Public Comments
Agenda Item # 9

November 23, 2020
City Council Meeting

From: O'Connor, Bonny
Sent: Wednesday, November 18, 2020 5:43 PM
To: Public Comment
Subject: FW: Concern about City of Pacifica planning document on landslide hazards
Attachments: DavisSims2013JSS.pdf; DavisBlesius_entropy-17-04271-v2.pdf

From: Jerry D Davis [redacted]
Sent: Wednesday, November 18, 2020 5:39 PM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>; Wehrmeister, Tina <wehrmeistert@ci.pacifica.ca.us>
Cc: Christine Boles <[redacted]
Subject: Concern about City of Pacifica planning document on landslide hazards

[CAUTION: External Email]

Dear Bonny and Tina,

I have concerns about Figure 8-2: Slope Failure and Coastal Erosion in the Safety section of the Draft General Plan at https://www.cityofpacifica.org/civicax/filebank/blobdload.aspx?blobid=6557 . The areas shown as being characterized by "Few Landslides" in Slope Failure Threat include sites where there have been significant landslides, as we've documented in the two attached papers, which also references a 1997 USGS Study we used as an initial set of features we reassessed in the early 2000's as well as on decadal historical landslides dating back to the 1940's.

Howard TR, Baldwin JE, Donley HF (1988) Landslides in Pacifica California caused by the storm, Landslides Floods and Marine Effects of the Storm of January in the San Francisco Bay Region California. US Geological Survey Professional Paper 1434. US Geological Survey, Washington.

Figure 8-2 cites: Pacific Institute, 2009; FEMA Revised DFIRM, 2011; US Geological Survey, 1997; ESA, 2009; City of Pacifica, 2008; San Mateo County, 2009; Dyett & Bhatia, 2013, but there is no reference list to help locate these sources. My assumption is that these sources were misinterpreted or the original sources were inaccurate.

This also relates to the Vista Mar Project, so please include in the public record related to that project.

Regards,

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Physical and maximum entropy models applied to inventories of hillslope sediment sources

Jerry D. Davis · Stephanie M. Sims

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Abstract
Purpose The purpose of our study was to identify major hillslope sediment sources in a partially urbanized coastal watershed supporting salmonid habitat and to evaluate the use of physical and maximum entropy models in predicting sites of greatest concern. Questions include when and where increased runoff from trail and unpaved road surfaces has influenced patterns of landslides and gullies to a greater degree than what would be expected from background processes and controls, such as precipitation intensity, vegetation, soils, and slope characteristics.
Materials and methods San Pedro Creek Watershed, USA, provides habitat for *Oncorhynchus mykiss* despite 33% of the watershed being urbanized. The watershed drains steep hillslopes with a median slope of 21°, with the steepest slopes on the 578-m North Peak of Montara Mountain. We inventoried hillslope sediment sources based on field surveys and aerial photographic interpretation in 1941, 1955, 1975, 1983, and 1997. We interpreted causative factors using precipitation records, geologic and soil mapping, digital elevation derivatives, land cover, and road/trail network changes and applied a physical landslide susceptibility model (Stability Index Approach to Terrain Stability Hazard Mapping (SINMAP)) for hillslope stability and a maximum entropy model for assessing gully and landslide centroids.
Results and discussion Maps of landslide and gullies reveal an association with land use changes over time. Agricultural land uses led to the development of extensive gullies in parts of the watershed, and some of these continue to contribute significant sediment to the stream system; others were built-over in residential developments. The most significant remaining gullies result from impervious runoff from roads built into steep hillslopes. Although the best single predictor of landslide susceptibility is physically modelled hillslope stability (SINMAP), slope equally contributed to multivariate MAXENT models (area under the receiver operator characteristic curve (AUC)=0.74 in 1941, 0.65 in 1975, and 0.79 in 1983). Other covariates in the maximum entropy models include plan curvature, trail distance in 1975, geology in 1983 (favoring colluvium), and vegetation.
Conclusions Combining physical hillslope stability with a maximum entropy model appears promising, although overall slope angle also contributed equally. Landslides are episodic and linked to major precipitation/runoff events, such as ENSO events in 1962, 1972, and 1982, but road and trail development from 1955 to 1975 also contributed equally. As by count most gullies relate to earlier agricultural practices, they represent ongoing sediment sources.

Keywords Debris flows · Geomorphology · Gullies · Infinite slope model · Landslides · Maximum entropy model · Sediment source · Stability

1 Introduction

Excess sedimentation of water bodies is problematic and prevalent worldwide. Fine sediment is increasingly seen as one of the leading water quality concerns for fisheries, nutrient loading, and eutrophication (FISRWG 1998). Although natural geomorphic processes generate fine sediment, land uses including urbanization, agriculture, and grazing significantly enhance the amount produced. Increasing attention is being paid to sediment source identification and analysis (Collins and Walling 2004).

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Sediment sources can be complex and difficult to recognize. Studies utilize a multitude of field, laboratory, and computer modeling techniques. Methods include: the use of aerial photography supported by field observations and data collection (WFPB 1997a; Collins et al. 2001); direct surficial erosion measurement employing morphometry and erosion pins (Hooke 1979; Prosser et al. 2000; Couper and Maddock 2001); GIS modeling (Parsons and Abrahams 1993; DeRose et al. 1998; Finco and Hepner 1998; Millward and Mersey 1999; Dai and Lee 2001); and many combined approaches (Aniya 1985). Other technologies have enabled the dating of sediments based on floodplain cores by analyzing element content relative to source composition (Magilligan 1985; Pasternack et al. 2001; Owens and Walling 2002) and "fingerprinting" derived from sediment size and composition to identify sources (Clapp et al. 2002; Collins and Walling 2002; Mukundan et al. 2012).

This case study documents methods used in a sediment source analysis of a tectonically active, urbanized coastal watershed, employing a combined approach incorporating field assessment, historic orthophotographic inventory, physical modeling of landslide susceptibility, and maximum entropy modeling of gullies and landslides as the most prominent hillslope sediment sources affecting the watershed.

2 Material and methods

2.1 San Pedro Creek watershed and sediment yield factors

Situated roughly 24 km south of San Francisco, California, USA, within the coastal community of Pacifica in San Mateo County, San Pedro Creek drains a 21.3-km^2 watershed (Fig. 1) northwest to the Pacific Ocean. The Santa Cruz Mountains form the eastern divide, 5.8 km away from the ocean, with a maximum elevation of 578 m at the North Peak of Montara Mountain. Steep hillslopes are common with 10% of all slopes at >35°, and the median slope 21°, based on 10 m cells derived from the US National Elevation Dataset (NED) (Fig. 2).

The geology of San Pedro Creek watershed is composed mainly of marine clastic sedimentary rocks ranging in age from the partially metamorphosed Jurassic/Cretaceous Franciscan Assemblage north of Pilarcitos Fault, to Paleogene marine sedimentary rocks to the south, abutting the granitic mass of Montara Mountain at the southern end of the basin. The Franciscan also includes limestone, greenstone, and serpentinite units. The geologic structure is fractured by the right-lateral Pilarcitos Fault, part of the San Andreas system, as well as smaller faults associated with the uplift of Montara Mountain (Fig. 3) (Pampeyan 1994).

The hillslopes are dominated by mollisols, and vary by parent material, depth of weathering, colluvial cover, and slope angle (Kashiwagi and Hokholt 1991; Soil Survey Staff 1999). Soil mapping complexes in the watershed combine relatively thin haplustolls, developed on weathered bedrock, with thicker argiustolls on colluvium or more deeply weathered granitic rocks (Kashiwagi and Hokholt 1991). During field mapping of vegetation, we typically observed chaparral growing on thin, rocky residual haplustolls and coastal scrub on what appeared to be argiustolls.

Although the valley floor of the watershed is now dominated by residential and commercial development, the upper hillslopes are mostly blanketed with a combination of native, exotic, and mixed vegetation composed of native and exotic grasses, forests, scrubs, and riparian areas (Fig. 4). Coastal scrub and chaparral cover about 90% of the undeveloped areas (Davis et al. 2002). Common coastal scrub plants include *Baccharis pilularis* and small trees such as *Corylus cornuta*; chaparral is dominated by *Arctostaphylos* spp. or *Chrysolepis chrysophylla*. Communities appear to be controlled by underlying bedrock type, soil depth, slope, and aspect (Vasey 2001). Riparian trees, including in steeper swales, are dominated by *Alnu rubra*, *Salix* spp., and *Cornus sericea*. Exotic forests also cover a large portion of the watershed and consist mainly of *Eucalyptus globulus* and *Pinus radiata*. The remaining area consists of grasslands on some south-facing slopes (Vasey 2003).

Debris flows and slides are common in the watershed because of the steep terrain, areas of weakly consolidated bedrock, and intense seasonal rainfall (Brabb and Pampeyen 1972), with 90% of the 840-mm annual rainfall occurring between the months of November and April (US Army Corps of Engineers 1998). Mass movements are especially common in colluvial hollows similar to those described by Reneau et al. (1990). Colluvial fill of these hollows to a depth of up to 6 m has been documented (Rib and Liang 1978). Subsurface water flow is the predominant cause of slope failure while geology and topography are also significant controls (Collins et al. 2001). Slope failures in Pacifica originate on slopes between 26° and 45° near the heads of first-order drainages, and more than 35% of all slopes in the watershed are in this range. During a January 1982 El Niño

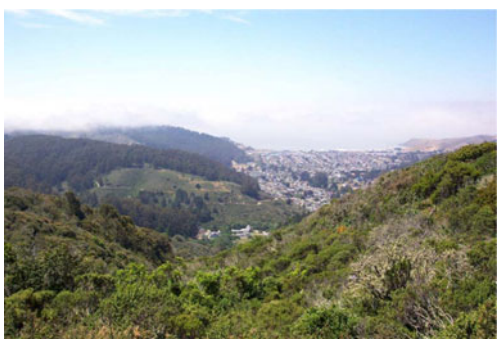

Fig. 1 Pacifica State Beach, California, USA, looking northwest from Montara Mountain Trail. The beach forms the northwestern extent of San Pedro Creek Watershed (SPCW) and is the outlet of San Pedro Creek

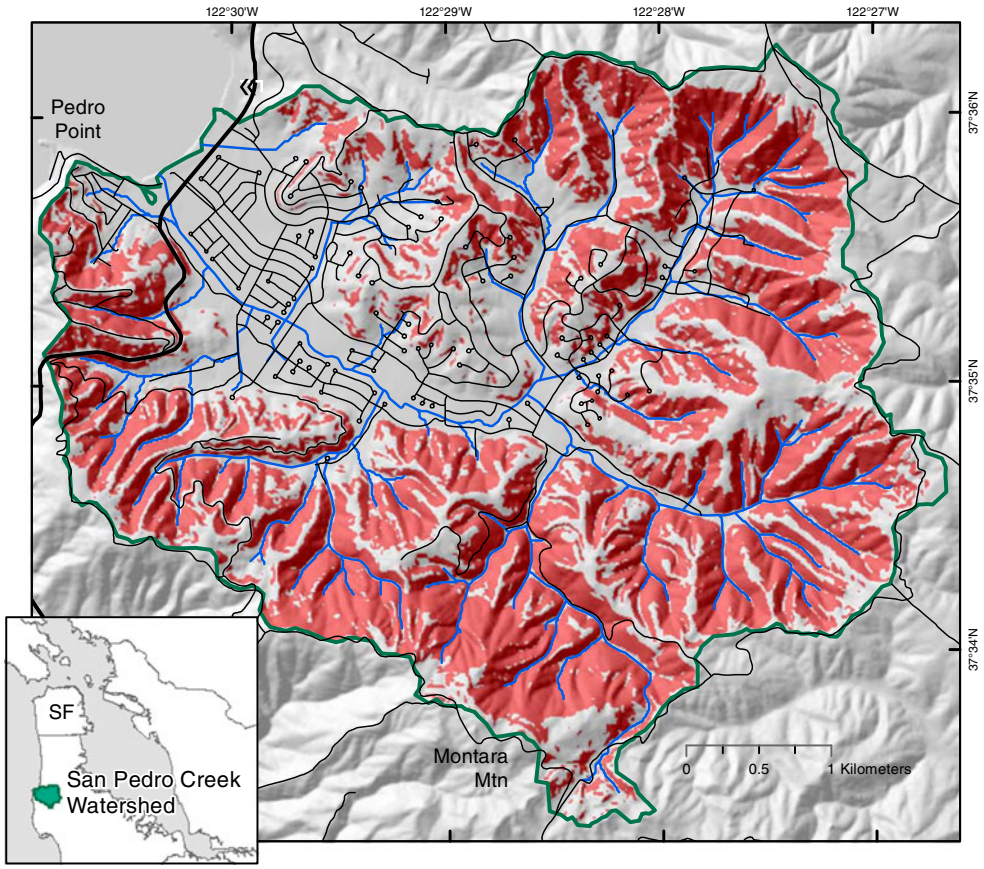

Fig. 2 Slopes greater than 26°, San Pedro Creek Watershed

event, the five largest landslides occurred between a narrow range of 26° and 30° (Howard et al. 1988). Between October 1981 and April 1982, 1,221 mm of precipitation was recorded at Half Moon Bay Weather Station (Howard et al. 1988). Rainfall data collected during a 27-h storm period between 3 and 5 January 1982 indicates that with antecedent moisture of 500 to 760 mm, 8 h of intense rainfall at 10 to 20 mm h^{-1} is sufficient to initiate abundant debris flows (Cannon and Ellen 1988).

Slopewash processes from sheetwash to gully erosion also characterize these steep hillslopes. Many sites are naturally prone to gullying due to a combination of steep slopes, erodible soils, and grassland vegetation supporting gophers (*Thomomys* spp.) and thus piping networks. Piping funnels water into gully heads and can significantly contribute to gully expansion. Landslide scars are also subject to ongoing surface erosion (WFPB 1997a), and rilled and gullied slopes are potentially major sources of sediment (Meyer 1986). Deep gullies have developed along some of the coastal hillslopes because of agriculture and subsequent grazing (Davis et al. 2002). A contributing factor noted in field observations is concentration and diversion of flows by hillslope trails and roads.

Urbanization, comprising about 33% of the total area, has been an important factor influencing the erosion potential of hillslopes in the watershed (Davis et al. 2002) and is the greatest land cover change factor over the last century. Pampeyan (1994) found that hillslope toe removal associated with increased development altered hillslope morphology and increased landslide potential within the watershed (Fig. 5). To reduce this hazard, hillside terraces (Fig. 6) are sometimes used to prevent excess moisture and debris accumulation.

Recreational use in the open-space areas of the upper watershed is seen in the establishment of maintained and unmaintained trails. Multiple user groups frequent the trails, including pedestrians, mountain bikers, equestrians, and off-road motorcycles, though the latter use has been greatly curtailed in recent decades. Trails increase the effective drainage density of the watershed, diverting and concentrating flow as a network of impervious surfaces.

Mitigation measures reduce the sediment produced by some sources. Some equestrian trails near horse stables are regularly maintained to prevent soil compaction and channel formation. Recent restoration in the Pedro Point area used by off-road motorcyclists during the 1960s through 1980s includes partial revegetation, with netting and downed organic material promoting growth on hillslopes prone to significant surface erosion, though this has met with little success on steep

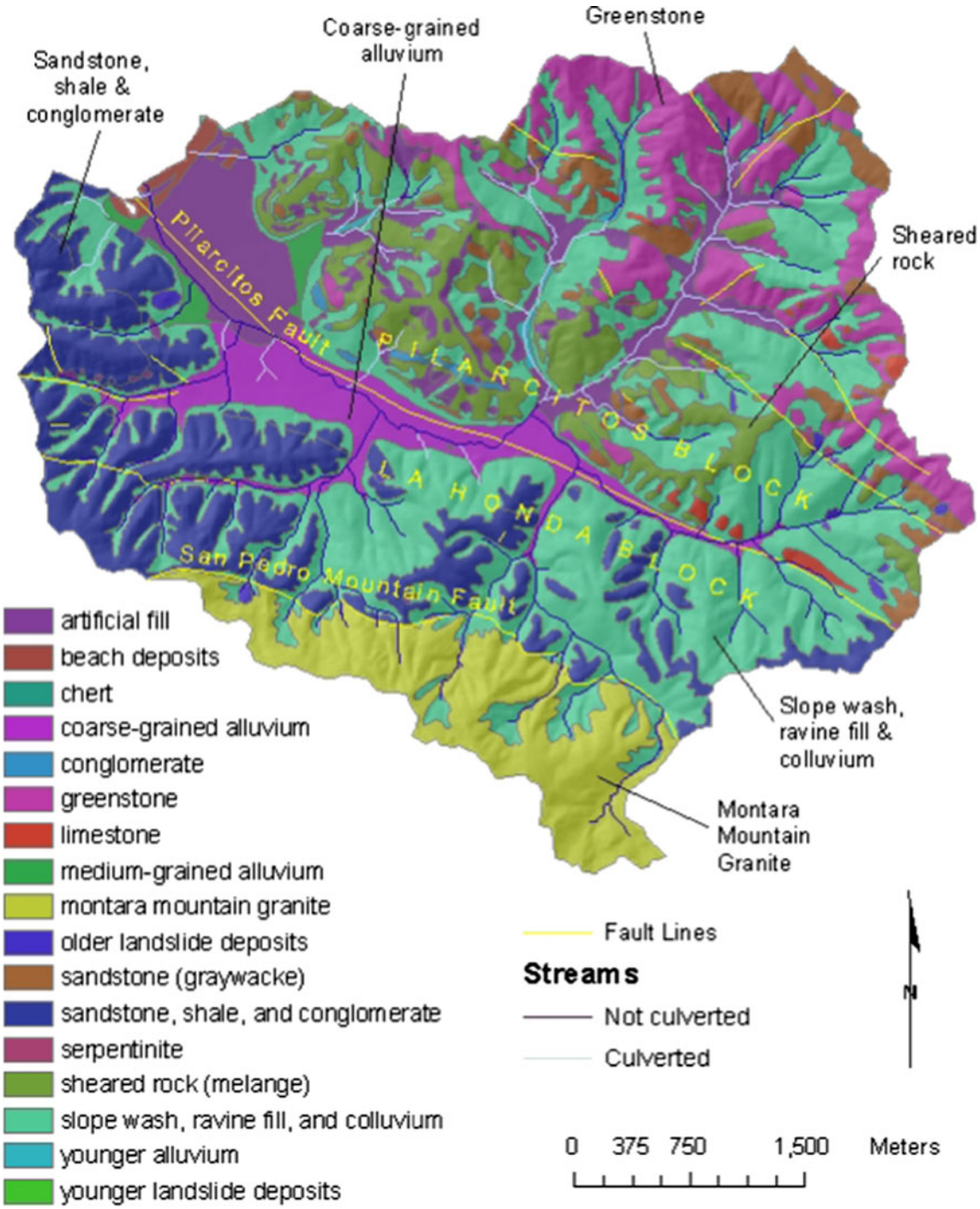

Fig. 3 Geology of San Pedro Creek Watershed (Pampeyan 1994)

slopes. Water bars are commonly placed along trails diverting flow in efforts to reduce incision.

Urbanization has also greatly altered the fluvial system of San Pedro Creek and its tributaries (Collins et al. 2001) and is the subject of companion studies of channel characteristics and sediment storage dynamics along the main-stem and tributaries (Collins et al. 2001; Amato 2003; Pearce et al. 2004; Smulyan 2012).

2.2 Sediment source inventory

The combined approach used in this research is intended, in part, to guide land management efforts by prioritizing areas for treatment. Without stream gauging, sediment yield can only be approximated, but there is an acute need to identify sediment sources that affect critical salmonid habitat. Land use/land cover changes over the last century have clearly

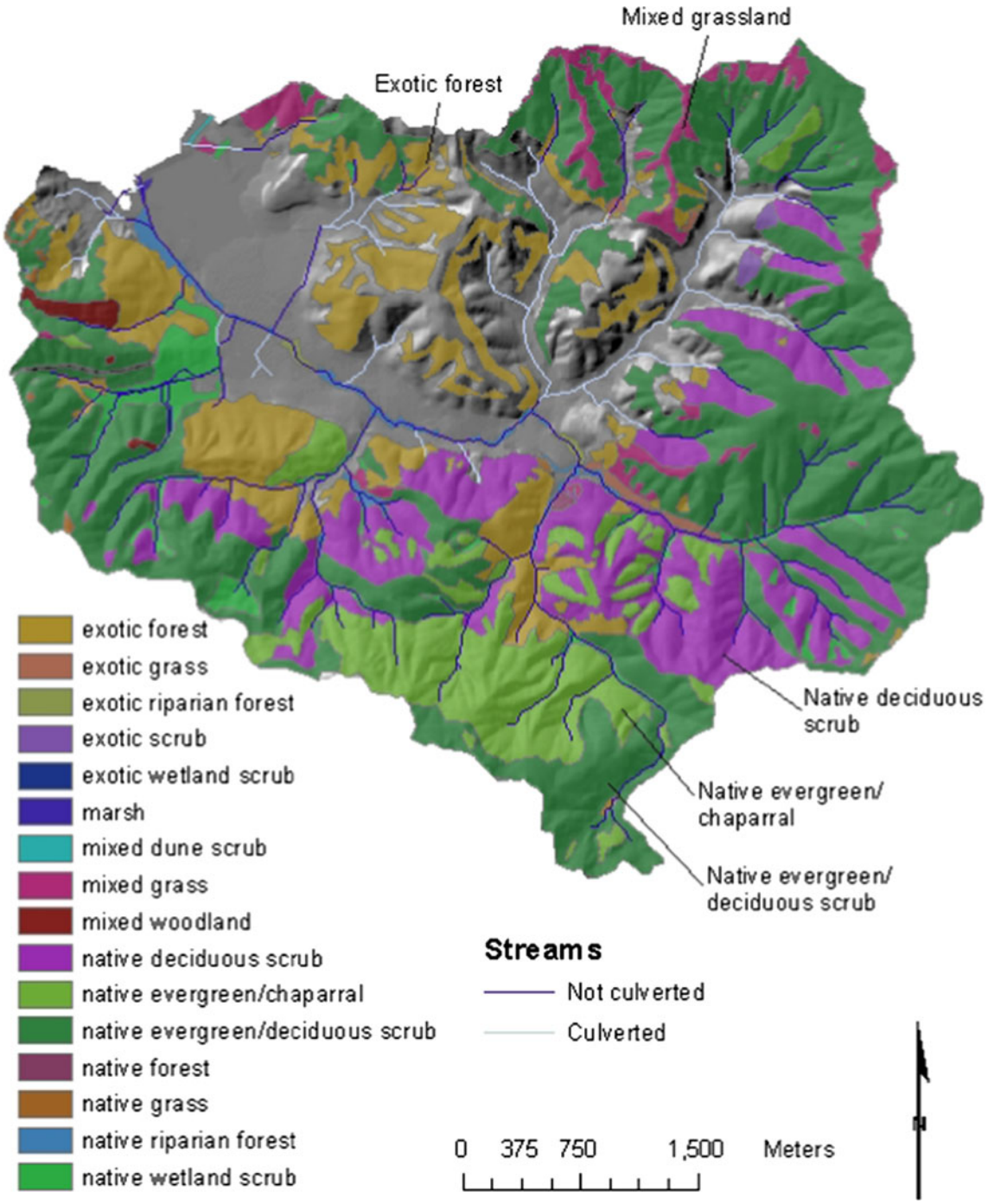

Fig. 4 Land cover of SPCW. Vegetation data for the gray areas either was not collected or is urban land cover (Davis et al. 2002)

increased fine sediment yield while altering coarse sediment pathways, leading to degraded salmonid habitat and a stream system unable to maintain itself under constraints of floodplain development. Distinguishing modern from historical sediment sources is helping to guide watershed and stream corridor restoration efforts (Smulyan 2012).

This research builds on the work of the US Geological Survey (USGS) scientists who have compiled data on landslides in San Mateo County using aerial photographic interpretation (Brabb et al. 1972; Nilsen 1986; Ellen et al. 1997). A more detailed map that included part of the studied watershed was generated as a result of the January 1982 El Niño event that created numerous shallow but fast-moving failures throughout the San Francisco Bay area, including 475 in the greater Pacifica area alone (Smith 1988), with a high concentration in the watershed (Ellen and Wieczorek et al.

Fig. 5 Urbanization in the north subwatershed from the valley floor encroaching on the toe slopes of hillsides. The northern profile of the Oddstad landslide is shown covered in trees to stabilize the hillside

1988; Howard et al. 1988), where five debris flows were studied in extensive detail. One of these, the Oddstad event, dislodged 2,290 m^3 of material, demolishing two homes and killing three people (Howard et al. 1988).

Our work builds on these analyses by: (a) identifying additional landslide scars apparent in field and aerial photograph interpretation; (b) looking at slopewash phenomena such as gullies, similar to methods employed by the Washington Forest Practice Board (WFPB 1997a, b); (c) documenting the connection of these sediment sources to changes in land use from the 1940s through the 1990s; and (d) analyzing landslide and gully susceptibility through physical and statistical GIS models.

Fig. 6 Terraced hillslopes altering the geomorphology of natural slopes

To evaluate the pattern of sediment sources over time, aerial photography from six different years were georeferenced using roads and buildings: 1941 at a scale of 1:24,000; 1955 at 1:10,000; and 1975, 1983, 1991, and 1997 at 1:12,000. Aerial photography from 1941 was acquired from Whittier College (1941); all other years were from Pacific Aerial Surveys (1955, 1975, 1983, 1991, 1997). Gullies, landslide scarps, and obvious landslide tracks were then digitized into ArcGIS where they were analyzed in conjunction with existing layers, such as slope, geology, and soils. Landslides were interpreted for scar area, track, date of occurrence, connectivity to stream channels, and possible triggers of mass wasting events, with ground truth support where still visible; similar measures were obtained for gullies.

To identify landslides and gullies triggered by anthropogenic sources, land cover, and trail/road networks were digitized from georeferenced aerial photography for each of these years. Vegetation or land cover map classifications were primarily based upon vegetation types on hillslopes: grassland, coastal scrub, chaparral, and forest. Two additional land-cover categories were added: cultivated and developed lands. For the 1941 data, Wieslander Vegetation Type Maps from the 1930s were used for land cover (Wieslander 1935; Geospatial Innovation Facility 2013); this newly available data source is a treasure from the New Deal era which not only provides information on species but also shows the greater extent of cultivated and grazing lands extant during the period.

2.3 Field surveys

In sediment source analysis studies, field surveys are still a common method used to identify localized areas contributing to water quality deterioration and associated watershed degradation. They are particularly useful for total maximum daily load studies to determine sediment yield and sometimes the entire sediment budget of a watershed (Stillwater 1999; PWA 2003). Field surveys of hillslopes help verify the findings of aerial photographic interpretation, including for historical events, and GIS models.

Site-specific land use impacts are revealed through field surveys and help to ground-truth observations from aerial photographic interpretation. Direct correlations between mass wasting events and physical trigger mechanisms such as concentrated flow from a culvert or drainage ditch are readily identified (Bullard et al. 1982; WFPB 1997b). These features are apparent on a fine scale and can often be attributed to the spatial proximity of the associated trigger mechanism. Most of the trails and some of the roads likely to be producing sediment with connectivity to the stream network were surveyed (Sims 2004).

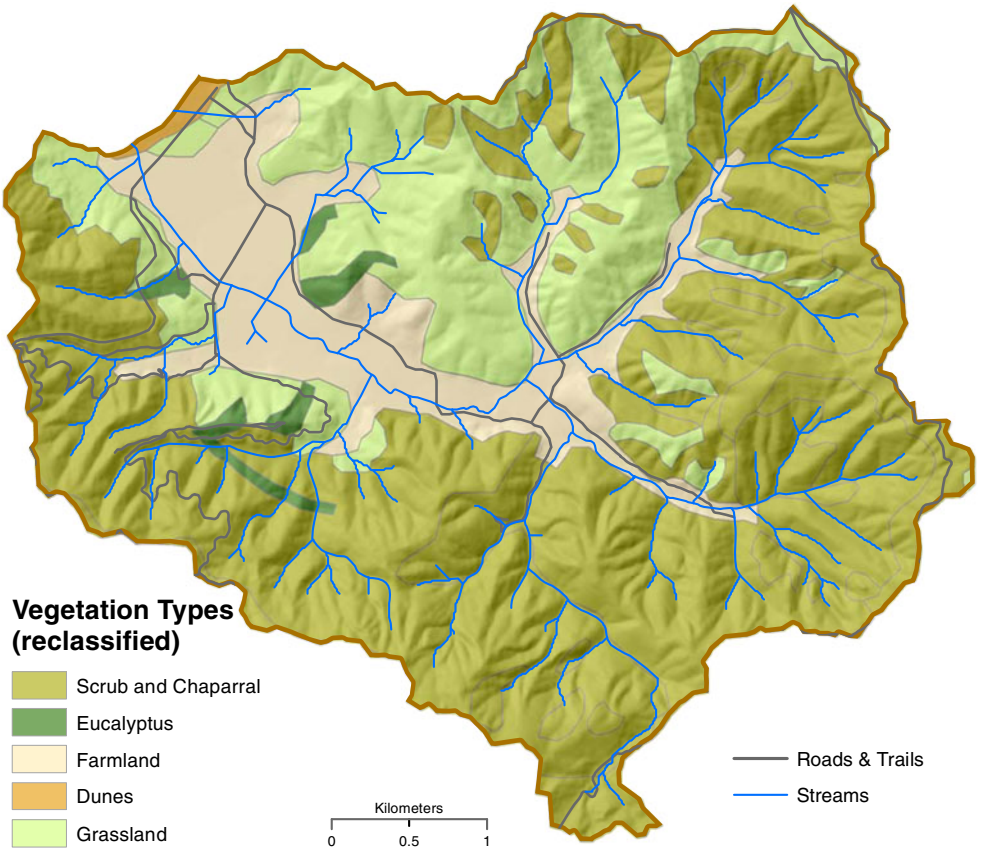

Fig. 7 Vegetation in 1941 with existing roads and trails

2.4 GIS modeling

Comparing the results of inventories to models of landslides and surface erosion can support interpretation of the recorded features and possibly predict ongoing sediment sources. We explored multiple GIS modeling methods, including heuristic soil erodibility and drainage density and connectivity models. For a basin-wide assessment, two models together were used to elucidate the spatial conditions leading to significant erosional features—a physical shallow landslide model, the Stability Index Approach to Terrain Stability Hazard Mapping (SINMAP 2; Pack et al. 2005), and a maximum entropy model (Phillips et al. 2006) to relate environmental factors to gully and landslide distributions.

2.4.1 Stability index (SINMAP)

Since shallow landslides are an important source of sediment (Dietrich and Montgomery 1998) and are often a direct result of land use, mapping landslide potential can be important in sediment source analysis studies, especially in steep terrain where they are common. Recent advances in applying GIS methods in physical landslide models, including the work by Dietrich and Montgomery (1998) and others, show promise. These models are based on understanding how fluvial processes interact with soil and bedrock to generate landslides. The SINMAP 2 model (Pack et al. 2005) which runs in ArcGIS 9.3 (Esri 2013), uses an approach similar to the Shallow Slope Stability Model (SHALSTAB) (Dietrich et al.

Table 1 General land use patterns per year observed for the entire San Pedro Creek Watershed in hectares and percentage

	1941		1955		1975		1983		1991		1997	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Developed	26.7	1.3	199.3	9.4	574.2	27.0	578.4	27.2	581.5	27.4	581.5	27.4
Farmland	304.8	14.3	125.5	5.9	18.5	0.9	15.2	0.7	13.5	0.6	13.4	0.6
Other	1,793.0	84.4	1,800.0	84.7	1,532.0	72.1	1,531.2	72.1	1,529.8	72.0	1,529.8	72.0
Total watershed	2,125.0		2,125.0		2,125.0		2,125.0		2,125.0		2,125.0	

1998) and employs a dimensionless form of the infinite slope stability model:

$$FS = \frac{C + \cos\ \theta[1-wr]\tan\phi}{\sin\theta}$$

where θ is slope angle, ∅ is friction angle; w is the relative wetness, derived from a ratio of either the vertical or slope-perpendicular estimates of water table height to soil thickness:

$$w\ = \frac{D_w}{D} = \frac{h_w}{h}$$

C is the combined dimensionless cohesion:

$$C = \frac{C_r + C_s}{h\rho_s g}$$

and r is the water to soil density ratio:

$$r\ = \frac{\rho_w}{\rho_s}$$

In SINMAP an assumption is made that the capacity for lateral flux is T sinθ, where T is soil transmissivity (in square meters per hoour) derived as the product of hydraulic conductivity and soil thickness. Together with an estimate of specific catchment area $a = A/b$, where A is contributing area for unit contour length b, slope and recharge R relative to transmissivity T, the relative wetness w is derived as:

$$w\ =\ Min\left(\frac{Ra}{T\sin\theta}, 1\right)$$

Finally, the stability index is initially derived as the minimum factor of safety, with minimum cohesion and maximum recharge to transmissivity ratio. For $FS_{min}<1$, SI is set to Prob(FS>1); and for, $FS_{max}<1$, SI is set to zero (Pack et al. 2005).

2.4.2 Maximum entropy model

Heuristic (Blesius and Weirich 2010) and a wide variety of statistical models such as discriminant analysis (Dhakal et al. 1999) and logistic regression (Dai et al. 2001; Ohlmacher and Davis 2003) have been applied to landslide susceptibility mapping. Felicísimo et al. (2013) compared logistic regression, the maximum entropy (MAXENT) application of Phillips et al. (2004) with recent updates (Phillips and Dudík 2008), multiple adaptive regression splines, and classification and regression trees (CART) for mapping landslide susceptibility in northern Spain; CART and MAXENT performed best based upon area under the receiver operator characteristic curve (AUC). While entropy-based models have been employed in geomorphology for many years (e.g., Leopold and Langbein (1962) on longitudinal profiles and Yang (1971) on stream morphology), application to event-based landforms such as landslides and gullies is recent. The presence-only nature of landslides—or the limited knowledge of absence locations—makes maximum entropy methods designed for species habitat analysis appealing. MAXENT compares the conditional density function of covariates (predictor variables) at presence sites $f_1(z)$ to the marginal (background) density of covariates in the study area $f(z)$, to derive the conditional occurrence probability $\Pr(y=1|z)$ (Elith et al. 2011).

3 Results and discussion

Analysis of sediment sources requires considering both temporal and spatial factors. Temporal factors include periods of significant precipitation events, often tied to El Niño Southern Oscillation (ENSO) cycles, and land use changes. Spatial patterns of terrain, drainage, geologic substrate, and vegetation factors combine with human alteration of the landscape to create diverse sites either favoring or limiting the various sediment sources. Finally, these spatial factors change over time, sometimes creating contrasting scenarios.

3.1 Temporal factors: precipitation events and land cover change

The most evident temporal factors influencing sediment sources are precipitation events and changes in land use or land management policies. Most landslides were identified in 1941, the first year of review, and 1983, after a severe ENSO-related rainfall event that triggered a large number of failures. A large number were also visible in 1975, following a few severe rainfall events, but also a period that included a major expansion of residential development as well as the introduction of recreational off-road motorcycle use in many areas (Davis et al. 2010).

While our analysis focuses mostly on the twentieth century, earlier events may have implications for sediment production. San Pedro Valley was occupied beginning roughly 5,000 years ago by native Ohlone people who subjected the watershed to a frequent fire regime enhancing hunting and foraging (Collins et al. 2001). Spanish settlers arrived in the late eighteenth century and fire-setting faded away by the end of the 1800s (Collins et al. 2001). With Spanish settlement came agriculture, grazing animals, exotic plant species, and increased population. Occupation by US citizens began in the mid-1800s as westward settlement intensified and expanded

agriculture and urban development including structures, roads, and railroad lines.

As late as 1941 land use in the valley consisted of farming on the alluvial valley floors, with grazing on grassland areas; steeper and more remote areas were covered in scrub and chaparral (Fig. 7). Undeveloped areas comprised 84% of the total area (Table 1). The majority of the valley floor was farmland, extending along all major tributaries. Residential development comprised only 1% of land cover as the initial stages of tract residential development began in Pedro Point. A few trails and roads ran along ridge tops and the valley floor along the creek.

A total of 41 gullies and 156 landslide scars were detected in the watershed in 1941 (Table 2) (Sims 2004) and, while an attempt was made to assess relative age based on vegetation cover, it is difficult to determine when they were initiated. Grazing pressure on grassy hillslopes is a likely factor, and dates back at least to the early nineteenth century, when hide-and-tallow production was common along the coast (Culp 2002). Some gullies were also observed to occur in run-out zones of older landslides.

Land use along the valley floor changed significantly from 1941 to 1955 (see Table 1) (Sims 2004). Development increased nearly 10-fold, whereas farmland decreased by over 50% from 300 ha in 1941 to 125 ha in 1955. Residential development encroached on tributaries and expanded further upslope. Other land uses increased slightly, possibly from the decommissioning of farmland. New roads and trails followed the expansion of urban development. Thirty-nine new landslides were observed on the aerial photographs between 1941 and 1955, all on hillslopes away from the periphery of urban development. Many new slides were near well-established trails formerly used as roads, primarily on slope wash, ravine fill, and colluvium substrate. No new large gullies were formed between 1941 and 1955. However, all gullies visible in 1941 were still apparent in 1955. Previously existing gullies most likely expanded in depth (as many continue to create highly turbid outflows that we have observed, and some have growing depositional fans) and area but the precise extent of change was not measurable on the available air photos. A network of roads and trails covered the developed areas of the valley floor and extended along some of the tributaries. Along the periphery of these developed areas, construction practices probably generated loose soils highly susceptible to erosion during rainfall in the winter months. This would have increased short-term sediment supply to San Pedro Creek.

Table 2 Event counts when first visible on aerial photographs

	1941	1955	1975	1983	1997
Gullies	41	0	5	1	1
Landslides	156	39	142	253	10
Fresh	86	31	104	217	7
Mature	43	6	30	27	3
Old	27	2	8	9	0

The most significant land use change in the watershed occurred by 1975 (Fig. 8; Table 1), when developed land tripled while farmland decreased 7-fold. Features were not mapped in the 1960s as this was the period of the most extensive residential development, and it would have been too difficult to accurately distinguish land clearing and erosion features in the aerial photographs. Most of the previous farmland along the valley floor was converted to residential tract housing by 1975, with development in some areas extending up hillslopes. Only a few farmland areas remained; these have since been converted to horse ranches and a county park. Extensive road networks accompanied development of the valley floor and adjacent hillslopes. Trail and road networks were extensively developed upslope of horse ranches.

Between 1955 and 1975, 142 new landslides were observed on the aerial photographs (Table 2), though fewer gullies (Sims 2004). This high incidence of failures can at least partially be attributed to storm events in 1958 (VanderWerf 1994) and 1962 (Culp 2002). Photos from 1963 show very large slides in the southern subwatersheds and large slides in the North and Middle Fork subwatersheds from an intense rainfall event in 1962. Landslides found in 1975 were scattered widely but predominantly over the upper hillslopes in most substrates. Between 1955 and 1975 many gullies were removed or leveled for residential development, though a few new ones developed on the slopewash, ravine fill, and colluvium of lower hillslopes.

Surface erosion probably increased along trails, roads, and the periphery of urban development. Many of the upper hillslopes with previously sparse cover had a thick vegetation layer in 1975 but many new trails cross these areas, directing flow from inter-basin transfer as described by Nyssen et al. (2002) for roads crossing steep terrain in Ethiopia. The new trail network used by the Pacifica Motorcycle Club in Pedro Point was also likely becoming a significant source of surface erosion, increasing soil exposure from fresh landslides because of intensified recreational use. Landslide tracks obvious in 1963 photographs exposed a large surface area susceptible to erosion. This short-term erosion probably only occurred on fresh scars and deposits until vegetation was reestablished. Additionally, residential development and roads expanded significantly, creating short-term sources on areas of exposed and displaced soil.

Land use changed very little between 1975 and 1983 (Table 1) (Sims 2004). A Hillside Preservation District ordinance passed in 1972 by the City of Pacifica (1975) greatly limited development on steep hillslopes, though some new recreational trails were established. Between 1975 and 1983, 253 new landslides were observed (Table 2) (Sims 2004). Most of these likely resulted from the January 1982 El Niño

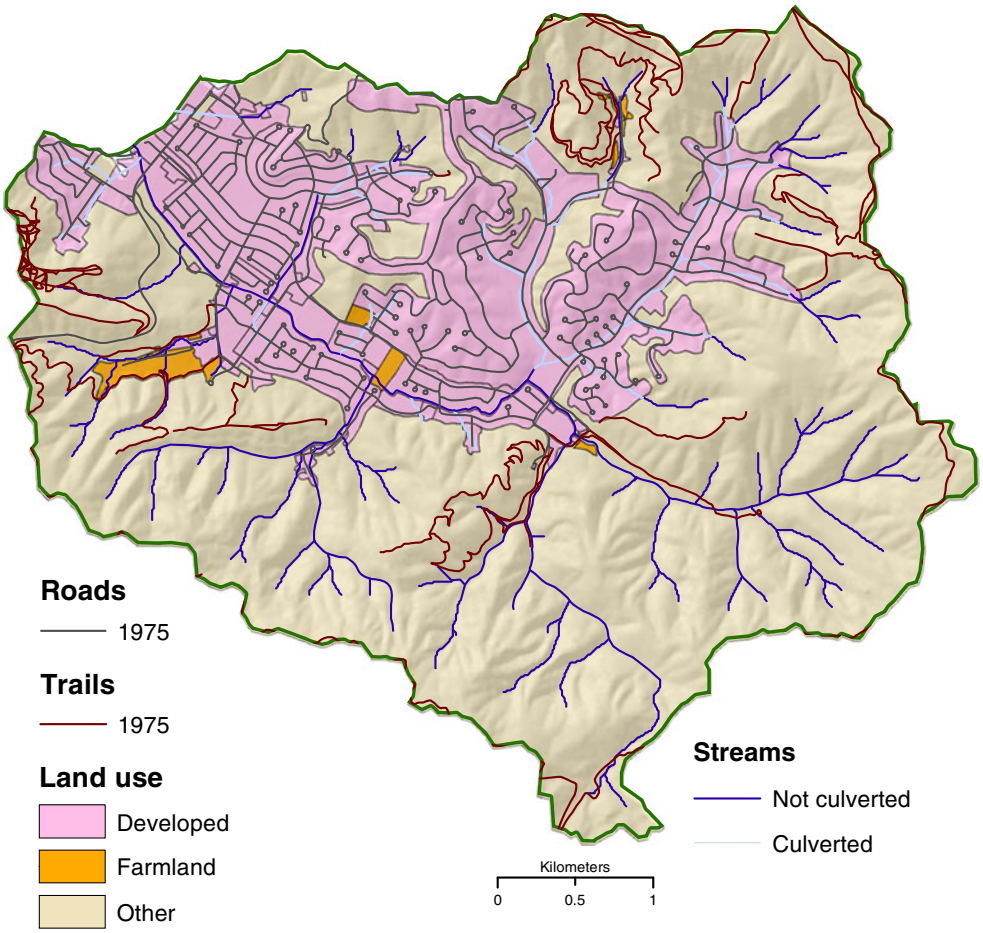

Fig. 8 Land use in 1975 with existing roads and trails

event that delivered 150–200 mm of precipitation to the area within less than 30 h with an average intensity of 5.0 to 6.6 mm h^{-1}, triggering 475 slides in the greater Pacifica area (Howard et al. 1988). A large number of slides occurred on undeveloped hillslopes on nearly every type of substrate (Howard et al. 1988). In 1983, only one new gully was observed, in colluvial substrate (Table 2) (Sims 2004).

Between 1983 and 1997, land use changed very little in the watershed (Table 2) (Sims 2004). Developed areas increased by only 3.1 ha. Farmland and other land uses decreased slightly by 1.8 and 1.4 ha, respectively. All major roads were constructed by 1975 and all major trails by 1983. There were only ten new landslides in the watershed observed on 1997 aerial photographs (Table 2), distributed throughout the upstream subwatersheds, indicating that there were no severe storm events since 1983. Only one new gully was observed, near Pedro Point and adjacent to off-road motorcycle trails.

Currently, most of the lower watershed of San Pedro Creek is urbanized with residential and commercial uses while most of the upper watershed is designated as recreational open space, with public lands managed by city, county (San Pedro Valley County Park), state (McNee Ranch State Park), and national (Golden Gate National Recreation Area) park agencies, as well as a local land trust. The primary human impacts in these public lands are trails, currently used by hikers, mountain bikers, and equestrians. The Pacifica Land Trust recently acquired land on Pedro Point that was previously utilized by off-road motorcycle enthusiasts (Fig. 9), a cause of severe alteration of vegetative cover (Davis et al. 2002). In addition to the public open-space land, there are four private horse ranch facilities. Nearby trails on both surrounding public and private lands are regularly accessed on horseback from some of these facilities.

Fig. 9 Remnant bare soil and erosion from previous off-road use in Pedro Point II subwatershed

Table 3 Summary statistics for gully and landslide centroids

	Gullies	Landslides				
		1941	1955	1975	1983	1997
Scar area (m^2)						
Med	764	138	112	42	71	51
Mean	1,046	203	157	55.5	107	81
S	966	252	183	55.4	145	68
Slope (°)						
Med	19.4	29.7	30.3	30.5	32.4	28.6
Mean	18.7	29.3	29.5	29.9	31.5	28.4
S	7.1	7.0	6.6	6.4	5.7	4.3
Plan curvature						
Med	−0.38	−0.17	−0.28	−0.21	−0.53	−1.92
Mean	−0.54	−0.30	−0.45	−0.32	−0.60	−1.56
S	0.77	0.99	0.68	1.15	1.04	1.53
Profile curvature						
Med	0.18	−0.03	0.18	−0.05	0.12	0.28
Mean	0.27	0.02	0.23	0.00	0.23	0.32
S	0.49	0.71	0.59	0.80	0.82	1.05
Flow accumulation (3×3 focal maximum (m^2))						
Med	11,600	500	400	400	500	1,100
Mean	22,526	1,700	1,100	2,100	4,100	20,700
S	40,064	5,500	1,800	8,300	19,100	33,900
SINMAP stability index						
Med		0.98	1.00	0.97	0.94	1.00
Mean		1.10	1.38	1.09	0.89	0.93
S		0.67	0.93	0.57	0.35	0.23
Stream distance (m)						
Med	91	111	161	103	67	106
Mean	114	124	157	113	81	96
S	81	82	86	72	59	76
Trail distance (m)						
Med	808	493	152	72	197	197
Mean	681	509	259	146	210	160
S	440	343	272	158	157	84
Land cover/vegetation						
Cultivated	0.15	0.00	0.00	0.01	0.01	0.00
Grassland	0.59	0.42	0.10	0.13	0.00	0.00
Scrublands	0.22	0.57	0.62	0.77	0.94	1.00
Forest	0.04	0.01	0.13	0.09	0.04	0.00
Geology						
Granitic	0.02	0.05	0.00	0.10	0.02	0.11
Sandstone	0.31	0.42	0.49	0.47	0.19	0.22
Colluvium	0.67	0.53	0.51	0.44	0.79	0.67

Elevation source for derivatives: 10 m USGS National Elevation Dataset (NED); 10 m product derived from photogrammetric contour plotting. Two low-pass filters applied to elevation used for curvature derivations

3.2 Spatial factors

Spatial factors were extracted for all gully and landslide centroids (Table 3), with elevation derivatives (slope and curvature), flow accumulation, and trail and stream distances derived in ArcGIS 10.1 (Esri 2013). Not surprisingly, slope angles are consistently steep for landslides and a bit less so for gullies. Curvature rasters were created from elevation after passing it through two successive low-pass filters to attempt to remove contour artifacts in the elevation data. While profile curvature appears to be an inconsistent measure, a slightly negative plan curvature is generally favoured, a tendency that

Table 4 Derivation of San Pedro Creek Watershed SINMAP inputs (min and max Transmissivity (T)/recharge (R), cohesion factor (C), friction angle (ϕ), and soil density (ρ))

Soil parent material	Depth (m)	Hydraulic conductivity (m h^{-1})	T (m^2 h^{-1})	R (m h^{-1})		T/R (m)		C		ϕ (°)		ρ (kg m^{-3})
				min	max	min	max	min	max	min	max	
Granitic	1	0.10	0.1	0.0002	0.0042	24	500	0	0.25	30	45	2,000
Colluvium	3	0.03	0.1	0.0002	0.0042	24	500	0	0.25	30	45	2,000

Soil data from Natural Resources Conservation Service SSURGO data (Kashiwagi and Hokholt 1991), modified using surficial geologic interpretations from Pampeyan (1994)

fits with the common observation of shallow landslide scars on swales without stream channels. In the original analysis, flow accumulation was poorly represented, likely because of a mismatch between feature centroids and high-accumulation raster cell locations; the results shown here are from a 3×3-m focal maximum, thus represents the maximum flow accumulation within a 30×30-m window around the centroid, which we believe creates a more accurate representation of the gully-enhancing drainage conditions in the vicinity of each feature. Gullies occur most frequently in grasslands, which were also more common before 1941, and many were used for grazing, although landslides are more common in scrublands (coastal scrub and chaparral). Forest cover may have prevented the detection of some features, as in Brardinoni et al. (2002), though extensive field mapping in 2003 detected very few relict features under forest cover (Sims 2004). Colluvium is the most common substrate for gullies and more recent landslides (1983 and 1997). Finally, field and GIS connectivity analysis have shown that 65% of the landslides and 74% of the gullies identified on the aerial photographs are connected to the stream network (Sims 2004); these results have led to management changes by the City of Pacifica and San Mateo County Parks (Davis et al. 2004).

3.3 GIS models

3.3.1 Stability index (SINMAP)

SINMAP inputs used for San Pedro Creek watershed were determined from a soil survey and SSURGO data from the Natural Resources Conservation Service (Kashiwagi and Hokholt 1991), refined by surficial geologic mapping that included an interpretation of colluvium depth (Pampeyan 1994). For our study, we selected a single set of inputs that approximate the conditions for two contrasting conditions that nevertheless create similar SINMAP inputs: (a) moderate thickness, highly permeable soils on granitic rock of Montara Mountain; and (b) moderately permeable soils on often deep colluvium in much of the watershed to the north (Table 4). Similar to SHALSTAB, SINMAP assumes steady-state rainfall conditions. Landslides from the inventory under these assumptions mostly fit within undersaturated conditions, but with stability index conditions at <1.0, owing to the steep slopes of this watershed (Fig. 10). By contrast, when the model was tested with conditions of thinner soils (0.5 m) that can occur on spurs without significant colluvium, model results would often predict oversaturation.

Resulting stability index values scaled from 0.5 to 1.5 are mapped in Fig. 11. The close correspondence to steeper slopes is clear, though drainage also plays a significant part with locations on lower slope positions in swales scoring in the unstable range. Also on this figure are the locations of all gullies and landslides, with the latter symbolized by the year of detection on aerial photography. Spatial distributions point to the likelihood of somewhat contrasting causes for the three biggest years for these events. In 1941, the north-central areas of relatively moderate relief experienced a large number of landslides and gullies; this area was also dominated by grassland. In 1975, a number of landslide clusters appeared in

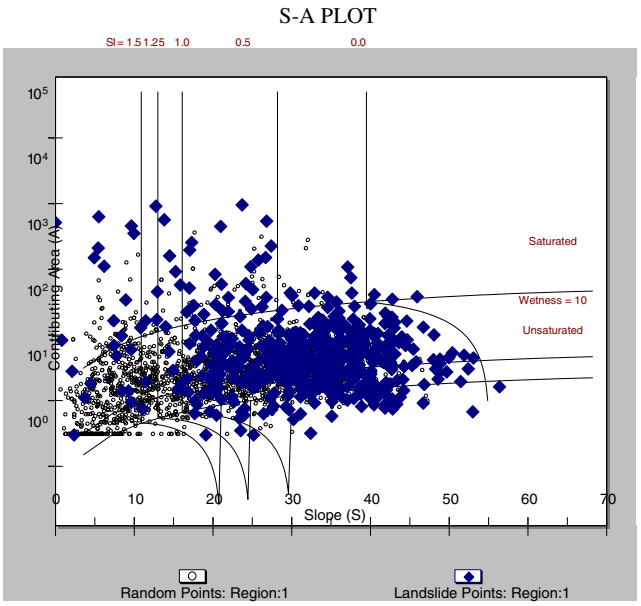

Fig. 10 SINMAP slope-area plot, displaying landslide points from all years. Wetness curves are derived by the model from input conditions of soil hydraulic conductivity and thickness (deriving transmissivity) related to rainfall intensity under local topographic conditions. Stability index curves are derived using an infinite slope model

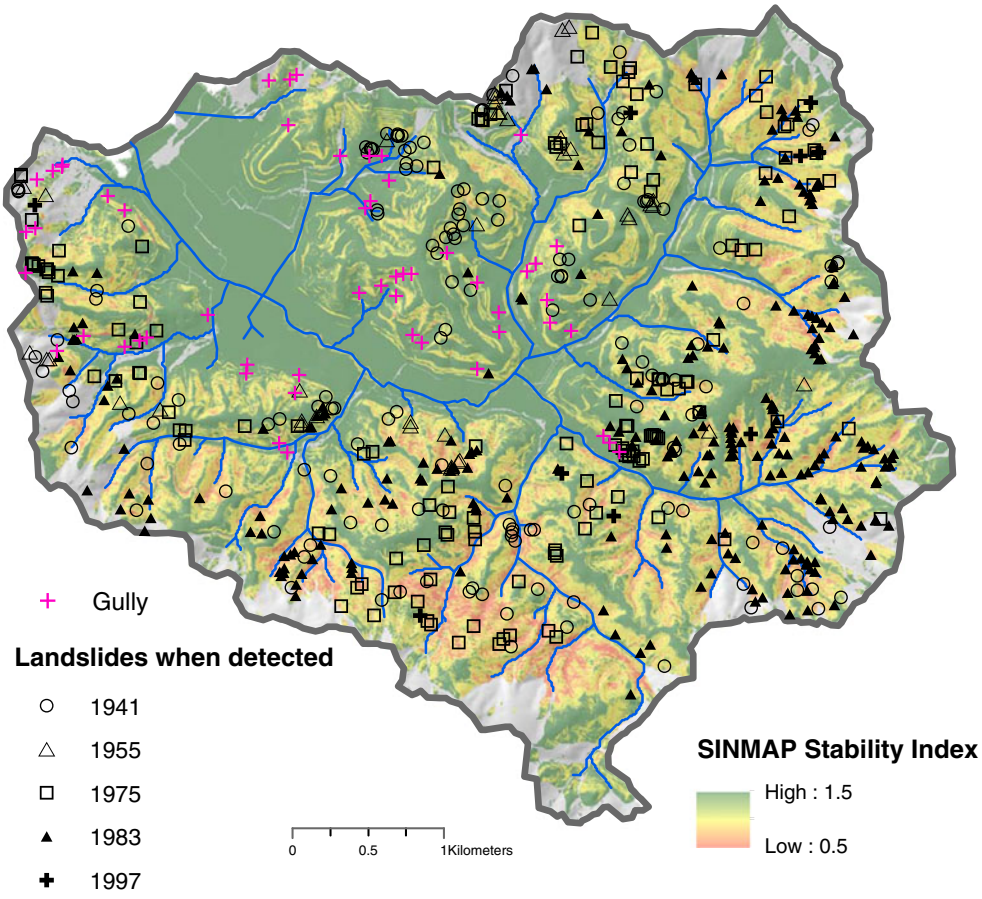

Fig. 11 SINMAP stability index and landslides, with year first visible on aerial photography, and gullies from all years (mostly before 1941)

scattered locations. In 1983, landslides were numerous overall, yet surprisingly absent on the steepest slopes of Montara Mountain.

A physical model such as SINMAP has the advantage of employing the nature of water movement and the stability factors of the infinite slope model, however it also has limitations. Inputs to the model itself are often difficult to assess, and cohesion in particular is well known to vary spatially, due in part to the major influence yet complex nature of root cohesion (Ghestem et al. 2011). If the susceptibility maps generated by our SINMAP model are used alone, we would expect many more landslides than have actually taken place; the effect of root strength on cohesion is clearly missing. Other variables that are not part of the physical model cannot be incorporated but are likely significant, such as distance to streams, roads, and trails. Many slope failures can be attributed to concentrated runoff from impervious surfaces such as trails and abandoned roads crossing steep terrain. Finally, SINMAP interprets slope stability relevant to landslides and thus cannot be used to assess gullies.

3.3.2 Maximum entropy model

MAXENT models were developed for all gullies and landslides in the years first visible, for both 3 and 10 m input rasters (Table 5), with 10-fold replicates used to assess model performance as AUC and threshold-based p values. USGS elevation sources were from LiDAR for 1/9 arcsec (3 m) derivatives and photogrammetric contouring for 1/3 arcsec (10 m) derivatives. As each has artifacts characteristic of the elevation source (LiDAR noise or contour step effects), one low-pass filter (3×3) was applied before deriving slope, and two successive low-pass filters (3×3) applied before deriving curvature. Final prediction maps and the results described below are limited to the 10-m models to avoid the possible influence of LiDAR-detected gullies and landslides, whereas these are not represented in the photogrammetric contour maps used to generate the 10-m elevation raster. Note that recent NED 1/3 arcsec data may be resampled from LiDAR-derived data sources; therefore, we used an earlier dataset. Two assessments of covariate contributions are provided: percent contribution and permutation importance. Vegetation and geology layers were entered as categorical variables, with lambda results reported for each class; all others were considered continuous.

Nearly all gullies were in existence by 1941, so these were not separated by year. Based on AUC, the 10-m model performed best, and its prediction was used for the prediction map in Fig. 12. In terms of covariate contribution, the biggest contributor was vegetation, with the grassland areas favored

Table 5 MAXENT results from 10-fold (8-fold in 1997) replicates of all gullies and shallow landslides by year of aerial photography

	Gullies		Landslides									
			1941		1955		1975		1983		1997	
Cell size (m)	3	10*	3	10	3	10	3	10	3	10	3	10
n	54	54	130	130	32	32	133	133	223	223	8	8
AUC	0.791	0.851	0.765	0.740	0.715	0.748	0.699	0.654	0.825	0.792	0.846	0.838
AUC_{test}			0.685	0.681			0.724	0.702	0.848	0.758		
p	0.010	0.005	0.000	0.004	0.191	0.140	0.007	0.011	0.000	0.000	0.154	0.163
p_{test}			0.000	0.000			0.000	0.000	0.000	0.001		
Covariate contributions												
Slope												
%	18.4	19.4										
PI	26.1	40.7										
Flow accumulation												
%	2.6	35.6										
PI	1.9	23.4										
Plan curvature												
%	8.9	1.1	42.1	8.4	36.2	43.1	31.8	11.4	33.2	18.3	38.0	63.5
PI	17.2	4.4	25.4	11.5	31.2	39.3	33.8	18.3	22.8	21.2	51.5	59.2
SINMAP stability index												
%			23.1	45.9	22.1	9.3	29.4	39.9	36.9	40.4	29.3	12
PI			29.4	39	23.7	1.6	34.1	41.8	45.4	40.7	14.0	6.9
Stream distance												
%	3.0	1.6	3.7	6.2	20.9	21.3	4.0	3.1	2.8	4.4	0.0	0.0
PI	5.2	1.0	6.7	9.3	26.4	30.2	5.0	3.9	3.6	8.9	0.0	0.0
Trail/road distance												
%	16.7	11.5	4.9	6.6	10.8	15.9	12.2	12.2	6.6	7.1	0.2	0.1
PI	14.0	10.5	12.8	6.9	12.2	13.6	18.2	15.2	9.0	5.2	0.0	1.7
Vegetation												
%	47.0	30.3	25.8	32.4	3.9	4.8	15.0	25.9	8.5	15.1	21.9	22.5
PI	32.7	19.9	25.3	33.3	1.8	6.1	6.8	12.3	5.3	13.8	25.1	32.2
Geology												
%	3.4	0.5	0.4	0.6	6.1	5.6	7.6	7.5	11.9	14.8	10.6	1.9
PI	2.9	0.1	0.3	0.1	4.7	9.2	2.1	8.5	14.0	10.3	9.4	0.0

Raster variable inputs are from 3 and 10 m cells, with elevation derivatives using LiDAR for the former and USGS photogrammetric contours for the latter, with low-pass filters applied to each elevation source; 10-m gully results reflect the use of a 3×3 window focal maximum of flow accumulation values. Counts of landslides (*n*) are less than the original counts because SINMAP removes any areas "defended" by forces not reflected in the model, such as along larger drainages, and stability index values set to zero are removed. Variables were chosen based on their contribution to one or more models, and correlated variables were removed from consideration. Covariate contributions are given as percent contribution and permutation importance (PI). Models are evaluated as area under the (receiver operator) curve (AUC) for a threshold-independent assessment. For a threshold-dependent evaluation, arithmetic means of the ten *p* values use the maximum test sensitivity+specificity threshold from MAXENT (Phillips et al. 2006). AUC_{test} and p_{test} use subsequent test data (e.g., 1941 slides tested with 1975 slides)

for gullies over the more widespread scrublands, as was also apparent in Table 3. Coastal grasslands likely favored for grazing are not surprisingly good candidates for gully development, though piping from similarly grassland-favoring gophers may also contribute. Slope and planform curvature are next in importance, and at least for the 10-m model, flow accumulation has a strong importance. After noting that the permutation importance of flow accumulation increased substantially from 1.9 in the 3 m to 7.5 in the 10 m, we suspected that the difficulty of accurately intersecting high flow-accumulation cells with gully centroids caused this factor to be underrepresented in comparison to its actual impact in nature, since gullies are typically found in locations that concentrate flow. Therefore, we instead used a 3×3 focal maximum of flow accumulation on the 10-m data to create the results shown in Table 5, establishing flow accumulation

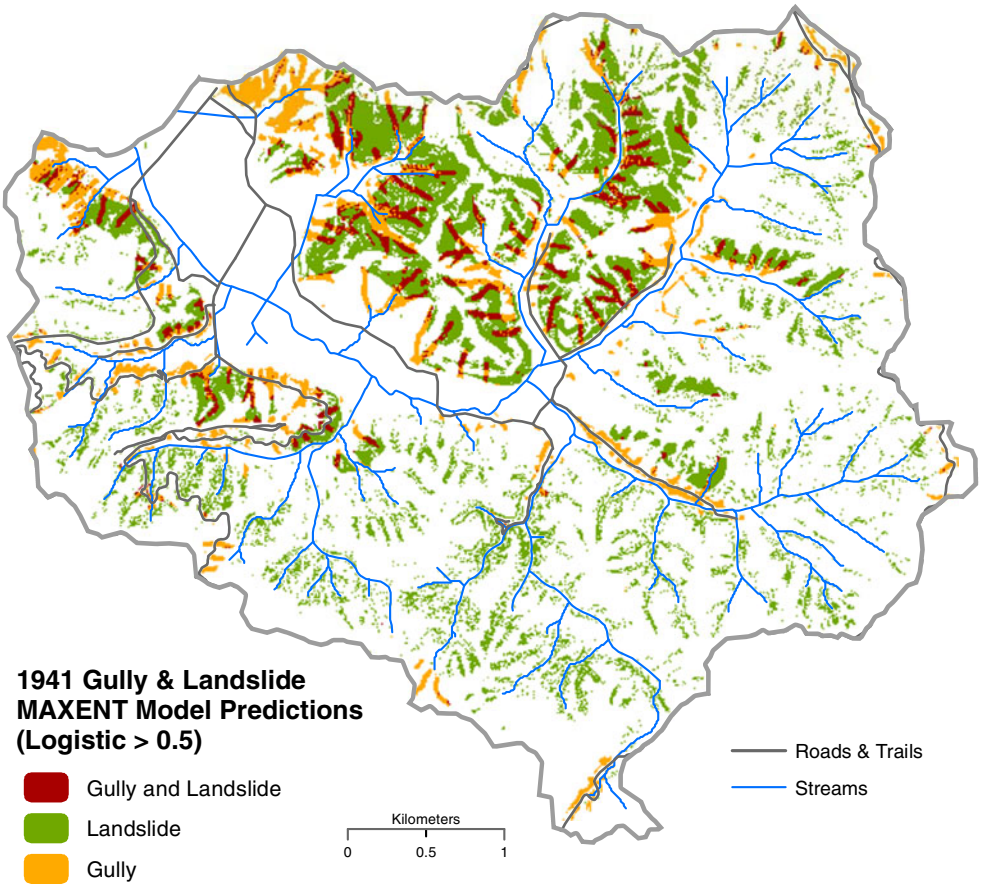

Fig. 12 1941 Gully and landslide MAXENT model predictions, above a 0.5 logistic threshold

as second in importance only to slope, with vegetation next in importance. Variable jackknifing provides further support for the importance of flow accumulation, which gains an AUC of 0.76 when used alone, the highest of any input variable.

The 10-m landslide model for 1941 (also on Fig. 10) also illustrates a preference for the areas of relatively moderate relief in the north-central part of the watershed, with vegetation and the SINMAP stability index contributing the most to the resulting model; variable jackknifing confirms this, with either variable used alone creating an AUC of 0.65. Many landslides occurred in scrubland areas on the steep eastern and southern hillslopes, though the north-central grassland shared a propensity for landslides and gullies; grazing may have been a factor for both. Replacing the stability index with slope produced similar results (AUC=0.761, with slope scoring 0.64 alone).

By 1975 and 1983 (Fig. 13), the north-central area so prominent in 1941 had experienced residential development, with many of the gully and landslide sites paved over and landscaped for housing. Instead, steeper scrubland hillslopes to the east and south experienced the greatest number of landslides, and public attention shifted to the hazards from landslide-prone hillslopes above residences. For landslides, the stability index is the most important contributor and alone creates an AUC of 0.627 in 1975 and 0.727 in 1983. If slope is used instead of stability index, again the overall AUC is similar, but slope alone creates a somewhat lower AUC of 0.612 in 1975 and 0.677 in 1983. Plan curvature and vegetation are the next most important contributors, with trail distance also playing an important role in 1975, and geology in 1983. In 1983, landslides were abundant in colluvial sites, probably generated from widespread threshold exceedances documented for the well-known 1982 ENSO year (Wieczorek 1987).

4 Conclusions

Combining physical models such as the SINMAP slope stability model with a maximum entropy model appears promising, though the results of the multivariate model differ little from ones using slope angle instead of modelled slope stability. As the stability index is a bit better than slope as a single predictor of landslides, this advantage largely disappears in a multivariate model.

Considering both temporal and spatial dimensions is important in understanding gully and landslide susceptibility. In this study, the spatial pattern of features in 1941 reflects the

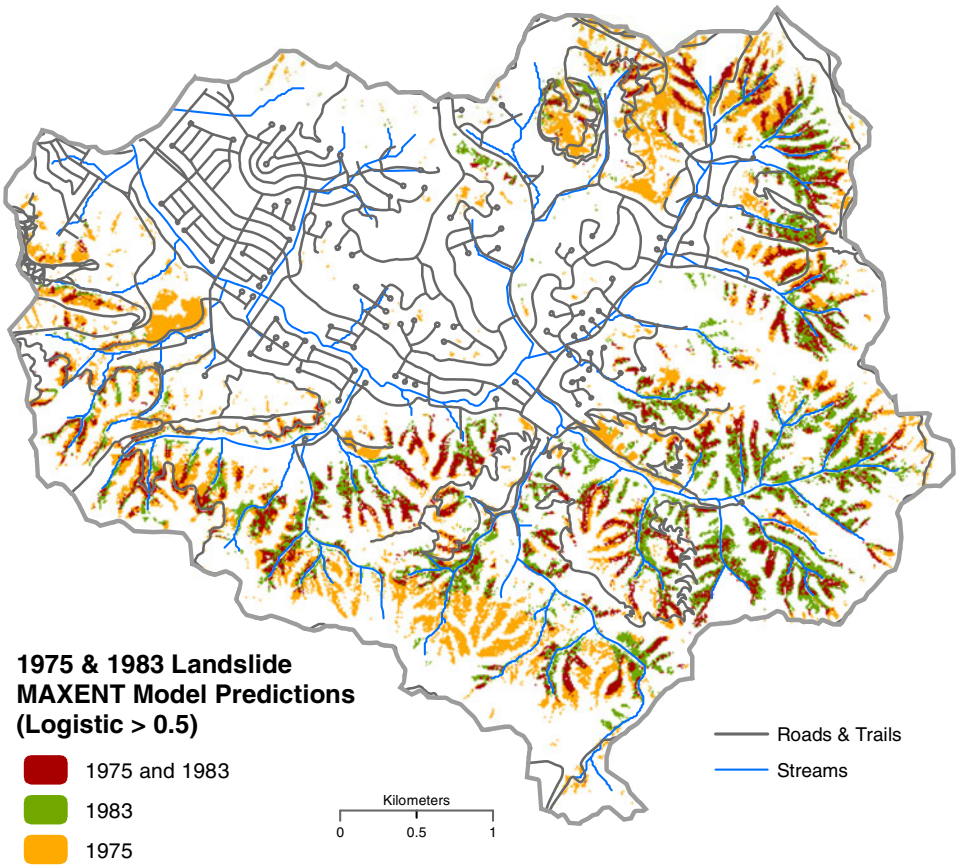

Fig. 13 1975 and 1983 landslide MAXENT model predictions, above a 0.5 logistic threshold

agricultural and grazing regime in force up to that time, with local high flow accumulation sites favored for gullies, whereas in 1975 the effects of recreational trail use was more pronounced. Precipitation events were significant in all periods, but the 1982 ENSO effects created a contrasting pattern of landslides in 1983 compared with other years. These susceptibility maps are best interpreted in the context of the regimes that created them: agriculture and grazing in 1941; rapid development and poorly managed trail use in 1975; and ENSO-driven precipitation threshold exceedances in 1983.

Hillslope sediment sources will continue to contribute to the fine sediment load of San Pedro Creek, however the nature of these has changed over time, as the distribution of gullies and landslides respond to meteorological events and land use changes. Changing patterns of landslides and surface erosion features makes sense given changes in land cover. While gullies are still initiated because of inter-basin transfer where trails and roads cross drainages, most appear to have formed when hillslopes were intensively grazed or even farmed. Gullies still generate sediment, but new gullies are being formed less frequently. Landslide hazards continue to threaten many homes, as their occurrence is closely tied to precipitation-driven pore-pressure thresholds but are also locally created from impervious trail runoff in steep terrain, as was especially evident in the analysis of 1975 landslide patterns. Fortunately, the Hillside Preservation District ordinance has prevented further construction on steep hillslopes.

Understanding the spatial and temporal nature of these sources should help us understand that causes are complex and multiple factors, varying over time, contribute to generating sediment from episodic and longer-term hillslope erosion. Land management policies need to consider this and not assume that conditions are static. Watersheds with steep hillslopes in tectonically active areas get a disproportionate amount of sediment generation from episodic mass wasting events such as shallow landslides, and many of the disturbed areas continue to generate sediment long after the initial failure. While major ENSO-generated rainfall events play a significant role in generating the pore-pressure thresholds for creating slope failures, poor land management can greatly exacerbate these natural tendencies.

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Article

A Hybrid Physical and Maximum-Entropy Landslide Susceptibility Model

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Abstract: The clear need for accurate landslide susceptibility mapping has led to multiple approaches. Physical models are easily interpreted and have high predictive capabilities but rely on spatially explicit and accurate parameterization, which is commonly not possible. Statistical methods can include other factors influencing slope stability such as distance to roads, but rely on good landslide inventories. The maximum entropy (MaxEnt) model has been widely and successfully used in species distribution mapping, because data on absence are often uncertain. Similarly, knowledge about the absence of landslides is often limited due to mapping scale or methodology. In this paper a hybrid approach is described that combines the physically-based landslide susceptibility model "Stability INdex MAPping" (SINMAP) with MaxEnt. This method is tested in a coastal watershed in Pacifica, CA, USA, with a well-documented landslide history including 3 inventories of 154 scars on 1941 imagery, 142 in 1975, and 253 in 1983. Results indicate that SINMAP alone overestimated susceptibility due to insufficient data on root cohesion. Models were compared using SINMAP stability index (SI) or slope alone, and SI or slope in combination with other environmental factors: curvature, a 50-m trail buffer, vegetation, and geology. For 1941 and 1975, using slope alone was similar to using SI alone; however in 1983 SI alone creates an Areas Under the receiver operator Curve (AUC) of 0.785, compared with 0.749 for slope alone. In maximum-entropy models created using all environmental factors, the stability index (SI) from SINMAP represented the greatest contributions in all three years (1941: 48.1%; 1975: 35.3; and 1983: 48%), with AUC of 0.795, 0822, and 0.859, respectively; however; using slope instead of SI created similar overall AUC values, likely due to the combined effect with plan curvature indicating focused hydrologic inputs and vegetation identifying the

effect of root cohesion. The combined approach—using either stability index or slope—highlights the importance of additional environmental variables in modeling landslide initiation.

Keywords: landslide susceptibility; maximum entropy model; physical model; hybrid model; cohesion

1. Introduction

Mass movement or mass wasting describes the movement of rock, debris, soil, or earth material by gravity. This movement may be fast or slow, typically depending on the amount of water present in the mass. Therefore multiple kinds of mass wasting can be distinguished. Varnes [1] has provided a comprehensive and widely accepted classification of mass movement types. Landslides are a special case of mass movement, but the term is also often used as a general description of any loose material sliding down a slope. The sizes of landslides vary, with smaller ones being more common than larger ones. Landslides are triggered when a threshold of stability is crossed, usually involving earthquakes or excess water, or an intrinsic threshold resulting from successive weathering of slope material [2]. Hydrologic inputs are a significant contributor to decreasing slope stability by their effect on pore pressure, and redirected flows can lead to slope failures. For instance, soil piping can contribute to landslides by increasing within-soil drainage rates [3], and runoff from impervious surfaces such as roads [4] can also contribute to downslope failures through concentrating flow.

Landslides can be a serious threat to human habitat, and they are amongst the most damaging geo-hazards, although their effect may be attributed to the triggering factor. Recently, the 2014 Oso landslide in Washington State, USA, likely due to prolonged precipitation and involving a volume of 8×10^6 m^3 over an area of about 2.6 km^2, killed 41 people [5,6]. In 2010, a large landslide along the Hunza River in Pakistan not only erased two villages, but additionally created a large dam resulting in a lake which flooded villages upstream and threatened flooding of habitat downstream [7]. The cumulative effect of small landslides can also be very destructive, particularly when large regions are affected by swarms of landslides. Thousands of landslides caused by an intense storm in January of 1982 resulted in the loss of life of 25 people in the San Francisco Bay area. Although most of these slides were not of large size, some of the scars can still be recognized on recent aerial photography.

Given that landslides can be a dangerous event, it is important to understand their behaviour, and the conditions under which they occur. For this purpose, a spatiotemporal inventory of landslide episodes in the past is critical, and these inventories are a crucial component in the process of landslide analysis. Various methods are applied, although the most common procedures are identification in the field and detection of landslide scars from aerial photography. There are of course many logistical challenges in developing timely, accurate inventories; and it has been shown that landslide inventories can differ between investigators, methods applied, and multiple scales of data sources [8,9]. Recently, semi-automated landslide mapping using object-oriented image analysis (OBIA) from very-high resolution satellite images has received some attention [10,11]. Full automation has yet to be achieved, but this approach could be a promising path to rapidly creating a landslide record shortly after the event. The inventory is subsequently used to create maps of landslide susceptibility in order to identify areas or locations that

may experience sliding at some time in the future. Landslide hazard maps finally combine spatial with temporal probabilities [6,9].

Landslide susceptibility mapping typically involves one of three approaches: heuristic reasoning, statistical analysis, and physically-based models. Each procedure has advantages and disadvantages. In general, heuristic methods are considered basic, involving coarse scales; statistical analysis is assumed to be appropriate at intermediate scales; while deterministic or physically-based methods are the most sophisticated but may only be possible at very fine scales. This progression from basic to sophisticate necessitates the inclusion of additional parameters. For example, physically-based models require geotechnical parameters, such as soil or root cohesion and angle of internal friction [12]. These variables are not routinely collected or available for large areas.

Heuristic models can be easily implemented in a GIS environment and include consideration of variables such as lithology, geomorphology, land use, soils, or elevation and its derivatives. It should be noted, however, that slope needs to be treated with caution at coarse scales. A more detailed discussion of the variables can be found in van Westen *et al.* [9]. These variables are frequently weighted either by the investigator, or by more objective methods, such as multi-criteria decision analysis or physical modeling [13,14].

Statistical models require a thorough landslide inventory for at least part of the study area for model development and validation. In addition, they assume that the environmental factors in the validation and development part of the study area are very similar. Statistical models that have been widely adopted to model landslide susceptibility are logistic regression and discriminant analysis [15]. While appealing and easily interpreted, these methods assume that the modeler has data on absences, which is unlikely to be true. Landslide inventories vary depending on scale or method, so that the absence of a landslide on a particular map may not necessarily imply that there are no landslides at a certain location. Only large-scale field-based methods have the potential to clearly show even smaller failures, whereas aerial photography-based methods may miss landslides due to vegetation cover or insufficient scale. Even so, older landslides may be fairly obscured due to erosional processes [8].

Physically-based models of landslides often employ the limit equilibrium method, predicting slope stability as a factor of safety (FS) from cohesion, slope, pore water pressure and angle of internal friction. The factor of safety describes the stability of a slope as a ratio of shear strength and shear stress. While methods to calculate the FS vary, in a GIS environment, the infinite slope method is used almost exclusively, because it is the most suitable for a pixel-based analysis. The factor of safety can be written as (modified after Tosi [16]):

$$FS = \frac{c' + (\gamma\, z\cos^2\theta - u)\tan\phi'}{\gamma\, z\sin\theta\cos\theta} \quad (1)$$

where c' is effective soil cohesion, γ is unit weight of the soil, z is soil depth, θ is slope angle, and ϕ is effective angle of internal friction.

Cohesion ideally includes the added effect of root cohesion, which can be complex with large ranges even within nominally forested land cover, because the cohesive action of roots will have a stabilizing effect on the slope to the point of preventing the slope from failure [16,17]. While root cohesion can be quantified, this is a complex procedure not routinely done and availability of sufficiently spatially accurate data is extremely limited. Although it is therefore often ignored, there have been instances

where it is included. Attempts have been made to relate root cohesion to satellite derived vegetation information [18,19]. However, more research is needed in this area.

When studying large numbers of landslides in a study area with limited detailed geotechnical site data, statistical methods commonly provide higher prediction accuracies [20], though the results are best seen as identifying causal factors instead of a general model that can be applied to many sites as a physical model can be. Other methods such as support vector machine, artificial neural networks, fuzzy logic, or decision trees have also been successfully employed recently, including applications of hybrid or ensemble methods [14,21–23].

While classical entropy-based models have long been used in geomorphic systems (e.g., on longitudinal profiles and on stream morphology), application to event-based landforms such as landslides and gullies is recent, although Haigh [24] distinguished entropy dissipating and entropy accumulating landslides in the Himalayas. The presence-only nature of landslides—or the limited knowledge of absence locations—makes maximum entropy methods designed for species habitat analysis appealing. Geomorphological events such as rapid mass wasting share many characteristics with biological occurrences in that while they respond to environmental conditions, absences may not imply the lack of favorable conditions. At a local scale, positively and negatively spatially autocorrelated effects may also play a part, since mass wasting events may either increase the likelihood of other events in close proximity due to increasing hillslope gradients along the failure margins, or change the local hydrological conditions to decrease the probability for nearby events.

This research presents a novel hybrid or ensemble type model where the result of a physically-based method is incorporated into an entropy model, specifically a maximum entropy model (MaxEnt). Physical and maximum entropy models are at opposite ends of the spectrum in that the former is easily interpreted, based on physical principles, while the latter is in the realm of black boxes, operating in information (sometimes called environmental) space. However, the hybrid approach combines advantages of both methods. Given an appropriate scale of study where all critical parameters are known, physical models are clearly the best approach, and those that are spatially explicit should be able to have a high predictive power. However, many of these parameters are poorly known and spatially heterogeneous, so a pure physical modeling approach may be difficult to achieve. Maximum entropy models make no statistical assumptions about the variables used as inputs, and as a Bayesian approach focuses on maximizing probabilities, in this case that observations are similar based upon inputs in terms of maximizing entropy in information space which may include environmental space [25]. In the process, the model is parsimonious, with variables incorporated on the basis of their being necessary and sufficient in maximizing prediction accuracy [26].

2. Study Area

The 21.3 km^2 watershed of San Pedro Creek (Pacifica, CA, USA) has been the focus of numerous landslide and hydrological studies as a result of its steep hillslopes and hazardous conditions [27]. Steep hillslopes are common with more than ten per cent of slopes greater than 35° and a median slope at 10 m precision of 21°. The maximum elevation is along the southern boundary of the watershed, the 578-m North Peak of Montara Mountain, a mass of granodiorite on the Salinian block that is moving northwestward with the Pacific Plate (Figure 1). The dominant surficial geology derives from marine

deposits accreted at a convergent plate boundary, divided by the right-lateral Pilarcitos Fault into Jurassic/Cretaceous Franciscan Assemblage of graywacke, melange, greenstone, limestone and serpentinite to the north; and Paleogene marine sedimentary rocks to the south, including extensive uplifted turbidite beds visible along coastal bluffs. Mollisols of varying thickness have developed on weathered bedrock, slopewash, ravine fill and colluvium [28,29].

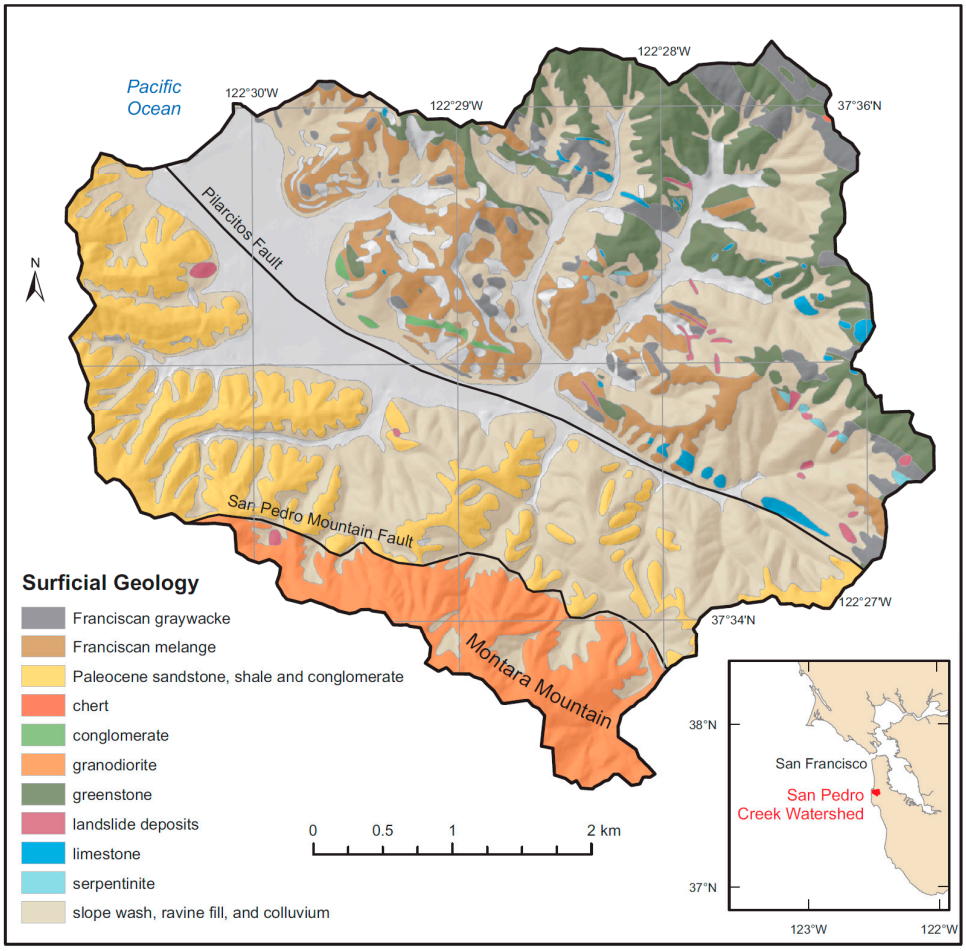

Figure 1. Surficial geology of San Pedro Creek watershed, after Pampeyan [30].

Land cover is one third urbanized as residential and commercial development, including most of the valley floors but extending upslope (Figure 2). The undeveloped areas are vegetated by a mixture of native and exotic grasses, forests, coastal scrub and chaparral, with riparian corridors of varying complexity along drainage lines (Figure 3). Upland vegetation communities are influenced by bedrock type, soil depth, slope and aspect, with *Arctostaphylos* chaparral prominent on steep areas with thin soils, and coastal scrub (with *Baccharis pilularis*, *Chrysolepis chrysophylla*, and other species) commonly on colluvium. Grasses are primarily on some south facing slopes, while trees are primarily introduced, mostly composed of *Eucalyptus globulus* and *Pinus radiata*.

A combination of steep terrain and relatively weak bedrock can lead to extensive debris flows and slides during intense rainfall events [31]. Field and aerial photographic analysis conducted during a sediment source analysis [32] also points to the significance of impervious runoff from roads crossing steep midslopes, as seen in Figure 4. Precipitation is markedly seasonal, with 90% of the 840 mm annual rainfall occurring between November and April [33].

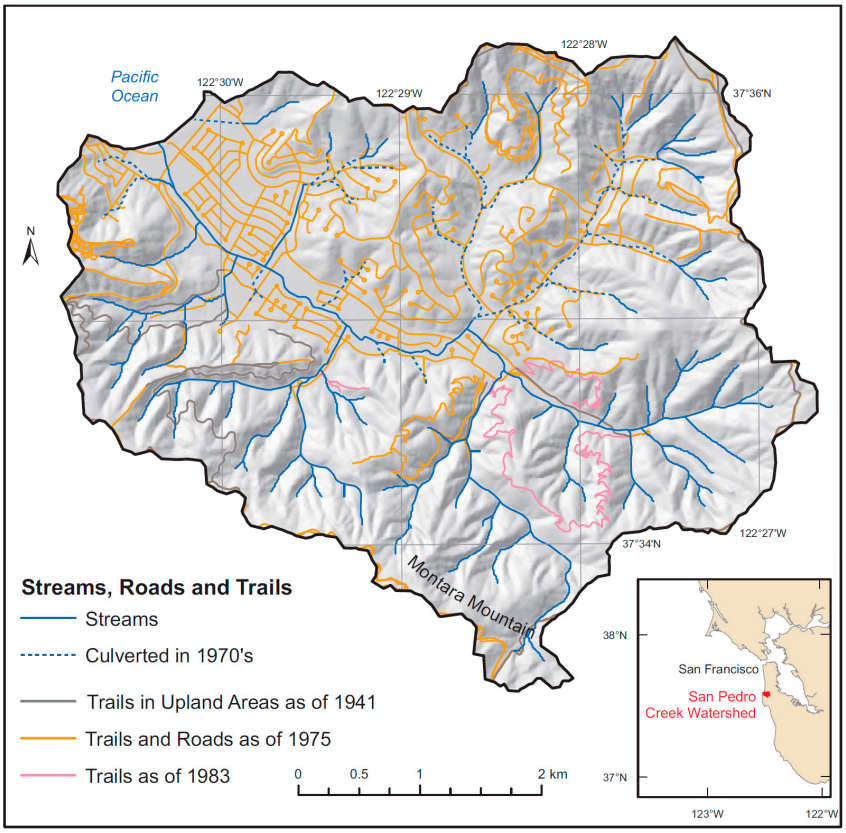

Figure 2. Streams, roads and trails in San Pedro Creek watershed.

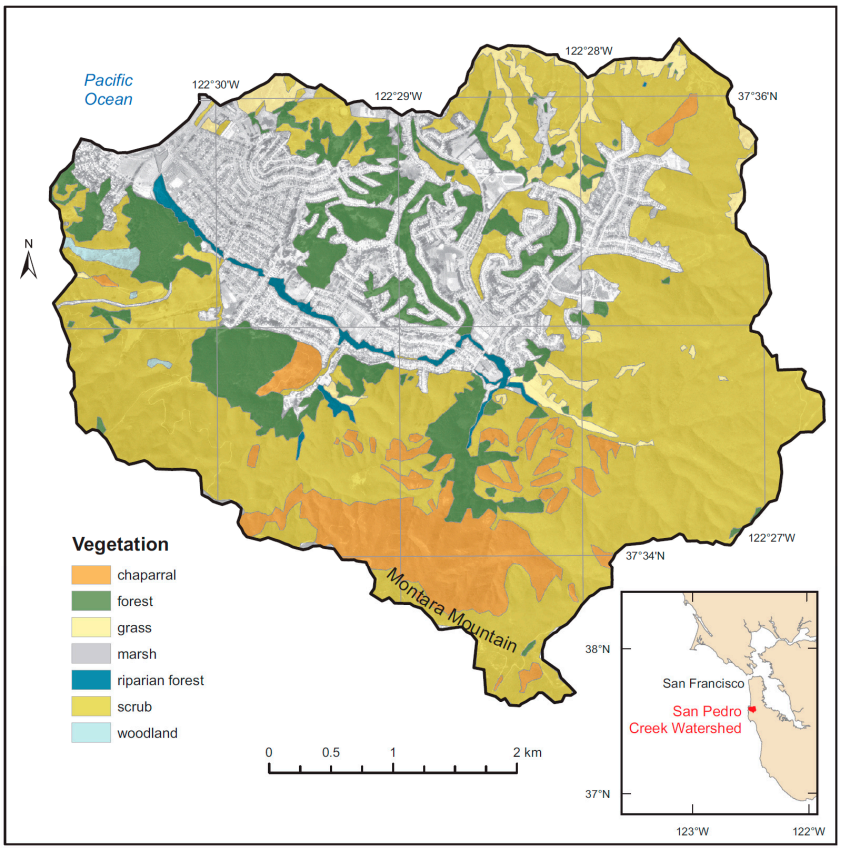

Figure 3. Major vegetation types in undeveloped areas, San Pedro Creek watershed, based upon field mapping in 2002.

Figure 4. Shallow landslides associated with impervious runoff in San Pedro Creek watershed. At left is the crest of a failure that occurred below Higgins Road in 2003; at right are older scars from the 1970's below a dirt road above Picardo Ranch. (Photographs by Jerry Davis)

3. Methodology

3.1. Physically-Based Model

Several versions of the infinite slope method have been employed with two good examples being SHALSTAB and SINMAP [34]. For this research SINMAP was used where the FS is given as:

$$FS = \frac{C + \cos\ \theta\ [1 - wr] \tan \phi}{\sin\ \theta} \quad (2)$$

where C is made dimensionless by a combination of soil (C_s) and root cohesion (C_r), soil thickness D, soil density ρ_s, and gravity g.

$$C = \frac{C_r + C_s}{D\ \rho_s g} \quad (3)$$

Here, $r = \rho_w/\rho_s$ is the ratio of the density of water to soil density, and the ratio of the height of the saturated zone, D_w, and D, is the relative wetness $w = D_w/D$.

The model extends the infinite slope model spatially to accumulate flows downslope, using the assumption that the capacity for downslope lateral flux is $T\ sin\theta$, where T is soil transmissivity ($m^2\ h^{-1}$) derived as the product of hydraulic conductivity and soil thickness, and provides spatial patterns of relative wetness. In SINMAP, together with an estimate of specific catchment area $a = A/b$, where A is contributing area for unit contour length b, slope and recharge (R) relative to transmissivity T, the relative wetness w is derived as:

$$w = Min\left(\frac{Ra}{T \sin \theta}, 1\right) \quad (4)$$

A stability index (SI) is then derived as the minimum factor of safety, with minimum cohesion and maximum recharge-to-transmissivity ratio. For $FS_{min} < 1$, SI is set to $Prob(FS > 1)$; and for $FS_{max} < 1$, SI is set to zero [34].

3.2. Maximum Entropy Model

Maximum entropy (MaxEnt) is increasingly being considered in the study of a variety of earth system processes [35,36]. MaxEnt compares the conditional density function of covariates (predictor variables) at presence sites $f_1(z)$ to the marginal (background) density of covariates in the study area $f(z)$, in order to derive the conditional occurrence probability $Pr(y = 1|z)$ [37]. Maximum entropy models derive from information theory (as opposed to thermodynamic entropy models), and have shown promise in a variety of applications in earth science [38].

A maximum entropy modeling approach was used by Convertino *et al.* [26] for the 9130 km^2 Arno River basin in the Tuscany region of Italy. Felicísimo [39] compared logistic regression, the maximum entropy (MaxEnt) application of Phillips *et al.* [40], multiple adaptive regression splines (MARS), and classification and regression trees (CART) for modeling landslide susceptibility in a region of northern Spain; CART and MaxEnt performed best based upon area under the receiver operator characteristic curve (AUC).

3.3. Hybrid Model

We propose a hybrid approach (Figure 5), starting with a physical infinite-slope model extended spatially with downslope accumulated flows influenced by soil thickness and tranmissivity (SINMAP) that is then used as an input into a maximum entropy model that is able to incorporate factors unsuitable for the physical model; various GIS geoprocessing tools are also used to create derivative datasets such as slope, curvature, and distances to streams and trails or roads. A physical model such as SINMAP has the advantage of employing the nature of water movement and the stability factors of the infinite slope model, and thus it can go farther than its inputs can do statistically, but it also has limitations. Inputs to the model itself are often difficult to assess, and cohesion in particular is well known to vary spatially, due in part to the major influence yet complex nature of root cohesion [41]. If no suitable root cohesion data are available, maps generated by the purely physical model considering only particle cohesion often show extensive slope failures. This is not surprising given the well-known counteracting role of root structures for preventing landslides. Because some parameters, particularly engineering properties of soil, such as cohesion and friction angle are difficult to quantify with the physically-based models at medium to coarse scales; other variables, such as distance to streams, roads and trails become more significant. Many slope failures may be attributed to local hydrologic factors such as concentrated runoff from impervious surfaces, for example trails and abandoned roads built on hillslopes. A hybrid approach incorporating as an input slope stability derived from a physical model, itself unattainable from any statistical approach, has the potential to do better than either a purely physical or purely statistical model.

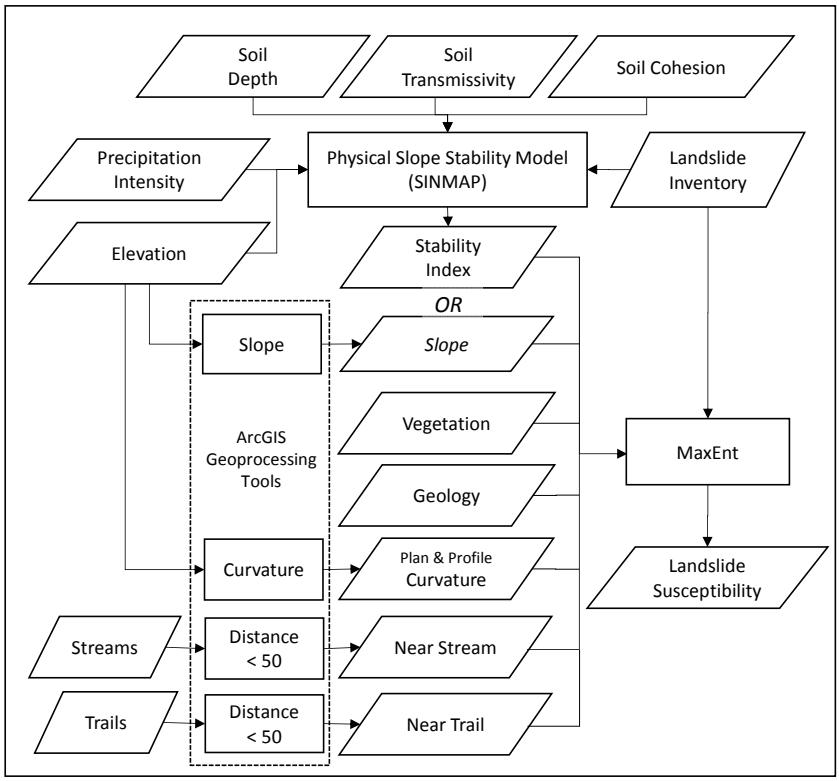

Figure 5. Hybrid model combining a physical infinite-slope model extended spatially via soil thickness and transmissivity using downslope accumulated flows (SINMAP) with a maximum entropy (MaxEnt) model. SINMAP runs in ArcGIS, and ArcGIS geoprocessing tools are used to generate slope, plan curvature, stream distance and trail/road distance. If slope is used instead of stability index, this produces a purely statistical maximum-entropy model.

3.4. Landslide Scar Data and Causal Factors

Landslides are commonly focused in colluvial hollows similar to those described by Reneau *et al.* [42], and in this watershed colluvial fills of up to 6 m have been documented [43]. Subsurface hydrology is a major cause of shallow landslides [44]. Landslides appear to largely originate on slopes of 26°–45° and more than 35% of all watershed hillslopes fall into this range. In an El Niño event of January 1982, the largest landslides all occurred between a narrow range of 26°–30° [45] during a period of intense rainfall on already saturated hillslopes [46].

Urbanization has been an important factor increasing landslide hazards in the watershed. Pampeyan [30] found that hillslope toe removal associated with increased development is a factor in increasing landslide potential within the watershed. Development on steep hillslopes has been seen as a contributing cause of landslides, leading in the 1970's to the passage of a Hillside Protection Ordinance by the City of Pacifica. Finally, recreational use of steep hillslopes has led to the construction of extensive trail networks, most problematically in the case of off-road motorcycles, though the latter use has been greatly curtailed in recent decades. These trails divert and concentrate flow, contributing to landslide hazards downslope.

A combination of archival research, aerial photography interpretation and field surveys were used to compile a spatiotemporal inventory of landslides (as well as gullies) occurring in San Pedro Creek watershed [32]. In this study, shallow landslides were identified by scars and tracks from imagery from

1941 (1:24,000), 1955 (1:10,000), 1975, 1983, 1991 and 1997 (1:12,000). Environmental factors considered included surficial geology, vegetated land cover, distances to streams and trail networks, and slope and curvature derivatives of elevation. While gullies were primarily developed during the earlier agricultural development of the watershed, as seen on the 1941 aerial photograph, steep topography and intense rainfall events clearly drove the patterns of landslides especially in later years with an expansion of impervious surfaces including road and trail development on hillslopes [47]. The focus of this paper is on a hybrid model applied to data collected for these studies for 1941, 1975 and 1983, when contributing factors appear to be more closely aligned with either (a) expansion of agricultural and other land uses (1941 imagery), (b) hydrological connectivity to impervious surfaces (1975), or (c) widespread slope instability after an intense precipitation event in 1982 (1983).

Causal factors considered included categorical variables such as major vegetation classes (grassland/herbaceous, scrub, and forest), major surficial geology groups (granitics, sandstone, and colluvial hillslope deposits), and proximity to trails and streams. Vegetation is based on Wieslander [48] for 1941; aerial photographic interpretation in 1955, 1975, 1983, and 1997; and 2002 field mapping [49]. The most significant vegetation changes occurred between 1955 and 1975, a time of accelerated suburban development of the watershed. Trails and predominantly dirt roads built on hillslopes were digitized from these same aerial photographs (paved roads on valley floors were not used in our analysis.)

Continuous factors were derived from elevation data, including slope and curvature. We acquired elevation data in two resolutions—3 m from LiDAR and 10 m from photogrammetric contouring—from the US Geological Survey, but selected the 10-m data for the model to avoid detecting actual scars in the LiDAR data. Each source has characteristic artifacts—LiDAR noise and stepped contour interpolation effects—that were mitigated using 3 × 3 low-pass filters: one for slope and two in succession for curvature. Spatial variation in precipitation intensity as was used in Convertino *et al.* [26], was not considered for our study due to the relatively small size of our study area with very few rain gauges to derive a suitable spatial input. Categorical variables included vegetation, geology, and Boolean 50-m trail and stream buffers.

4. Results

The hybrid landslide susceptibility model (see Figure 5) starts with deriving a stability index that employs data on soils, surficial geology, and elevation. Transmissivity and soil thickness were derived from a combination of soil and colluvium thickness, and a single set of inputs to approximate two contrasting conditions that create similar SINMAP inputs was selected: (a) moderately thick soils with high hydraulic conductivity on the granitic slopes of Montara Mountain, and (b) deep colluvium with moderate hydraulic conductivity (Table 1). Steady-state rainfall conditions are assumed.

Table 1. SINMAP inputs for transmissivity (T), recharge (R), cohesion (C), friction (φ), and density (ρ). Soil data from Natural Resources Conservation Service SSURGO data, modified with colluvium depths from [30].

Parent material	Soil depth (m)	Hydraulic conductivity (m h^{-1})	T (m^2 h^{-1})	R (m h^{-1})	T/R (m)	C	Φ (º)	P (kg m^{-3})
granitic	1	0.10	0.1	0.0002–0.0042	24–500	0–0.25	30–45	2000
colluvium	3	0.03	0.1	0.0002–0.0042	24–500	0–0.25	30–45	2000

Given these assumptions, inventoried landslides from all years were predicted by SINMAP to be mostly undersaturated but unstable, with majorities of observed scars predicted in areas with a stability index less than 1.0 (Figure 6; Table 2). The stability index is mapped together with 1941, 1975, and 1983 landslides in Figure 7. The general patterns observed is a widespread occurrence of slope failures each year, with 154 visible in 1941, 142 in 1975 and 252 in 1983. The last period is strikingly missing scars on the steepest slopes of Montara Mountain, suggesting somewhat contrasting conditions for slope failures captured in 1983. In both 1975 and 1983, however, many areas with predicted low stability index experienced no landslides, and while this may partially relate to an inability to predict the more complex local hydrologic flow and cohesion patterns in soils and colluvium, clearly missing are some important spatial controls that could not be considered in the physical model.

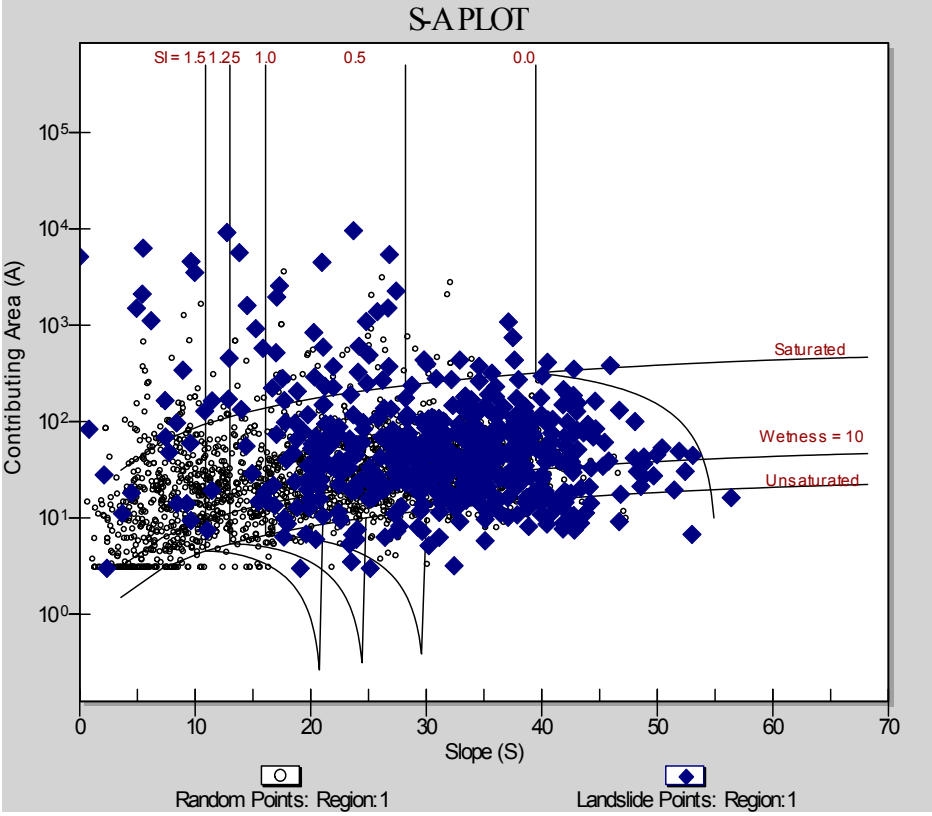

Figure 6. Slope-Area Plot generated by SINMAP, with inventory landslides from all years plotted with boundary curves of stability index and saturation.

Table 2. Stability Indices (SI) < 1.0 predicted by SINMAP for landslide scars by year.

Imagery Year	1941	1955	1975	1983	1997
n scars	154	39	142	253	10
n SI < 1.0	91	24	91	197	6
%	59%	62%	64%	78%	60%

Variations in root cohesion is clearly an important missing variable in the physical model. The SINMAP inputs were based on soil particle cohesion alone, yet it appears this is insufficient to avoid slope failure; this is not surprising as the significance of roots in maintaining slopes is well known [16]. Given the highly variable depth of rooting in general and for scrub and chaparral plant communities in particular,

however, reasonable root cohesion estimates could not be sufficiently partitioned spatially to derive realistic estimates for physical modeling. Other potentially important variables may be slope curvature and proximity to features such as impervious surfaces and streams. In the hybrid model, the stability index result from SINMAP is therefore transferred along with these other factors into a maximum entropy model.

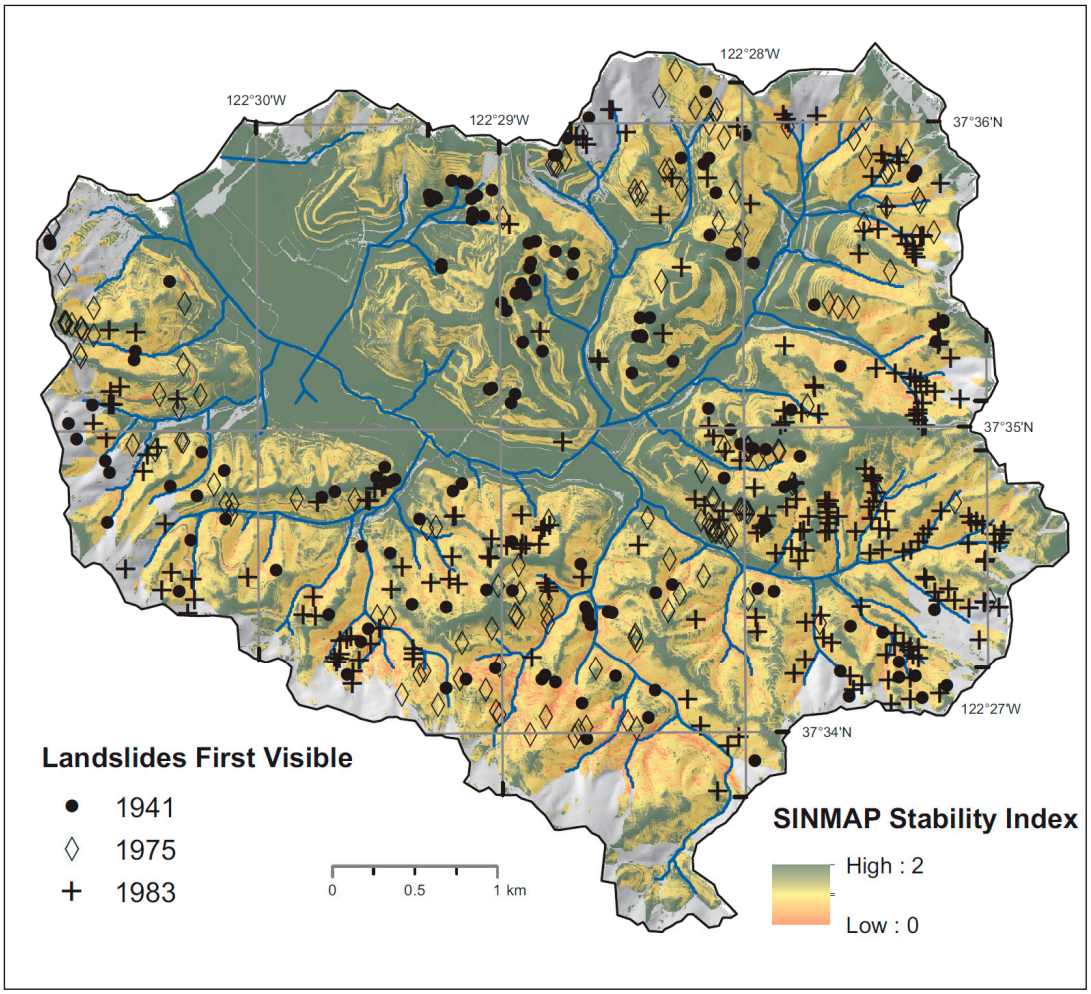

Figure 7. Locations where landslides were first visible in 1941, 1975 and 1983, plotted on SINMAP Stability Index.

MaxEnt models were developed for landslides first visible in 1941, 1975, and 1983 aerial photography, for 10 m input rasters; smaller numbers of scars first visible in 1955 and 1997 were used to test models developed for prior years 1941 and 1983, with 1983 data used to test the 1975 model. Results as receiver operator curves and prediction maps are given in Figures 8–10. Using a cross-validation approach, ten-fold random replicates (similar to the approach of Felicísimo *et al.* [39] for landslide modeling and Phillips *et al.* [40] for species distribution niche modeling) were used to assess model performance as AUC and threshold-based p values (Table 3). As slope and stability index are correlated, separate models were developed, one the hybrid model employing SI, the other a purely statistical model employing slope in degrees. Two measures of covariate contributions were assessed: percent contribution and permutation importance with lambda results reported for each class of categorical variables.

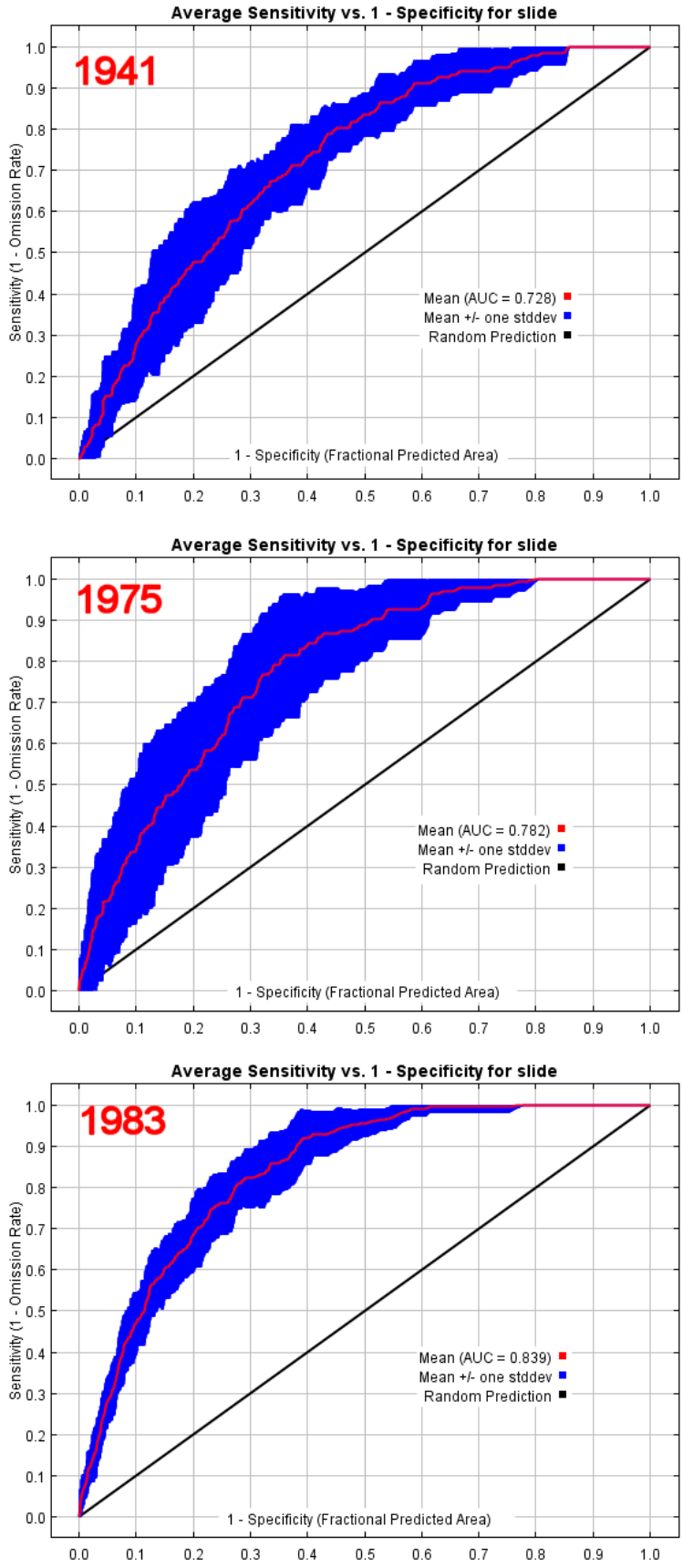

Figure 8. Receiver operator curves (ROC) generated by MaxEnt for 1941, 1975, and 1983 landslides, from 10-fold replicate models. Receiving operator curves are shown as the total range of replicate curves, with the mean curve in red.

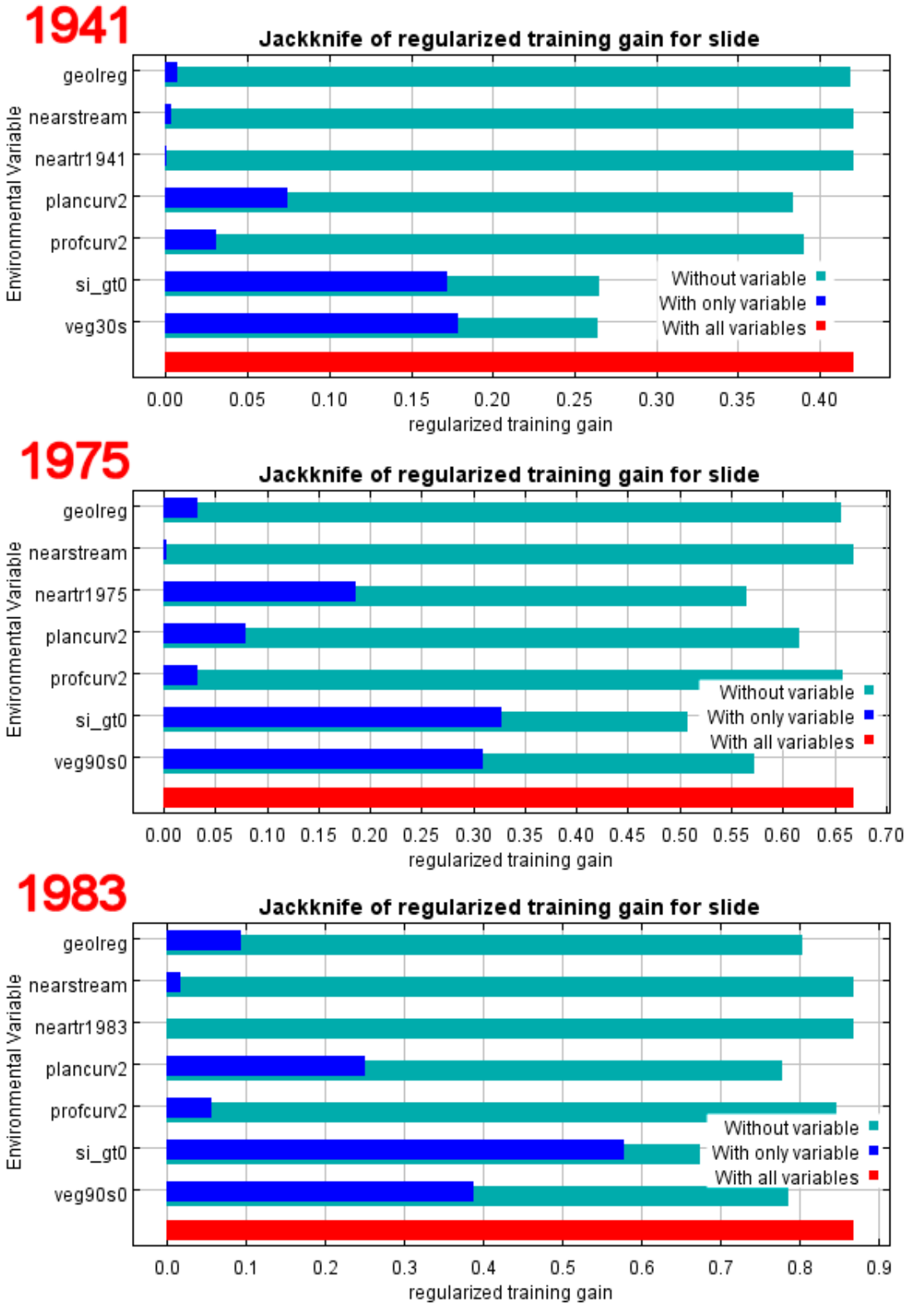

Figure 9. Variable contribution jackknife plots generated by MaxEnt for 1941, 1975, and 1983 landslides, from 10-fold replicate models. Jackknife plots provide the variable contributions from geology (geolreg), proximity to streams (nearstream), proximity to trails (neartr_), plan curvature (plancurv2), profile curvature (profcurv2), stability index (si_gt0), and vegetation (veg_).

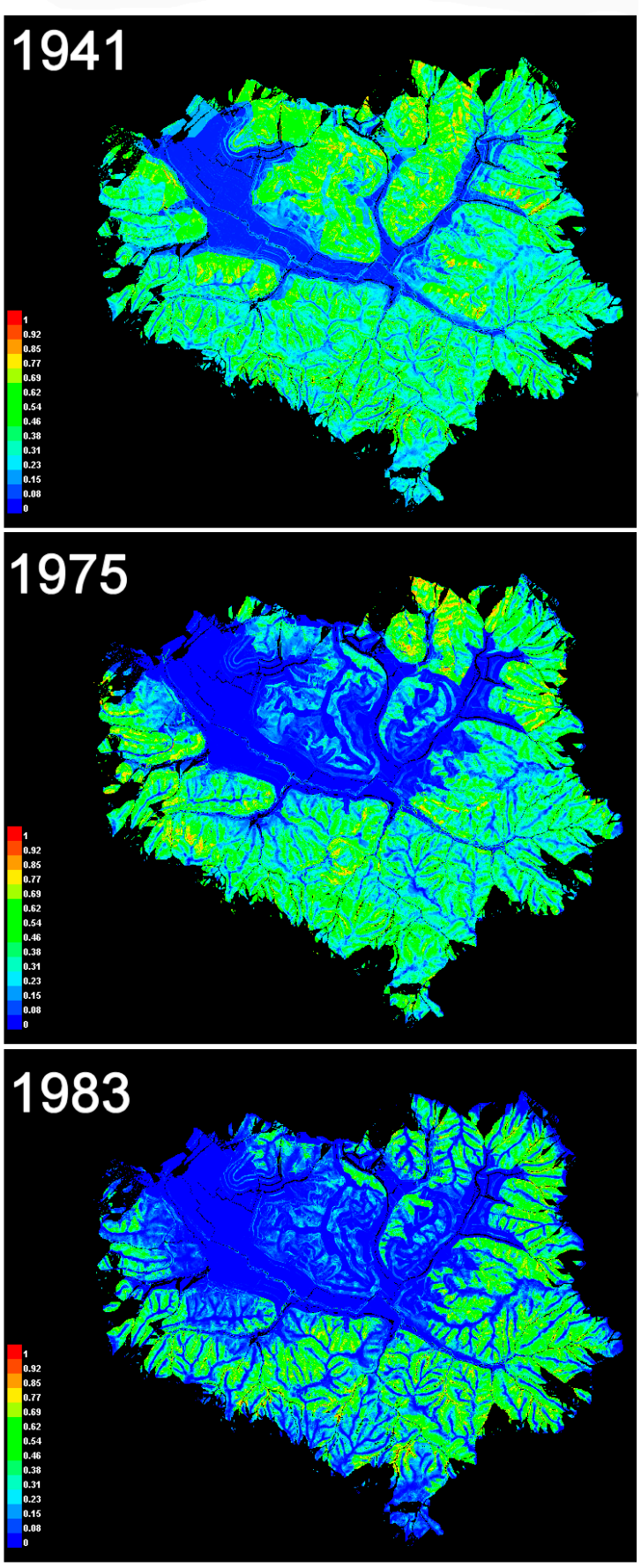

Figure 10. Maps generated by MaxEnt for 1941, 1975, and 1983 landslides, from 10-fold replicate models.

Table 3. Maxent results by year of shallow landslide scars from aerial photography, including overall and 10-fold replicate models. Variables were chosen based upon their contribution to one or more models, and correlated variables (SI and slope) were not used together. Variable contributions are given as percent contribution (%) and permutation importance (PI). Models are evaluated as AUC for a threshold-independent assessment; for a threshold-dependent evaluation, arithmetic means of the 10 p values use the maximum test sensitivity + specificity threshold from MaxEnt [40]. Lambdas for categorical variables are for unreplicated models using all data for training.

		1941		**1975**		**1983**	
	using:	SI	slope	SI	slope	SI	slope
n		132	154	132	141	226	252
AUC (using all data)		0.795	0.796	0.822	0.814	0.859	0.857
AUC subsequent-year test data		0.778	0.795	0.749	0.742	0.853	0.842
subsequent test year		1955		1983		1997	
n slides in test year		31	39	226	253	9	10
10-fold replicates:							
AUC with 10-fold replicates		0.728	0.743	0.782	0.772	0.839	0.836
AUC standard deviation		0.044	0.041	0.058	0.040	0.026	0.024
p: maximum test sensitivity + specificity		0.004	0.041	0.001	0.000	0.000	0.000
SINMAP stability index	%C	48.1		35.3		48	
	PI	50.2		49.7		57.4	
Slope (°)	%C		59.1		41		37.5
	PI		59.3		49.2		46.4
Plan curvature	%C	9.6	13.4	6.4	7.4	15.3	19.6
	PI	9.4	15	3.9	6.6	13.9	18.8
Profile curvature	%C	6.7	2.3	1.5	1.1	2.2	1.7
	PI	10.1	4.8	4.2	3.1	5	2.7
50-m trail buffer	%C	0	0.3	22.5	16.8	0.1	0
	PI	0	0.2	14.9	16.4	0.1	0
Vegetation	%C	35	23.7	32.2	33.2	24.6	27
	PI	29.9	20	24.9	23.6	15.5	20.3
0. Farmed (1941), Developed (1975 & 1983) λ		0.0	0.00	−1.93	−2.14	−0.02	−0.42
1. Grassland λ		1.76	1.17	1.06	1.25		
2. Scrublands λ		0.54				1.43	1.39
3. Forest λ			−0.01	−0.56	−0.34		
Geology	%C	0.5	1.1	2.1	0.6	9.8	13.4
	PI	0.1	0.7	2.2	1.2	7.9	11.4
1. Granitic λ		−0.22	−0.40	0.0	0.0	−1.10	−1.03
2. Sandstone λ		0.03			0.15		
3. Colluvium λ			0.03	−0.33	−0.02	0.54	0.58

5. Discussion and Conclusions

In considering the hybrid model as an improvement over either a physically based model or a maximum entropy based statistical model, we can compare results from MaxEnt with varying inputs, such as (a) using stability index alone; (b) using stability index along with environmental factors; and (c) using slope angle as an alternative to stability index, along with the remaining environmental variables. Each of the three years of significant landslide evidence—1941, 1975 and 1983—represent contrasting scenarios indicative of both land cover changes and varying rainfall intensity conditions. These are interpreted below as the effects of cultivation and grazing on moderate slopes before 1941, suburban development leading up to 1975, and an especially intense rainfall event in 1982 seen in 1983 imagery.

The landslide model for 1941 (AUC = 0.795) illustrates a preference for the areas of relatively moderate relief in the north-central part of the watershed, with vegetation and the SINMAP stability index contributing the most to the resulting model: 48% and 35%, respectively. Patterns of landslides reflect agricultural and grazing conditions prevalent until later residential development in the 1950's. Many landslides occurred in scrubland areas on the steep eastern and southern hillslopes, though the north-central grassland shared a propensity for landslides, where grazing on hillslopes is a likely factor. Replacing the stability index with slope, however, produced identical results (AUC = 0.796), with slope contributing 59% of the model), suggesting no real improvement over stability index in the MaxEnt model. Stability index alone produced MaxEnt AUC of 0.652, while slope alone yielded an AUC of 0.687.

Similarly, in 1975, little difference results from choosing slope over SI, either alone (AUC for SI alone is 0.717, for slope alone is 0.719), or in combination with other factors (0.822 for the hybrid model with SI, 0.814 for a purely statistical model with slope). By 1975, the north-central area had experienced suburban development, with some landslide areas in the north central area landscaped and stabilized for housing. The greatest numbers of landslides occurred instead on steeper grassland and scrubland hillslopes to the east and south. Using landslide scars from 1983 as test data scored low in AUC, suggesting that the 1975 model reflects contrasting conditions in that year as compared with the later year. One likely factor is the prominence of suburban development and major expansion of trails, including off-road motorcycle trails [50], on hillslopes leading up to 1975, and this is shown by the 22.5% contribution of a 50-m trail buffer for the hybrid model and the 16.8% contribution of this factor in the purely statistical model employing slope.

The model from 1983 however does appear to show stability index contributing more than slope, at least as a single factor: when used alone, SI creates an AUC of 0.785, with slope alone creating an AUC of 0.749. But there is no real difference between the overall hybrid model (AUC of 0.859) and the statistical model employing slope (AUC = 0.857). In 1983, plan curvature and vegetation are the next most important contributors. Interestingly, numerous scars occur on the scrublands that dominate undeveloped steep hillslopes; it is likely that scrubland root structures do not extend deep enough to prevent landslides that result from an intense rainfall event. Similarly, only in the 1983 model does surficial geology play a prominent role, when landslides were abundant on colluvium, likely initiated from pore pressure threshold exceedances during the 1982 ENSO year [51].

Based on the mean and spread of receiver operator curves, the model worked much better for 1983 slope failures. This may have resulted from better landslide data from that more recent year, aided by better preservation of landslide scars that could be observed during field visits in later years. Another explanation

may be the conditions leading to failures that likely provide a contrast between 1975 and 1983: the significance of impervious runoff in 1975 is less evident in 1983 in a lesser contribution of trail proximity, when under the intense 1982 ENSO rainfall events plan curvature (concentrating flow) appears to have played a more widespread role, in contrast to the possibly less predictable effects of impervious runoff.

In conclusion, the potential benefit of the hybrid approach will certainly take additional testing, perhaps also in larger study areas where spatial variability in rainfall intensity may play a part. While apparent from this and other studies that a maximum entropy model provides the ability to incorporate many variables that cannot be incorporated in a physical model alone, the results are difficult to apply generally, which is of course the appeal of a physical model. Our results suggest that while a stability measure developed via a physical modeling approach can provide more information than slope alone, slope in combination with plan curvature (influencing the concentration of hydrologic flows) and vegetation (influencing patterns of root cohesion) can provide similar overall predictive power. The potential benefit of the hybrid approach may be to better identify the contributing factors for initiating landslides by including a potentially clearer picture of slope stability variation from the physical model output, and one that can be improved with more spatially detailed soil parameters, but may benefit from the additional contribution of environmental factors influencing root cohesion and hydrologic flows, in a maximum-entropy model.

Author Contributions

Conceptualization of the project was initiated by Jerry Davis and further developed in discussions between the two authors. SINMAP, MaxEnt, and ArcGIS analysis and figures were completed by Jerry Davis. Composition of the document was completed by both authors. Both authors have read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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From: O'Connor, Bonny
Sent: Monday, November 23, 2020 9:03 AM
To: Public Comment
Subject: FW: Pacifica City Council 11/23/2020 - Vista Mar Project Appeal Comments
Attachments: Vista Mar GHG Equivalency_US EPA_11-20-20.pdf

Importance: High

From: John Mikulin [mailto:[redacted]
Sent: Monday, November 23, 2020 9:03 AM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Cc: Sarah Nell Mikulin [redacted]
Subject: Pacifica City Council 11/23/2020 - Vista Mar Project Appeal Comments
Importance: High

[CAUTION: External Email]

Dear Pacifica City Council Staff:

We are property owners and full-time residents in Pacifica, and we are writing to voice our strong opposition to the proposed Vista Mar development project. We urge the Pacifica City Council to reconsider the Pacifica Planning Commission's uninformed decision to allow the Vista Mar project to be constructed without a thorough safety and environmental impact analysis.

There is a rational basis to conclude that there are significant seismic, hydrological, biological, air quality, and climate change impacts associated with the proposed project, and therefore a complete Environmental Impact Report is warranted.

Based on the Pacifica Planning Commission's existing record of decision, the negative impacts of the proposed Visa Mar development project include:
1) Creating safety hazards for roadways and properties adjacent to the proposed development site due to increased seismic, erosion, and flood risk;
2) Destroying and significantly degrading existing wetlands, riparian areas, habitat, and open space;
3) Destroying heritage Monterey Pine trees;
4) Increasing local air pollution via project construction and operation through the use of additional heavy-duty diesel vehicles and equipment, light-duty gasoline vehicles, and fugitive dust emissions (i.e., increases in PM2.5, PM10, NOx, VOC and CO). Note that the Pacifica Planning Commission's Mitigated Negative Declaration (prepared by Rainey, January 2020 - see URL below) lacks sufficient technical detail to verify the accuracy of the emissions estimates provided. The analysis requires more data regarding the types and vintage of equipment used during construction and operation, as well as the utilization factors for this equipment; and
https://files.ceqanet.opr.ca.gov/258447-2/attachment/H482tcOcvy4ZZyhTUZ0VqmaXGEg8_FwsGB7ky3bdTALsZMquxYUGVa0Ls6LHG1u995I9eH2kCMyCp2k0
https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health
https://oehha.ca.gov/air/health-effects-diesel-exhaust

https://oehha.ca.gov/air/air-pollution-and-childrens-health-fact-sheet-oehha-and-american-lung-association
5) Increase greenhouse gas (GHG) emissions (current estimate = 471.2 MT/CO2e - see commenter supplemental GHG analysis in attached .pdf) and vehicle miles traveled in Pacifica/San Mateo County in conflict with existing California statutes including SB 32 (2016) and SB 375 (2008).
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080SB375

We implore the Pacifica City Council to deny the request to construct this ill-conceived and poorly sited residential development project, at least until the environmental and public safety hazards associated with the proposal can be thoroughly analyzed and shared with the community. Allowing this project to proceed absent these elements is fraught with legal and safety risk for both the City of Pacifica and the developer. Furthermore, as stated above, there is rational basis to assume that the parcel in question is unfit for development given the reasonable likelihood of significant safety hazards and irreparable environmental impacts that development activities would engender.

We thank you for your consideration of these comments as you seek to better align Pacifica's public decision making with existing statutory requirements, public safety, and rational thought.

Sincerely,

_____
John & Nellie Mikulin
[redacted]
Pacifica, California 94044

11/23/2020 Agenda - http://pacificacityca.iqm2.com/Citizens/Detail_Meeting.aspx?ID=1335
CAUTION: This email originated from outside of the City of Pacifica. Unless you recognize the sender's email address and know the content is safe, do not click links, open attachments or reply.

Equivalency Results

How are they calculated?

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

471 Metric Tons

Greenhouse gas emissions from

102
Passenger vehicles driven for one year

-or-

1,169,231
Miles driven by an average passenger vehicle

CO_2 emissions from

53,021
gallons of gasoline consumed

-or-

46,287
gallons of diesel consumed

-or-

519,198
Pounds of coal burned

-or-

6.2
tanker trucks' worth of gasoline

-or-

54.4
homes' energy use for one year

-or-

79.8
homes' electricity use for one year

-or-

2.6

railcars' worth of coal burned

-or-

1,091

barrels of oil consumed

-or-

19,263

propane cylinders used for home barbeques

-or-

0.0001

coal-fired power plants in one year

-or-

60,093,183

number of smartphones charged

Greenhouse gas emissions avoided by

160

Tons of waste recycled instead of landfilled

-or-

22.9

Garbage trucks of waste recycled instead of landfilled

-or-

20,049

-or-

0.102

-or-

waste recycled instead of landfilled

running for a year

17,901

Incandescent lamps switched to LEDs

Carbon sequestered by

7,791

tree seedlings grown for 10 years

-or-

615

acres of U.S. forests in one year

-or-

3.2

acres of U.S. forests preserved from conversion to cropland in one year

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richard@lozeaudrury.com

BY E-MAIL AND OVERNIGHT MAIL

November 22, 2020

Mayor Deirdre Martin and
Honorable Members of the City Council
City of Pacifica
170 Santa Maria Avenue
Pacifica, CA 94044
citycouncil@ci.pacifica.ca.us
martind@ci.pacifica.ca.us
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RE: Vista Mar Project – General Plan Inconsistencies

Dear Mayor Martin and Honorable Members of the City Council:

I hereby write on behalf of the Coalition of Pacificans for an Updated Plan and Pacifica resident Summer Lee (collectively, "CPUP") to comment on the proposed Vista Mar Project ("Project" or "Vista Mar Project") proposed to be located at Monterey Road, South of the Monterey Road/Hickey Blvd. intersection in Pacifica (APN 009-381-020). We incorporate by reference all comments that have been made on the Project, including comments requesting preparation of an environmental impact report ("EIR"). By this letter, CPUP informs that City of Pacifica ("City") that it may not approve the Project because the City's forty-year-old 1980 General Plan ("General Plan") is legally inadequate, fatally out of date, and fatally inconsistent. These legal deficiencies are directly relevant to the proposed Project. Until the General Plan is updated to comply with legal requirements, the City may not approve the Vista Mar Project. We submit herewith as Exhibit A the comments of land use planners Terrell Watt, AICP and Jared Ikeda, which are incorporated herein by reference in their entirety.

A. PROPOSED PROJECT

The proposed Vista Mar Project would include construction of four separate buildings, each with two attached townhomes for a total of eight residential units on a 1.2 acre site (Project Site) located along Monterey Road. The site is steep, with over 50% slopes, is tree covered, including approximately 57 trees, at least 6 of these trees

considered heritage trees as defined by the Municipal Code, and contains an ephemeral drainage with riparian habitat, and has existing landslides.

Watt and Ikeda explain that the site is rich in existing and potential biological resources. According to Live Oak Associates report – Biological Constraints Analysis of the Vista Mar Property - 2007: "An unnamed onsite drainage channel, flows in a southwesterly direction along the southeastern boundary of the project site, was identified as having a defined bed and bank and appears to carry water for most if not all of the year. This channel empties into a storm drain near the southern corner of the site which will likely connect to other established waterways (i.e., local creeks or the Pacific Ocean). Therefore, it is highly possible that this feature may be considered a potential Water of the United States and Water of the State." Id. The IS/MND assumes this resource is jurisdictional and calls for a wetlands delineation and mitigation pursuant to the required regulatory permitting process.

In order to build the Project as proposed the site would be scraped of virtually all trees and other vegetation, deep graded and recontoured, drainage and jurisdictional waters/wetlands filled, destroying the visual and biological integrity of the Project site and surrounding open space area. According to the IS/MND and the attached Geotechnical Investigation by Miramar Enterprises to build the Project "any vegetation and organically contaminated soils should be cleared from the building area." Page 8. "All areas to receive fills should be stripped of organics and loose or soft near-surface soils." Id. [T]he contractor should be prepared for hard drilling or excavation at depths in excess of 15 feet." Id. In addition, the Geotechnical Investigation notes the presence of the drainage swale and notes: "The threat from future debris flow down this ravine remains high, and threatens development within or around the swale area of the subject parcel." Id. at 6. Mitigation proposed in updated Project plans to address flooding and debris flows will involve construction of catchment walls uphill, with no ability to monitor them and clean them out.

The Project site is within the Milagra Creek watershed in an area known for flooding. A storm drain near the southern corner of the site connects to the waterway of Big Inch Creek which drains into the ocean. Evidence of flooding in this area that occurred even in a relatively dry winter is documented in the Watt/Ikeda letter. Altering the natural conditions on a site typically disrupts the ecosystems and amplifies flood and debris runoff, endangering lives and existing development. The current general plan lacks accurate and up to date maps of flooding and flood related risks, and therefore lacks the information necessary to evaluate the safety implications of the proposed development.

B. LEGAL STANDARDS

"The Legislature has mandated that every county and city must adopt a 'comprehensive, long-term general plan for the physical development of the county or city, and of any land outside its boundaries which in the planning agency's judgment bears relation to its planning.'" *Citizens of Goleta Valley v. Bd. of Sups.* (1990) 52 Cal.3d 553, 570 (quoting Gov. Code §65300). The Supreme Court has described the general

plan as "the constitution for all future developments within the city or county." Id. (internal quotation marks omitted). The "propriety of virtually any local decision affecting land use and development depends upon consistency with the applicable general plan and its elements." *DeVita v. Cty. of Napa*, 9 Cal. 4th 763, 803 (1995).

To be legally adequate, the general plan must show "substantial compliance with the statutory requirements" for general plans. *Camp v. Bd. of Sups.*, 123 Cal.App.3d 334, 348 (1981). The elements of the general plan must meet the minimum requirements contained in state law. *Hernandez v. Encinitas*, 28 Cal.App.4th 1048, 1070 (1994); *Buena Vista Gardens v. San Diego*, 175 Cal.App.3d 289, 298 (1985).

If a general plan is legally inadequate, and those inadequacies have a "nexus" to a proposed project, then the project may not be approved. *Garat v. City of Riverside*, 2 Cal.App.4th 259, 293-294 (1991). Where a city's general plan is found to be inadequate, a land use approval is legally vulnerable whenever the inadequacy is relevant to the challenged approval. If there is a nexus between the general plan deficiency and the land use approval being challenged, the approval must be set aside. *Flavell v. Albany,* 19 Cal.App.4th 1846 (1993); *Neighborhood Action Group v. Calaveras*, 156 Cal.App.3d 1176, 1187 (1984).

The requirement that a city's general plan be adequate as a prerequisite to undertaking any land use approval has been emphasized repeatedly by the courts. *Resource Defense Fund v. Santa Cruz*, 133 Cal.App.3d 800, 806 (1982) ("Since consistency with the general plan is required, absence of a valid general plan, or valid relevant elements or components thereof, precludes any enactment of zoning ordinances and the like."); *Kings County Farm Bureau v. Hanford*, 221 Cal.App.3d 692, 744-745 (1990)(project approval overturned due to inadequate general plan elements); *Carmel v. Bd. of Sup.*, 137 Cal.App.3d 964, 974 (1982) (permit to construct hotel void due to inadequacy of general plan).

Subdivision approvals must be consistent with an adequate general plan. Gov. Code sect. 66473.5. If one of the elements of the general plan is inadequate, a city cannot legally find that the subdivision is consistent with the general plan; thus, no valid subdivision approval will occur. *Camp v. Bd. of Sups.*, 123 Cal.App.3d 334, 348 (1981); *Save El Toro Assoc. v. Days*, 74 Cal.App.3d 64, 72-74 (1977) (city could not approve any subdivision due to inadequate general plan).

Each city must "periodically review, and revise, as necessary, the general plan." Gov. Code sect. 65103(a); *Citizens of Goleta Valley v. Bd. of Supervisors,* 52 Cal. 3d 553, 572, 801 P.2d 1161 (1990). The California Supreme Court has stated that there is an implied duty to keep the general plan current. *DeVita v. Cty. of Napa*, 9 Cal. 4th 763, 792 (1995). Although there is no specific timeline for updating a general plan, the court of appeal has stated:

> This conclusion does not preclude a court from looking at the results of a public entity's failure to update its entire plan or any part thereof, i.e., the failure to update a plan and/or its parts may cause a general plan or mandatory element to not be in

> compliance with the statutory requirement ("legally inadequate") which, in turn, if properly challenged in a timely manner, may subject the entity to an attack on its validity pursuant to those proceedings provided in section 65750, et seq.

Garat, 2 Cal.App.4th at 296, n. 28.

The California Office of Planning and Research must notify a city that its general plan has not been revised within eight years, and must notify the Attorney General if a city has not revised its general plan within ten years. Gov. Code sect. 65040.5. The Housing Element must be updated at least once every eight years. Gov. Code sect. 65080(B)(2)(L); 65588(a), 65588(e)(2)(A). Pacifica updated its Housing Element in 2015.

The revision of the Housing Element triggers a legal requirement to update other elements of the General Plan. For example, "Upon the next revision of the housing element on or after January 1, 2009, the conservation element shall identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management." Cal. Gov't Code § 65302(d)(3).

Government Code 65302(g)(1) provides that, "A safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires. The safety element shall include mapping of known seismic and other geologic hazards. It shall also address evacuation routes, military installations, peakload water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards. (2) The safety element, upon the next revision of the housing element on or after January 1, 2009, shall also do the following: (A) Identify information regarding flood hazards, including, but not limited to, the following: (i) Flood hazard zones." Cal. Gov't Code § 65302(g).

C. THE 1980 PACIFICA GENERAL PLAN IS WOEFULLY OUT OF DATE, INTERNALLY INCONSISTENT AND LEGALLY INADEQUATE.

Pacifica is relying on the 1980 General Plan, which is ***40 years out-of-date***. Only the Housing Element has been updated recently, in 2015. However, in plain violation of law, other required elements were not updated when the Housing Element was updated, resulting in blatant inconsistencies and legal inadequacies.

Although the Government Code does not set a firm deadline for updating of the general plan, the city must be notified when the general plan is more than ten years out of date. Gov. Code sect. 65040.5. There is no reasonable interpretation under which a forty-year-old general plan can be deemed to comply with the duty to "periodically review, and revise, as necessary, the general plan," Gov. Code sect. 65103(a); *Citizens of Goleta*

Valley v. Bd. of Supervisors, 52 Cal. 3d 553, 572, 801 P.2d 1161 (1990), or to keep the general plan current. *DeVita v. Cty. of Napa*, 9 Cal. 4th 763, 792 (1995). Whatever is meant by the term "periodically review and revise," it must mean something less than forty years.

Furthermore, the Housing Element must be revised at least every eight years, and when it is revised, the Conservation Element must also be updated to conform to the Housing Element and to update the plan to account for flooding risks, to identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management. Cal. Gov't Code § 65302(d)(3). Although the Housing Element was updated in 2015, the Conservation Element has not been updated since the 1980s. This deficiency directly implicates the proposed Vista Mar Project since the Project property includes a tributary of Big Inch Creek and riparian habitat that accommodates floodwater.

Similarly, the Safety Element was required to be updated when the Housing Element was updated in 2015, but it was not. Cal. Gov't Code § 65302(g). The Safety Element must include consideration of "slope instability," "flood hazard zones" and other risks. The proposed Vista Mar Project directly implicates these risk due to the slope of over 50%, known flooding in the area, and the stormwater corridor on the site.

Because the 1980 Pacifica General Plan is woefully out of date as to elements that are directly relevant to the proposed Vista Mar Project, the City may not approve the Project unless and until it updates the General Plan to conform to all legal requirements.

The City is well aware that its General Plan is inadequate. The City began a General Plan update process in 2009, but never adopted a new general plan. The City states on its general plan update site:

> Why Update the General Plan?
>
> The City of Pacifica last comprehensively updated its General Pan in 1980. Many issues facing Pacifica are enduring but the legal environment governing land use, environmental preservation, housing, and other planning issues have changed. New priorities have emerged with a new generation of Pacifica residents and stakeholders...This update plan can provide an opportunity to eliminate obsolete text and policies, ensure legal conformity and address today's challenges. Homepage at https://www.cityofpacifica.org/depts/planning/general_plan_update_project/default.asp

A memo prepared for the general plan update titled Key Areas of Environmental Concern, sheds further light on the need for the Update (see above link):

> "The existing General Plan is over 30 years old. Some of the policies are out of date and State requirements have changed substantially." Page 1

> "In Pacifica, increased flooding and erosion due to sea level rise [and Climate Change] have the potential to be serious direct impacts." Page 1
>
> "The Planning Area's undevelopable land provides habitat or potential habitat for a variety of species and natural communities. These are extensively updated since the previous General Plan. Some of these have special status, having been listed under the federal or state Endangered Species Acts or identified in the California Natural Diversity Data Base." Page 2.

The general plan update process was never completed with the exception of the Housing Element. When the Housing Element was updated, no other mandatory Elements were updated, thereby exacerbating internal inconsistencies in the current general plan. As a result, the current general plan is legally inadequate in ways directly relevant to the Project that render any action by the City to approve the Project's Tentative Subdivision Map and Site Development Permit invalid.

D. THE INADEQUACIES IN THE PACIFICA GENERAL PLAN ARE DIRECTLY RELEVANT TO THE VISTA MAR PROJECT AND PRECLUDE ITS APPROVAL.

1. THE GENERAL PLAN FAILS TO ANSWER THE FUNDAMENTAL QUESTION OF WHETHER THE SITE CAN BE DEVELOPED AT ALL.

The most basic question when approving a project is whether the parcel can be developed at all. The General Plan fails to answer this threshold question. The Land Use Element adopted in the 1980s identifies the Project parcel as appropriate for Low Density Residential development of 3-9 units per acre. However, the 2015 Housing Element provides conflicting information. Table III-1 of the Housing Element on page 73 identifies the Project site as being "flat" and appropriate for housing. However, Table III-2 of the Housing Element at page 77 does not identify the parcel as being appropriate for housing. Also, the Housing Element is plainly inadequate and inaccurate. Table III-1 shows the Project parcel as being "flat" and therefore appropriate for development. However, this is simply false as a matter of fact. The parcel includes areas with over 50% slope. There is no definition of "flat" that applies to this parcel.

The Land Use Element provisions indicate that sites with slopes in excess of 35% may not be developable and although the text is in sections relating to other neighborhoods, the de facto definition of developable is clear: "Only three areas with slopes less than 35% remain in ... development in the lower quarter of the Very Low Density Residential range is most appropriate...Development must be sensitive to the potential physical and visual impacts...". General Plan at page 52. "At the back of Vista Mar are two fingers of the valley which still contain some developable land less than 35% slope." Id. The Seismic Safety and Safety Element notes that the majority of landslides occur on steep slopes, over 35%, underscoring the merits of this de facto definition. Element page 101-102. If the required information were included in the current general plan concerning hazards and other site features, and the general plan text were internally consistent, the Project site would have been designated differently and potentially deemed undevelopable consistently throughout the general plan.

A general plan must be internally consistent, both among the elements and within each element. Gov. Code sect. 65300.5; *Concerned Citizens of Calaveras Co*, 166 Cal.App.3d at 97-98. This requirement applies to maps and drawings as well as text. *Citizens Assoc. v. Inyo*, 172 Cal.App.3d 151 (1985); *Environ. Council v. Bd. of Sups.*, 135 Cal.App.3d 428 (1982); *Karlson v. Camarillo*, 100 Cal.App.3d 789 (1980).

The Pacfica General Plan is wildly inconsistent. Certain sections show that the parcel is flat and developable. Other sections show that the parcel is not appropriate for development. There is no more fundamental inconsistency then whether the parcel can or cannot be developed at all. These General Plan inconsistencies preclude the City from approving the Project.

2. CONSERVATION ELEMENT WAS NOT UPDATED IN 2015 AS REQUIRED BY LAW AND FAILS TO IDENTIFY RIVERS AND STREAMS ON THE PROJECT SITE THAT WILL BE DIRECTLY IMPACTED BY THE PROJECT.

Gov. Code Section 65302(d) (3) provides, "Upon the next revision of the housing element on or after January 1, 2009, the conservation element shall identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management." Although the Housing Element was revised in 2015, the City failed to update the Conservation Element.

The Project site contains an ephemeral stream that could be considered jurisdictional waters and as such the Project would require a Lake and Streambed Alteration Agreement (LSAA). IS/MND at pages 36-37, Miramar Enterprises Letter at page 4. The Project proposes to fill this streambed, disrupting the flow of stormwater. The General Plan includes no information or diagrams showing these features, including on site drainage, riparian area and biological resources, on the Project site. Nor does the Conservation Element or any other Element of the current General Plan contain the required flood corridors and flood mapping. This information is readily available. Yet, as required by law, current and complete information including, but not limited to flooding and flood corridors, riparian habitats, and stormwater management, are not in the current General Plan rendering the plan incomplete and defective as to the required information necessary to identify the potential hazards associated with Project site development.

This information is critical to the Project and its approvability, yet it is nowhere to be found in the General Plan. Since the Project site includes "creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management," this requirement is directly relevant to the Project approval. The City may not approve the Project until the General Plan is updated to address this issue.

3. SAFETY ELEMENT WAS NOT UPDATED IN 2015 AS REQUIRED BY LAW AND FAILS TO IDENTIFY FLOOD HAZARDS AND SLOPE INSTABILITY HAZARDS ON THE PROJECT SITE.

Gov't Code Section 65302 provides that "[i]nformation about the watershed the Project site lies in and the flooding history of the area, contributed to by the site's drainage" must be included in the general plan safety element. Specifically, Government Code Section 65302(g) (g) (2) provides that:

> "The safety element, upon the next revision of the housing element on or after January 1, 2009, shall also do the following:
>
> (A) Identify information regarding flood hazards, including, but not limited to, the following:
>
> (i) Flood hazard zones. As used in this subdivision, "flood hazard zone" means an area subject to flooding that is delineated as either a special hazard area or an area of moderate or minimal hazard on an official flood insurance rate map issued by the Federal Emergency Management Agency (FEMA). The identification of a flood hazard zone does not imply that areas outside the flood hazard zones or uses permitted within flood hazard zones will be free from flooding or flood damage."

The Housing Element was updated in 2015 triggering this requirement, but the Safety Element was not updated to comply with this requirement.

As discussed in the Watt/Ikeda letter, the Project site is subject to flooding. Filling the riparian corridor on the site may exacerbate this flooding. Engineer Steve Bond explains that the deep foundations of the buildings will interfere with the flow of shallow groundwater, which will result in flooding. The failure to of the City to update the Safety Element to identify flood hazards therefore is directly relevant to the Project.

Government Code section 65302(g)(1) provides that, "A safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires. The safety element shall include mapping of known seismic and other geologic hazards. It shall also address evacuation routes, military installations, peakload water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards." Government Code section 65302(g)(2) requires that the "The safety element, upon the next revision of the housing element on or after January 1, 2009" must be updated. Despite the fact that the Housing Element was revised in 2014 and certified by HCD in 2015, the Safety Element has not been updated since that time.

As discussed in the Watt/Ikeda letter the Project site includes very steep slopes of over 50%, and landslides have been identified on the Project site. Therefore, the failure of the City to update the Safety Element as required by law is directly relevant to the Project. The City may not approve the Vista Mar Project until the General Plan is updated to address this legal deficiency.

E. THE PROJECT IS INCONSISTENT WITH THE GENERAL PLAN.

The "propriety of virtually any local decision affecting land use and development depends upon consistency with the applicable general plan and its elements." *Citizens of Goleta Valley v. Bd. of Sups.*, 52 Cal.3d 553, 570 (1990). The "critical factors" the court must examine are "the nature of the policies and the nature of the inconsistency;" and it should not simply defer to the City's interpretation. *Families Unafraid to Uphold Rural El Dorado ("FUTURE") v. Board of Supervisors of El Dorado County*, 62 Cal.App.4th 1334, 1338 (1998). Even where policies are not mandatory, a court may find that a project is inconsistent with those policies without finding an "outright conflict." *Napa Citizens for Honest Government v. Napa County Board of Supervisors*, 91 Cal.App.4th 342, 357, 379 (2001). A project is inconsistent with general plan policies if it "frustrates" their implementation. *Id.* "An action, program or project is consistent with the general plan if, considering all its aspects, it will further the objectives and policies of the general plan and not obstruct their attainment." *Corona-Norco Unified School District v. City of Corona*, 13 Cal. App. 4th 1577, (1993). Where a project is inconsistent with the general plan, the project cannot be approved.

Watt and Ikeda explain that the Vista Mar Project is inconsistent with numerous General Plan policies, including but not limited to the following:

- **Conservation Element Policy 3: Protect significant trees**. The Project is inconsistent with this Policy as all vegetation would be scraped and approximately 57 trees, at least 6 of them Heritage Trees removed or destroyed.
- **Conservation Element Policy 5: Local year round creeks and their riparian habitats shall be protected.** The Project proposes to fill a tributary to Big Inch Creek on site and destroy the related riparian habitat.
- **General Plan Pages 52-53: Prohibition of development on slopes over 35%.** The Project develops slopes of over 50%.
- **Community Design Element Hillside Guidelines, Guideline 1: Preserve visually significant slopes and ridgelines, maintain natural open space between areas of development, set aside and preserve natural features**. The Project is on a highly visible slope and will involve mass grading and destruction of the natural area.
- **Community Design Element Hillside Guidelines, Guideline 3: Fit development to the topography, place man-made structures to complement the natural environment.** The Project will scrape and mass-grade the steep 50% slope, and does the opposite of fitting the development to the natural topography.

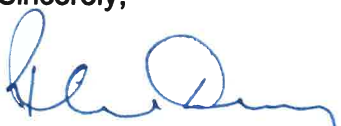
- **Community Design Element Hillside Guidelines, Guideline 4: Minimize grading; discourage mass grading and terracing for construction pads.** The Project involves mass grading.

Since the Vista Mar Project is inconsistent with numerous provisions of the General Plan, the City may not approve the Project.

CONCLUSION

For the above reasons, the City may not approve the Vista Mar Project because the Pacifica General Plan is woefully inadequate in ways that are directly relevant the Project. Furthermore, even if the General Plan were legally sound (which it is not), the Vista Mar Project is inconsistent with numerous provisions of the General Plan. Therefore, the City may not approve the Vista Mar Project.

Sincerely,



Richard Toshiyuki Drury
LOZEAU DRURY LLP

EXHIBIT A

Terrell Watt Planning Consultants
1937 Filbert Street
San Francisco, CA 94123
terryjwatt@gmail.com
415-377-6280

November 19, 2020

Via Email: richard@lozeaudrury.com
Richard Drury
Lozeau Drury LLP
1939 Harrison Street, Suite 150
Oakland, CA 94612

RE: Review and Comments on the Proposed Vista Mar Project

Dear Mr. Drury,

This letter regards the Proposed Vista Mar Project (Project) and specifically addresses the question of whether the Project can be found consistent with the City's current general plan (general plan or current general plan). In preparing these comments, Terry Watt, Planner, collaborated with Jared Ikeda, retired Landscape Architect and Planner (*Bio's attached hereto as Attachments 1 and 2*). The primary documents we reviewed in preparing these comments included, but were not limited to, the following:

1. City of Pacifica General Plan Elements and available maps and diagrams
2. The Current Housing Element
3. Vista Mar Initial Study/MND and Appendices
4. Letters Submitted on the Project IS/MND
5. Prior General Plan Update documents

Our comments below describe the multiple reasons that the City's current general plan is legally inadequate in ways implicated by the Project that render any action by the City to approve the Project's Tentative Subdivision Map and Site Development Permit invalid.

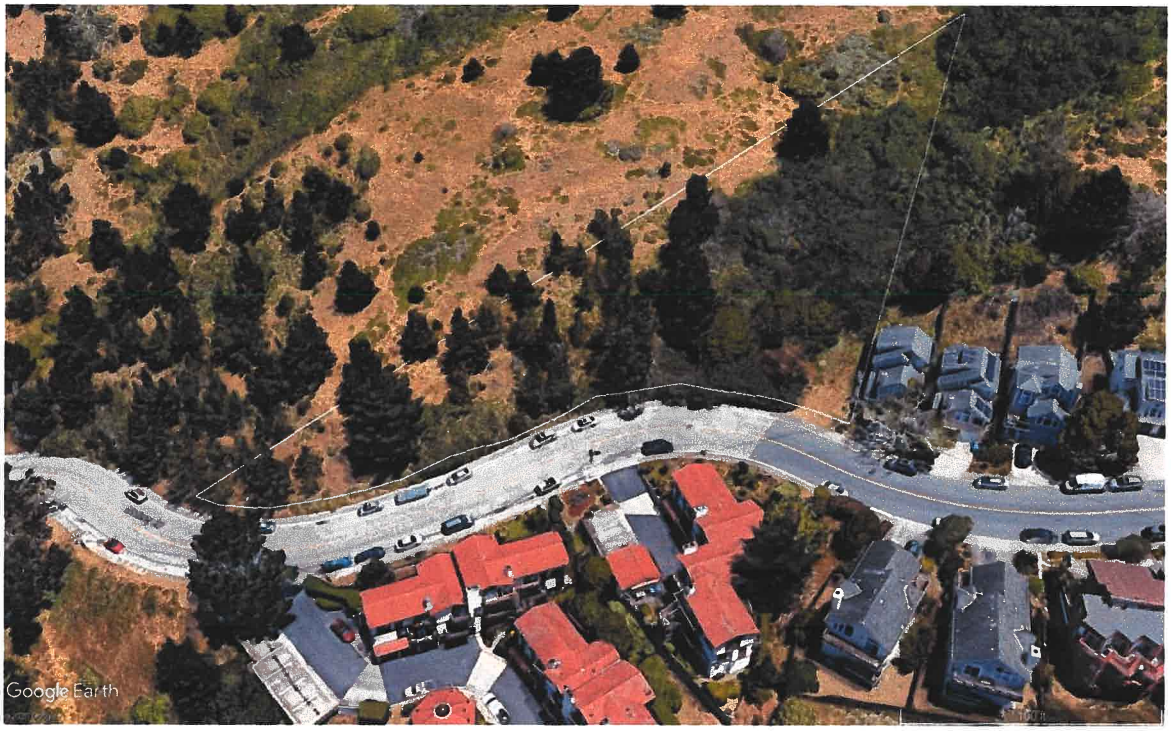
I. Introductory Comments

California law is clear – a land use action, such as approval of a tentative subdivision map or development permit that is not consistent with a city's current general plan, the charter for development, is invalid at the time it is passed. The general plan must be adequate as a prerequisite to undertaking a land use approval. This is because for consistency to be found,

the city's general plan must be legally adequate. Where there is a nexus between a land use action – in this case approval of the Vista Mar Development – and deficiencies or inadequacies in the general plan, render it impossible to find consistency between development approval and general plan, the approval may be set aside. This letter lays out the reasons why the general plan is legally inadequate in ways implicated by the Project that render any approval action invalid.

Project and Site Conditions: The proposed Vista Mar Project (Project) would include construction of four separate buildings, each with two attached townhomes for a total of eight residential units on a 1.2 acre site (Project site) located along Monterey Road.

The site is steep, with over 50% slopes, is tree covered, including at least 6 Heritage Trees, contains an ephemeral drainage with riparian habitat, and has existing landslides. Sources: IS/MND, Arborist updated tree count, 1991 Geotechnical Report.

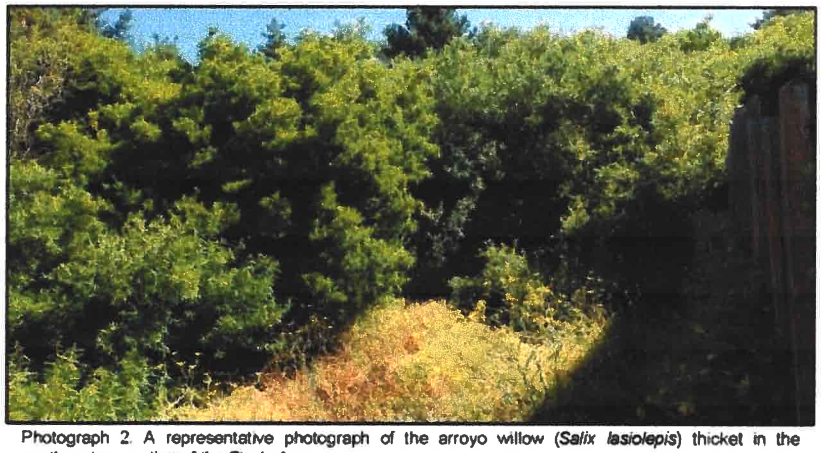


The site is rich in existing and potential biological resources including but not limited to: 1) federally listed species such as the Mission Blue Butterfly and its host plants (silver lupine, summer lupine, manycolored lupine), subject to US Fish and Wildlife consultation, 2) nesting and migratory birds, and 3) jurisdictional waters and riparian vegetation and species, subject to California Department of Fish & Wildlife jurisdiction and permitting. IS/MND pages 34-38. According to Live Oak Associates report – Biological Constraints Analysis of the Vista Mar Property - 2007: "*An unnamed onsite drainage channel, flows in a southwesterly direction along the southeastern boundary of the project site, was identified as having a defined bed and bank and appears to carry water for most if not all of the year. This channel empties into a storm drain near the southern corner of the site which will likely connect to other established waterways (i.e., local creeks or the Pacific Ocean). Therefore, it is highly possible that this feature may be considered a potential Water of the United States and Water of the State.*" Id. The IS/MND assumes this resource is jurisdictional and calls for a wetlands delineation and mitigation pursuant to the required regulatory permitting process.

In addition, the site is home to approximately 57 trees, at least 6 of these trees considered heritage trees as defined by the Municipal Code. IS/MND pages 38-39 as updated by Aborist tree count. A formal wetland delineation along with surveys to determine the presence and extent of important habitats and species have been deferred per the mitigation measures in the IS/MND, rendering a complete description of the site's important biological resources and description of wildlife use of the site impossible at this time. The presence of the resources

described in the IS/MND and in multiple expert letters submitted on the Project to date, indicates this site and the open space area surrounding the site, are of value for habitat and wildlife, and as such would warrant protection by general plan policies. See site photos and figures below documenting these biological resource values on the Project site.

Photograph 1. A representative photograph of the arroyo willow (*Salix lasiolepis*) thicket in the eastern portion of the Study Area.



Photograph 2. A representative photograph of the arroyo willow (*Salix lasiolepis*) thicket in the southeastern portion of the Study Area.

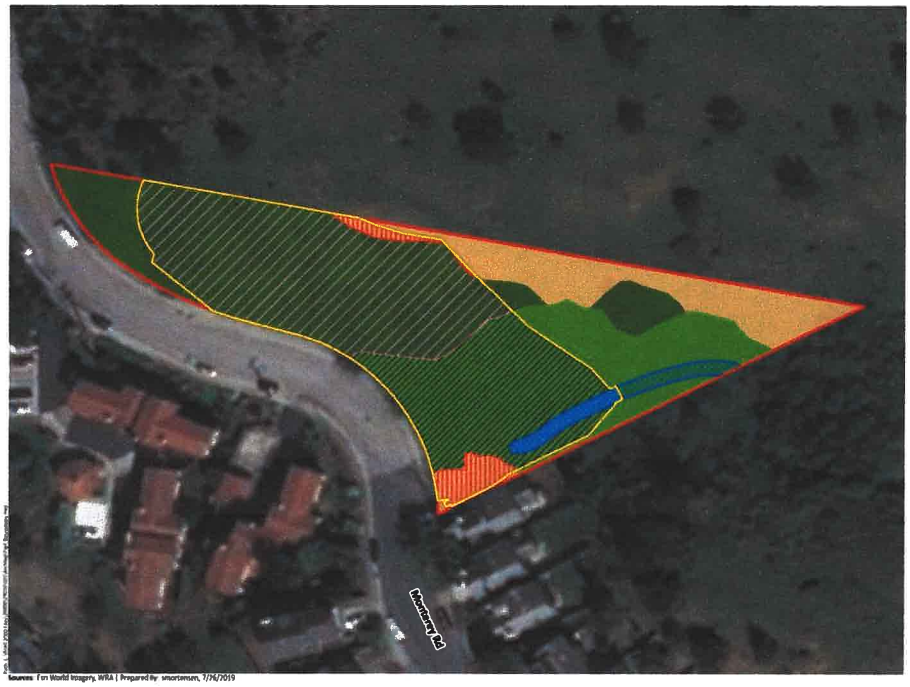


Figure 4.
Biological Communities

Vista Mar Development
Pacifica, San Mateo County, California

Study Area (1.3 ac.)
Project Area (0.78 ac.)
Top of Bank / Ordinary High Water Mark

Non-sensitive Communities

Monterey Pine Forest (0.58 ac.)
Non-native Annual Grassland (0.22 ac.)

Potentially Sensitive Communities

Arroyo Willow Thickets (0.46 ac.)
Ephemeral Drainage Ditch (0.04 ac., 172.77 lin. ft.)

Impacts

Impacts to Arroyo Willow Thickets (0.26 ac.)
Impacts to Ephemeral Drainage Ditch (0.02 ac., 96.19 lin. ft.)
Impacts to Monterey Pine Forest (0.46 ac.)
Impacts to Non-native Annual Grassland (0.04 ac.)

N
0 50 100
Feet

wra

Sources: Esri World Imagery, WRA | Prepared By: smortensen, 7/26/2019

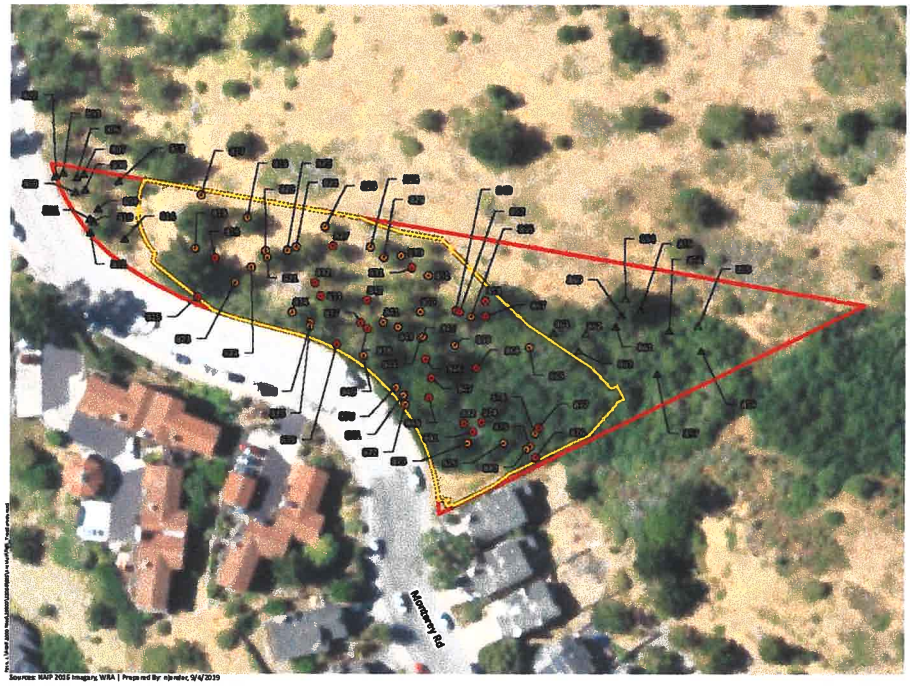


Figure 1.
Tree Survey and Impacts

Vista Mar Development
Pacifica, San Mateo County, California

Study Area (1.26 ac.)
Project Area (0.78 ac.)
Heritage Tree, No Impact
Tree, No Impact
Tree, Proposed for Removal
Heritage Tree, Proposed for Removal

N
0 50 100
Feet

wra

Sources: NAIP 2016 Imagery, WRA | Prepared By: mjordan, 9/4/2019

Photograph 3 Tree #815, a 85.1" circumference Monterey pine (*Pinus radiata*) heritage tree proposed for removal in the western portion of the Study Area

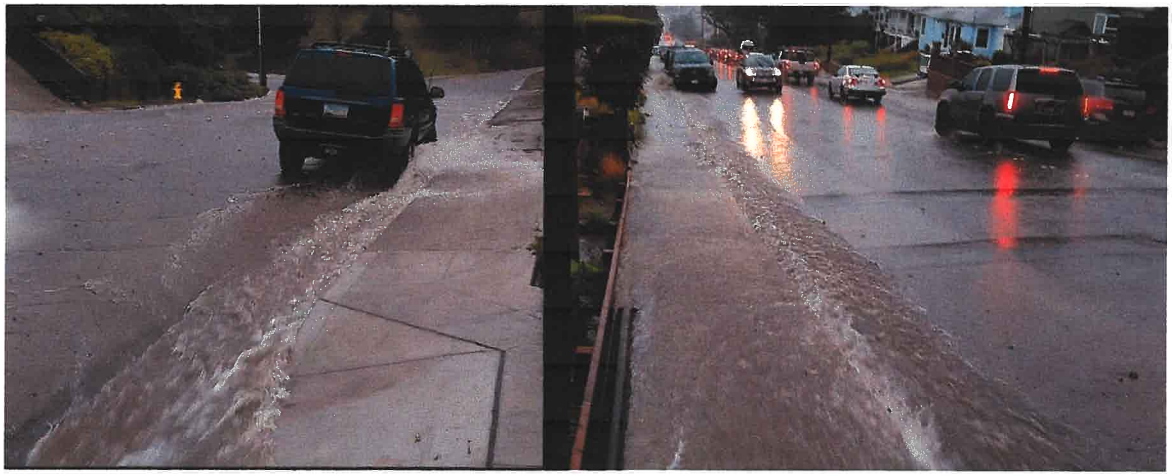
Photograph 4 Tree #853, a 64.4" circumference Monterey pine (*Pinus radiata*) heritage tree proposed for removal in the central portion of the Study Area

Photograph 6 Tree #847, a 120.3" circumference California wax myrtle (*Morella californica*) heritage tree proposed for removal in the southern portion of the Study Area

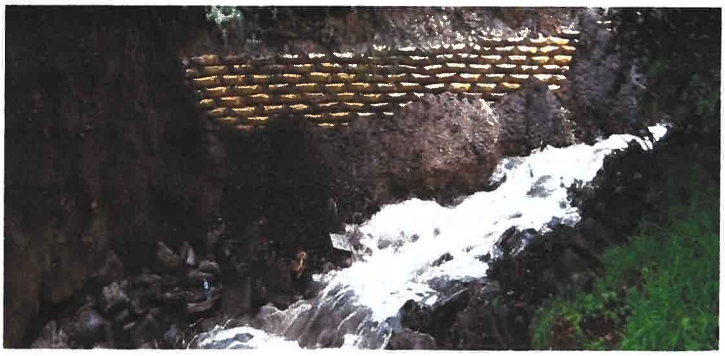
In order to build the Project as proposed the site would be scraped of virtually all trees and other vegetation, deep graded and recontoured, drainage and jurisdictional waters/wetlands filled, destroying the visual and biological integrity of the Project site and surrounding open space area. According to the IS/MND and the attached Geotechnical Investigation by Miramar Enterprises to build the Project *"any vegetation and organically contaminated soils should be cleared from the building area." Page 8. "All areas to receive fills should be stripped of organics and loose or soft near-surface soils." Id. [T]he contractor should be prepared for hard drilling or excavation at depths in excess of 15 feet." Id.*[1] *In addition, the Geotechnical Investigation notes the presence of the drainage swale and notes: "The threat from future debris flow down this ravine remains high, and threatens development within or around the swale area of the subject parcel." Id. at 6.* Mitigation proposed in updated Project plans to address flooding and debris flows will involve construction of catchment walls uphill, with no ability to monitor them and clean them out.

The Project site is within the Milagra Creek watershed in an area known for flooding. A storm drain near the southern corner of the site connects to the waterway of Big Inch Creek which drains into the ocean. See Aerial below. Evidence of flooding in this area that occurred even in a relatively dry winter is documented in photos below. El Nino calendar link: https://images.app.goog.gl/MRUivgcvyYXUuSMQ7. It is not surprising that the Project site is not within a recognized FEMA floodplain. Climate change has increased the number and veracity of storms such that existing FEMA maps may not longer represent actual conditions. Altering the natural conditions on a site typically disrupts the ecosystems and amplifies flood and debris runoff, endangering lives and existing development. The current general plan lacks accurate and up to date maps of flooding and flood related risks, and therefore lacks the information necessary to evaluate the safety implications of the proposed development.

[1] Updated plans indicate that deep grading will be over 25 feet in depth.



Street flooding along Monterey Road January 2020

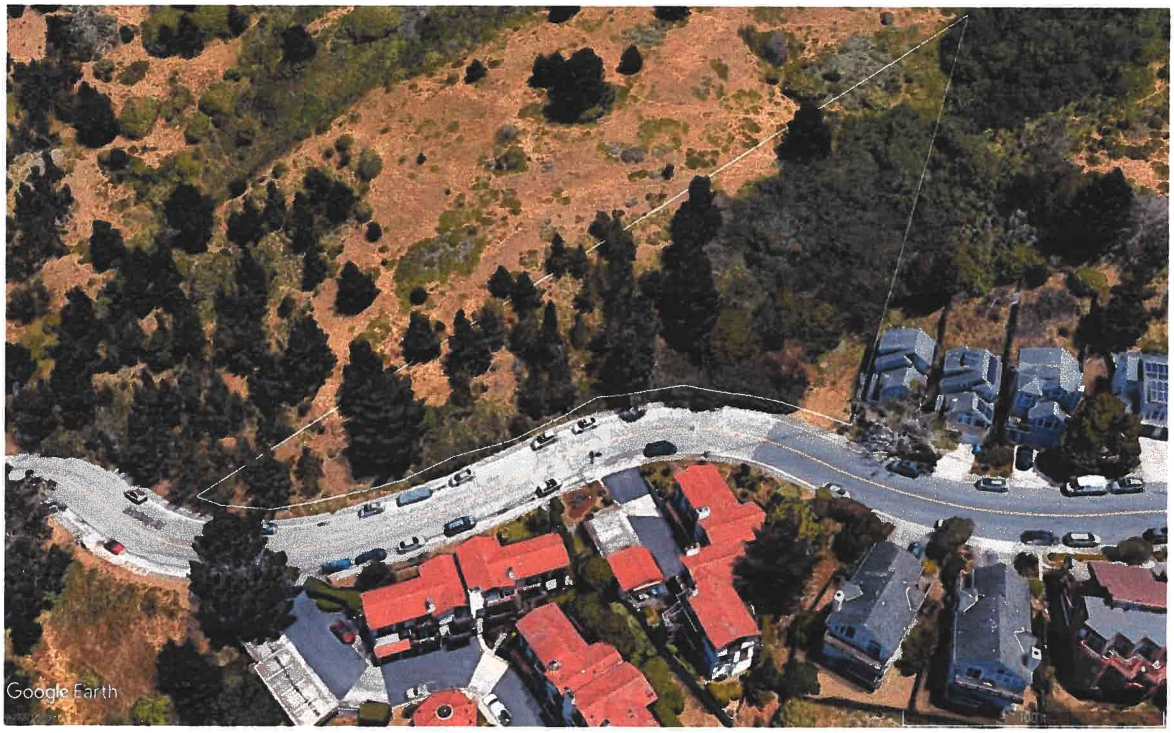


Bank erosion downstream off Monterey Road

Aerial view of coastal bluff erosion – Google Earth

In summary, development of the proposed Project would require the majority of the site, if not all of the site to be cleared of vegetation, deep mass graded (over 25 feet in some cases), and covered with retaining walls, dozens of feet high in some cases. As described above, site development is likely to transfer the risk from increased flooding to the endangerment of the neighborhood and detriment to the watershed, including increased coastal erosion. This is contrary to the current general plan and other regulations that stress consideration of the effect of development on visually significant slopes, open space, topography, and existing vegetation. See current general plan Seismic Safety and Safety Element and Conservation and Community Design Policies, see also General Plan at page 39. As the Seismic Safety and Safety

Element states: "General Plan policies have recognized development constraints on steep hillside lots. Steep slopes have traditionally been placed in lowest density land use designations in recognition of the difficulty and potential danger of development." Element at page 102. As described in more detail in the body of this letter, to the extent the current general plan provides guidance as to the site's development potential, the Project is inconsistent with most of the pertinent policies.



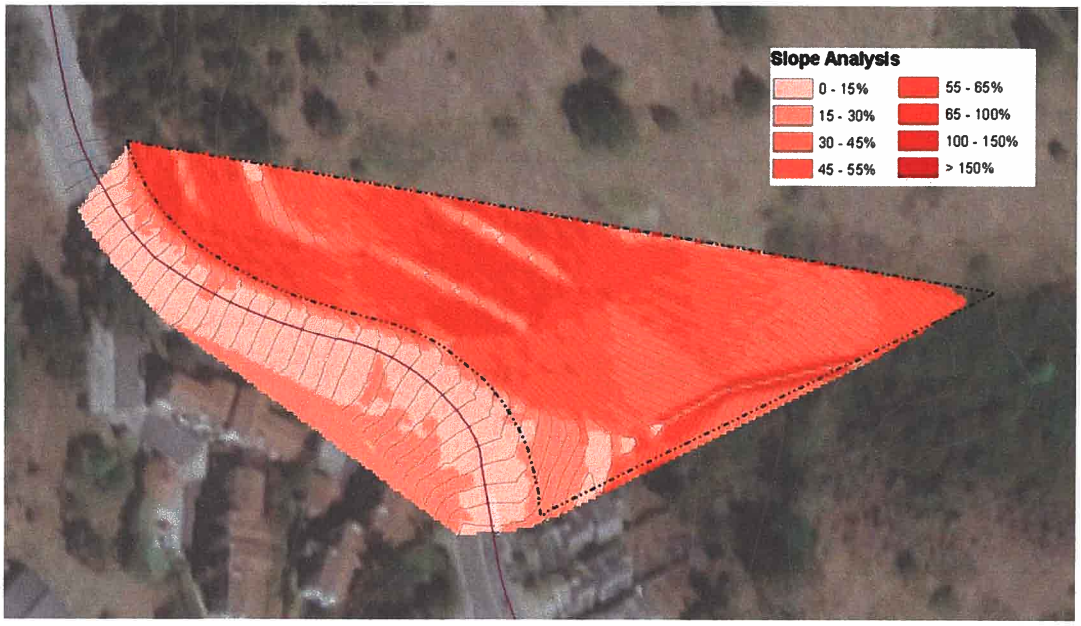
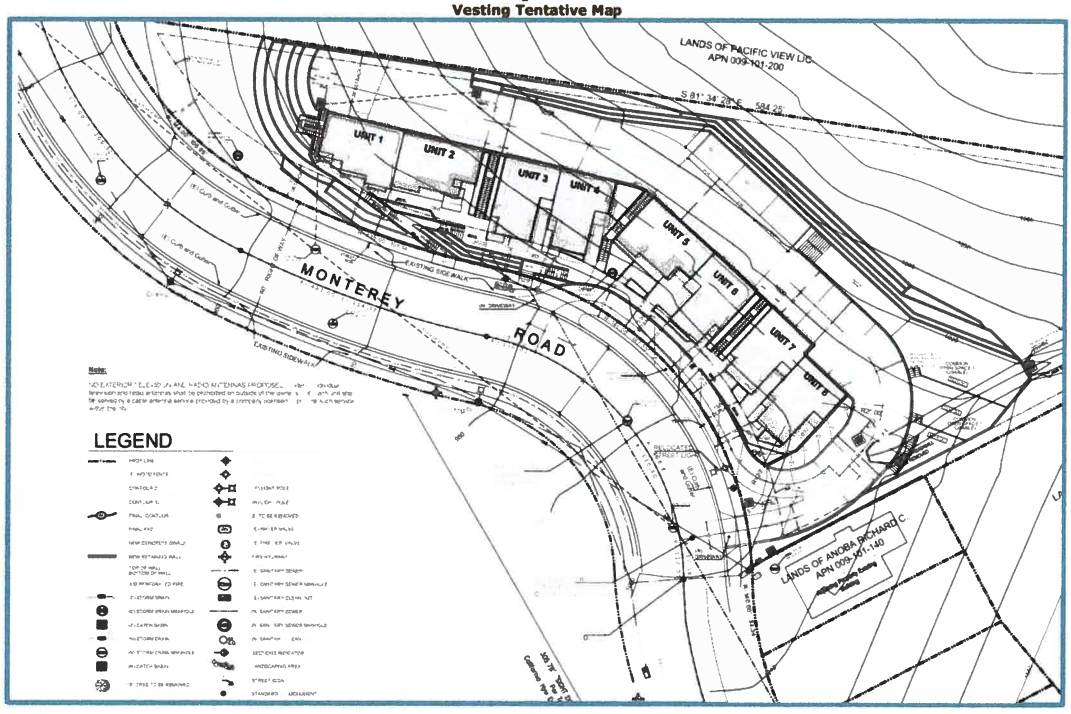


Figure 3
Vesting Tentative Map



General Plan Context: The City's current general plan is the single most important planning document and the "blueprint" or "constitution for all future development." *Lesher*

Communications, Inc. v City of Walnut Creek, 52 Cal. 3d, 531 540 (1990). Under *Lesher*, any subordinate land use action, such as a tentative map approval, that is not consistent with a City's current general plan is "invalid at the time it is passed." Id. at 544. Specifically, where a general plan is found to be inadequate, a land use approval is vulnerable whenever an inadequacy is relevant to the approval. Where the defects are related to the land use approval, the city cannot find the approval consistent with the general plan. That is the case here: the current general plan is legally inadequate in ways implicated by the Project that render any action by the City to approve the Project's Tentative Subdivision Map and Site Development Permit invalid. The only cure is to complete the comprehensive update of the general plan to create internal consistency and completeness before a project on this site can be approved.

II. The Current General Plan is Legally Inadequate in Respects Implicated by the Project

As described above, where the defects are related to the land use approval, the city cannot find the approval consistent with the general plan. That is the case here: the current general plan is legally inadequate in ways implicated by the Project that render any action by the City to approve the Project's Tentative Subdivision Map and Site Development Permit invalid for the reasons described below.

A. The City's General Plan Has Expired and No Longer Functions as a Legal Basis for Project Approval

Pacifica's current general plan consists of the following Elements and a couple of optional elements, with most of the elements based on information from the 1970's[2] and adopted in the 1980's. The exception is the City's Housing Element which was certified by the California Housing and Community Development Agency in 2015.

- Land Use
- Circulation
- Safety and Seismic Safety
- Conservation
- Open Space
- Noise
- Community Design
- Community Facilities
- Housing

[2] The General Plan Background Report dates back to 1977 and 1978. General Plan at page 2.

When the Housing Element was last updated in 2014 and certified in 2015, required updates to the other Elements were not completed[3], nor were internal inconsistencies between the Housing Element and other Elements reconciled. For a general plan to serve as an effective guide for orderly growth and development, and preservation and conservation of natural resources, the general plan must be kept up to date. By its own text, the current general plan has expired. Population and housing estimates indicate the term of the current general plan, with the exception of the Housing Element, is valid only until 2000. While there is no requirement that a general plan, other than the Housing Element, be updated at any specific interval, each city is required to periodically review, and revise, as necessary, the general plan. Gov't Code Section 65103(a); see *Citizens of Goleta Valley*, 52 Cal. 3d at 572. The California Supreme Court stated that there is an implied duty to keep the general plan current. See *DeVita,* 9 Cal. 4th at 792 (citing). Elements must be updated to reflect changed circumstances and evolving issues of importance to the community. As an indication that a general plan is in need of updating, The California Governor's Office of Planning and Research must notify a city that its general plan has not been revised within eight years and must notify the California Attorney General if a city has not revised its general plan within ten years. Gov't Code Section 65040.5.[4]

Here, elements of the current general plan, including the Land Use, Conservation, Open Space and Recreation, and Seismic Safety and Safety Elements are nearly 40 years old, and rely on background information and data dating back even farther. A 40-year old general plan simply cannot reflect evolving issues of importance to the community. Maps including but not limited to the Water Systems map (GP page 96b), Community Facilities Map (96a), Circulation Map (91a) are out of date and no longer reflect current conditions. A stark example is the fact that the Circulation Map does not include the Devil's Slide Bypass Tunnel (Tom Lantos Tunnel), completed in 2011, rendering correlation of the land use element and circulation elements impossible. In the intervening years since the current general plan was adopted, other circumstances have changed, such as an increase in the severity of storms triggering increased flood events and landslides and new infrastructure built such as the Tom Lantos Tunnel, among many more examples mandating a comprehensive update be completed. Also of merit, the State of California has recognized the importance of protecting remaining natural and working lands as a key strategy to mitigate the worst impacts of climate change and to "future proof" California. In recognition of this, California's Air Resources Board has included protection of natural and working lands in the Scoping Plan, acknowledging the importance of these lands to achieve climate goals while retaining biodiversity. https://www.gov.ca.gov/2020/10/07/governor-newsom-launches-innovative-strategies-to-use-california-land-to-fight-climate-change-conserve-biodiversity-and-boost-climate-resilience/ . As

[3] Cal. Gov't Code Section 65302 (3) Upon the next revision of the housing element on or after January 1, 2009, the conservation element shall identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for the purposes of groundwater recharge and stormwater management.

[4] We have requested the letters to the City from OPR and are certain the City has these prior letters on file.

discussed in more detail below, the 2015 certification of an updated Housing Element only exacerbated the internal inconsistencies in the general plan.

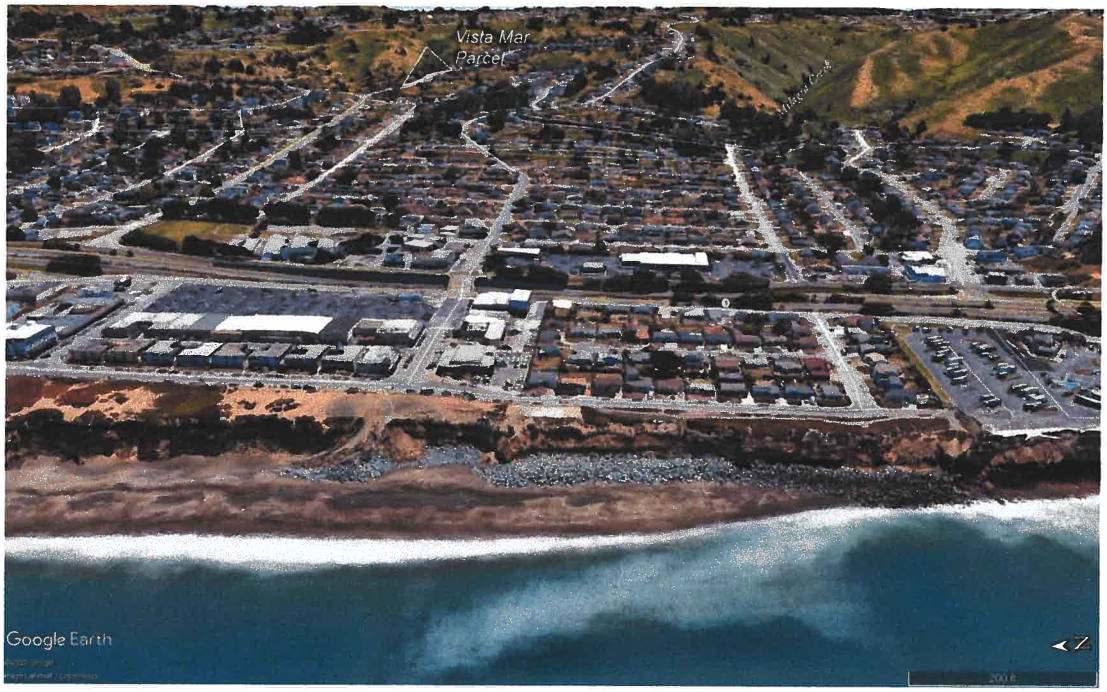
The City's general plan update site, from the update process initiated, but not completed, states in pertinent part:

> Why Update the General Plan?
>
> The City of Pacifica last comprehensively updated its General Pan in 1980. Many issues facing Pacifica are enduring but the legal environment governing land use, environmental preservation, housing, and other planning issues have changed. New priorities have emerged with a new generation of Pacifica residents and stakeholders...This update plan can provide an opportunity to eliminate obsolete text and policies, ensure legal conformity and address today's challenges. Homepage at https://www.cityofpacifica.org/depts/planning/general_plan_update_project/default.asp

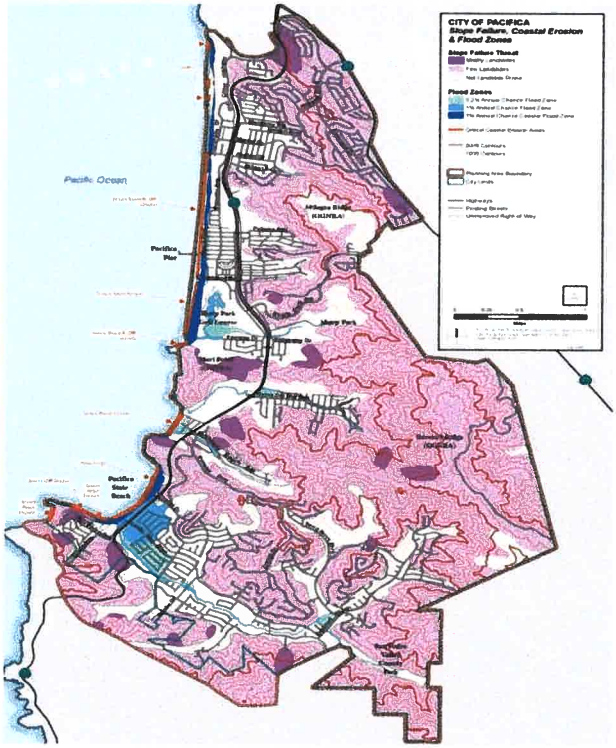
A memo prepared for the general plan update titled Key Areas of Environmental Concern, sheds further light on the need for the Update (see above link):

> "The existing General Plan is over 30 years old. Some of the policies are out of date and State requirements have changed substantially." Page 1
>
> "In Pacifica, increased flooding and erosion due to sea level rise [and Climate Change] have the potential to be serious direct impacts." Page 1
>
> "The Planning Area's undevelopable land provides habitat or potential habitat for a variety of species and natural communities. These are extensively updated since the previous General Plan. Some of these have special status, having been listed under the federal or state Endangered Species Acts or identified in the California Natural Diversity Data Base." Page 2.

The memo continues on to flag both flooding and geologic hazards as of increasing concern due to climate change. This and other information goes directly to the question of the development potential of the Project site and the appropriate density for the site. Without accurate, internally consistent and up to date information about the hazards on the Project site, the site's biological values and current information about the adequacy of community facilities and services (e.g., public safety), it is not possible to determine the permissible land use on the Project site. This information is readily available and its omission from the current general plan renders the general plan incomplete and defective as to the potential hazards associated with site development.



Aerial view of coastal bluff erosion – Google Earth



*City of Pacifica, **Draft** Slope Failure Coastal Erosion & Flood Zone Map*

The general plan update process was never completed with the exception of the Housing Element. When the Housing Element was updated, no other mandatory Elements were updated, thereby exacerbating internal inconsistencies in the current general plan. As a result, the current general plan is legally inadequate in ways implicated by the Project that render any action by the City to approve the Project's Tentative Subdivision Map and Site Development Permit invalid.

B. The Plan Does not Serve as an Adequate "Yardstick"

A general plan must allow an individual parcel to be checked against the general plan to show what land uses and population density are permissible -- in other words provide a yardstick for evaluating project consistency with the general plan. Where critical information is unavailable, out of date, internally inconsistent or missing, the general plan is inadequate to perform this essential function of providing this parcel specific information. Examples of the general plan's failure to provide a yardstick are plentiful including, but not limited to, the following:

1) Various General Plan Elements are Internally Inconsistent and In Conflict with Respect to the Question of Whether the Project site is Even Developable

A general plan must be integrated and internally consistent, both among the elements and within each element. Gov't Code Section 65300.5. This rule applies to both mandatory and optional elements. In the case of the Pacifica general plan, the plan contains internal inconsistences implicated by the Project and Project site.

The adoption of the Housing Element in 2014 caused and made worse a number of internal inconsistencies in the current general plan that are directly implicated by the Project and project site. For example, the current Housing Element contains conflicting information about the Project site - on the one hand mis-identifying the Project site as a flat, developable vacant lot and on the other hand omitting the site as having potential for housing. Housing Element Table III-1, page 73 and Table III-2, page 77

It makes logical sense that the site was omitted from the list of potential housing sites due to site constraints (steep slopes, hazards associated with slopes, biological resources, etc.), but the site is not explicitly called out on pages 80-81 as constrained. This internal inconsistency in the Housing Element combines with internally inconsistent policies in the other Elements (e.g., Low Density designation but Conservation and Design Policies effectively prohibiting that type of development). The result is an internally inconsistent general plan with inconsistencies relevant to the ultimate question of the permissible development, use and density on the Project site. Collectively, the general plan text and policies fail to provide a clear and consistent description for site development as required by general plan law and therefore fail to provide a clear yardstick to determine permissible development, uses and density.

The Project site is not flat, but to the contrary is very steep with slopes over 50%, a riparian drainage/wetland, at least 6 heritage trees[5] and likely hazards due to unstable surface soils and on-site landslides. Development as proposed would require massive grading and land alteration, removal of the wetland/riparian feature, dozens of mature trees, 51 slated for removal and of those at least 6 considered heritage by the City[6]. Although the Land Use Element map designates the Project site as low density development, development is contingent on consistency with other policies in the general plan[7] and many of these policies suggest the site is not developable. The general plan excerpts below illustrate why it is not possible to know whether, and if so how, this site could be developed consistent with the current general plan. :

- The Housing Element contains conflicting information about the site's developability leaving significant questions about whether the site in fact should be developed at the density proposed if at all. See e.g., Tables III-1 and III-2.

- The Housing Element and the Land Use Element conflict with respect to the site's developability. The Land Use map designates the site for Low Density Residential (3-9 dwelling units per acre), while the Housing Element contains conflicting information about whether the site is developable. See Tables III-1 and Table III-2 at pages 73 and 77, respectively.

- Conservation Element policies applied to the site - at the very minimum - would greatly constrain the area of the site that is developable and could prohibit development altogether as development requires massive grading and tree removal (invoking the general plan's Transfer of Development Transfer policy to provide economic use). Policies such as the following would prohibit the proposed development on the site, contrary to the land use designation of low density residential:

    - Policy 3. Protect significant trees of neighborhood or area importance... For the proposed development to occur, at least 57 trees would be removed, at least 6 of them Heritage Trees. IS/MND page 39 and updated Arborist tree count. Therefore, the proposed development at the density proposed would obstruct attainment of this policy.
    - Policy 5. Local year-round creeks and their riparian habitats shall be protected. The Project would destroy the on-site stream and riparian habitat, filling the

[5] IS/MND at pages 38-39 and updated Arborist tree count.
[6] IS/MND at pages 38-39 and updated Arborist tree count.
[7] The General Plan's policy allowing transfer of development rights provides economic use of properties otherwise unbuildable.

entire area. See Geotechnical Investigation Appendix to IS/MND and development plans.

- Action Program 2. Develop regulations which will protect watershed areas... The site is within a watershed draining to an area of known flooding and from there to the ocean where coastal bluffs are eroding.

- The Community Design Element, which as an optional element, must be internally consistent with the general plan as a whole. This Element contains a number of policies which appear to greatly limit or even prohibit the development proposed by the Project, again contrary to the land use designation:

  - Policy 1. Preserve the unique qualities of the City's neighborhoods.
  - Policy 3. Protect the City's irreplaceable scenic and visual amenities.
  - Action Programs Short Term 2. Promote the preservation of open space and natural landforms which define the City's residential and commercial areas.
  - Guideline 4. Hillside development guidelines; in-filling on hillside sites should be considered for its potential relationship to, or effect on visually significant slopes, open space, to natural grade and topography of the area, and existing vegetation.
  - Guideline 1. Preserve "visually significant" slopes and ridgelines, maintain natural open space between areas of development, set aside and preserve natural features.
  - Guideline 3. Fit development to the topography; place man-made structures to complement the natural environment.
  - Guideline 4. Minimize grading; discourage mass grading and terracing for construction pads.

Contrary to all of these provisions, The Project would scrape existing vegetation and mass grade the site, forever changing the unique character of the natural open space area in this neighborhood and potentially increasing hazards to existing development.

- Land Use Element provisions indicate that sites with slopes in excess of 35% may not be developable and although the text is in sections relating to other neighborhoods, the de facto definition of developable is clear: "Only three areas with slopes less than 35% remain in ... development in the lower quarter of the Very Low Density Residential range is most appropriate...Development must be sensitive to the potential physical and visual impacts...". General Plan at page 52. "At the back of Vista Mar are two fingers of the valley which still contain some developable land less than 35% slope." Id. The Seismic Safety and Safety Element notes that the majority of landslides occur on steep slopes, over 35%, underscoring the merits of this de facto definition. Element page 101-

102. If the required information were included in the current general plan concerning hazards and other site features, and the general plan text were internally consistent, the Project site would have been designated differently and potentially deemed undevelopable consistently throughout the general plan.

As a result of the conflicting general plan text, policies and provisions, it is not possible to ascertain the developability of the Project site, let alone the permissible density as required by current general plan. In short, the current general plan fails to provide a yardstick for the site's permissible development.

2) The General Plan Lacks Required Information

The City's general plan must be complete, containing the seven statutory elements as well as other information required by statute. The current general plan omits required information, information pertinent to the question of site developability, permissible use and density. Examples of required information that is out of date or altogether missing from the general plan, includes, but is not limited to, the following:

Land Use Element. Consistent standards for population density (measured in numbers of persons) and building intensity (using measures such as units per acre). As described above, policies and text in some sections of the general plan call into question whether the site is even developable, while the land use designation calls for low density development. In addition, population density figures vary throughout the general plan since so much time has passed between adoption of the Land Use Element in the 1980s and Housing Element in 2014/certification in 2015. Without consistent and current information about population density and building intensity, it is not possible to determine whether the land use, transportation and other elements are correlated (e.g., sufficiency of services and public facilities).

Conservation Element (Gov't Code Section 65301): The conservation element shall identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for the purposes of groundwater recharge and stormwater management. Gov. Code Section 65302(d) (3) provides, "Upon the next revision of the housing element on or after January 1, 2009, the conservation element shall identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management." Although the Housing Element was revised in 2015, the City failed to update the Conservation Element. According to the IS/MND and Appendix prepared by Miramar Enterprises, the Project site contains an ephemeral drainage ditch that could be considered jurisdictional waters and as such the Project would require a Lake and Streambed Alteration Agreement (LSAA). IS/MND at pages 36-37, Miramar Enterprises Letter at page 4. There is no information or the recommended diagrams showing these features,

including on site drainage, riparian area and biological resources, on the Project site in the general plan, including the Conservation Element. Nor does the Conservation Element or any other Element of the current general plan contain the required flood corridors and flood mapping. This information is readily available. Yet, as required by law, current and complete information including, but not limited to flooding and flood corridors, riparian habitats, and stormwater management, are not in the current general plan rendering the plan incomplete and defective as to the required information necessary to identify the potential hazards associated with Project site development.

Watershed Map

Safety Element Gov't Code Section 65302 provides that "[i]nformation about the watershed the Project site lies in and the flooding history of the area, contributed to by the site's drainage" must be included in the general plan safety element. Specifically, Government Code Section 65302(g) (g) (2) provides that:

"The safety element, upon the next revision of the housing element on or after January 1, 2009, shall also do the following:

(A) Identify information regarding flood hazards, including, but not limited to, the following:

(i) Flood hazard zones. As used in this subdivision, "flood hazard zone" means an area subject to flooding that is delineated as either a special hazard area

> or an area of moderate or minimal hazard on an official flood insurance rate map issued by the Federal Emergency Management Agency (FEMA). The identification of a flood hazard zone does not imply that areas outside the flood hazard zones or uses permitted within flood hazard zones will be free from flooding or flood damage."

The Housing Element was updated in 2014/certified in 2015 triggering this requirement, but the Safety Element was not updated to comply with this requirement.

Land Use and Safety Element: The current Safety Element describes in some detail the slope failures that occurred in 1982 and 1983, noting that the 1983 failures have not been mapped or analyzed in detail. Element page 100. Information concerning landslides in and adjacent to the Project site is readily available and must be provided in the general plan for it to serve as the required "yardstick" for parcel development. Given that the project site includes steep slopes over 50%, the failure to update this these Element's to comply with the law directly implicates the proposed project.

Government Code section 65302(g)(1) provides that, "A safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence; liquefaction; and other seismic hazards identified pursuant to Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires. The safety element shall include mapping of known seismic and other geologic hazards. It shall also address evacuation routes, military installations, peakload water supply requirements, and minimum road widths and clearances around structures, as those items relate to identified fire and geologic hazards."

Government Code section 65302(g)(2) requires that the "The safety element, upon the next revision of the housing element on or after January 1, 2009" must be updated. Despite the fact that the Housing Element was revised in 2014 and certified by HCD in 2015, the Safety Element has not been updated since that time.

Community Facilities Element: The Community Facilities Element lacks current maps and information about community facilities including but not limited to regional and local roads, and other public facilities and services, thereby making it impossible to correlate the land use, housing, circulation and community facilities elements or to determine the adequacy of public services and facilities to accommodate new development. Project by project environmental review does not suffice as there could be service and infrastructure deficiencies and at some point, they will be triggered.

Without this required information, it is not possible to determine the developability of the site or the permissible density. This is contrary to the law.

III. The Project is Inconsistent with the General Plan

Since the general plan is the constitution for all future development, any decision by a city affecting land use and development must be consistent with the general plan. For the reasons described in detail above, due to internally conflicting policies and provisions, there is no clear yardstick to determine what development on the Project site is permissible. That said, the proposed project is also clearly inconsistent with the majority of policies in the general plan. "An action, program or project is consistent with the general plan if, considering all its aspects, it will further the objectives and policies of the general plan and not obstruct their attainment." Emphasis added. *Corona-Norco Unified School District v. City of Corona*, 13 Cal. App. 4th 1577, (1993). Where a project is inconsistent with the general plan, the project cannot be approved.

Clearly for the reasons stated above, the project is not consistent with the majority of general plan provisions and policies applicable to the Project and Project site and development of the Project as proposed would obstruct attainment of many of those policies as summarized in the Table below.

Summary Examples of Vertical and Horizontal General Plan Inconsistencies (see text of letter above for additional details and citations)		
GP Element Policy or Provision	Internal (Horizontal) Inconsistencies	Project (Vertical) Inconsistencies
Conservation Element Policy 3. Protect significant trees of neighborhood or area importance...	Inconsistent with the land use designation for low density development and the housing element.	The Project is inconsistent with and Project development would obstruct achievement of this Policy as all vegetation would be scraped and approximately 57 trees, at least 6 of them Heritage Trees removed or destroyed.
Conservation Element Policy 5. Local year round creeks and their riparian habitats shall be protected.	Inconsistent with the land use and housing element's designations for low density development.	Inconsistent with and would obstruct achievement of this Policy as the site would be scraped, deep mass graded and existing drainage (creek) and riparian corridor and habitat filled.
De facto definition of developable land as less than 35% slope. See GP at pages 52-53 and Seismic Safety and Safety Element.	Inconsistent with the land use and housing element's identification of the site as developable and policies of the conservation and community design elements requiring protection of natural features.	Inconsistent as the site is predominantly over 35% slopes with slopes over 51%. See slope map above.
Community Design Element Hillside Guidelines: • Guideline 1. Preserve "visually significant" slopes and ridgelines, maintain natural open space between areas of development, set aside and preserve natural features.	Inconsistent with land use and housing element's identification of the site as developable and for low density development.	Inconsistent as the site would have to be scraped and mass graded to accommodate the Project as proposed.

• Guideline 3. Fit development to the topography; place man-made structures to complement the natural environment. • Guideline 4. Minimize grading; discourage mass grading and terracing for construction pads.		
The Housing Element both describes the Project site as flat and developable and omits it from the development sites. See e.g., Element Tables III-1 and III-2.	The Housing Element contains inconsistent information concerning the site's development potential as described herein. See e.g., Tables III-1 and III-2.	It is not possible to determine the Project site's development potential based on the internal inconsistencies in the Housing Element.
The Land Use Element designates the Project site for low density development, while text describes site's with slopes of over 35% as de facto not developable. The Housing Element contains conflicting information about the site's development potential as well. See details in body of the letter.	Land Use and Housing Elements contain conflicting text, policies and provisions concerning the development potential for the project site and fail to provide a yardstick for measuring Project consistency	It is not possible to determine the permissible development, uses and density of the Project site as a result of the many conflicting provisions of the General Plan. As such vertical consistency is not present and Project approval would be invalid.

IV. Conclusion

For all of the above stated reasons, the City's general plan fails to provide a legal basis for approval of the Project as proposed. Approval of the Project as proposed would therefore be invalid. Prior to consideration of any Project at this site, the City's General Plan must be updated. We appreciate the opportunity to provide these comments.

Sincerely,

Terry Watt

Terry Watt, AICP

&

Jared Ikeda

Jared Ikeda

ATTACHMENT 1 and 2

Jared M. Ikeda

Jared Ikeda is a retired land use planner with more than thirty eight years of professional experience in preparation of land use planning studies, community planning, environmental impact studies, landscape development plans, and recreation planning. He has served on the board of directors of a major international landscape architectural firm, management of specific project work, supervision, and coordination of multi-disciplinary teams, as well as serving as land planning specialist within multi-disciplinary teams.

He has served as a lecturer in the Department of Landscape Architecture at California State Polytechnic University, Pomona. His teaching activities focuses upon advanced landscape design and stresses use of computer technology including AutoCAD and ArcView software.
Most recently he has been involved in the preparation of the Monterey County General Plan Update from 1999 to 2004 and was responsible for studies and preparation of the Environmental Resource Management Element and the Circulation Element. He also directed consultant work on the Environmental Impact Report.

Project Experience
A selected list of his experience includes:

- Mr. Ikeda has served as a consultant to Economics Research Associates in preparing an Economic Development Strategy for Riverside and San Bernardino Counties in Southern California.
- Served as Principal-in-charge and provided direction for the preparation of the Specific Plan for the 2000 acre East Tustin Specific Plan (now known as the Tustin Ranch) for the City of Tustin and The Irvine Company.
- Served as a Principal Planner for the preparation of the San Juan Capistrano Master Open Space Plan. The study approach evaluated all open space resources within the City to determine the best utilization and plan for 160 acres of newly acquired open lands by the City.
- Participated as a consultant team for the preparation of the La Verne Heights Specific Plan for Lewis Homes of California.
- Directed the preparation of the Master Environmental Impact Report for the 20,000 acre Chino Hills Specific Plan for the County of San Bernardino. The Specific Plan enabled development of infrastructure and delineation of land use for a planned community of more than 89,000 people.
- Prepared the Las Virgenes, Triunfo, Malibu, Topanga Areawide Wastewater Collection and Treatment Plan EIR/EIS for the Las Virgenes Municipal Water District / US EPA. This EIR/EIS encompassed a region extending from the western boundary of the City of Los Angeles west to the City of Camarillo and south of the Ventura Freeway to the ocean. The study area included the majority of the Santa Monica Mountains and the Malibu Coast.
- Prepared Environmental Impact Reports and Statements for a variety of residential development projects, wastewater treatment facilities, oil storage terminals, high voltage electrical transmission lines, and park and recreation facilities.

Experience

Principal: Ikeda Consulting, 2005 to Present

Monterey County Redevelopment Agency, 2004-2005

Senior Admin Analyst: County of Monterey, Environmental Resource Policy, 1999-2004

Lecturer: Cal Poly Pomona, Dept of Landscape Architecture 1997-1999

Vice-President/Officer-in-Charge EDAW Inc., Irvine Office: 1980 to 1987

EDAW, Inc. 1969 to 1989

Education

Bachelor of Science in Environmental Design, California State Polytechnic University, Pomona, 1968.

Honors

Best Comprehensive Plan, Orange Co. Section, American Planning Association, San Juan Capistrano Master Open Space Plan, 1992

Distinguished Alumnus Award, 1983, School of Environmental Design, California State Polytechnic University, Pomona.

Merit Award, American Society of Landscape Architects, Santa Ana River Open Space Study, 1973

Lectures & Publications

Mr. Ikeda has served as a guest lecturer at UCLA, UC Irvine, and Cal Poly Pomona. Mr. Ikeda has also served as Chairman of a panel on Computers and Landscape Architecture for the Southern California Chapter of the American Society of Landscape Architecture. Contributor to *"Design with Digital Tools"* McGraw Hill, 2000

Terry Watt, AICP

Terry Watt Planning Consultants

1937 Filbert Street - San Francisco, CA 94123

terrywatt@att.net Cell: 415-377-6280

Terry Watt, AICP, owns Terry Watt Planning Consultants. Ms. Watt's firm specializes in planning and implementation projects with a focus on regionally-significant land use and conservation work that advances sustainable development patterns and practices. Prior to forming her own consulting group, she was the staff planning expert with the environmental and land use law firm Shute, Mihaly & Weinberger. She is an expert in general and specific planning and zoning, open space and agricultural land conservation strategies and approaches and environmental compliance, including CEQA and NEPA. Her skills also include facilitation and negotiation, public outreach and project management. Terry is a frequent presenter at regional, national and statewide workshops and symposiums. She holds a master's degree in City and Regional Planning from the University of Southern California and a multi-disciplinary bachelor's degree in Urban Studies from Stanford University.

Terry works with a wide variety of clients throughout California including non-profit organizations, government agencies and foundations. She volunteers up to half her professional time on select projects. Recent projects and roles include:

- Project Manager and Governor's Office Liaison for San Joaquin Valley: Least Conflict Lands for Solar PV project. Project funding came from the Hewlett and Energy Foundation's, matched by environmental organizations, the California Energy Commission and other private parties. The objective of the project was to identify areas in the Valley that had very low resource values for renewable energy to serve as an incentive for development of least conflict lands rather than valuable resource lands. Watt was responsible for overall project management and day to day coordination, multi-stakeholder (150 stakeholders) and agency (57 federal, local and agency advisors) outreach and participation, facilitation of meetings, Governor's Office convening's, all project logistics and project report. Link to Collaboration Platform – Data Basin San Joaquin Valley: http://sjvp.databasin.org/
- Governor's Office Liaison and Outreach Coordinator for the State's portion of the Desert Renewable Energy Conservation Plan (DRECP). As outreach coordinator, worked closely with local governments on DRECP related consistency issues with local general plans.
- Planning Consultant to California Attorney General's Office - Environment Section focusing on climate change, CEQA and general plans. (2007- 2010). While working with the Environment Section, assisted with settlements (Stockton General Plan, Pleasanton Housing Element and CEQA litigation); identified locally based best practices for local government planning to address climate change issues; and managed government outreach and consultation on general plans and climate action plans/energy elements/sustainability planning efforts. Post 2010 continue to provide periodic consulting services to the Environment Section related to select cases.
- Strategic Advisor and Planning Consultant to the Santa Clara Valley Open Space Authority, Greenbelt Alliance and Committee for Green Foothills for the Coyote Valley Project focused on developing a conservation and development plan for the Valley. Watt was responsible for preparing the group's early CEQA comment letter on the negative declaration for a proposed Warehouse Project and assisting with scoping comments for the EIR.
- Measure M-2 Sales Tax and Environmental Mitigation Measure. (2009-). Terry was the Co-project

manager/facilitator of a 30+-member environmental coalition that through a unique partnership with the Orange County Transportation Authority (OCTA) and state and federal wildlife agencies generated nearly $500 million in funding for programmatic environmental mitigation (conservation land acquisition and stewardship) in Measure M2, Orange County Transportation Sales Tax.

- State Office of Planning and Research Special Projects (2011 – 2017). Advisor to OPR on General Plan Guidelines, Infill and Renewable Energy Templates as part of the required update of the General Plan Guidelines. Expert panelist for workshops on SB 743.
- Marin Countywide General Plan and Environmental Impact Report (2004 to 2007). Project Manager for the award-winning Marin Countywide Plan Update and its Environmental Impact Report. The General Plan was among the first to incorporate leading edge climate change, greenhouse gas emissions reduction and sustainability policies as well as monitoring, tracking and implementation measures to measure success.
- Staff to the Martis Fund, a joint project of five environmental groups and a Business Group (Highlands Group and DMB Inc.). (2008 – ongoing). The Fund was created as a result of litigation settlement. The Fund has distributed over $15 million dollars since its inception to a range of conservation (acquisition of over 5,000 acres of open space), stewardship and restoration projects and workforce housing projects (emergency rental housing support, down payment assistance and low income apartments). Funding comes from a permanent transfer fee on all real estate sales at Martis Camp. http://www.martisfund.org/PDFs/Martis-Fund-Brochure.pdf
- Tejon Ranch Land Use and Conservation Agreement. (2006 – ongoing). Project coordinator for a dialogue process between environmental groups (Natural Resources Defense Council, Sierra Club, Endangered Habitats League, Planning and Conservation League, Audubon California) and The Tejon Ranch Company that resulted in a major Land Use and Conservation Agreement for the permanent protection of 240,000+ acres (90%) of the 270,000 acre Tejon Ranch. Secretary John Laird refers to the Agreement as a "miracle" agreement. In return for permanent conservation of 240,000+ acres, environmental groups agreed not to oppose projects within the development footprints; but can comment on regional planning efforts and the projects. Terry has an ongoing role overseeing implementation of the Agreement, including early role forming and managing the Conservancy formed by the Agreement. The Agreement provided the cornerstone of the Habitat Conservation Plan for a major portion of the Ranch; the Tejon Multi-Species Habitat Conservation Plan, TUMSHP, approved in April 2013. She recently joined the Board of the Tejon Ranch Conservancy created and funded by the Agreement.
- Orange County Wildlife Corridor. Project coordinator and architect for dialogue process between environmental and conservation organizations, City of Irvine and Lennar/Five Points development team that resulted in an 8 party Agreement, related general plan amendment and full funding to build an urban wildlife corridor to the specifications of the science team (6-member team jointly selected by all groups) connecting two high value conservation areas in central Orange County (Coastal and Eastern NCCP/HCP lands). Watt provides some ongoing implementation support. Recently (2017) coordinated DEIR comments letters on two Orange County Project proposals that could adversely impact the 5 Point/Irvine Wildlife Corridor.
- Ongoing assistance and authorship of expert comments on projects with recent letters on the proposed draft Amador County General Plan on behalf of the Foothill Conservancy and the proposed Squaw Valley Resort on behalf of a coalition of environmental and labor organizations.
- Facilitator to the Bolsa Chica Land Trust for recent agreement with Landowners to purchase remaining private acres of the Bolsa Chica uplands. Currently assisting with fundraising for the property.
- Advisor to the Nature Conservancy, the American Farmland Trust, Center for Law, Energy and Environment on numerous publications concerning urban infill and conservation.

PROFESSIONAL MEMBERSHIPS AND BOARDS

- Lambda Alpha International - Golden Gate Chapter
- American Institute of Certified Planners (AICP)
- American Planning Association (APA)
- Tahoe Fund Founding Board Member
- Tejon Ranch Conservancy Board Member
- Santa Lucia Conservancy Board Member
- Founder Council of Infill Builders
- Board Member, Planning and Conservation League

AWARDS

- State and National APA Awards for Marin County General Plan
- APA Awards for South Livermore Valley Plans
- Carla Bard Award for Individual Achievement, PCL

PUBLICATIONS

Contributor to the Award Winning Textbook:

Ecosystems of California, 2016, Chapter 40:

Land Use Regulation for Resource Conservation

From: O'Connor, Bonny
Sent: Monday, November 23, 2020 10:50 AM
To: Public Comment
Subject: FW: Vista Mar General Plan non-conformance and invalid Planning Approvals

From: Marijo Van Dyke [mailto[redacted]]
Sent: Monday, November 23, 2020 10:49 AM
To: Christine Boles [redacted]
Cc: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>; Wehrmeister, Tina <wehrmeistert@ci.pacifica.ca.us>; Murdock, Christian <murdockc@ci.pacifica.ca.us>; Sharma, Deepa <DSharma@bwslaw.com>; Bazzano, Denise <DBazzano@bwslaw.com>; Michelle Kenyon [BWS Law] <mkenyon@bwslaw.com>; Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Woodhouse, Kevin <woodhousek@ci.pacifica.ca.us>; Berman, Lauren <bermanl@ci.pacifica.ca.us>; Bigstyck, Tygarjas <bigstyckt@ci.pacifica.ca.us>; Ferguson, Alex <fergusona@ci.pacifica.ca.us>; Godwin, James <godwinj@ci.pacifica.ca.us>; Hauser, Samantha <hausers@ci.pacifica.ca.us>; Nibbelin, John <nibbelinj@ci.pacifica.ca.us>; Leal, David <leald@ci.pacifica.ca.us>
Subject: Re: Vista Mar General Plan non-conformance and invalid Planning Approvals

[CAUTION: External Email]

Brilliant Christine!!!

On Sun, Nov 22, 2020 at 8:06 PM Christine Boles [redacted] wrote:

> Dear Council Members, Mayor Martin, Planning Commissioners, City Manager and City Planning Staff,
>
> Please find attached letter with additional comments related to tomorrow's Vista Mar appeal at the City Council meeting. I look forward to finally being able to present our findings tomorrow evening.
>
> Bonny, can you please confirm receipt for the public record?
>
> I can make myself available tomorrow after 2:00 if you have any questions. Thank you all for your time in reviewing this matter.
>
> Sincerely,
>
> Christine Boles, Architect
>
> **Beausoleil Architects**
>
> [redacted]

Pacifica, CA 94044

[redacted]

www.beausoleil-architects.com

"Do your little bit of good where you are; it's those little bits of good put together that overwhelm the world." - Desmond Tutu

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From: O'Connor, Bonny
Sent: Monday, November 23, 2020 10:52 AM
To: Public Comment
Subject: FW: Vista Mar Project

From: toni marie Damore [redacted]
Sent: Monday, November 23, 2020 10:51 AM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Subject: Vista Mar Project

[CAUTION: External Email]

Dear City Council,

My husband and I live at [redacted] Monterey rd, in one of the first houses built on this once artichoke field. It was built by Mr. Wilson. How do I know? Because when we first moved in, our 98 year old neighbor told me. First hand knowledge. I am glad that Dorthea is still alive and that she has moved in with her daughter so she doesn't have to deal with this ill conceived Vista Mar project.

During our first winter on Monterey rd, we had a record amount of rain. The schools were closed because of the flooding throughout Pacifica. Monterey road turned into a torrential river. Houses across the street had channels of water rushing down their driveways and flooding their property. Sandbags are now a permanent winter time decoration. Because even in a moderate winter, Monterey road is a funnel for rain. How do I know? First hand knowledge.

The intersection at Monterey/Hickey and Norfolk is bordering on dangerous as it is and to add more traffic is absurd. Yes, Norfolk that little street does have traffic and people turning on and off of Monterey road. Monterey road is already a very busy thoroughfare offering one of the few arteries in and out of Pacifica. If you lived here in 2011, during the Tsunami warning resulting from the Japan Earthquake, then you know, first hand, how Pacifica's isolation can be a blessing and a curse.

And I am wondering if all staff and parents who are part of the Sunset Ridge community were notified. The approximately 540 students come from all over Pacifica, from the back of the valley to the top of Hickey blvd. They will most definitely be impacted by this development. I can't imagine what picking up and dropping off your child safely will then entail. Right there is a wealth of first hand knowledge.

This development, let's be honest, does not benefit the Pacificans who drive up and down Hickey/Monterey everyday. Nor does it benefit the visitors who come to enjoy what this small town has to offer. It doesn't benefit the deer, birds and other wildlife who we gladly share our space with. This lovely wild environment is one of the things that makes this place so special.

I truly love Pacifica (and I wasn't even born here!) I work here and play here. I know the people here love nature, look after their neighbors and have a strong, independent spirit. I see that when I go to the grocery store, when I teach, when I surf, and when the quarry development was voted down.

I truly hope that the city will turn a critical eye to this development and see that it just doesn't fit into our community or its values. I do know, however, of an abandoned development behind Cabrillo Elementary that seems to be prepped and ready to go for some housing! Why not put it there?

Thank you for your time,
Toni Marie D'Amore

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From: O'Connor, Bonny
Sent: Monday, November 23, 2020 10:57 AM
To: Public Comment
Subject: FW: Vista Mar Project

From: toni marie Damore [mailto[redacted]
Sent: Monday, November 23, 2020 10:56 AM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Subject: Vista Mar Project

[CAUTION: External Email]

Dear City Council,

My husband and I live at [redacted] Monterey rd, in one of the first houses built on this once artichoke field. It was built by Mr. Wilson. How do I know? Because when we first moved in, our 98 year old neighbor told me. First hand knowledge. I am glad that Dorthea is still alive and that she has moved in with her daughter so she doesn't have to deal with this ill conceived Vista Mar project.

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Thank you for your time,
Toni Marie D'Amore

CAUTION: This email originated from outside of the City of Pacifica. Unless you recognize the sender's email address and know the content is safe, do not click links, open attachments or reply.

From: Coffey, Sarah
Sent: Monday, November 23, 2020 12:27 PM
To: Public Comment
Subject: FW: Vista Mar Project - Comments
Attachments: Vista Mar LOOBG 11.23.20 SENT.pdf; Smallwood Reply to WRA 11.20.20.pdf; Bond Vista Mar comment response 11.23.2020 SENT.pdf; SWAPE 2020.11.23_Vista Mar Comment Letter.pdf

From: Brian Gaffney <[redacted]>
Sent: Monday, November 23, 2020 12:25 PM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>; Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Cc: Kristin Cramer [redacted]
Subject: Vista Mar Project - Comments

[CAUTION: External Email]

Dear Mayor Martin, Members of the City Council and Ms. O'Connor, please see the attached four comments submitted on behalf of Kristin Cramer regarding the proposed Vista Mar project - for submission into the administrative record for tonight's City Council meeting on this proposed project.

Ms. O'Connor or Ms. Coffey please confirm receipt of this email and the four attachments.
Thank you
--
Brian Gaffney
LAW OFFICES OF BRIAN GAFFNEY APC
[redacted]
Pacifica, CA 94044
[redacted]

CONFIDENTIALITY NOTE: This and any accompanying pages contain information from LAW OFFICES OF BRIAN GAFFNEY APC which may be confidential and/or legally privileged. The information is intended to be for the sole use of the individual or entity named above. Unauthorized interception, review, use or disclosure is prohibited and may violate applicable laws including the Electronic Communications Privacy Act, 18 U.S.C. §§ 2510-2521. If you are not the intended recipient please contact the sender and destroy all copies of the communication

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LAW OFFICES OF BRIAN GAFFNEY, A Professional Corporation

[redacted]

Via Email

November 23, 2020

Pacifica City Council
martind@ci.pacifica.ca.us
beckmeyers@ci.pacifica.ca.us
vaterlauss@ci.pacifica.ca.us
bierm@ci.pacifica.ca.us
o'neillm@ci.pacifica.ca.us
connorb@ci.pacifica.ca.us

RE: Proposed Vista Mar Project, File No. 2002-001

Dear Mayor Martin, Members of the City Council and Ms. O'Connor,

This comment is submitted on behalf of Kristin Cramer regarding the proposed Vista Mar Project. For the reasons provided below, Ms. Cramer urges the City of Pacifica to prepare an Environmental Impact Report (EIR) on this proposed project, and to correct the legal issues identified below. We incorporate by reference all comments that have been made regarding the Project, including comments that the Vista Mar Project may not be approved based on the inadequacies of the Pacifica General Plan, and that the Project violates the General Plan and the Pacifica Municipal Code.

I. Substantial Evidence of Potentially Significant Adverse Impacts Triggers the Need to Prepare an Environmental Impact Report Prior to Project Approval

An EIR "shall" be prepared where, as here, "there is substantial evidence, in light of the whole record before the lead agency, that the project *may* have a significant effect on the environment." Pub. Res. Code § 21080(d), emphasis added. If there is substantial evidence supporting a "fair argument" that a project "**may"** have a significant environmental effect, the lead agency "shall" prepare an EIR. CEQA Guideline15064(a)(1); *Laurel Heights Improvement Assn. v. Regents of University of California* (1993) 6 Cal.4th 112, 1135. The fair argument standard provides a "low threshold" for requiring the preparation of an EIR, with a preference for resolving doubts in favor of an EIR. *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 84; *Architectural Heritage Assn. v. County of Monterey* (2004) 122 Cal.App. 4th 1095, 1110. "Substantial evidence" is "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." CEQA Guideline 15384 subd. (a). Substantial evidence includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts. CEQA Guideline 15384 subd. (b). Relevant personal observations of area residents on nontechnical subjects may qualify as substantial evidence for a fair argument. *Pocket Protectors*

v. City of Sacramento (2004) 124 Cal. App. 4th 903, 928; *Ocean View Estates* 116 Cal.App.4th at 402; *Arviv Enterprises, Inc. v. South Valley Area Planning Com*. (2002) 101 Cal.App.4th 1333, 1347. **Notably, where some experts conclude there may be a potentially adverse impact, and other experts disagree, an EIR must still be prepared**. CEQA Guidelines 15064, subd. (g); *Pocket Protectors,* 124 Cal. App. 4th at 928.

The City's November 23, 2020 Staff Report summarily concludes that "the comments received from aforementioned professionals were not found to present a fair argument that the Project may have a significant effect on the environment. The City determined that there is not substantial evidence in the record that the Project may have a significant effect on the environment," but the Staff Report fails to provide any explanation why or on what basis it reached these conclusions.

Clearly, the comments submitted by Steven Bond and Associates, Matt Hagemann and Paul Rosenfeld (SWAPE), Patrick Kobernus, and Dr. Shawn Smallwood constitute expert opinion supported by fact. There is a fair argument to support the experts' conclusions of potentially significant adverse project impacts, even though City staff did not reach the same conclusions. Thus, there is substantial evidence before the City that the proposed Vista Mar project will have potentially significant adverse environmental effects. As discussed below, the proposed project will have potentially significant adverse biological, health risk, air quality, greenhouse gas, geomorphology, hydrology, and aesthetics impacts. Moreover, these potentially significant impacts will not be reduced by the proposed mitigation measures.

A. Biological Impacts

Shawn Smallwood, PhD - after review of the Initial Study and proposed Mitigated Negative Declaration (IS/MND) and the WRA (2019) report, visiting the site, and consulting databases of bird observations - concluded on August 30, 2020 that the project will result in potentially significant adverse biological impacts even with implementation of the proposed mitigation measures. Dr. Smallwood based this conclusion on (1) the loss of bird nests and loss of bird fledglings from habitat loss, (2) interference with wildlife movement in the region, (3) habitat fragmentation, and (4) likely bird death from window collisions from the project.

Further, after WRA's September 15th responses to his August 30, 2020 comments, Dr. Smallwood continued to opine – based on his site visit and observations, education and experience - that the project will result in potentially significant adverse biological impacts even with implementation of the proposed mitigation measures.

In addition, the IS/MND concludes that the proposed project "could have a potentially significant impact related to substantial adverse effects on riparian habitat or other sensitive natural communities, or on State or federally protected wetlands through direct removal, filling, hydrological interruption, or other means." IS/MND p. 37. These impacts are the result of the project's proposed filling and permanent destruction of 96 feet of the ephemeral drainage, and "disturbance" during project construction of 0.26 acres of riparian arroyo willow thickets. IS/MND pp. 36-37. WRA surveyed the 1.3-acre parcel to determine if any wetlands were present, based primarily on the presence of wetland plant indicators and ponded water. Similarly, the Biological Constraints Analysis prepared by Live Oak Associates, Inc. in

December 2007 for this potential development noted that an onsite drainage channel appeared to carry water for "most if not all of the year," that this feature may be considered a Water of the United States and Water of the State, and that "Impacts to wetland habitats and other jurisdictional waters, such as the onsite drainage, are generally considered significant under provisions of CEQA and would likely constrain development."

B. Aesthetic Impacts

Under CEQA, it is the state's policy to take all action necessary to provide the people of the state with enjoyment of aesthetic, natural, and scenic environmental qualities. Pub. Res. Code § 21001, subd. (b). Environment is defined to include objects of aesthetic significance. Pub. Res. Code § 21060.5. As guidance for the City's evaluation of aesthetic impacts, the CEQA Guidelines suggest consideration of whether a proposed project would "[s]ubstantially degrade the existing visual character or quality of the site and its surroundings."

Courts have long recognized that aesthetic issues "are properly studied in an EIR to assess the impacts of a project." *Pocket Protectors v. City of Sacramento* (2004) 124 Cal. App. 4th 903, 936–37; *Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal.App.4th 477, 492; *Ocean View Estates Homeowners Assn., Inc. v. Montecito Water Dist*. (2004) 116 Cal.App.4th 396, 401; *National Parks & Conservation Assn. v. County of Riverside* (1999) 71 Cal.App.4th 1341, 1360. In *Citizens for Responsible & Open Government v. City of Grand Terrace* (2008) 160 Cal.App.4th 1323, the court ruled an EIR was required where evidence showed a two- and three-story senior housing facility might cause significant "changes to the physical and aesthetic conditions and character of the surrounding low-density, single-family residential neighborhood" due to the proposed facility's density and height.

The City's November 23, 2020 Staff Report states that public comments received on the Project have not provided any substantial evidence that the Project, as mitigated, would result in a potentially significant impact on aesthetics despite that Christine Boles, a licensed architect, has concluded that proposed project will result in potentially significant adverse aesthetic impacts. Ms. Boles is an expert whose conclusion of potentially significant adverse aesthetic impacts is based on facts, including the prominent location of the site on a steep hill overlooking the Manor District, the project's massing with areas of solid three story construction at or near the front setback line, the project's relative height overshadowing the majority of the area's existing housing stock including the adjacent homes and condominiums, project incompatibility with the neighborhood pattern of two-story elements at the front setback with third floors set back further still, and that the trees, natural features and natural grades will be completely altered on over 58% of the site, including removal of 58 trees.

Further, there is substantial evidence from members of the public who commented that the proposed project will create a significant visual impact, a significant adverse aesthetic impact, and be aesthetically out of scale for the neighborhood.

As the IS/MND concedes, the proposed project would introduce new sources of light and glare from illuminated signage, and exterior and interior lighting. In addition, the Pacifica Heritage Tree Preservation Ordinance recognizes that the preservation of heritage trees is

important to conserve the attractiveness, aesthetic and scenic beauty of the City.[1] PMC 4-12.01. Thus, the aesthetic concerns raised by individuals are not solely for their personal benefit, but to further the attractiveness and beauty of the City of Pacifica.

C. Health Risk, Air Quality, and Greenhouse Gas Impacts

Soil Water Air Protection Enterprise ("SWAPE") also reviewed the IS /MND. SWAPE specializes in estimating criteria air pollutant and greenhouse gas emissions ("GHG") released during construction and operational activities associated with proposed land use projects. SWAPE's September 16th review concluded that the IS/MND fails to adequately evaluate the project's air quality, health risk, or greenhouse gas impacts. As a result, SWAPE concluded that emissions and health risk impacts associated with construction and operation of the proposed Vista Mar project are underestimated and inadequately addressed.

Based on SWAPE's modeling and screening-level health risk assessment, they conclude that construction and operation of the Project could result in a potentially significant adverse health risk impact. Of particular note, SWAPE concluded that:

> **The excess cancer risk over the course of a residential lifetime (30 years), utilizing age sensitivity factors, is approximately 200 in one million. The infant, child, and lifetime cancer risks all exceed the BAAQMD threshold of 10 in one million, thus resulting in a potentially significant adverse health risk impact not previously addressed or identified by the IS/MND.**

After review of the September 2020 Errata Sheet, as well as the Raney Response to Comments (Attachment N to the October 2020 Planning Commission Staff Report), on November 23rd SWAPE concluded that the Errata and Response to Comments were insufficient in addressing SWAPE's concerns regarding the Project's air quality, health risk, and greenhouse gas impacts. Therefore, on October 23rd SWAPE's expert opinion continued to be that an EIR should be prepared to adequately evaluate the Project's air quality, health risk, and greenhouse gas impacts.

For Air Quality impacts, on November 23rd SWAPE concludes that the modeling relied upon for the IS/MND, Errata and Response to Comments include unsubstantiated changes to architectural coating construction phase length, unsubstantiated change to acres of grading value, unsubstantiated change to default co2 intensity factors, unsubstantiated changes to fireplace values, and an incorrect application of operational mitigation measures.

For Greenhouse Gas impacts (GHG), on November 23rd SWAPE concludes, based on review of the Errata and Response to Comments, that the proposed Project still fails to adequately evaluate the Project's anticipated GHG impacts as the GHG analyses in the IS/MND, Errata and Response to Comments rely upon an incorrect and unsubstantiated air model, and because they rely upon an outdated threshold.

[1] Heritage trees are all trees within the City, exclusive of eucalyptus, with a trunk circumference of 50 inches or more, measured at 24 inches above the natural grade. PMC 4-12.02, subd. (c)(1).

For Health Risk impacts, on November 23rd SWAPE concludes that diesel particulate matter health risk emissions are inadequately evaluated, and that IS/MND's less-than-significant impact conclusion regarding the Project's health risk impact should not be relied upon as the Project has failed to prepare a construction health risk assessment or an operational health risk assessment; and further that SWAPE's screening-level analysis indicates significant adverse health risks impacts.

On this last point, because the Response to Comments criticized SWAPE's reliance on exhaust PM10 emissions, SWAPE prepared an updated screening-level Health Risk Assessment - relying upon exhaust PM2.5 estimates in the City's Errata. This updated Health Risk Assessment still demonstrates a potentially significant adverse health risk impact. Thus, regardless of the use of exhaust PM2.5 or exhaust PM10 estimates, Project emissions and health risk impacts are potentially significant.

Perhaps most importantly, SWAPE concludes that its screening-level Health Risk Assessment demonstrates that construction and operation of the Project could result in a potentially significant adverse health risk impact, when correct exposure assumptions and up-to-date, applicable guidance are used.

Based on these facts, SWAPE's expert opinion continues to be that an EIR should be prepared to adequately evaluate the potential air quality, health risk, and greenhouse gas impacts that the project may have on the surrounding environment.

D. <u>Geomorphology and Hydrology Impacts</u>

Steve Bond, a professional geologist specializing in engineering geology and Hydrogeology, concluded on September 18, 2020 that the proposed project is likely to result in significant adverse impacts, including (1) slope destabilization resulting from the project raising of the water table, and (2) erosion from fugitive groundwater seeps subsequent to an elevated water table. Dr. Bond concluded that these impacts will occur even with the mitigations discussed or proposed. Dr. Bond reached these conclusions after visiting the site, reviewing the IS/ND, the Geoforensics 2002 report and the 2019 Geocon report, and diagramming groundwater levels relative the proposed housing units.

Since then Dr. Bond reviewed three previous geological investigations of the site: the Herzog (1988) Report, the Hom (1991) Report, and the Cotton (1992) Report. Dr. Bond aslo reviewed a critique of his September comments by GeoForensics Inc. entitled "Geotechnical Commentary #2". Based on this review, Dr. Bond's conclusions – that the project will likely result in significant adverse impacts from slope destabilization as well as erosion even with the mitigations proposed – have not changed.

In fact, the greater detail shown in the reports by Herzog (1988) and by Hom (1991) raised additional grounds for concluding potentially significant project impacts: the proposed project will construct at least two housing units into an excavation formed from landslide deposits, and will be 10 feet below the water table. Dr. Bond finds this situation "inherently unstable."

II. The IS/MND Fails to Consider All Phases of the Project in Analyzing Traffic Impacts

The grading plan for the project would include approximately 6,453 cubic yards (cy) of cut material and 3,443 cy of fill material. August 3, 2020 Staff Report, Packet p. 19. The grading phase of the project is anticipated to take two months, during which time there is expected to be up to 5 one-way truck trips per day. Ibid. Building construction is estimated to take 14 months. Id at Packet p. 20.

Despite this, the transportation analysis avoids any consideration of the construction phase of the project. Under CEQA, all phases of project planning, implementation, and operation must be considered in the initial study. CEQA Guideline 15063(a)(1).

III. The IS/MND Fails to Analyze Baseline Conditions of Riparian Habitat, Waters of the United States and Wetlands on Site

The fundamental goal of CEQA is to inform decision makers and the public of any potentially significant adverse effects of a project. To make such an assessment, the agency must delineate environmental conditions prevailing absent the project, defining a "baseline" against which predicted effects can be described and quantified. *Neighbors for Smart Rail v. Exposition Metro Line Constr. Auth.* (2013) 57 Cal. 4th 439, 447. This baseline for CEQA analysis must be the "existing physical conditions in the affected area." This requirement applies to an initial study or negative declaration. *Communities for a Better Env't v. S. Coast Air Quality Mgmt. Dist*. Here, the City and the project applicant have not adequately defined the baseline conditions for riparian habitat, water of the United States or wetlands. The City's certification of the Mitigated Negative Declaration without this analysis will violate CEQA.

V. The Proposed Mitigation Measures Violate CEQA

The IS/MND proposed mitigations are improper under CEQA to reduce potentially significant impacts. These purported mitigations improperly defer the analysis of project impacts, particularly biological resource impacts, until after project approval. As the Planning Staff Report for the October 19, 2020 hearing concedes "the actual presence or absence of any given species would be determined pursuant to Mitigation Measure IV-1 through IV-3." (Staff Report at PDF 956) Likewise, the analysis of wetland impacts – Mitigation Measure IV-4 -will be deferred until after project approval. In each instance, the City will not know the Project biological impacts until after project approval.

Further, proposed Mitigations IV-4, IV-5 and IV-6 are improper under CEQA to reduce potentially significant impacts to riparian habitat, wetlands and waters of the United States. These purported mitigations improperly defer the formulation of mitigation measures - without committing to specific performance criteria for judging the efficacy of the future mitigation measures." *POET, LLC v. California Air Resources Board* (2013) 218 Cal.App.4th 681, 698-99. Mitigations IV-4, IV-5 and IV-6 require only notification of other agencies without any specific action. An agency goes too far when it simply requires a project applicant to obtain a biological report and then comply with any recommendations that may be made in the report." Save Panoche Valley v. San Benito Cty. (2013) 217 Cal. App. 4th 503 citing Defend the Bay v. City of Irvine (2004) 119 Cal.App.4th 1261, 1275, 15 Cal.Rptr.3d 176.)

In addition, many of the mitigation measures violate CEQA as they are generalized goals and not specific performance criteria. For example, Measure IV-1(b) nests moved to *suitable* areas, Measure IV-2 mitigation only where plants present in *suitable* densities, and Measure IV-3 *appropriate* exclusion zones are vague generalized goals.

V. Take of Endangered Species is a Violation of the Federal Endangered Species Act.

Mission Blue Butterfly, a federally listed endangered species, may be present at the site. Any take of a single individual of such species is prohibited under federal law. 16 U.S.C. § 1538. "Take" includes harass or harm. "Harm" includes any act which actually kill.s or injures fish or wildlife, **including significant habitat modification or degradation** that significantly impairs essential behavioral patterns. "Harass" includes an intentional or negligent act which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

Mitigation Measure IV-2 does not prohibit the take of this butterfly, as it is based on a vague standard of "suitable densities." Further, even with a CEQA determination of "less than significant impact" if the project results in a take of the Mission Blue Butterfly, the project would violate the federal Endangered Species Act.

A government agency, pursuant to whose authority a third party directly exacts a taking of an endangered species, may be deemed to have violated the provisions of the ESA. *Strahan v. Coxe*, 127 F.3d 155, 163 (1st Cir. 1997). See also *Sierra Club v. Yeutter*, 926 F.2d 429, 438–39 (5th Cir.1991) (Forest Service's management of timber stands was a taking of the red-cockaded woodpecker in violation of the ESA); *Defenders of Wildlife v. EPA*, 882 F.2d 1294, 1301 (8th Cir.1989) (EPA's registration of pesticides containing strychnine violated the ESA; *Palila v. Hawaii Dep't of Land and Nat. Resources*, 639 F.2d 495, 497–98 (9th Cir.1981) (state's practice of maintaining feral goats and sheep in palila's habitat constituted a taking); *Loggerhead Turtle v. County Council of Volusia County*, 896 F.Supp. 1170, 1180–81 (M.D.Fla.1995) (county's authorization of vehicular beach access during turtle mating season exacted a taking of the turtles in violation of the ESA).

Conclusion

For the above reasons, the City has before it numerous facts, reasonable assumptions predicated upon facts, and expert opinions supported by fact that the Vista Mar project will have potentially significant adverse impacts. CEQA Guideline 15384(b). A negative declaration is only permitted if there is no substantial evidence that the project or any of its aspects may cause a significant effect on the environment. Again, where some experts conclude there may be a potentially adverse impact, and other experts disagree, an EIR must still be prepared. CEQA Guidelines 15064, subd. (g); *Pocket Protectors v. City of Sacramento* (2004) 124 Cal. App. 4th 903, 928. By law, the City is required to have an EIR prepared for this proposed project in order that the public and City decision makers are fully informed of project impacts, mitigations and alternatives prior to project approval.

In addition, the IS/MND is flawed as it fails to consider all phases of the project, fails to analyze baseline conditions, and its proposed biological resource mitigation measures violate CEQA. Further, the City could be liable for any take of a federally endangered butterflies.

Sincerely,

Brian Gaffney

Shawn Smallwood, PhD
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Bonny O'Connor, Associate Planner
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RE: Vista Mar Project and Initial Study / Mitigated Negative Declaration

Dear Ms. O'Connor,

I write to reply to WRA's September 15 responses to my 30 August 2020 comments regarding potentially significant biological impacts from the proposed Vista Mar Project. None of WRA's responses has changed the conclusions expressed in my comment letter of 30 August 2020.

WRA's responses were speculative and conclusory. For example, WRA claims that the protections afforded raptors by California Fish and Game Code 3503.5 does not qualify raptors as special-status species. This Code disallows take and destruction of nests, specifically to species of raptor. For this reason, species of raptor are special-status species.

WRA claims that *preconstruction* surveys will locate and protect all bird and woodrat nests, but offers up no evidence that such surveys are anywhere nearly as effective as *detection* surveys.

WRA continues to claim an absence of special-status species based on negative findings from a cursory reconnaissance-level site visit coupled with speculated reasons why such species should not occur there. For example, WRA claims hoary bat associates with forest environments, but speculates the trees on site are too small for hoary bats. In contrast, I've observed hoary bats for 7 years in a grassland environment. Species do not always occur where WRA or any other biologist expects them to occur. For this reason, standards exist for determining presence and absence. Determinations of absence are inappropriate in the absence of *detection* surveys; such surveys have not been undertaken at this site.

WRA says it was misleading of me to support a breeding bird impact estimate based on scientific investigations of breeding birds in habitat elsewhere. My impact estimate was based on relevant scientific information and reasonable inferences from this information, Science has long proven that such fact-based reasonable inferences are more effective than speculation -- the only approach used by WRA.

Scientific information and reasonable inferences based thereon are also what I relied upon to predict bird-window collision mortality, even though WRA mistakenly characterizes my prediction as speculative. In fact, my prediction was based on the largest collection of bird-impact estimates of which I am aware, and a very simple derivation and application of the mean and standard error from that collection of estimates. WRA neglected the issue until I raised it, and now relies on speculation to downplay the impact.

Based on my education and experience, after review of the WRA 2019 report, the WRA September 15 2020 critique, the IS/MND, my site visit, wildlife observations, and the reasons above, it continues to be my opinion that the project will result in potentially significant adverse biological impacts even with implementation of the proposed mitigation measures, as detailed in my 30 August 2020 comments.

Thank you for your attention to these comments.

_____

Shawn Smallwood, Ph.D.

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23 November 2020

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Subject: Vista Mar Project Initial Study / Mitigated Negative Declaration
City of Pacifica File No. 2002-001, PSD-714-02
Response to Comments

Dear Ms. O'Connor,

I previously submitted comments on the above subject project on 18 September 2020. I have recently reviewed 3 additional investigation reports of the subject property that I had not previously reviewed:

Donald Herzog Associates Inc, 1988, Letter Report, Subject Geological Investigation Lot 14, Block 3, Pacific Palisades Tract Pacifica, California

John C. Hom & Associates, Inc., 1991, "Geotechnical Investigation Pacific Palisades, Lot 14 , Block 3 , Monterey Road, Pacifica, California

William Cotton and Associates, 1992, Preliminary Geologic and Geotechnical Review, Miramar Townhouse Subdivision, 507 Monterey Road.

I have also reviewed a critique of my earlier comments by GeoForensics Inc., 2020, "Geotechnical Commentary #2".

Upon review of the Herzog, Hom, and Cotton reports and the GeoForensics critique, my conclusions – that the project will likely result in significant adverse impacts from slope destabilization as well as erosion even with the mitigations proposed – have not changed.

In fact, the greater detail shown in the reports by Herzog (1988) and by Hom (1991) raises additional grounds for concluding potentially significant project impacts, which grounds I discuss below

The GeoForensics critique includes a number of false or misleading statements.

GeoForensics incorrectly states that I have not been to the site and have violated professional codes by not applying an inked geology stamp to my letter. As

stated in my 18 September 2020 letter I visited the site; a site visit was conducted on 26 August 2020. Contrary to GeoForensics' critique, there is no requirement that a geologist stamp and license numbers be applied to correspondence. Further, my professional license numbers were included in my CV attached to my September letter.

GeoForensics states that "the majority of the property consists of medium dense to dense surface soils over relatively shallow weathered bedrock" - implying the project occurs *only* in bedrock. Regarding the extent of bedrock, there are countervailing facts indicating that approximately 30% of the project property area is composed of landslide debris and deposits. Previous studies by Herzog (1988) and by Hom (1991) identify active, recent, and historic landslides immediately upslope of the project and define a slide plane and landslide materials below the proposed project.

While the Initial Study euphemistically addressed the existence of landslides as "liberated colluvial material" which on occasion has traveled offsite onto Monterey Road, it did not address the extent or depth of the landslide(s). Cotton (1992) recommended (more) fully evaluating these landslides with geologic cross sections illustrating the subsurface configurations of the landslide masses. To my knowledge this has not ever been done. Despite this, the current project proposes to construct at least two housing units into an excavation formed from these landslide deposits, and will be 10 feet below the water table. Such a situation is inherently unstable. Thus, based on the Herzog and Hom reports, *Unit 8 and to a lesser extent unit 7* will be abutted by landslide deposits and placed within the landslide materials discussed above.

The GeoForensics critique also argues that groundwater gradients ought to be equal regardless of topographic variations, thus seeking to abrogate my interpretation of groundwater dynamics. As stated in my 18 September letter, groundwater elevations presented in Figure 1 are the result of a reasonable contour interpretation using the ground surface as a reference. The difference in groundwater gradient is consistent with the differences in hillside slopes represented in cross-sections 1.1 and 2.2. Absent an investigation, it is incorrect to assume that gradient of a water table will not reflect topographic variations as suggested by GeoForensics. In geology, specifically hydrogeology, steeper hill slopes are expected to host steeper water tables. Thus, my 18 September interpretation is a reasonable inference based on the science and the known facts.

My 18 September comments expressed a concern that the Initial Study's evaluation of the project was done without identifying or discussing the magnitude of the groundwater flux or its potential effect on the project. The GeoForensics critique states that they base their criticism of the steepness of

water table on their “belief” in a shallower water table. GeoForensics’ belief is speculative, and not based on any facts that I can ascertain.

Thank you for your attention to these issues.

Steven Bond PG, CEG CHG

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November 23, 2020

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Subject: Comments on the Vista Mar Project (SCH No. 2020019032)

Dear Ms. O'Connor,

We have reviewed the September 2020 Errata Sheet ("Errata"), as well as the Raney Response to Comments (Attachment N to the October 2020 Planning Commission Staff Report) ("RTC"), for the Vista Mar Project ("Project") located in the City of Pacifica ("City"). After our review of the Errata and RTC, we find that the Errata and RTC are insufficient in addressing our concerns regarding the Project's air quality, health risk, and greenhouse gas impacts. As we asserted in our September 16th comment letter, an EIR should be prepared to adequately evaluate the Project's potential impacts.

Air Quality

In our September 16th comment letter, we identified several issues with the January 2020 Initial Study – Mitigated Negative Declaration's ("IS/MND") air model (California Emissions Estimator Model, "CalEEMod")[1] that artificially reduced the Project's construction and operational emissions. After review of the Errata and RTC, we found that the Errata and RTC fail to address all our concerns and maintain that the IS/MND's CalEEMod model is flawed and fails to accurately estimate the Project's criteria air pollutant emissions. As such, we find the IS/MND and Errata to be inadequate and maintain that an EIR should be prepared to adequately evaluate the Project's local and regional air quality impacts. Until a proper air quality analysis is conducted, the Project should not be approved.

[1] http://caleemod.com/

Unsubstantiated Changes to Architectural Coating Construction Phase Length

As discussed in our September 16th comment letter, the IS/MND's CalEEMod model included an unsubstantiated change to the Project's anticipated architectural coating construction phase length. Review of the Errata and RTC demonstrate that the Project still fails to justify or correct this modeling error. As discussed below, we find the IS/MND and Errata to be inadequate and maintain that the air quality impact significance determination is unsubstantiated.

Regarding the unsubstantiated change to the default architectural coating construction phase length, the RTC states:

> "As noted in the CalEEMod User Guide, where project-specific information is known, the user should override the default values. Because project-specific information was provided by the applicant, the default construction phase lengths were adjusted to match the actual anticipated construction schedule for the project. Thus, the information used within the IS/MND represents a more accurate depiction of project construction as opposed to the CalEEMod defaults that are approximately 280 miles away from the project site. Considering that the construction phase lengths used in the emissions modeling are project specific, the commentator's comparison of the percentage increase in phase lengths from the CalEEMod default values does not provide useful information regarding the accuracy of the emissions analysis prepared for the project.
>
> With regard to the architectural coating phase in particular, it is common practice for architectural coatings to be applied throughout the construction phase as needed. For instance, a retaining wall constructed early in the construction process may require architectural coating or sealing, prior to construction of other on-site structures. Once construction begins on the units, components of each unit would be finished at separate times, some such components may require coating prior to completion of the next task or unit. Thus, the assumption that architectural coating would occur throughout the construction phase is reasonable.
>
> Nevertheless, in response to the comment, Page 13 of the IS/MND has been updated, as shown below, to provide greater clarity regarding the construction phasing:
>
> While the exact timing and length of each phase cannot be determined at this time, *the following phase lengths have been assumed for the purposes of this analysis* based on available project information:
>
> - Site preparation: two weeks;
> - Grading: two months;
> - Paving: one week; and
> - Building construction: 14 months-; and
> - Architectural Coating: 14 months

> The foregoing revision clarifies the inputs used in the emissions modeling and reproduces information that was available in Appendix A of the 1S/MND. The foregoing changes do not affect the analysis presented within the IS/MND" (RTC p. 40).

However, this justification is insufficient for three reasons. First, the RTC's claim that "project-specific information was provided by the applicant" is unsubstantiated. As stated in our September 16th comment letter, the IS/MND failed to mention or address any changes to the architectural coating phase of construction whatsoever. Second, the Errata's claim that "it is common practice for architectural coatings to be applied throughout the construction phase as needed" is unsubstantiated. Without providing any sources or evidence to substantiate this claim, we are unable to verify the changes to the architectural coating phase in the model. Third, simply because the IS/MND was revised to state that the Project's air quality analysis *assumes* an architectural coating phase length of 14 months, this does not justify the revised architectural coating phase length. Regarding altering default data, the CalEEMod User's Guide states:

> "CalEEMod was designed with default assumptions supported by substantial evidence to the extent available at the time of programming. The functionality and content of CalEEMod is based on fully adopted methods and data. However, CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, *provided that the information is supported by substantial evidence as required by CEQA*" (emphasis added).[2]

As you can see in the excerpt above, only Project-specific information "supported by substantial evidence" should replace the CalEEMod default values. Here, since the IS/MND simply assumes an architectural coating phase length of 14 months, without providing any substantial evidence to support this phase length, we cannot verify the revised value. As such, we maintain our September 16th comment, and still conclude that the IS/MND and Errata's CalEEMod models are incorrect and the less-than-significant air quality impact conclusion should not be relied upon.

Unsubstantiated Change to Acres of Grading Value

As discussed in our September 16th comment letter, the IS/MND's CalEEMod model included unsubstantiated reductions to the Project's acres of grading values. Review of the RTC demonstrates that the Project still fails to justify or correct this modeling error. As discussed below, we find the IS/MND and Errata to be inadequate and maintain that the air quality impact significance determination is unsubstantiated.

Regarding the unsubstantiated changes to the default acres of grading values, the RTC states:

> "With regard to grading CalEEMod assumes that grading of the site would occur both during the site preparation phase and the grading phase. The default CalEEMod values assumed that 16.5

[2] "CalEEMod User's Guide." CAPCOA, November 2017, *available at*: http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 12.

acres would be graded during the project grading phase, while 5.50 acres would be graded during the site preparation phase. For the proposed project, grading is only anticipated to occur during the grading phase and the CalEEMod inputs were adjusted accordingly. Thus, based on the 0.7- acre-area of the site that would be graded, the default values were adjusted to reflect that grading would not occur during the site preparation phase (site preparation grading changed from 5.50 acre default to zero acres), but that grading would occur during the grading phase over a 0.7 acre portion of the site (grading phase grading area changed from 16.50 acre default to 0.7 acres). As noted by the commenter, the area to be graded was presented in the IS/MND on page 24, and the source of the grading information was noted in CalEEMod as the project applicant.

Contrary to the commenter's assertion, the text quoted from the CalEEMod User Guide does not serve to demonstrate an insufficiency regarding the analysis presented in the IS/MND. The length and width of the grading area were not used in determining the area-of grading; rather, only the total area to be graded, as provided by the project applicant, was used to determine the area to be graded during the grading phase of the project. The text emphasized by the commenter appears to expressly condone the use of the total area to be graded as a means of determining the amount of grading needed on the site. Furthermore, the grading phase is assumed to occur over two months, with multiple pieces of equipment working within the site for the duration of the grading phase. A two-month grading period with multiple pieces of equipment working within the site, represents a reasonable, if not conservative, approach to analysis for grading a total of 0.7 acres" (RTC p. 40-41).

However, this justification is incorrect. As discussed in our September 16th comment letter and stated in the CalEEMod User's Guide, the dimensions of the grading site have *no impact* on the acres of grading value. Thus, the RTC's claim that a "0.7-acre-area of the site" would be graded does not substantiate the changes.

Furthermore, while the RTC states that "[t]he length and width of the grading area were not used in determining the area-of grading; rather, only the total area to be graded," and that "[a] two-month grading period with multiple pieces of equipment working" correlates with "a reasonable, if not conservative, approach," these claims are unsupported. As the total area to be graded is calculated based on the dimensions of the grading site, the Errata's claim that the length and width were not used, but rather "only the total area to be graded" is incorrect and unsubstantiated. Without substantial evidence to support the reductions to default acres of grading values in the models, we cannot verify the revised values. As such, we maintain our September 16th comment, and still conclude that the IS/MND, Errata and RTC's CalEEMod models are incorrect and the less-than-significant air quality impact conclusion should not be relied upon.

Unsubstantiated Change to Default CO_2 Intensity Factors

As discussed in our September 16th comment letter, the IS/MND's CalEEMod model included an unsubstantiated change to the default CO_2 intensity factor. Review of the Errata and RTC demonstrate

that the Project still fails to justify or correct this modeling error. As discussed below, we find the IS/MND, Errata and RTC to be inadequate and maintain that the air quality impact significance determination is unsubstantiated.

Regarding the unsubstantiated reduction of the default CO_2 intensity factor, the RTC states:

> "The State's Renewable Portfolio Standards (RPS) are a legislative requirement mandating that public utilities source a certain percentage of their retail electricity from renewable sources. Producing electricity from renewable sources reduces the GHG emissions intensity of electricity, thus reducing the amount of GHG emissions released per unit of energy consumed. The default values for the emissions intensity of PG&E electricity in CalEEMod are based on values from the year 2008.[3] Since that time, PG&E has increased the proportion of electricity produced by renewable sources from 14 percent[4] to 39 percent by the year 2018,[5] which is the most recent year for which data is currently available. PG&E will be required to continue increasing the renewable content of their electricity in-line with the RPS eventually reaching 60 percent renewable energy content by the year 2030. Because compliance with RPS is a legislative requirement, PG&E is required to achieve the renewable electricity generation benchmarks established by the RPS. Thus, the incorporation of reduced electricity emissions factors in the emissions modeling is justified" (RTC p. 41-42).

However, this justification is incorrect for two reasons. First, as demonstrated in the excerpt above, the RTC claims that PG&E has increased the proportion of renewables by 25% since CalEEMod was last updated.[3] However, as stated in our previous letter, the IS/MND's CalEEMod model included a ***58% reduction*** to the default CO_2 intensity factor. Thus, based on the RTC's claim that PG&E has increased the proportion of renewables by 25% since CalEEMod was last updated, this reduction is overestimated by 33%.[4] Second, as stated in our previous comment letter, simply because the ***State*** has these ***goals*** does not mean that they will be achieved locally ***at the Project site***. The RTC fails to address this issue, and as a result, we maintain that the revised CO_2 intensity factor is unsupported. As previously stated, this unsubstantiated reduction presents an impediment to accurately determining air quality impacts, as CalEEMod uses the CO_2 intensity factor to calculate the Project's greenhouse gas ("GHG") emissions associated with electricity use.[5] As such, we maintain our September 16th comment, and still conclude that the IS/MND, Errata and RTC's CalEEMod models are incorrect and the less-than-significant air quality impact conclusion should not be relied upon.

Unsubstantiated Changes to Fireplace Values

As discussed in our September 16th comment letter, the IS/MND's CalEEMod model included unsubstantiated changes to the Project's anticipated fireplace values. Review of the Errata and RTC demonstrate that the Project still fails to justify or correct this modeling error. As discussed below, we

[3] Calculated: 39% - 14% = 25%
[4] Calculated: 58% - 25% = 33%
[5] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.caleemod.com/, p. 17.

find the IS/MND, Errata and RTC to be inadequate and maintain that the air quality impact significance determination is unsubstantiated.

Regarding the unsubstantiated changes to the Project's anticipated number of fireplaces, the RTC states:

> "According to applicant provided information, the proposed residences would not include the installation of wood-fired hearths or fireplaces. Thus, the number of wood fireplaces and the amount of wood burned within the project site were adjusted to zero. Applicant provided information was cited within the CalEEMod outputs as the reason for the change to the emissions modeling inputs. Nevertheless, in response to the comment, page 24 of the IS/MND is hereby revised as follows:
>
> Accordingly, *the proposed project's modeling assumes the following project and/or site-specific information*:
>
> - Construction would begin in April 2020;
> - Construction would occur over an approximately 16-month period;
> - The CO2 intensity factor was adjusted to reflect the PG&E's progress towards the State renewable portfolio standards goal by the operational year (anticipated to be 2021);
> - A total of 0.7 acres of land would be graded;
> - A total of 100 CY of material would be exported during site prep and 3,000 CY during grading;
> - The proposed residences would not include wood-burning hearths or fireplaces;
> - Project would exceed Title 245 by 15%;
> - 24kWh of on-site renewable energy would be used;
> - Water conservation strategies would be applied to 30 percent of indoor and 60 percent of outdoor water use; and
> - The proposed project's required compliance with the 2016 Building Energy Efficiency Standards listed in the California Building Standards Code was assumed.
>
> Based on the above, only minor text changes are required to the IS/MND, and the analysis presented within the IS/MND remains valid" (RTC p. 43).

However, this justification is insufficient for several reasons. First, while the RTC states that "applicant provided information" substantiates the reductions to default fireplace values, this supposed "information" was not disclosed in the IS/MND. As previously stated in our September 16th comment letter, we are unable to verify these changes the model, *because the IS/MND failed to provide this information*. Second, simply because the IS/MND was revised to state that the Project's air quality analysis *assumes* that the proposed residences would not include fireplaces, this does not justify the omission of fireplaces in the model. Regarding altering default data, the CalEEMod User's Guide states:

> "CalEEMod was designed with default assumptions supported by substantial evidence to the extent available at the time of programming. The functionality and content of CalEEMod is

> based on fully adopted methods and data. However, CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, *provided that the information is supported by substantial evidence as required by CEQA*" (emphasis added).[6]

As you can see in the excerpt above, only Project-specific information "supported by substantial evidence" should replace the CalEEMod default values. Here, while the IS/MND was updated to state that the modeling "assumes" these features, the IS/MND and Errata fail to provide any meaningful or substantial evidence to support this claim. As such, we maintain our September 16th comment, and still conclude that the IS/MND, Errata and RTC's CalEEMod models are incorrect and the less-than-significant air quality impact conclusion should not be relied upon.

Incorrect Application of Operational Mitigation Measures

As discussed in our September 16th comment letter, the IS/MND's CalEEMod models incorrectly included several mobile, energy-, and water-related operational mitigation measures. Specifically, the IS/MND's models incorrectly included the following mitigation measures: "Improve Pedestrian Network," "Exceed Title 24," "Kilowatt Hours of Renewable Electricity Generated, "Percent of Electricity Use Generated with Renewable Energy," and "Apply Water Conservation Strategy." Review of the Errata and RTC demonstrate that the Project still fails to justify or omit the unsubstantiated operational mitigation measures. As discussed below, we find the IS/MND and Errata to be inadequate and maintain that the IS/MND's air quality significance determination should not be relied upon.

Regarding the inclusion of the operational mitigation measures, the RTC states:

> "Generally, the mitigation measures apply to mobile emissions, energy consumption, and water consumption. However, for each measure it is important to note that due to the limitations of the CalEEMod software, it is sometimes necessary to apply inherent site design and *project features* in the "mitigation" tabs of CalEEMod, even if those measures are *not necessarily mitigation* under CEQA. For instance, as noted on page 24 of the IS/MND, the project, as proposed, was designed to exceed the energy efficiency requirements within the 2016 California Building Code (CBSC) by 15 percent. In addition, the project was anticipated to include on-site renewable energy generation systems (solar panels), and would include water conservation strategies to reduce indoor water consumption by 30 percent and outdoor water consumption by 60 percent. Methods for applying the foregoing *project characteristics* are either impractical or not possible in CalEEMod. Therefore, all of the *project characteristics* mentioned above were applied in the "mitigation" tabs of CalEEMod, despite the measures being part of the *design of the project*" (emphasis added) (RTC p. 43).

However, the RTC's justification for the inclusion of the above-mentioned operational mitigation measures is insufficient. Simply because the Errata claims these inputs are "project characteristics" or

[6] "CalEEMod User's Guide." CAPCOA, November 2017, *available at*: http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 12.

"project features" and "not necessarily mitigation" does not justify their inclusion in the model. According to the Association of Environmental Professionals ("AEP") *CEQA Portal Topic Paper* on mitigation measures:

> "By definition, *mitigation measures are not part of the original project design*. Rather, mitigation measures are actions taken by the lead agency to reduce impacts to the environment resulting from the original project design. Mitigation measures are identified by the lead agency after the project has undergone environmental review and are *above-and-beyond existing laws, regulations, and requirements* that would reduce environmental impacts" (emphasis added).[7]

The guidance goes on to state:

> "While not "mitigation", a good practice is *to include those project design feature(s) that address environmental impacts in the mitigation monitoring and reporting program (MMRP)*. Often the MMRP is all that accompanies building and construction plans through the permit process. If the design features are not listed as important to addressing an environmental impact, *it is easy for someone not involved in the original environmental process to approve a change to the project that could eliminate one or more of the design features without understanding the resulting environmental impact*" (emphasis added).[8]

As you can see in the excerpts above, *project design features are not mitigation measures* and may be *eliminated from the Project's design*. Thus, since the above-mentioned operational mitigation measures included in the IS/MND, Errata and RTC's CalEEMod models are not included as mitigation measures, we cannot guarantee that they would be implemented, monitored, and enforced on the Project site. As a result, we maintain our September 16th comment, and still conclude that the inclusion of the above-mentioned operational mitigation measures in the model is incorrect, and the IS/MND, Errata and RTC's CalEEMod models should not be relied upon to determine Project significance.

Diesel Particulate Matter Health Risk Emissions Inadequately Evaluated

As discussed in our September 16th comment letter, the IS/MND failed to adequately evaluate the proposed Project's potential health risk impacts. Review of the Errata and RTC demonstrate that the Project still fails to adequately evaluate the Project's potential health risk impacts. As discussed below, we find the Errata and RTC to be inadequate and maintain that the IS/MND's less-than-significant impact conclusion regarding the Project's health risk impact should not be relied upon for the following three reasons:

(1) The IS/MND, Errata and RTC fail to prepare a construction health risk assessment;
(2) The IS/MND, Errata and RTC fail to prepare an operational health risk assessment; and
(3) SWAPE's screening-level analysis indicates significant adverse health risks impacts.

[7] "CEQA Portal Topic Paper Mitigation Measures." AEP, February 2020, *available at:* https://ceqaportal.org/tp/CEQA%20Mitigation%202020.pdf, p. 5.
[8] "CEQA Portal Topic Paper Mitigation Measures." AEP, February 2020, *available at:* https://ceqaportal.org/tp/CEQA%20Mitigation%202020.pdf, p. 6.

1) Failure to Prepare a Construction HRA

Regarding the IS/MND's omission of a construction health risk assessment ("HRA"), the RTC states:

> "Pages 28 through 29 of the IS/MND present a discussion of the limited duration of potential exposure, as well as the existing regulations that would reduce the emission of DPM. For instance, project construction would be limited to a one to two-year period, and all off-road equipment operating at the site would be subject to the In-Use Off-Road Diesel Vehicle Regulation, which requires increasingly stringent emissions standards be met by off-road equipment. Thus, nearby receptors would not be exposed to emissions from on-site construction equipment for a substantial amount of time, and emissions from on-site construction equipment must be reduced in compliance with the existing statewide regulations related to off-road diesel vehicles. A common surrogate for DPM is PM2.5, which was estimated as part of the CalEEMod emissions estimates prepared for the IS/MND and revised herein. As demonstrated in this response to comments, exhaust emissions PM2.5 would be released at a maximum rate of 0.88 lbs/day, which is far below the BAAQMD's thresholds for significance for exhaust-related PM2.5. While BAAQMD's threshold of significance is not necessarily meant to serve as a threshold for DPM emissions, the fact that total exhaust related PM2.5 emissions would be far below the BAAQMD's thresholds of significance provides an indication of the comparative scope of emissions that would occur due to the proposed project. Based on the above, the amount of DPM emitted during on-site construction activity would be low, and given the dispersive nature of DPM, the ultimate dosage at any nearby receptor location would be limited. Furthermore, the period of time during which DPM emissions would occur is relatively limited. Because health risks are a result of dosage and exposure duration, the IS/MND concluded that the proposed Project would not result in significant health risks related to project construction" (RTC p. 46-47).

However, this justification is insufficient for two reasons. First, just because sensitive receptors "would not be exposed to emissions from on-site construction equipment for a substantial amount of time," and "emissions from on-site construction equipment must be reduced in compliance with the existing statewide regulations" does not justify the omission of a quantified construction HRA. As previously stated in our September 16th comment letter, construction of the Project will produce emissions of DPM, a human carcinogen, through the exhaust stacks of construction equipment over a construction period of approximately 18 months (Initial Study p. 13). Without making a reasonable effort to connect the Project's construction-related DPM emissions and the potential health risk impacts posed to nearby sensitive receptors, the IS/MND, Errata and RTC fail to demonstrate that health risk impacts associated with Project construction would be less-than-significant. Second, we agree with the RTC's statement that the BAAQMD threshold for PM2.5 emissions is not meant to serve as a threshold for DPM emissions. However, the RTC's claim that "the fact that total exhaust related $PM_{2.5}$ emissions would be far below the BAAQMD's thresholds of significance provides an indication of the comparative scope of emissions that would occur due to the proposed project" is incorrect. We maintain that the BAAQMD $PM_{2.5}$ threshold does not apply to DPM emissions, nor does it connect these emissions to potential health risk impacts. Thus, the RTC's conclusion that "the proposed Project would not result in significant

health risks related to project construction" is incorrect and unsubstantiated. As such, we reiterate our September 16th comment that an EIR should be prepared, making a reasonable effort to connect the Project's construction-related DPM emissions and the potential health risk impacts posed to nearby receptors.

Furthermore, the RTC states:

> "SWAPE's claim that the "OEHHA document recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors" is misleading. The quoted text from SWAPE's comment cites page 8-18, within Section 8.2.10, of the OEHHA guidance document as the source of this information; however, page 8-18 does not contain such a recommendation. Rather, page 8-18 includes recommendations related to how to conduct a health risk assessment (HRA) for short-term projects, not whether or not short-term projects should be evaluated if such projects exceed two-months. The likely source of SWAPE's claim is presented in the following quoted text from page 8-18 the OEHHA Guide:
>
> > Due to the uncertainty in assessing cancer risk from very short-term exposures, we do not recommend assessing cancer risk for projects lasting less than two months at the MEIR. We recommend that exposure from projects longer than 2 months but less than 6 months be assumed to last 6 months (e.g., a 2-month project would be evaluated as if it lasted 6 months). Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs (OEHHA, 2009). Thus, for example, if the District is evaluating a proposed 5-year mitigation project at a hazardous waste site, the cancer risks for the residents would be calculated based on exposures starting in the third trimester through the first five years of life.
>
> Based on the quoted text above, SWAPE appears to misconstrue the OEHHA's recommendation that projects shorter than two months not be analyzed, as direction that all projects longer than two months be analyzed" (RTC p. 47).

However, this justification is similarly insufficient, as the RTC is incorrect in stating that our September 16th comment letter misrepresented OEHHA guidance. Rather, the OEHHA- referenced excerpt further demonstrates our claim that the Project's anticipated 18-month construction schedule, which is greater than two-months, indicates that the Project should conduct an HRA, as "[e]xposure from projects lasting more than 6 months should be evaluated for the duration of the project." As such, the RTC fails to justify the omission of a quantified construction HRA, and we maintain our September 16th comment, and still conclude that the Project's health risk impacts have been inadequately evaluated.

2) Failure to Prepare an Operational HRA

Regarding the IS/MND's omission of an operational HRA, the RTC states:

> "On page 28 the IS/MND correctly states: "The proposed townhouses would not involve any land uses or operations that would be considered major sources of TACs, including DPM. As such, the project would not generate any substantial pollutant concentrations during operations." The determination that project operations would not result result in substantial TAC emissions was made based on the common sources of TACs included in the California Air Resource Board's Air Quality and Land Use Handbook: A Community Health Perspective (Handbook), as well as Raney's professional judgement regarding typical activities associated with residential developments. The CARB's Handbook includes land uses such chrome plating facilities, gas dispensing facilities, certain dry cleaners, freeways and high traffic roads, distribution centers, and rail yards as typical sources of TACs. Residential uses, such as those included in the proposed project, involve none of the TAC producing activities that occur in association with the CARS identified TAC emitting land uses. The commenter is correct that operation of the project would involve approximately 76 vehicle trips per day; however the CARB does not consider roadways to be major sources of TACs unless the roadway experiences at least 50,000 vehicles per day. Monterey Road does not experience roadway traffic anywhere close to this volume of vehicles, and the addition of project related traffic would not result in a substantial amount of increased TAC emissions from operation of Monterey Road. Moreover, the limited amount of TAC emissions that would be generated by the anticipated 76 daily vehicle trips would be distributed throughout the atmosphere over the entire length of each vehicle trip. As a result, a single receptor would not be exposed to even the relatively minor concentration of TACs generated by all of the anticipated project-related daily vehicle trips. Finally, the majority of passenger vehicles are gasoline-powered, with only small percentages of passenger vehicles being diesel or electrically powered. Gasoline and electric vehicles do not release DPM, which is the pollutant that SWAPE ultimately claims would be released during project operations. Thus, it is unlikely that DPM would be emitted by project-related vehicles, and if a future resident on site happens to own a diesel vehicle, emissions from that vehicle would be minimal, because passenger vehicle DPM emissions are much less than emissions from heavy-duty equipment or heavy-duty diesel trucks, and would be dispersed throughout the path of travel of the vehicle" (RTC p. 48).

However, this justification is insufficient. Review of the California Air Resources Board's ("CARB") *Air Quality Land Use Handbook: A Community Health Perspective* ("Handbook") demonstrates that the Handbook only specifies "*common*" sources of TACs, as stated in the RTC. However, simply because the Project would not involve *common* sources of TACs does not provide any detailed or meaningful information which correlates the Project's operational air emissions with the resulting health impacts of Project operations. Nor does this unsupported conclusion justify the omission of a quantified operational HRA whatsoever. Thus, by failing to provide a quantified HRA for Project operation, the IS/MND, Errata and RTC fail to adequately evaluate the potential health risk impacts posed to nearby, existing sensitive receptors.

Furthermore, the RTC's claim that "the CARB does not consider roadways to be major sources of TACs unless the roadway experiences at least 50,000 vehicles per day" is incorrect and unsubstantiated. Rather, the CARB's Handbook asserts:

> "Avoid sitting new sensitive land uses within 500 feet of a freeway, urban roads within 100,000 vehicles/day, or rural roads with 50,000 vehicles/day."[9]

As you can see in the excerpt above, the RTC's claim misrepresents CARB guidance. As such, the fact that the proposed Project generates less than 50,000 vehicle trips per day fails to substantiate the Project's omission of a quantified operational HRA. As such, we reiterate our September 16th comment that an EIR should be prepared, making a reasonable effort to connect the Project's operational DPM emissions and the potential health risk impacts posed to nearby receptors.

Furthermore, the RTC states:

> "The foregoing consideration of potential operational sources of TACS associated with the project demonstrates that the proposed project would not result in substantial TAC emissions over the lifetime of the project. Considering the contents of the OEHHA guide discussed above, OEHHA does not require that a HRA be prepared for each and every project; rather, HRAs need only be prepared where a significant source of TACs has been identified. In the case of the proposed project, an operational source of TACs does not exist and has not been identified by SWAPE. Therefore, while the project would not operate over an extended period of time, project operations would not result in TAC emissions or substantial health risks to any nearby receptors and an operational HRA is not required.
>
> With regard to SWAPE's third claim, because the project was determined not to result in the substantial release of TACs, the project would not have the potential to result in health risks to nearby receptors, and a detailed HRA does not need to be prepared in order to determine that the project would not exceed the BAAQMD's specific numeric thresholds of significance" (RTC p. 48-49).

However, this justification is similarly insufficient. The RTC's claim that "HRAs need only be prepared where a significant source of TACs has been identified," further supports our recommendation that a quantified operational HRA be prepared, as our screening-level HRA demonstrated a significant TAC-related impact. Specifically, SWAPE's September 16th screening-level HRA indicated an estimated lifetime cancer risk of 200 in one million for nearby, existing sensitive receptors, which would significantly exceed the BAAQMD's numeric threshold of 10 in one million. As such, we recommend the preparation of an HRA, as our September 16th comment letter indicated that the Project has the potential to be a significant source of TACs.

[9] "Air Quality Land Use Handbook: A Community Health Perspective." CARB, April 2005, *available at:* https://ww3.arb.ca.gov/ch/handbook.pdf, p. 4, Table 1-1.

3) Screening-Level Analysis Demonstrates Significant Impacts

As previously stated, SWAPE's September 16th screening-level HRA indicated an estimated lifetime cancer risk of 200 in one million for nearby, existing sensitive receptors, which would exceed the BAAQMD's numeric threshold of 10 in one million, demonstrating that the proposed Project would result in a potentially significant adverse health risk impact. Regarding SWAPE's screening-level analysis, the RTC states:

> "In order to prepare a screening-level HRA SWAPE prepared a CalEEMod run that differed significantly from the CalEEMod run prepared for the proposed project. As discussed in Response to Comments 2-2 through 2-9 the emissions estimation prepared for the proposed project required only minor revisions, which resulted in small changes to the estimated emissions levels. The changes implemented by SWAPE, such as the use of default construction phase lengths and grading areas, as well as changes to the energy intensity factor and project design characteristics are not justified and have likely been implemented to artificially increase project-related emissions. For instance, the land uses applied by SWAPE in CalEEMod include an "enclosed parking structure," two separate "city park" land uses, and single-family housing. The total acreage of these land uses adds up to 1.40 acres, despite the fact that the project site is only 1.2 acres, and only 0. 7 acres would be disturbed with implementation of the project. Increasing the acreage of the site would likely increase emissions from construction and operation of the project" (RTC p. 49).

As you can see in the excerpt above, the RTC claims that the changes implemented by SWAPE were unjustified and SWAPE's model incorrectly assumed that the Project site would be 1.40 acres. However, these justifications for the RTC's failure to address the Project's potentially significant adverse health risk impacts indicated by SWAPE's screening-level HRA are insufficient for three reasons. First, the RTC's argument that SWAPE's overestimation of the Project's lot acreage resulted in overestimated emissions, is incorrect. Rather, as emissions in CalEEMod are calculated and dispersed across the total area (acreage) of the Project site, overestimating the site acreage would result in ***decreased*** emissions. As such, this claim by the RTC demonstrates that emissions, and thus potentially significant adverse health risk impacts, may be higher than indicated in SWAPE's CalEEMod model. Second, as discussed above, we reiterate the applicability of our September 16th comments on the IS/MND's CalEEMod model. As such, the RTC's claim that the changes implemented by SWAPE were unjustified is incorrect. Third, we prepared an updated screening-level HRA (attached hereto) relying upon emission estimates from the Errata (Table 3 & 4), which still demonstrates a potentially significant adverse health risk impact. Thus, regardless of the use of SWAPE's updated model or the RTC's model, Project emissions and health risk impacts are potentially significant.

The RTC goes on to state:

> "DPM is the solid material in diesel exhaust, because more than 90% of such material is less than one micrometer in diameter, DPM is a subset of the PM2.5 category of pollutants.10 Despite DPM being a subset of PM2.5, SWAPE has used PM10 as a proxy to estimate emissions of DPM. PM10 includes larger size classes of particles, those particles equal or less than 10

micrometer in diameter, as well as the smaller classes included in PM2.5. By assuming all PM10 emissions represent DPM, SWAPE has inflated the amount of DPM emissions occurring due to the project. For instance, according to SWAPE's own conclusion modeling, maximum annual exhaust emissions of PM10 would be 0.0764 tons per year (tons/yr) while maximum annual emissions of PM2.5would be 0.0729 tons/yr. Given the sensitive nature of DPM emissions and dispersion analyses, even a slight discrepancy in the total emissions can lead to large changes in health risks. Without further justification for the use of PM10 rather than the more accurate PM2.5, the veracity of SWAPE's conclusions regarding project-related health risks is further diminished.

Despite review of SWAPE's CalEEMod outputs, the method by which SWAPE arrives at an estimate of 153 pounds of DPM emitted over the construction period is unclear. Without the ability to replicate SWAPE's assumptions regarding DPM emissions, the accuracy of the emissions calculations used by SWAPE in the HRA, and the resulting estimation of health risks, cannot be verified" (RTC p. 50).

As you can see in the excerpt above, the RTC claims that SWAPE assumed that "all PM10 emissions represent DPM" is incorrect. As described in our September 16th comment letter, SWAPE relied upon the ***exhaust*** PM_{10} emissions, rather than ***all*** PM_{10} emissions, as claimed by the RTC, to represent DPM. Furthermore, the RTC states that we should have instead utilized $PM_{2.5}$ emissions to represent DPM instead. However, the RTC fails to provide any sources or substantial evidence to support the recommendation of $PM_{2.5}$ emissions; thus we cannot verify this alternative methodology. Furthermore, we prepared an updated screening-level HRA (attached hereto) relying upon exhaust $PM_{2.5}$ estimates from the CalEEMod output files available in the Errata, which still demonstrates a potentially significant adverse health risk impact. Thus, regardless of the use of exhaust $PM_{2.5}$ or exhaust PM_{10} estimates, Project emissions and health risk impacts are potentially significant.

Finally, the RTC states:

"As discussed in Response to Comment 2-10, and on page 28 of the IS/MND, the project would not involve operational sources of DPM. Because SWAPE has not identified any operational sources of DPM, interpretation of the CalEEMod estimated emissions of PM10 lacks justification. PM10 is any particulate matter that is less than 10 micrometers in diameter; thus, PM10 includes a wide variety of potential particles including compounds that are directly emitted or those that form through chemical reactions in the atmosphere. With no clear course of DPM related to the project, assuming that the estimate of PM10 emissions generated by CalEEmod represents DPM lacks support. Despite the lack of specifically identified operational sources of DPM, SWAPE states that "A release height of three meters was selected to represent the height of exhaust stacks on operational equipment and other heavy-duty vehicles...was used to simulate instantaneous plum dispersion upon release." Residential uses do not involve the use of operational equipment with exhaust stacks that release DPM or heavy-duty vehicles. SWAPE does not provide support for why this highly unusual use of equipment with exhaust stacks or heavy-duty vehicles would occur during project operations, thus rendering the commenter's

assumption that operational emissions of DPM would occur unsupported. Such inputs are better suited to the analysis of a construction project, and the use of unsupported modeling parameters would return erroneous estimates of emissions dispersion and resulting concentrations" (RTC p. 50-51).

As you can see in the excerpt above, the RTC claims that "SWAPE has not identified any operational sources of DPM." However, this claim fails to recognize both SWAPE and the RTC's identification of operational DPM sources for the proposed Project. Specifically, as acknowledged previously, SWAPE's screening-level analysis demonstrates a combined construction and operational increased cancer risk of 200 in one million. Without conducting a Project-specific HRA, SWAPE's HRA is the only *quantified* analysis regarding cancer-related health risk impacts for the proposed Project and thus, demonstrates that there are potentially significant adverse impacts. While the RTC goes on to state that "[r]esidential uses do not involve the use of operational equipment with exhaust stacks that release DPM or heavy-duty vehicles," this directly contradicts the RTC's previous claim that the Project would generate approximately 76 daily vehicle trips. More so, the IS/MND, Errata and RTC's CalEEMod models demonstrate that the fleet mix associated with these daily vehicle trips would include heavy-duty trucks, which produce DPM emissions. As such, the RTC's claim that the Project would not produce significant health risk impacts is unsubstantiated.

Finally, according to CEQA Guidelines § 15064.4(b), if there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, a full CEQA analysis must be prepared for the project. As SWAPE's September 16th screening-level HRA (which is the only quantified HRA that has been conducted for the proposed Project) demonstrates potentially significant adverse impacts, a full CEQA analysis – in the form of an EIR - should be prepared for the Project to include a quantified analysis of the Project's anticipated health risk impacts, and mitigation should be implemented where necessary, per CEQA Guidelines.

Updated Screening-Level Analysis Demonstrates Significant Impacts

To evaluate the potential health risk impacts posed by Project construction and operation to nearby existing sensitive receptors, SWAPE prepared an updated screening-level HRA utilizing exhaust $PM_{2.5}$ estimates available in the Errata's CalEEMod output files. The results of our assessment as described below, demonstrate that the proposed Project would result in a potentially significant adverse health risk impact not previously identified or addressed by the IS/MND.

As previously stated in our September 16th comment letter, in order to conduct our screening-level risk assessment we relied upon AERSCREEN, which is a screening level air quality dispersion model.[10] The model replaced SCREEN3, and AERSCREEN is included in the OEHHA[11] and the California Air Pollution

[10] U.S. EPA (April 2011) AERSCREEN Released as the EPA Recommended Screening Model, http://www.epa.gov/ttn/scram/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf
[11] OEHHA (February 2015) Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments, https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

Control Officers Associated ("CAPCOA")[12] guidance as the appropriate air dispersion model for Level 2 health risk screening assessments ("HRSAs"). A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

Based on the annual $PM_{2.5}$ exhaust estimates from the Errata's CalEEMod output files, we prepared a preliminary HRA of the Project's construction and operational health risk impacts to residential sensitive receptors. Consistent with recommendations set forth by OEHHA, we assumed residential exposure begins during the third trimester stage of life. The Agenda's CalEEMod model indicates that construction activities will generate approximately 158 pounds of DPM over the 525-day construction period. The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in equipment usage and truck trips over Project construction, we calculated an average DPM emission rate by the following equation:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{157.6\ lbs}{525\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.001576\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.001576 grams per second ("g/s"). Subtracting the 525-day construction period from the total residential duration of 30 years, we assumed that after Project construction, the sensitive receptor would be exposed to the Project's operational DPM for an additional 28.56 years, approximately. The Project's operational CalEEMod emissions, calculated by subtracting the existing emissions from the proposed Project, indicate that operational activities will generate approximately 10 pounds of DPM per year throughout operation. Applying the same equation used to estimate the construction DPM rate, we estimated the following emission rate for Project operation:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{10.24\ lbs}{365\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.000147\ g/s}$$

Using this equation, we estimated an operational emission rate of 0.000147 g/s. Construction and operational activity was simulated as a 1.2-acre rectangular area source in AERSCREEN with dimensions of 81 by 60 meters. A release height of three meters was selected to represent the height of exhaust stacks on operational equipment and other heavy-duty vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution.

The AERSCREEN model generates maximum reasonable estimates of single-hour DPM concentrations from the Project site. EPA guidance suggests that in screening procedures, the annualized average

[12] CAPCOA (July 2009) Health Risk Assessments for Proposed Land Use Projects, http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.

concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10%.[13] While the closest residential sensitive receptor is located less than 5 meters away, the MEIR is located approximately 50 meters from the Project site, according to the AERSCREEN output files. The single-hour concentration estimated by AERSCREEN for Project construction is approximately 7.628 µg/m^3 DPM at approximately 50 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.7628 µg/m^3 for Project construction at the MEIR. For Project operation, the single-hour concentration estimated by AERSCREEN is 0.7129 µg/m^3 DPM at approximately 50 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.7129 µg/m^3 for Project operation at the MEIR.

We calculated the excess cancer risk to the MEIR using applicable HRA methodologies prescribed by OEHHA. In our updated CalEEMod model (attached hereto), we utilized the construction schedule included in the Errata's CalEEMod model. Consistent with this schedule, the annualized average concentration for construction was used for the entire third trimester of pregnancy (0.25 years) and the first 1.19 years of the infantile stage of life (0 – 2 years). The annualized averaged concentration for operation was used for the remainder of the 30-year exposure period, which makes up the remainder of the infantile stage of life, and the entire child and adult stages of life (2 – 16 years) and (16 – 30 years), respectively.

Consistent with OEHHA, as recommended by SCAQMD, BAAQMD, and SJVAPCD guidance, we used Age Sensitivity Factors ("ASFs") to account for the heightened susceptibility of young children to the carcinogenic toxicity of air pollution.[14, 15, 16, 17] According to this guidance, the quantified cancer risk should be multiplied by a factor of ten during the third trimester of pregnancy and during the first two years of life (infant) as well as multiplied by a factor of three during the child stage of life (2 – 16 years). Furthermore, in accordance with the guidance set forth by OEHHA, we used the 95th percentile

[13] "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised." EPA, 1992, *available at*: http://www.epa.gov/ttn/scram/guidance/guide/EPA-454R-92-019_OCR.pdf; *see also* "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf p. 4-36.

[14] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

[15] "Draft Environmental Impact Report (DEIR) for the Proposed The Exchange (SCH No. 2018071058)." SCAQMD, March 2019, *available at:* http://www.aqmd.gov/docs/default-source/ceqa/comment-letters/2019/march/RVC190115-03.pdf?sfvrsn=8, p. 4.

[16] "California Environmental Quality Act Air Quality Guidelines." BAAQMD, May 2017, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, p. 56; see also "Recommended Methods for Screening and Modeling Local Risks and Hazards." BAAQMD, May 2011, *available at:* http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20Modeling%20Approach.ashx, p. 65, 86.

[17] "Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document." SJVAPCD, May 2015, *available at:* https://www.valleyair.org/busind/pto/staff-report-5-28-15.pdf, p. 8, 20, 24.

breathing rates for infants.[18] Finally, according to BAAQMD guidance, we used a Fraction of Time At Home ("FAH") value of 0.85 for the 3rd trimester and infant receptors, 0.72 for child receptors, and 0.73 for the adult receptors.[19] We used a cancer potency factor of 1.1 (mg/kg-day)$^{-1}$ and an averaging time of 25,550 days. The results of our calculations are shown below.

The Maximally Exposed Individual at an Existing Residential Receptor

Activity	Duration (years)	Concentration (ug/m3)	Breathing Rate (L/kg-day)	Cancer Risk without ASFs*	ASF	Cancer Risk with ASFs*
Construction	0.25	0.7628	361	8.8E-07	10	8.8E-06
3rd Trimester Duration	***0.25***			***8.8E-07***	***3rd Trimester Exposure***	***8.8E-06***
Construction	1.19	0.7628	1090	1.3E-05	10	1.3E-04
Operation	0.81	0.07129	1090	8.1E-07	10	8.1E-06
Infant Exposure Duration	***2.00***			***1.3E-05***	***Infant Exposure***	***1.3E-04***
Operation	14.00	0.07129	572	6.2E-06	3	1.9E-05
Child Exposure Duration	***14.00***			***6.2E-06***	***Child Exposure***	***1.9E-05***
Operation	14.00	0.07129	261	2.9E-06	1	2.9E-06
Adult Exposure Duration	***14.00***			***2.9E-06***	***Adult Exposure***	***2.9E-06***
Lifetime Exposure Duration	**30.00**			**2.3E-05**	**Lifetime Exposure**	**1.6E-04**

* We, along with CARB and SCAQMD, recommend using the more updated and health protective 2015 OEHHA guidance, which includes ASFs.

As demonstrated in the table above, the excess cancer risk to adults, children, infants, and during the 3rd trimester of pregnancy at the MEIR located roughly 50 meters away, utilizing age sensitivity factors, over the course of Project construction and operation, are approximately 2.9, 19, 130, and 8.8 in one million, respectively. The excess cancer risk over the course of a residential lifetime (30 years), utilizing age sensitivity factors, is approximately 160 in one million. **The infant, child, and lifetime cancer risks all exceed the BAAQMD threshold of 10 in one million, thus resulting in a potentially significant adverse health risk impact not previously addressed or identified by the IS/MND, Errata, or RTC**. Results without age sensitivity factors are presented in the table above, although we **do not** recommend

[18] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act," June 5, 2015, *available at:* http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588-risk-assessment-guidelines.pdf?sfvrsn=6, p. 19.
"Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

[19] "Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines." BAAQMD, January 2016, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines_clean_jan_2016-pdf.pdf?la=en

utilizing these values for health risk analysis. Regardless, the excess cancer risk posed to adults, children, infants, and during the third trimester of pregnancy at the MEIR, located approximately 50 meters away, over the course of Project construction and operation, without age sensitivity factors, are approximately 2.9, 6.2, 13, and 0.88 in one million, respectively. The excess cancer risk over the course of a residential lifetime (30 years) at the MEIR, without age sensitivity factors, is approximately 23 in one million. **The infant and lifetime construction and operational cancer risks, without using age sensitivity factors, all exceed the BAAQMD threshold of 10 in one million, thus resulting in a potentially significant adverse health risk impact not previously addressed or identified by the IS/MND, Errata or RTC**. While we recommend the use of age sensitivity factors, these health risk impacts exceed the BAAQMD threshold regardless.

An agency must include an analysis of health risks that connects the Project's air emissions with the health risk posed by those emissions. Our analysis represents a screening-level HRA, which is known to be conservative and tends to err on the side of health protection. The purpose of the screening-level construction and operational HRA shown above is to demonstrate the link between the proposed Project's emissions and the potential health risk. As previously stated in our September 16th comment letter, o**ur screening-level HRA demonstrates that construction and operation of the Project could result in a potentially significant adverse health risk impact, when correct exposure assumptions and up-to-date, applicable guidance are used**. Therefore, since our screening-level construction HRA indicates a potentially significant adverse impact, an EIR should include a reasonable effort to connect the Project's air quality emissions and the potential health risks posed to nearby receptors. Thus, an EIR should include a quantified air pollution model as well as an updated, quantified refined health risk assessment which adequately and accurately evaluates health risk impacts associated with both Project construction and operation.

Greenhouse Gas

Failure to Adequately Evaluate Greenhouse Gas Impacts

As discussed in our September 16th comment letter, the IS/MND estimated that the Project would result in net annual construction-related greenhouse gas ("GHG") emissions of 381.27 metric tons of CO_2 equivalents per year ("MT CO_2e/year") and net annual operational GHG emissions of 94.58 MT CO_2e/year. As a result, the IS/MND concluded that the Project's GHG emissions would not exceed the BAAQMD bright-line threshold of 1,100 MT CO_2e/year. Review of the Errata and RTC demonstrates that the proposed Project still fails to adequately evaluate the Project's anticipated GHG impacts. As discussed below, we maintain that the IS/MND, Errata and RTC's GHG analyses, as well as the subsequent less-than-significant impact conclusion, are incorrect for the following two reasons:

(1) The IS/MND, Errata and RTC's GHG analyses rely upon an incorrect and unsubstantiated air model; and
(2) The IS/MND, Errata and RTC's GHG analyses rely upon an outdated threshold.

(1) Incorrect and Unsubstantiated Quantitative GHG Analysis

As discussed in our September 16th comment letter, the IS/MND's quantitative GHG analysis relied upon an incorrect and unsubstantiated air model. Regarding our September 16th comment, the RTC states:

"As discussed in Response to Comments 2-6 and 2-9, an updated CalEEMod emissions estimation has been prepared to remove the transit-related mitigation and correct an error related to the number of haul trucks required during project construction. As such, page 51 and 52 of the IS/MND are hereby revised as follows:

> Construction of the proposed project was anticipated to occur over approximately 16 months with total emissions of ~~381.27~~381.34 MTC02e/yr. Operational emissions were determined to equal ~~94.58~~89.86 MTC02e/yr. Consequently, even if project operational and construction emissions were considered together, the total GHG emissions of ~~475.854~~71.20 MTC02e/yr would be well below BMQMD's threshold of 1,100 MTC02e/yr. Therefore, neither construction nor operation of the proposed project would be anticipated to result in significant emissions of GHGs.

As shown in the above revisions, the changes to the emissions modeling made in response to the comments results in only minor changes to the estimate of emissions presented in the IS/MND" (RTC p. 51).

However, this response is insufficient, because the IS/MND, Errata and RTC continue to utilize and incorrect and unsubstantiated air model to estimate the Project's GHG emissions. While the Errata includes an updated CalEEMod model, as referenced above, the model continues to include incorrect and unsubstantiated input parameters, as discussed in the "Unsubstantiated Input Parameters Used to Estimate Project Emissions" section of this letter. As a result, we find the Errata and RTC to be inadequate and maintain that the IS/MND, Errata and RTC's GHG analyses are incorrect and unsubstantiated. Thus, we maintain our September 16th comment, and still conclude that a Project-specific EIR should be prepared, using correct, project-specific modeling to adequately assess and mitigate the Project's GHG impact.

(2) Use of an Incorrect Threshold

As discussed in our September 16th comment letter, the IS/MND's quantitative GHG analyses relied upon an outdated threshold. Regarding the use of an outdated threshold, the RTC states:

> "As stated on page 51 of the IS/MND, the analysis presented in the IS/MND relies on BAAQMD's adopted thresholds of significance at the time that the environmental analysis of the project was prepared. In the absence of any other adopted thresholds or any formally adopted guidance from BAAQMD for the analysis of GHG emission beyond the year 2020, BAAQMD's adopted thresholds of significance for project-level operational GHG emissions of 1,100 MTCO2e/yr or 4.6 MTCO2e/yr per service population were deemed appropriate for use in the IS/MND. In fact, on February 25, 2020, BAAQMD re-posted their CEQA thresholds of significance, and continued to include the foregoing GHG emissions thresholds. Although BAAQMD has reissued their adopted GHG thresholds, BMQMD has not yet published guidance stating that such thresholds are outdated or inapplicable. In the absence of published guidance regarding the use of alternative thresholds of significance, BAAQMD's thresholds remain applicable.

> Despite the recent promulgation of BAAQMD's GHG thresholds of significance, in response to the comment, project-related GHG emissions may be considered in light of the commenter's suggested thresholds. Prior to comparison of project emissions to the commenter's suggested thresholds, it should be noted that the commenter does not provide any methodology used to calculate their suggested threshold of 660 MT/CO2e/yr, nor does the commenter site any communication or guidance from BAAQMD suggesting that BAAQMD has endorsed these thresholds. Considering the lack of methodology or BAAQMD support for the suggested threshold, consideration of the commenter's suggested threshold is provided for informational purposes only" (RTC p. 52-53).

However, this justification is insufficient for three reasons.

First, as acknowledged by the RTC, the BAAQMD's bright line and screening thresholds of 1,100 MT CO_2e/year and 4.6 MT CO_2e/SP/year were developed for the year 2020, based on AB 32, and thus, only apply to projects that will be operational by 2020.[20] Considering that the proposed Project has yet to be approved, and it is November of 2020, these thresholds are outdated and do not apply to the proposed Project.

Second, according to the Association for Environmental Professionals ("AEP") *Beyond Newhall and 2020: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California*,

> "Once the state has a full plan for 2030 (which is expected in 2017), and then a project with a horizon between 2021 and 2030 should be evaluated based on a threshold using the 2030 target."[21]

As demonstrated above, the proposed Project, which has a horizon between 2021 and 2030, should have been evaluated based on a threshold using the 2030 target, despite the fact that the BAAQMD has not explicitly stated that these thresholds are outdated and inapplicable. Rather, to conduct the most conservative analysis and evaluate the Project's consistency with the state's 2030 GHG reduction target, the IS/MND and Errata should have utilized the 2030 "Substantial Progress" thresholds of 660 MT CO_2e and of 2.6 MT CO_2e/SP/year to evaluate the Project's emissions.

Third, the RTC's claim that SWAPE failed to "provide any methodology used to calculate" the "substantial progress" threshold of 660 MT CO_2e is incorrect. Rather, our September 16th comment letter provided *five* sources, indicating that numerous other projects within the BAAQMD have utilized this threshold. Furthermore, each of these sources relied upon the above-referenced AEP *Beyond Newhall and 2020: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California*, which discloses the assumptions, calculations, and methodology underlying these

[20] "California Environmental Quality Act Air Quality Guidelines." BAAQMD, May 2017, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, p. D-20 – D-22.
[21] "Beyond Newhall and 2020: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California." Association of Environmental Professionals (AEP), October 2016, *available at:* https://califaep.org/docs/AEP-2016_Final_White_Paper.pdf, p. 40.

thresholds. As such, the RTC's claim is incorrect, as we did provide adequate sources and substantiation for these thresholds. As such, we reiterate the applicability of the updated "substantial progress" thresholds and recommend that the Project not be approved until an EIR is prepared to adequately compare the Project's emissions to the proper threshold based on the most recent guidance available.

Disclaimer: SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,

Matt Hagemann, P.G., C.Hg.

Paul E. Rosenfeld, Ph.D.

Start date and time 11/20/20 10:58:08

AERSCREEN 16216

Vista Mar Construction

Vista Mar Construction

---------- DATA ENTRY VALIDATION ----------

	METRIC	ENGLISH
** AREADATA **	----------	----------
Emission Rate:	0.158E-02 g/s	0.125E-01 lb/hr
Area Height:	3.00 meters	9.84 feet
Area Source Length:	81.00 meters	265.75 feet
Area Source Width:	60.00 meters	196.85 feet
Vertical Dimension:	1.50 meters	4.92 feet
Model Mode:	URBAN	
Population:	38759	
Dist to Ambient Air:	1.0 meters	3. feet

** BUILDING DATA **

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters 0.0 feet

Probe distance: 5000. meters 16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K -9.7 / 98.3 Deg F

Minimum Wind Speed: 0.5 m/s

Anemometer Height: 10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type: Average Moisture

Surface friction velocity (u*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2020.11.20_VistaMar_RTC_Construction.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

****

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season	Albedo	Bo	zo
Winter	0.35	1.50	1.000
Spring	0.14	1.00	1.000
Summer	0.16	2.00	1.000
Autumn	0.18	2.00	1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 11/20/20 10:58:54

****

Running AERMOD

Processing Winter

Processing surface roughness sector 1

```
**************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

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

Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

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

```
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ****************************************

  Running AERMOD
```

```
 Processing Spring

Processing surface roughness sector  1

**************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25


    ********   WARNING MESSAGES   ********
```

```
               ***  NONE  ***

**************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

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

  Running AERMOD

 Processing Summer

Processing surface roughness sector  1

**************************************************

Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   3
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************
Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************
Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************
Processing wind flow sector   6
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  30

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  35

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  40
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 ******************************************


  Running AERMOD

 Processing Autumn


Processing surface roughness sector  1


**************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***
```

```
**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

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

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  30

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  35

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

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

```
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

FLOWSECTOR   ended 11/20/20 10:59:06

REFINE       started 11/20/20 10:59:06

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

REFINE       ended 11/20/20 10:59:07

 *******************************************
 AERSCREEN Finished Successfully
 With no errors or warnings
 Check log file for details
 *******************************************

 Ending date and time  11/20/20 10:59:09
```

```
 Concentration     Distance Elevation  Diag  Season/Month   Zo sector       Date
 H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS     HT
REF TA     HT
   0.52116E+01         1.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.67397E+01        25.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
*  0.76487E+01        48.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.76280E+01        50.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42712E+01        75.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28800E+01       100.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21774E+01       125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17246E+01       150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14116E+01       175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11853E+01       200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10142E+01       225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.88217E+00       250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.77689E+00       275.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.69181E+00       300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62146E+00       325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.56256E+00       350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.51278E+00       375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47006E+00       400.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43313E+00       425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40113E+00       450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37286E+00       475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34790E+00       500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32553E+00       525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30560E+00       550.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28775E+00       575.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27156E+00       600.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25693E+00       625.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24362E+00       650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23150E+00       675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22037E+00       700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21011E+00       725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20063E+00       750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19184E+00       775.00      0.00   0.0        Winter       0-360   10011001
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-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.18372E+00   800.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.17617E+00   825.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16917E+00   850.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16263E+00   875.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15652E+00   900.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15078E+00   925.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.14541E+00   950.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.14036E+00   975.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.13560E+00   1000.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.13111E+00   1025.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.12687E+00   1050.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.12390E+00   1075.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.12005E+00   1100.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.11640E+00   1125.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.11294E+00   1150.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.10966E+00   1175.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0

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   0.10653E+00      1200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10356E+00      1225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10073E+00      1250.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.98028E-01      1275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.95452E-01      1300.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.92990E-01      1325.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.90636E-01      1350.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.88383E-01      1375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.86226E-01      1400.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.84158E-01      1425.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.82175E-01      1450.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.80270E-01      1475.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.78442E-01      1500.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.76684E-01      1525.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.74994E-01      1550.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.73367E-01      1574.99      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.71800E-01      1600.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.70290E-01      1625.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68834E-01      1650.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.67430E-01      1675.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.66075E-01      1700.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.64766E-01      1725.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63501E-01      1750.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62279E-01      1775.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.61097E-01      1800.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59953E-01      1824.99      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58845E-01      1850.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57773E-01      1875.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.56734E-01      1900.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55727E-01      1924.99      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.54750E-01      1950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53803E-01      1975.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52884E-01      2000.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51992E-01      2025.00      0.00   5.0        Winter       0-360   10011001
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-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.51125E-01   2050.00   0.00 40.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.50283E-01   2075.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.49465E-01   2100.00   0.00 20.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.48670E-01   2124.99   0.00 40.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.47897E-01   2150.00   0.00 30.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.47144E-01   2175.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.46412E-01   2200.00   0.00 20.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.45699E-01   2224.99   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.45005E-01   2250.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.44330E-01   2275.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.43671E-01   2300.00   0.00 40.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.43029E-01   2325.00   0.00 40.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.42404E-01   2350.00   0.00 25.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.41794E-01   2375.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.41199E-01   2399.99   0.00 35.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.40618E-01   2425.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0

```
   0.40052E-01      2449.99      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39499E-01      2475.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38959E-01      2500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38432E-01      2525.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37917E-01      2550.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37414E-01      2575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36922E-01      2600.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36442E-01      2625.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35972E-01      2650.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35513E-01      2675.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35063E-01      2700.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34624E-01      2725.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34194E-01      2750.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33773E-01      2775.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33361E-01      2800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32957E-01      2825.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32562E-01      2850.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.32175E-01      2875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31796E-01      2900.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31425E-01      2925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31061E-01      2950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30704E-01      2975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30355E-01      3000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30012E-01      3025.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29676E-01      3050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29346E-01      3074.99      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29023E-01      3100.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28705E-01      3125.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28394E-01      3150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28089E-01      3174.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27789E-01      3200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27494E-01      3225.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27205E-01      3250.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26921E-01      3275.00      0.00  20.0        Winter       0-360   10011001
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-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.26643E-01   3300.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.26369E-01   3325.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.26100E-01   3350.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.25836E-01   3375.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.25576E-01   3400.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.25321E-01   3425.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.25071E-01   3450.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24824E-01   3475.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24582E-01   3500.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24344E-01   3525.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24109E-01   3550.00   0.00 25.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.23879E-01   3575.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.23652E-01   3600.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.23429E-01   3625.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.23210E-01   3650.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.22994E-01   3675.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0

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   0.22782E-01      3700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22573E-01      3725.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22368E-01      3750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22165E-01      3775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21966E-01      3800.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21770E-01      3825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21577E-01      3849.99      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21386E-01      3875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21199E-01      3900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21015E-01      3925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20833E-01      3950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20654E-01      3975.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20477E-01      4000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20304E-01      4025.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20132E-01      4050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19964E-01      4075.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19797E-01      4100.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.19633E-01      4125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19472E-01      4150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19312E-01      4175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19155E-01      4200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19001E-01      4225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18848E-01      4250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18697E-01      4275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18549E-01      4300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18402E-01      4325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18258E-01      4350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18115E-01      4375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17974E-01      4400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17836E-01      4425.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17699E-01      4450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17564E-01      4475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17430E-01      4500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17299E-01      4525.00      0.00   0.0        Winter       0-360   10011001
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-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.17169E-01   4550.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.17041E-01   4575.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16914E-01   4600.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16789E-01   4625.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16666E-01   4650.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16544E-01   4675.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16424E-01   4700.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16305E-01   4725.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16188E-01   4750.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16072E-01   4775.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15958E-01   4800.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15845E-01   4825.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15733E-01   4850.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15623E-01   4875.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15514E-01   4900.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15406E-01   4925.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0

```
   0.15300E-01      4950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15195E-01      4975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15091E-01      5000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

Start date and time 11/20/20 10:59:22

AERSCREEN 16216

Vista Mar Operation

Vista Mar Operation

---------- DATA ENTRY VALIDATION ----------

	METRIC	ENGLISH
** AREADATA **	---	---
Emission Rate:	0.147E-03 g/s	0.117E-02 lb/hr
Area Height:	3.00 meters	9.84 feet
Area Source Length:	81.00 meters	265.75 feet
Area Source Width:	60.00 meters	196.85 feet
Vertical Dimension:	1.50 meters	4.92 feet
Model Mode:	URBAN	
Population:	38759	
Dist to Ambient Air:	1.0 meters	3. feet

** BUILDING DATA **

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters 0.0 feet

Probe distance: 5000. meters 16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K -9.7 / 98.3 Deg F

Minimum Wind Speed: 0.5 m/s

Anemometer Height: 10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type: Average Moisture

Surface friction velocity (u*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2020.11.20_VistaMar_RTC_Operation.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

****

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season	Albedo	Bo	zo
Winter	0.35	1.50	1.000
Spring	0.14	1.00	1.000
Summer	0.16	2.00	1.000
Autumn	0.18	2.00	1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 11/20/20 11:00:08

****

Running AERMOD

Processing Winter

Processing surface roughness sector 1

```
**************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

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

Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

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

```
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ****************************************

  Running AERMOD
```

```
 Processing Spring

Processing surface roughness sector  1

**************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25


    ********   WARNING MESSAGES   ********
```

```
               ***  NONE  ***

**************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

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

  Running AERMOD

 Processing Summer

Processing surface roughness sector  1

**************************************************

Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   3
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************
Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************
Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************
Processing wind flow sector   6
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  30

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  35

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  40
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 ******************************************


  Running AERMOD

 Processing Autumn


Processing surface roughness sector  1


**************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***
```

```
**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

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

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  30

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  35

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

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

```
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

FLOWSECTOR   ended 11/20/20 11:00:21

REFINE       started 11/20/20 11:00:21

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

REFINE       ended 11/20/20 11:00:22

 *******************************************
 AERSCREEN Finished Successfully
 With no errors or warnings
 Check log file for details
 *******************************************

 Ending date and time  11/20/20 11:00:24
```

```
 Concentration     Distance Elevation  Diag  Season/Month   Zo sector       Date
 H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS     HT
REF TA     HT
   0.48709E+00         1.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62991E+00        25.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
*  0.71487E+00        48.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.71293E+00        50.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39919E+00        75.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26918E+00       100.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20351E+00       125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16119E+00       150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13193E+00       175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11078E+00       200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.94791E-01       225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.82450E-01       250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.72610E-01       275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.64658E-01       300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58084E-01       325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52579E-01       350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
```

```
310.0    2.0
   0.47925E-01       375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43933E-01       400.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40481E-01       425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37491E-01       450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34849E-01       475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32516E-01       500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30425E-01       525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28562E-01       550.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26894E-01       575.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25380E-01       600.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24013E-01       625.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22769E-01       650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21636E-01       675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20596E-01       700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19638E-01       725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18752E-01       750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17930E-01       775.00      0.00   0.0        Winter       0-360   10011001
```

-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.17171E-01   800.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.16465E-01   825.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15811E-01   850.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.15200E-01   875.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.14629E-01   900.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.14092E-01   925.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.13590E-01   950.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.13118E-01   975.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.12673E-01   1000.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.12254E-01   1025.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.11858E-01   1050.00   0.00 10.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.11580E-01   1075.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.11220E-01   1100.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.10879E-01   1125.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.10556E-01   1150.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.10249E-01   1175.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0

```
   0.99568E-02      1200.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.96790E-02      1225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.94144E-02      1250.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.91620E-02      1275.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.89212E-02      1300.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.86911E-02      1325.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.84711E-02      1350.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.82605E-02      1375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.80589E-02      1400.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.78656E-02      1425.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.76803E-02      1450.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.75023E-02      1475.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.73314E-02      1500.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.71671E-02      1525.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.70091E-02      1550.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68571E-02      1574.99      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.67106E-02      1600.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.65695E-02      1625.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.64334E-02      1650.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63022E-02      1675.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.61755E-02      1700.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.60532E-02      1725.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59350E-02      1750.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58207E-02      1775.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57103E-02      1800.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.56033E-02      1825.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.54999E-02      1850.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53996E-02      1875.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53025E-02      1900.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52084E-02      1924.99      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51171E-02      1950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.50286E-02      1975.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49427E-02      2000.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48593E-02      2025.00      0.00   5.0        Winter       0-360   10011001
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-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.47783E-02   2050.00   0.00 30.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.46996E-02   2075.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.46232E-02   2100.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.45488E-02   2124.99   0.00 25.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.44766E-02   2150.00   0.00 30.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.44062E-02   2175.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.43378E-02   2200.00   0.00 20.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.42712E-02   2225.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.42063E-02   2250.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.41432E-02   2275.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.40816E-02   2300.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.40216E-02   2325.00   0.00 40.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.39632E-02   2350.00   0.00 25.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.39062E-02   2375.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.38506E-02   2399.99   0.00 35.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.37963E-02   2425.00   0.00   5.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0

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   0.37434E-02      2449.99      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36917E-02      2475.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36412E-02      2500.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35920E-02      2525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35439E-02      2550.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34968E-02      2575.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34509E-02      2600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34060E-02      2625.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33621E-02      2650.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33191E-02      2675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32771E-02      2700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32360E-02      2725.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31958E-02      2750.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31565E-02      2775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31180E-02      2800.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30803E-02      2824.99      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30434E-02      2850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.30072E-02      2875.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29718E-02      2900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29371E-02      2925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29030E-02      2950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28697E-02      2975.00      0.00  40.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28370E-02      3000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28050E-02      3025.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27736E-02      3050.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27428E-02      3075.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27125E-02      3100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26829E-02      3125.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26538E-02      3150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26252E-02      3174.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25972E-02      3200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25697E-02      3225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25427E-02      3250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25162E-02      3275.00      0.00  20.0        Winter       0-360   10011001
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-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24901E-02   3300.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24645E-02   3325.00   0.00 15.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24394E-02   3350.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.24147E-02   3375.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.23904E-02   3400.00   0.00   0.0   Winter   0-360   10011001
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310.0   2.0
   0.23666E-02   3425.00   0.00   0.0   Winter   0-360   10011001
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310.0   2.0
   0.23432E-02   3450.00   0.00   5.0   Winter   0-360   10011001
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310.0   2.0
   0.23201E-02   3475.00   0.00   0.0   Winter   0-360   10011001
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310.0   2.0
   0.22975E-02   3500.00   0.00   0.0   Winter   0-360   10011001
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310.0   2.0
   0.22752E-02   3525.00   0.00   0.0   Winter   0-360   10011001
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310.0   2.0
   0.22533E-02   3550.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.22318E-02   3575.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.22106E-02   3600.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.21898E-02   3625.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.21693E-02   3650.00   0.00 40.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
   0.21491E-02   3675.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0

```
   0.21293E-02      3700.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.21098E-02      3725.00      0.00   0.0        Winter       0-360   10011001
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   0.20905E-02      3750.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.20716E-02      3775.00      0.00  25.0        Winter       0-360   10011001
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310.0    2.0
   0.20530E-02      3800.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.20347E-02      3825.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.20166E-02      3849.99      0.00  15.0        Winter       0-360   10011001
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310.0    2.0
   0.19988E-02      3875.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.19813E-02      3900.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.19641E-02      3925.00      0.00   5.0        Winter       0-360   10011001
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310.0    2.0
   0.19471E-02      3950.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.19304E-02      3975.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.19139E-02      4000.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.18976E-02      4025.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
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310.0    2.0
   0.18659E-02      4075.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.18503E-02      4100.00      0.00  25.0        Winter       0-360   10011001
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```

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310.0    2.0
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310.0    2.0
   0.18199E-02      4150.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.18050E-02      4175.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
   0.17903E-02      4200.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
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310.0    2.0
   0.17336E-02      4300.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
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310.0    2.0
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310.0    2.0
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310.0    2.0
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310.0    2.0
   0.16416E-02      4475.00      0.00   0.0        Winter       0-360   10011001
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310.0    2.0
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310.0    2.0
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310.0   2.0
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310.0   2.0
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310.0   2.0
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310.0   2.0
   0.14500E-02   4900.00   0.00   0.0   Winter   0-360   10011001
-1.30 0.043 -9.000 0.020 -999.   21.   6.0 1.000   1.50   0.35   0.50   10.0
310.0   2.0
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310.0   2.0

```
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310.0    2.0
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310.0    2.0
   0.14105E-02      5000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

From: O'Connor, Bonny
Sent: Monday, November 23, 2020 1:59 PM
To: Public Comment
Subject: FW: City Council Letter re Vista Mar Project 11.23.2020
Attachments: Pacifica City Council Letter 11.23.2020.pdf

From: John Kontrabecki [redacted]
Sent: Monday, November 23, 2020 1:58 PM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Cc: Javier Chavarria [redacted]
Subject: City Council Letter re Vista Mar Project 11.23.2020

[CAUTION: External Email]

Please find attached a letter addressed and sent to members of the City Council in connection with the Vista Mar project appeal.

John

John Kontrabecki
TKG International
[redacted]

CAUTION: This email originated from outside of the City of Pacifica. Unless you recognize the sender's email address and know the content is safe, do not click links, open attachments or reply.

John T. Kontrabecki
Attorney at Law
[redacted]

November 23, 2020

Mayor Deirdre Martin and
Honorable Members of the City Council
City of Pacifica
170 Santa Maria Avenue
Pacifica, CA 94044

citycouncil@ci.pacifica.ca.us
martind@ci.pacifica.ca.us
beckmeyers@ci.pacifica.ca.us
vaterlauss@ci.pacifica.ca.us
bierm@ci.pacifica.ca.us
o'neillm@ci.pacifica.ca.us

Re: Vista Mar Project

Dear Mayor Martin and Honorable Members of the City Council:

I am writing on behalf of Monterey Road Pacifica LLC, the owner and sponsor of the Vista Mar residential development project.

The California Legislature recognized that there is a housing crises in the State and declared on October 9, 2019 a statewide housing emergency to be in effect until January 1, 2025. On that day, the Housing Crises Act of 2019 was signed into law. Among the provisions, the Act amended Government Code Section 65589.5 as follows:

> "(o) [A] housing development project shall be subject **only to the ordinances, policies, and standards adopted and in effect** when a preliminary application including all of the information required by Section 65941.1 is submitted." (Emphasis added.)

The Vista Mar project has complied with every ordinance, policy, and standard adopted and in effect when its preliminary application for project approval was submitted. The project conforms to the General Plan, Zoning Ordinance, and all other applicable ordinances from the Pacifica Municipal Code in effect when approved unanimously by the Planning Commission. The project sponsor has asked for no variances or other exceptions to the law in seeking approval.

In the letter addressed to Mayor Deirdre Martin and Honorable Members of the City Council of the City of Pacifica, attorney Richard Toshiyuki Drury, on behalf of the so-called Coalition of Pacificans for an Updated Plan and Pacifica resident Summer Lee, attempts to nullify all the laws that govern land use planning in Pacifica. These include the General Plan, the Housing Element, and the Safety Element. In Mr. Drury's opinion, while acknowledging the Government Code does not set a time table or deadline for updating the General Plan, the 1980 Pacifica General Plan must be invalid because it is "woefully out of date" and "internally inconsistent." In his view, there is no project that may be legally approved in the City of Pacifica at this time or in the foreseeable future because of these inconsistencies. He argues in essence that all project development and construction must come to a halt until the Pacifica General Plan and associated elements are updated and approved by the City Council. This is an absurd position and result.

Mr. Drury's letter is replete with misstatements of fact regarding the project and the conditions of the site where it is to be located. His comments also ignore the various measures taken by the sponsor to address the attributes of the site in its design. All the legitimate site conditions and site attributes have been carefully considered in collaboration with the Planning Staff so that the project, as approved by the Planning Commission, fully complies with the laws in effect when the preliminary application for approval was submitted.

The Housing Crises Act of 2019 prevails over any nullification argument Mr. Drury has made. The sponsor has complied with the law and hereby respectfully requests that the City Council affirm the decision of the Planning Commission approving this project.

Sincerely,

J. T. Kontrabecki

John T. Kontrabecki, Esq.

From: O'Connor, Bonny
Sent: Monday, November 23, 2020 3:52 PM
To: Public Comment
Subject: FW: Vista Mar Appeal response to Christine Boles Lettet 11.22.2020
Attachments: Pacifica City Council Letter 11.23.2020-2.pdf

From: John Kontrabecki [mailto:[redacted]
Sent: Monday, November 23, 2020 3:00 PM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Cc: Javier Chavarria [redacted]
Subject: Vista Mar Appeal response to Christine Boles Lettet 11.22.2020

[CAUTION: External Email]

Please find a response to the Christine Boles letter address to the Planning Department and City Council on 11.22.2020

John

John Kontrabecki, Esq.
TKG International
[redacted]

CAUTION: This email originated from outside of the City of Pacifica. Unless you recognize the sender's email address and know the content is safe, do not click links, open attachments or reply.

John T. Kontrabecki
Attorney at Law
[redacted]

November 23, 2020

Mayor Deirdre Martin and
Honorable Members of the City Council
City of Pacifica
170 Santa Maria Avenue
Pacifica, CA 94044

citycouncil@ci.pacifica.ca.us
martind@ci.pacifica.ca.us
beckmeyers@ci.pacifica.ca.us
vaterlauss@ci.pacifica.ca.us
bierm@ci.pacifica.ca.us
o'neillm@ci.pacifica.ca.us

Re: Vista Mar Project

Dear Mayor Martin and Honorable Members of the City Council:

I am writing on behalf of Monterey Road Pacifica LLC, the owner and sponsor of the Vista Mar residential development project. My comments relate to the approval process.

This project received unanimous approval by the Planning Commission after two public hearings. At the hearings, an opposition group led by Christine and Robert Boles attempted to derail the approval process by conflating the conceptual review of the project that was rightfully before the Planning Commission with a technical review that properly belongs before the Building Department after the Planning Commission completes its conceptual review. Based upon the letter of Christine Boles sent on November 22, 2020 to the Planning Staff and City Council, she is continuing to disrupt an orderly conceptual review process with technical review objections.

Whenever an application is made for developing a project in any city in California, it must go through a rigorous two step administrative vetting process.

The first step is called "conceptual review." The purpose is to evaluate what is proposed to be developed. The project applicant must provide sufficient information to allow the Planning Staff to properly evaluate the project for compliance with the applicable land use planning laws. This includes complying with the General Plan, Zoning Ordinance,

other municipal laws that govern the development of the site, and the California Environmental Quality Act. After passing muster with the Planning Staff, there is a public hearing before the Planning Commission, and if the project complies with the law, it will be granted conceptual approval.

The second step is called "technical review." The purpose is to determine how the proposed project is going to be constructed. Here the project applicant must provide a set of detailed construction documents that explain the construction methods to be used. The construction documents include an in-depth geotechnical study with design recommendations for the building foundations and retaining walls, civil engineering drawings for the site works, structural engineering drawings and calculations, landscape architectural drawings, and architectural drawings and details. The technical reports will include a detailed soils engineering and stability study and hydrology analysis. These construction documents and reports will address in a technical manner all the issues that need to be addressed to allow the Building Department to conclude the project can be constructed properly and safely in conformance with the building code.

Christine Boles keeps insisting that an in-depth geotechnical investigation is necessary now for conceptual approval by the Planning Commission. She is wrong. This type of investigation is necessary to apply for technical review and is conducted only after conceptual review of the project is approved by the Planning Commission. It is a waste of engineering time and financial resources for a geotechnical engineer to make the borings and calculations required for foundation designs unless a project has been conceptually approved. At the conceptual review stage, the geotechnical review is based upon a survey of site geology and test borings. In this instance, the survey was conducted by GeoForensics who has a long history with developments in Pacifica and is very familiar with the geology of this site. The test borings showed the area to be constructed is made of bedrock.

The technical questions raised by Christine Boles are not being ignored. They will be examined in depth at the appropriate time, after the Planning Commission's decision is confirmed, by the Building Department. This is the way the process is set up to work.

Sincerely,

J. T. Kontrabecki

John T. Kontrabecki, Esq.

From: O'Connor, Bonny
Sent: Monday, November 23, 2020 3:49 PM
To: Public Comment
Subject: FW: Vista Mar Project
Attachments: 2.15.19 citys RFQ collusion.pdf; 7.8.15 tina general plan.pdf; PRA_Response_Gaffney_20201117_Final_wDocs.pdf

From: Summer Lee [mailto:[redacted]
Sent: Monday, November 23, 2020 3:47 PM
To: _City Council Group <CityCouncil@ci.pacifica.ca.us>; Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Subject: Re: Vista Mar Project

[CAUTION: External Email]

Dear Council Members,

This letter addresses the issue of bias and credibility as entered into the public record by City Planner Christian Murdoch. From the records from the Oct 19th Planning Commission hearing:

“Sr Planner Murdock stated that it was relevant to consider, to only is the comment from an objective third party licensed professional or other qualified expert, but is there some potential bias that will benefit gain from providing the comments. He stated that a licensed professional who lives next door to a project and is opposed to the project, they may need to weigh the credibility of the professional opinion being rendered when there is also likely a significant personal benefit or impact from the project that could have influenced that professional opinion, and [that is] a practical example of what Asst. City Attorney Sharma is indicating as to weighing the credibility of that licensed professional’s opinion.”

In light of Murdock directing a governing body to disregard the public's input as well as expert opinion, I would like to enter into the administrative record the correspondence between the planning department and the Vista Mar project applicant and developer as evidence of irregular planning practice, not to mention bias and questionable credibility of the planning department.

The first attached document shows Tina Wehrmeister advising the applicant in anticipated neighbor opposition.

The second document shows during the bid process, the planning department lets the applicant choose the consultant doing the environmental review (the bid that was lowest cost and provided the least analysis).

A third document shows correspondence between the planning department and the applicant, where inside the subject of payments the planning department grants the applicant a meeting with the environmental consultant to address the consultant's response to expert comments casting doubt on their analysis.

Sincerely,
Summer Lee

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O'Connor, Bonny

From: John Kontrabecki <[redacted]
Sent: Friday, February 15, 2019 2:08 PM
To: O'Connor, Bonny
Cc: Javier Chavarria; Murdock, Christian
Subject: Re: Monterey Road Environmental Review

Bonny-
Javier and I reviewed your email and the two consultant proposals. We believe it is premature to select the Metropolitan proposal because the Raney proposal does not have the same scope as the Metropolitan proposal. Until Raney has provided information that allows you to compare their with Metropolitan on an equal basis as to scope, no decision can be made.
We would like to meet with you to discuss both proposals in order to move this process forward. Javier will call you Monday morning to set a time for a meeting.
Thank you,
John
John Kontrabecki
TKG International
[redacted]

AIR - Raney.
NOISE - Raney #10

From: "o'connorb@ci.pacifica.ca.us"
Date: Thursday, February 14, 2019 at 5:30 PM
To: John Kontrabecki
Cc: Javier Chavarria , Christian Murdock
Subject: RE: Monterey Road Environmental Review

Hi John and Javier,
On January 23, 2019, City staff released a request for scope, budget, and timeline to conduct the California Environmental Quality Act (CEQA) review for the 8-unit residential project on Monterey Road known as the Vista Mar Project. The request was sent to the City's two on-call environmental consultants, Raney Planning and Management, Inc. (Raney) and Metropolitan Planning Group (M-Group). The deadline to respond to the request was February 11, 2019 (5:00pm). On February 11, 2019, staff received two proposals, one from each of the on-call consultants.
Please find a copy of both proposals HERE. The two proposals had comparable scopes-of-work to address the various environmental resources evaluated under CEQA, with the exception of four resources. Staff found that M-Group prepared a scope that would adequately analyze the potential impacts of the proposed project on the various environmental resources and the higher cost associated with the proposal was justified by their scope. Staff selected M-Group's proposal for the following reasons:

1. **Aesthetics:** The proposed project will introduce a visual change to the current vacant steep slope, which will need to be analyzed. The M-Group proposal included the development of two visual simulations to analyze the project's potential impact on aesthetics. In comparison, Raney proposed to use pre-project photos and the applicant's developed project renderings to analyze impacts. Staff believes that M-Group's methodology will provide the adequate analysis to determine the potential impacts on aesthetics.

M-group

2. **Cultural resources:** Access to information on cultural resources is limited to qualified professionals and academics. M-Group's proposals included a qualified subconsultant to perform the cultural and tribal resources work. In comparison, Raney's proposal did not discuss how they would address the cultural and tribal resources and no qualified in-house personnel was listed for the project. Therefore, staff believes that M-Group's

M-group.

methodology will provide the adequate analysis to determine the potential impacts on cultural and tribal resources.

3. **Biological resources:** A potential jurisdictional waterway was identified on the property in the applicant's provided 2007 biological assessment. M-Group proposed to have a subconsultant conduct a site visit and a peer review of the 2007 analysis to determine if the findings are still applicable. Additionally, M-Group provided an optional task to conduct a jurisdiction water determination. It is staff's understanding that the need for this optional task will be determined as part of the peer-review. In comparison, Raney proposed to have a subconsultant conduct a new analysis due to the age of the applicant's provided analysis. Additionally, Raney provided an optional task to conduct a peer review of the 2007 biological assessment instead of preparing a new analysis. Although, the scopes differed, staff found both of the methodologies adequate. However M-Group's proposal was more thoughtful as their recommended approach of peer reviewing the existing biological analysis is more cost efficient and their provided optional task would address a possible next step.

M-group
Raney

4. **Traffic:** Current traffic levels at intersections near the project, including Gateway Ave. and Hickey Blvd. and Manor Dr. and Oceana Blvd. are often backed up during commuting hours. The proposed project would increase the trips to these intersections. M-Group's proposals included a qualified subconsultant to conduct a traffic impact analysis. In comparison, Raney's proposal did not discuss how they would analyze the potential traffic impacts and no qualified in-house personnel was listed for the project.

Raney
OK

5. **Cost:** There was an approximately $20,000 costs difference between the two proposals. M-Group's higher proposed cost is associated with the traffic analysis ($12,000), visual simulation ($10,250), and cultural resources analysis ($3,494) included in M-Group's proposal.
6. **Timeline:** Both proposals outlined a four month timeline from the notice to proceed.

M-Groups budget is $62,332. The City's master fee schedule sets a 10 percent administration fee for consultant costs. Therefore, the overall cost will be $68,565.20. After the funds are received from the applicant, staff can provide M-Group with a notice to proceed.
Please let me know if you have any questions.
Thanks,
Bonny

Bonny O'Connor, AICP
Associate Planner
Planning Department
City of Pacifica
1800 Francisco Blvd.
Pacifica, CA 94044

Planning Intern

From: Wehrmeister, Tina
Sent: Wednesday, July 08, 2015 3:17 PM
To: [redacted]
Cc: Planning Intern
Subject: Vista Mar project
Attachments: General Plan p.36.pdf

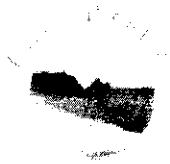
Thanks for coming in to meet with us Javier. To summarize the meeting and outcomes, we discussed the recent comment letter from staff and you were going to make some changes to the plans to address Code compliance issues including but not limited to:

1. Carefully reviewing and confirming that the project meets C-3 requirements.
2. Addressing private and common outdoor space requirements. Currently the table on the front of the plans and the plan notations do not match.
3. Addressing the distance requirements between buildings and submitting variance findings if necessary.

Staff committed to reviewing and making a final decision on the CEQA document. We have done that and have determined that an Initial Study will be required and the project cannot be exempted. This decision was based in part on the 2007 biology report that is part of the record for this site. This document states "An...unnamed onsite drainage channel,....was identified as having a defined bed and bank and appears to carry water for most if not all of the year." An Initial Study will take four to six months to prepare assuming the document will find that a Mitigated Negative Declaration is appropriate.

Also, and this is just for information, please read the highlighted section of the attached document. Any opposition WILL utilize this section to challenge the project so you should be prepared to defend how the project is consistent.

Tina Wehrmeister
Planning Director
City of Pacifica
www.cityofpacifica.org



The pattern of development and automobile circulation in the Fairmont neighborhood is well developed and adequate to meet the needs of the minor infilling which will occur.

WESTVIEW-PACIFIC HIGHLANDS

This large, predominantly single-family neighborhood is served by two elementary schools, San Andreas and Westview. Imperial Park and Horizon Garden provide open space. The San Andreas Fault crosses the northern half of the neighborhood. Water tanks located on the hill above Imperial Drive are a potential hazard to the homes below should they rupture during an earthquake.

Except for a large multiple-family development on the south side of Hickey at Skyline, the dominant land use is single-family residential. Low density residential use is designated for the vacant site at the southernmost tip of the neighborhood near Skyline and Sharp Park Road. Part of this southernmost site contains a superficial landslide which indicates the need for sensitive design and proper engineering for the proposed development and access. The corner of Skyline and Sharp Park Road should be developed in high density residential uses.

A gently sloping area off Miller Avenue is suitable for low density residential development. Because of its orientation, the residential area off Miller should be included in the adjacent East Edgemar-Pacific Manor neighborhood. The existing neighborhood boundary line is based on the 1970 Census Tract boundary. For current data analysis reasons, it is valuable to keep the area in the Westview-Pacific Highlands neighborhood. This should be re-evaluated when the boundaries are drawn for the subsequent Censuses. Detailed geologic and soils evaluation should also be required for this site.

On the southwestern boundary of the neighborhood, defined by Milagra Ridge County Park, the large vacant area is designated Open Space Residential. While this land is generally quite steep, detailed evaluation of soils, geology, slope and access could identify some buildable locations.

A large steep area along Monterey Road and Norfolk Place, between Norfolk and the rear of the single-family lots on Heathcliff, has been planned and zoned for low density residential development. Each site proposed for development should have a thorough geotechnical investigation. In recognition of the high visibility of the area, innovative design solutions should be proposed which minimize height, building mass, and retaining walls to the extent feasible. Buildings should be separated wherever possible in order to break up building mass, and adequate and appropriate landscaping should be used to soften the appearance of buildings.

A variety of types of housing are appropriate for the area, including apartments, condominiums, or other types of clustered housing. Provision of usable open space for play areas for children should be included in project design as much as possible. One major vacant parcel exists in this neighborhood, the Fairmont III School site. The site should be reserved for medium density residential land use with access limited to Skyline Boulevard.

The existing pattern of arterial and collector streets is well established in this neighborhood. Capacities are adequate to handle the proposed development which would essentially build-out this area. Access for

CITY OF PACIFICA
170 Santa Maria Avenue • Pacifica, California 94044-2506
www.cityofpacifica.org

Scenic Pacifica
Incorporated Nov. 22, 1957

MAYOR
Deirdre Martin

MAYOR PRO TEM
Sue Beckmeyer

COUNCIL
Sue Vaterlaus
Mary Bier
Mike O'Neill

November 17, 2020

Brian Gaffney
[redacted]
Pacifica, CA 94044
Via Email: [redacted]

Subject: Public Records Act Request re: City's Decision to File Notice of Determination for the Vista Mar Project

Dear Mr. Gaffney

The City of Pacifica ("City") is in receipt of your California Public Records Act request ("Request"), which was received by the City Clerk's Office on November 9, 2020. A copy of your Request is enclosed for reference.

COVID-19 Emergency Update

On March 2, 2020, the Governor of the State of California declared a State of Emergency. On March 16, 2020, the City Manager, acting as the Director of Emergency Services, issued a Proclamation of local emergency due to the COVID-19 pandemic. That Proclamation was ratified by the City Council on March 18, 2020, by Resolution No. 18-2020. On March 19, 2020, Governor Newsom issued Executive Order No. 33-20, ordering all Californians to shelter at home. The San Mateo County Health Officer has also issued public health Orders, the most recent of which is dated June 17, 2020.

As a result of these extraordinary events, the City has taken steps to comply with the State and County's Orders, by significantly reducing staffing, and closing City Hall to the public. Due to this closure and limited staffing resources, the City's ability to respond to all public records act requests have necessarily been delayed.

Responsive Records

The City wishes to cooperate to the fullest extent possible with the Public Records Act (Government Code section 6250 *et seq*.). Under established California law, the City is obliged to comply with a request for a public record so long as the requester makes a specific and focused request for information, that information is maintained by the City in its ordinary course of business, the information is disclosable, and the record can be located with reasonable effort.

The Public Records Act provides for the inspection or copying of existing identifiable public records; it does not compel the City to create new records, lists, privilege logs, or reports in response to a request. The City is required to determine whether the request, in whole or in part, seeks copies of disclosable public records. Ordinarily, this determination must take place within ten (10) days of the City's receipt of the request.

The City has identified non-exempt, non-privileged records responsive to your Request. The responsive document is being provided with this response letter. The City has redacted certain portions of the documents which are exempt under the public interest exemption pursuant to Government Code section 6255 as the "public interest served by not disclosing the record[s] clearly outweighs the public interest served by disclosure of the record[s]."

This completes the response to your Request received by the City Clerk's Office on November 9, 2020. Should you have any questions, please contact me directly at 650-738-7307 or via email at coffeys@ci.pacifica.ca.us .

Sincerely,

Sarah Coffey

Sarah Coffey
City Clerk

LAW OFFICES OF BRIAN GAFFNEY, A Professional Corporation

[redacted]

RECEIVED
NOV 09 2020
via email
CITY CLERK

November 9, 2020

City of Pacifica
connorb@ci.pacifica.ca.us
coffeys@ci.pacifica.ca.us

Re: Public Records Act Request

Dear Ms. Coffey and Ms. O'Connor,

On behalf of our client, and pursuant to the California Public Records Act and the California Constitution, this office requests that the City of Pacifica (City) provide copies of:

All records related to the City's decision to file a Notice of Determination for the Vista Mar project (City File No. 2002-001) on October 20, 2020.[1]

We prefer you release records in PDF for convenience and to expedite release. Please email those records to this office. If certain responsive records exist only in hard copy, please advise as soon possible.

We request that the City make documents available as promptly as they are available. If documents are clearly disclosable and immediately available, release the records to this office immediately. If you must conduct a more extensive search, that search must not delay the prompt disclosure of what is available immediately.

We request that the City exercise its discretion and waive all duplication costs associated with this public interest request. If you decide to charge fees, you may charge actual duplication costs, but not costs associated with overhead or staff time. (Govt. Code § 6253, subd. (b).)

Sincerely,
Brian Gaffney
Brian Gaffney

---

[1] The California Constitution guarantees the people the right of access to information concerning the conduct of the people's business and California statutes must be broadly construed where it furthers the people's right of access. (California Constitution, Article 1, Section 3, subd. (b).)

Public records requested here include any writing containing information relating to the conduct of the public's business **prepared, owned, used, or retained** by the agency regardless of form or characteristics. (Govt. Code § 6252, subd. (e), emphasis added.). "Records" include all documents, correspondence, including email; agency guidelines and policies; memoranda; agency Memoranda of Understanding; notices, comments, and responses to comments; biological, scientific, and other studies; reports; environmental analyses; surveys; timelines; charts; graphs; maps; analyses; data; meeting minutes and agendas; distribution lists; notes and transcripts of meetings and conversations; and any other relevant information, **whether in hard copy or electronic/computer format**.

Coffey, Sarah

From: Brian Gaffney <[redacted]
Sent: Monday, November 9, 2020 12:35 PM
To: O'Connor, Bonny; Coffey, Sarah
Subject: Public Records Request - City's decision to file a NOD for the Vista Mar project on October 20, 2020
Attachments: PRA7 Pacifica 10.9.20 SENT.pdf

[CAUTION: External Email]

Please see the attached PRA request.
Thank you.

--
Brian Gaffney
LAW OFFICES OF BRIAN GAFFNEY APC
[redacted]

CONFIDENTIALITY NOTE: This and any accompanying pages contain information from LAW OFFICES OF BRIAN GAFFNEY APC which may be confidential and/or legally privileged. The information is intended to be for the sole use of the individual or entity named above. Unauthorized interception, review, use or disclosure is prohibited and may violate applicable laws including the Electronic Communications Privacy Act, 18 U.S.C. §§ 2510-2521. If you are not the intended recipient please contact the sender and destroy all copies of the communication

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O'Connor, Bonny

From: O'Connor, Bonny
Sent: Tuesday, October 20, 2020 12:19 AM
To: 'John Kontrabecki'; 'Javier Chavarria'
Cc: Murdock, Christian; Pacifica Permit Tech
Subject: RE: Vista Mar: Request for Funds

Hi John and Javier,
Congratulations on the outcome of tonight's hearing. As a result of the Planning Commission's action, staff will need to file a Notice of Determination (NOD) of a Mitigated Negative Declaration and submit filing fees to the County. Please provide the City with a check for $2,456.75 ($2,406.75 CDFW Fees + $50.00 County Clerk Processing Fees) **tomorrow** (Tuesday) if possible. The NOD needs to be filed within 5 days of the decision and due to COVID-19, the Clerk's office is closed, so we will need to use the time to mail the NOD to the office. Please make the check for $2,456.75 payable to San Mateo County Clerk-Recorder. The Check can be dropped off at the City's offices at 1800 Francisco Blvd. The office will be closed, but staff can collect the check through the mail slip.
Please let me know if you have any concerns.
Thanks,
Bonny

From: O'Connor, Bonny
Sent: Monday, October 19, 2020 4:04 PM
To: 'John Kontrabecki' [redacted]>; Javier Chavarria [redacted]>
Subject: RE: Vista Mar: Request for Funds

Thank you, John

From: John Kontrabecki [mailto[redacted]
Sent: Monday, October 19, 2020 4:03 PM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>; Javier Chavarria [redacted]
Subject: Re: Vista Mar: Request for Funds

[CAUTION: External Email]

Bonney-

Payment made.

John

John Kontrabecki
TKG International
[redacted]

From: "o'connorb@ci.pacifica.ca.us" <o'connorb@ci.pacifica.ca.us>
Date: Friday, October 16, 2020 at 2:11 PM
To: John Kontrabecki <[redacted]>, Javier Chavarria <[redacted]>
Subject: RE: Vista Mar: Request for Funds

Hello John and Javier,
I wanted to follow up on my email below. Additionally, as a result of the additional assistance needed from Raney and their consultants, they have requested additional funds for the work they have performed and to cover the cost of them attending Monday's hearing.
Therefore we respectfully request the following funds:

- $7,210 For City Staff and Attorney *($18,210 requested on 9/22/20, less the $11,000 provided on 10/5/20)*
- $3,215 For Raney and Subcontractors, breakdown and scope detailed below:
    - WRA - $1,100 for providing responses to several other (beyond Smallwood's letter) sets of comments from various other entities and on subject matter other than birds and wildlife. Additional staff have had to spend time developing these responses and this effort has utilized the budget that was previously intended to pay for Brian's time participating in the upcoming hearing.
    - GeoCon - $545 for hearing attendance (assumes 3 hours)
    - Raney - $1,570 for the expansion the budget to cover our expenses for Response to Comments preparation of two additional comment letters regarding the Vista Mar IS/MND: one from Steven Bond and Associates, and one from Coast Ridge Ecology. In order to adequately address these comment letters, the City has requested that Raney prepare detailed and bracketed responses to both the Bond letter and the Coast Ridge Ecology letter.

Please submit $10,425 to the City at your earliest opportunity. As you have used previously, the City has an electronic payment option at https://www.cityofpacifica.org/depts/asd/finance/make_online_payment/default.asp. Please be sure to reference Vista Mar Project (File No. 2002-001) in the appropriate field. Alternatively, a check made out to the City of Pacifica can also be accepted via mail.
Thank you,
Bonny

From: O'Connor, Bonny
Sent: Friday, October 9, 2020 2:37 PM
To: 'John Kontrabecki' [redacted]
Cc: Javier Chavarria <[redacted]>
Subject: RE: Vista Mar: Request for Funds

Hi John and Javier,
Thank you for the provided funds. Please find attached a receipt for your records. However, we will need some additional funds as requested below as the City operates on a deposit system and not a billing system. Without available deposit to bill the City's costs against it, it may affect the City's ability to continue work on the project. The reimbursement agreement that Javier signed as part of the application for the project includes agreement to provide additional deposits as needed.
Thanks,
Bonny

From: John Kontrabecki [redacted]
Sent: Friday, October 2, 2020 2:48 PM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Cc: Javier Chavarria <[redacted]
Subject: Re: Vista Mar: Request for Funds

[CAUTION: External Email]

Bonny-

I just sent the City of Pacifica $11,000 which represents the balance for staff and legal fees for the Vista Mar project.

John

John Kontrabecki
TKG International
[redacted]

From: "o'connorb@ci.pacifica.ca.us" <o'connorb@ci.pacifica.ca.us>
Date: Wednesday, September 23, 2020 at 3:40 PM
To: John Kontrabecki [redacted]
Cc: Javier Chavarria [redacted]>
Subject: RE: Vista Mar: Request for Funds

Hi John,
I'm happy to talk with you. I'm available until 4:30 today and then 5:30 to 7:30. I can see if Rod from Raney can join us if those times work. We would likely have more luck with Raney for a more immediate zoom call.
Let me know and I can set up a Zoom meeting
Bonny

From: John Kontrabecki [redacted]
Sent: Wednesday, September 23, 2020 3:36 PM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Subject: Re: Vista Mar: Request for Funds

[CAUTION: External Email]

I would like to speak with you about both the SWAPE and Bond reports and the amount of the deposit.

Why are you estimating $8,000 in legal fees? Given where we are in the process, it seems high to me and I am a lawyer.

Can we discuss this over the phone?

John

John Kontrabecki
TKG International
[redacted]

From: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Date: Wednesday, September 23, 2020 at 3:30 PM
To: John Kontrabecki <[redacted], Javier Chavarria [redacted]
Subject: RE: Vista Mar: Request for Funds

Hi John,
Raney is the City's consultant who has been hired to prepare an environmental document in accordance with the California Environmental Quality Act on the City's behalf. While you are welcomed to provide information to the City in response to the public comments received, we would prefer that the applicant not have direct contact with the consultant and to have information go through the City.
I appreciate your understanding.
In regards to the request for funds below, it would be helpful to receive the funds requested below, especially Raney's portion, as soon as possible to allow work to continue. They have not proceeded with the SWAPE or Bond work because the funds have not yet been approved.
If you would like to talk about anything, please let me know and I can be available for a call.
Thanks,
Bonny

From: John Kontrabecki [redacted]
Sent: Wednesday, September 23, 2020 1:52 PM
To: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>; Javier Chavarria [redacted]
Subject: Re: Vista Mar: Request for Funds

[CAUTION: External Email]

Bonny-

I have read the three reports you have sent to me regarding the Vistamar project submitted in opposition to the approval of the project by the Planning Commission.

We would like to reach out directly to Raney to cooperate with them in any way they may require to assess and respond to these reports. May we have your permission to do so?

John

John Kontrabecki
TKG International
[redacted]

[redacted]

From: O'Connor, Bonny <o'connorb@ci.pacifica.ca.us>
Date: Tuesday, September 22, 2020 at 5:27 PM
To: John Kontrabecki <[redacted]>, Javier Chavarria [redacted]>
Subject: Vista Mar: Request for Funds

Hello Javier and John,

As expected, last night the Planning Commission continued your item to October 5, 2020. The continuance was requested to address public comments received on the project. Of the comments received, attached are two more comment letters that we will need support from our consultants to evaluate. As we previously discussed, the cost to process the Vista Mar Project has exceeded the amount of the deposits previously provided to the City for the project. Since your last provided deposit on Aug. 3, staff has spent time preparing for planning commission meetings, reviewing subsequent submittals of materials, preparing subsequent staff reports, and accepting and evaluating public comments received on the project. Currently, staff costs and legal costs are over the provided deposit amount. Funds remain in the Raney account, however as noted above, we are requiring further assistance from them due to public comments received on the project. Raney provided an estimate to address the Smallwood letter (previously provided to you) and the SWAPE letter(attached). We are still reviewing the Bond letter (attached) and will follow up if additional funds for Raney are necessary. In anticipation of the additional costs to be charged to the project we would like to request a check for $28,435.75 to address the current overages and anticipated future costs. A breakdown of this number is provided below:

	Current Balance	Estimated Future Deposit
City Staff	$-10,219.75	$3,000.00
Legal Staff	$-6.00	$8,000.00
Raney Planning and Management	$ 947.67	$7,210.00 See attached breakdown
To address overages	$ 10,225.75	
To address anticipated future costs		$18,210.00

As you have used previously, the City has an electronic payment option at https://www.cityofpacifica.org/depts/asd/finance/make_online_payment/default.asp. Please be sure to reference Vista Mar Project (File No. 2002-001) in the appropriate field. Alternatively, a check made out to the City of Pacifica can also be accepted.

Please let me know if you have any questions.
Thanks,
Bonny

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Public Comments
Agenda Item # 10

November 23, 2020
City Council Meeting

November 19, 2020

Ms. Deidre Martin, Mayor

Ms. Sue Beckmeyer, Mayor pro tem ✓

Councilman Michael O'Neill

Councilwoman Sue Vaterlaus

Councilwoman Mary Bier

Re: City of Pacifica Council meeting, 11/23/20, Appeal for removal of heritage trees, approved by PB&R Commission on 10/28/20.

My husband I purchased the two small cottages at [redacted] Salada Avenue, Pacifica, CA in 1964. The property, at that time, was zoned C-4 and the intentions were to tear the buildings down and erect four rental units. But at that time we had three small children, a house payment, and could not afford these plans.

We rented them immediately, one tenant, a U.S. postal carrier occupied the address at [redacted]Salada for 11 years, the cottage at 30 Salada was occupied by a public works employee for 6 years. In the following years the property was down-zoned and because we never had to advertise for a tenant, we lost interest in re-building. We have renovated the cottages several times and are probably the only Pacifica landlord that provides affordable rent.

At the time of purchase the property was overgrown with the 7 trees. We have had them trimmed numerous times. A few years ago the tree

roots invaded the drainage system and it was replaced, then a new sewer lateral installed. Limbs kept breaking off in the winter storms. One year a roof was damaged, the next year a roof vent, and we stopped re-placing the fence on the property line because of repetitive breakage.

The trees are not pretty anymore. They lean to the east because of the strong winds coming from the west, have long trunks and very little canopy.

Two arborists have determined that the trees exhibit poor form, severe canopy imbalance, and have a history of storm related limb failures. There are also power lines running through several trees.p

We are concerned about the liability of these trees remaining on the property.

We agree to re-plant boxed trees, per City's requirements.

Shirlee L. Gibbs

Property Owner, [redacted] Pacifica, CA 94044

From: Coffey, Sarah
Sent: Monday, November 23, 2020 9:52 AM
To: Public Comment
Subject: FW: In Support of Appeal of PB&R Comm 10/28 decision re HT-001-20

From: Alex Bennett [redacted]
Sent: Saturday, November 21, 2020 8:53 PM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>
Cc: Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: In Support of Appeal of PB&R Comm 10/28 decision re HT-001-20

[CAUTION: External Email]

Dear Members of the Pacific City Council:

This email is to express my impassioned support in Favor of the Appeal of the decision of the PB&R Commission of 10/28/2020 re HT-001-20 for Removal of Four Heritage Monterey Cypress at 24–30 Salada Avenue.

To quickly review:

- Property owner Christopher Gibbs requested removal of these trees.
- The City rejected his request.
- Mr. Gibbs appealed to the PB&R Commission.
- The PB&R Commission granted his appeal.
- Susan Miller and Cindy Abbott have appealed the PB&R Commission's decision.
- Their appeal now comes before you.

Please grant the appeal from Susan Miller and Cindy Abbott. If you grant their appeal, you will prevent Mr. Gibbs from removing these trees.

From a City perspective, there is no reason to remove these trees, and every reason for them to remain.

The decisive issue before you is Mr. Gibbs has repeatedly made false claims these trees are "high risk." He has pressed this and related false claims about the trees:

- When he made his original request to the City. Aren Clark did not agree. The City accordingly rejected his request.

- When speaking to the PB&R Commission at their Oct 28 meeting. Apparently, the Commission accepted his false claims and, after first tying, on a split vote, approved his appeal.

In these two rounds, Mr. Gibbs sought to support his false claims with an arborist report he obtained. The arborist report does not say the trees are high risk; it does not make any assessment of risk at all. Mr. Gibbs misrepresented the arborist report on this and other crucial points. Apparently, the PB&R Commission did not check the claims Mr. Gibbs made against what was actually said in the arborist report.

The present appellants, Susan Miller and Cindy Abbott, requested an on-site visual inspection by TRAQ-certified arborist Roy Leggitt of Tree Management Experts of San Francisco. If you read Mr. Leggitt's report (included in the appeal) referring to the well-established ISA Basic Tree Risk Assessment Form, it will be clear:

- The City made the right decision to reject Mr. Gibbs' request.
- The statements by Mr. Gibbs were baseless and not supported by his arborist report.
- The PB&R Commission erred in accepting his statements and granting his appeal.
- The appeal of Susan Miller and Cindy Abbott should be granted.

Above I said there is every reason for the trees to remain...

This dramatic grouping of beautiful trees is visible in direct line of sight from 14 houses and 2 apartment buildings. Dozens more residents can see the crowns of these trees from their homes. For all residents and tourists walking down Salada Avenue, these trees are in a prominent direct line of sight for half of the block between Palmetto Avenue and Beach Boulevard. They are a key part of making West Sharp Park a destination for recreation and business.

These are times when public confidence in government is crucial. If these trees are removed when there is no reason for removing them, and every reason for letting them remain, public confidence will erode into bitterness.

Thank you very much for reading and weighing,

Alex Bennett
West Sharp Park Resident

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From: Coffey, Sarah
Sent: Monday, November 23, 2020 9:29 AM
To: Public Comment
Subject: FW: Heritage Trees Salada Ave

From: mary purdie <[redacted]
Sent: Monday, November 23, 2020 12:00 AM
To: Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: Heritage Trees Salada Ave

[CAUTION: External Email]

The Heritage Trees on Salada Ave should be saved. They should not be cut down & replaced with other trees. They should be properly assessed and then trimmed if necessary. The reason they have been deemed Heritage Trees is to preserve and protect them. The city staff determined they did not represent an unreasonable risk. The City of Pacifica should implement a policy like Pacific Grove that limits Heritage Tree removal. The City of Pacifica needs a consistent standard when assessing and preserving Heritage Trees.

Currently there are no plans on file with the planning department for this lot. Why are we cutting down these trees?

The Heritage Trees are beautiful and enhance the beauty of Pacifica. People visit Pacifica because if it's beauty. They come to Pacifica for the gorgeous scenery. They want to get out of the sky scrapers and concrete in the city and enjoy nature. These Heritage Trees are part of Pacifica's beautiful scenery and landscape. Without them Salada Ave is barren and looks like any other street anywhere.

These visitors who enjoy Pacifica's beauty bring revenue to our local shops and restaurants.
People who purchase houses in Pacifica (and pay taxes) do so because of it's uniqueness. It's a beautiful beach/natural/coastal community.

People want to enjoy nature. The City of
Pacifica should do all it can to preserve every part of our uniqueness as a coastal community.
These Heritage Trees are part of our uniqueness and should be saved.

Mary Purdie
Sheldon Licardy
[redacted]
Pacifica CA

From: Coffey, Sarah
Sent: Monday, November 23, 2020 10:47 AM
To: Public Comment
Subject: FW: Heritage Trees @Salada Ave.

From: KEVIN OROURKE <[redacted]
Sent: Monday, November 23, 2020 10:46 AM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: Heritage Trees @Salada Ave.

[CAUTION: External Email]

Dear Mayor Martin,

Please reconsider the approval to removal 4 heritage trees from the property of 24-30 Salada Ave.

The Heritage Tree program is important for the beautification and environmental air quality in the City of Pacifica.
This program should not be taken lightly and approved only for trees that are deemed at risk to do damage as assessed by a risk assessment expert.
I am concerned about the precedent being set when the denial of a permit by the Beaches, Parks and Recreation Committee is so easily overturned by City Council.

Annemie O'Rourke
[redacted]
Pacifica, CA

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From: Coffey, Sarah
Sent: Monday, November 23, 2020 11:00 AM
To: Public Comment
Subject: FW: Heritage Trees on Salada Avenue

From: Pat Kremer <[redacted]
Sent: Monday, November 23, 2020 10:54 AM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: Heritage Trees on Salada Avenue

[CAUTION: External Email]

To: Pacifica City Council
From: Patricia Kremer [redacted]., Sharp Park
Date: November 23, 2020
Subject: Heritage Trees on Salada Ave.

The large Monterey Cypress trees in Pacifica add significantly to the beauty of our community. When possible, I am strongly in favor of keeping these old trees, especially when prudent pruning can keep them from being dangerous to people and property. Remember, many of our trees are more than 80 years old ! When the Sharp Park Golf Course was created (~1930), John McLaren from Golden Gate Park fame, planted many cypress trees on and along the golf course property. These trees, along with many others, give Sharp Park a distinctively "old" character. Two other trees on Salada Ave., closer to Francisco Blvd., are not as tall as the trees involved in this appeal, but have a beautiful shape.

The removal of four trees seems excessive in this case. The trees in question are in a group of several trees, none of which is distinctively beautiful, but as a group add character to the neighborhood. I walked around the area yesterday and had an opportunity to speak with one of the tenants. In my opinion, one or two of the most "dangerous" trees, those which might injure people or property if branches or the entire tree fell, could be removed without damaging the overall appearance of the property. Any other of the mature trees with potential problems, could be judiciously pruned to make the property around them safer. If the removal of any trees is permitted, however, they should be replaced with Monterey Cypress, although the precise placement would probably be better lining the street rather than perpendicular to it. Although the definition is unclear, I assume "boxed trees" indicates trees that are several feet tall, not

seedlings. The appeal recommends a 3:1 ratio of new trees to the number removed. This seems very reasonable to me, as cypress trees take a long time before they have their beautiful and distinctive appearance.

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From: Coffey, Sarah
Sent: Monday, November 23, 2020 11:15 AM
To: Public Comment
Subject: FW: Comment on Item 10. Appeal of PB&R Commission decision regarding removal of 4 Heritage trees

From: Peter Loeb [redacted]
Sent: Monday, November 23, 2020 11:14 AM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: Comment on Item 10. Appeal of PB&R Commission decision regarding removal of 4 Heritage trees

[CAUTION: External Email]

The arborist report from the appellant says these heritage trees are not high risk trees. The applicant did not submit an arborist report with a tree rating, so there are not grounds to remove these moderate risk heritage trees. Removing moderate risk heritage trees sets a very bad precedent for protecting other heritage trees in Pacifica.

If the appeal is denied, it sets a precedent that all moderate risk heritage trees are subject to removal. There are around 200 moderate risk trees on the city of Pacifica list, and that does not count trees on private property such as the ones that are the subject of the appeal. If this appeal is denied, all moderate risk trees in the city, whether on public or private property, become subject for removal.

Please uphold the appeal.

Peter Loeb

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From: Coffey, Sarah
Sent: Monday, November 23, 2020 11:44 AM
To: Public Comment
Subject: FW: Agenda Item

From: Stan Zeavin <[redacted]
Sent: Monday, November 23, 2020 11:17 AM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: Agenda Item

[CAUTION: External Email]

Honorable Council,

An important reason to postpone any decision on tree removal tonight is stated in the staff report: "A Request for Proposals is currently out for the selection of a consultant for …(an up coming tree policy/ordinance update)

This decision should be postponed also since staff had determined that Mr. Gibbs' application did not meet the criteria to grant a tree removal permit pursuant to PMC 4-12.05©. With contradictory arborist reports and a last minute ISA Tree Risk Ratings assessment pulled out of thin air, PLEASE trust your own staff determination. The independent arborist stated that "Mr. Gibbs asserted that the trees were "high risk" on multiple occasions, but without basis to support that." Your own staff agreed. And I have to ask to whom or what is the risk if one of these trees should drop a limb on the vacant land to the east?

Another consideration given the expected tree ordinance update might be to question if the PB&R commission whose responsibility and expertise is public property in our Parks and Beaches should be the appropriate body to make final determinations on private property.

Finally, it seems to me supremely ironic that at the same time folks are asking for more trees in Sharp Park and we are paying a consultant to research trees that may

survive our coastal requirements in order to hide the drab new proposed 55 foot buildings that may be encouraged along Palmetto you are tonight considering the removal of heritage trees that have proven their ability to withstand our coastal weather and soils.

Thank you,

Margaret Goodale
Linda Mar

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From: Coffey, Sarah
Sent: Monday, November 23, 2020 11:58 AM
To: Public Comment
Subject: FW: Appeal on behalf of Heritage Trees at Salada Ave.

From: James Kremer [redacted]
Sent: Monday, November 23, 2020 11:57 AM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>
Cc: Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: Appeal on behalf of Heritage Trees at Salada Ave.

[CAUTION: External Email]

To the City Council:

The grove of Heritage Trees at 24-30 Salada Avenue should be preserved. The rationale offered to waive the Heritage Tree ordinance is short-sighted, serves biased parties but not the public interest, and ignores the intent & perhaps the letter of our ordinance.

Staff's initial report made clear that these trees do not present serious risk. The arborist (Kielty) cited by the permit applicant did not assert "high" risk. A certified Tree Risk Assessor (Leggitt) pointed out that it would be an unfortunate precedent to accept inconclusive reports that do not specifically address actual risks in waiving our Tree Ordinance. Waiving is especially unacceptable in this case, where the good alternative of responsible maintenance (pruning) would alleviate whatever risk exists.

The justification given in the revised PB&R decision (that "*removal [is] intended to increase public and private property safety"*) seems disingenuous, an "easy way out" when another option exists – a superior option which ***meets the same goals***, and indeed was recommended initially by Staff.

In my opinion, this issue is an example of a more serious issue -- I think of it as "policy creep". We have regulations in force, but we repeatedly weaken them in a series of special waivers, and poorly justified exceptions. Our regulations, without exception, were the result of careful deliberation, and often widely supported in the community. If the community feels they are no longer appropriate, face this head on! It is not a proper role of a Council to chip away at them.

This should not be a close call:
• The City's Heritage Tree Ordinance says leave the trees.
• The risk assessment arborist report says leave the trees.
• The initial opinion of the City Staff said leave the trees.

• Any risk is not severe or immediate and can be easily mediated by appropriate maintenance.
• The danger of precedent in such an unbalanced case is most unfortunate.

The Lorax had it right. Who speaks for the trees? I urge YOU to.

-- Jim

James Kremer
Sharp Park
Pacifica, CA
[redacted]

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From: Dinah Verby <[redacted]
Sent: Monday, November 23, 2020 1:05 PM
To: Public Comment
Cc: Dinah Verby; Martin, Deirdre; Beckmeyer, Sue; Vaterlaus, Sue; Bier, Mary; O'Neill, Mike
Subject: Nov. 23 , 2020 City Council Agenda Item 10

[CAUTION: External Email]

To the Honorable City Council Members:

I support the appeal of the Heritage Tree Permit for 24-30 Salada Avenue and urge the City Council to uphold the appeal and deny the permit to remove the 4 heritage trees.

I have reviewed the Agenda packet as posted on the City website. The most credible report is that of the independent arborist, Roy Leggitt, who has no financial interest in the removal of the trees. He assesses the risk of failure as “low to moderate” and states that it can be managed with normal pruning. City staff agrees with Leggitt’s assessment. Quoting from the staff report, City staff feels that “the trees do not represent an unreasonable risk because the potential for limb failure could be reduced through proper pruning.” Why then, was the permit granted?

It is unclear why the PB&R Commission majority rejected the staff recommendation. The Pacifica Municipal Code provides that the granting of a heritage tree removal permit “shall” be based on six specific criteria. This is a mandatory requirement. Yet there are no written findings that discuss the criteria or disclose the basis for the Commission’s vote. Similarly, the draft minutes of the PB&R meeting do not reflect any discussion of most of the criteria. What the minutes do reveal is that some Commissioners seemed confused by the City’s tree policies and unsure of what criteria to consider. In summary, the draft minutes, as recorded, do not supply a sufficient factual or legal basis for the granting of the permit.

I must also comment that the draft minutes are confusing at best, and arguably inaccurate. E.G. a 3-3 vote on a motion to deny the applicant’s appeal was recorded as “The Motion Stands.” That is an inaccurate and confusing description of a motion that failed. Similarly, the minutes report that various Commissioners “motioned” to approve or deny. This is a grammatically incorrect, inaccurate and confusing report of what were presumably votes on a motion.

Another technical point is that I cannot tell from the public record which of the 7 trees are targeted for removal. Perhaps staff has this info, but it is not posted with the Agenda items.

In conclusion, I urge the City Council to deny the permit and to defer applications like these until after the City updates its tree policy and removal process. If the City does grant this permit, than please include a 3-to-1 replacement ratio as a permit condition, with the further condition that the replacements occur within a one-year period following removal of the trees.

Thank you very much.

Dinah Verby

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From: Coffey, Sarah
Sent: Monday, November 23, 2020 2:06 PM
To: Public Comment
Subject: FW: Trees at Risk of Removal in the City of Pacifica: Monday's 11/23, City Council Meeting
Attachments: image.png

From: Vera Toth-Fejel <[redacted]
Sent: Monday, November 23, 2020 1:20 PM
To: Martin, Deirdre <martind@ci.pacifica.ca.us>; Beckmeyer, Sue <beckmeyers@ci.pacifica.ca.us>; Vaterlaus, Sue <vaterlauss@ci.pacifica.ca.us>; Bier, Mary <bierm@ci.pacifica.ca.us>; O'Neill, Mike <o'neillm@ci.pacifica.ca.us>; Coffey, Sarah <coffeys@ci.pacifica.ca.us>
Subject: Trees at Risk of Removal in the City of Pacifica: Monday's 11/23, City Council Meeting

[CAUTION: External Email]

City Council,

I'm writing to express my concern regarding the potential removal of 4 heritage Monterey Cypress tress located at 24-30 Salada Ave, Pacifica. Since the trees clearly do not present any risks that could not be mitigated by the owner, I'd like to request that the City Council uphold the goal of environmental sustainability and not move forward with supporting tree removal. This would go in direct conflict with the City Council's own commitment to protect these trees, which are a delightful nod to the beauty of Pacifica's coastal environment, and provide part of the landscape which attracts visitors to the area, thus bringing in needed revenues. Please note comments below from relevant ordinances and recommendations.

Respectfully submitted,

Vera Toth-Fejel
Resident of Pacifica

> "The City of Pacifica Heritage Tree Ordinance is intended: "*To protect and conserve the attractiveness, aesthetic and scenic beauty and historic atmosphere of the City*". Monterey Cypress trees are in keeping with the historic coastal character of the City of Pacifica, and particularly in Sharp Park, where they have flourished for decades in the coastal climate. The Four Heritage Monterey Cypress trees located at 24-30 Salada Avenue are the only trees of significant size on an otherwise barren street. To remove these trees, that do not pose a high risk, raises a direct conflict to the intention of the Heritage Tree Ordinance to protect these trees that are living history, provide aesthetic beauty, and are a haven for wildlife including a variety of birds and even hawks. Further, in this time of growing crisis, removing trees that have been capturing and storing carbon for decades ignores the important role of trees to defend against climate change."

The staff report provided to the PBR Commission for the October 28, 2020 meeting:

> Relation to City Council Goals and Work Plan:
> Denying the application to remove the trees is consistent with Chapter 12, SEc. 4-12.01 (2) stating that one purpose of preserving of heritage trees is: "To protect and conserve the attractiveness, aesthetic and scenic beauty and historic atmosphere of the City"

The current (dated 11/23) staff report to City Council now states that the relation to City Council Goals and Work Plan is:

> Upholding the PB&r Commission's decision is consistent with the following Council adopted Goal:
>
> "Maintaining a Safe Community: ***Approving the Heritage Tree Permit will allow for the removal of moderate risk trees. The removal of these trees are intended to increase public and private property safety."***

An equally important City Council Goal is:

> "Environmental Sustainability: Includes mapping out parks and open space, preserving hillsides and beaches, ***paying attention to flora and fauna needs, environmental health and climate adaptation."***

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