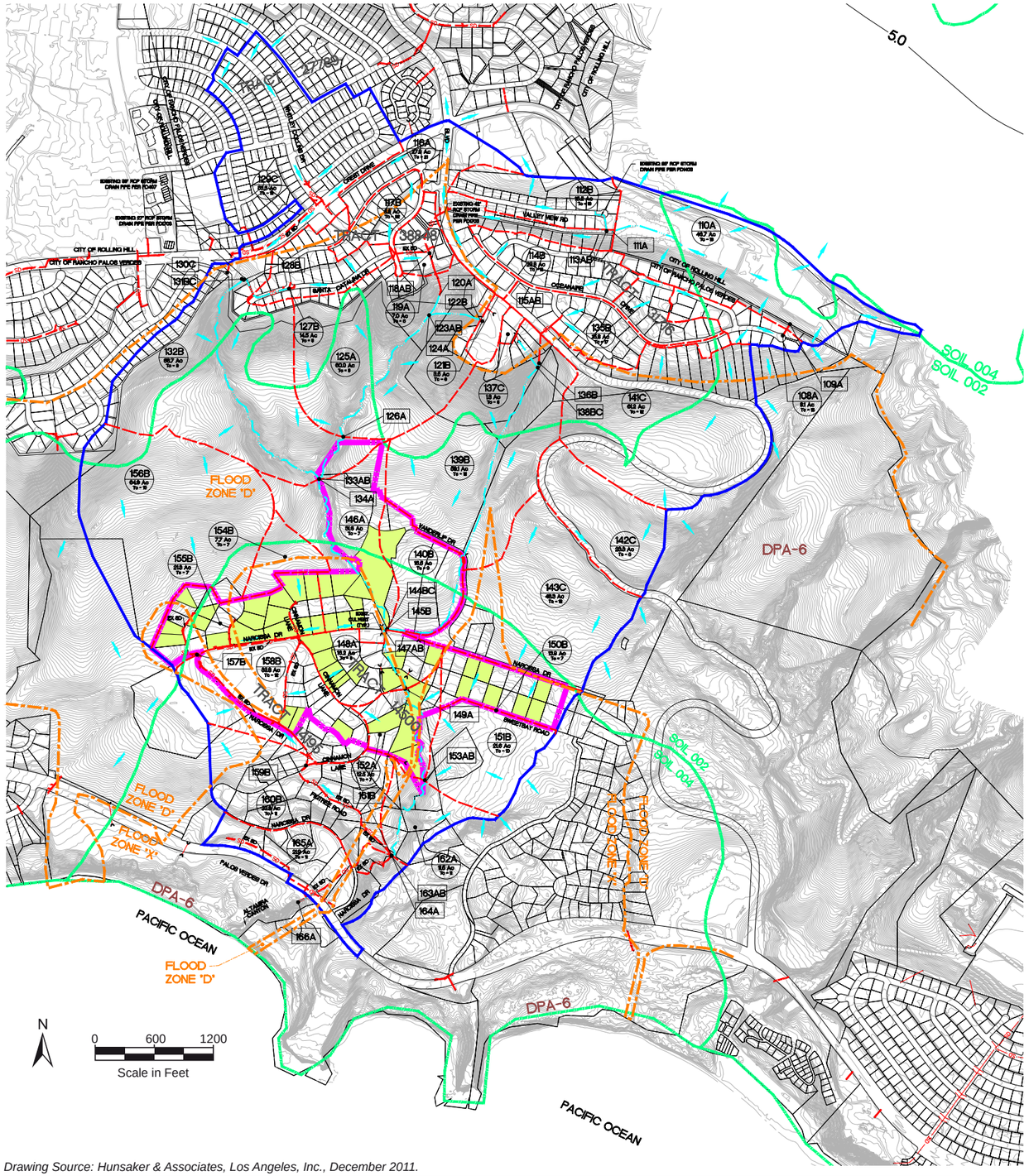
In the vicinity of the project area, runoff is conveyed within existing drainage courses, storm drains, and culverts that traverse the site. The project area is divided roughly by Cinnamon Lane into two major drainage areas. The area east of Cinnamon Lane drains a total of approximately 637 acres, of which approximately 82 acres are located in the Zone 2 area. Drainage in the easterly watershed is conveyed by Altamira Canyon southwesterly to Narcissa Drive. The area west of Cinnamon Lane drains a total of 115 acres, of which approximately 42 acres are located in the Zone 2 area. Drainage in the westerly watershed is conveyed by a combination of an existing subsurface storm drain system and surface flow in a southeasterly direction along Figtree Road to the cul-de-sac at the end of Figtree Road. The storm drain continues southeasterly through private lots to a junction with Altamira Canyon (the easterly watershed) approximately 400 feet north of Narcissa Drive. From the junction, the storm drain drains southwesterly across Narsissa Drive and Palos Verdes Drive South and outlets into the lower reaches of Altamira Canyon. Altamira Canyon drains directly into the Pacific Ocean from Palos Verdes Drive South.

b. Flood Hazard Zones. The Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Agency (FEMA) for Zone 2 and the surrounding area (Map ID 06037C2026F) indicates that the site and surrounding area are contained within Zone X and Zone D. Zone X designates an area with a minimal risk of flooding (not within the 100-year flood zone) and Zone D designates an area with areas in which flood hazards are undetermined, but possible. The flood hazard zones are shown in Figure 4.8-1. As shown on Figure 4.8-1, 10 of the 47 lots that could be developed as a result of the project are partially or completely located within the Zone D designation.

c. Water Quality (Federal, State, and local regulations). Direct discharges of pollutants into waters of the United States are not allowed, except in accordance with the National Pollutant Discharge Elimination System (NPDES) program established in Section 402 of the Clean Water Act (CWA). The major purpose of the NPDES program is to protect human health and the environment by protecting the quality of water. California's primary statute governing water quality and water pollution is the Porter-Cologne Water Quality Control Act of 1970 (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB) broad powers to protect water quality and is the primary vehicle for implementation of California's responsibility under the federal CWA. The Porter- Cologne Act grants the SWRCB and RWQCBs the authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites, and to require clean up of discharges of hazardous materials and other pollutants.

The protection of water quality in the watercourses within Rancho Palos Verdes is under the jurisdiction of the Los Angeles RWQCB (SWRCB District 4). The RWQCB establishes requirements prescribing discharge limits and establishes water quality objectives through the "Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges Within the County of Los Angeles, and the Incorporated Cities Therein, Except the City of Long Beach" for which the City of Rancho Palos Verdes is a co-permittee (Order No. 01-182), NPDES Permit No. CAS004001, dated December 13, 2001 and amended most recently in April 2011, issued by the California Regional Water Quality Control Board – Los Angeles Region, which also serves as a NPDES permit under the Federal Clean Water Act. As a co-permittee, the City is required to implement procedures with respect to the entry of non-storm water discharges into the municipal storm water system. The Rancho Palos Verdes Municipal Code (Chapter 13.10) addresses specific storm water pollution requirements for new developments in accordance with the NPDES Permit.

The NPDES permit specifies that all new development and redevelopment projects that fall under specific priority project categories must complete a Standard Urban Storm Water Mitigation Plan (SUSMP) (March 2000). These categories of development are considered "priority" because the RWQCB determined that they have the greatest potential to degrade water quality. If applicable, structural or treatment control BMPs for a project (including, as applicable, post-construction treatment control BMPs) set forth in project plans would be required to meet the design standards set forth in the SUSMP and the current Municipal NPDES Permit. (As the proposed project involves ordinance revisions that could facilitate up to



Drawing Source: Hunsaker & Associates, Los Angeles, Inc., December 2011.

HYDROLOGIC SUMMARY TABLE

SUB AREA	NODE	AREA (Ac)	Sub-total Area (Ac)	% IMPERVIOUSNESS (Existing Condition)	% IMPERVIOUSNESS (Proposed Condition)	SOIL TYPE	ISOHYET	50-YR TC (min)	QB (cfs) (Pre-development)	Capital (cfs) (Pre-development)	QB (cfs) (Post-development)	Capital (cfs) (Post-development)	DEBRIS (CY)
108A		8.1		21	21	002	4.9	13		18.9		18.9	
	109A												
110A		46.7		2	2	002	4.9	18		91.3		91.3	
	111A												
112B		16.2		21	21	004	4.9	18		28.1		28.1	
	113AB												
114B		23.8		42	42	004	4.9	18		43.6		43.6	
	115AB												
116A		27.9		21	21	004	4.9	21		44.2		44.2	
117B		8.8		42	42	004	4.9	22		14.1		14.1	
	118AB												
119A		7.0		21	21	004	4.9	6		21.2		21.2	
	120A												
121B		3.5		21	21	004	4.9	6		10.6		10.6	
	122B												
	123AB		**142.0**							**170.0**		**170.0**	
	124A												
125A		60.0		1	1	004	4.9	9	156.8	252.4	156.8	252.4	4500.0
	126A												
127B		14.5		42	42	004	4.9	9		37.0		37.0	
	128B												
129C		53.3		42	42	004	4.9	13		112.4		112.4	
	130C												
	131BC		**67.8**							**147.5**		**147.5**	
132B		68.7		1	1	002	4.9	9	200.0	321.9	200.0	321.9	5152.5
	133AB		**338.5**						**598.8**	**737.7**	**598.8**	**737.7**	
	134A												
135B		15.8		42	42	004	4.9	17		29.0		29.0	
	136B												
137C		1.3		21	21	004	4.9	5		4.4		4.4	
	138BC		**17.1**							**32.7**		**32.7**	
139B		59.1		2	2	004	4.9	12	132.8	213.8	132.8	213.8	4432.5
140B		16.5		38	40	002	4.9	9					
141C		61.2		1	1	002	4.9	12	154.4	248.6	154.4	248.6	4590.0
142C		23.3		1	1	002	4.9	5	91.6	147.4	91.6	147.4	1747.5
143C		48.3		5	5	002	4.9	12	121.8	196.1	121.8	196.1	3622.5
	144BC		**225.5**						**499.2**	**723.9**	**499.2**	**723.9**	
	145B												
146A		31.6		13	23	002	4.9	7					
	147AB		**595.6**						**1076.0**	**1464.0**	**1076.3**	**1464.4**	
148A		16.2		22	40	004	4.9	8					
	149A												
150B		13.9		26	40	004	4.9	7					
151B		21.6		2	2	005	4.9	10	53.9	84.5	53.9	84.5	1587.6
152A		12.5		18	40	004	4.9	7					
	153AB		**659.8**						**1102.7**	**1483.7**	**1165.7**	**1568.4**	
154B		7.7		2	2	004	4.9	7	22.8	36.7	51.9	47.9	566.0
155B		21.3		13	40	005	4.9	7					
156B		64.9		2	2	002	4.9	10	180.6	283.2	180.6	283.2	4770.2
	157B												
158B		33.8		16	20	004	4.9	12					
	159B												
160B		33.8		36	36	004	4.9	11					
	161B												
162A		11.5		2	2	004	4.9	11	27.1	43.7	27.1	43.7	862.5
	163AB		932.8						1541.5	**2025.2**	1585.9	**2083.5**	
	164A												
165A		21.9		42	42	004	4.9	11					
	166A		854.6						1577.2	**2092.5**	1586.3	**2128.4**	

LEGEND:

- 150B / 35.5 Ac / Tc = 18 — SUBAREA NODE, ACREAGE, TIME OF CONCENTRATION
- 153A — CONFLUENCE NODE
- VACANT OR DEVELOPED WITH STRUCTURES OTHER THAN RESIDENCES; POTENTIALLY DEVELOPABLE UNDER PROPOSED ORDINANCE REVISIONS
- DPA-6 — DEBRIS POTENTIAL AREA (DPA)
- SOIL 004 / SOIL 002 — SOIL CLASSIFICATION BOUNDARY
- FLOOD ZONE AREA
- 5.0 — ISOHYET
- CITY BOUNDARY
- PROJECT BOUNDARY
- WATERSHED BOUNDARY
- FLOW PATH
- SD — SD — EXISTING CULVERT, EXISTING STORM DRAIN
- SUBAREA BOUNDARY
- MAIN CHANNEL

DRAINAGE DESIGN CRITERIA:

1. 50-YR, 24-HR ISOHYET: 4.9
2. SOIL TYPES: 2 & 4
3. DESIGN STORMS: 50-YR, 24-HR
4. PERCENT IMPERVIOUS VALUES:
   EXISTING RESIDENTIAL – 42%
   ONSITE UNDEVELOPED LOTS – 2%
   OFFSITE VACANT AREA – 1%
   PROPOSED RESIDENTIAL – 40%
5. DPA = 6, 48,000 CY PER SQ MI
6. BULK FACTOR = 1.61

Drainage Plan

Figure 4.8-1

47 new residences on existing lots, individual construction projects built pursuant to the ordinance would not be subject to the SUSMP, as would be the case, for example, for a 47-lot subdivision.) While the current Los Angeles County MS4 permit does not specifically require addressing hydromodification effects and Low Impact Development (LID) principles, an interim clarification letter sent in 2006 to the County of Los Angeles and its co-permittees specifically discussed shortcomings in the current MS4 Permit that required attention. The County of Los Angeles and City of Los Angeles have since adopted ordinances or policies that specifically address LID and hydromodification requirements. The County's Low Impact Development Ordinance adopted in January 2009 requires that impacts due to development be treated at the source.

d. City of Rancho Palos Verdes Requirements. In accordance with Rancho Palos Verdes Municipal Code Chapter 13.10.050, owners and occupants of property within the city must comply with the following requirement:

> *B. Use of Water. Runoff of water used for irrigation purposes shall be minimized to the maximum extent practicable. Runoff of water from the permitted washing down of paved areas shall be minimized to the maximum extent practicable. Sweeping and collection of debris is encouraged for trash disposal.*

Section 15.20.050 of the City of Rancho Palos Verdes Municipal Code establishes measures required for projects that are exceptions to the City's landslide moratorium regulations, including the following:

> *A. If lot drainage deficiencies are identified by the director of public works, all such deficiencies shall be corrected by the applicant.*
> *B. If the project involves additional plumbing fixtures, or additions of habitable space which exceed two hundred square feet, or could be used as a new bedroom, bathroom, laundry room or kitchen, and if the lot or parcel is not served by a sanitary sewer system, septic systems shall be replaced with approved holding tank systems in which to dispose of on-site waste water. The capacity of the required holding tank system shall be subject to the review and approval of the city's building official. For the purposes of this subsection, the addition of a sink to an existing bathroom, kitchen or laundry room shall not be construed to be an additional plumbing fixture. For those projects which involve additions of less than two hundred square feet in total area and which are not to be used as a new bedroom, bathroom, laundry room or kitchen, the applicant shall submit for recordation a covenant specifically agreeing that the addition of the habitable space will not be used for those purposes. Such covenant shall be submitted to the director for recordation prior to the issuance of a building permit. For lots or parcels which are to be served by a sanitary sewer system on or after the effective date of the ordinance codified in this section (July 6, 2000), additional plumbing fixtures may be permitted and the requirement for a holding tank may be waived, provided that the lot or parcel is to be connected to the sanitary sewer system. If a sanitary sewer system is approved and/or under construction but is not yet operational at the time that a project requiring a landslide moratorium exception permit is approved, the requirement for a holding tank may be waived, provided that the lot or parcel is required to be connected to the sanitary sewer*

system pursuant to Section 15.20.110 of this chapter, or by an agreement or condition of project approval.

C. *Roof runoff from all buildings and structures on the site shall be contained and directed to the streets or an approved drainage course.*

D. *If required by the city geotechnical staff, the applicant shall submit a soils report, and/or a geotechnical report, for the review and approval of the city geotechnical staff.*

E. *If the lot or parcel is not served by a sanitary sewer system, the applicant shall submit for recordation a covenant agreeing to support and participate in existing or future sewer and/or storm drain assessment districts and any other geological and geotechnical hazard abatement measures required by the city. Such covenant shall be submitted to the director prior to the issuance of a building permit.*

F. *If the lot or parcel is not served by a sanitary sewer system, the applicant shall submit for recordation a covenant agreeing to an irrevocable offer to dedicate to the city a sewer and storm drain easement on the subject property, as well as any other easement required by the city to mitigate landslide conditions. Such covenant shall be submitted to the director prior to the issuance of a building permit.*

G. *A hold harmless agreement satisfactory to the city attorney promising to defend, indemnify and hold the city harmless from any claims or damages resulting from the requested project. Such agreement shall be submitted to the director prior to the issuance of a building permit.*

H. *The applicant shall submit for recordation a covenant agreeing to construct the project strictly in accordance with the approved plans; and agreeing to prohibit further projects on the subject site without first filing an application with the director pursuant to the terms of this chapter. Such covenant shall be submitted to the director for recordation prior to the issuance of a building permit.*

I. *All landscaping irrigation systems shall be part of a water management system approved by the director of public works. Irrigation for landscaping shall be permitted only as necessary to maintain the yard and garden.*

J. *If the lot or parcel is served by a sanitary sewer system, the sewer lateral that serves the applicant's property shall be inspected to verify that there are no cracks, breaks or leaks and, if such deficiencies are present, the sewer lateral shall be repaired or reconstructed to eliminate them, prior to the issuance of a building permit for the project that is being approved pursuant to the issuance of the moratorium exception permit.*

K. *All other necessary permits and approvals required pursuant to this code or any other applicable statute, law or ordinance shall be obtained.*

The Palos Verdes General Plan (1975) includes the following policies related to drainage and water quality:

7. *Prohibit activities that create excessive silt, pollutant runoff, increase canyon wall erosion, or potential for landslide, within Resource Management Districts containing Hydrologic Factors (RM 6).*

11. *Stringently regulate irrigation, natural drainage, and other water-related considerations, in both new development and existing uses affecting existing or potential slide areas.*

15. *Require a master landscape plan for any proposed development showing the retention/enhancement of natural vegetation proposed, new complementing vegetation, and all efforts involving retention/enhancement/protection of hydrologic factors, vegetation and wildlife factors.*

The Palos Verdes General Plan (1975) includes the following policy for infrastructure:

5. *Require that all flood control/natural water source interfaces and systems be treated so that erosion will be held to a minimum.*

4.8.2 Impact Analysis

a. Methodology and Significance Thresholds. As discussed in the Initial Study prepared for the proposed project (Appendix A), the project area sits inland of steep coastal bluffs above the Pacific Ocean at an average elevation of approximately 350 feet above sea level. In addition, according to the Department of Conservation Tsunami Inundation Map for the Redondo Beach (South) Quadrangle, the project area is located outside a tsunami inundation area (DOC, March 2009). Therefore, as discussed in the Initial Study, impacts related to flooding as a result of the failure of a levee or dam and inundation by seiche, tsunami, or mudflow would be less than significant.

Impacts would be considered potentially significant if the proposed project would:

- *Violate any water quality standards or waste discharge requirements*
- *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering or the local groundwater table level*
- *Substantially alter the existing drainage pattern of the area such that substantial erosion or siltation occurs*
- *Substantially alter the existing drainage pattern or substantially increase the rate or amount of surface runoff in a manner which results in flooding*
- *Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff*
- *Otherwise substantially degrade water quality*
- *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map*
- *Place within a 100-year flood hazard area structures which would impede or redirect flood flows*
- *Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam*
- *Expose people or structures to a significant risk of loss, injury, or death as a result of inundation by seiche, tsunami, or mudflow*

The Initial Study determined that the proposed project could result in potentially significant

impacts related to all of these impact categories except for the last two related to levee or dam failure or inundation by seiche, tsunami, or mudflow. These two topics are therefore not discussed further in this section.

Two hydrologic methods were used for the drainage analysis contained within the Hydrologic Study prepared by Hunsaker and Associates, 2011. The methods include the Rational Method and the Modified Rational Method, which are included in the 2006 Los Angeles County Hydrology Manual. A 24-hour storm analysis based upon the Los Angeles County Rational and Modified Rational Method of Hydrology was used for clear, burned, and burned and bulked conditions for the watershed. The amount of impervious surfaces in the project area was determined from the Land Use and Imperviousness Table provided in the Los Angeles County Hydrology Manual, 2006.

b. Project Impacts and Mitigation Measures.

Impact HWQ-1 During construction of the proposed project, the soil surface would be subject to erosion and the downstream watershed, including the Pacific Ocean, could be subject to temporary sedimentation and discharges of various pollutants. However, with implementation of Mitigation Measure HWQ-1, impacts relating to the potential for discharge of various pollutants, including sediment, would be Class II, *significant but mitigable*.

Adoption of the proposed ordinance revisions would result in the possible future development of up to 47 new residences on existing legal lots in Zone 2. Each of the 47 lots would be graded to accommodate single-family residential structures. As discussed in Section 2.0, *Project Description*, grading on each of the lots would be limited to less than 1,000 cubic yards (cut and fill combined), with no more than 50 cubic yards of imported fill per lot.

Excavation and grading could result in erosion of soils and sedimentation, which could cause temporary impacts to surface water quality and therefore violate water quality standards or contribute additional sources of polluted runoff. Project development would likely require temporary onsite storage of excavated soils (stockpiling). During grading and soil storage, there is the potential for soil migration offsite via wind entrainment and/or water erosion. Therefore, impacts would be potentially significant.

Mitigation Measures. The following mitigation measure would be required to reduce impacts related to water quality during construction activities to a less than significant level.

HWQ-1 **Construction pollution, sediment and erosion control.** Prior to issuance of any Grading Permit or Building Permit, each applicant shall prepare a Construction Erosion Control and Water Quality Plan for the review and approval of the Building Official. The applicant shall be responsible for continuous and effective implementation of the plan during construction of each residence. The plan shall include Best Management Practices that may include, but not be limited to, the following:

- *Erosion Control. Eroded sediments from areas disturbed by construction and from stockpiles of soil shall be retained on site to minimize sediment transport from the site to streets, drainage facilities or adjacent properties via runoff, vehicle tracking or wind. Utilize erosion control techniques, such as soil stabilizers, covering soil during construction, wind blocking devices, cease grading during high winds, use of soil binders (watering graded soils should be avoided), filtration devices, and stabilizing ingress/egress points. Reduce fugitive dust to the maximum extent practicable.*
- *Erosion from slopes and channels shall be controlled by implementing an effective combination of BMPs (as approved in Regional Board Resolution No. 99-03), such as the limiting of grading schedule during the wet season; inspecting graded areas during rain events; planting and maintenance of vegetation on slopes; and covering erosion susceptible slopes.*
- *Pollutant Detainment Methods. Protect downstream drainages from escaping pollutants by capturing materials carried in runoff and preventing transport from the site. Examples of detainment methods that retard movement of water and separate sediment and other contaminants are silt fences, hay bales, sand bags, berms, silt and debris basins.*
- *Construction Materials Control. Construction related materials, wastes, spills or residues shall be retained on site to minimize transport from the site to streets, drainage facilities or adjoining properties by wind or runoff. Runoff from equipment and vehicle washing shall be contained at construction sites unless treated to remove sediment and pollutants. Non-Stormwater runoff from equipment and vehicle washing and any other activity shall be contained at the project site.*
- *Recycling/Disposal. Maintain a clean site. This includes proper recycling of construction-related materials and equipment fluids.*
- *Cleanup and dispose of small construction wastes (i.e., dry concrete) appropriately.*

Significance After Mitigation. Impacts related to the quality of runoff during construction, water quality standards, and degradation of water quality during construction would be less than significant with implementation of Mitigation Measure HWQ-1.

Impact HWQ-2 Development that would be facilitated by the proposed ordinance revisions would incrementally increase the amount of impermeable surfaces in the project area, and potential new development would also generate various urban pollutants such as oil, herbicides and pesticides, which could adversely affect surface water quality. With implementation of Mitigation Measure HWQ-2, impacts related to surface water quality would be Class II, *significant but mitigable*.

The proposed project would allow for development of up to 47 new single-family homes in the Portuguese Bend area. This new development would increase the number of vehicles and the amount of pesticides used in the project area compared to existing conditions. Impermeable surfaces such as driveways would accumulate deposits of oil, grease, and other vehicle fluids and hydrocarbons. In addition, maintenance of new landscaping could introduce chemical inputs such as pesticides and herbicides. During storms, these deposits would be washed into and through the drainage systems and to the Pacific Ocean. The addition of fertilizers, pesticides and other chemicals to new landscaping has the potential to include higher than natural concentrations of trace metals, biodegradable wastes (which affect dissolved oxygen levels), and excessive major nutrients such as nitrogen and phosphorus.

Urban runoff can have a variety of deleterious effects. Oil and grease contain a number of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Heavy metals such as lead, cadmium, and copper are the most common metals found in urban storm water runoff. These metals can be toxic to aquatic organisms, and have the potential to contaminate drinking water supplies. Nutrients from fertilizers, including nitrogen and phosphorous, can result in excessive or accelerated growth of vegetation or algae, resulting in oxygen depletion and additional impaired uses of water. Therefore, the increased impervious surface area, vehicular activity and use of pesticides for landscaping onsite, could increase the amount of pollutants in onsite runoff, which could adversely affect the water quality of receiving waters including the Pacific Ocean.

As discussed above, the project would involve revisions to a landslide moratorium ordinance, which would allow for potential development of 47 individual single-family residences in the project area. The 47 residences and associated hardscaping could potentially increase the impervious surface area on each of the individual lots by up to approximately 38%. The development that could potentially result from the project as well as the increase in impervious surfacing in the project area would incrementally increase the amount of pollutants that could be contained in runoff from the area. Therefore, impacts would be potentially significant.

Mitigation Measures. As discussed above under *Setting*, in accordance with Rancho Palos Verdes Municipal Code Chapter 13.10.050, owners and occupants of property within the city are required to minimize the runoff of water used for irrigation purposes to the maximum extent practicable. Runoff of water from washing down paved areas is required to be minimized to the maximum extent practicable. Sweeping and collection of debris is encouraged for trash disposal. In addition, with implementation of Mitigation Measure HWQ-2 listed below which would require adherence to the Municipal Code requirements related to the NPDES permit, runoff from the individual residences that could be developed as a result of the project would not have a substantial effect on water quality.

HWQ-2 **NPDES Review.** Any development proposal located within, adjacent to or draining into a designated Environmentally Sensitive Area (ESA) and involving the creation of two thousand five hundred square feet or more (≥ 2,500 SF) of impervious surface shall require the review and approval by the City's National Pollutant Discharge Elimination System (NPDES) consultant prior to building permit issuance.

Significance After Mitigation. Impacts related to the quality of runoff, water quality standards, and degradation of water quality after construction would be less than significant with implementation of Mitigation Measure HWQ-2.

Impact HWQ-3 Potential buildout under the proposed ordinance revisions would incrementally increase the amount of impermeable surface within the project area, which would affect the location and amount of infiltration. Based on the hydrologic and geologic conditions in the project area, impacts related to groundwater recharge would be Class III, *less than significant*.

The proposed project would allow for the construction of single-family homes on up to 47 of the 111 existing lots in the Zone 2 area. The remaining sixty-four lots are developed primarily with single-family residences and associated accessory structures and landscaping. The addition of new single-family residences, hardscaping and parking areas would incrementally increase the overall amount of impermeable surface area onsite. Impermeable surface area could increase by up to approximately 38% on individual lots as they are built out. The resulting increase in runoff from individual lots is projected to range between 9.8% and 15.1% over existing conditions (Hunsaker and Associates, 2011). Therefore, groundwater recharge on individual lots would likely be incrementally reduced compared to existing conditions.

As discussed in Section 4.5 *Geology*, infiltration is a concern in the project area because an increase in infiltration could affect the stability of existing landslides in the project vicinity. Adding water to the landslide material adds weight, creates buoyancy, and further decreases clay strength on the existing slopes, which could lead to slope failure.

Due to the low permeability of the existing soils (clays) and steepness of the natural canyons, an increase in infiltration as a result of the project as a whole is likely to be low. For a given storm event, the total infiltration from the added flow due to the increase in impervious surface area would not exceed existing conditions (Hunsaker and Associates, 2011). Portions of the additional runoff that would be added to the existing drainage system for the project area would be directed to Altamira Canyon. However, the portions of Altamira Canyon that would contain the drainage from the project area are generally steep, and as such do not contribute substantially to groundwater recharge as water moves quickly over the land surface, minimizing infiltration. Therefore, the incremental increase in surface water from the project area would not substantially increase infiltration in Altamira Canyon or related effects on landslide potential.

A decrease in infiltration could affect groundwater recharge in the area. However, as discussed above, infiltration is not desirable in the project area. Therefore impacts related to a reduction in groundwater recharge would be less than significant.

Mitigation Measures. Impacts would be less than significant, therefore mitigation is not required.

Significance After Mitigation. Impacts would be less than significant without mitigation.

Impact HWQ-4 Potential buildout under the proposed ordinance revisions would incrementally increase the amount of onsite impermeable surface area, which may increase storm water flows and create localized flooding. However, with implementation of Mitigation Measure GEO-3 and Mitigation Measure HWQ-4, buildout under the ordinance revisions would result in a flow rate generally similar to existing conditions. Therefore, impacts related to storm water runoff would be Class II, *significant but mitigable*.

As described above, the proposed ordinance revisions would allow for the construction of single-family homes on 47 of the lots in the project area. The addition of single-family structures, hardscaping, and driveways/parking areas would incrementally increase the overall amount of impermeable surface area in the project area. An increase in impervious surfaces would increase the peak flow rate compared to existing conditions. This has the potential to create flooding and drainage problems if the existing drainage system is inadequate to handle additional flow.

The existing drainage system in the project area was designed for all 111 lots in the 112-acre Zone 2 area. Therefore, a combination of the natural and constructed drainage conveyances have the capacity to convey the runoff from the project area (Hunsaker and Associates, LA Inc., 2011). The increase in peak runoff rates as a result of cumulative development of the 47 lots for the design storm events (10, 25, 50-year, and Capital Storm) ranges from 0.5% to 1% for the entire watershed and 2.9% to 4.5% for the project area (Zone 2), as shown in Table 4.8-1 and Table 4.8-2 respectively.

Table 4.8-1
Cumulative Watershed Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	37.4	40.1	2.70	6.7%
	q (cfs/ac)	0.044	0.047	0.003	6.7%
	Vol (ac-ft)	12.0	12.9	0.90	7.0%
	vol (ac-ft/ac)	0.014	0.015	0.001	7.0%
2-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	276.7	282.5	5.78	2.0%
	q (cfs/ac)	0.324	0.331	0.007	2.0%
	Vol (ac-ft)	53.4	55.4	2.00	3.6%
	vol (ac-ft/ac)	0.062	0.065	0.002	3.6%
2-year	Area (ac)	854.7	854.7	0.00	0.0%

Table 4.8-1
Cumulative Watershed Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
(Burn)	Q (cfs)	312.0	317.3	5.3	1.7%
	q (cfs/ac)	0.365	0.371	0.006	1.7%
	Vol (ac-ft)	65.2	68.2	3.0	4.4%
	vol (ac-ft/ac)	0.076	0.080	0.004	4.4%
5-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	579.62	587.37	7.75	1.3%
	q (cfs/ac)	0.678	0.687	0.009	1.3%
	Vol (ac-ft)	91.44	96.56	5.12	5.3%
	vol (ac-ft/ac)	0.107	0.113	0.006	5.3%
10-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	876.86	885.38	8.52	1.0%
	q (cfs/ac)	1.026	1.036	0.010	1.0%
	Vol (ac-ft)	121.6	126.68	5.08	4.0%
	vol (ac-ft/ac)	0.142	0.148	0.006	4.0%
25-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	1230.7	1237.3	6.63	0.5%
	q (cfs/ac)	1.440	1.448	0.008	0.5%
	Vol (ac-ft)	164.78	170.7	5.92	3.5%
	vol (ac-ft/ac)	0.193	0.200	0.007	3.5%
50-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	1505.4	1515.53	10.13	0.7%
	q (cfs/ac)	1.761	1.773	0.012	0.7%
	Vol (ac-ft)	197.98	204.58	6.60	3.2%
	vol (ac-ft/ac)	0.232	0.239	0.008	3.2%
Capital	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	2116.30	2128.40	12.10	0.6%
	q (cfs/ac)	2.476	2.490	0.014	0.6%
	Flow Vol (ac-ft)	228.3	234.91	6.61	2.8%
	Debris Vol (ac-ft)	20.3	20.3	0.00	0.0%
	total Vol (ac-ft)	230.8	237.4	6.62	2.8%
	vol (ac-ft/ac)	0.270	0.278	0.008	2.8%

Source: Hunsaker and Associates, LA Inc., 2011
Note: Volume (Vol) Acre (ac)
Acre-feet (ac-ft) Cubic feet per second (cfs)

Table 4.8-2
Project Area (Zone 2) Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	9.7	12.0	2.30	19.2%
	q (cfs/ac)	0.067	0.082	0.016	19.2%
	Vol (ac-ft)	3.1	3.8	0.70	18.4%
	vol (ac-ft/ac)	0.021	0.026	0.005	18.4%
2-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	62.4	70.8	8.40	11.9%
	q (cfs/ac)	0.428	0.486	0.058	11.9%
	Vol (ac-ft)	9.7	12.7	3.00	23.6%
	vol (ac-ft/ac)	0.067	0.087	0.02	23.6%
5-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	129.3	138.9	9.60	6.9%
	q (cfs/ac)	0.887	0.953	0.066	6.9%
	Vol (ac-ft)	16.3	21.4	5.10	23.8%
	vol (ac-ft/ac)	0.112	0.147	0.03	23.8%
10-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	187.9	196.7	8.80	4.5%
	q (cfs/ac)	1.289	1.349	0.060	4.5%
	Vol (ac-ft)	21.2	26.2	5.00	19.1%
	vol (ac-ft/ac)	0.145	0.180	0.03	19.1%
25-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	263.2	271.1	7.87	2.9%
	q (cfs/ac)	1.805	1.859	0.054	2.9%
	Vol (ac-ft)	27.8	33.9	6.10	18.0%
	vol (ac-ft/ac)	0.191	0.233	0.04	18.0%
50-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	314.3	324.45	10.15	3.1%
	q (cfs/ac)	2.156	2.225	0.070	3.1%
	Vol (ac-ft)	35.9	39.8	3.90	9.8%
	vol (ac-ft/ac)	0.246	0.273	0.03	9.8%

Source: Hunsaker and Associates, LA Inc., 2011
Note: Volume (Vol) Acre (ac)
Acre-feet (ac-ft) Cubic feet per second (cfs)

Localized flood effects may occur on an individual lot basis (Hunsaker and Associates, LA Inc., 2011). The hydrologic analysis conducted by Hunsaker and Associates determined that

increases in runoff from an individual lot would range from approximately 9.8% to 15.1%, as shown in Table 4.8-3.

Table 4.8-3
Median Lot Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.02	0.06	0.04	64.8%
	q (cfs/ac)	0.03	0.08	0.053	64.8%
	Vol (ac-ft)	0.01	0.02	0.01	62.3%
	vol (ac-ft/ac)	0.01	0.03	0.016	62.3%
2-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.22	0.36	0.14	40.1%
	q (cfs/ac)	0.29	0.49	0.195	40.1%
	Vol (ac-ft)	0.01	0.06	0.05	79.9%
	vol (ac-ft/ac)	0.02	0.09	0.07	79.9%
5-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.54	0.70	0.16	23.4%
	q (cfs/ac)	0.73	0.95	0.223	23.4%
	Vol (ac-ft)	0.02	0.11	0.09	80.6%
	vol (ac-ft/ac)	0.03	0.15	0.12	80.6%
10-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.85	1.00	0.15	15.1%
	q (cfs/ac)	1.14	1.35	0.204	15.1%
	Vol (ac-ft)	0.05	0.13	0.09	64.6%
	vol (ac-ft/ac)	0.06	0.18	0.12	64.6%
25-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	1.24	1.38	0.14	9.8%
	q (cfs/ac)	1.68	1.86	0.183	9.8%
	Vol (ac-ft)	0.07	0.17	0.10	60.9%
	vol (ac-ft/ac)	0.09	0.23	0.14	60.9%
50-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	1.47	1.65	0.17	10.6%
	q (cfs/ac)	1.99	2.23	0.235	10.6%
	Vol (ac-ft)	0.14	0.20	0.07	33.1%
	vol (ac-ft/ac)	0.18	0.27	0.09	33.1%

Source: Hunsaker and Associates, LA Inc., 2011
Note: Volume (Vol) Acre (ac)
Acre-feet (ac-ft) Cubic feet per second (cfs)

The hydrologic analysis conducted as part of the Drainage Report (Appendix E) determined that the post-development runoff rates would result in an increase in runoff from the existing lots into the natural watercourses. Capital storm is determined by applying burned and bulked factors in 50-year storm. Vacant lots within Zone 2 area are adjacent to existing developed lots, therefore those vacant lots do not experience the full burn effect as natural area and no capital storm is determined. For the proposed project, the SUSMP 0.75 inch 24-hour storm event criteria were used to determine if runoff volume or flow should be treated (Hunsaker and Associates, 2011).

The Modified Rational Method was used to determine the peak flow rate and the peak volume for the project compared to existing conditions, utilizing the Los Angeles County Time of Concentration calculator (based upon the Rational Method) . Water quality treatment flow rates and volumes were calculated with the Los Angeles County Time of Concentration calculator developed for the SUSMP analysis (using a rainfall of 0.75 inches). It was assumed that the amount of impervious surfacing on the 47 lots that could potentially be developed would increase by 38% compared to existing conditions on the vacant lots (Hunsaker and Associates, 2011). The increase in peak flow rate and volume would potentially increase storm water flows and create flooding.

As discussed in the *Setting*, Section 15.20.050 of the City of Rancho Palos Verdes Municipal Code establishes requirements for projects that are exceptions to the City's landslide moratorium regulations. The following measures apply to drainage effects within the project area:

- *If lot drainage deficiencies are identified by the director of public works, all such deficiencies shall be corrected by the applicant.*
- *Roof runoff from all buildings and structures on the site shall be contained and directed to the streets or an approved drainage course.*
- *If required by the city geotechnical staff, the applicant shall submit a soils report, and/or a geotechnical report, for the review and approval of the city geotechnical staff.*
- *All landscaping irrigation systems shall be part of a water management system approved by the director of public works. Irrigation for landscaping shall be permitted only as necessary to maintain the yard and garden.*

Nonetheless, impacts would be potentially significant.

Mitigation Measures. As discussed in Section 4.5, *Geology*, Mitigation Measure GEO-3 would be required. Mitigation Measure GEO-3 would require that storm drainage improvements to reduce lot infiltration of run-off are designed and approved by the City prior to issuance of building permits; all lot drainage deficiencies, if any, identified by City staff are corrected; and that runoff from all buildings and paved areas is collected and directed to the street or to an approved drainage course as approved by the City Engineer. In addition, Mitigation Measure HWQ-4 would be required to reduce impacts to a less than significant level.

HWQ-4 **Flooding.** Prior to issuance of any grading permit or building permit, the applicant for any individual construction project shall comply with the

following, pursuant to the review and approval by the City Building Official:

- *Illustrate that point (concentrated) flow on each of the properties is either normalized, attenuated adequately, or will reach an acceptable conveyance such as a storm drain, channel, or natural drainage course. All runoff shall be directed to an acceptable conveyance and shall not be allowed to drain to localized sumps or catchment areas with no outlet.*
- *Maintain existing drainage patterns and outlet at historical outlet points*
- *Minimize changes to the character of the runoff at property lines. Changes in character include concentration of flow outletting onto adjacent properties or increasing the frequency or duration of runoff outletting onto adjacent properties*
- *Reduce increases in runoff by utilizing appropriate and applicable low impact development principles*
- *Provide onsite detention facilities or conveyance to acceptable off-lot conveyance devices*
- *Minimize "Dry Weather" runoff which could add to the total infiltration from the project*

Significance After Mitigation. Impacts related to alteration of drainage patterns, the potential for the proposed project to result in flooding, and the capacity of storm water drainage systems would be less than significant with implementation of Mitigation Measure HWQ-4.

Impact HWQ-5 Adoption of the proposed ordinance revisions would allow for the construction of up to 47 single-family homes within the project area. Several of the single-family homes could be constructed in an area in which there is a potential for flood hazards to exist. However, with implementation of Mitigation Measure HWQ-5, flooding impacts would be Class II, *significant but mitigable*.

The FIRM issued by FEMA for Zone 2 and the surrounding area (Map ID 06037C2026F) indicates that the site and surrounding area are contained within Zone X and Zone D. Zone X designates an area with a minimal risk of flooding (not within the 100-year flood zone) and Zone D designates an area in which flood hazards are undetermined, but possible. Ten of the 47 lots that could be developed as a result of the project are partially or completely located within the Zone D designation, as shown in Figure 4.8-1. Therefore, flooding could occur, which could cause damage to structures and could be hazardous to humans during a storm event. Impacts are potentially significant.

Mitigation Measures. Mitigation Measure HWQ-5 would be required to reduce impacts to a less than significant level.

HWQ-5 Standards of Construction in a Flood Zone D Area. Prior to issuance of any grading permit or building permit, the applicant for any construction project located in an area designated as Zone D by FEMA shall comply with the following, pursuant to Section 15.42.120 of the City of Rancho

Palos Verdes Municipal Code. Plans shall be reviewed and approved accordingly by the City Building Official:

- *All new construction shall be designed to be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy*
- *All new construction shall be constructed with materials and utility equipment resistant to flood damage*
- *All new construction shall be constructed using methods and practices that minimize flood damage*
- *All new construction shall be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding*

Significance After Mitigation. Impacts would be less than significant with implementation of Mitigation Measure HWQ-5.

c. Cumulative Impacts. Cumulative development in the City and surrounding areas would include approximately 90,000 square feet of commercial/retail, 50,000 square feet of office, 2,000 residential units, and 190,000 square feet of institutional uses, as shown in Table 3-1 in Section 3.0, *Environmental Setting*. Planned and pending development in the general vicinity could increase impermeable surface area, thereby potentially increasing peak flood flows and overall runoff volumes. However, with implementation of mitigation measures similar to the proposed project, the post development peak discharges will not substantially increase peak flood flows or increase flooding. Consequently, the project would not contribute materially to any potential cumulative increases in peak runoff or associated flooding impacts.

With respect to surface water quality, construction activity associated with cumulative development would temporarily increase sedimentation due to grading and construction activities. In addition, new development would increase the generation of urban pollutants that may adversely affect water quality in the long term. However, like the proposed project, all future development would be subject to implementation of appropriate Best Management Practices in accordance with City, State and Federal requirements. Furthermore, all qualifying projects are subject to the requirements of the NPDES Permit as required by Mitigation Measure HWQ-2, which is specifically designed to develop, achieve, and implement a timely, comprehensive, and cost-effective storm water pollution control program. Thus, implementation of applicable requirements on development in the area would reduce cumulative impacts to a less than significant level. As discussed above, with implementation of mitigation measures, the project's contribution to increased pollutant loads in area surface water would be reduced to a less than significant level and thus would not be cumulatively considerable.