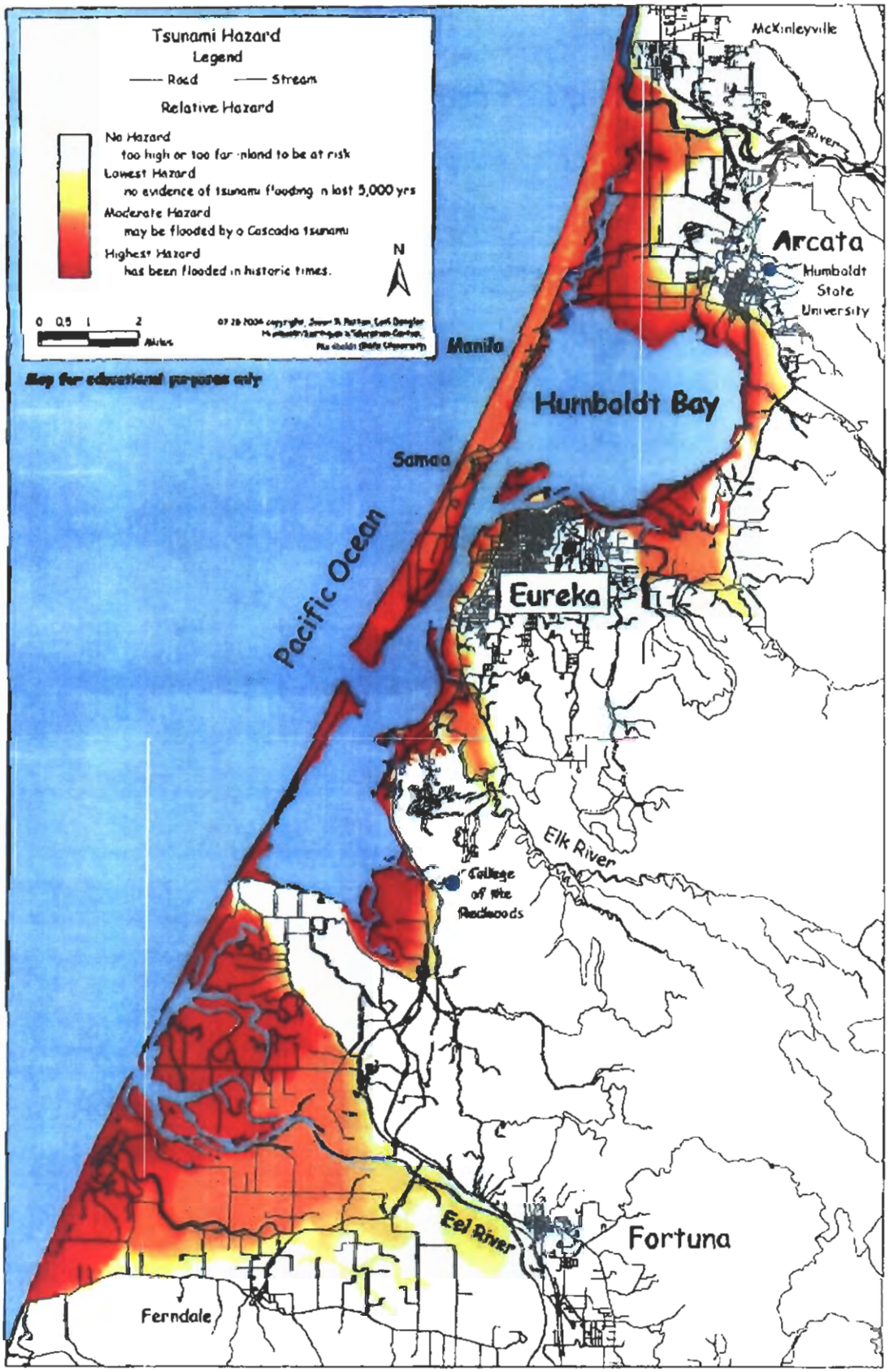
EXHIBIT NO. 16

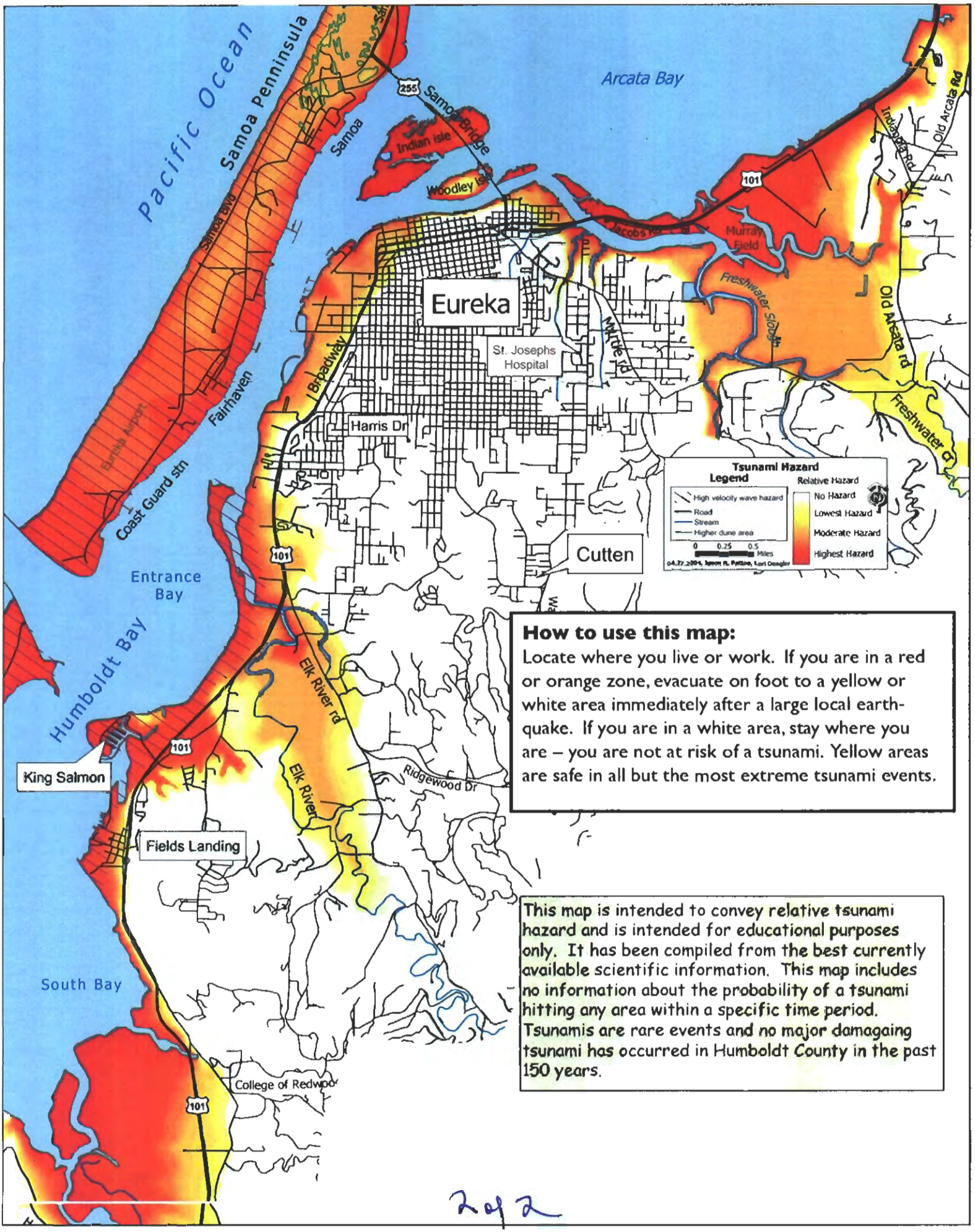
APPLICATION NO. HUM-MAJ-1-08

HUMBOLDT COUNTY LCP AMENDMENT (SAMOA TOWN PLAN)

TSUNAMI HAZARD MAP, DATED 7/28/04, HUMBOLDT STATE UNIVERSITY, ILLUSTRATING TSUNAMI INUNDATION RELATIVE HAZARD AREAS (INCLUDING AREAS RELEVANT TO THE REVIEW OF SUCH HAZARDS PURSUANT TO THE REQUIREMENTS OF THE HUMBOLDT BAY AREA PLAN)


Tsunami Hazard
Legend
Road
Stream
Relative Hazard
No Hazard
too high or too far inland to be at risk
Lowest Hazard
no evidence of tsunami flooding in last 5,000 yrs
Moderate Hazard
may be flooded by a Cascadia tsunami
Highest Hazard
has been flooded in historic times.
N
0 0.5 1 2
Miles
Map for educational purposes only
McKinleyville
Arcata
Humboldt State University
Manila
Humboldt Bay
Samoa
Pacific Ocean
Eureka
Elk River
College of the Redwoods
Eel River
Fortuna
Ferndale

142



How to use this map:
Locate where you live or work. If you are in a red or orange zone, evacuate on foot to a yellow or white area immediately after a large local earthquake. If you are in a white area, stay where you are – you are not at risk of a tsunami. Yellow areas are safe in all but the most extreme tsunami events.

This map is intended to convey relative tsunami hazard and is intended for educational purposes only. It has been compiled from the best currently available scientific information. This map includes no information about the probability of a tsunami hitting any area within a specific time period. Tsunamis are rare events and no major damagaing tsunami has occurred in Humboldt County in the past 150 years.

EXHIBIT NO. 17

APPLICATION NO. HUM-MAJ-1-08

HUMBOLDT COUNTY LCP AMENDMENT (SAMOA TOWN PLAN)

"THIRD PARTY REVIEW OF SAMOA TOWN MASTER PLAN TSUNAMI VULNERABILITY REPORT" PREPARED BY JOSE BORRERO, FREDRIC RAICHLEN, HARRY YEH (UNDATED). COPY SUBMITTED TO THE COASTAL COMMISSION BY HUMBOLDT OCUNTY, 3/8/07 (1 of 32)

THIRD PARTY REVIEW OF SAMOA TOWN MASTER PLAN TSUNAMI VULNERABILITY REPORT

by
Jose Borrero, Fredric Raichlen, Harry Yeh

EXECUTIVE SUMMARY

The third party review of the tsunami vulnerability of the Samoa Town Plan was undertaken to investigate the framework of assumptions that led to an elevation of +30 ft MSL for the lowest habitable floor for residential occupancy in Samoa Town suggested by GeoEngioneers (GE). This review will be presented along with certain suggestions. Generally we found that the tsunami vulnerability report by GeoEngineers depended strongly on geological evidence of tsunami attack from past events and a view of the dune system to the west of the Town as providing a "tsunami barrier". This has prompted us to use a sophisticated numerical model of the area that incorporates two Cascadia Subduction Zone earthquakes (magnitudes 8.5 and 9.0) into the model to define inundation zones on the North Spit.

The review that was undertaken has three major sections as presented herein:

- Review of the section in the GeoEngineers' report dealing with the geological aspects of tsunami mitigation.
- The development of a numerical model and a discussion of the results of applying this model using the current topography of the north peninsula to investigate inundation patterns for two CSZ earthquakes (magnitudes 8.5 and 9.0).
- Review of the section of GeoEngineers' report devoted to mitigation and safety.

(In these sections appropriate selections from the GeoEngineers' report and the PG&E (2002) report are presented for the convenience of the reader with our comments presented in bold-face font.)

CONCLUSIONS

The following major conclusions were drawn from the combined review of the GeoEngineers' report and the application of the numerical model used in this review.

- Our numerical simulations predict the maximum tsunami elevation on the seaward face of the seaward dunes of about 20 feet to 24 feet. This is consistent with the geologic evidence that was used as the basis in the GeoEngineers' report. This agreement provides us with some degree of confidence in our estimate. Consequently, we recommend eliminating the factor of safety used by GeoEngineers, i.e., a somewhat arbitrary factor of safety of 1.5. Instead of this factor of safety, we added the effect of maximum tides (3 feet to 4 feet re MSL) to the prediction. This results in the maximum predicted tsunami inundation elevation of 24 ft to 28 ft MSL for the general area of the Samoa Town Master Plan.

- We must caution that there are still many uncertainties involved in our predicted tsunami elevation for a number of reasons. First, the tsunami source we used in our simulation is based on the estimated co-seismic seafloor displacement resulted from the rupture of main fault, which is not an exact science. Furthermore, the rupture in a splay fault could create enhanced seafloor displacement; thereby much greater tsunami may result. There also is a possibility that strong seismic motions may trigger a large submarine landslide, which could generate excessively large tsunamis locally. In addition, in some aspects of the numerical study we assumed a coseismic uplift of the North Spit which may or may not be accurate. Therefore, the estimate by GeoEngineers of the 30 ft elevation for habitable floors for the Samoa Town Master Plan site is reasonable considering all of the uncertainties involved in such a tsunami inundation prediction.

- Unlike the phenomenon of river floods, tsunamis are rare events and a minimal amount of data, if any at all, are available for a given locality. Hence a probabilistic (or risk) analysis for a given site is usually impractical. The best practice to establish a design tsunami condition must be based on the combination of a theoretical understanding of the problem, rational numerical modeling, past field experience, and engineering judgment. We believe that the geological evidence of the study by GeoEngineers and PG&E combined with the results of our numerical model study provide a certain degree of confidence in estimating the tsunami vulnerability of the Samoa Town Master Plan site.

- Even if the tsunami source were identified, local tsunami effects could not be predicted accurately because the flows interact strongly with the complex three-dimensional bathymetry and topography of the area. This is especially true for the prediction of the effects of a tsunami on the east side of Samoa. If the tsunami entered Humboldt Bay through the entrance from the south end of North Spit and propagated northward along the 30-ft deep dredged channel it is possible that the east side of Samoa could be more vulnerable than the west side. This is because of the low elevation of some of the developed area. An accurate prediction of inundation for such a complex tsunami propagation process is difficult. In Section II where the numerical model results are presented and discussed it can be seen that the numerical model can handle this aspect of tsunami effects in only an approximate manner.

- We emphasize that a sufficient number of the assembly sites (shelters) be constructed at strategically planned locations for vertical evacuation. These structures must be designed by qualified professional engineers and can be multi-use or stand alone structures. They should be located based on expected arrival times of a tsunami.

- It is not clear if the ground elevation of the new Emergency Services building should be above 40 feet MSL or that of the upper floor that will be used for evacuation. It is emphasized that there must be multiple assembly sites

- Evacuation routes to the shelters must be carefully planned not only for the residents but also for beach visitors in the event of an earthquake.

- Inside of the shelters, warning signs stating that "tsunami effects last for several hours" must be posted.

- The Samoa Town Plan should not allow any fences in the township, except for those required, and those must be low enough not to hinder evacuation.

- The Safety Plan should include annual evacuation drills and the Plan should be reviewed and updated annually.

I. REVIEW OF THE GEOLOGICAL INDICATIONS OF TSUNAMI VULNERABILITY

In the review of this section of the report we considered the important elements of the geological investigations and the run-up considerations that led to the estimate of the inundation elevation of +30 ft MSL suggested by GeoEngineers. Some important points brought out by GeoEngineers in this section of their report will be presented and discussed.

- **To a large extent the determination of the maximum inundation elevation at the site of the Samoa Town Master Plan is based on the Master of Science thesis of Leroy (1999) and the report of PG&E relating to the Humboldt Bay ISFSI site (Independent Spent Fuel Storage Installation) (December 27, 2002).**

- **It is not clear in either the GeoEngineers' report, PG&E report, or Leroy (1999) whether the authors have made a distinction between run-up and inundation. These can be two distinct phenomena that must be clearly stated in referring to potential flooding scenarios for the Samoa Town Master Plan area. Run-up refers to the elevation to which a wave, e.g., a tsunami, will propagate up a slope (or in this case a dune-face). Inundation is the elevation of flooding due to the wave that may or may not be the same as the run-up.**

The presence of inconsistent sand layers in coastal marsh deposits provides indications of large waves inundating the coastal area of northern California during the late Holocene, including events in the 300 and 1100 yr BP (before present) range.

- **Although this does not refer directly to the Samoa Town Master Plan area it does suggest that major waves occurred at the time of tectonic events occurring around 300 and 1100 yr BP. This observation basically layed the groundwork for the *possibility* of the inundation of the North Spit by tsunamis.**

It is stated that in the Samoa peninsula (the North Spit) paleoseismic evidence was observed in the area of the Mad River Slough approximately four miles north of the Samoa Town Master Plan site. Paleoseismic evidence refers to ground subsidence or uplift associated with past tectonic events and does not, *per se*, refer to historic tsunami events.

- **Leroy (1999) postulates that the Samoa peninsula area experiences co-seismic *uplift* across much of the area due to CSZ earthquake, thereby providing additional protection from dune overtopping in the Samoa Town Master Plan site and from inundation from Humboldt Bay.**

It is stated that there is a general lack of clean sand layers at the base of younger wetland deposits overlying older buried wetland deposits adjacent to the forested dunes in the northern portion of the plan area.

- **This suggests that the dunes seaward of the Samoa Town Master Plan area were not *overtopped* by the tsunami run-up associated with the event of 300 years ago, i.e., 1700. In the event of a major earthquake along the Cascadia Subduction Zone with a magnitude of 9.0 and the generation of a massive tsunami it is probable that, at least, the region of the coast north of Samoa would be inundated. Even though there are high dunes and a forested region north of the Samoa Town Master Plan site providing some protection from local tsunamis, massive waves generated by a magnitude 9.0 CSZ earthquake may travel overland from the north toward the south affecting the North Spit.**

- **In an indirect way, attention has been given to the potential for tsunami flooding of the Samoa Town from the east, i.e., from Humboldt Bay. This is from evidence of the overtopping of the South Spit by past extreme events. There is another caveat, and that is that the dune field is not two dimensional so even though certain dune heights are discussed in the GeoEngineers' report, the dunes in fact are three dimensional, i.e., there are regions in the seaward dune field with peaks that range in height. Therefore, there is a possibility of flow through the lower elevation sections of the dunes. In addition, dune erosion caused by the initial waves in a tsunami wave train may occur that can result in overtopping by subsequent waves. Therefore, the expected run-up on the seaward face of the dunes is important to establish.**

Leroy (1999) states, in the section entitled: "Evaluation of the Spits as Tsunami Barricade", that " the only likely tsunami deposits found to date are on the bay margin against the southeastern portion of the South Spit".

- **Our interpretation of this is that tsunami deposits have not been found elsewhere on the North Spit, but overtopping of the South Spit is possible with related flooding of the North Spit.**

The statement is made that dune development is believed to occur primarily after a seismic event that uplifts the shoreline.

- **This does not address the possibility that major storm wave events in combination with winds can play an important role in the formation and accretion or the erosion of the seaward dune field. In addition, as mentioned earlier, the impingement of tsunamis on the dunes, even in non-overtopping events, can modify the dune shape and enhance (or deter) run-up from subsequent earthquakes and tsunamis.**

- **The estimate of run-up in the GeoEngineers' report is somewhat confusing. It is stated that this is based on considerations of the overtopping of the South Spit with an average elevation of about 15 ft (4.5 m) MSL and a maximum elevation of about 20 ft (6 m) MSL. (This implies bay-side flooding.) This is used as the basis for the inundation level in the Samoa Town Master Plan area. To the maximum of about 20 ft MSL a factor of safety of 1.5 is applied to arrive at a height of 30 ft above MSL being the height for mitigation considerations. (We**

are not in favor of assigning an arbitrary factor of safety to such results.) Indeed it is stated that the 10 ft added to the 20 ft elevation is approximately the difference between high and low tides. We consider this to be excessive. Actually the mean tidal range at Samoa (40° 50' N ;124° 11' W) is 5.4 ft and the spring tidal range is 7.3 ft. Referring to MSL, this would result in a spring tidal range of about 3 ft to 4 ft above MSL. Thus, a reasonable level would be about 24 ft re MSL rather than 30 ft re MSL as stated in the report. The estimate of PG&E of a 31 ft run-up on the seaward dune face due to a CSZ earthquake and resultant tsunami is used by GeoEngineers to support their recommended base elevation for buildings of 30 ft. This approach is considered somewhat questionable, since the GeoEngineers recommendation is based on the factor of safety of 1.5. We believe that an estimate based on the run-up on the seaward dune face is a more reliable approach. It is seen in Section II (the section treating the numerical model) that this is the approach taken by us.

The PG&E report (December 27, 2002) that dealt with the ISFSI (Independent Spent Fuel Storage Installation) site at Humboldt Bay was reviewed in regard to the facts that could be applied to the North Spit relative to the question of inundation at the Samoa Town Master Plan site. Several of their conclusions are summarized in the following with the page reference to their report shown in italics at the end of the comment.

- **The conjecture is presented regarding the escarpment on the west of the dunes and whether it could have been caused by a tsunami. From their description we tend to agree with PG&E that major storm wave events could have caused this, although a causative tsunami cannot be completely ruled out.** ***(personal communication of GeoEngineers with Dr. Carver)***

- **In the review of paleotsunami evidence found by PG&E geologists PG&E stated that no tsunami evidence was found at Mad River Slough, Eureka Slough, or at the Humboldt Bay Power Plant. There was evidence of three tsunamis in the South Bay region. They further state:** "Evidence of paleotsunamis are also evident in the sand dunes of the North Spit. No evidence of past tsunami inundation was found at High Praire Creek or at six sites investigated around the north and east sides of Humboldt Bay." ***(PG&E Report Pg. 9-58 and Table 9-2)***

- **It is stated that the dunes on the northern part of the North Spit range from 53 ft to 72 ft re MLLW (or about 49 ft to 68 ft re MSL). Observations show that these dunes had never been overtopped by past tsunamis. PG&E states that this places an upper limit on run-up on the seaward face of these dunes. As discussed earlier, this does not eliminate the possibility of inundation at the Samoa Town Master Plan site from the bay-side by tsunami propagation through the entrance to Humboldt Bay or through lower elevations in the three-dimensional dune field. (*** ***PG&E Report Pg. 9-19)***

- **PG&E bases its estimate of the inundation in Humboldt Bay on the work of Leroy (1999) reviewed earlier. They state the run-up height "had to be**

higher that 18 to 23 ft re MLLW (about 14 to 19 ft re MSL) for about the past millennium. (*PG&E Report Pg. 9-32)*

- **The tidal range of 10 ft used in the GeoEngineers' report appears excessive as discussed earlier. (*PG&E Report Pg. 9-39)***

- **The PG&E report estimates the open-coast run-up height based on various analyses. They state that a CSZ magnitude 8.8 earthquake would result in a run-up of 31 ft re MSL. This elevation is used by GeoEngineers to support their estimate of 20 ft re MSL plus a factor of safety of 50% resulting in a safe elevation for structures of 30 ft re MSL. *(PG&E Report Pg. 9-39).* (As mentioned earlier this question will be discussed by us in Section II of this report.)**

The statement is made on Page 6 of the GeoEngineers' report (October 17, 2006) that based on a literature review the expected run-up (not inundation) for a Magnitude 9 earthquake on the CSZ is approximately 31 ft re MSL which they state is at the middle of the range developed by PG&E.

- **It is not clear what literature was reviewed by GeoEngineers to arrive at this estimate other than the thesis of Leroy (1999) and the PG&E report of 2002.**

The GeoEngineers' report speaks of an attenuation factor of a tsunami of 95% in the Samoa Town Master Plan area.

- **In our opinion this is speculation. Based on these estimates the elevation of the lowest habitable floor was given as 30 ft MSL. It is our opinion that with little knowledge of the dissipation mechanism for tsunami flow overland it is reasonable not to consider attenuation due to surface effects.**

It is stated by GeoEngineers that the estimate of inundation would be placed on a firmer base by conducting numerical model studies.

- **The results of the limited numerical investigation by us using currently available topography of the study area are presented in Section II. (Any more comprehensive numerical study would have to be conducted under a separate contractual understanding.)**

II. NUMERICAL MODELING OF SCENARIO EVENTS

In order to assess the validity of the tsunami inundation and runup levels used in the vulnerability report we conducted a numerical modeling study of tsunami inundation in the Humboldt Bay region for two seismic sources.

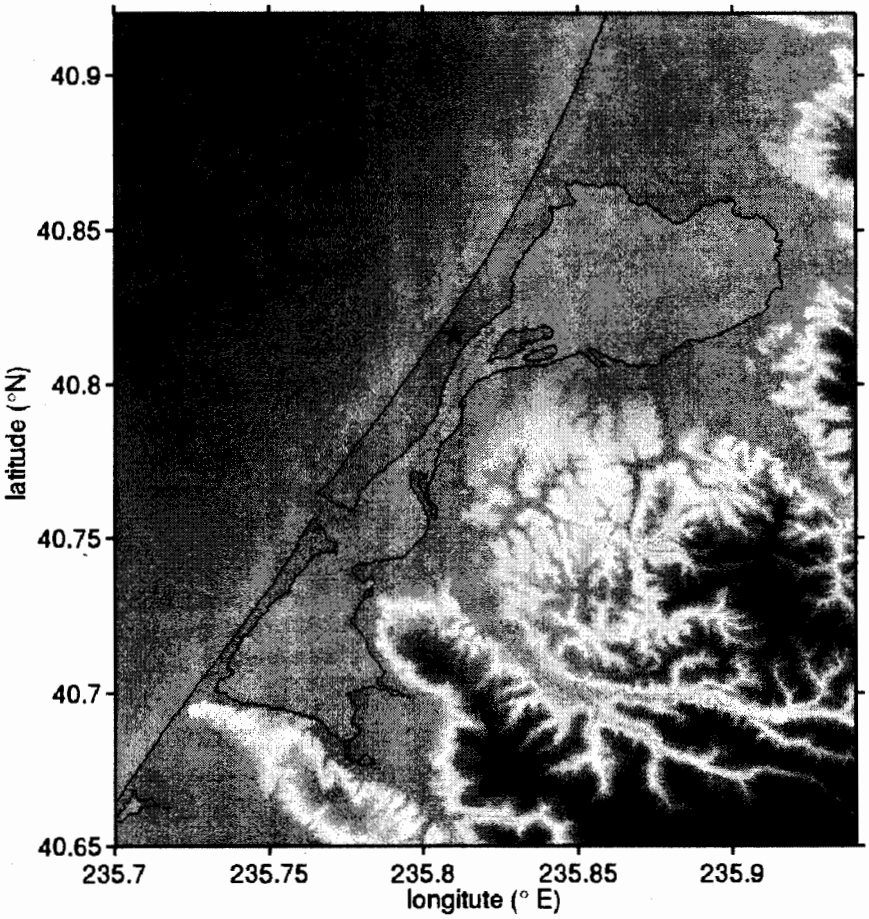


Figure 1: Map showing the region considered in the numerical model. The star indicates the study site.

The Numerical Model

Numerical modeling of tsunamis consists of three parts; generation, propagation and coastal effects that include runup and inland inundation. We assume an instantaneous, static initial condition of the water surface calculated from the earthquake displacement field using Okada [1985]'s model for a fault rupture at depth. For tsunami propagation and runup, we use the model MOST, which solves the 2+1 non-linear shallow water wave equations in rectangular or spherical coordinates (Titov and Gonzales, 1997 and Titov and Synolakis, 1997). Runup calculations are performed using a moving shoreline algorithm to evolve the wave front over dry land (Titov and Synolakis, 1998). Runup and inundation are computed over the post earthquake deformed topography.

We used a system of three nested grids. The bathymetry and topography data were merged in a GIS from the highest resolution and re-gridded to a uniform 1-arc second (~25 m) resolution. The nested grid configuration allows for more efficient computation of propagation in areas where local runup is not of interest. The outermost grid was re-sampled to a resolution of 30-arcsec, the intermediate grid to 15-arcsec, while innermost grid down to 1-arcsec (23 by 31 m at 41.7° N). Details of the multi grid computations are discussed in Borrero et al. [2001, 2005].

Seismic Sources

We modeled two faulting scenarios to assess the local tsunami hazard from a CSZ rupture. The first scenarios was a M_W = 8.5 event based on the SP1 source described in Bernard et al., 1994 for a rupture of the southern segments of the CSZ and including slip partitioning on the Little Salmon Fault. We also consider a second scenario with M_W = 9.0 which is similar to the hypothesized 1700 AD event described in Satake et al. [2003] combined with the model of Bernard et al. [1994]. For the northern part, the fault area is 800 km by 100 km with a uniform slip of 8 m. The southern part is made up of multiple faults per Bernard et al. [1994] and it is identical to SP1. The associated deformation fields for these scenarios are shown in Figure 2 with the detailed faulting parameters for each listed in Table 1. The two scenarios are essentially the same for the southern segments of the CSZ. The difference in magnitude is made up in the 9.0 event by extending the rupture northward some 800 km.

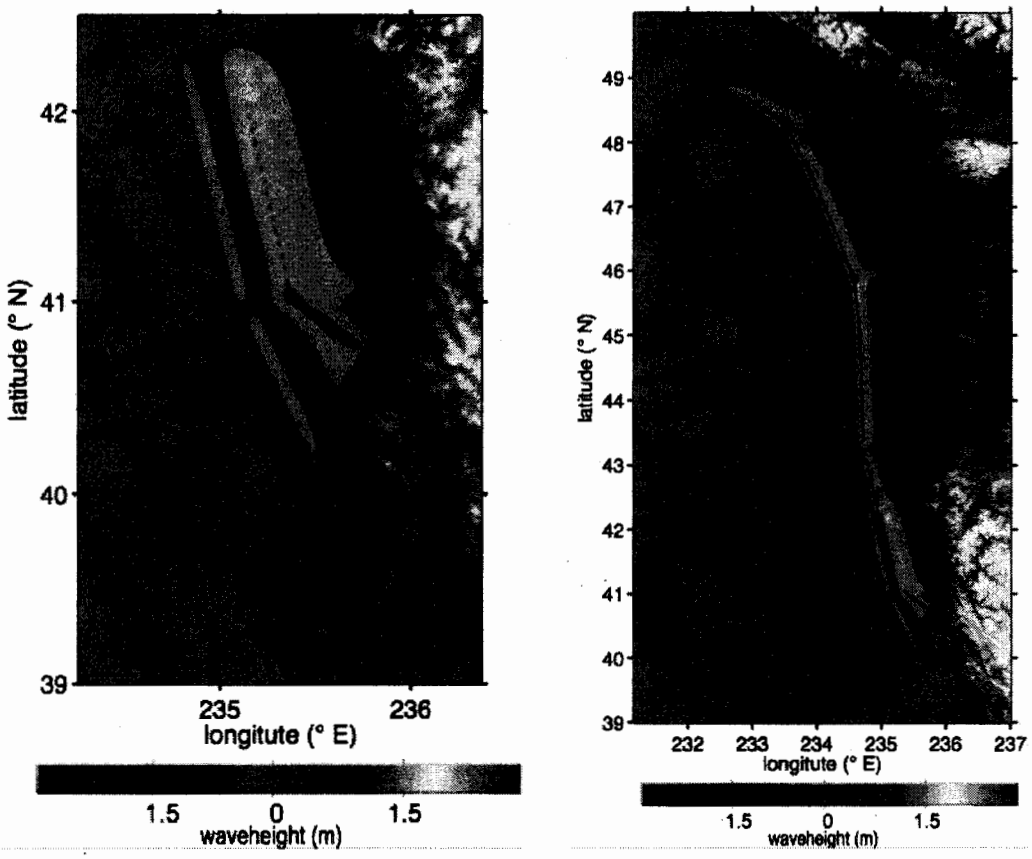


Figure 2: Initial surface deformation for the two scenarios modeled. M_W = 8.5 on the left and M_W = 9.0 on the right.

Tsunami Source	L (km)	W (km)	disp (m)	M_W
SP1	----	----	----	8.5
segment 1	150	30	4	
segment 2	150	10	4	
segment 3	150	70	8	
segment 4	90	30	4	
segment 5	90	70	8	
segment 6	90	10	4	
Extended event	----	----	----	9
SP1	240	100	6.6	
extension	800	100	8	

Table 1: The detailed faulting parameters of the two scenarios used in modeling. M_W = 8.5 scenario is consist of six segments and M_W = 9.0 uses eight more additional segments to extend the rupture towards north.

The Numerical Model Results

Inundation

Figure 3 – 10 compare the model results obtained from the two scenarios. Figures 3 – 6 are for the M_W = 8.5 event, while Figures 7 – 10 are for the M_W = 9.0 event. Figures 3 and 7 shows the inundated areas, the depth of the inundation over land and the overall runup for each of the two scenarios. For each of the cases modeled the proposed Samoa Town Master Plan area was not inundated. Our model suggests that for these events the dunes on the northern sand spit are high enough to prevent inundation directly from the sea. This is shown in Figures 5 and 9. These figure show cross sections of maximum tsunami wave height plotted along with the local topography. The profile number is shown at the top of each figure, and the location of each profile is presented in Figures 4 and 8 for the two different tectonic events.

It is also interesting to note that the region is not inundated from the lagoon side either. In addition, animations of the time histories of water levels from the numerical simulations do not show this area being flooded. We attribute this to the degree of local co-seismic uplift which is incorporated into the model. Because the ground level was raised during the seismic event, the end result is that waves which would have otherwise inundated the area are unable to flood over the new land level. This effect was observed in recent tsunami events such as the March 28, 2005 Nias-Simeulue tsunami where local ground uplift was on the order of 2 – 4 m. Thus, the amount of uplift associated with the CSZ earthquakes is important to the inundation process, and this will be discussed later.

Figures 6 and 10 show time series histories of water levels on either side of the North Spit. The time histories are shown relative to ground levels before the earthquake event, i.e., no assumed coseismic uplift of the North Spit is considered. The time series are taken from locations in water that is deep enough so the full cycle of the wave can be observed, i.e., Gage 1 was located at 7.6 m depth and Gage 2 was located at 4.55 m depth. Both sites are uplifted about 1.2 m during the earthquake.

Model Caveats

While these two specific scenarios do not produce destructive levels of inundation at the study site, this should not be interpreted as an indication that this site is safe from all possible tsunami events. This simulation depicts the results from a very specific set of conditions and assumptions. Real tsunami events are by nature extremely variable and unpredictable.

This is stated very clearly in the 1994 Bernard et. al. report when they note that due to averaging in the determination of fault plane solutions, "tsunami wave amplitudes will be much higher than a fault plane generating mechanism might indicate". Furthermore, the PG&E study states: "Potential tsunamis from the Cascadia subduction zone could generate wave runup along the open coast at Humboldt Bay. The height would probably be greater if the earthquake also triggered one or more large submarine landslides off the adjacent coast; however, no evidence of such larger, landslide-

generated tsunamis in the past 2,000 and probably the past 3,600 years has been found in Humboldt Bay". It is impossible in this study to properly account for all of the potential variables inherent in tsunami inundation; submarine landslides are one potential variable.

The PG&E study summarizes that tsunami wave heights from a large rupture on the CSZ would be on the order of '30 – 40 feet'. A tsunami of this height would overtop the southern spit but not overtop the northern spit. The possibility of a large coseismically induced landslide cannot be ignored. There is evidence of extremely high runup values (66 – 69 feet) at Orick, located to the north of Humboldt Bay. The reason for the extremely high runup here is not known. An enhanced tsunami caused by a coseismic landslide or bathymetric focusing are two possibilities.

The PG&E report notes that "recent detailed bathymetric mapping of the Cascadia continental margin has revealed several enormous landslide masses off shore of Oregon that have features interpreted as indicative of large and sudden movements of thousands of square miles of the lower continental slope" "The presence of these large offshore submarine landslides suggests a mechanism for generating anomalously large tsunamis at infrequent intervals" They go on to state that "no geologic evidence for such tsunamis has been found in the late Holocene coastal stratigraphy in northwestern California or other places along the Cascadia coast".

Chapter 9 of the PG&E report gives an overview of tsunami modeling efforts performed for this region and compares these results to runup data from observed tsunamis throughout the world. One must be careful in interpreting these worldwide results as runup is controlled to a first order by the local bathymetry. Based on empirical data alone, a tsunamigenic earthquake of magnitude 8.8 on the Cascadia subduction zone "would generate average maximum runup heights along the northern California coast of 31 feet MSL (35 feet MLLW). The runup range for magnitude 8.5 to 9.2 is 28 to 37 feet [32 to 41 feet MLLW])".

PG&E studied several different tsunami modeling studies performed for the Humboldt Bay area. The results are summarized briefly below.

1) **Wiegel, 1965** – ***postulated a tsunami runup of 25 ft form a locally generated magnitude 8 earthquake with a return period of 800 years***. PG&E state "He concluded, "Based upon present evidence, there appears to be little likelihood of the generation of a large tsunami in a region near Humboldt Bay." It should be noted that at the time of his analysis, in late 1964, the existence of the Cascadia subduction zone as a potential local tsunami source was yet to be recognized."

2) **PG&E, 1966** – "Using a Corps of Engineers procedure (Camfield, 1980) and Brandsma and others' ***maximum tsunami wave of +5.2 feet*** at a point offshore in water of moderate depth (600 feet), PG&E (1985b) computed the wave runup at the mouth of Humboldt Bay to be 16.1 feet above mean lower low water. This runup height would decrease as the wave propagated through the bay to the PG&E power plant site, although no quantitative analysis of the attenuation was done."

3) **Houston and Garcia, 1980** - Predicted tsunamis for the west coast of the U.S. for flood insurance purposes. PG&E state "Houston and Garcia's (1980) ***100-year tsunami runup at the entrance to Humboldt Bay was estimated to be 10.6 feet above mean lower low water, and the 500-year tsunami runup was estimated to be 20.7 feet above mean lower low water.*** Similar to the above procedure, no specific analysis was performed to predict water levels at the power plant site itself."

4) **Whitmore, 1993** – PG&E states: "In the numerical analysis by Whitmore (1993), Cascadia subduction zone source parameters were used to compute inundation wave amplitudes along the coast of Washington, Oregon, northern California, and adjacent areas to the north and south. The largest event analyzed was magnitude 8.8 that ruptured from central Washington to between Eureka and Crescent City. The fault rupture was 400 miles long, dipped 13 degrees, and the maximum seafloor uplift was 12 feet. At points along the coast opposite the modeled earthquake, the ***maximum computed tsunami amplitude was 19 feet***, with an ***average maximum amplitude of about 15 feet***. Maximum amplitudes were computed at three locations within Humboldt Bay (Eureka: 1.7 feet, Fields Landing: 0.66 feet, and Bucksport, between Eureka and Fields Landing: 2.8 feet). ***The maximum amplitude of 8.7 feet was calculated on the ocean side of the North Spit***, just to the south of the end of the modeled fault rupture."

5) **NOAA, Bernard et al., 1994** – PG&E State "The planned approach for the study (Bernard and others, 1994), included application of seismic source models for the Cascadia subduction zone to predict the generation of significant tsunami waves impinging on Humboldt Bay and Crescent City, followed by numerical modeling of inundation in these two areas of interest. ***The initial results of the seismic source modeling indicated the Cascadia subduction zone produced tsunami wave amplitudes that were judged to be unreasonably small.*** Therefore, Bernard and others (1994) evaluated the complexities of recent tsunamis generated by earthquakes in Nicaragua (1992), Indonesia (1992), and Japan (1993), and used an empirical approach to estimate the incident wave amplitudes at Humboldt Bay. ***Using tsunami observations associated with the 1964 Alaska and 1993 Hokkaido earthquakes, they judgmentally derived a 10-meter (33-foot) incident wave at a 50-meter (164- foot) water depth to be used in inundation models***.

6) ***Lamberson and others (1998)*** – As Described in PG&E, "Roland Lamberson, Professor at Humboldt State University, has developed, along with his students, a numerical tidal model calibrated for Humboldt Bay. During 1997, they performed a pilot study (Lamberson and others, 1998) to assess the feasibility of using their current finite-difference tidal model to simulate tsunami wave amplitudes and water velocities inside Humboldt Bay. ***They tested their model at low tide (0 set at mean lower low water), using an arbitrary input set of three large (4 to 6 meter amplitude) waves at the mouth of Humboldt Bay, having a period of 15 minutes.*** At the entrance to Humboldt Bay the third wave had the maximum wave height of 8 meters (26 feet MLLW). ***A wave overtopping the spits was not included in their model***, although the input wave clearly would have washed over the South Spit and the southern portion of the North Spit. In their model, the maximum flooding at the ISFSI site occurred during the second wave,

and had an elevation of 5 meters (16.4 feet) above mean lower low water. Current velocities at the ISFSI site were a maximum of 2 meters (6.6 feet) per second. Lamberson and others (1998) concluded their model performed well."

7) ***Myers and others (1999)*** – From the PG&E Report: "Edward Myers, a Ph.D. student, and a team of researchers from the Oregon Graduate Institute developed a finite element model for propagation of Cascadia subduction zone tsunami waves from their source near the plate interface off the coast of the Pacific northwest, to the coast. To generate the tsunamis, they used various rupture models for the Cascadia subduction zone as presented in Priest and others (2000). These models assume a geometry of the plate interface and vary the rupture dimensions by adjusting the locations and amounts of slip on the seaward and landward transition zones around a central locked zone. They estimated regions and amounts of seafloor uplift corresponding with each of these rupture scenarios, assumed the sea floor uplift was directly transferred to the sea surface as the initial conditions for their model. They then propagated the tsunami wave trains through their finite element grid toward the coast, and reported the estimated wave heights and run-up velocities associated with each of the scenarios. In their study, the authors reported their results for a number of locations along the coast from Cape Mendocino to the northern Olympic Peninsula. These results depend on a relatively coarse finite element grid, and are most useful to estimate tsunami-focusing mechanisms offshore, but are considered approximate for estimation of runup at the coast (A. Baptista, personal communication, 2002). The authors chose two sites for detailed estimation of runup characteristics: Seaside and Newport, Oregon. The finite element grid was much denser than the regional grid at these two sites to permit detailed estimation of runup routes, flow velocities, and runup heights. The authors report that predicted wave heights and runup velocities are very sensitive to grid density, reinforcing the notion that estimates of run-up outside of Seaside and Newport should be considered approximate. Furthermore, Dr. Baptista (Personal communication, 2002) reports that runup velocities predicted by these models are much less accurate than wave heights. ***This model predicts wave heights at the coast at Humboldt Bay between 17 and 30 feet (MLLW) and flow velocities between 3 and 13 ft/s, but they did not model runups within Humboldt Bay***. At Klamath, near Lagoon Creek, they predict wave heights between 17 and 46.5 feet (MLLW) and flow velocities between 6.5 and 15 ft/s, but preferably around 10 ft/s.

Finally the PG&E Report summarizes the tsunami hazard with the following statement: "The runup height from a local Cascadia-generated tsunami on the open coast at the mouth of Humboldt Bay is estimated to be as much as 30 to 40 feet above mean lower low water at the bay entrance. This estimate considers evidence of paleotsunamis at the North Spit, and assumes overtopping and erosion of the sand barriers and marsh at the South Spit. It compares well with the predicted runup height estimates from historical tsunamis in continental margin settings in Alaska, Chile, Peru, and Colombia, as well as runup estimates for paleotsunamis at Lagoon Creek and Crescent City."

Conclusion

We believe that the PG&E report is accurate and comprehensive. Our modeling supports the evidence that the north spit has not been overtopped by direct tsunami

attack, however this does not mean that it can never happen, especially in the light of the extreme (~69 ft) runup heights believed to have occured at nearby Orick and the horrendous effects of the 2004 Boxing Day tsunami in Sumatra. Furthermore, the particular source models we used for this preliminary study were based on the source models of Bernard et al., 1994, which the authors themselves remark may be too small to accurately represent the hazard. Larger events can be arbitrarily constructed that will result in larger runup and possibly overtopping of the north spit dunes, especially towards the southern end of the north spit where maximum dune elevations are lower.

Our judgement is that the 30 ft elevation for habitable floors for the Samoa Town Master Plan is conservative. This area is undeniably in a high risk area for tsunamis and earthquakes. Any future developments in this area, such as the Samoa Town Master Plan, should carefully weigh the tsunami hazard before allowing an increase in population density there.

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Titov, V. V., and F. Gonzales (1997), Implementation and testing of the method of splitting tsunami (MOST) model, Technical Memorandum ERL PMEL 112, NOAA.

Titov, V. V., and C. E. Synolakis (1998), Numerical modeling of tidal wave runup, Journal of Waterway, Port, Coastal, And Ocean Engineering, 124 (4), 157–171.

Numerical Model Results

$M_W = 8.5$ case

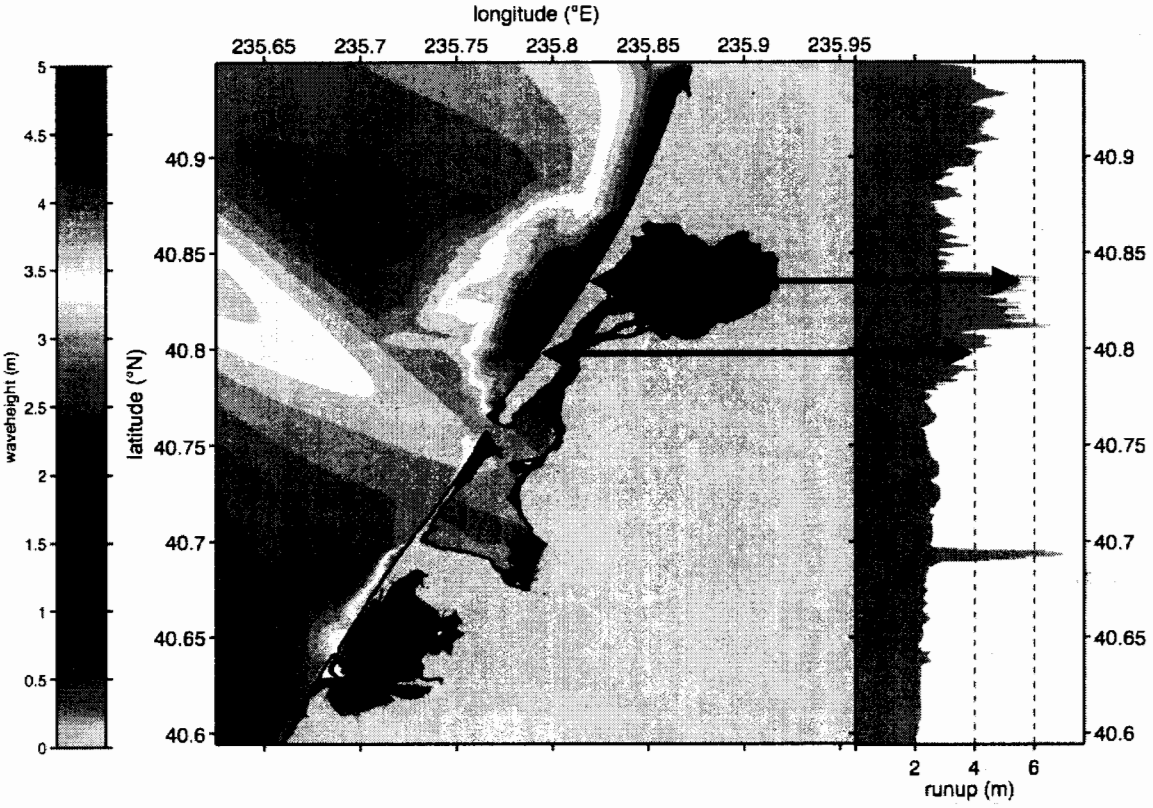


Figure 3: Maximum waveheights offshore, inundated areas and onshore runup for the $M_w = 8.5$ case.

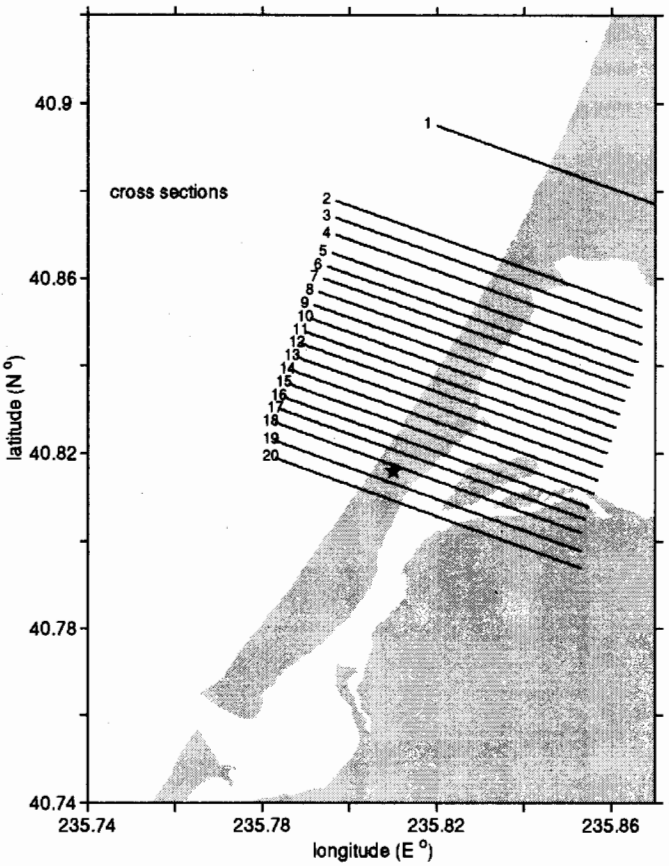
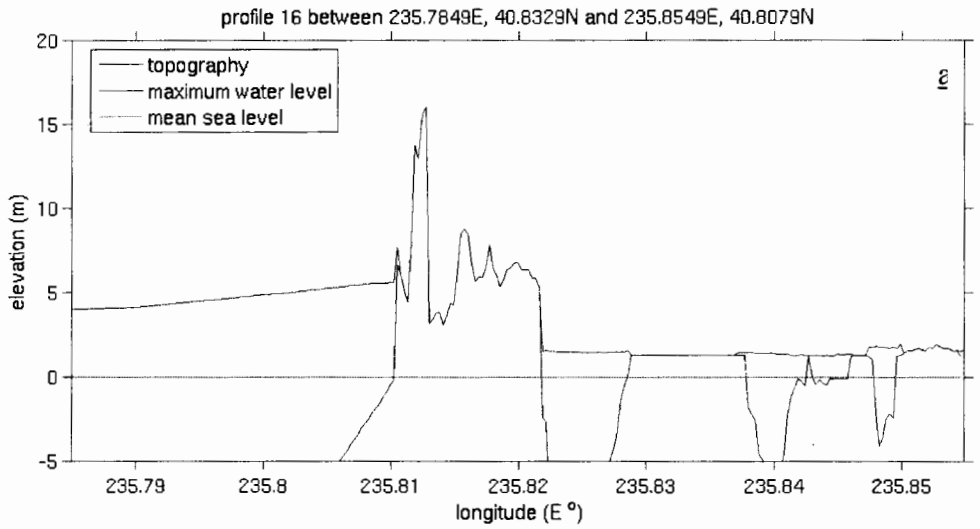
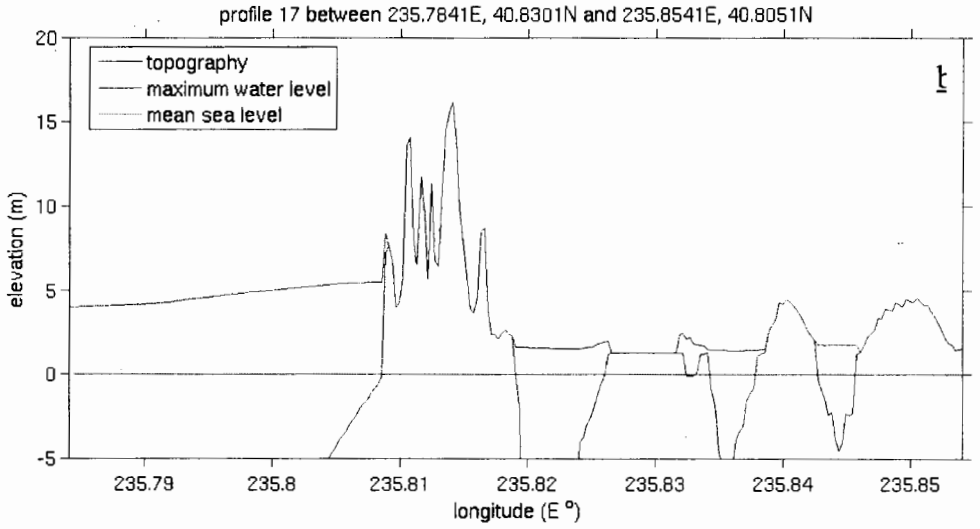
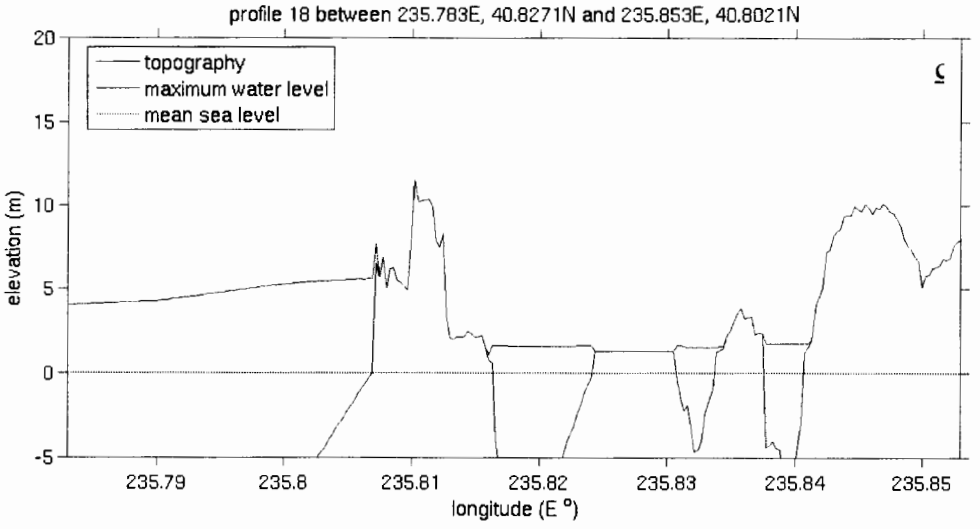


Figure 4: Locations of cross shore profiles. Profiles 16 – 20 cover the study area and are shown below for each case.


profile 16 between 235.7849E, 40.8329N and 235.8549E, 40.8079N
topography
maximum water level
mean sea level
elevation (m)
longitude (E °)
a


profile 17 between 235.7841E, 40.8301N and 235.8541E, 40.8051N
topography
maximum water level
mean sea level
elevation (m)
longitude (E °)
b


profile 18 between 235.783E, 40.8271N and 235.853E, 40.8021N
topography
maximum water level
mean sea level
elevation (m)
longitude (E °)
c

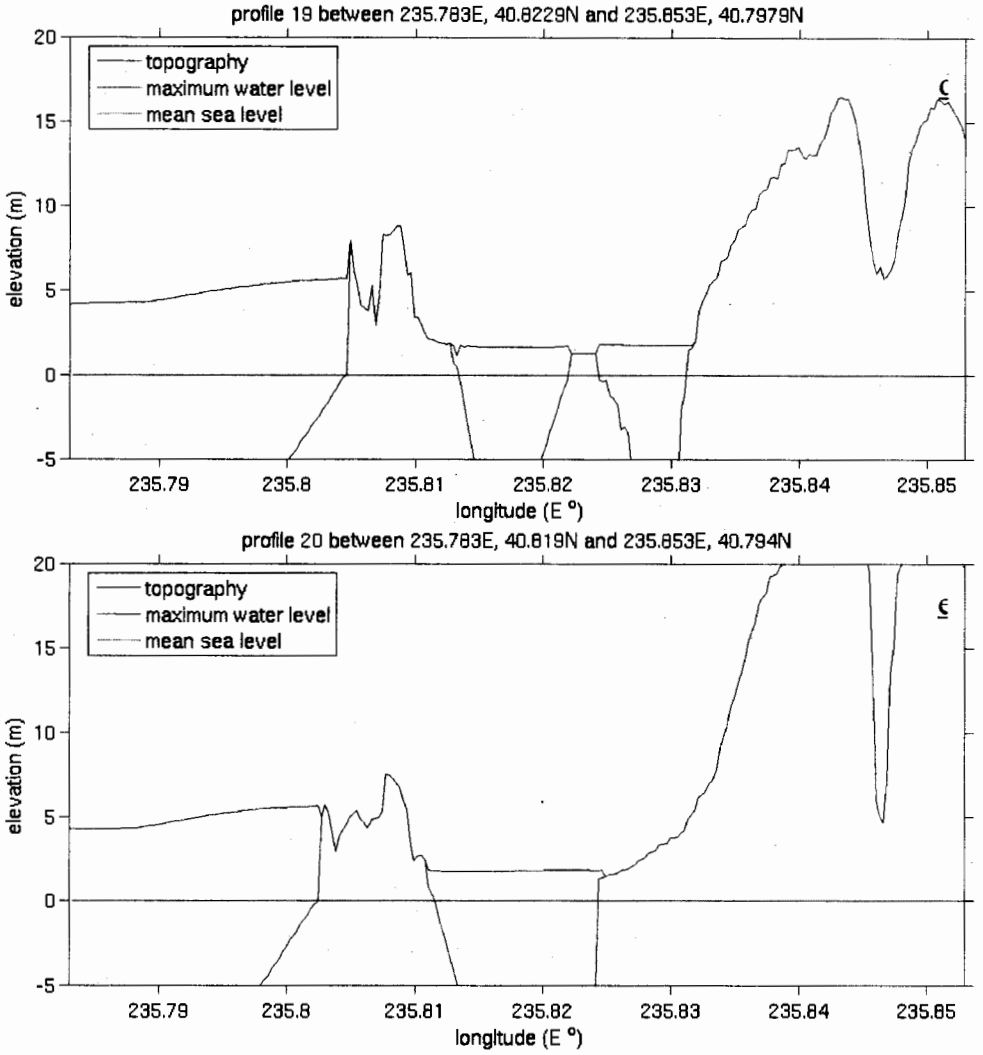


Figure 5 (a-e): Profiles of maximum water levels plotted against mean sea level and local topography for Scenario 1 ($M_W = 8.5$). Note how dune regions are not overtopped by tsunami surges approaching from the seaward side.

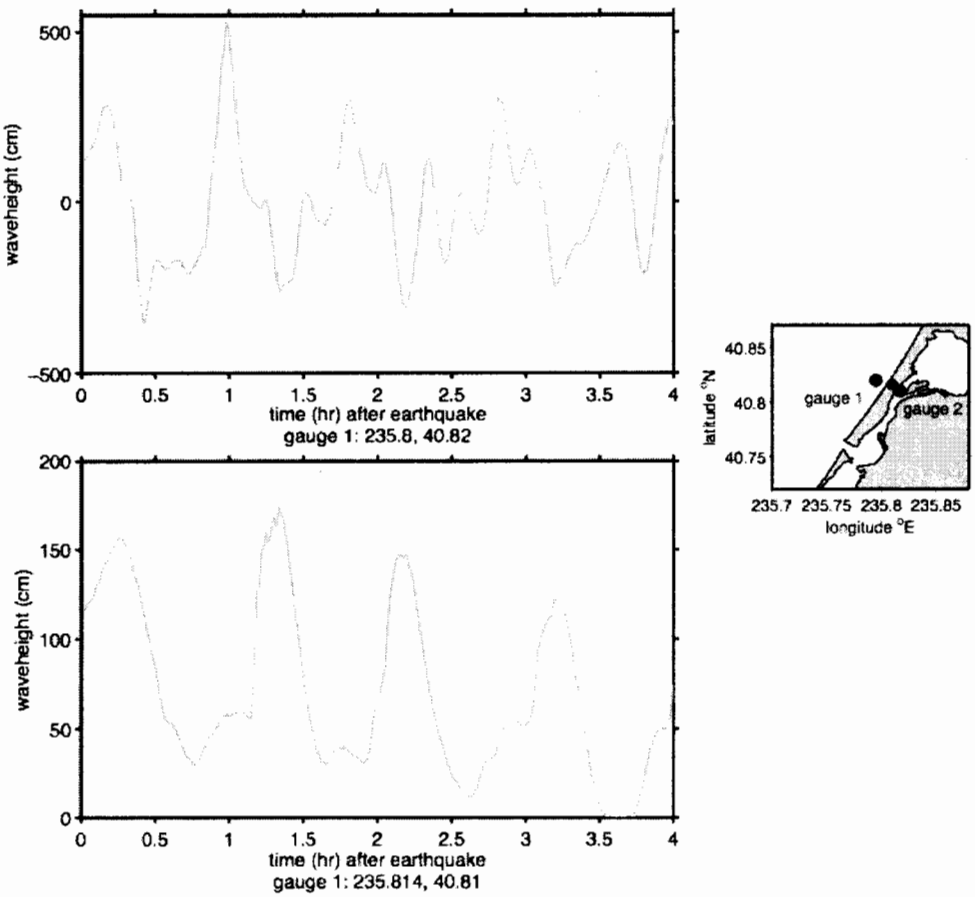


Figure 6: Time histories of water levels on either side of the north spit for the $M_w = 8.5$ event.

$M_W = 9.0$ Scenario

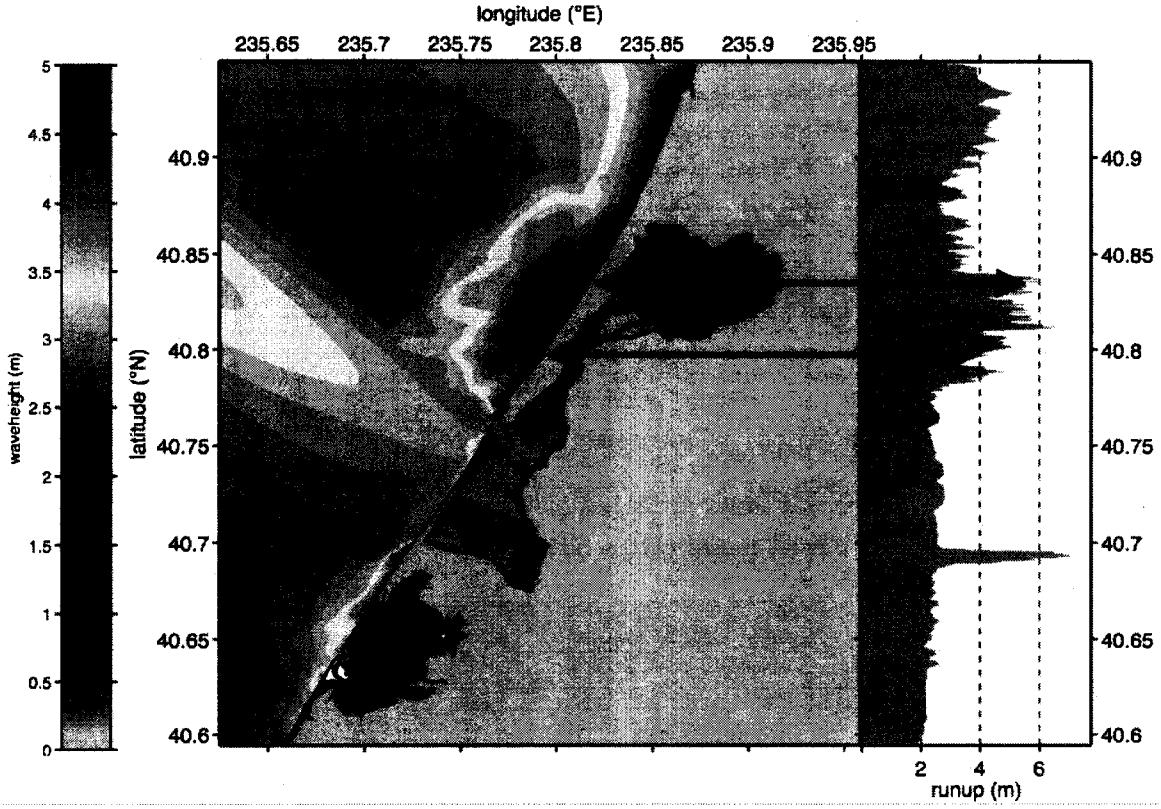


Figure 7: Maximum wave heights offshore, inundated areas and onshore runup for the $M_w = 9.0$ case.

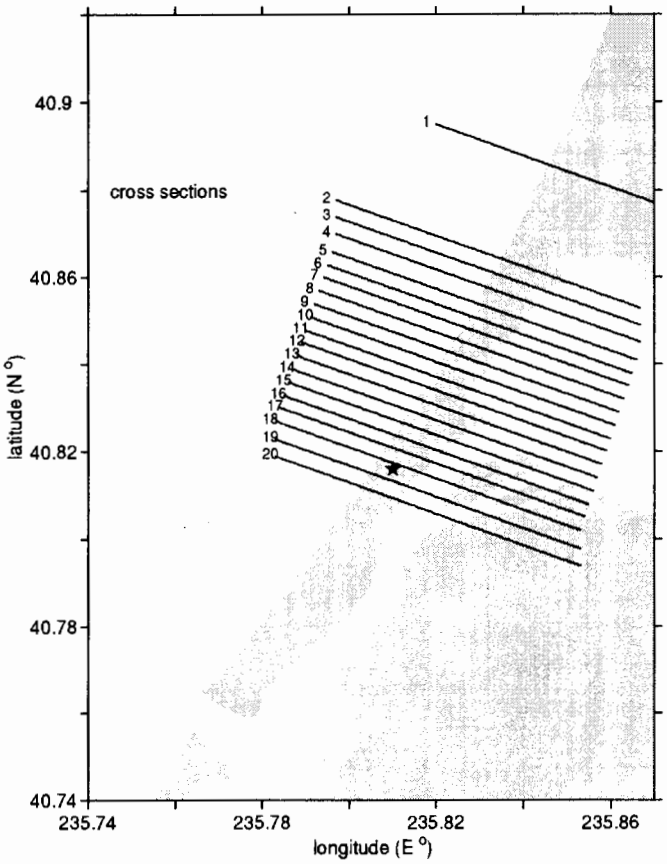
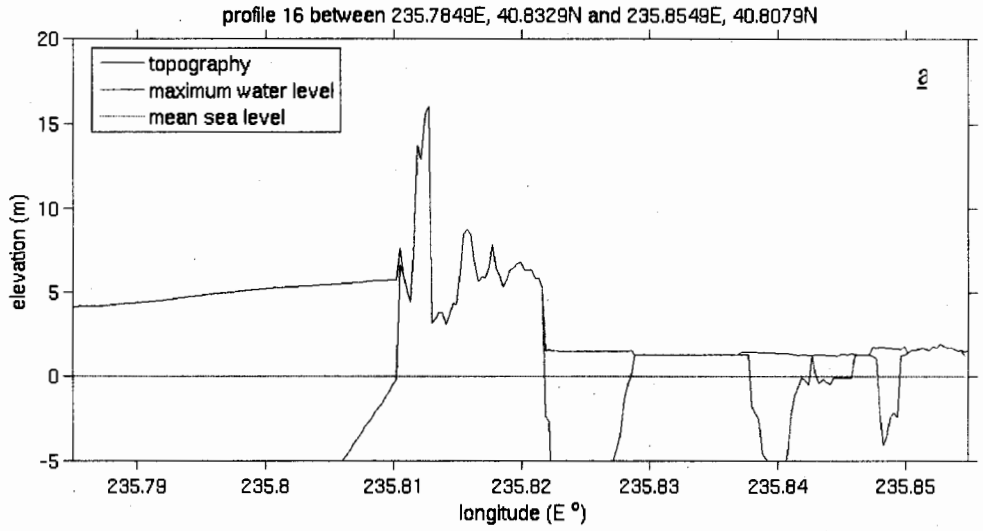
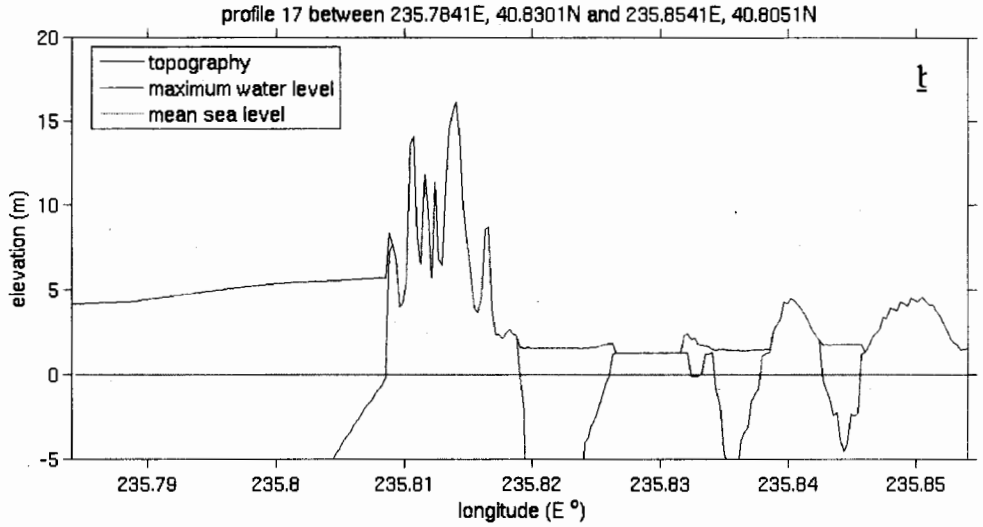


Figure 8: Locations of cross shore profiles. Profiles 16 – 20 cover the study area and are shown below for each case.


profile 16 between 235.7849E, 40.8329N and 235.8549E, 40.8079N
topography
maximum water level
mean sea level
elevation (m)
longitude (E °)
20
15
10
5
0
-5
235.79
235.8
235.81
235.82
235.83
235.84
235.85


profile 17 between 235.7841E, 40.8301N and 235.8541E, 40.8051N
topography
maximum water level
mean sea level
elevation (m)
longitude (E °)
20
15
10
5
0
-5
235.79
235.8
235.81
235.82
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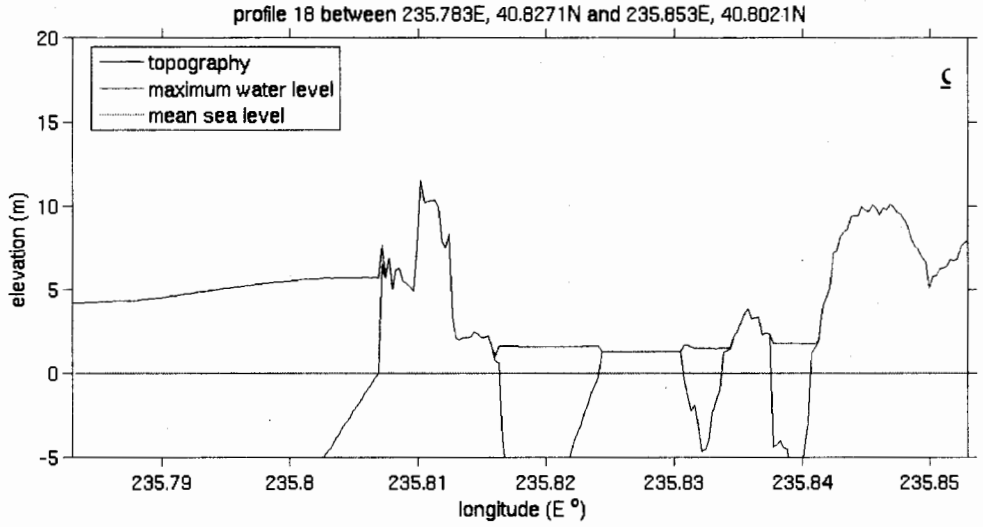
235.84
235.85


profile 18 between 235.783E, 40.8271N and 235.853E, 40.8021N
topography
maximum water level
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235.85

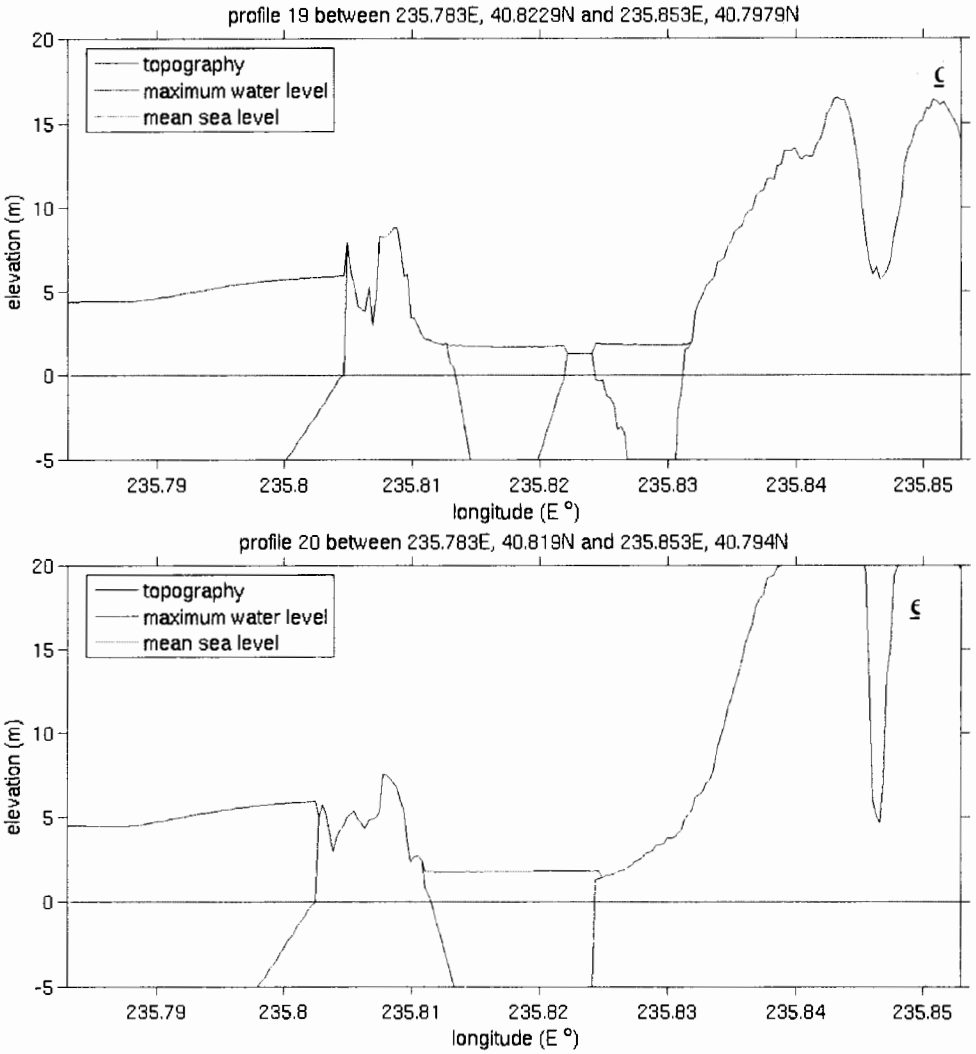

Figure 9 (a-e): Profiles of maximum water levels plotted against mean sea level and local topography for Scenario 2 (M_w = 9.0). Note how dune regions are not overtopped by tsunami surges approaching from the seaward side.

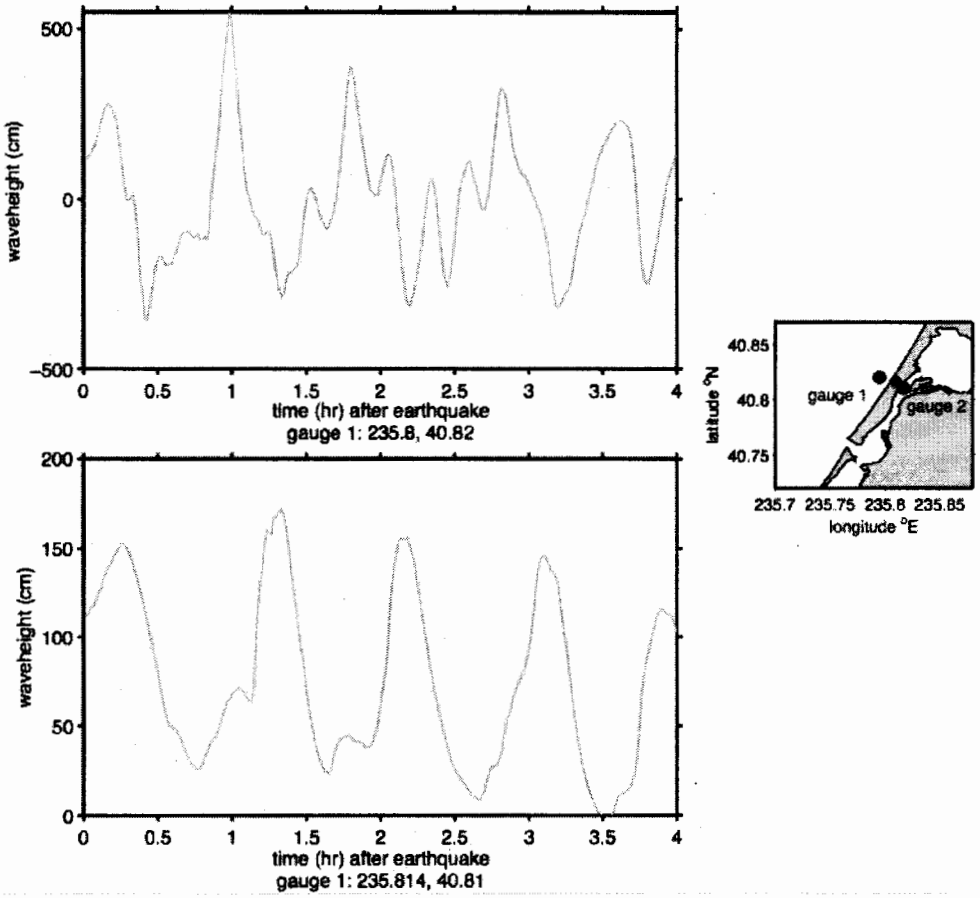

Figure 10: Time histories of water levels on either side of the north spit for the $M_w = 9.0$ event.

III. MITIGATION AND SAFETY

GENERAL

The Samoa Town Master Planning approach presents two types of mitigation strategies: a) measures to minimize damage and b) measures to promote safety.

MITIGATION MEASURES

As discussed by the State of California Seismic Safety Commission (2005), there are no U.S. building codes that provide design guidelines to reduce or prevent damage to structures from tsunami hazards. They contrast differences expressed in FEMA's Coastal Construction Manual (FEMA 55) and the National Tsunami Hazard Mitigation Program "Background Paper #5: Building Design" with respect to the feasibility of designing for tsunami impacts. While the FEMA publication states it is impractical, the National Tsunami Mitigation Program paper suggests that proper design can significantly reduce the impact of a tsunami on buildings. This paper also reports that only the City and County of Honolulu have implemented building requirements for tsunami. In lieu of appropriate building codes for the design of structures, avoidance of the hazard by siting structures above the anticipated runup elevation is suggested.

Although there is no established building code for tsunami mitigation, studies of damage from historic tsunamis indicate that building survivability varies with construction type (Yeh et al., 2005). The data show that wood frame construction experienced considerable damage and was frequently destroyed even when the tsunami inundation was small, even only a few feet deep. On the other hand, well-engineered reinforced concrete structures sustained only minor damage for most cases. Recent data, including those of the 2004 Indian Ocean Tsunami, support this conclusion. (Ref: Yeh, H., Robertson, I., and Preuss, J., 2005, Development of Design Guidelines for Structures that Serve as Tsunami Vertical Evacuation Sites, Open File Report 2005-4, Washington Division of Geology and Earth Resources, State of Washington (contract 52-AB-NR-200051), Olympia, Washington.)

The recommendation of siting all structures above the anticipated inundation elevation does not guarantee the safety of the area. It is because the prediction of inundation cannot be made accurately, as we discussed in Section II. Although the west side of the Samoa Town Master Plan site seems protected by dunes, there are several weak spots with marginal elevations as low as 20 ft (6 m). Once a tsunami penetrates such spots, the breached channels could be widened due to scouring action and the currents may rush into the town with significantly speed. Therefore, the entire area of the Samoa Town Plan must be designated as a tsunami risk

zone.

Critical for the protection of the populous is to provide a sufficient number of strategically located tsunami refuge structures (= assembly sites as described by GeoEngineers). Vertical evacuation to the refuge structures should save lives not only for the residents, but also for beach visitors.

Tsunami refuges can be multi-use or stand-alone structures. For example, the new Emergency Services building (recommended by GeoEngineers), Check-in Registration Building near New Navy Base Road, some of the buildings in Business Park and other public facilities can be considered as the multi-use buildings used for vertical evacuation. An example of the stand-alone structure is shown in Fig. 1. Those buildings must be reinforced concrete or steel frame structures in accordance with the proper seismic code, providing sufficiently high elevation of the refuge floor. Because of the locality, careful consideration must be made for their foundation design to protect against tsunami-induced scour and liquefaction caused by the ground shaking.

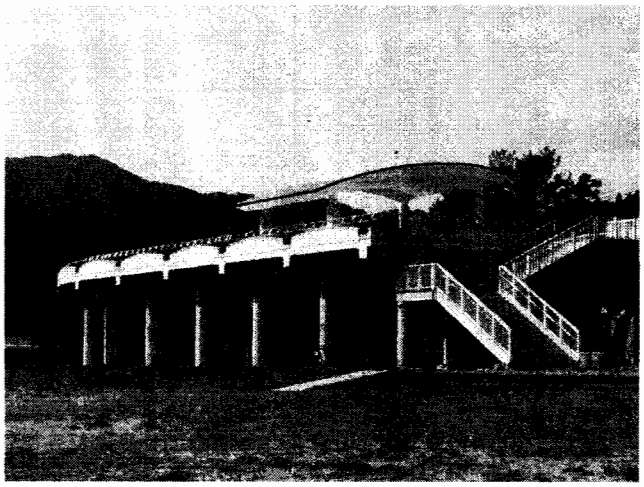

Figure 1 – Tsunami Shelter at Shirahama Beach Resort (Photo by N. Shuto)

Because accurate tsunami behaviors are difficult to predict, tsunami risk areas should be planned so as to provide individuals with every possible opportunity to escape under unexpected circumstance. With such considerations, the reviewers suggest that no fence for the residential houses be allowed in the township (even if allowed, they must be very low picket fences) and the Samoa Town Master Plan area must be graded so that there will be no spot where the grade is steeper than 1V:2H.

Guidelines for Single-family Use

Planning criteria were developed for uses that could prevent potential life loss. Single family occupancy use (lowest habitable floor) will be restricted to above Elevation 30 feet MSL.

Guidelines for Multi-family Use

Habitation uses will be located above Elevation 30 feet msl. In the case of multi-family and resort use buildings the first floor level can be used for non-residential use such as parking. Residential use could occur on the second story.

> **The 30-ft criterion for the maximum tsunami elevation was made by imposing a safety factor of 1.5 to the estimate of the maximum tsunami elevation: the 1.5 safety factor was determined arbitrarily without clear justification.**
>
> **Our numerical simulation for the CSZ events of M_W 8.8 and 9.0 also shows that the maximum tsunami elevation at the ocean-side beach would be approximately 20ft. This agreement with the GeoEngineers' report provides some confidence in their proposed tsunami mitigation elevations.**

Guidelines for Public and Critical Facilities

It is recommended that critical facilities be constructed above Elevation 40 feet because they are centers of population concentrations and/or may be necessary for first response and recovery.

MEASURES TO REDUCE TSUNAMI AMPLITUDE AND VELOCITY

Anecdotal evidence from recent tsunami events including the December 26, 2004 Indian Ocean Tsunami strongly indicates that natural features such as off shore reefs, dunes, dense forested areas and wetlands help to reduce both velocity and inundation. In India, there were reports that dense stands of mangrove forests provided protection and helped to reduce velocity and run up elevations. Conversely, there were numerous reports, such as multiple communities in Sri Lanka, that compared the high damage levels experienced by communities where there had been destruction of dunes and off-shore reefs, with low (or even no) damage levels in communities where such features were present.

> **The above statement is simply a general trend and should not be emphasized. In fact, there are many exceptions found from field observations. Tsunami behaviors are complex and cannot be generalized especially when considering the height of damaging tsunami waves.**

Preservation and/or enhancement of eco-system features by Samoa Town Master Plan to reduce tsunami wave effects include:

- Dune Preservation

  No development is proposed west of New Navy Base Road.

  Designated pathways and trails to Samoa Beach will be constructed in order to avoid creation of non-designated trails. This measure will be stipulated as a condition of subdivision approval.

  Interpretative signage at the parking areas to inform recreation users of

sensitive biological resources in the plan area. This measure will be stipulated as a condition of subdivision approval.

The parking area along Navy Base Road appears a weak spot where tsunamis may penetrate. There are a few more low-elevation spots along the dune (west side of Navy Base Road) because of the existing access trail to the beach. Careful considerations must be taken to design the escape routes for beach goers.

- Vegetation

  Preservation and enhancement of vegetation in dune areas adjacent to New Navy Base Road and elsewhere will strengthen existing dunes and reduce likelihood of degradation. Plantings will both reduce effects of tsunami while contributing to soil stabilization. Details are provided in the EIR.

  For proposed Natural Resource and Public Recreation areas, a vegetation planting plan will be developed to reduce the potential for mobilizing large woody debris that could impact structures below the 26 foot elevation. Planting of deep rooted species such as shore pine and shrubs instead of Eucalyptus trees (which are very brittle) in these areas would reduce potential impacts. Also, some species of Eucalyptus trees are highly flammable. Removal of "danger" species within the plan area is proposed.

The reviewers are puzzled by the criterion of elevation 26 ft that was made for floatable debris. How did the authors determine this elevation?

- Wetlands

  Wetlands create added opportunities for friction as well as for water detention.

  Existing wetlands on the site will be expanded.

  To improve the functional value of the two small wetlands adjacent developed dunes will be restored to native landscapes, fill material will be removed and native vegetations will be panted within the setback area.

SAFETY MEASURES

Because of the concern about the need for public education to promote evacuation and safety planning for a locally generated tsunami from the CSZ, Bernard et al. (1994) completed inundation modeling of a hypothetical wave to evaluate regional impacts to northern California. For Humboldt Bay an offshore wave height of 30 feet (approximately 10 meters) in water 150 feet deep was assumed. The model used a relatively coarse grid with spacing 100 meters and a topographic elevation model that assumed regular/even topography. As such it was unable to take into consideration the effects of dunes and other irregularities characterizing the Samoa Peninsula. The modeling results where used as the basis for a planning scenario of a great CSZ earthquake along the North Coast of California (Toppozada et al., 1995).

More recent safety planning efforts (Lori Dengler and Jay Patton (estimate: 2005) refined the expected tsunami hazard (See Appendix A of this document). This document (like the

previous effort) clearly states that it is to be used only for emergency planning purposes; it is not intended to be used for site design. It is also not clear if the authors adjusted the zonation to reflect mean sea level (msl) versus mean low low water (mllw) used for the studies that their map was based on. Dengler and Patton (2005) report that over 150 paleotsunami sediment core samples have been taken along the margins of the bay and in the Mad River Slough. The only places where identifiable tsunami sands have been found are in the South Bay region immediately adjacent to the spit and in the Hookton Slough area.

Safety aspects of the Samoa Town Master Plan are intended to maximize response effectiveness and evacuation opportunities. Four types of Safety Measures have been proposed:

Central location chosen for the Emergency Services Vehicle Storage Facility

The facility housing the Emergency Services Vehicles is centrally located with respect to harbor facilities and to expected response demands. It should be constructed at or above Elevation 40 feet. In the event of a tsunami the vehicles will be removed from the storage facility to assist with response. The building will then become available for assembly.

Designated Assembly Sites

Assembly sites are safe buildings above the expected tsunami run up elevation where people could take refuge and remain until they are notified that it is safe to leave. Assembly sites should be buildings that have sanitary facilities and be large enough to accommodate refugees for several hours. The assembly sites should be located so that people can travel by foot within approximately 5 to 8 minutes.

> **Locations of the assembly buildings must be determined based on the expected tsunami arrival times. Our preliminary numerical simulation indicates that the first tsunami could arrive within 10 minutes after the CSZ earthquake but the largest would be the subsequent wave that would arrive 1 hour after the quake. Also accessibility for handicapped persons must be considered in the design of assembly buildings.**

Specific sites meeting these criteria should be completed during preparation of the Safety Plan and following completion of the peer review. We understand the peer review may include tsunami inundation modeling which could help refine locations of potential evacuation sites.

At this time, we understand that the new Emergency Services building has been identified as one structure to be used for shelter. Therefore, we recommend that the floor elevation for assembly at the new Emergency Services building be constructed above Elevation 40 feet MSL.

> **It is not clear if the ground elevation of the new Emergency Services building should be above 40 ft MSL, or that of the upper floors that will be**

used for evacuation. It must be emphasized that there must be multiple assembly sites; the Emergency Services building alone is insufficient.

In addition, use of the proposed water tower will be prohibited for vertical evacuation because of its proximity to the commercial gas station and potential for a fire hazard. Signage will be installed.

It appears that the location of the Emergency Services building is currently planned right next to the water tower and the same block as the gas station.

Evacuation Routes

Strong ground motion from the earthquake essentially constitutes the warning from a CSZ earthquake. Based on this assumption the amount of time available for evacuation will be very short. An evacuation route plan will be prepared for the plan area which will include information on tsunami warning devices. The plan will be kept on file at the Samoa Peninsula Fire department (SPFD) in the Samoa Block Building. Key SPFD emergency services personnel shall be trained in tsunami evacuation procedures. Throughout the plan area, directional signage will be posted on designated paths that show non-vehicular evacuation routes to designated assembly sites.

Both the residents and visitors must be considered for evacuation planning. This means that the Samoa Town Master Plan should include the evacuation routes from the beach area.

Safety Plan

A Tsunami Safety Plan will be submitted the County as a condition of subdivision approval.

- The tsunami evacuation plan, including designated routes will also include information on tsunami warning devices and techniques and a public information and education program targeted at Samoa residents and visitors.

- The applicant will submit a proportional share of the fee towards a fund for the installation and maintenance of a warning siren in the town of Samoa. (If funding for a warning siren becomes available prior to the collection of sufficient funds from each newly proposed residence, the fund can be used for tsunami education, identification of evacuation routes, signage and subsidized weather radios to residents of Samoa.)

The Safety Plan should include annual evacuation drill and the Plan should be reviewed and updated annually.

EXHIBIT NO. 18

APPLICATION NO. HUM-MAJ-1-08

HUMBOLDT COUNTY LCP AMENDMENT (SAMOA TOWN PLAN)

"REVISED TSUNAMI VULNERABILITY EVALUATION, SAMOA TOWN MASTER PLAN, HUMBOLDT COUNTY, CALIFORNIA" PREPARED BY GEOENGINEERS FOR SAMOA-PACIFIC PARTNERSHIP, LLC., DATED 10/17/06 (1 of 24)

REVISED TSUNAMI VULNERABILITY EVALUATION
SAMOA TOWN MASTER PLAN
HUMBOLDT COUNTY, CALIFORNIA

OCTOBER 17, 2006

FOR
SAMOA-PACIFIC PARTNERSHIP, LLC

GeoEngineers

File No. 10586-001-00

Revised Tsunami Vulnerability Evaluation
Samoa Town Master Plan
Humboldt County, California
File No. 10586-001-00

October 17, 2006

Prepared for:

Samoa Pacific Partnership, LLC
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Galan W. McInelly

Galan W. McInelly, Principal

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REVISED TSUNAMI VULNERABILITY EVALUATION
SAMOA TOWN MASTER PLAN
HUMBOLDT COUNTY, CALIFORNIA
FOR
SAMOA PACIFIC PARTNERSHIP

INTRODUCTION

At the request of the Samoa Pacific Partnership, we have completed a two phase analysis to reduce damage and increase safety against tsunami for residents, business, and visitors to the Samoa Town. For Phase I of the evaluation, GeoEngineers Inc. summarized issues pertaining to the tsunami hazard for Planwest Partners as part of the Environmental Impact Report [EIR] ("Samoa Town Master Plan Final Master Environmental Impact Report" dated April 14, 2006 and the "Samoa Town Master Plan Recirculation Environmental Impact Report" dated May 12, 2006). We included in our evaluation a description of earthquake sources likely to generate a tsunami[1]. This report was revised to clarify that Peninsula School is an existing structure and not part of the present Samoa Town Master Plan project, to clarify the recommended other elevation, for occupied areas of residential structures and to clarify the recommended elevation of the emergency services facilities and designated assembly areas.

The current (Phase II) effort prepared by GeoEngineers Inc. with Planwest Partners presents the geological data and rationale used to establish criteria for the project with respect to "worst case" tsunami run-up elevations.[2] It also describes mitigation and safety measures applied to the Samoa Town Master Plan based on the site plan and mitigation strategies documented in the 2006 EIR documents.

This document is divided into two parts to evaluate the tsunami vulnerability. In Part I of this evaluation, we present data that we used to establish the design event. During preparation of this report, we were provided a copy of Pacific Gas & Electric Company report in support of a proposed facility in Humboldt Bay. We present the basis for the criteria in the EIR In Part II, we discuss the mitigation elements for the Site Plan and the discuss safety and evacuation. Our evaluation is based on a review of available literature, plans provided to us by the project proponent, our knowledge of the area, and professional experience.

PART I: DEFINE EXPOSURE

SEISMIC SETTING: THE DESIGN EVENT

The seismic setting of the Samoa Town Master Plan area is described in Chapter 2.07 of the "Samoa Town Master Plan Final Master Environmental Impact Report" dated April 14, 2006 and the "Samoa Town Master Plan Recirculation Environmental Impact Report" dated May 12 2006. The following is a summary of the seismic setting extracted from that chapter for those unfamiliar with the project or area.

The north coast of California is an area of high seismic activity with at least five distinct sources of earthquakes. Earthquakes capable of causing slight to moderate damage originating within the Gorda Plate and along the Mendocino Fault have a combined recurrence interval of approximately 5.5 years, based on historical records (Dengler, et al., 1992). Earthquake sources that could affect the plan area are:

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[1] Prepared by GeoEngineers Inc. (team consisted of Jane Preuss AICP, with Craig Erdman, PG, CEG, a Professional Geologist and Certified Engineering Geologist and Elson "Chip" T. Barnett PG, a Professional Geologist.

[2] GeoEngineers with Planwest Partners [same team--Jane Preuss joined Planwest Partners in 2005])

1. Faults within the Gorda Plate
    - The stresses produced by the differential motions of the plates causes internal deformation in the Gorda Plate that has resulted in the majority of damaging earthquakes in the Humboldt Bay region (Dengler et al., 1992).
2. The Mendocino Transform Fault Zone
    - The Mendocino Fault Zone extends west from near Cape Mendocino. At its closest point it is located approximately 39 miles southwest of the plan area. It is the second most frequent source of damaging earthquakes in the region.
3. The San Andreas Transform Fault Zone
    - The northern end of the San Andreas Fault Zone is located approximately 43 miles south of the plan area. The San Andreas Fault Zone is capable of producing large earthquakes similar to the 1906 San Francisco Earthquake, which caused significant damage in the Humboldt Bay region.
4. Faults within the North American Plate
    - Fault activity investigations of these indicate that several episodes of movement have occurred within the last 2,000 years; however, there is no historic record (i.e. the last 200 years) of activity on these faults.
5. The Cascadia Subduction Zone (CSZ) where the Gorda and Juan de Fuca Plates are subducted beneath the North American Plate
    - The CSZ is the potential source of the largest magnitude earthquakes in the Humboldt Bay region. It extends from Cape Mendocino northward to Vancouver Island and from approximately 32 miles west of the plan area to over 100 miles east of the plan area. It forms the boundary between the North American plate and the oceanic crust formed by the Juan De Fuca and Gorda plates. The North American plate and the oceanic plates are moving towards each other, forming what geologists refer to as a convergent plate margin. The North American plate is moving over oceanic plates, and the oceanic plates are sliding (subducting) underneath the North American plate.

A great earthquake (magnitude 8 to 9) along the CSZ, similar to the events about 1100 and 300 years ago, is selected as the design event capable of producing a tsunami that could affect the plan area. Recurrence intervals (RI) for such a seismic event range from 150 to 540 years (Toppozada et al., 1995; Darienzo and Peterson, 1995; Petersen et al., 1996; Atwater and Hemphill-Haley, 1997), which equates to a probability of recurrence of about 0.2 to 0.7 percent annually. In comparison, engineers have typically used peak ground accelerations with a 10 percent probability of exceedence in a 50-year period for developing seismic design criteria for structures. This equates to a seismic event with a recurrence interval of about 1 in 500 years, or about 0.2 percent annually. According to Peterson et al. (1996), a rupture along the entire CSZ is expected to have a Magnitude 8.8 (expected to recur every 500 years), while a rupture of only the southern segment would have a magnitude of 8.3 (expected to recur every 150 years).

GEOLOGIC INDICATIONS OF TSUNAMI

Earthquakes along subduction zones at convergent plate margins are capable of generating significant and destructive tsunami. Geologic strata can help scientists identify events that occurred prior to written records, such as past earthquakes (paleoseismic events) and past tsunami (paleotsunami). Extensive studies have occurred along the Pacific Northwest coast to identify potential indications of past earthquakes and tsunami. Based on these studies, buried wetland deposits (peat and tidal marsh deposits)

and drowned forests have been identified at numerous sites along the CSZ in Vancouver (Canada), Washington, Oregon and northernmost California (USA) including the vicinity of the plan area (Atwater, 1987, Clague and Bobrowsky, 1994a, Peterson and Darienzo, 1990, and Jacoby and others, 1995). The buried forest and wetland deposits along coastal areas are interpreted as evidence of paleoseismic activity (Atwater, 1987, Clague and Bobrowsky, 1994a, Peterson and Darienzo, 1990, and Jacoby and others, 1995). Researchers have also observed a clean sand layer at the base of younger marsh deposits and overlying the buried wetland deposits at many of the sites studied. The buried sand layer is interpreted as an indicator of paleotsunami inundation. The age constraints on the various geomorphic features of the North Spit support a scenario in which regional tectonic cycles have played an integral role in development of the sand dunes on the spits. Dune sequences on the North and South Spits along with dune sequences at Clam Beach could reflect at least two complete seismic cycles of the Cascadia subduction zone in the last 2000 years, with tectonic events occurring around 1100 and 300 year BP (Leroy 1999). The presence of anomalous sand layers in coastal marsh deposits provides indications for large waves inundating the coastal area of northern California during the late Holocene, including events in the 300 and 1,100 yr BP range (Carver et al., 1998).

Local evidence of paleoseismic and paleotsunami activity in the vicinity of the plan area - on the Samoa Peninsula and the surrounding Humboldt Bay area - is reported by Vick (1988), Jacoby et al. (1995), and Leroy (1999). Paleoseismic evidence was observed in the buried wetlands in the area of Mad River Slough (Vick, 1988 and Jacoby et al., 1995). Investigations of buried wetlands in the Mad River Slough area identify zones where local coseismic (accompanying an earthquake) subsidence has occurred. There was no clean sand layer at the base of younger wetland deposits and overlying older, buried wetland deposits adjacent to forested dunes in the northern portion of the plan area. It is interpreted that the Samoa Peninsula in the northern portion of the plan area was not overtopped by the tsunami 300 years ago.

TSUNAMI RUN-UP ELEVATION: DISCUSSION OF DUNE OVERTOPPING

The North and South Spits of Humboldt Bay are primarily composed of sand dunes. On the North Spit there are three identifiable phases of dune aggregation represented by four main dune sequences. Leroy (1999) reports paleotsunami evidence in the dune complex of the Samoa Peninsula, including the plan area. He also indicates that localized areas of the Samoa Peninsula were not overtopped by the tsunami that occurred about 300 years ago. Leroy (1999) interprets that the older dune sequences were of sufficient elevation to have prevented overtopping by that tsunami. The older dune sequences are located in the northern and central portion of the Samoa Peninsula and include the northern portion (approximately two-thirds) of the plan area. The older dunes are typically forested, with maximum elevations of about 70 feet (21 m) above sea level (asl). By contrast, Leroy (1999) interprets that low-lying areas in the Humboldt Bay area adjacent to the South Spit and outside the plan area but within the vicinity were overtopped by the tsunami generated about 300 years ago.

According to data and interpretations summarized by Leroy (1999), the Samoa peninsula area experiences co-seismic uplift across much of the area, with co-seismic subsidence occurring within the Freshwater and South Bay synclines. Leroy interprets the evidence to indicate that a seismic event approximately 1100 years ago preserved the wave-cut escarpment and gravel deposits along the western edge of Dune Sequence D. In other words, this feature represents an older beach that was apparently uplifted during a seismic event about 1100 years ago. Leroy (1999) suggests that uplift at this time may have occurred from Clam Beach (north of the Samoa peninsula) south to Table Bluff (at the south end of the South Spit). Interseismic subsidence is inferred by Leroy (1999) and others to occur across the area (i.e. earth subsidence occurs between seismic events).

Dune development is believed to occur primarily after a seismic event that uplifts the shoreline, causing the shoreline to migrate westward and exposing source material for dunes.

The only known area where potential tsunami deposits have been observed is on the southeast side of the South Spit. Leroy (1999) does not show the exact location of the potential tsunami deposit consisting of sand, but states that "Although many cores have been taken in Humboldt Bay, the only *likely* tsunami deposits found to date are on the bay margin, against the southeastern portion of the South Spit. {Italics added.}

Based on the presence of these two sand layers within marsh and estuarine deposits in South Bay, it appears possible that the South Spit was overtopped by tsunami circa 1100 year BP and circa 300 years BP. The dunes on the South Spit are at an average Elevation 4 to 4.5 meters (13 to 15 feet); with one area as high as approximate Elevation 7 meters (23 feet). Most of the maximum elevations are around 5 to 6meters with a low of 3.5 meters reported by Leroy.

As mentioned above, no sand deposits were observed in explorations in the Mad River Slough (Vick, 1989; Jacoby et al., 1995), where at least four buried soil horizons are present and where adjacent dunes are at an average Elevation of 15 meters or greater. The buried soil horizons are interpreted to be the result of co-seismic subsidence.

Based on the above evidence pertaining to overtopping plus lack of sand deposits observed in the Mad River Slough, Leroy (1999) constrained the height of a tsunami from about 4.5 meters to less than 15meters (15 to 50 feet) assuming 1) overtopping of the South Spit and 2) that Dune complex D (on the North Spit) formed a barricade to tsunami (no tsunami deposits in the Mad River Slough). Leroy (1999) assessed that dunes from Samoa to the south end of the North Spit could act as a barricade or could be overtopped, depending on wave height and tidal stage. The dunes in the Samoa area have been modified by previous grading activities (GeoEngineers, 2000a).

The unstated assumption for the maximum inundation height is that the tsunami flowed all the way up to but not over the crest of the dunes. This assumption does not seem reasonable to GeoEngineers because 1) no scour/vegetation loss on the west side of Dune Complex D has been reported and 2) no difference has been reported in soil development/soil loss observed in soil pits on the west side of Dune Complex D versus elsewhere in the complex. Therefore, the maximum is, in the opinion of GeoEngineers, likely lower.

The wave-cut escarpment appears (based on elevation points marked on Leroy's maps) to be at approximate Elevation 2 to 7 meters (6.5 to 23 feet). Leroy (1999) observed a tree stump at the outer edge of the wave-cut escarpment and completed age-dating. The tree died off sometime around 300 years BP, apparently from burial by Dune Sequence A. The age of the tree provides a maximum age for Dune Sequence A. Since this feature (and the tree) appears not to have been obliterated at the time of the last interpreted Cascadia event 300 years ago, we interpret the maximum height of the wave-cut terrace to be near the maximum inundation height of the associated tsunami.

Leroy (1999) argues that the South Spit is "at the minimum elevation at which it can remain stable." Assuming the present heights of the Samoa Peninsula (North Spit) and the South Spit are representative of previous stable configurations of the spits, the tsunami is inferred to have overtopped an area with an average elevation of about 15 feet (approximately 4.5 m) and a maximum elevation of about 20 feet (approximately 6 m).

RUN-UP ELEVATION IN THE PLANNING AREA

Based on the paleotsunami evidence of dune overtopping the tsunami run-up elevation of 20 feet was interpreted to be the maximum dune height overtopped by a tsunami about 300 years along the South Spit (Leroy, 1999). There was no evaluation of wave occurrence relative to tidal stage and storm surge available at the time of our initial evaluation. A 10-foot factor of safety was therefore added to the height of the design event (difference between approximate high and low tides), for a total run-up height of 30 feet above mean sea level (msl). The complexity of vertical response to a great CSZ earthquake in the plan area is a function of numerous tectonic components, as previously discussed. Because of the difficulty in predicting local fault response (potential uplift) and a regional elastic response (potential subsidence), no vertical displacement in response to a great CSZ earthquake was assumed. However, there may be some uplift since the plan area is on the upthrown block of the Little Salmon fault.

REVIEW OF PACIFIC GAS & ELECTRIC REPORT

The Pacific Gas & Electric report (2002) provides a comprehensive summary of tsunami events affecting the Pacific Northwest and specific information pertinent to the ISFSI site, and also pertinent to the Samoa Peninsula. We were also able to discuss some of the findings in the report with William Page of Pacific Gas & Electric and with Dr. Gary Carver during separate telephone calls on September 27, 2006. Some of the key information includes:

- The studies completed for the PG&E report (including the thesis prepared by Thomas Leroy in 1999) used Mean Low Low Water (MLLW) as opposed to Mean Seal Level (MSL) used for most U.S. Geological Survey topographic maps and most engineering projects. The Samoa Master Plan uses a vertical datum of Mean Sea Level. MLLW is about 3.7 feet lower than MSL in the project area (PG&E, 2002).
- Dr. Carver (personal communication, 2006) states that he did not re-interpret the escarpment on the outer face of the dunes on the North Spit to be from a tsunami. He still maintains the escarpment notched into the dunes on the North Spit is from normal coastal processes (e.g. storm surges). Instead, he states that his runup elevation is based on a widely distributed layer of pebbles and cobbles found across the west face of the dunes on the North Spit. According to Dr. Carver, one location was surveyed relative to debris deposits (interpreted to be Mean High High Water [MHHW]) that was believed to be the highest elevation. The pebbles and gravel layer is interpreted to be the lag deposit from a tsunami. The surveyed highest extent of the pebble and gravel layer is approximately Elevation 38 feet MHHW, or about Elevation 34 feet MSL. Dr. Carver states that some drift of the material may have occurred over time. There are other uncertainties, such as whether or not the deposit has experienced uplift since the time of its deposition. It is also not certain if the elevation of the lag deposit is constant or varies across the North Spit. The age of the deposit is uncertain, according to our conversation with Dr. Carver, it sounds like the pebble and gravel layer is buried in a soil horizon. Dr. Carver could not remember the radiocarbon date of trees that provide a minimum age. He referred me back to the PG&E report and to Mr. Page to obtain copies of letters Dr. Carver wrote to Mr. Page.
- It is not clear if the North Spit dune complex has experienced net uplift or perhaps differential uplift. It might be possible to evaluate the potential for differential uplift by evaluating the wave-cut escarpment. Dr. Carver states that no one has evaluated the elevation of the wave-cut escarpment, in part because of the long distance involved and the isolated exposure of the inner edge. We concurred that the most feasible way to survey the escarpment elevation, as well as the elevation of the pebble and gravel layer, is by using a survey-grade global positioning system.
- They summarize six tsunami events recorded on the west coast of North America. These events appear to range about 200 to 850 years apart.

- The event about 300 years ago occurred at low tide. The PG& E report, "there is some evidence that significant earthquakes occur at low tide," citing a written communication by George Plafker (2002).
- In the PG&E report, they used a normal tidal range of 6.9 feet for the Humboldt Bay area, versus the maximum difference of about 10 feet we used.
- The authors of the PG&E report present the estimate of open-coast runup height based on six different analyses that are summarized in Table 9-4 of their report. These include information from geologic data from northern California, oral histories, tsunami modeling of the Humboldt Bay area, back-calculated water depths of tsunami at Lagoon Creek, topographic and geologic constraints on the North and South Spit and empirically-derived runup heights from world-wide data. The resulting runup height is approximately 30 to 40 feet MLLW, or about 26 to 36 feet MSL. The authors state that a Cascadia Subduction Zone rupture with Magnitude 8.8 would result in a runup of 31 feet (MSL). Using Figure 9-19 in the PG&E report, we find that a Magnitude 9.0 Cascadia event (the design event with a recurrence interval of approximately 500 years) should have a runup to approximate Elevation 31 feet (MSL). We are not certain of the discrepancy, and why they plot the Cascadia event off of the trend line rather than on it.

Based on the literature review we have completed, it appears that the expected runup for a Magnitude 9 Cascadia event is approximately Elevation 31 feet msl, which is also the mid-range for the range developed by PGE. Some uncertainties exist based on world-wide trends and for local site conditions. Because of the presence of foredunes, some surface roughness creates friction. This friction will reduce turbulence and slow the tsunami surge. Therefore, a small amount of attenuation, on the order of about 0.95 might be expected within the majority of the Samoa Town Master Plan area. By applying an attenuation factor to the anticipated inundation Elevation 31 foot elevation msl, the resulting runup is approximately Elevation 29.5 feet; which we rounded up to Elevation 30 feet msl. Therefore, we recommend that the lowest habitable floor for residential occupancy should be above Elevation 30 feet msl.

Some of these uncertainties could be evaluated by completing field studies to survey the upslope limit of the pebble and gravel deposits described by Dr. Carver (personal communication, 2006) and to further evaluate effects of uplift in the area. Furthermore, it may be possible that runup heights are greater where features block inundation inland (e.g. dunes). Therefore, inundation may be lower in the slightly lower-lying Samoa Master Plan area than to the north where established dunes are present. The trade-off is that the water velocities may be slightly higher in the Plan area. Computer-based modeling of tsunami using the local information to evaluate wave height could also provide a better indication of the inundation height in the vicinity of the Samoa Town Master Plan, but should utilize more accurately surveyed information before it is accomplished.

PART 2: MITIGATION AND SAFETY

GENERAL

The Samoa Town Master Planning approach presents two types of mitigation strategies: a) measures to minimize damage and b) measures to promote safety.

MITIGATION MEASURES

As discussed by the State of California Seismic Safety Commission (2005), there are no U.S. building codes that provide design guidelines to reduce or prevent damage to structures from tsunami hazard. They contrast differences expressed in FEMA's Coastal Construction Manual (FEMA 55) and the National Tsunami Hazard Mitigation Program "Background Paper #5: Building Design" with respect to the feasibility of designing for tsunami impacts. While the FEMA publication states it is impractical, the

National Tsunami Mitigation Program paper suggests that proper design can significantly reduce the impacts of tsunami on buildings. This paper also reports that only the City and County of Honolulu has implemented building requirements for tsunami. In lieu of appropriate building codes for design of structures, avoidance of the hazard by siting structures above the anticipated runup elevation is suggested.

Use Guidelines for Single-family Use

Planning criteria were developed for uses that could result in potential life loss. Single family occupancy use (lowest habitable floor) will be restricted to above Elevation 30 feet msl.

Use Guidelines for Multi-family Use

Habitation uses will be located above Elevation 30 feet msl. In the case of multi-family and resort use buildings the first floor level can be used for non-residential use such as parking. Residential use could occur on the second story.

Use Guidelines for Public and Critical Facilities

It is recommended that critical facilities be constructed above Elevation 40 feet because they are centers of population concentrations and/or may be necessary for first response and recovery.

MEASURES TO REDUCE TSUNAMI AMPLITUDE AND VELOCITY

Anecdotal evidence from recent tsunami events including the December 26, 2004 Indian Ocean Tsunami strongly indicates that natural features such as off shore reefs, dunes, dense forested areas and wetlands help to reduce both velocity and inundation. In India, there were reports that dense stands of mangrove forests provided protection and helped to reduce velocity and run up elevations. Conversely, there were numerous reports, such as multiple communities in Sri Lanka, that compared the high damage levels experienced by communities where there had been destruction of dunes and off-shore reefs, with low (or even no) damage levels in communities where such features were present.

Preservation and/or enhancement of eco-system features by Samoa Town Master Plan to reduce tsunami wave effects include:

- Dune Preservation
  - No development is proposed west of New Navy Base Road.
  - Designated pathways and trails to Samoa Beach will be constructed in order to avoid creation of non-designated trails. This measure will be stipulated as a condition of subdivision approval.
  - Interpretative signage at the parking areas to inform recreation users of sensitive biological resources in the plan area. This measure will be stipulated as a condition of subdivision approval.
- Vegetation
  - Preservation and enhancement of vegetation in dune areas adjacent to New Navy Base Road and elsewhere will strengthen existing dunes and reduce likelihood of degradation. Plantings will both reduce effects of tsunami while contributing to soil stabilization. Details are provided in the EIR.
  - For proposed Natural Resource and Public Recreation areas, a vegetation planting plan will be developed to reduce the potential for mobilizing large woody debris that could impact structures below the 26 foot elevation. Planting of deep rooted species such as shore pine and shrubs instead of Eucalyptus trees (which are very brittle) in these areas would reduce

potential impacts. Also, some species of Eucalyptus trees are highly flammable. Removal of "danger" species within the plan area is proposed.

- Wetlands
  - Wetlands create added opportunities for friction as well as for water detention.
  - Existing wetlands on the site will be expanded.
  - To improve the functional value of the two small wetlands adjacent developed dunes will be restored to native landscapes, fill material will be removed and native vegetations will be panted within the setback area.

SAFETY MEASURES

Because of the concern about the need for public education to promote evacuation and safety planning for a locally generated tsunami from the CSZ, Bernard et al. (1994) completed inundation modeling of a hypothetical wave to evaluate regional impacts to northern California. For Humboldt Bay an offshore wave height of 30 feet (approximately 10 meters) in water 150 feet deep was assumed. The model used a relatively coarse grid with spacing 100 meters and a topographic elevation model that assumed regular/even topography. As such it was unable to take into consideration the effects of dunes and other irregularities characterizing the Samoa Peninsula. The modeling results where used as the basis for a planning scenario of a great CSZ earthquake along the North Coast of California (Toppozada et al., 1995).

More recent safety planning efforts (Lori Dengler and Jay Patton (estimate: 2005) refined the expected tsunami hazard (See Appendix A of this document). This document (like the previous effort) clearly states that it is to be used only for emergency planning purposes; it is not intended to be used for site design. It is also not clear if the authors adjusted the zonation to reflect mean sea level (msl) versus mean low low water (mllw) used for the studies that their map was based on. Dengler and Patton (2005) report that over 150 paleotsunami sediment core samples have been taken along the margins of the bay and in the Mad River Slough. The only places where identifiable tsunami sands have been found are in the South Bay region immediately adjacent to the spit and in the Hookton Slough area.

Safety aspects of the Samoa Town Master Plan are intended to maximize response effectiveness and evacuation opportunities. Four types of Safety Measures have been proposed:

Central location chosen for the Emergency Services Vehicle Storage Facility

The facility housing the Emergency Services Vehicles is centrally located with respect to harbor facilities and to expected response demands. It should be constructed at or above Elevation 40 feet. In the event of a tsunami the vehicles will be removed from the storage facility to assist with response. The building will then become available for assembly.

Designated Assembly Sites

Assembly sites are safe buildings above the expected tsunami run up elevation where people could take refuge and remain until they are notified that it is safe to leave. Assembly site sites should be buildings that have sanitary facilities and be large enough to accommodate refugees for several hours. The assembly sites should be located so that people can travel by foot within approximately 5 to 8 minutes.

Specific sites meeting these criteria should be completed during preparation of the Safety Plan and following completion of the peer review. We understand the peer review may include tsunami inundation modeling which could help refine locations of potential evacuation sites.

At this time, we understand that the new Emergency Services building has been identified as one structure to be used for shelter. Therefore, we recommend that the floor elevation for assembly at the new Emergency Services building be constructed above Elevation 40 feet msl.

In addition, use of the proposed water tower will be prohibited for vertical evacuation because of its proximity to the commercial gas station and potential for a fire hazard. Signage will be installed.

Evacuation Routes

Strong ground motion from the earthquake essentially constitutes the warning from a CSZ earthquake. Based on this assumption the amount of time available for evacuation will be very short. An evacuation route plan will be prepared for the plan area which will include information on tsunami warning devices. The plan will be kept on file at the Samoa Peninsula Fire department (SPFD) in the Samoa Block Building. Key SPFD emergency services personnel shall be trained in tsunami evacuation procedures. Throughout the plan area, directional signage will be posted on designated paths that show non-vehicular evacuation routes to designated assembly sites.

Safety Plan

A Tsunami Safety Plan will be submitted to the County as a condition of subdivision approval.

- The tsunami evacuation plan, including designated routes will also include information on tsunami warning devices and techniques and a public information and education program targeted at Samoa residents and visitors.
- The applicant will submit a proportional share of the fee towards a fund for the installation and maintenance of a warning siren in the town of Samoa. (If funding for a warning siren becomes available prior to the collection of sufficient funds from each newly proposed residence, the fund can be used for tsunami education, identification of evacuation routes, signage and subsidized weather radios to residents of Samoa).

LIMITATIONS

This report has been prepared for use by Samoa Pacific Partnership, LLC for evaluation of tsunami hazards and mitigation relative to the Samoa Town Master Plan, in Humboldt County, California. This report is not intended for use by others, and the information contained herein is not applicable to other sites. Please refer to Appendix B titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to the appendix titled Report Limitations and Guidelines for Use for additional information pertaining to use of this report.

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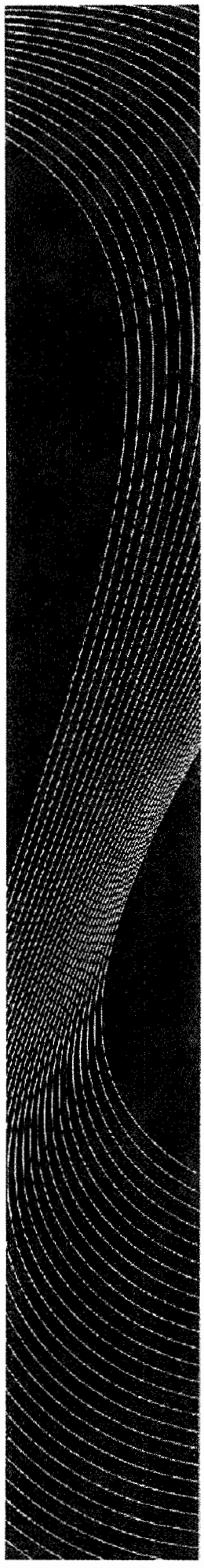

APPENDIX A
BACKGROUND ON EMERGENCY PREPAREDNESS

APPENDIX A
BACKGROUND ON EMERGENCY PREPAREDNESS

MAPPING HUMBOLDT COUNTY'S TSUNAMI HAZARD

Lori Dengler and Jay Patton, Geology Department, Humboldt State University

WHY IS IT IMPORTANT TO MAP TSUNAMI HAZARD?

Twenty-one tsunamis have been observed or recorded on California's North Coast since 1855. All but four were teletsunamis originating from sources elsewhere in the Pacific. Crescent City in Del Norte County has suffered more tsunami damage in the past 150 years than any other area of the US West coast outside of Alaska. Prior to 1992 only distant source tsunamis were considered by the local emergency planning community a significant risk. The 1992 Cape Mendocino earthquake (Mw 7.1) changed this perception. The earthquake, located on or near the Cascadia subduction zone megathrust fault system, produced a modest local tsunami that was recorded at the tide gauges on the North Spit and at Crescent City and observed by eyewitnesses. Although the tsunami was not damaging, it did raise the concern of scientists and emergency planners about the impact of a larger earthquake/tsunami from the Cascadia subduction zone. The National Oceanographic and Atmospheric Administration (NOAA) conducted numerical modeling of the Humboldt Bay and Crescent City areas (Bernard and others, 1994) to estimate the likely extent of inundation as part of a CDMG (now California Geological Survey) earthquake planning scenario for a magnitude 8.4 earthquake on the Cascadia subduction zone and numerous paleoseismic investigations have looked for evidence of prehistoric earthquakes and tsunamis in the region.

With increased awareness of the tsunami hazard, there has been confusion about areas at risk and areas of safety. Some areas of high hazard have no evacuation planning or tsunami education efforts. Several local schools have developed tsunami evacuation plans even though the location of the school poses no risk. Unnecessary evacuation increases exposure to other earthquake hazards. The hazard maps produced by this project are intended for educational purposes, to improve awareness of tsunami hazards and to encourage responsible emergency planning efforts by illustrating the range of possible tsunami events based on the best currently available information.

ABOUT THE MAPS

The Humboldt County Tsunami Hazard Maps combine the results of past studies to depict the relative tsunami hazard of coastal Humboldt County in Northern California. Unlike inundation maps with a single line to show the inland extent of flooding, these maps use a four-color scheme to represent relative risk.

- Highest hazard areas (red) have experienced tsunami or storm wave inundation in historic times and include beaches and low coastal bluffs on the open coast and low areas adjacent to Humboldt Bay and major river deltas. The high hazard zones are also mapped as zone A (100 year flooding) on FEMA Flood Insurance Rate Maps.
- Moderate hazard areas (orange) are areas likely to be flooded by a major tsunami generated by the Cascadia subduction zone based on published paleotsunami studies, numerical modeling (Bernard and others, 1994) and observations of recent tsunamis elsewhere. Current estimates of major Cascadia earthquake recurrence averages about 500 years and range from 200 to 800 years. The most recent great Cascadia earthquake is believed to have occurred in 1700.

- Low hazard areas (yellow) show no evidence of flooding in the paleotsunami record and are likely to provide refuge in all but the most extreme event.
- No hazard areas (grey) are too high in elevation and/or too far inland to be at risk.

A continuous gradational color scale with blurred boundaries help to convey the continuum of possible events and the uncertainty in delineating distinct inundation lines. We emphasize numerous sources of uncertainty in hazard delineation. The ambient tide condition will raise or lower the background sea level by 8 or more feet and will be further affected by El Niño conditions and large storm events and swells. The size and character of faulting in a specific event may also amplify or reduce the size of the resulting tsunami. Only recently has the impact of landsliding been recognize in contributing to tsunami hazards. As large Cascadia event is likely to generate local slumping. The size and location of such slumps can greatly increase tsunami amplitude locally.

The maps are GIS based to facilitate ready adaptation by planners and emergency managers. The maps are intended for educational purposes, to improve awareness of tsunami hazards and to encourage emergency planning efforts of local and regional organizations by illustrating the range of possible tsunami events.

DEFINING HAZARD AREA BOUNDARIES:

This project recognizes the complexity of tsunami hazards. Not only can tsunamis hit the coast at high velocity, the fluctuating surges of water can cause infilling and draw downs of bays and send surges of water miles inland along large coastal rivers. The nature of the hazard and the likely elevations impact will differ in these various areas.

We define four different zones and develop criteria to delineate the hazard area boundaries:

Open Coast Zone: The open coastline directly exposed to the ocean. Includes all areas within 2 km of the coast. This area is vulnerable to inundation and high velocity tsunami waves.

Bay Zone: The margins of Humboldt Bay and lagoons more than 2 km from the coast. This area is vulnerable to rapid changes in water level, fluctuating currents and flooding.

Special Study Zone: Pacific Gas and Electric Company Power Plant and King Salmon opposite the mouth of Humboldt Bay. This area is vulnerable to both Open Coast and Bay effects. Studies of the tsunami hazard have been conducted by PG&E.

Coastal Estuary Zone: Coastal flood plain areas from the end of the Open Coast Zone to elevations inland of 35m. This area is vulnerable to tsunami river bores. Flooding potential strongly dependent on ambient tide and water levels.

Upland Zone: All areas more than 2km inland from the coast not included in the Bay or Coastal Estuary Zones. This zone is not vulnerable to tsunami hazards but will be affected by other earthquake effects if a large Cascadia earthquake occurs.

1. Hazard area boundaries are initially defined for each zone above based on elevation:

Zone	Description	High	Moderate	Low	None
Open Coast	Everywhere within 2km of coast			10 - 35 m elev	above 35 m elev
Coastal Estuary	Low lying flat topography of river valleys and bottomlands			6 - 15 m elev	above 15 m elev
	Low lying flat Bay topography adjacent to Humboldt Bay			3 - 5 m elev	above 5 m elev
Special Study Zone	Area studied by PG&E			7.5 - 20 m elev	above 20 m elev
Uplands	All other areas inland of Open Coast zone				all elevations

2. Hazard boundaries are adjusted using the following:

FEMA Q3 flood maps.

All high hazard zones should also be defined as Zone A (100 year flooding) in the Q3 maps.

NOAA Tsunami Inundation modeling

In 1994, NOAA conducted numerical modeling of the tsunami hazard in the Humboldt Bay region as part of the California division of Mines and Geology Earthquake Planning Scenario for an earthquake on the Cascadia subduction zone. We adjusted the moderate hazard area in some areas to agree with the 1994 study. However, we do not consider the inundation mapping accurate in the Samoa Peninsula region as it used topographic data from USGS 7 1/2 minute quadrangles that do not accurately delineate the dune topography.

Paleotsunami studies

A number of paleoseismic and paleotsunami investigations have been conducted in the Humboldt Bay region since 1980. Many of the studies were supported by Pacific Gas & Electric Company as part of their Humboldt Bay Power Plant hazard assessment. Over 150 paleotsunami sediment core samples have been taken along the margins of the bay and in the Mad River Slough. The only places where identifiable tsunami sands have been found are in the South Bay region immediately adjacent to the spit and in the Hookton Slough area. In addition, a Masters thesis (Leroy, 1999) examined the relative ages of soil and dune deposits on both spits. The paleoseismic studies show no evidence for significant overtopping of the Samoa Peninsula from the town of Samoa north.

See map areas as defined above for the Northern Samoa Peninsula.

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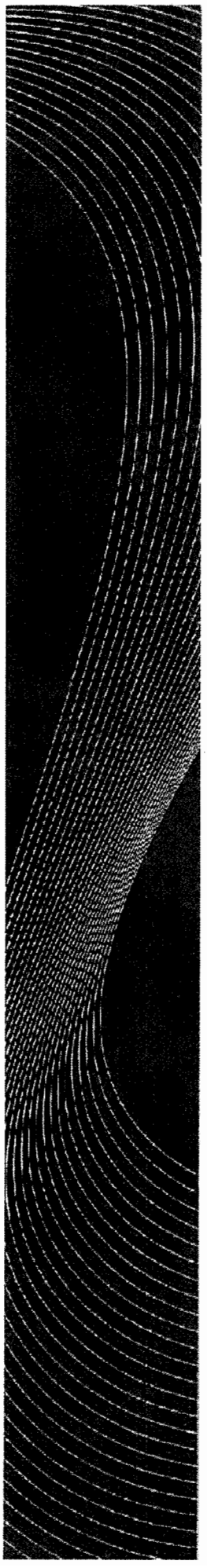
APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE



APPENDIX B

REPORT LIMITATIONS AND GUIDELINES FOR USE[3]

This appendix provides information to help you manage your risks with respect to the use of this report.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for the exclusive use of Samoa Town Partnership and their authorized agents. This report may be made available to contractors and regulatory agencies for review. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report has been prepared for the proposed Samoa Town Master Plan. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

[3] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

SUBSURFACE CONDITIONS CAN CHANGE

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

MOST GEOTECHNICAL AND GEOLOGIC FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

GEOTECHNICAL ENGINEERING REPORT RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT COULD BE SUBJECT TO MISINTERPRETATION

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

DO NOT REDRAW THE EXPLORATION LOGS

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

CONTRACTORS ARE RESPONSIBLE FOR SITE SAFETY ON THEIR OWN CONSTRUCTION PROJECTS

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

READ THESE PROVISIONS CLOSELY

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

GEOTECHNICAL, GEOLOGIC AND ENVIRONMENTAL REPORTS SHOULD NOT BE INTERCHANGED

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perf orm a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

BIOLOGICAL POLLUTANTS

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

Town of Samoa, California

Draft
Tsunami Safety Plan

Lead Agency:

Humboldt County
Community Development Services Department

September 2007

Draft Samoa Tsunami Safety Plan

Lead Agency:
Humboldt County
Community Development Services

Contact:
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TOWN OF SAMOA
Draft TSUNAMI SAFETY PLAN
(September, 2007)

INTRODUCTION

The town of Samoa is located in Humboldt County in Northern California. The town site is on Samoa Peninsula which is the narrow (approximately 1 mile wide) sand spit north of the Humboldt Bay entrance between the Pacific Ocean and Humboldt Bay. Due to the low elevations and isolated location of the town there has been a Tsunami Vulnerability Report conducted on the area. The Vulnerability Report has helped identify the Tsunami Hazard Zone and the potentially safer elevations in the event of a large local earthquake and tsunami event.

The Samoa Town Master Plan is proposing a mixed use development for the town site including additional residential and light industrial uses. With the proposed increase in people residing, working are recreating in the Samoa Town area the need for a Tsunami Safety Plan becomes increasingly important for the safety of the existing residents and visitors as well as the future residents, visitors and businesses.

This Tsunami Safety Plan includes:

- Basic information about and potential generation of tsunamis affecting the Samoa Peninsula.
- Preparation measures for your family and business in the event of a tsunami.
- The community education involved in tsunami preparedness.
- Specific evacuation procedures, routes and maps for during and after a tsunami.
- Publicity and outreach and specific material available.
- Contact information for further information for all agencies involved in the event of a tsunami in the Humboldt Bay Region.

ABOUT TSUNAMIS

What is a tsunami and what causes tsunamis

A tsunami is a series of waves most commonly caused by an earthquake beneath the sea floor. They can be generated by earthquakes that occur locally or far away. If a large earthquake displaces the sea floor near the California north coast the first waves may reach the shore minutes after the ground stops shaking. *There would be no time for authorities to issue a warning.* Such large earthquakes can be generated by the Cascadia Subduction Zone (CSZ). A distantly generated earthquake may take hours for the tsunami waves to reach Humboldt County. In 1964 a magnitude 9.2 earthquake in Alaska generated a tsunami. As a result, a series of four waves took approximately 4 hours to reach Crescent City where 11 people were killed.

How do we know tsunamis have impacted the Samoa Peninsula

Geologic traces can help scientists identify past earthquakes (paleoseismic events) and past tsunamis (paleotsunami) that occurred prior to written records. Over 150 paleotsunami sediment core samples have been taken along the margins of Humboldt Bay and in the Mad River Slough. These samples indicate that earthquakes with tsunami have inundated the coastal area of Northern California, including the two CSZ events: one that occurred 300 years ago and one that occurred 1,100 years ago. More recently, on April 25, 1992, a magnitude 7.1 earthquake which generated a small tsunami occurred near Cape Mendocino near the town of Petrolia. Although not damaging, this earthquake confirmed the CSZ's capability to produce earthquakes that generate local tsunamis.

FAMILY AND BUSINESS PREPARATION

Assemble emergency kits

In the event of a distant tsunami when there is sufficient time to evacuate by vehicle take your emergency kit with you. Otherwise your Disaster Supplies Kit stays at your residence. ***Do not take your Disaster Supplies Kit when evacuating on foot in the case of a CSZ near tsunami event.***

(For Emergency Kit assembly, see Appendix A: American Red Cross Emergency Preparedness Checklist)

Help with tsunami awareness in your community

- Start a tsunami buddy system
- Make and distribute emergency packs
- Initiate or participate in a local preparedness program

COMMUNITY EDUCATION

Education and Curriculum

Education efforts by local authorities for the local residents and visitors are integral in minimizing tsunami damage and deaths. The Samoa Peninsula Volunteer Fire Department (SPVFD) will be responsible for maintaining basic emergency preparedness and tsunami awareness for town residence. The SPVFD will be involved with coordinating and conducting the twice yearly town evacuation drills to the Samoa assembly area.

A curriculum specific to the Humboldt County North Spit should be developed for the local Peninsula School. It is very important that this North Spit specific curriculum is provided in the school and throughout the community. Awareness is crucial in the effort to keep the local residents prepared for a tsunami event.

For tsunami education to be effective it must be implemented town wide and must be consistent throughout the year. Efforts with tsunami education should specifically be targeted at the younger generation. School age children will assimilate the information and are likely to retain it and pass it on to future generations.

Local educators will be developing a school curriculum, oriented to fourth and fifth grades, which will include:

- Printed materials for students
- Instructional materials for teachers
- Display materials for classrooms (thematic posters)

These curriculum materials will be distributed broadly in hazard areas.

For Samoa Peninsula Elementary, more specific North Spit materials/ training will include:

- Samoa Tsunami Ready Brochure
- Instructional materials for teachers
- Display materials for classrooms (thematic posters)
- Twice yearly evacuation drills to Samoa assembly area (see map)

EVACUATION

How do I know when to evacuate

The first clue is often a strong earthquake. ***If you feel strong motion you should immediately move to high ground.*** If you notice unusual activity such as a sudden drop or rise in sea level it may be a warning of impending danger. Move to high ground or inland immediately. Often your only warning will be when the waves go farther out than normal.

Waves can kill and injure people and cause great property damage where they come ashore. If you are on the beach and feel an earthquake no matter how small, immediately move inland or to

high ground. Get into the habit of counting how long the earthquake shaking lasts. If you count 20 seconds or more of very strong ground shaking and you are in a tsunami hazard zone (below 30 feet) move to high ground immediately.

The first wave is often not the largest; successive waves may be spaced many minutes apart and continue to arrive for several house. Do not return to low land until you are notified that it is safe. In Crescent City in 1964 several people who returned to the hazard zone after the third wave, were killed by the fourth wave.

For an earthquake that occurs far out in the Pacific Ocean the Alaska Tsunami Warning center will alert local NOAA officials who may order evacuation. If an evacuation is ordered the The Samoa Peninsula Volunteer Fire Department (SPVFD) will be responding for the town of Samoa. Isolated areas may not receive official announcement, so it is important to have a plan to evacuate.

How do I get inland or to high ground

When the earthquake is your warning, *go on foot.* A tsunami may be imminent and you will not have time to drive.

Evacuation Routes

Follow signs and arrows. The tsunami evacuation map indicates the tsunami hazard zone. The elevation above 30 feet is designated as the Low Tsunami Hazard Zone. However, there is one designated assembly area located at the highest possible elevation for all people in the existing town area to evacuate to. This assembly area is located up the marked trail in the wooded area located north of Fenwick Avenue on the uphill or northwest side of Vance Avenue at the water tank pads.

Evacuation Routes are clearly marked on the map by the red arrows. Roadways and pedestrian trails throughout the area are marked as evacuation routes with signs that look like this:

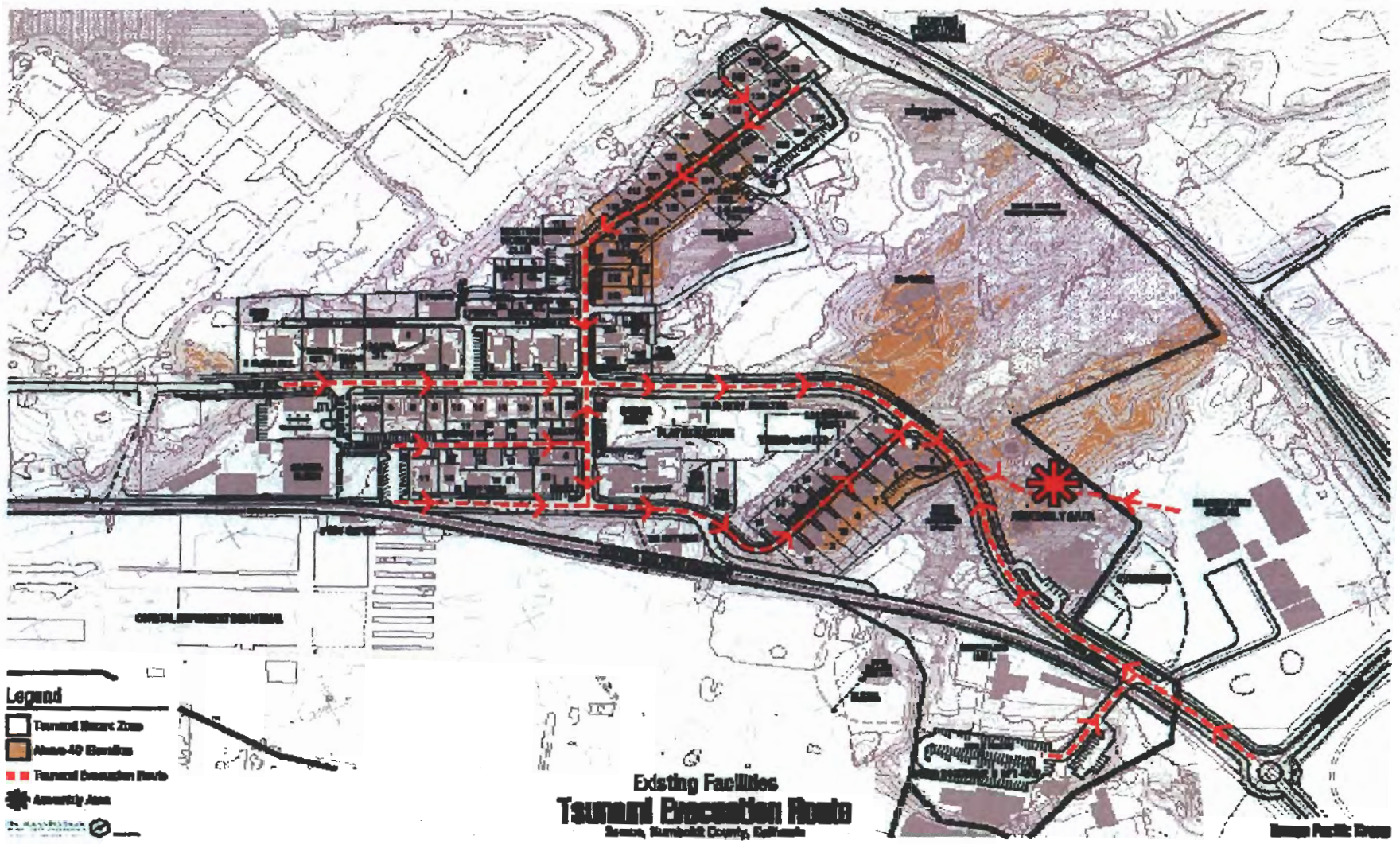
Signs will be strategically placed to ensure no confusion when people need to evacuation quickly. All route signs will have clearly posted directional arrows:

ASSEMBLY LOCATIONS

Where do I go--Designated Assembly sites

Follow the evacuation route signs to the designated site where people can remain until they are notified that it is safe to leave; which could be several hours. The Assembly site for the existing Town of Samoa is located at 58 feet above sea level. The water tank pad is up the marked trail in the wooded area located north of Fenwick Avenue on the uphill or northwest side of Vance Avenue. Look for signage on Vance Avenue to mark the short trail to the assembly area. The water tank pad is designated as the high ground assembly area for the existing Town of Samoa. The assembly site will be marked with a sign:

Evacuation Routes for Existing Town



What if I can't get out of my house

If you need help evacuating, tie something white (sheet or towel) to the front door knob. Make it large enough to be visible from the street. If the emergency is a distant tsunami, then help may arrive. In the event of a local tsunami, it is unlikely that anyone will help you before the waves arrive, so make a plan and be prepared.

How long before I can return to my house

You; should anticipate staying away from the low areas for up to 20 hours. Listen to the NOAA weather radio for the "all clear" notification. Tsunami events consist of many waves that may be 30 to 60 minutes apart. The most damaging waves may be the third or fourth wave. Afterwards there may be strong oscillations in the water.

Earthquakes and tsunamis cause many kinds of damage that continue to be dangerous after the waves have stopped, downed electrical power lines for example. There may also be hazardous spills that are potentially flammable. Fires are also common with tsunamis. Finally, local officials must inspect all flooded or earthquake-damaged structures before anyone can go back into them. Tsunami waters, like flood waters, can undermine foundations, causing buildings to sink and tilt, floors to crack, or walls to collapse. Stay out of buildings if waters remain around it.

Mobilization of Services

The Samoa Peninsula Volunteer Fire Department (SPVFD) will mobilize in the event of a tsunami. The SPVFD will notify all residents in the town of Samoa of the tsunami warning. After the tsunami event the SPVFD will coordinate inspections to determine whether buildings are safe to reoccupy. Other agencies with key responsibilities before, during and after a tsunami event include National Oceanic and Atmospheric Administration (NOAA), the Humboldt County American Red Cross and the Humboldt County Office of Emergency Services (OES). It is important to understand that in the event of a large tsunami multiple coastal communities on the North Spit will be in need of assistance. So a well prepared community will keep community members safe until further assistance arrives

What to do After the Tsunami

Continue listening to a NOAA Weather Radio, Coast Guard emergency frequency station, or other reliable source for emergency information. The tsunami may have damaged roads, bridges, or other structures that may be unsafe.

Use the telephone only for emergency calls. Telephone lines are frequently overloaded in disaster situations. They need to be clear for emergency calls to get through.

Once it is safe to reenter buildings tsunami waters have inundated, open the windows and doors to help dry the building. Shovel mud while it is still moist to give walls and floors an opportunity to dry. Check food supplies. Any food that has come in contact with tsunami flood waters may be contaminated and should be thrown out.

Publicity and Outreach

Outreach

Brochures on tsunami safety will be widely available in such places as the Post Office, the Samoa Cookhouse, the Samoa Block and the Emergency Services Vehicle Storage Building. They could also be available in high traffic places in town such as part of information kiosks on the town history and recreation opportunities on the Samoa Peninsula, and in venues of broader interest such as the tsunami room at the Humboldt County fair.

The tsunami safety brochures will be useful in supplementing the tsunami education programs conducted by NOAA, the Humboldt County American Red Cross, and the Humboldt County Office of Emergency Services.

Conclusion

With the implementation of this Tsunami Safety Plan the Town of Samoa will be eligible for certification as a "Tsunami Ready Community" by the National Weather Service. The basic "Tsunami Ready Community" certification requirements are met and exceeded by this plan. This plan requires coordination between NOAA, the Humboldt County American Red Cross, and the Humboldt County Office of Emergency Services and especially SPVFD. With the coordination of all agencies involved this Tsunami Safety Plan will provide the existing and proposed town of Samoa with an appropriate and concise plan for preparing for and reacting to a local tsunami event.

Further Information

NOAA
National Weather Service Office
Eureka Office (Woodley Island)
300 Startare Drive
Eureka, CA 95501
(707) 443-6484
http://www.wrh.noaa.gov/Eureka

Humboldt County Sheriff's Department
Office of Emergency Services, (County Courthouse)
826 4th Street, Eureka, CA 95501
Phone (707) 268-2500

Humboldt Earthquake Education Center
Geology Dept., Humboldt State University
Arcata, CA 95521; Phone (707) 826-6019
Earthquake Hot Line (707) 826-6020
http://www.humboldt.edu/~geodept/earthquakes/eqk_info.html

Humboldt County American Red Cross
406 11th St., Eureka, CA 95501
Phone (707) 443-4521

Samoa Peninsula Volunteer Fire Department
1982 Gass Street
Fairhaven, CA 95564
(707) 443-9042

Governor's Office of Emergency Services
3650 Schriever Ave, Mather, CA 95655
(916) 845-8510
www.oes.ca.gov

State of California
Seismic Safety Commission
1755 Creekside Oaks Drive, Ste. 100
Sacramento, CA 95833
(916) 263-0583
http://www.seismic.ca.gov/

Appendix A

TORNADO • FLASH FLOOD • EARTHQUAKE • WINTER STORM • HURRICANE • FIRE • HAZARDOUS MATERIALS SPILL

Emergency Preparedness Checklist

American Red Cross

Federal Emergency Management Agency

The next time disaster strikes, you may not have much time to act. Prepare now for a sudden emergency.

Learn how to protect yourself and cope with disaster by planning ahead. This checklist will help you get started. Discuss these ideas with your family, then prepare an emergency plan. Post the plan where everyone will see it—on the refrigerator or bulletin board.

For additional information about how to prepare for hazards in your community, contact your local emergency management or civil defense office and American Red Cross chapter.

Emergency Checklist

Call Your Emergency Management Office or American Red Cross Chapter

- ❑ Find out which disasters could occur in your area.
- ❑ Ask how to prepare for each disaster.
- ❑ Ask how you would be warned of an emergency.
- ❑ Learn your community's evacuation routes.
- ❑ Ask about special assistance for elderly or disabled persons.

Also...

- ❑ Ask your workplace about emergency plans.
- ❑ Learn about emergency plans for your children's school or day care center.

Create an Emergency Plan

- ❑ Meet with household members. Discuss with children the dangers of fire, severe weather, earthquakes and other emergencies.
- ❑ Discuss how to respond to each disaster that could occur.
- ❑ Discuss what to do about power outages and personal injuries.
- ❑ Draw a floor plan of your home. Mark two escape routes from each room.
- ❑ Learn how to turn off the water, gas and electricity at main switches.
- ❑ Post emergency telephone numbers near telephones.
- ❑ Teach children how and when to call 911, police and fire.
- ❑ Instruct household members to turn on the radio for emergency information.
- ❑ Pick one out-of-state and one local friend or relative for family members to call if separated by disaster (it is often easier to call out-of-state than within the affected area).
- ❑ Teach children how to make long distance telephone calls.
- ❑ Pick two meeting places:
  1) A place near your home in case of a fire.
  2) A place outside your neighborhood in case you cannot return home after a disaster.
- ❑ Take a basic first aid and CPR class.
- ❑ Keep family records in a water and fire-proof container.

Prepare a Disaster Supplies Kit

Assemble supplies you might need in an evacuation. Store them in an easy-to-carry container such as a backpack or duffle bag.

Include:

- ❑ A supply of water (one gallon per person per day). Store water in sealed, write-labeled containers. Identify the storage date and replace every six months.
- ❑ A supply of non-perishable packaged or canned food and a non-electric can opener.
- ❑ A change of clothing, rain gear and sturdy shoes.
- ❑ Blankets or sleeping bags.
- ❑ A first aid kit and prescription medications.
- ❑ An extra pair of glasses.
- ❑ A battery-powered radio, flashlight and plenty of extra batteries.
- ❑ Credit cards and cash.
- ❑ An extra set of car keys.
- ❑ A list of family physicians.
- ❑ A list of important family information; the style and serial number of medical devices such as pacemakers.
- ❑ Special items for infants, elderly or disabled family members.

Appendix B
Signs to be Used

Tsunami Sign Needs

Ordered By: _____
Jurisdiction:

	TYPE/ USE OR APPLICATION	QUANTITY
	**Evacuation Route Sign** Place on main roadways (i.e. Vance Avenue)	
	**Directional Arrows** Would accompany evacuation route sign	
	**Assembly Area** Place at water tank	
	**Foot Evacuation Trails**	

Appendix C Tsunami Brochure

SAMOA'S TSUNAMI RISK

A tsunami (incorrectly called a "tidal wave") is a series of waves most commonly caused by an earthquake beneath the sea floor. In the open ocean, tsunami waves travel as fast as a jet airplane. As the waves enter shallow water, they slow down and may rise to several feet or in rare cases, more than 50 feet. Tsunamis can cause great loss of life and property damage when they come ashore. The first wave is almost never the largest; successive waves may be spaced 10 or more minutes apart and continue arriving for many hours.

Over 150 paleotsunami sediment core samples have been taken along the margins of Humboldt Bay and in the Mad River Slough. These samples indicate that earthquakes with tsunami have impacted the coastal area of Northern California, including the two Cascadia events: one that occurred 300 years ago and one that occurred 1,100 years ago. In 1964 a magnitude 9.2 earthquake in Alaska generated a tsunami. As a result, a series of 4 waves took approximately 4 hours to reach Crescent City where 11 people were killed.

Two kinds of tsunami could affect Humboldt County:

Local-source tsunami: If a large earthquake strikes nearby, the first waves may reach the coast within minutes. There is no time for authorities to issue a warning. Strong ground shaking is your warning. If you feel more than 20 seconds of strong ground shaking, move immediately to higher ground and go on foot. Follow designated tsunami evacuation routes or go to an area 100 feet above sea level and as far inland as you can.

Distant-source tsunami: Very large earthquakes in other areas of the Pacific may also cause tsunamis. Tsunami Warning Centers will contact local officials who may order an evacuation. Even if an order of an evacuation by emergency service personnel, TV and radio stations (through the Emergency Alert System) and on NOAA Weather Radio. If you do not hear an announcement, but notice a sudden drop or rise in sea level or hear a loud noise coming from the ocean, nature may be warning you of impending danger. Move away from open water and head to high ground immediately.

WHAT AREAS ARE AT RISK?

The map on the inside shows areas of relative tsunami hazard in the Town of Samoa. Green areas indicate higher ground. The light blue above 40 feet in elevation are the safest areas. Be aware of areas that are indicated as being within the Tsunami Hazard Zone.

WHAT IF I AM OUTSIDE THE MAP AREA?

Go to an area 100 feet above sea level, if possible or go 2 miles inland, away from open water. If you cannot get this high or far, go as high as possible. Every foot inland or upwards can make a difference.

HOW CAN I SAVE MYSELF FROM A LOCAL-SOURCE TSUNAMI?

If you are near ocean water and feel an earthquake, no matter how small, immediately move inland or to high ground. COUNT how long the earthquake shaking lasts. If you count 20 seconds or more of very strong ground shaking, and YOU are located in a tsunami hazard zone on the map, evacuate to the ASSEMBLY AREA as soon as it is safe to do so.

DO NOT USE A CAR TO EVACUATE. Roads and bridges may be damaged by the strong ground shaking. **GO ON FOOT** because of traffic jams. Use high roads as inland power lines and other debris. If your only evacuation route is blocked by downed power lines carefully cross without touching the lines.

If evacuation is impossible, go to the upper floors of such building or climb a tree. The upper floors of buildings or a tree may offer protection, but should only be used as a last resort.

NOAA Weather Radio

The best way to stay informed of official tsunami alerts is to have a NOAA weather radio. They are inexpensive and available at most electronic stores.

TSUNAMI!

HOW TO SURVIVE THIS HAZARD IN SAMOA

IF YOU FEEL A STRONG EARTHQUAKE:

1. Drop, cover, and hold on and watch for falling objects until the earthquake is over.

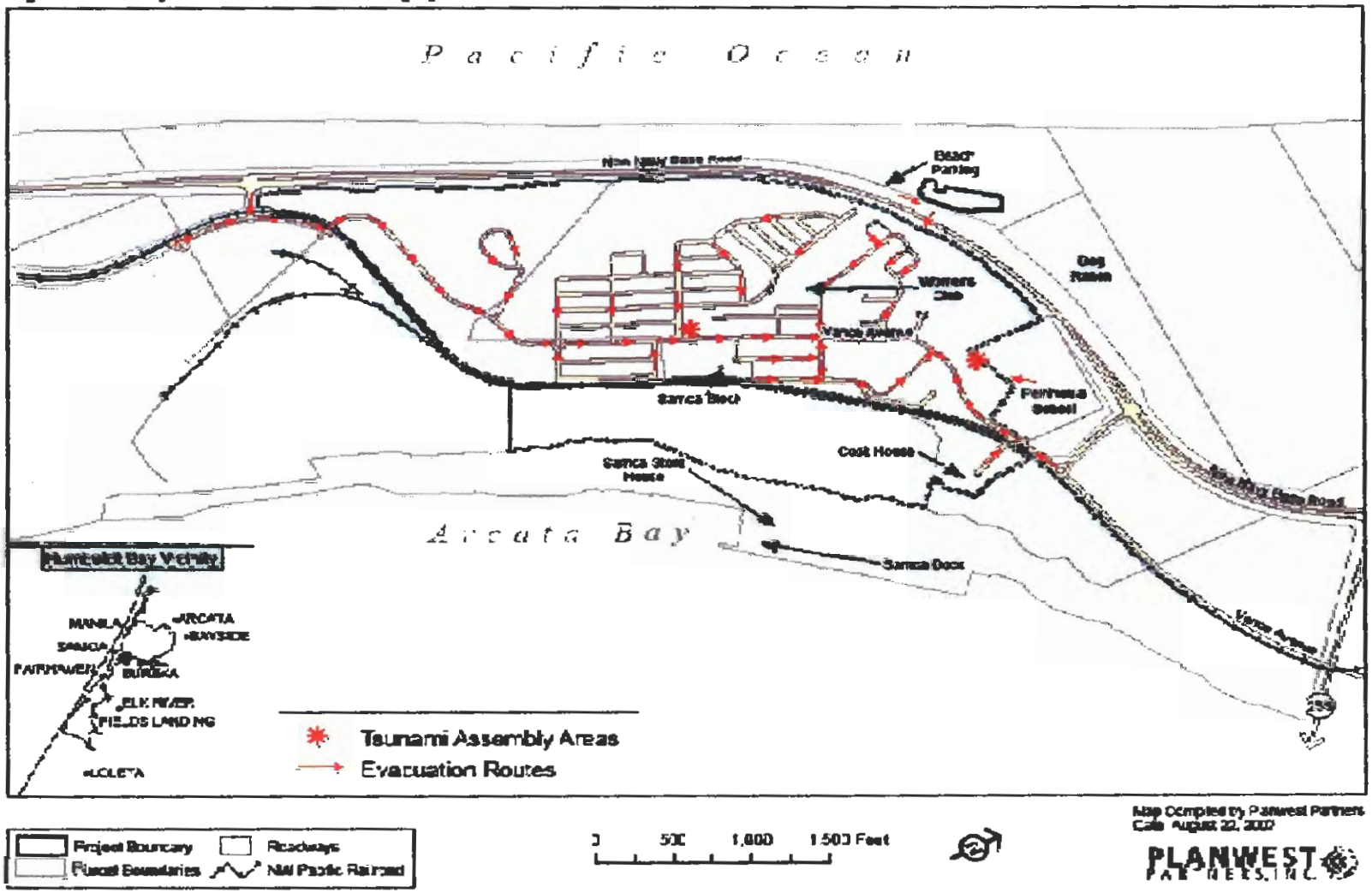
2. Move to higher ground or move away from bodies of water immediately. A tsunami may be coming. Do not wait. Don't drive.

DO NOT WAIT FOR OFFICIAL WARNING

3. Stay away from bodies of water. Do not return to shore after the first wave. Waves may continue to arrive for hours.

4. Listen to your radio for instructions. Do not return to the beach before an official "all clear".

Figure 4.7.3 - Proposed Plan Tsunami Warning System and Main Evacuation Routes



Appendix D – Safety Evacuation Drill Preparation

Planning and execution outline

Event narrative:

The basic plan is for community members to listen for the siren and then walk to the evacuation site, wbere event staff will be waiting for them. At the evacuation site, there will be three stations. The first station will be for time stamping their evaluation forms. If they didn't bring their form, we'll have blank ones for them to use. It's going to be critical to keep people moving quickly through this station. Next, they'll be given a pencil and clip board and asked to fill out their evaluation form. This is where it will help to have lots of event staff on hand to answer questions. The final station is where they turn their form in and get a coupon for a 20% discount at the Cook House.

The community participation in the drill could be as low as 20 people and as high as 100. It's impossible to know in advance. If turn out is good, the evacuation site could get hectic because most people should arrive within the first 15 minutes.

Notifications:

1. Samoa Cookhouse
2. Harbor District
3. Coast Guard
4. Op area
5. Oyster companies
6. Small cluster of homes north of bridge onramp)
7. RCTWG
8. Samoa residents
9. Coastal Comm., Planning folks, Board of Supervisors
10. Evergreen Pulp
11. Maritime Museum)

Prepare well ahead of event:

1. Make signs for Samoa Beach.)
2. Build PSA for NWR)
3. Write and distribute news release
4. Test inverter with time clock
5. Make flyer for Cook House to hand out to patrons from 4:00 on
6. Settle on route sign locations
7. Prepare 15 temporary evacuation. signs

The day before the event

1. Dry run at 9:00 AM. Meet at Samoa Gym
2. Media reminders

The day of the event

1. Post signs at Samoa Beach parking area by 3:00 p.m.
2. Install temp evac route and evac site signs by 3:00 p.m.
3. Synchronize time of time clock and siren activator's watch.
4. Stage at evacuation site and Samoa Gym by 4:30 p.m.
5. Call key radio stations and ask them to remind listeners about the drill and siren

Event Execution (in no order):

1. Fire department staff to control and calm auto traffic at entrance to town and corner of Vance and Rideout, starting at 5:45 p.m.
2. Fire department to stand by with medical aid equipment and personnel.
3. Photograph event – Cybelle Immitt
4. At ~ 5:45 p.m., everyone goes to evac site to help process evacuees.
5. Brad to activate siren at 6:00 p.m.
6. Debbie to start time clock when she hears the siren.

Miscellaneous details:

1. Wear dark blue shirts, if possible, to help identify you as event staff.
2. Park your cars at the Fireman's Hall that is just west of the Samoa Cookhouse.

Media Talking points:

Disclaimer: Developing talking points before an event is useful because it allows you to give some thought to what you will say when confronted with an uncomfortable or challenging question. The wording I have below might seem a bit manipulative, but that is not the point. The goal is to choose our words carefully to ensure that the educational value of this event is preserved – instead of, for example, being overshadowed by a fumbling of some part of the drill.

1. If the drill is a disaster, our position to the media and others:
    a. "you learn more when things go wrong than when they go right"
    b. "That's why we have drills – to find the weak areas"
    c. "The things that went wrong today are the things that would go wrong during a real event. Therefore, this has been a valuable exercise"
    d. Any other comment you want to make that this is about practicing and learning, not perfection in drills.
2. If the drill goes off perfectly:
    a. "The success of this drill demonstrates the effectiveness of people working together to prepare their community…"
    b. Use the rest of your time with the media to get the same old messages out: "If you feel an earthquake, go to high ground", etc.

Materials and equipment to Bring to the event:

Event Organizer/ Sponsor

1. Tables
2. Refreshments at Samoa Gym and at evacuation site.
3. clip boards – as many as possible
4. 10 folding chairs
5. Congrats banner and balloons

6. Cabana
7. Signs
8. T-posts
9. -post driver
10. Inverter for time clock
11. Time clock
12. 50 extra evaluation forms in case participants forget theirs
13. 100 pencils
14. clip boards (~10)
15. Self stick name tags with tsunami logo to identify "staff"
16. Extra tri-fold brochures for Samoa
17. Masking tape

Fire Department

1. PA system
2. Engines
3. Medical aid staff
4. Orange cones for traffic calming
5. clip boards

Redwood Coast Tsunami Working Group

1. Posters
2. clip boards
3. Standard educational information

Red Cross

1. Cip boards (~10)
2. Examples of evacuation bags
3. Standard Red Cross information

EXHIBIT NO. 20

APPLICATION NO. HUM-MAJ-1-08

HUMBOLDT COUNTY LCP AMENDMENT (SAMOA TOWN PLAN)

DEPARTMENT OF COMMERCE, NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION, NATIONAL WEATHER SERVICE (NWS) INSTRUCTION 10-1802, DATED 10/6/04, "OPERATIONS & SERVICES, STORMREADY & TSUNAMIREADY RECOGNITION PROGRAMS (1 of 25)

Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-1802
October 6, 2004

Operations and Services

STORMREADY AND TSUNAMIREADY RECOGNITION PROGRAMS

NOTICE: This publication is available at: http://www.nws.noaa.gov/directives

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OPR: OS51 (S. Kuhl) **Certified by:** OS5 (W. Lerner)
Type of Issuance: Routine

SUMMARY OF REVISIONS: Supercedes StormReady and TsunamiReady Recognition Programs, NWSI 10-1802, dated November 11, 2003. Revisions include:

1. Modified Section 6.0 - Renewal of Storm/TsunamiReady Status. Added instructions regarding subsequent community/county renewals (i.e., after 1st time renewal) and instructions for communities that fail to apply for re-recognition.
2. Added new Section 7.1 - StormReady Commendation Award
3. Added new Section 8.0 - StormReady Supporter Overview

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signed 9/22/04

Gregory A. Mandt Date
Director, Office of Climate,
Water, and Weather Services

StormReady and TsunamiReady Organization and Operations Manual

Table of Contents Page

1. Introduction. Some 90 percent of all Presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly $14 billion in damage. A destructive tsunami can create a tremendous risk to life and property for coastal communities along the Pacific, Atlantic, and Caribbean. To help Americans guard against the ravages of severe weather and potential tsunami damage, the National Weather Service (NWS) has designed the StormReady and TsunamiReady programs aimed at arming America's communities with the communication and safety skills necessary to save lives and property.

1.1 StormReady Overview. Many laws and regulations exist to help local emergency managers deal with hazardous material spills, search and rescue operations, medical crises, etc., but there are relatively few uniformly-recognized guidelines dealing with the specifics of hazardous weather response operations.

The NWS recognized this need and designed StormReady - - a program to help cities, counties, towns, and other designated communities, implement procedures to reduce the potential for disastrous, weather-related consequences.

By participating in StormReady, local agencies can earn recognition for their jurisdiction by meeting guidelines established by the NWS in partnership with federal, state, and local emergency management professionals. The StormReady program is intended to:

- Improve the timeliness and effectiveness of hazardous weather warnings for the public.
- Provide detailed and clear recommendations by which local emergency managers may establish/improve effective hazardous weather operations.
- Help local emergency managers justify costs and purchases related to supporting their hazardous weather-related program.
- Reward local hazardous-weather mitigation programs that have achieved a desired performance level.
- Provide a means of acquiring additional Community Rating System points assigned by the National Flood Insurance Program (NFIP).
- Provide an "image incentive" to counties, cities, towns, and other designate communities, that can identify themselves as being StormReady .
- Encourage the enhancement of hazardous weather preparedness programs in jurisdictions surrounding StormReady Communities and Counties.

StormReady is a **voluntary** program offered to provide guidance and incentive to officials interested in improving their respective hazardous weather operations. **Implied or explicit references to "requirements" are made with regard to the voluntary participants in the StormReady program and should not be construed as being state or federal mandates.**

1.2 TsunamiReady Overview. Tsunamis are quite rare compared to hazardous weather events in the United States. As a result, tsunami hazard awareness and preparedness in some locations along the U.S. West Coast, Caribbean, Alaska, and within the Pacific Region (Hawaii, American Samoa, Guam, Republic of Palau, Federated States of Micronesia, and Republic of the Marshall Islands) is inconsistent and, in many cases, insufficient. Even in locations with a history of deadly tsunamis, an adequate level of awareness and preparedness is difficult to achieve and sustain over time. The TsunamiReady program was created to help meet the needs of communities at risk from tsunamis.

Due to the similarities in the awareness and preparedness practices (communications, warning reception and dissemination, public education, etc.) in the severe weather and tsunami programs, the guidelines for becoming a TsunamiReady community mirror those of StormReady with a few important exceptions and additions. For example, a TsunamiReady community must have defined evacuation routes that lead to a designated shelter outside of the hazard zone (see Appendix D, TsunamiReady Guidelines).

Note: Communities that apply for TsunamiReady recognition may also satisfy many of the requirements for becoming StormReady, and are therefore strongly encouraged to jointly apply for StormReady recognition as well.

The TsunamiReady program is designed to educate local emergency management officials and their constituents and to promote a well-designed tsunami emergency response plan for each community. TsunamiReady promotes tsunami hazard preparedness as an active collaboration among federal, state, and local emergency management agencies. This collaboration supports greater and more consistent tsunami awareness and mitigation efforts among communities at risk. The TsunamiReady program is intended to:

- Improve the timeliness and effectiveness of tsunami warnings for the public.
- Provide detailed and clear recommendations by which local emergency managers may establish/improve effective tsunami emergency operations.
- Help local emergency managers justify costs and purchases related to supporting their tsunami preparedness program.
- Increase public awareness and understanding of the tsunami hazard.
- Encourage consistency in educational materials and response among communities and states.
- Reward local tsunami hazard mitigation programs that have achieved a desired performance level.
- Provide an "image incentive" to coastal counties, cities, towns, and other designated communities, that can identify themselves as being TsunamiReady.

- Encourage the enhancement of tsunami preparedness programs in jurisdictions surrounding the TsunamiReady Communities and Counties.

TsunamiReady is a voluntary program offered to provide guidance and incentive to officials interested in improving their respective tsunami hazard operations. **Implied or explicit references to "requirements" are made with regard to the voluntary participants in the TsunamiReady program and should not be construed as being state or federal mandates.**

2. StormReady Advisory Board Organization. StormReady Advisory Boards implement and oversee the StormReady and TsunamiReady programs. Advisory Boards are set up on a national, regional, and local level.

2.1 National StormReady Advisory Board. The National StormReady Advisory Board is responsible for general oversight of the StormReady and TsunamiReady programs. The National Board maintains a minimum set of guidelines that are consistent across the country. The National StormReady Advisory Board reviews existing and proposed guidelines at its annual meetings and publishes updated guidelines. The National StormReady Advisory Board includes:

NWS Warning Coordination Meteorologist (WCM) Program Leader (NWSH)
NWS Eastern Region WCM Program Leader
NWS Southern Region WCM Program Leader
NWS Central Region WCM Program Leader
NWS Western Region WCM Program Leader
NWS Alaska Region WCM Program Leader
NWS Pacific Region WCM Program Leader
President (or designee) of the National Emergency Management Association
President (or designee) of the International Association of Emergency Managers

2.2 Regional StormReady Advisory Board. Each of the NWS six regional offices have Regional StormReady Advisory Boards plus a Regional TsunamiReady Board where appropriate. The regional director determines team membership. Regional StormReady Advisory Boards monitor the activities of local boards and ensure the national guidelines are maintained. Regional boards also collect and review proposed guideline changes received from Local StormReady Advisory Boards. Recommendations for change to the national guidelines are forwarded to the National StormReady Advisory Board for consideration.

2.3 Local StormReady Advisory Board. The Local StormReady Advisory Board can enhance StormReady guidelines to fit local and state situations. Local StormReady Advisory Boards may be set up either on a WFO or statewide basis. Each local board consists of at a minimum:

1 - NWS office Meteorologist in Charge (MIC).
1 - NWS office WCM.
1 - State emergency management agency director or designee.*
1 - Local emergency management association president or designee.*

* One per state if local board is WFO based with multi-state responsibility.

The Local StormReady Advisory Board oversees all steps leading to the recognition of a StormReady community, county, or parish. This includes developing by-laws for the Board's activities, enhancing the national guidelines for the local area, establishing procedures for site verification visits, and implementing procedures for application review.

The appropriate Local StormReady Board with at least one additional member - - the Tsunami Warning Center's Geophysicist In Charge - - provides oversight of the TsunamiReady program at the local level. The Local StormReady Board has authority to enhance TsunamiReady to fit local and state situations.

The Local StormReady Board is responsible for all steps leading to the recognition of the TsunamiReady community. This includes implementing procedures for site verification visits and application review.

3. The Application Process. Application for StormReady and/or TsunamiReady recognition is a formal process requiring a written application, site verification visit(s), local board action, and recognition. The StormReady and combined Storm/TsunamiReady application forms are available on the NWS StormReady web site at: http://www.stormready.noaa.gov/apply.htm

3.1 Application Submission. A county or incorporated community seeking StormReady recognition should prepare a written application following the guidelines outlined in Appendix B and submit it to the appropriate NWS office. A county or incorporated community seeking TsunamiReady recognition should prepare a written application following the guidelines outlined in Appendix E and submit it to the appropriate NWS office.

Some applicants will have jurisdiction over both a community and the unincorporated areas of the surrounding county. In these cases, a single application is sufficient, with the combined populations used to determine the appropriate guideline categories. If a community earns Storm/TsunamiReady recognition, the unincorporated communities will be included in the recognition, but do not get individually recognized.

While much of the application is a basic accounting of technology, a brief narrative describing aspects of preparedness and planning activities is necessary and will help assess such things as the hazardous weather plan, exercises, and public safety programs.

The local StormReady Advisory Board Chairperson will provide copies of the application to each board member and assign a team to visit the applicant to formally discuss the application.

3.2 Local Application Review. A StormReady Advisory Board member will review the application to ensure the appropriate guidelines are met. (See Appendix A, StormReady Guidelines, and Appendix D, TsunamiReady Guidelines). If the application indicates the guidelines are not met, the applying agency will be notified about any changes needed to meet the

guidelines. After these changes are made, the agency should submit an updated application for additional Board review.

Once the Population-Based Guidelines are met, the local StormReady Advisory Board will provide each board member with a copy of the application. The Board Chairperson will assign a team to visit the applicant to verify the accuracy on the application and to formally discuss any application issues.

3.3 Site Verification Visit. The Local StormReady Advisory Board Chairperson will assign a verification team of no less than two members to visit an applicant. The verification team should be composed of, at a minimum, one NWS person and one emergency manager. StormReady/ TsunamiReady verification team members should be StormReady Advisory Board members, or other individuals deemed qualified to make an assessment by the Local StormReady Advisory Board.

During the site verification visit, the verification team member(s) will check off the "Verif" boxes listed in each Guideline on the StormReady or combined Storm/TsunamiReady application, for each item that the applicant has in their EOC and/or 24 hour warning point. During the site visit, the verification team should visit both the warning point and EOC to:

a. Verify equipment listed on application;
b. Confirm suitable location of equipment; and,
c. Confirm readiness of equipment.

During a site visit, the team will also review the applicant's hazardous weather plan. This review may require the applicant to explain procedures to ensure that the content meets StormReady Guidelines. A full copy of the applicant's Hazardous Weather Plan does not need to be submitted to the StormReady Advisory Board; however, the verification team may request a copy for further offsite review.

During a TsunamiReady site visit, the team will review the applicant's Tsunami Hazard Response Plan. This review may require the applicant to explain procedures to ensure that the content meets TsunamiReady Guidelines. A full copy of the applicant's Tsunami Hazard Response Plan does not need to be submitted to the StormReady Advisory Board; however, the verification team may request a copy for further offsite review.

After the site visit, the verification team will send their site visit summary, and any additional comments or documentation deemed pertinent, to the Local StormReady Advisory Board.

3.4 StormReady Board Review. The Local StormReady Advisory Board will review a jurisdiction's application and associated site visit summaries at the Board's next meeting. The local StormReady Advisory Board may approve an application for recognition after this first review.

If the recognition is not approved, the local Board will provide written guidance on what improvements are needed to for the community to achieve recognition. Upon written response from the applying jurisdiction, the local Advisory Board will schedule another site verification visit and review. If a community disputes a decision made by the local Advisory Board, the dispute will be forwarded to the Regional StormReady Advisory Board for resolution.

3.5 The Recognition Process. When the Local StormReady Advisory Board determines an applicant has met the program guidelines, it can grant StormReady and/or TsunamiReady recognition to the applicant. The local Board will notify the National and Regional StormReady Advisory Boards of each recognition they grant.

The successful applicant will receive a formal notification letter from the local NWS Meteorologist In Charge (MIC), two StormReady and/or TsunamiReady signs, authorization to use the StormReady logo, instructions for acquiring additional signs, and information concerning the notification of the National Flood Insurance Program for possible adjustment to insurance rates (section 4).

Recognition will be for a period of 3 years from the date the official letter of recognition is signed by the MIC of the local WFO.

StormReady recognition information and examples are located at the NWS National StormReady Web site at: http://www.stormready.noaa.gov

3.6 Recognition Ceremony. Details of the recognition announcement and ceremony will be coordinated between the applicant and the local NWS office which has responsibility for the community or county.

A typical ceremony includes a formal media announcement and should be a combination of the unveiling of the StormReady and/or TsunamiReady signs and a subsequent press conference. See Appendix C for information and examples of recognition materials.

4. National Flood Insurance Program. Recognized jurisdictions participating in the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), National Flood Insurance Program (NFIP) may receive 25 Community Rating Points towards lowering flood insurance rates. StormReady communities should forward a copy of their recognition letter to their NFIP representative for details. More information on the NFIP and the Community Rating System is available at: http://www.fema.gov/nfip/crs.shtm

5. Recognition Monitoring. A formal plan to monitor a recognized jurisdiction is not necessary. However, if a formal concern is brought to the Local StormReady Advisory Board, the Board will review the issue and may suspend the recognition for 60 days while the review is conducted. If the local Board review indicates the community or county no longer meets Storm/TsunamiReady guidelines, and the discrepancy cannot be resolved within a reasonable amount of time, the Local StormReady Advisory Board will request the StormReady signs be

removed. A written notification from the local WFO MIC will be sent to the NFIP informing them of this action.

6. Renewal of Storm/TsunamiReady Status. Storm/TsunamiReady recognition is valid for 3 years from the date the local WFO MIC signs a communities official StormReady Recognition Letter. Six months prior to the expiration of the recognition, the Local StormReady Advisory Board will notify recognized jurisdictions in writing of their need to re-apply. Communities should follow the applicable guidelines published at the time of the notification.

Subsequent renewals (i.e., after 1st time renewal) will repeat the interval and procedures outlined in sections 6.1 and 6.2 of the StormReady Organization and Operations Manual at: http://www.stormready.noaa.gov/resources/OpsManual2005.pdf

The Local StormReady Advisory Board should seek to maintain an atmosphere of constant improvement by keeping the evaluation guidelines representative of advancing technology and techniques. Site verification visits for re-recognition will be at the discretion of the Local StormReady Advisory Board.

If the anniversary date for renewal passes, a community will not lose its Storm/TsunamiReady status if it has turned in a renewal application, and/or has provided a letter of intent to renew its recognition (one time submission only) to the Local StormReady Advisory Board. A county or community will only lose its Storm/TsunamiReady status, if it fails to renew its application, or does not provide a letter of intent to renew, within 6 months after the official renewal date. Local StormReady Advisory Boards have the authority to formally terminate a communities recognition.

If a community chooses not to apply for re-recognition, the Local StormReady Advisory Board will request the Storm/TsunamiReady signs be removed. A written notification from the local WFO MIC will be sent to the NFIP informing them of this action. Notify Donna Franklin (donna.franklin@noaa.gov) so she can remove the community from the National StormReady database and National StormReady Web site.

7. StormReady Community Hero Award. The Storm/TsunamiReady Community Hero Award is a special *national level* recognition award that may be presented by senior NWS or NOAA officials to an individual(s) within a community or county that has been recognized as Storm/TsunamiReady. The award is designed to formally recognize those individuals within a community or county in which a life/lives and/or property have been saved as a direct result of their proactive actions which personify the NWS Storm/TsunamiReady program. Award guidelines and protocol can be found in the StormReady Organization and Operations Manual (section 7.1) at: http://www.stormready.noaa.gov/resources/OpsManual2005.pdf

7.1 StormReady Commendation Award. The Storm/TsunamiReady Commendation Award is a *local level* award within the framework of the nationally recognized StormReady program that may be presented by a local WFO to a community that has been designated Storm/ TsunamiReady. The award is designed to formally recognize a community or county in which a

life/lives and/or property has been saved as a result of the successful implementation of the Storm/TsunamiReady program. Award guidelines and protocol can be found in the StormReady Organization and Operations Manual (section 7.2) at: http://www.stormready.noaa.gov/resources/OpsManual2005.pdf

8.0 StormReady Supporter Overview. StormReady Supporters are local entities that do not qualify for Storm/TsunamiReady Recognition, yet promote the principles and guidelines of the Storm/TsunamiReady program into their severe weather/tsunami safety and awareness plans. Entities may be eligible as a StormReady Supporter, based on the bylaws of the local NWS StormReady Advisory Board and the endorsement from local emergency management. Examples of potential StormReady Supporters might include, but are not limited to businesses, hospitals, shopping centers and malls, schools, and nuclear power plants. StormReady Supporter guidelines can be found in the StormReady Organization and Operations Manual (sections 1.4 through 1.7) at: http://www.stormready.noaa.gov/resources/OpsManual2005.pdf

APPENDIX A - StormReady Guidelines

Since the tax base typically dictates the resources applied to public programs, the guidelines for successful participation in the StormReady Program are based on population. Four population categories are used for developing appropriate recognition guidelines related to weather disaster preparedness. The population-based categories are:

Guidelines	Population			
	< 2,500	2,500 - 14,999	15,000 - 40,000	> 40,000
Guideline 1: Communications				
Established 24 hr Warning Point (WP)	X*	X*	X	X
Established Emergency Operations Center (EOC)	X*	X*	X	X
Ability to relay real-time storm reports to forecast office	X	X	X	X
Guideline 2: NWS Information Reception				
Number of ways for EOC and WP to receive NWS warning, etc (If in range, one *must* be NWR)	3	4	4	4
Guideline 3: Hydrometeorological Monitoring				
Number of systems to monitor Hydrometeorological data.	1	2	3	4
Guideline 4: Local Warning Dissemination				
Number of ways EOC/WP can disseminate warnings to public	1	2	3	4
NWR - SAME receivers in public facilities	X	X	X	X
Guideline 5: Community Preparedness				
Number of annual weather safety talks	1	2	3	4
Spotters and dispatchers trained biennially	X	X	X	X
Host / co-host annual NWS spotter training				X
Guideline 6: Administrative				
Formal hazardous weather operations plan	X	X	X	X
Biennial visits by emergency manager to NWS office	X	X	X	X
Annual visits by NWS official to community	X	X	X	X

* For cities or towns with less than 15,000 people, a 24-hour warning point and EOC are required; however, another jurisdiction within the county may provide that resource.

Guideline 1: Communications & Coordination Center

Effective communication is the key to disaster management. This is especially true in natural hazard emergencies (e.g., flood, wildfire) where rapid changes may permit only short lead-time warnings that require an immediate, educated response.

1. 24-Hour Warning Point. To receive recognition under the StormReady Program, an applying agency will need a 24-hour warning point (WP) to receive NWS information and provide local reports and advice. Typically, this is a law enforcement or fire department dispatching point. For cities or towns without a local dispatching point, another jurisdiction within the county may act in that capacity for them.

* For cities or towns with less than 15,000 people, a 24-hour warning point is required; however, another jurisdiction within the county may provide that resource.

The warning point will need to have:

- 24-hour operations.
- Warning reception capability.
- Warning dissemination capability.
- Ability and authority to activate local warning system(s).

2. Emergency Operations Center (EOC). All agencies must have an EOC. For towns and cities with less than 15,000 people, the EOC may be provided by another jurisdiction within the county. The EOC will need to be staffed during hazardous weather events and, when staffed, assume the warning point's hazardous weather functions.

* For cities or towns with less than 15,000 people, an EOC is required; however, another jurisdiction within the county may provide that resource.

The following summarizes the weather-related roles of an EOC:

- May assume weather-related duties of warning point, when staffed.
- Activated based on predetermined guidelines related to NWS information and/or weather events.
- Staffed with emergency management director or designee.
- Warning reception capability (see guideline 2).
- Ability and authority to activate local warning system(s). Must have capabilities equal to or better than the warning point.
- Ability to communicate with adjacent EOCs/Warning Points.
- Established communications link with NWS to relay real-time weather information to support the warning decision making process.

3. Real-Time Storm Reports. An integral part of the warning decision making process is timely reports of real-time weather information. StormReady communities should relay these reports to the local NWS forecast office. At a minimum, these reports should include the type, location, and time of significant weather events. The extent and tracking of these reports are left to the discretion of the local StormReady Advisory Board.

Guideline 2: National Weather Service Warning Reception

Warning Points and EOCs each need multiple ways to receive NWS warnings. The StormReady Program guidelines for receiving NWS warnings in an EOC/WP require a combination of the following, based on population:

- NOAA Weather Radio receiver with tone alert. Specific Area Message Encoding is preferred. *Required for recognition only if within range of transmitter.*
- Emergency Management Weather Information Network (EMWIN) receiver: Satellite feed and/or VHF radio transmission of NWS products.
- Statewide law enforcement telecommunications: Automatic relay of NWS products on law enforcement systems.
- Amateur Radio transceiver: Potential communications directly to NWS office.
- Wireless Devises: From a provider not directly tied to a local system such as EMWIN.
- Television: Local network or cable TV.
- Local Radio (Emergency Alert System - LP1/LP2).
- National Warning System (NAWAS) drop: FEMA-controlled civil defense hotline.
- NOAA Weather Wire drop: Satellite downlink data feed from NWS.
- Other: For example, active participation in a state-run warning network.

Guideline 3: Hydrometeorological Monitoring

While receipt of warnings is crucial to the success of any EOC or Warning Point, there should also be a means of monitoring weather information, especially radar data. To obtain StormReady recognition, each EOC/WP (based on population) should have some combination of the following recommended means of gathering weather information:

- Internet
- Television/radio
- Two-way radio
- Emergency Management Weather Information Network (EMWIN)
- Local systems for monitoring weather

Guideline 4: Warning Dissemination

Once NWS warnings are received, or local information suggests an imminent weather threat, local emergency officials should communicate with as much of their population as possible. To be recognized as StormReady, a community must have NOAA Weather Radio in the following facilities:

Required Locations:
- 24 hour Warning Point
- Emergency Operations Center
- City Hall
- School Superintendent Office

Recommended Locations:
- Courthouses
- Public libraries
- Hospitals
- All schools
- Fairgrounds
- Parks and recreation areas
- Public utilities
- Sports arenas
- Transportation departments
- Nursing Homes/Assisted Living

In addition, recognition will be contingent on having one or more of the following means (based on population) of ensuring timely warning dissemination to citizens:

- Cable television audio/video overrides.
- Local flood warning systems with no single point of failure.
- Other locally-controlled methods like a local broadcast system or sirens on emergency vehicles.
- Outdoor warning sirens.
- *Counties Only:* A County-wide communications network that ensures the flow of information between all cities and towns within its borders. This would include acting as a warning point for the smaller towns.

Guideline 5: Community Preparedness

Public education is vital in preparing citizens to respond properly to weather threats. An educated public most likely will take steps to receive weather warnings, recognize potentially threatening weather situations, and act appropriately to those situations. Those seeking recognition in the StormReady Program will need to:

- Conduct or facilitate safety talks for schools, hospitals, nursing homes, and industries (number of talks per year will be based on population). These may be a part of multi-hazard presentations affecting local communities/regions (e.g., flood, wildfire, tsunami).
- Accomplish weather-related safety campaigns which include publicity for NOAA Weather Radios where coverage exists. These may be a part of multi-hazard presentations affecting local communities/regions (e.g. flood, wildfire, tsunami).

- EOC/Warning Point staff and Storm Spotters will need to attend NWS Storm Spotter training sessions at least every other year. All jurisdictions larger than 40,000 people will need to host/co-host a Spotter training session every year.

Guideline 6: Administrative

A program cannot be successful without formal planning and pro-active administration. To be recognized in the StormReady Program a community needs:

- Approved hazardous weather action plans must be in place. These plans will need to address, at a minimum, the following:
  - Hazards/risk assessment
  - Warning Point procedures relating to natural hazards
  - EOC activation criteria and procedures if applicable
  - Storm Spotter activation criteria and reporting procedures if applicable.
  - Storm Spotter roster and training record if applicable.
  - Criteria and procedures for activation of sirens, cable television override, and/or local systems activation in accordance with state Emergency Alert System (EAS) plans.
  - Annual exercises relating to natural hazard.

To facilitate close working relationships, the community/county emergency management program leader will need to visit the supporting NWS office at least every other year. NWS officials will commit to visit recognized counties, cities, and towns annually to tour EOCs/Warning points and meet with key officials.

APPENDIX B - StormReady Application Form

The StormReady application form is located at the NWS National StormReady Web site at: http://www.stormready.noaa.gov/apply.htm

APPENDIX C - StormReady Recognition Information/Examples

StormReady recognition information and examples are located at the NWS National StormReady Web site at: http://www.stormready.noaa.gov

APPENDIX D - TsunamiReady Guidelines

Guidelines for participation in the TsunamiReady program are given in the following table. Each guideline is fully discussed following the table. Four community categories (based upon population) are used for developing appropriate recognition guidelines.

Guidelines	Population			
	< 2,500	2,500 - 14,999	15,000 - 40,000	> 40,000
Guideline 1: Communications and Coordination				
Established 24-hour Warning Point (WP)	X*	X*	X	X
Established Emergency Operations Center (EOC)	X*	X*	X	X
Guideline 2: Tsunami Warning Reception				
Number of ways for EOC/WP to receive NWS tsunami messages. (If in range, one *must* be NWR receiver with tone alert; NWR-SAME is preferred)	3	4	4	4
Guideline 3: Local Warning Dissemination				
Number of ways EOC/WP can disseminate warnings to public	1	2	3	4
NWR - SAME receivers in public facilities	X	X	X	X
For county/borough warning points, county/borough communication network that ensures information flow among communities	X	X	X	X
Guideline 4: Community Preparedness				
Number of annual tsunami awareness programs	1	2	3	4
Designate/establish tsunami shelter/area in safe zone	X	X	X	X
Designate tsunami evacuation areas and evacuation routes, and install evacuation route signs	X	X	X	X
Provide written, locally specific, tsunami hazard response material to public	X	X	X	X
Schools: Encourage tsunami hazard curriculum, practice evacuations (if in hazard zone), and provide safety material to staff and students.	X	X	X	X
Guideline 5: Administrative				
Formal tsunami hazard operations plan	X	X	X	X

Biennial meeting/discussion between emergency manager and NWS	X	X	X	X
Visit by NWS official to community at least every other year	X	X	X	X

* For cities or towns with less than 15,000 people, a 24-hour warning point and EOC are required; however, another jurisdiction within the county may provide that resource.

Guideline 1: Communications and Coordination Center

A key to effective hazards management is effective communication. This is especially true in tsunami emergencies, since wave arrival times may be measured in just minutes. Such a "short fused" event requires an immediate but careful, systematic and appropriate response. To ensure such a proper response, communities must have established the following:

1. 24-Hour Warning Point. To receive recognition under the TsunamiReady program, an agency needs to have a 24-hour Warning Point (WP) able to receive NWS Tsunami information and provide local reports and advice. Typically, this might be a law enforcement or fire department dispatching point. For cities or towns without a local dispatching point, a county/borough agency could act for them in that capacity. The warning point needs to have:

- 24 hour operations
- Warning reception capability
- Warning communication/dissemination capability
- Ability and authority to activate local warning system(s)

2. Emergency Operations Center. Agencies serving jurisdictions of more than 2,500 people will need an emergency operations center (EOC). It must be staffed during tsunami events to execute the warning point's tsunami warning functions. Summarized below are tsunami-related roles of an EOC:

- Activate based on predetermined guidelines related to NWS tsunami information and/or tsunami events
- Staffed by emergency management director or designee
- Possess warning reception/dissemination capabilities equal to or better than the warning point
- Ability to communicate with adjacent EOCs/Warning Points
- Ability to communicate with local NWS office.

Guideline 2: Tsunami Warning Reception

Warning points and EOCs each need multiple ways to receive NWS Tsunami Warnings. TsunamiReady guidelines to receive NWS warnings in an EOC/WP require a combination of the following, based on population:

- NOAA Weather Radio (NWR) receiver with tone alert. Specific Area Message Encoding (SAME) is preferred. Required for recognition only if within range of transmitter
- NOAA Weather Wire drop: Satellite downlink from NWS.
- Emergency Management Weather Information Network (EMWIN) receiver: Satellite feed and/or VHF radio transmission of NWS products
- Statewide Telecommunications System: Automatic relay of NWS products on statewide emergency management or law enforcement system
- Statewide Warning Fan-out System: State authorized system of passing message throughout warning area
- NOAA Weather Wire via Internet NOAAPort Lite: Provides alarmed warning messages through a dedicated Internet connection
- Direct link to NWS office: For example, amateur or VHF radio
- E-mail from Tsunami Warning Center: Direct e-mail from Warning Center to emergency manager
- Pager Message from Tsunami Warning Center: Page issued from Warning Center directly to EOC/WP
- Radio/TV via Emergency Alert System: Local radio/TV or cable TV
- US Coast Guard Broadcasts: WP/EOC monitoring of USCG marine channels
- National Warning System (NAWAS) drop: FEMA-controlled civil defense hot-line

Guideline 3: Warning Dissemination

1. Upon receipt of NWS tsunami warnings or other reliable information suggesting a Tsunami is imminent, local emergency officials should communicate the threat to as much of the population as possible. Receiving TsunamiReady recognition requires having one or more of the following means of ensuring timely warning dissemination to citizens (based on population):

    - A community program subsidizing the purchase of NWR.
    - Outdoor warning sirens
    - Television audio/video overrides
    - Phone messaging (dial-down) systems
    - Other locally-controlled methods, e.g., local broadcast system or emergency vehicle sirens.

2. Once NWS Tsunami Warnings are received, or local information suggests an imminent tsunami threat, the local emergency officials should communicate with as much of the

population as possible. To be recognized as TsunamiReady, a community must have NOAA Weather Radio in the following facilities:

Required Locations:
- 24 hour Warning Point
- Emergency Operations Center
- City Hall
- School superintendent office or equivalent

Recommended Locations:
- Courthouses
- Public libraries
- Hospitals
- All schools
- Fairgrounds
- Parks and recreation areas
- Public utilities
- Sports arenas
- Transportation departments
- Nursing Homes/Assisted Living
- Harbors

Receivers with SAME capability are preferred (this is required for recognition only if locations are within range of NWR transmitter).

In addition, recognition will be contingent on having one or more of the following means (based on population) of ensuring timely warning dissemination to citizens:

- Cable television audio/video overrides.
- Local Flood warning systems with no single point of failure.
- Other locally-controlled methods like a local broadcast system or sirens on emergency vehicles.
- Outdoor warning sirens.

3. Counties/Boroughs Only: A county/borough-wide communications network ensuring the flow of information among all cities and towns within its borders. This would include provision of a warning point for the smaller towns, and fanning out of the message as required by state policy. Critical public access buildings should be defined by each community's tsunami warning plan.

Guideline 4: Awareness

Public education is vital in preparing citizens to respond properly to Tsunami threats. An educated public is more likely to take steps to receive tsunami warnings, recognize potentially threatening Tsunami events, and respond appropriately to those events. Communities seeking recognition in the TsunamiReady program must:

1. Conduct or sponsor Tsunami awareness programs. Possible locations may include schools, hospitals, fairs, workshops, and community meetings (number of presentations per year is based on population).

2. Define Tsunami evacuation areas and evacuation routes, and install evacuation route signs.

3. Designate a Tsunami shelter/area outside the hazard zone.

4. Provide written Tsunami hazard information to the populace, including:
   - Hazard zone maps
   - Evacuation routes
   - Basic tsunami information

   These instructions can be distributed through mailings, i.e, utility bills, within phone books, and posted at common meeting points such as libraries and public buildings throughout the community.

5. Local schools must meet the following criteria:
   - Encourage the inclusion of Tsunami information in primary and secondary school curriculums. NWS will help identify curriculum support material.
   - Provide an opportunity biennially for a Tsunami awareness presentation by the local NWS office and/or the local Emergency Manager.
   - Schools within the defined hazard zone must have Tsunami evacuation drills at least biennially.
   - Written safety material should be provided to all staff and students.
   - Have an earthquake plan.

Guideline 5: Administrative

No program can be successful without formal planning and a pro-active administration. To be recognized in the TsunamiReady Program:

1. A Tsunami warning plan must be in place and approved by the local governing body. This plan must address the following:
   - Warning point procedures
   - EOC activation criteria and procedures
   - Warning point and EOC personnel specification
   - Hazard zone map with evacuation routes
   - Procedures for canceling an emergency for those less-than-destructive Tsunamis
   - Criteria and procedures for activation of sirens, cable television override, and/or local systems activation in accordance with state Emergency Alert System (EAS) plans, and warning fan-out procedures, if necessary
   - Annual exercises.

2. Yearly visit/discussion with local NWS Office or Tsunami Warning Center personnel. Due to distance and other logistical constraint in the Alaska and Pacific Regions, this guideline can be met by a visit to the NWS office, phone discussion, or e-mail contacts.

3. NWS officials will commit to visit recognized communities, at least every other year, to tour EOCs/Warning points and meet with key officials.

APPENDIX E - Combined Storm/TsunamiReady Application Form

The combined Storm/TsunamiReady application form is located on the NWS StormReady web site at: http://www.stormready.noaa.gov/apply.htm

California Regional Water Quality Control Board
North Coast Region
Bob Anderson, Chairman

Linda S. Adams
Secretary for Environmental Protection

www.waterboards.ca.gov/northcoast
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

Arnold Schwarzenegger
Governor

November 10, 2009

Melanie Faust
California Coastal Commission
710 E Street, Suite 200
Eureka, CA 95501

Dear Ms. Faust:

Subject: Clarifications on Regional Water Quality Control Board Site Cleanup Process for the Samoa Peninsula Brownfield

File: Samoa Peninsula (Town of Samoa), Samoa, California
Case No. 1NHU890

Regional Water Quality Control Board (Regional Water Board) staff has appreciated working with you in the permitting process for the Town of Samoa. The following letter clarifies the process used by the Regional Water Board staff in the investigation and cleanup of discharges to the environment.

Section 13304 of the California Water Code contains the authority to require discharges to clean up wastes discharged or abate the effects of the waste. State Water Resources Control Board Resolution 92-49 "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304" was adopted in 1992 and amended on April of 1994 and October of 1996. This document sets out the procedures that are followed for investigation of wastes and clean up procedures. In addition, Title 27 of the California Code of Regulations requires cleanup of contamination in soils to background where feasible.

There are two areas of the Town of Samoa where significant levels of contamination were identified and remedial activities will occur in the future. These two areas are the Soccer Field and the Housing. The owners of the Town of Samoa have proposed a combination of removal of contaminated soil and/or groundwater and capping low levels in place for the Soccer Field and removal of contaminated soils for the Housing areas.

There are also eight areas of the Town of Samoa where low level contamination was identified in soils and/or groundwater. Please see attached map of the eight areas. The contamination has been defined on the property owned by the Town of Samoa and is of limited areal extent. This low level contamination has likely been in place for at least several decades or longer.

Regional Water Board staff reviewed the various investigation documents submitted for the Town of Samoa following the criteria set out in the above laws and policy documents. Staff made a determination that no further action was necessary to protect human health and safety, the environment, and waters of the state at this time based on the current land use of the eight areas in question. This determination is not based on the ability of a discharger to afford the cleanup of waste.

Due to the fact that the eight areas are not going to be cleaned up to background, Regional Water Board staff finds that the property is not suitable for unrestricted use and a land use restriction is necessary for the protection of public health or safety and the environment. A land use restriction is recorded or required to be recorded under Assembly Bill 2436 as filed with Secretary of State on September 16, 2002. These documents have been drafted for the eight locations. Please see the attached sample deed restrictions.

The low levels of contaminants in soils are either already located beneath the seasonal high groundwater level or are within five feet of seasonal high groundwater. Several areas have groundwater contamination and no soil contamination. A rise in sea level in the future will not make a material change in the amount of contaminants in groundwater. In fact, the addition of more groundwater may likely dilute the low level concentrations already identified. In addition, none of the eight areas in question are immediately adjacent to Humboldt Bay or the Pacific Ocean. The age of the discharges and the current sampling information indicate that it is highly unlikely that groundwater contamination will extend to either the bay or the ocean.

There are no specific monitoring requirements in the deed restrictions. However, in the event that land use or circumstances change in the future, the deed restriction language requires the following:

> F. *Covenantor desires and intends that in order to benefit the Board, and to protect the present and future public health and safety, the Burdened Property shall be used in such a manner as to avoid potential harm to persons or property that may result from hazardous materials that may have been deposited on portions of the Burdened Property.*

The deed restrictions also detail enforcement actions and actions to terminate the deed restrictions in the event that land use or contamination changes in the future.

If you have any further questions, please contact me at (707)576-2673.

Sincerely,

Kasey Ashley

Kasey Ashley P.G.
Senior Engineering Geologist

091110_KA_kasamoa12

Enclosures: Site Map
Eight Draft Deed Restrictions

cc: Andrew Whitney, Economic Development Division, County of Humboldt, 520 E Street, Eureka, CA 95501
Orrin Plocher, Freshwater Environmental Services, 78 Sunny Brae, Arcata, CA 95521
Jed Douglas, Winzler & Kelly, 633 Third Street, Eureka, CA 95501-0417
Mr. Dan Johnson, Samoa Pacific Group LLC, 5251 Ericson Way, Arcata, CA 95521

Recording Requested By:

Samoa Pacific Group, LLC

When Recorded, Mail To:
Catherine Kuhlman, Executive Officer
California Regional Water Quality Control Board
North Coast Region
5550 Skylane Boulevard, Suite A
Santa Rosa, California 95403

COVENANT AND ENVIRONMENTAL RESTRICTION
ON PROPERTY

Cookhouse Garages, Samoa, California

This Covenant and Environmental Restriction on Property (this "Covenant") is made as of the ____ day of _____, 2009 by Samoa Pacific Group, LLC ("Covenantor") who is the Owner of record of that certain property situated off Cookhouse Road, in the City of Samoa, County of Humboldt, State of California, which is more particularly described in Exhibit A attached hereto and incorporated herein by this reference (such portion hereinafter referred to as the "Burdened Property"), for the benefit of the California Regional Water Quality Control Board for the North Coast Region (the "Board"), with reference to the following facts:

A. This Covenant is an environmental covenant provided for by Civil code section 1471 and required by the Board pursuant to Water Code section 13307.1 because the Burdened Property is contaminated by hazardous materials as defined in section 25260 of the Health and Safety Code.

B. Contamination of the Burdened Property. Soil at the Burdened Property was contaminated by unknown activities possibly related to vehicle maintenance conducted by previous occupants of the town of Samoa. These operations resulted in very low level contamination of soil with semi-volatile organic chemicals including benzo(a) pyrene and flouranthene which constitute hazardous materials as that term is defined in Health & Safety Code Section 25260.

C. Exposure Pathways. The contaminants addressed in this Covenant are present in soil on the Burdened Property. Without the mitigation measures which have been performed on the Burdened Property, exposure to these contaminants could take place via in-place contact, or surface-water runoff, resulting in dermal contact, inhalation, or ingestion by humans. The risk of public exposure to the contaminants has been substantially lessened by the controls described in the Soil Contingency Plan, including any future amendments thereto, as incorporated herein as Exhibit B.

Deleted: chg deed soil management.doc

EXHIBIT NO. 22

APPLICATION NO. HUM-MAJ-1-08

HUMBOLDT COUNTY LCP AMENDMENT (SAMOA TOWN PLAN)

"CERTIFICATE OF SUBDIVISION COMPLIANCE" WITH ANNOTATIONS, ISSUED BY HUMBOLDT COUNTY COMMUNITY DEVELOPMENT SERVICES ON 12/5/09 FOR 79 LOTS OWNED BY SIMPSON SAMOA COMPANY, RECORDED AS 2000-25874-10 HUMBOLDT COUNTY RECORDER, 12/7/00 (1 of 11)

Recording Requested By:

Simpson Samoa Company

Return To:
Humboldt County
Community Development Services
3015 H Street
Eureka, CA 95501-4484

2000-25874-10
Recorded — Official Records
Humboldt County, California
Carolyn Crnich, Recorder
Recorded by First American Title Ins Co
Exempt from payment of fees
Clerk: MM Total: 0.00
Dec 7, 2000 at 10:00
CONFORMED COPY

CERTIFICATE OF SUBDIVISION COMPLIANCE

ASSESSOR'S REFERENCE NUMBER(S):
401-031-28,-34,-37 LLA-99-23

NUMBER OF PARCELS CERTIFIED:
seventy nine

PROPERTY OWNER(S) OF RECORD:
Simpson Samoa Company

NOTICE IS HEREBY GIVEN pursuant to Section 66499.35 of the California Government Code that the Humboldt County Community Development Services has determined that the real property described in EXHIBIT "A" attached hereto complies with the provisions of the California Subdivision Map Act and Humboldt County Ordinances enacted pursuant thereto.

THIS CERTIFICATE relates only to issues of compliance or noncompliance with the Subdivision Map Act and local ordinances enacted pursuant thereto and no further compliance with the Subdivision Map Act is necessary once all conditions contained herein are satisfied. However, development of the parcel may require issuance of a permit or permits, or other grant or grants of approval.

THIS CERTIFICATE does not certify that the real property for which this certificate has been issued is suitable for development in accordance with existing or future regulations.

ISSUED ON 12/05/00 BY Kirk Girard
Kirk Girard, Director of Community Development Services, County of Humboldt

ACKNOWLEDGMENT

STATE OF CALIFORNIA
COUNTY OF HUMBOLDT

On Dec 6, 2000 before me, LESLIE M. RIECKE, Notary Public, personally appeared KIRK GIRARD, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

Witness my hand and official seal.

Leslie M. Riecke
SIGNATURE OF NOTARY

LESLIE M. RIECKE
Comm. #1260749
NOTARY PUBLIC
HUMBOLDT COUNTY, CALIFORNIA
My commission expires May 12, 2004

Seal

(J:/planning/current/forms/notary/form7.pub/rev:06-27-00)

RE: Simpson Samoa Company H.C.P.D. File No. APN 401-031-28 et al

EXHIBIT A

PROPERTY DESCRIPTION

All that real property situated in the County of Humboldt, State of California, described as follows:

PARCEL ONE:
Lot Thirty-eight (38) in Block One (1) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWO:
Lots Thirty-six (36) and Thirty-seven (37) in Block One (1) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THREE:
Lot Forty (40) in Block Two (2) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FOUR:
Lot Thirty-nine (39) in Block Two (2) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIVE:
Lot Thirty-eight (38) in Block Two (2) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIX:
Lot Twenty-one (21) in Block Two (2) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SEVEN:
Lots Thirty-nine (39) and Forty (40) in Block Three (3) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL EIGHT:
Lot Thirty (30) in Block Three (3) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL NINE:
Lot Twenty-one (21) in Block Three (3) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TEN:

Lot Forty (40) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL ELEVEN:

Lot Thirty-nine (39) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWELVE:

Lots Thirty-four (34) and Thirty-five (35) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTEEN:

Lots Twenty-six (26), Twenty-seven (27), Twenty-eight (28), and Twenty-nine (29) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FOURTEEN:

Lot Twenty-five (25) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTEEN:

Lots Twenty-one (21) and Twenty-two (22) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTEEN:

Lot Forty (40) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SEVENTEEN:

Lots Thirty-eight (38) and Thirty-nine (39) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL EIGHTEEN:

Lots Thirty-six (36) and Thirty-seven (37) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL NINETEEN:

Lots Thirty-four (34) and Thirty-five (35) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY:

Lots Thirty (30) and Thirty-one (31) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-ONE:

Lots Twenty-eight (28) and Twenty-nine (29) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-TWO:

Lots Twenty-six (26) and Twenty-seven (27) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-THREE:

Lots Twenty-one (21) and Twenty-two (22) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-FOUR:

Lots Nineteen (19) and Twenty (20) in Block Two (2) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-FIVE:

Lot Sixteen (16) in Block Three (3) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-SIX:

Lot Five (5) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-SEVEN:

Lots Ten (10) and Eleven (11) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-EIGHT:

Lots Nineteen (19) and Twenty (20) in Block Four (4) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL TWENTY-NINE:

Lots One (1) and Two (2) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY:

Lot Nine (9) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-ONE:

Lots Ten (10) and Eleven (11) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-TWO:

Lot Twelve (12) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-THREE:

Lot Eighteen (18) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-FOUR:

Lots Nineteen (19) and Twenty (20) in Block Five (5) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-FIVE:

Lots Three (3), Four (4), Five (5), and Six (6) in Block Six (6) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

EXCEPTING THEREFROM that portion thereof conveyed to Northwestern Pacific Railroad Company by deed recorded February 2, 1925 in Book 171 Deeds, Page 186, Humboldt County Records.

PARCEL THIRTY-SIX:

Lots Thirty-six (36) and Thirty-seven (37) in Block Thirteen (13) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-SEVEN:

Lots Twenty-two (22) and Twenty-three (23) in Block Thirteen (13) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-EIGHT:

Lot Thirty-nine (39) in Block Twelve (12) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL THIRTY-NINE:
Lot Thirty-eight (38) in Block Twelve (12) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY:
Lot Two (2) in Block Thirteen (13) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-ONE:
Lot Seventeen (17) in Block Thirteen (13) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-TWO:
Lot Eighteen (18) in Block Thirteen (13) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-THREE:
Lot Forty (40) in Block Twenty-one (21) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-FOUR:
Lots Twenty-one (21) and Twenty-two (22) in Block Twenty-two (22) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-FIVE:
Lot Forty (40) in Block Twenty-three (23) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-SIX:
Lot Twenty-seven (27) in Block Thirty (30) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-SEVEN:
Lots Twenty-three (23) and Twenty-four (24) in Block Thirty (30) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-EIGHT:
Lots Twenty-one (21) and Twenty-two (22) in Block Thirty (30) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FORTY-NINE:
Lot Twenty-two (22) in Block Thirty-nine (39) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY:
Lots Thirty-eight (38), Thirty-nine (39), and Forty (40) in Block Thirteen (13) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-ONE:
Lot Thirty-eight (38) in Block Three (3) according to the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-TWO:
Lots Twenty-seven (27) and Twenty-eight (28) in Block Twelve (12) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-THREE:
Lots Twenty-five (25) and Twenty-six (26) in Block Twelve (12) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-FOUR:
Lots Twenty-three (23) and Twenty-four (24) in Block Twelve (12) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-FIVE:
Lots Twenty-one (21) and Twenty-two (22) in Block Twelve (12) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-SIX:
Lot Forty (40) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-SEVEN:
Lots Thirty-eight (38) and Thirty-nine (39) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-EIGHT:
Lot Thirty-seven (37) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL FIFTY-NINE:

Lot Thirty-six (36) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY:

Lots Thirty-four (34) and Thirty-five (35) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-ONE:

Lot Thirty-three (33) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-TWO:

Lot Thirty-two (32) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-THREE:

Lots Thirty (30) and Thirty-one (31) in Block Eleven (11) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-FOUR:

Lots Thirty-eight (38), Thirty-nine (39), and Forty (40) in Block Ten (10) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-FIVE:

Lots Thirty-three (33) and Thirty-four (34) in Block Ten (10) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-SIX:

Lots Thirty-one (31) and Thirty-two (32) in Block Ten (10) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-SEVEN:

Lots Twenty-eight (28), Twenty-nine (29), and Thirty (30) in Block Ten (10) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SIXTY-EIGHT:

Lot Five (5) in Block Seven (7) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

EXCEPTING THEREFROM that portion thereof conveyed to Northwestern Pacific Railroad Company by deed recorded June 20, 1911 in Book 116 Deeds, Page 9, Humboldt County Records.

PARCEL SIXTY-NINE:

Lots Six (6) and Seven (7) in Block Seven (7) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

EXCEPTING THEREFROM that portion thereof conveyed to Northwestern Pacific Railroad Company by deed recorded June 20, 1911 in Book 116 Deeds, Page 9, Humboldt County Records.

PARCEL SEVENTY:

Lot Eight (8) in Block Seven (7) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

EXCEPTING THEREFROM that portion thereof conveyed to Northwestern Pacific Railroad Company by deed recorded June 20, 1911 in Book 116 Deeds, Page 9, Humboldt County Records.

PARCEL SEVENTY-ONE:

Lot Nine (9) in Block Seven (7) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

EXCEPTING THEREFROM that portion thereof conveyed to Northwestern Pacific Railroad Company by deed recorded June 20, 1911 in Book 116 Deeds, Page 9, Humboldt County Records.

PARCEL SEVENTY-TWO:

Lots Twelve (12) and Thirteen (13) in Block Seven (7) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SEVENTY-THREE:

Lots Fourteen (14) and Fifteen (15) in Block Seven (7) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SEVENTY-FOUR:

Lots Sixteen (16) and Seventeen (17) in Block Seven (7) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SEVENTY-FIVE:

Lots One (1) and Two (2) in Block Eight (8) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SEVENTY-SIX:

Lot Twenty-seven (27) in Block Eight (8) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

EXCEPTING THEREFROM that portion thereof conveyed to Northwestern Pacific Railroad Company by deed recorded June 20, 1911 in Book 116 Deeds, Page 9, Humboldt County Records.

PARCEL SEVENTY-SEVEN:

Lot Twenty-six (26) in Block Eight (8) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

EXCEPTING THEREFROM that portion thereof conveyed to Northwestern Pacific Railroad Company by deed recorded June 20, 1911 in Book 116 Deeds, Page 9, Humboldt County Records.

PARCEL SEVENTY-EIGHT:

Lot Thirty-five (35) in Block Twenty-five (25) as shown on the Amended Map of Samoa or West Eureka, filed in Book 5 Maps, Page 74, Humboldt County Records.

PARCEL SEVENTY-NINE:

Beginning at the intersection of the east line of Murray Avenue and the north line of Hiller Street as shown on the official map of the Town of Samoa, County of Humboldt, State of California, as filed in the office of the County Recorder of said Humboldt County, in Book 5 Maps, Page 74, and marked on the ground by a two inch iron pipe set four feet in the ground;

thence N 25° E, 100 feet to stake for corner;

thence S 65° E, 110 feet to an iron pipe for corner;

thence S 25° W, 100 feet to an iron pipe for corner;

thence N 65° W, 110 feet along the north line of Hiller Street to the place of beginning.

END OF DESCRIPTION

Prepared by:

Michael J. O'Hern

Michael J. O'Hern
LS 4829 Exp. 9-30-04

original LCPA
when initiated by
Humboldt County Board of Supervisors
September 2002

Agenda Item No. J-1

COUNTY OF HUMBOLDT
Board of Supervisors

For Meeting of September 10, 2002

DATE: August 7, 2002
TO: Board of Supervisors
FROM: Kirk Girard, Director of Community Development Services
SUBJECT: Samoa Pacific Group, LLC Plan Amendment Petition; Samoa Area
File No. 401-031-28 et al; Case No: GPP-02-01

RECOMMENDATION

That the Board of Supervisors:

1. Open the public hearing and receive staff report and public testimony.
2. Close the public hearing.
3. Based on the findings in the staff report and testimony received about the project, accept the petition by approving the attached resolution.
4. Direct the Clerk of the Board to notify the applicant and any other parties requesting notice of the Board's decision.

Prepared by: Michael E. Wheeler
Michael Wheeler, Senior Planner

CAO Approval: K Sunkin

REVIEW: Auditor ____ County Counsel CR Personnel ____ Risk Manager ____ Other ____

TYPE OF ITEM:
o Consent
x Departmental
o Public Hearing
o Other

cc: Applicant
Agent

PREVIOUS ACTION/REFERRAL
Board Item No.

BOARD OF SUPERVISORS, COUNTY OF HUMBOLDT
Upon the motion of Supervisor _____
seconded by Supervisor _____
and unanimously carried by those members present,
the Board hereby adopts the recommended action
contained in this report.

Dated: SEP 10 2002

by: _____
Lora Canzoneri, Clerk of the Board

pc: Community Development
Applicant
Agent

EXHIBIT NO. 23
APPLICATION NO.
HUM-MAJ-1-08 – HUMBOLDT COUNTY LCP AMENDMENT (SAMOA TOWN PLAN
AS INITIATED BY BOARD OF SUPERVISORS SEPTEMBER 10, 2002
BACKGROUND INFORMATION
(1 of 36)

SUMMARY

In 2001, the historic lumber town of Samoa was purchased by the Samoa Pacific Group, LLC as the result of an international auction. The land purchased at auction comprised 65 acres, and included the town of 98 houses, a restored hostelry, a post office, gymnasium, the Samoa Cookhouse, gift shop, fire house, wood shop, former gas station, the Women's Club, and the existing sewage treatment system. Samoa Pacific Group also purchased industrial and dune lands totaling approximately 150 acres, and they hold an option on an additional 200 acres of natural resource lands along the coast to the north of the town site.

In August 2002, the applicants submitted a Master Plan for the Samoa town site prepared by RNL Design in collaboration with The Planning Studio of Kevin Young. The Master Plan covers 174 acres of land in and adjacent to the existing town. The Master Plan provides for the future development of a wide range of uses within the town, including tourist-oriented accommodation and retail uses, new and renovated housing, business and industrial uses, historic/cultural/recreational uses, community uses and parks and open spaces.

Under the Humboldt Bay Area Plan and Coastal Zoning Ordinance, the project site is divided into three zoning classifications. The area to the east of the existing railroad alignment is zoned MC – Industrial Coastal Dependent. The lands between the railroad alignment and New Navy Base Road is zoned MG – Industrial General. All of the land on the Pacific Ocean or west side of New Navy Base Road is zoned NR – natural resources. These areas have equivalent general plan land use designations. As a result of the existing zoning and land use designations, all of the existing and proposed uses in the town will require an amendment to the Local Coastal Plan and a zoning reclassification.

The Master Plan for town site development includes the following:

- Historic/Cultural Precinct focused around the Samoa Cookhouse, and including a number of structures housing historic, cultural and museum entities.
- A total of 365 residential units, including 57 of the existing residential units plus an additional 308 units. New residential development is to include 25 high-end custom lots, 136 new "market" lots, 23 multi-family units, 68 affordable housing units and 56 senior housing units.
- To create a strong "tourist/retail" core, uses along two streets of the current Samoa town will be changed from residential use to retail commercial. These structures are located along Rideout Road and Cadman Court. Retail uses will include boutiques, services, tourist-oriented shops and galleries.
- Community Precinct centered around a new landscaped town square to be developed on the existing parking lot across from the Samoa Block. The Samoa Block will be renovated to provide 23,000 square feet for community uses, including a meeting hall, management company/association offices, recreation and professional office space.
- Tourist-oriented accommodation to include a 75-room lodge with 500-person conference center, 250-person performing arts center and spa, 19 vacation cottages, and a 71-space recreational vehicle park.

- Business Park (47 acres) situated to the south of Samoa Avenue and to the west of the extension of Vance Avenue. 15 acres are designated as the future sewage treatment plant site, and the business park will have 25 lots ranging in size from 1 acre to 2.2 acres. Uses in the business park are planned to be incubator and light industrial, warehousing, showroom, small business/office uses. 7.7 acres to the east of Vance Avenue are to be designated for coastal dependent industrial uses that require direct access to the coast and bay.

The Department has received a petition requesting that your Board accept for processing an applicant-initiated General Plan Amendment. The parcels are located in the Samoa area and are currently owned by the Samoa Pacific Group LLC. The parcels are to be part of large scale community development and revitalization project to be carried out under the Samoa Town Master Plan developed by the Samoa Pacific Group. The purpose of the proposed General Plan Amendment and Zone Reclassification is to facilitate implementation of the Master Plan and involves changing the land use designations consistent with the plan.

The project area is located in the Coastal Zone. In order to proceed with the project, the Department determined that a General Plan Amendment / Local Coastal Plan Amendment is required to ensure consistency with the General Plan. Section 1452 of the Framework Plan specifies that the Board of Supervisors may initiate plan amendments based on the recommendation of the Planning Commission, or requests by members of the public. The only decision to be made at this time is whether or not the Board will accept the individual Plan Amendment for processing, review and consideration. If accepted, final approval of the proposed amendments will be dependent upon a further showing that the request is both "in the public interest" and "consistent with a comprehensive view of the General Plan."

The Department strongly supports this project and recommends that your Board accept this petition. An Environmental Impact Report will be required for processing the General Plan Amendment. The acceptance of the application and subsequent environmental review process should ensure that the proposal impacts will be fully mitigated to the extent feasible.

DISCUSSION

Review Criteria

Pursuant to Section 1452 of the Framework Plan, Volume I, Plan Amendments may only be initiated by the Board of Supervisors based on a recommendation by Resolution of the Planning Commission or requested by members of the public. Section 1452.2 of the Framework Plan establishes findings, any **one** of which shall be grounds for considering a plan amendment. Specifically, the findings are:

1. Base information or physical conditions have changed; or
2. Community values and assumptions have changed; or
3. There is an error in the plan; or
4. To maintain established uses otherwise consistent with a comprehensive view of the plan.

Further, the policies of the General Plan do not prohibit the Board of Supervisors from considering plan amendments. Hence, the Board of Supervisors has the discretion of accepting for consideration any proposed plan amendment, even though none of the findings of Section 1452.2 may be able to be made for the specific request. However, where the findings are made, Section 1452.2 requires that the particular proposed plan amendment be considered. Amendments accepted for consideration are processed as staff resources permit consistent with the Department's budget allocation and work program.

Board Order No. 17 of January 15, 1985, sets forth General Plan Amendment Review Criteria (Attachment C of this Staff Report). The guidelines provide distinctions between "major" and "minor" plan amendments, and they are to be utilized in the review of proposed plan amendments where discretion is exercised on whether to consider the amendment.

Department's Analysis

The applicant's petition, which is essentially embodied in the Samoa Town Master Plan, provides an argument for consideration of a proposed plan amendment and associated zone reclassification based on a change in base information and to maintain established uses (Sections 1452.1 and 1452.4 of the Framework Plan).

The change in base information is based on the following:

- Since the adoption of the Humboldt Bay Area Plan in 1982, there has been a general decline in logging and forestry related uses of the town site.
- The subject parcels have changed ownership from industrial timber concerns to private commercial and residential development interests and represents an opportunity for significant economic redevelopment.
- The current plan and zone boundaries are not consistent with existing residential, commercial and community uses within the town site.

Town History and Further Potential

The town of Samoa has a history that dates back to the 1800's. In 1892, several prominent citizens of Eureka formed the Samoa Land and Improvement Company and purchased 270 acres of land at Samoa, including one mile of waterfront extending along Humboldt Bay and the Pacific Ocean. The company prepared a plan for a town with over 2,000 residential lots and promoted the town as the "Coney Island of the Pacific." In 1893, E.H. Vance and S.A. Vance (Vance Redwood Company) purchased land in Samoa from the Samoa Land and Improvement Company to build a sawmill, and that same year the Samoa Cookhouse opened to serve the mill workers.

In 1900, the A. B. Hammond Lumber Company purchased the Vance Redwood Company including the Samoa sawmill, and in the following years made major additions to the sawmill, including drying kilns and two logging camps. The Samoa mill soon developed into the world's largest redwood sawmill with a sash and door factory.

In 1912, the Hammond Lumber Company began purchasing the town site and building company housing for its employees and their families, and by 1915 operated a sawmill, planing mill, door and sash factory, molding plant, sorter shed, warehouses and shops at Samoa. Steamship docks and logging trains running from Little River through Fieldbrook and Arcata to Samoa provided for transportation of raw materials and finished goods. By 1924, Hammond Lumber Company owned all of the houses in Samoa.

Hammond Lumber Company managed the town until 1956 when Georgia Pacific purchased the company, and in 1959, Georgia Pacific completed construction of a plywood mill at Samoa. At the time, the mill was the largest plywood mill of its kind in the world. In 1963 construction began on a 500 ton a day bleached kraft pulp mill in Samoa, which was operational between 1965 and 1968.

In 1973, as a result of a Federal Trade Commission order to divest many of its assets, Georgia Pacific transferred ownership of the Samoa facilities to the Louisiana-Pacific Company, which continued management of Samoa with a full-time maintenance staff until the sale to Simpson-Samoa Company in 1998. This period saw a major decline in the logging and lumber industries in California as existing forestry inventories were depleted. As a result, it also saw a general decline in the vibrancy of the town of Samoa.

In 2001, the town of Samoa was put up for sale by the Simpson-Samoa Company and purchased by the Samoa Pacific Group, LLC as a result of an international auction. The Samoa Pacific Group, LLC is a group of local investors intent upon preserving the historical character of the town site. The land purchased at auction comprised 65 acres. Samoa Pacific Group also purchased industrial and dune lands totaling approximately 150 acres in September 2001, and they hold an option on an additional 200 acres of natural resource land along the land to the north of the town.

Humboldt Bay Area Plan

The Department has reviewed the proposal in relation to the Humboldt Bay Area Plan (HBAP) and has identified several plan policies applicable to the Samoa area. The Samoa town site is outside of the Urban Limit Line, and as the master plan envisions development at urban densities, the urban limit line would need to be adjusted to include the Samoa town site. Additionally, the following HBAP policies are applicable to the Samoa area:

3.13.B.5. Coastal Dependent Development – In reviewing projects requiring channel access, it is recognized that the channel adjacent to the Samoa Spit is naturally scoured and generally provides the best opportunity for deeper draft use.

3.14.A. Planned Industrial Uses – The North Spit south of the Samoa Bridge is the site of the County's heaviest industrial uses...These areas are planned Coastal Dependent Industrial because of the water-borne traffic which constitutes an integral part of these operations.

3.27.A.2. Recreation Planned Uses – Commercial Recreation facilities are planned at the intersection of New Navy Base Road and the Samoa Bridge.

3.30.A. Natural Resource Protection Policies and Standards – The Dune area extending west of Manila and Samoa Bridge is composed of environmentally sensitive dune habitats, and therefore is designated "natural resources." This designation restricts the type of development allowed in this area.

3.40.A. Visual Resource Protection – Samoa Blvd., directly west of Arcata, also offers views of the Bay and surrounding agriculture lands that are unparalleled near most urban coastal areas.

In reviewing the Samoa Pacific Group Master Plan, staff believes that the above policies were treated appropriately. Existing and potential Coastal Dependent Industrial Uses will be maintained. The proposal includes a Commercial Recreation component in the way of an RV park and additional coastal access facilities. Excluding the RV park site, which has been previously disturbed, all of the beach and dune areas along the west side of New Navy Base Road will not be disturbed. The proposed RV park will require modification of the natural resource area boundaries, but this impact could be mitigated through enhanced protections on adjacent lands or by assigning a natural resource designation to an equivalent area of land. Significant areas of land located between New Navy Base Road and the residential areas will be maintained in open space and restored to a natural dune environment. Visual resource protection will be maintained.

Tsunami Run-up Area

The Master Plan includes a Tsunami Evacuation Plan. Historic events in the area include a major tsunami that struck the Samoa peninsula in 1700 and overtopped the south end of the peninsula. There have been recorded tsunami events that date back 800, 1,100 and 1,500 years.

However, all of the data collected in the past 10 years indicates that there has not been any significant overtopping of the Samoa area from past tsunamis. This is primarily due to the nature of the ocean coastline in front of Samoa, which is believed to be fairly well protected by the dune environment located between the town and the ocean. The height, diversity of the dune topography and dune vegetation, coupled with the elevation of the town is believed to have created an environment that is less susceptible to tsunami inundation. Nonetheless, the master plan includes a Tsunami Evacuation Plan that identifies tsunami assembly points, evacuation routes, and safe ground above 40' elevation in the project area.

FINANCIAL IMPACT

The Economic Development Division of Community Development Services has secured grant funds to pay for permit and plan amendment application fees. The applicant will be responsible to pay for the costs of the Environmental Impact Report and any other special studies required for processing the application.

OTHER AGENCY INVOLVEMENT

The Department has referred the proposed project to numerous agencies for comments and recommendations. All responding agencies have either recommended approval or conditional approval of the project.

BOARD ALTERNATIVES

1. The Board of Supervisors can find that "Base information or physical conditions have **not** changed" and that the proposal could result in conversion of coastal dependent industrial and resource lands in a manner that is not in accord with a comprehensive view of the plan. To implement this alternative, it is recommended your Board direct the Department to draft the necessary resolution, and bring it back to your Board for consideration at a future (continued) public hearing.

ATTACHMENTS:

ATTACHMENT 1: Board Resolution Accepting the Petition
ATTACHMENT 2: Applicant's justification – Samoa Town Master Plan Report.
ATTACHMENT 3: Maps (see Samoa Town Master Plan Report pages 14 and 33).
ATTACHMENT 4: Board Order #17.

Certified copy of portion of proceedings, Meeting of January 15, 1985

SUBJECT: POLICY PERTAINING TO THE INITIATING OF PLAN AMENDMENTS

ACTION: This Board of Supervisors hereby takes the following actions:

1) Adopted the Plan Amendment Review Criteria as listed in Attachment "A".

2) Approved the Procedure outlined in Attachment "B" as it concerns applications for a petition for a plan amendment.

3) Rescinded Board Orders date August 3, 1982, and February 15, 1983, concerning the processing of minor plan amendments as shown on Attachments C and D.

Adopted on motion by Supervisor Walsh, seconded by Supervisor Pritchard and the following vote:

AYES: Supervisors— Renner, Pritchard, Chesbro, Walsh, Sparks
NOES: Supervisors— None
ABSENT: Supervisors— None
ABSTAIN: Supervisors— None

STATE OF CALIFORNIA } ss
County of Humboldt }

I, ROBERT E. HANLEY, Clerk of the Board of Supervisors, County of Humboldt, State of California, do hereby certify the foregoing to be a full, true and correct copy of the original made in the above entitled matter by said Board of Supervisors at a meeting held in Eureka, California as the same now appears of record in my office.

Originating Department: Planning ✓
cc:
Building Inspector

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Seal of said Board of Supervisors

ROBERT E. HANLEY January 15, 1985

Clerk of the Board of Supervisors of the County of Humboldt, State of California

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PLA[illegible] AMENDMENT [illegible]

The process approved to facilitate the Board of Supervisors' review of the initiation of plan amendments is as follows:

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endments.

1. The applicant submits an application for a petition for a plan amendment to the Planning Department. The application should include:

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a) a full project description, including justification

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b) a review of the project as it relates to the criteria established for Plan Amendment Review, and

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c) the fees established by resolution of the Board.

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2. The Department will review the request against the established criteria, assess its potential impact on the work program, and provide the Board with a recommendation concerning the application.

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3. The Board may then approve; approve with conditions, or deny the request for petition.

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At this point, the Board may initiate the plan amendment on its own. The effect of this is that no processing fees would be assessed to the applicant.

4. Once the Board takes an affirmative action, the applicant may then file the petition for plan amendment along with the fees adopted by resolution with the Department.

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ATTACHMENT "B"

PLAN AMENDMENT REVIEW CRITERIA

The following criteria are to be used in making distinctions between plan amendments. They are to be utilized in the Planning Department's and the Board's review of proposed plan amendments.

(1) Preliminary evaluation of the request with the General Plan - Volume I, Section 1452.2.

(2) Change from a Resource Designation to a Non-Resource Designation.

(3) Extension of Services, Sewer and/or Water, Beyond Established Sphere of Influence or Urban Expansion Boundary.

(4) Modification of an Existing Urban Limit Line or Urban Expansion Boundary.

(5) Affects a Major Coastal-Related issue such as Public Access to the Coast, Coastal Environmentally Sensitive Habitats, or Coastal Views.

(6) Minor adjustment of plan designation to be coterminous with parcel boundaries where coastal resource designations are not adversely affected.

(7) Land Area affected.

(8) Number of property owners.

(9) Date of most recent plan revision for this area.

(10) Approximate date of next scheduled revision for this area.

RESOLUTION NO. 02-81

BOARD OF SUPERVISORS, COUNTY OF HUMBOLDT, STATE OF CALIFORNIA
Certified copy of portion of proceedings; Meeting on September 10, 2002

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF HUMBOLDT ACCEPTING THE SAMOA PACIFIC GROUP PLAN AMENDMENT PETITION FOR FILE NO. AP 401-031-28; CASE NO. GPP -02-01

WHEREAS, Section 65358 of the State Government Code allows the Board of Supervisors to amend the General Plan up to 4 times in any calendar year; and

WHEREAS, Section 1452.2 of the Humboldt County Framework Plan establishes that, if the following findings are made, a requested plan amendment "shall be considered" by the Board of Supervisors:

1. Base information or physical conditions have changed, or
2. Community values and assumptions have changed, or
3. There is an error in the plan, or
4. The amendment is necessary to maintain established uses otherwise consistent with a comprehensive view of the plan; and

WHEREAS, the property owner has submitted a petition requesting a plan amendment and zone reclassification for property as identified in File AP 401-031-28, Case No. GPP-02-01; and

WHEREAS, the property owner's agent has submitted a map in file AP 401-031-28, and information which illustrates that three different types of zoning exist for these parcels and a general plan amendment and zone reclassification is required to facilitate a planned community development; and

NOW, THEREFORE, BE IT RESOLVED by the Humboldt County Board of Supervisors that the following findings are hereby made:

1. The proposed amendment and zone reclassification is accepted for processing to maintain established uses otherwise consistent with a comprehensive view of the plan, and because community values and assumptions have changed.

2. The applicant is hereby notified the proposed plan amendment and zone reclassification can only be approved if, after holding public hearings before the Planning Commission and Board of Supervisors, the Board finds that the applicant has submitted evidence which clearly supports making all of the required legal findings.

Adopted on motion by Supervisor Woolley, seconded by Supervisor Kirk and the following vote:

AYES: Supervisors: Smith, Rodoni, Woolley, Neely, and Kirk

NOES: Supervisors: None

ABSENT: Supervisors: None

STATE OF CALIFORNIA)
) SS.
County of Humboldt)

I, Lora Canzoneri, Clerk of the Board of Supervisors of the County of Humboldt, State of California do hereby certify the foregoing to be a full, true, and correct copy of the original made in the above-titled matter by said Board of Supervisors at a meeting held in Eureka, California as the same now appears of record in my office.

In Witness Whereof, I have hereunto set my hand and affixed the Seal of said Board of Supervisors.

LORA CANZONERI
Clerk of the Board of Supervisors of the County of Humboldt, State of California

By: Lora Canzoneri
LORA CANZONERI

Date: September 10, 2002

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Introduction

This is a Development Master Plan for 174 acres of land comprising the town of Samoa and adjacent lands in Humboldt County, California along a peninsula of land between the located between the Pacific Ocean and the northern portion of Humboldt Bay. In November of 2001, Economic Research Associates in San Francisco completed a "Market Evaluation and Alternative Development Program" study for the town. RNL Design was commissioned to provide planning input in support of that study. In February of 2002, RNL Design in collaboration with The PLANNING Studio of Kevin Young was asked to prepare this master plan for the future development of Samoa.

Future development proposed in the Master Plan includes approximately 308 additional residential units, a lodge/conference center/spa, a historic/cultural precinct, new tourist and resident-oriented retail, a business park, coastal dependent industrial uses and parks and open space.

This master plan report first describes the history of the Town of Samoa and the existing town and its surrounding environs. It then provides an analysis of planning opportunities and constraints identified by the planning team. Next it describes the planning methodology utilized in carrying out this study and summarizes the various conceptual plan alternatives that have been explored jointly by the consultant team and the owners. Finally, it describes the proposed overall Master Plan for the site and provides a conceptual description of the architectural and landscape character envisioned for the future development of the town.

Executive Summary

In 2001, the historic lumber town of Samoa, California was purchased by the Samoa Pacific Group, LLC as the result of an international auction. The town of Samoa is located in Humboldt County in northern California. It is situated within 3 miles of the town of Eureka and 7 miles of the town of Arcata along a peninsula of land between the Pacific Ocean and Humboldt Bay. The land was purchased at auction comprised 65 acres. The town included 98 houses, of which 90 were rental homes and 8 were condemned, a restored "Hostelry", a post office, gymnasium, "Samoa Cookhouse", gift shop, the "Samoa Block" (current fire house), wood shop, former gas station, Women's Club and the existing sewer system. Samoa Pacific Group also purchased industrial and dune lands totaling approximately 150 acres in September 2001. They also hold an option on an additional 200 acres of natural resource land along the coast to the north of the town.

In February 2002, RNL Design in collaboration with The PLANNING Studio of Kevin Young was asked to prepare this master plan for the future development of Samoa. The master plan covers 174 acres of land in and adjacent to the existing town.

In February 2002, work began on this master plan for the future development of Samoa. The master plan covers 174 acres of land in and adjacent to the existing town.

The initial task undertaken by the planning team was to complete a thorough analysis of the project site and its surrounding environs. Some of the principal findings of that site analysis are as follows:

- Significant structures within the town include the +20,000 square foot historic Samoa Cookhouse, a restored Victorian-style Hostelry, the two-story Samoa Block, the Women's Club building, a post office and 98 houses, 90 of which are currently rented. Eight homes are currently vacant and in need of repairs.
- The town of Samoa is accessed off of New Navy Base Road. The primary access is at the north end of the town via Cookhouse Road and Vance Avenue. Vance Avenue runs north and forms the main town street.
- Topography within the site ranges from gently undulating terrain to steep embankments. The lands along both shorelines are relatively flat, sloping gradually to the water. A primary dune zone runs along the ocean and reaches elevations up to 60 feet. The beach is fairly rugged in character, with significant wave action and fairly fine-textured brown sand. Most of the town is situated on relatively flat land with elevations in the 25 to 30 foot range. Further to the south and to the west of Vance Avenue, the terrain is more severely undulating with several arroyos and hillocks. Elevations in this limited area range from 15 feet up to 70 feet. Further south, the residential areas along Sunset Avenue are situated at elevations 25 feet to 40 feet. Once past the existing residential areas, the lands between Vance Avenue and New Navy Base Road are generally flat.
- The primary views from the town are to the Pacific Ocean to the west, and to Humboldt Bay and the City of Eureka to the east. The remaining pulp mill smokestack, located to the south of the town, on Simpson Pacific Cellulose land, is visible looking south down Vance Avenue.
- Water is provided by the Humboldt Bay Municipal Water District and is metered to the town, but not to individual homes. Electric power is provided by Pacific Gas and Electric Company who carried out a system-wide upgrade of lines and poles in 1998/1999. PG&E provides electricity to the town and the owners distribute it to the individual homes and businesses. The town has two wastewater collection, treatment

and disposal systems which are quite old and are operating at about 70% of capacity. Natural gas is available only to the Samoa Cookhouse, but could be extended to more of the town. Prior to any new major development, the water and sewer lines in the town will need to replaced and modernized. A new Sewage Treatment Plant will need to be constructed to handle the demand created by any new major development.

- According to the approved Humboldt Bay Local Coastal Plan and Humbodlt Coastal Zoning Regulations, the project site is divided into three zoning classifications. The area to the east of the existing railroad alignment is zoned MC - Industrial/Coastal Dependent. The lands between the railroad alignment and New Navy Base Road is zoned MG - Industrial General. All of the land on the Pacific Ocean or west side of New Navy Base Road is zoned NR - Natural Resources. As a result of this zoning, all of the existing uses in the town will require an amendment to the Coastal Development (General) Plan and a zoning re-classification.

Following the completion of the site analysis, opportunities and constraints as they related to potential development were identified. Some of the key opportunities that were identified included the following:

- The site enjoys excellent access to/from Arcata-Eureka Airport (16 miles/22 minutes) and the town of Arcata (10 minutes) via U.S. 101 and S.R. 255 through Manila. Samoa is also only 5 minutes drive from downtown Eureka via the Samoa Bridge;
- There is a large scenic beach and dunes area adjacent to the town;
- Parts of the town enjoy views of the bay and across to Eureka, as well as ocean views;
- The historic Samoa Cookhouse provides name recognition;
- There are major water and utility lines that already service the site;
- Large open development parcels are available;
- There is potential for the development of a variety of new uses including a tourist-oriented lodge or cottages, a conference retreat and an recreational vehicle park; affordable housing, first-time housing, rental housing and live/work lofts in the area; and heavy commercial and light industrial sites;
- Outside of Samoa, there is very little land available for both residential and industrial development in the County.

Some of the key constraints to future development include the following:

- Development of the site is subject to multiple regulatory jurisdictions and processes;
- Samoa is subject to seasonal weather patterns;
- Samoa is relatively isolated in relation to large metropolitan areas including San Francisco (275 miles/6 hours and 15 minutes drive) and Portland (415 miles/ 8 hours and 30 minutes drive);
- There is the potential for some tsunami inundation in the lower portions of the site;
- Existing residential units have limited on-site parking making on-street parking problematic;
- The adjacent, existing lumber storage yards are unsightly, as are old warehouse structures and expansive asphalt areas on Harbor Commission lands create a negative foreground view;
- The Humboldt Bay Harbor & Recreation and Conservation District controls the lands between the site and the bay;
- High-tension wires and pylons and the existing pulp mill smokestack on the adjacent Simpson Pacific Cellulose land creates a negative visual impact on the town;

Following completion of the site analysis and opportunities and constraints identification, the planning team developed a series of alternative land use concepts. The alternative concepts were presented to, and reviewed by, not only the owners, but representatives of several jurisdictional agencies and community groups who will be involved in the approval of the proposed development. As a result of several plan revisions and review meetings, the proposed Master Plan evolved.

The Master Plan provides for the future development of a wide range of uses within the town including tourist-oriented accommodation and retail uses, new and renovated housing, business and industrial uses, Historic/cultural/recreational uses, community uses and parks and open spaces.

The Historic/Cultural Precinct is focused around the historic Samoa Cookhouse, which will provide instant name recognition for the area. Development in this precinct will likely consist of a number of structures housing historic, cultural and museum entities. The existing Cookhouse will be renovated and will provide around 25,000 square feet of floor area. Additional new structures can supply up to 25,000 square feet of additional administration and display space. There will also be spacious outdoor display areas and between 100 and 150 parking spaces incorporated into the complex.

A total of 365 residential units are proposed for Samoa. This will include 57 of the existing residential units plus an additional 308 units of residential development. New residential development includes 25 high-end custom lots, 136 new "market" lots, 23 multi-family units, 68 affordable housing units and 56 senior housing units. New residential development will reflect the same character as the existing residential development in Samoa, with relatively narrow residential streets situated along a grid pattern and the inclusion of alleys where appropriate behind the lots. Existing homes to be retained are located along N. Bayview Avenue, Vance Avenue, Sanda Court and Sunset Avenue. New residential development is proposed in two areas, east of the railroad easement and west of Vance Avenue. Fifty-six senior housing units and 68 affordable housing units are proposed to be located east of the railroad easement below the existing town. Senior units will be one-story, approximately 400 square feet and will have single car garages. The 68 affordable housing units will generally be two-story units ranging in size from 1,200 to 1,600 square feet.

Additional residential development will include 136 "market" lots averaging 3,360 square feet situated to the north of Samoa Avenue and west of Vance Avenue. There will be 18 larger "custom" residential lots along the western and northern perimeters of this neighborhood. They will average 5,000 square feet in size and have average dimensions of 50' x 100'. There will also be seven 5,000 square foot lots located near the intersection of Vance Avenue and "A Street". At the corner of Vance Avenue and Rideout Road, a new "signature building" will provide approximately 23 new multi-family units ranging in size from 700 square feet to 1,000 square feet.

To create a strong "tourist/retail" core, uses along two streets will be changed from residential to retail commercial. These structures are located along Rideout Road and Cadman Court. Retail commercial uses will extend along Rideout Road from the Women's Club to the intersection with N. Bayview Avenue on the east. Retail uses will include boutiques, services, tourist-oriented shops and galleries. Existing structures along Cadman Court will be utilized by a performing arts school. Cadman Court runs from the town square and the Samoa Block to Rideout Road. It is anticipated that the large house at the corner of Rideout Road and N. Bayview Avenue, across from the

History of Samoa

One of the goals of the master plan was to maintain the historical character of the town of Samoa. With a history that dates back to the late 1800's, the town is closely tied to the rise and fall of the lumber industry in Humboldt County. Following is a brief summary of the history of the town of Samoa. Much of this historical information was extracted from the manuscript "A History of the Samoa Division of Louisiana-Pacific Corporation and it's Predecessors, 1853-1973" prepared by Lowell S. Mengel II as part of a Master of Arts thesis at Humboldt State University.

In 1892, several prominent citizens of the town of Eureka, in Northern California, formed the "Samoa Land and Improvement Company" and purchased 270 acres of land at Samoa. The land included one mile of waterfront and extended from the Pacific Ocean to Humboldt Bay. They prepared a plan for the town with over 2,000 residential lots and set about promoting the town as the "Coney Island of the Pacific" due to its beachfront location. At this time, several Samoan Island Chiefs were engaged in warfare, bringing the name Samoa to the front pages of local newspapers and the promoters chose the then popular name for their new town.

On April 12, 1893, E.H. Vance and S.A. Vance, sons of Vance Company founder John Vance, purchased land in Samoa from the Samoa Land and Improvement Co to build a new sawmill on the Samoa peninsula. In the meantime, Samoa Land and Improvement Company had prepared a 23-page booklet to promote the advantages of Samoa's wonderful climate, beach frontage, and employment opportunities stemming from the construction of the Vance Company Sawmill in 1893-1894 and the extension of the Eureka and Klamath River Railroad from Eureka. In 1893, the Samoa Cookhouse opened to serve the mill workers. At times, 500 men were served at the 50 tables. Large bunkhouses were built for the employees and six blocks were reserved for a hotel complex.

In 1900, the A.B. Hammond Lumber Company purchased the Vance Redwood Company, which owned the sawmill at Samoa. When A.B. Hammond contracted to buy the mill in 1900, the mill consisted of one band saw. Beginning in 1901, A.B. Hammond made major additions to the Samoa sawmill. By the end of 1901, the mill was producing 300,000 board feet of lumber a day. Two drying kilns were under construction and the firm was operating two logging camps and employing between 500 and 600 employees, 400 or so of whom worked in the mill and yards in Samoa. The Samoa mill soon developed into the world's largest redwood sawmill with a sash and door factory.

In 1912, the company began purchasing the town site and building company housing for its employees and their families. By 1915, Hammond Lumber Company operated a sawmill, planing mill, door and sash factory, molding plant, sorter shed, warehouses and shops at Samoa. In addition, it had docks and steamships along with logging trains running daily from the Little River area through Fieldbrook and Arcata to Samoa. Electrification of the sawmill at Samoa began in 1922. In 1923, a road from Samoa to Arcata was completed. Previously, the ferry to Eureka and the railroad to Arcata were the only routes to Samoa. By 1924, Hammond Lumber Company owned all of the houses in Samoa.

During World War I, a shipyard was operated by the A.B. Hammond Company along the waterfront. In addition, in the 1920's the Hammond Company constructed the "Samoa Block". The road to Arcata was extended providing access to Highway 101. Hammond Lumber managed the town until 1956 when Georgia Pacific purchased the company. By 1948, the Hammond Lumber Company plant at Samoa produced 150,000 feet of finished lumber a day. In 1954, over 600 people were employed at Samoa and room had been created sufficient enough to air dry 10,000,000 board feet of lumber at one time. In 1955, Hammond Lumber completed the first battery of four new direct flow type dry

kilns in Samoa. The kilns could each hold 136,000 board feet of lumber. By the end of 1955, Hammond Lumber was drying between 45,000,000 and 55,000,000 board feet of lumber a year.

In 1956, Georgia-Pacific purchased a majority of Hammond Lumber Stock. In 1958, Georgia-Pacific began construction of a plywood mill at Samoa. That plant opened in 1959 and was one of the largest of its kind in the world. In 1963, construction began on a 500 ton a day bleached kraft pulp mill in Samoa. A new automated redwood lumber mill was also under construction. By 1964, Georgia-Pacific began operation of the new Samoa sawmill. The old sawmill, built by the Vance family in 1894 was dismantled and torn down. The new pulp mill was operational by 1965 and by 1968, the Samoa division of Georgia-Pacific included the Samoa sawmill, plywood mill, stud mill and pulp mill.

In 1973, as the result of a Federal Trade Commission order to divest many of its assets, Georgia-Pacific transferred ownership of about 205 of its assets, including the facilities at Samoa to Louisiana-Pacific a spin-off company of Georgia-Pacific. Louisiana-Pacific became the new owner in 1973 and continued management of Samoa with a full-time maintenance staff until the sale to Simpson-Samoa Company in 1998. This period saw a major decline in the logging and lumber industries in California as existing forestry inventories were depleted. As a result, it also saw a general decline in the vibrancy of the town of Samoa.

In 2001, the town of Samoa was purchased by Samoa Pacific Group, LLC as the result of an international auction. The land was purchased at auction comprised 65 acres. Samoa Pacific Group also purchased industrial and dune lands totaling approximately 150 acres in September 2001. They also hold an option on an additional 200 acres of natural resource land along the coast to the north of the town.

Site Description

A. EXISTING FACILITIES/RESIDENTIAL STRUCTURES

The town of Samoa is located on a peninsula of land between the Pacific Ocean and Humboldt Bay in Humboldt County, California. It is situated approximately 3.5 miles from the town of Eureka and 7 miles from Arcata. It is accessed via Samoa Road to the south of Arcata and across the Samoa Bridge from downtown Eureka. The main entry to the town is from New Navy Base Road at the north end of town along Cookhouse Road.

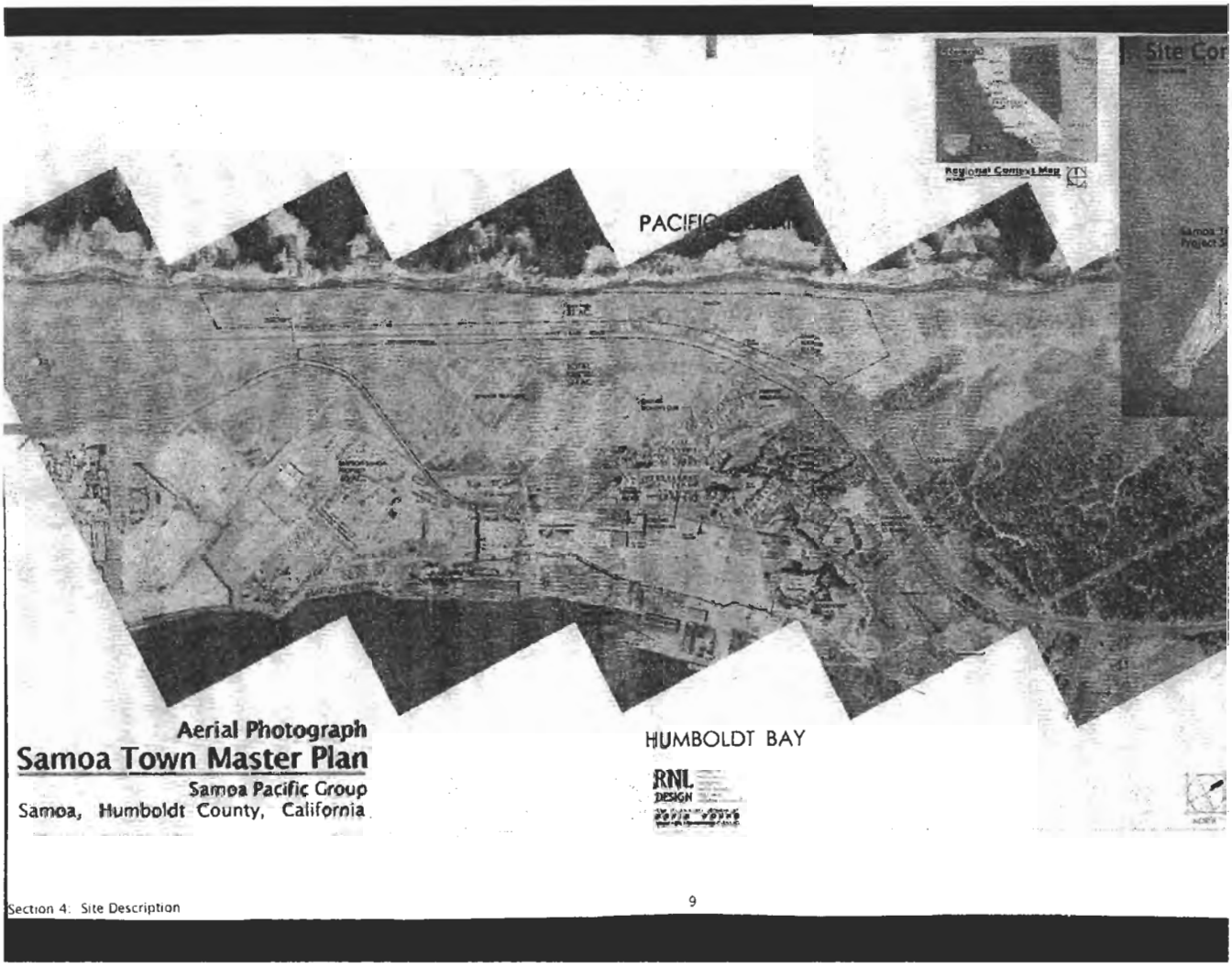
Near the entrance to the town is the historic Samoa Cookhouse, a +20,000 square foot, two-story wood frame building that still operates as a restaurant serving family-style meals three times a day. The ground floor of the cookhouse contains the restaurant, meeting rooms and historic lumber industry displays. The second floor, which is broken up into small rooms, is currently vacant. Adjacent to the Cookhouse is a small gift shop which still operates on an intermittent schedule. There are approximately 100 parking spaces in front of the Cookhouse. Below the parking lot are the old "Firemen's Hall" and a large gymnasium with a small attached apartment. There is also a storage building along the road adjacent to the "Fireman's Hall".

The existing town contains 99 houses. There are eight homes along Cadman Court that are currently vacant. The bulk of the housing was constructed during the 1920's and ranges from 650 square feet to 3,000 square feet. Monthly rents on the houses currently range from $391 to $850.

The most prominent structure in the town is the Victorian-style Hostelry. It was constructed in 1908 as the residence of the Vance Redwood Company owner. Located at the east end of Rideout Road, it has been used since then as a hostelry for lumber company executives and customers. It contains 11 bedrooms, a large kitchen, formal dining room and large living room. A recreation building with a pool room is attached to the rear of the house. The house is still in excellent condition and is used by the new owners as accommodation for visiting business associates.

Farther to the south along Cutten Street is the "Samoa Block". It is a two-story, +23,000 square foot structure that originally housed the mercantile, butcher shop, restaurant, community theater and offices. The building still houses the Samoa Volunteer Fire Department, but is in need of major repairs. Adjacent to the Samoa Block is a former gas station that currently houses a landscaping company. Adjacent to the Samoa Block, along N. Bayview Avenue is a small Post Office, maintenance shop and storage buildings.

The Woman's Club building is located at the junction of Rideout Road and Sunset Ave... in one of the residential neighborhoods. It contains a large meeting room, kitchen and enclosed porch.


PACIFIC
HUMBOLDT BAY
Aerial Photograph
Samoa Town Master Plan
Samoa Pacific Group
Samoa, Humboldt County, California
RNL DESIGN
Section 4: Site Description
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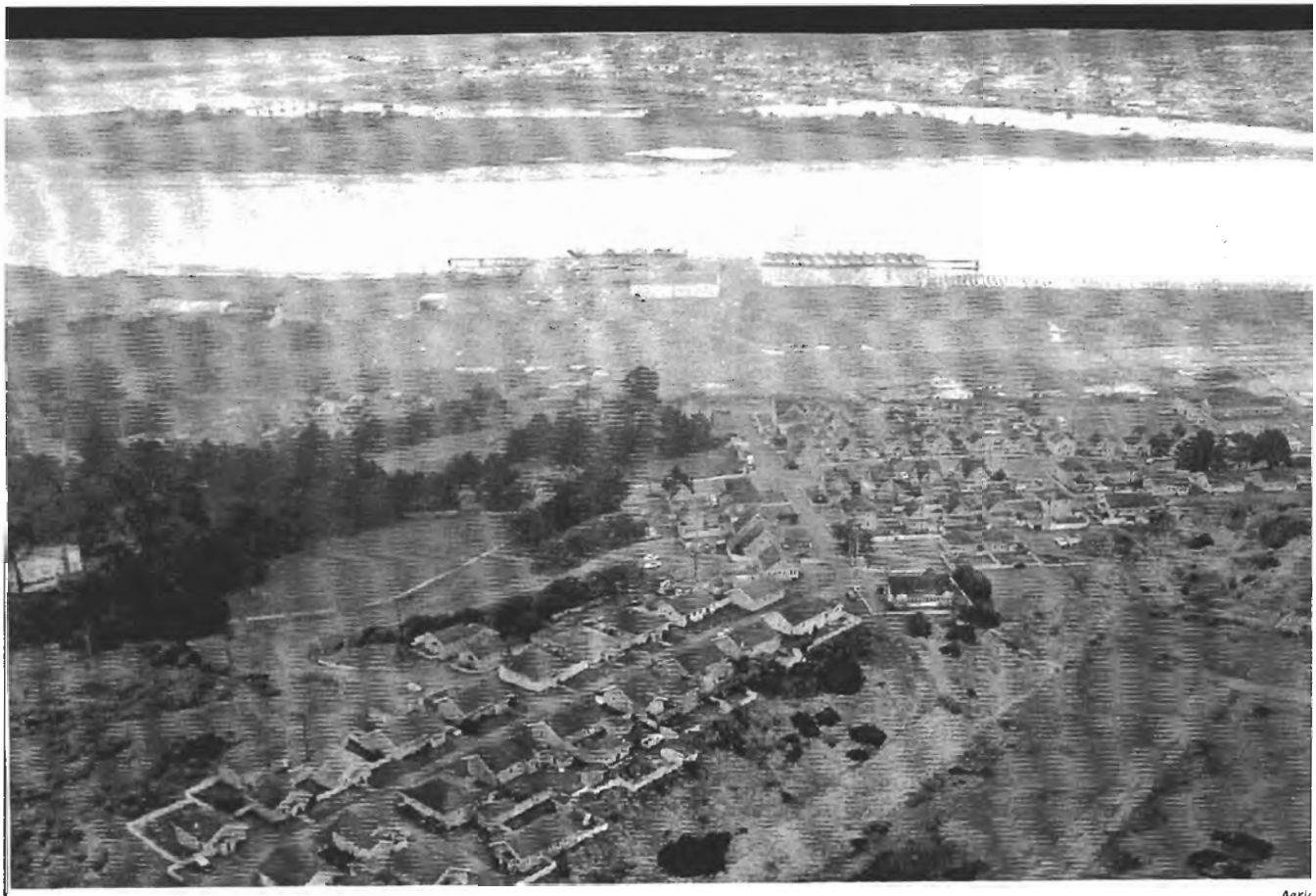

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B. EXISTING CIRCULATION

As discussed above, the Town of Samoa is accessed off of New Navy Base Road, which runs the length of the peninsula from the Samoa Bridge to a Coast Guard station at the end of the peninsula. The primary access is at the north end of the town via Cookhouse Road to Vance Avenue. Vance Avenue runs north and forms the main street through the town. It dead ends at the edge of the Simpson-Samoa land. It is a County Road from Cookhouse Road to the southern end of the elementary school. From there on, it is a private road. An elementary school and gymnasium are located to the west of Vance Avenue and the Cookhouse to the east. The first street to intersect with Vance Avenue is Fenwick Avenue, a narrow residential street lined by about 18 houses. The first main cross street is Rideout Road which provides access in both directions to the residential neighborhoods and the Hostelry. The Samoa Block and the Post Office are along Cutten Street. There is also an access point to New Navy Base Road at the southern end of the town, but it is currently within the Simpson-Samoa lands and access is limited. The remnants of a former rail line run parallel to Vance Avenue in front of the Cookhouse and along the bottom of the slope east of the Hostelry. Past the Post Office, the tracks have been abandoned with large portions missing altogether.

C. TOPOGRAPHY AND COASTAL ENVIRONMENTS

Samoa is situated on a peninsula between the Pacific Ocean and Humboldt Bay. The lands along both shorelines are relatively flat, with only minor undulations in the topography. To the north, there is a primary dune zone along the ocean which reaches elevations of up to 60 feet. Much of the dune area to the north is covered by fairly dense dune forest. The only exclusion to this is a parcel of land of about 9 acres known as the "Dog Ranch". This area has been cleared and is mostly disturbed land.

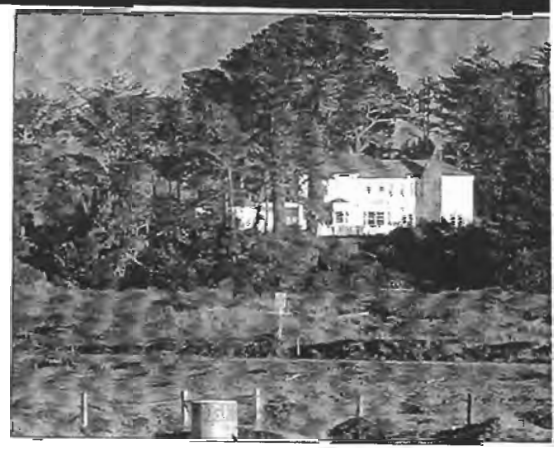
Further to the south, dune elevations range from about 15 feet to 30 feet in height. The beach is fairly typical of beaches found along the Northern California and Oregon coasts. It is generally rugged in character, with significant wave action and fairly fine-textured brown sand.

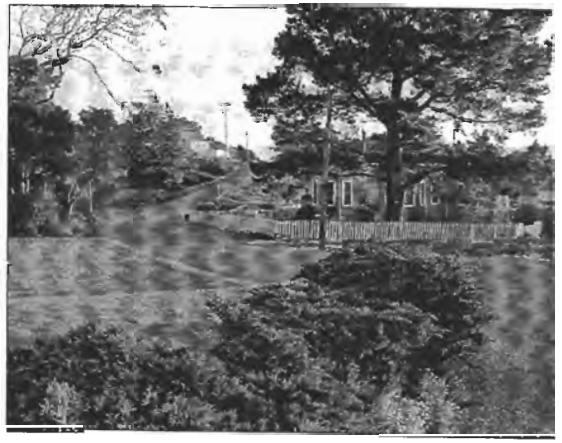
Within the town, the Elementary School, at the north end, is situated on relatively flat land with elevations in the 25 to 30 foot range. Further south and to the west of Vance Avenue, the terrain is more severely undulating with several arroyos and hillocks. Elevations in this area range from 15 feet up to 70 feet. Further south, the residential areas along Sunset Avenue are situated at elevations 25 feet to 40 feet. Once past the existing residential areas, the lands between Vance Avenue and New Navy Base Road are generally flat, having been utilized in the past for open air lumber storage. They are also lower than the residential neighborhoods lying at elevations of between 15 and 20 feet.

Lands to the east of Vance Avenue are less undulating, but are situated at a number of different levels. The Cookhouse and its adjacent facilities are located at about elevation 29 feet. The land between the parking lot and the road slope gently down to elevation 13 feet.

Most of the central part of town is situated on a relatively flat plateau in the 25 to 30 foot range. Between there and the Bay, there is a slope that ranges in height from 0 to 25 feet in height. The lands along the Bay are very flat and are at elevation 7 feet.

Another of the highest points in the town is just south of the Samoa Block and consists of a small hillock that reaches nearly 50 feet in elevation.





D. VIEWS AND VIEW PLANES

The primary views from the town are to the Pacific Ocean to the west, and to Humboldt Bay and the City of Eureka to the east. In addition to the City of Eureka to the east, there are a series of moderate-sized hills behind that city that form a backdrop to the city. The bay is visible from the Cookhouse, as well as much of the eastern edge of the town. Unfortunately, there is an area of between 600 and 1,200 feet in width between the town and the bay that was previously utilized for shipping, lumber activities and other industrial uses that is very unsightly. This area is primarily asphalt with a scattering of uninhabited or underutilized buildings which block some of the views to the bay. The views to the bay and across to Eureka are visible from most of the residential neighborhood situated to the east of Vance Avenue.

Because of the primary sand dunes located along the ocean coastline and to some degree to the east of New Navy Base Road, views to the Pacific Ocean are more limited. A panoramic view of the ocean is available from the General Manager's house looking west. In addition, there are exceptional views of the ocean from the Women's Club and the residences along Sunset Avenue. There are high-tension electrical lines and pylons which run parallel to the coastline and straddle New Navy Base Road that tend to downgrade ocean views from the town.

The remaining pulp mill smokestack, located to the south of the town on Simpson-Samoa land is visible looking south down Vance Avenue.

E. UTILITIES

Water is provided by the Humboldt Bay Municipal Water District, but is not metered. Electric power is provided by Pacific Gas and Electric Company who carried out a system-wide upgrade of lines and poles in 1998/1999. The town has two wastewater collection, treatment and disposal systems which are quite old and are operating at about 70% of capacity. Natural gas is available only to the Samoa Cookhouse, but could be extended to more of the town. Prior to any new major development, the water and sewer lines in the town will need to replaced and modernized. A new Sewage Treatment Plant will need to be constructed to handle the demand created by any new major development.

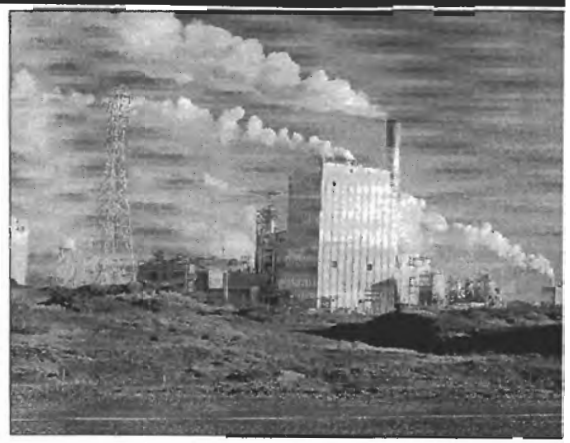
F. EXISTING ZONING

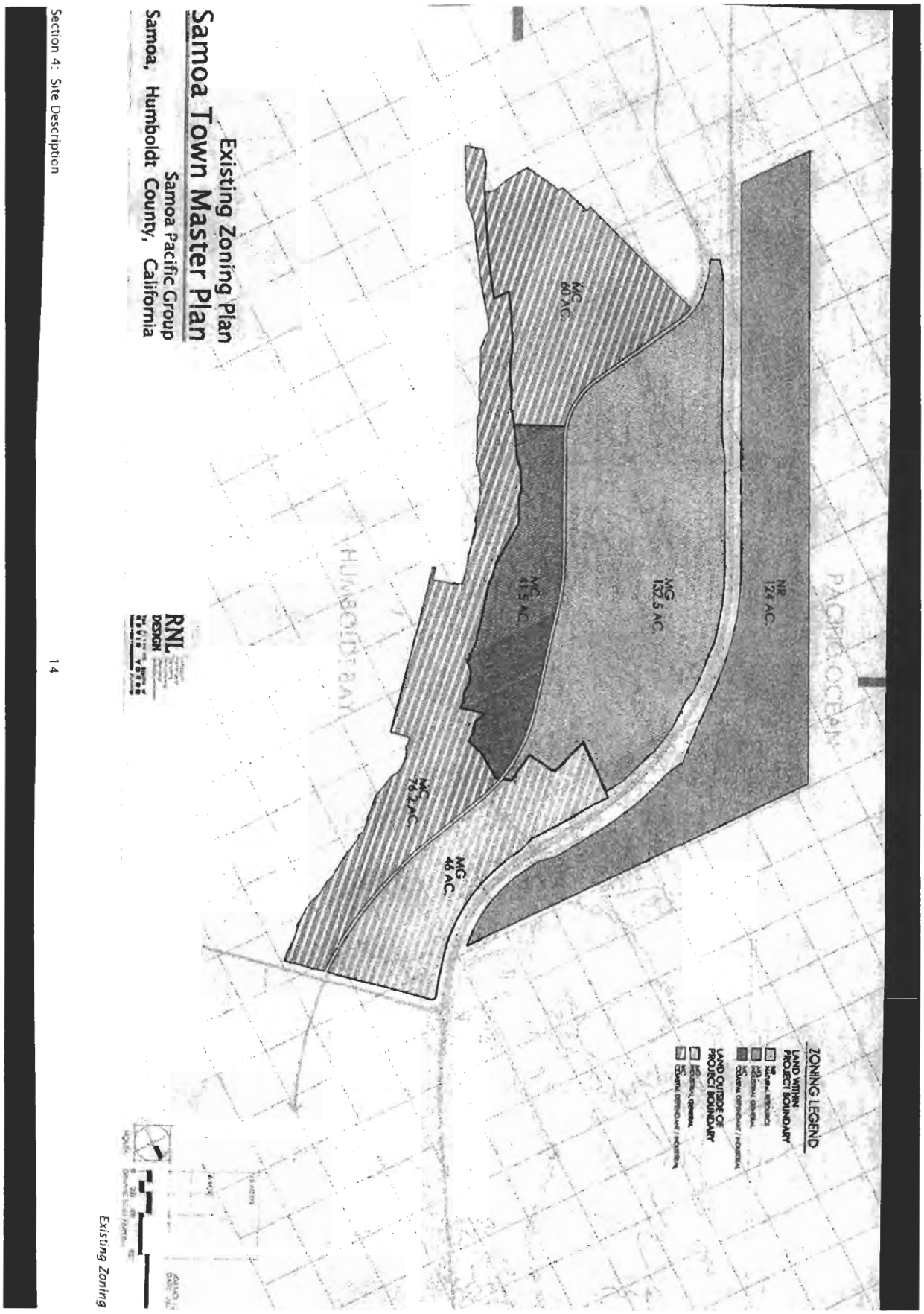
In June 2000, a lot line adjustment approved by the Humboldt County Planning Commission created a 59 acre town site parcel. According to the approved Humboldt County Coastal Development Plan and Humbodlt County Coastal Zoning Plan, the project site is divided into three zoning classifications. The area to the east of the existing railroad alignment is zoned MC - Industrial/Coastal Dependent. This zoning encompasses 41.5 acres of the site, plus an additional 67.4 acres of adjacent Simpson-Samoa land and an adjacent 76.2 acres of land controlled by the Humboldt County Harbor Commission.

The land between the railroad alignment and New Navy Base Road is zoned MG - Industrial General. These lands include 132.5 acres within the project site plus an additional 46 acres located to the north of the project site.

All of the land on the Pacific Ocean or west side of New Navy Base Road is zoned NR - Natural Resources. The NR zone covers a total of 124 acres.

As a result of this zoning, all of the residential development, as well as the existing commercial and community buildings within the Town of Samoa are currently non-conforming. As part of the entitlement process, all of the existing uses in the town will require an amendment to the Coastal Development (General) Plan and a zoning re-classification.





Section 4: Site Description

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Opportunities & Constraints

A. DEVELOPMENT OPPORTUNITIES

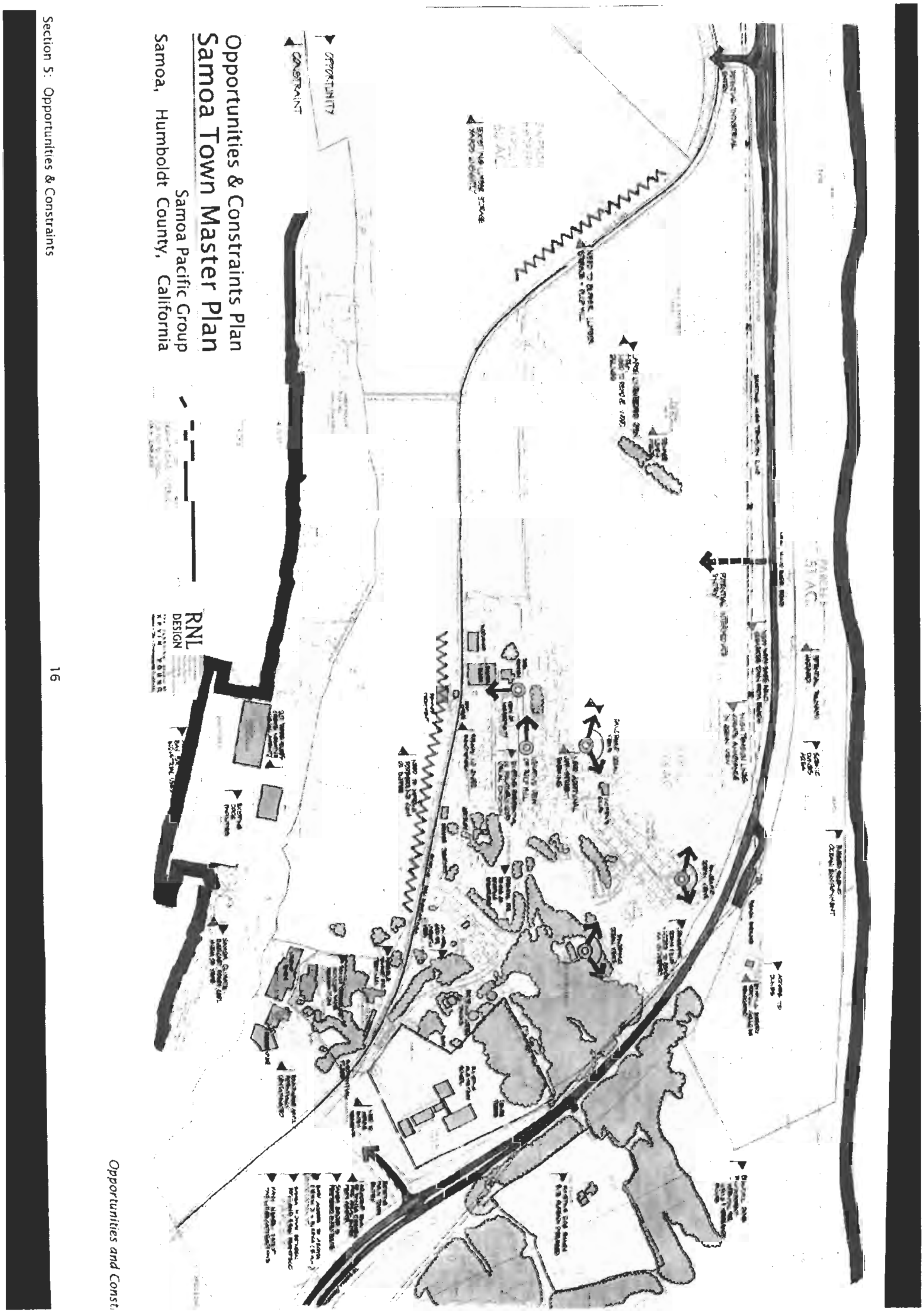
As part of the Market Evaluation Study prepared by Economic Research Associates for Samoa Town, RNL Design prepared several physical planning concepts designed to test ERA's proposed alternative development programs. As part of this analysis, ERA and RNL Design independently examined both opportunities and constraints as they related to potential development. A list of the opportunities identified includes the following:

- The existing town is in relatively good visual condition;
- The site is located within 22 minutes of the Arcata-Eureka Airport;
- The site has excellent road access, with Arcata being 10 minutes away via S.R. 255, and Eureka 5 minutes;
- The site is separated from the City of Eureka, yet only 3 miles away;
- There is potential for access to the bay for recreational and industrial usages as well as ferry service to Eureka;
- There is a large existing dock located on State land adjacent to the site that potentially could be utilized for cruise ship docking or other tourist-oriented water activities;
- There is the potential to develop and interest in developing an around-the-bay tourist train that would culminate at Samoa;
- The developers can control entry points to the town and the arrival sequence;
- There is a large scenic beach and dunes area adjacent to the town;
- The town enjoys views of the bay and across to Eureka;
- Views of the ocean exist in certain areas;
- The historic Samoa Cookhouse provides name recognition;
- There are several non-residential buildings with strong re-use potential including the Hostelry, Samoa Block, Women's Club and Manager's House;
- There are major water and utility lines that already service the site;
- Large open development parcels are available;
- Potential exists for the development of tourism accommodation in the town, including low density resort development, such as a lodge or cottages, a conference retreat, and an recreational vehicle park;
- There is demonstrated demand for affordable housing, first-time housing, rental housing and live/work lofts in the area;
- There appears to be demand for heavy commercial and light industrial sites.
- The Samoa Peninsula is designated as an Enterprise Zone by the State of California which allows tax credits and expense deductions on state taxes;
- Outside of Samoa, there is very little land available for industrial development in the County;
- There is very little land available for new residential development in either Arcata or Eureka;
- The County and the Humboldt County Harbor Commission believe there is demand for coastal dependent industrial land; and
- There are no high quality Recreational Vehicle Park facilities with hook-ups on the north coast.

B. CONSTRAINTS TO DEVELOPMENT

Potential constraints to future development have also beer identified during the market and master planning studies. These include the following:

- Development of the site is subject to multiple regula jurisdictions and processes;
- The weather in Samoa is cool for much of the year. Average high temperatures range from 54-58 degree from November through May, and 60-63 degrees fro June to October. Average precipitation ranges from inches November through January to one inch or les: June to September. The area is quite often overcast.
- The potential for the development of a significant to trade will be impacted by the seasonality of the area climate;
- Samoa is relatively isolated in relation to large metropolitan areas including San Francisco (275 mil and Portland (415 miles);
- The nearby town of Manila is in generally poor cond and negatively impacts the potential arrival sequenc the airport and Arcata;
- Samoa is perceived in some circles as remote and isolated;
- There may be the potential for some tsunami inunda in the lower portions of the site;
- Existing residential units have limited on-site parkin making on-street parking problematic;
- New Navy Base Road separates the town from the be
- The adjacent, existing lumber storage yards are uns
- The Humboldt County Harbor Commission controls lands between the site and the bay;
- Old warehouse structures and expansive asphalt are


Opportunities & Constraints Plan
Samoa Town Master Plan
Samoa Pacific Group
Samoa, Humboldt County, California
OPPORTUNITY
CONSTRAINT
RNL
DESIGN
Section 5: Opportunities & Constraints
16
Opportunities and Const.

Master Planning Approach

A. INITIAL DATA GATHERING, SITE ANALYSIS AND ON-SITE PLANNING AND DESIGN SESSION

To initiate the master planning study, the firm of Kelly-O'Hern prepared a detailed survey of the project site, including an additional 150-acre parcel that was held in option by the owners. The survey provided detailed topographic information for the site with 1 foot contour intervals.

To begin the planning process, a team from RNL Design and TPSOKY spent a week on-site. The purpose of this week-long planning session was to gather data, carry out initial meetings with the owners and representatives of various regulatory agencies, and to develop a series of initial conceptual master plan scenarios.

Initially, the entire planning team met with the client to review the ERA study and try to develop an initial development program for the town. The project boundaries were confirmed and additional options in terms of supplementary lands that might be available for purchase or lease were also reviewed.

The planning team toured the site, as well as the surrounding environs which comprised the Samoa peninsula, and the towns of Arcata and Eureka. An extensive photographic survey was undertaken, not only on the ground, but from the air to record all existing conditions and environmental relationships.

Once the project site had been thoroughly surveyed a series of initial meetings were held with officials from the following agencies:

- Humboldt County Planning Department
- City of Eureka City Manager's Office
- California Coastal Commission
- Humboldt County Harbor Commission
- California State Department of Transportation
- Audubon Society
- Northcoast Environmental Center
- Community members-at-large

The purpose of these meetings was to brief the various agencies and community groups on the scope of the master plan study and to solicit their initial inputs into the process. In addition, the overall entitlement process was discussed with representatives of the Humboldt County Planning Department, which will be the lead approving agency for the project and the representative of the California Coastal Commission. The purpose of these meetings was to begin to define what the overall timetable for the required entitlements will be and what materials will be required for each respective submittal.

Following these meetings, the planning team prepared a set of conceptual development alternatives based upon the preliminary program. A range of these alternatives is shown below. In addition, the planning team prepared a set of character sketches that illustrated some of their initial ideas related to the architectural and design character of Samoa. These sketches began to show what the town and individual buildings within the town might look like and what the predominant architectural character of the town might be once the master plan was implemented.

Each of these alternatives was reviewed with the owners to get their input and comments. By the end of the week-long session, the planning team and the owners had reached a consensus on a "Preferred Development Alternative".

Description of Plan Alternative

In order to arrive at the Master Plan, the planning team examined a number of conceptual and more detailed land use alternatives. This process began immediately during the initial on-site planning session. The planning team began with the preferred land use program as specified in the ERA report. Following the completion of the site analysis and the identification planning opportunities and constraints, the team reviewed the ERA program with the owners. From this review, the team developed a proposed development program. This refined program included the following uses:

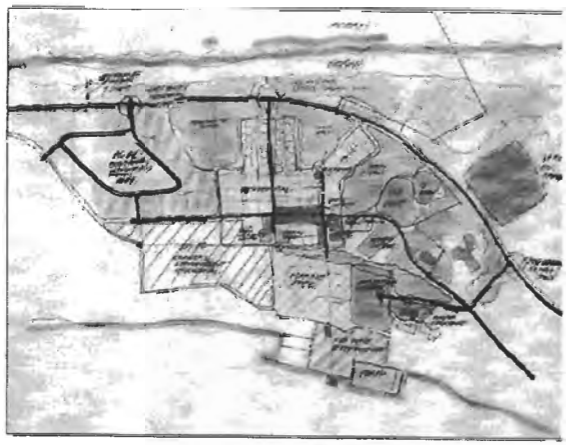
- Renovated "For Sale" Housing
- 75-room Resort Lodge
- 500-person Conference Center
- Health Spa
- Tourist and Resident-oriented Retail
- Live/Work Artist's Lofts
- Bed and Breakfast
- Entertainment and Recreation Uses
- Historic/Cultural Uses
- Commercial "Incubator" Business Park
- Coastal Dependent Industrial Uses
- 18-hole "Dunes" Golf Course
- Coastal Recreation Vehicle Park
- Equestrian Center
- Sewage Treatment Plant

Based upon this program, the planning team developed three alternative land use scenarios. While similar in nature, these alternatives explored different land use locations and relationships.

The principal planning and design goals reflected in each of these initial alternatives included:

1. Create a strong linkage and relationship between the ocean, town and bay.
2. Create a strong central streetscape running north-south through the town.
3. Incorporate a range of uses that would maximize market opportunities, while enhancing the financial viability of the existing town.
4. Maintain the "Coastal Sea Town" image and character of the town.
5. Maintain the historic character of the town.
6. Create significant buffers between the town and sensitive natural areas.
7. Buffer non-compatible uses from each other.
8. Create a strong tourist/retail core for the town.
9. Create strong relationships between future tourist accommodation, tourist retail uses, Historic/Cultural uses and recreational uses.
10. Enhance the existing town's economic viability through the inclusion of a significant amount of new residential development.

The first three concepts were labeled A, B and C. Concept A created a tourist-oriented accommodation and retail core are by locating the lodge, conference center and spa on the Manager's House site and extending the retail development along Vance Avenue from Rideout Rd. to Cutten Street. This area was linked via vacation cottages along Fenwick Avenue to a Historic/Cultural precinct surrounding the Cookhouse. A new town square was created on the southeast corner of Cutten Street across from the Samoa Block, which became the center of community activities. Cutten Street was extended to New Navy Base Road to become the main "resident's" entrance to the town. A 46-acre business park was located to the south of the town and was accessed by another new connection to New Navy Base Road. The area to the east of the Hostelry was to be



Opt

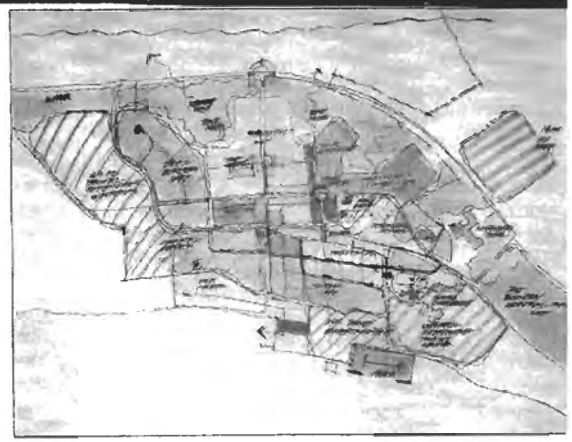
developed as a marine park. To the south of that area and east of Vance Avenue were coastal dependent Industrial uses.

Option B created additional business park and coastal dependent Industrial uses to the north of the Cookhouse on Simpson-Samoa lands. Historic/Cultural uses were located to the north and east of the Cookhouse, extending to the Bay to create a "fun zone", museum precinct and proposed marina. New residential uses were proposed on the lands to the east of the Hostelry, as well as between Vance Avenue and New Navy Base Road. The retail core was situated along Rideout Road running from N. Bayview Avenue to the end of Sunset Avenue. The main "resident's" entrance was located to the south of the town center, as were the business park uses. Coastal dependent industrial uses were placed further south of a new "business" entrance from Navy Base Road.

Option C also included new business park and coastal dependent industrial uses on the lands located to the north of the Cookhouse. In addition, the historical/cultural, "fun zone" and marina activities were located between the Cookhouse and the existing dock. The area to the east of Hostelry was designated for new residential development. In Option C, the tourist-oriented lodge, conference center and spa were moved closer to Vance Avenue to create a stronger relationship to the existing town. The area surrounding the Manager's House was designated for the development of high-end custom residential lots. The retail core was located between Vance Avenue and the railway alignment. It surrounded the town square and extended halfway down Vance Avenue and Cadman Court toward the Hostelry from the Samoa Block. As in Concept B, the main "resident's" entrance was located to the south of the town center, as were the business park uses. Also, coastal dependent industrial uses were placed further south of a new "business" entrance road from Navy Base Road.

During this initial session, the first meetings were held with representatives of Humboldt County, the City of Eureka, the California Coastal Commission and the Humboldt County Harbor Commission to introduce them to the Samoa planning process and solicit their initial input into the planning process. Initial areas of concern that were identified as a result of these meetings were the potential opposition to the18-hole golf course situated in sensitive dune areas; the need to include significant "coastal dependent industrial uses" and business park uses in the plan; difficulties in making a strong connection between the ocean and the bay due to ownership issues and the desire of the Harbor Commission and other to maintain access to and the viability of the existing Simpson Dock; and interest by the Harbor Commission in a 25-acre plus site to the north of the town for use as a bay dredge spoils site. Following these meetings, the initial alternative land use concepts were refined to produce a preferred land use concept that was reviewed with the owners. Some of the key elements of that plan were:

- The deletion of the dunes golf course from the plan;
- The inclusion of a ±9-acre RV park on lands adjacent to the dunes area on the previously disturbed "Dog Ranch" site;
- The addition of a main "resident's" entrance into the town to the south of the Samoa Block;
- The inclusion of significant new residential development to the west and east of the existing town;
- The expansion of retail development along Rideout Road from the Women's Club to N. Bayview Avenue and along Cadman Court, including the introduction of a new retail loft structure on the existing park site.
- The inclusion of a yacht marina adjacent to the Simpson-Samoa dock;



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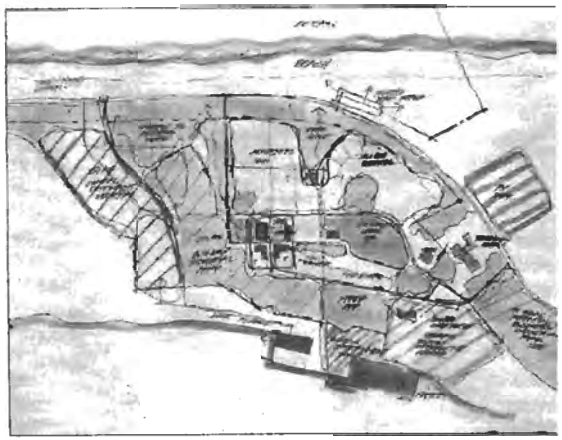

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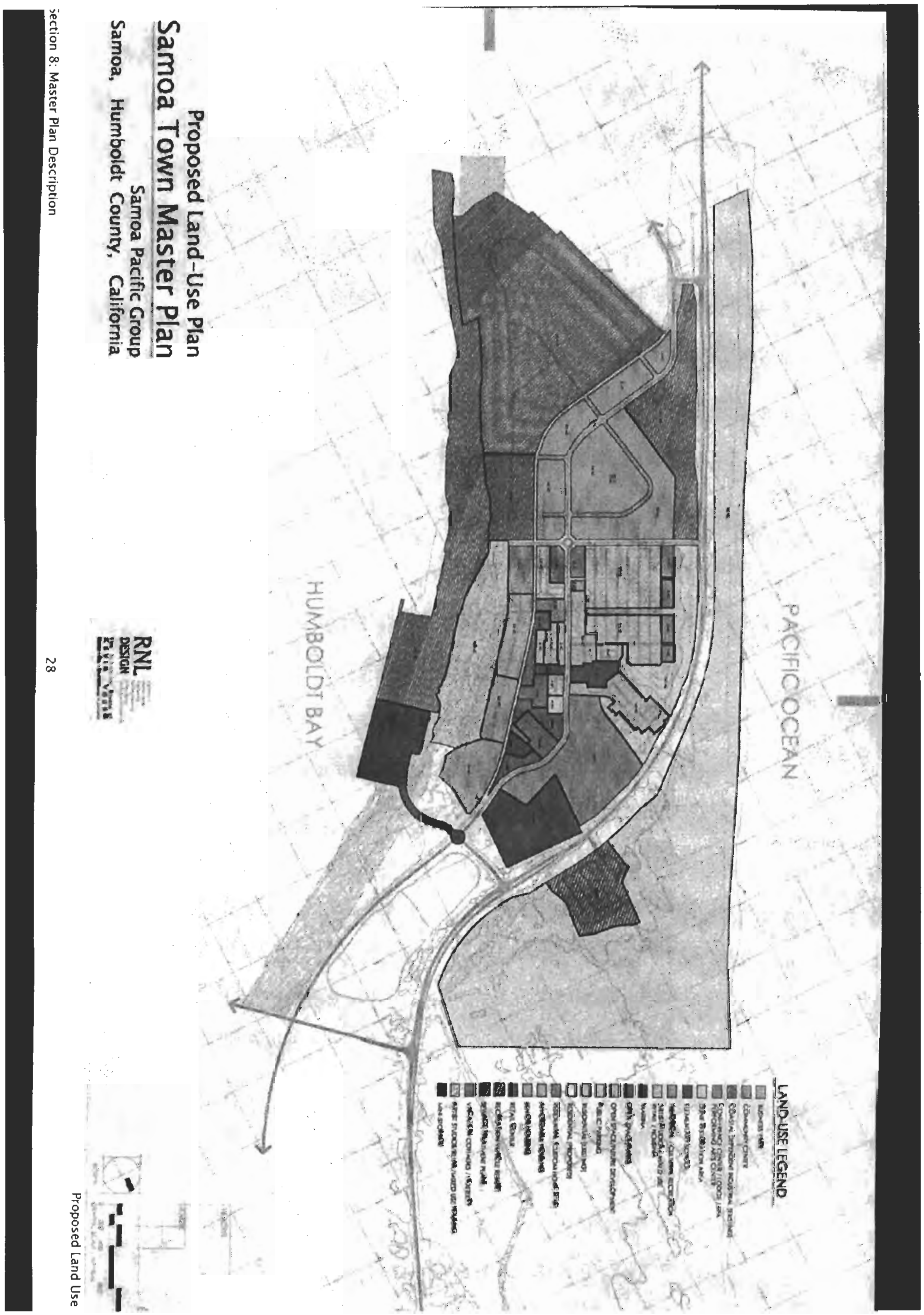

Proposed Land-Use Plan
Samoa Town Master Plan
Samoa Pacific Group
Samoa, Humboldt County, California
Section 8: Master Plan Description
RNL DESIGN
28
HUMBOLDT BAY
PACIFIC OCEAN
LAND-USE LEGEND
Proposed Land Use

33 of 36


Illustrative Master Plan
Samoa Town Master Plan
Samoa Pacific Group
Samoa, Humboldt County, California
HUMBOLDT BAY
PACIFIC OCEAN
RNL DESIGN
Section 8: Master Plan Description
29
Illustrative Master


LEGEND
EXISTING BUILDINGS
RELOCATED / CONVERTED BUILDINGS
NEW BUILDINGS
Samoa Town Master Plan
Building Identification Plan
Samoa, Humboldt County, California
Samoa Pacific Group
RNL DESIGN
31
Building Identification

In addition to pedestrian walkways provided along Vance Avenue, pedestrian/bicycle paths will be provided through most major open spaces and will connect residential areas to the town center. Cadman Court will be converted to a pedestrian-only promenade. In addition, pedestrian paths will connect to the existing underpass beneath New Navy Base Road providing access to the beach, as well as access to town from the proposed R.V. Park.

B. LAND USES

Historic/Cultural/Recreational Uses

The Historic/Cultural precinct is located at the Cookhouse Road entrance to the town. One of the goals of the master plan is to create a visitor-oriented precinct that will draw visitors to the site. The centerpiece of the precinct is the historic Samoa Cookhouse, which will provide instant name recognition for the area. In addition, the Northcoast Lumber Industry Association (NCLIA) is currently working on a plan to construct a tourist railway that would run from Eureka around the North end of Humboldt Bay and end at Samoa. This would provide a positive boost to tourism in Samoa and provide an additional means of bringing visitors to the town.

Development in this precinct will consist of a number of structures and outdoor display areas, in addition to between 100 and 150 parking spaces. The owners have held initial meetings with representatives of the Redwood Empire Alliance for Cultural History (REACH) to gauge their member organizations various levels of interest in relocating to the site. Several of the organizations have expressed initial interest, although at this point in time, it is difficult to say exactly which organizations would actually develop facilities at Samoa. As part of this planning exercise, the Samoa Pacific Group, LLC has expressed an interest in exploring the possibility of assisting interested cultural and historical organizations both within and outside of REACH in locating in Samoa by possibly providing land for them to develop their facilities on.

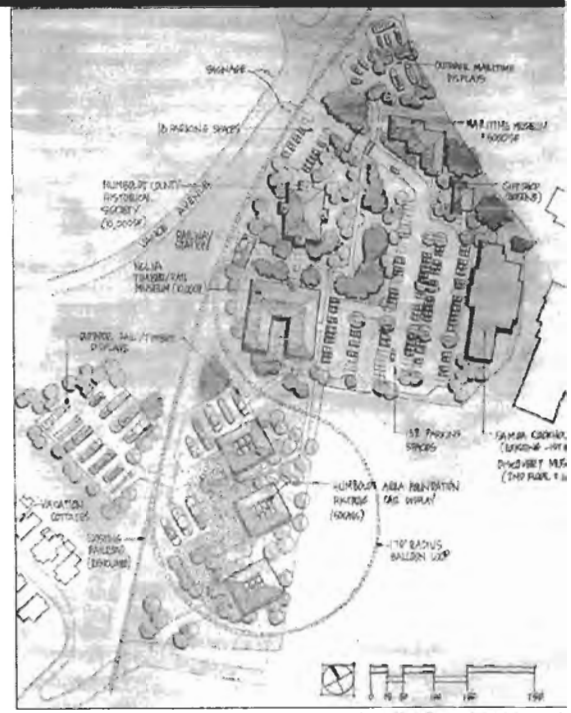
It is intended that a village complex would be developed surrounding the Samoa Cookhouse. The Cookhouse will be renovated and would likely continue to operate as a family-style restaurant on the lower floor. The second floor has the potential to approximately 10,000 square foot of space for other historic or cultural uses. The existing Gift Shop will also be maintained.

In addition, approximately 25,000 square feet of additional museum/indoor display space could be created in this area. Space could also be provided for extensive outdoor display areas. There could also be a small train station provided to serve the tourist train should it reach fruition.

It is envisioned that the various indoor and outdoor display areas, as well as the Cookhouse and Gift Shop would be connected through a series of pedestrian walkways and plazas. Adequate parking in the range of 125 to 165 spaces would be provided at the center of the village.

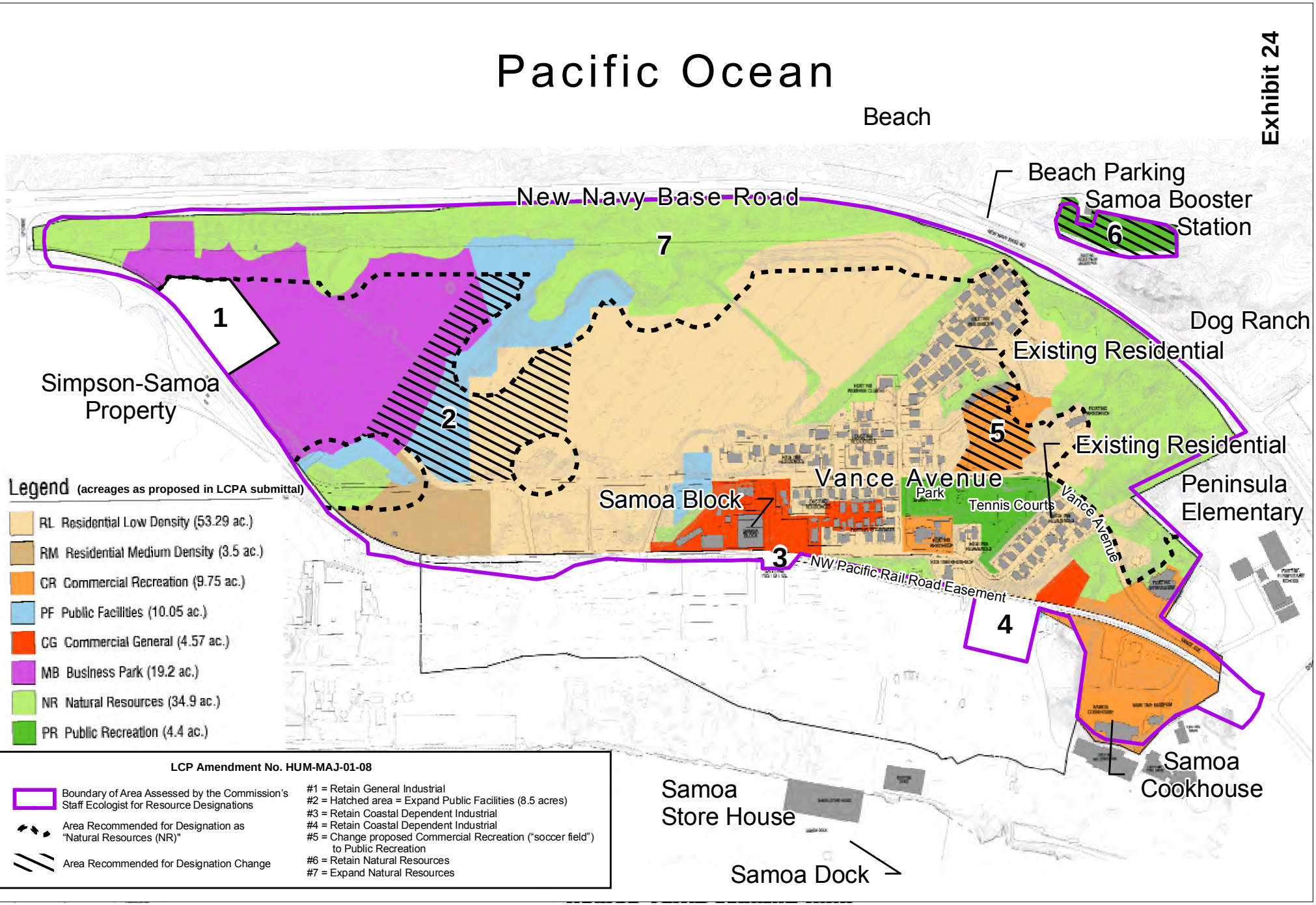
Residential Uses

The Master Plan proposes to maintain 57 of the existing 98 residential units in residential use. It proposes an additional 308 new units of residential development, including 25 high-end custom lots, 136 new market lots, 23 multi-family units, 68 affordable housing units and 56 senior housing units. At build-out, this will provide a total of 365 residential units in Samoa. New residential development has been planned to reflect the same character as that of the existing residential development in Samoa, with relatively narrow residential streets situated along a grid pattern and the inclusion of alleys where appropriate behind the lots.



Historic / Cultural Village Conceptual

Exhibit 24



All Locations Approximate. For Illustrative Purposes Only. DSM, 2011.

0 250 500 1,000 Feet

Exhibit 24
LCPA HUM-MAJ-01-08
Humboldt County (Samoa)
Required Land Use and Zoning Map Changes

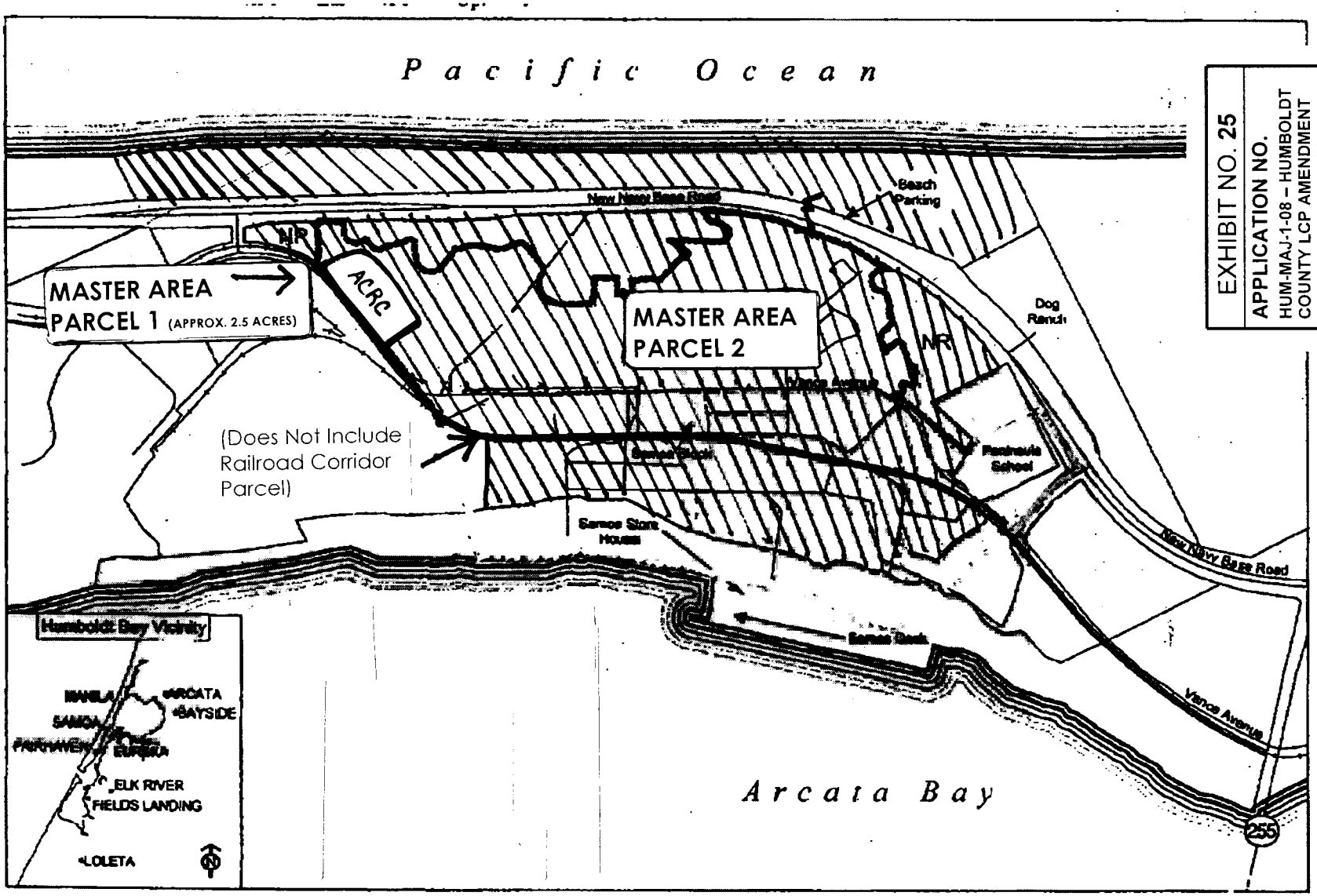


EXHIBIT NO. 25

APPLICATION NO.
HUM-MAJ-1-08 – HUMBOLDT COUNTY LCP AMENDMENT (SAMOA TOWN PLAN)
ILLUSTRATION OF REQUIRED MERGER & REDIVISION INTO TWO MASTER AREA PARCELS