

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

OCTOBER 4, 2006

**FOR
SAMOA-PACIFIC PARTNERSHIP, LLC**

EXHIBIT NO. 10A

APPLICATION NO.

**HUM-MAJ-1-08 – HUMBOLDT
COUNTY LCP AMENDMENT
(SAMOA)**

**CASCADIA SUBDUCTION
ZONE EARTHQUAKE AND
TSUNAMI RISK**

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File No. 10586-001-00

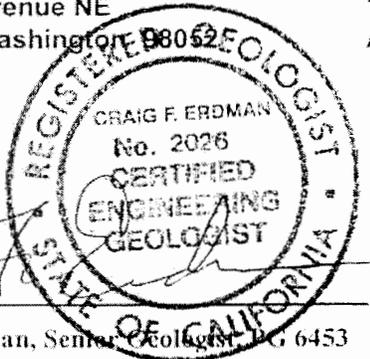
October 4, 2006

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**TSUNAMI VULNERABILITY EVALUATION
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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 tsunami¹.

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:

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 (Topozada 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 6 meters 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 15 meters (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 in the Samoa Town Master Plan area. However, occupied structures should not be located any lower than the previously established 30 feet elevation.

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 tsunamis. 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 use will be restricted to above Elevation 31 feet msl.

Use Guidelines for Multi-family Use

Habitation uses will be located above Elevation 31 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

For proposed public 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.

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 planted 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 were used as the basis for a planning scenario of a great CSZ earthquake along the North Coast of California (Topozada 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 has been sited 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 shelter.

Designated Shelters

Refuge sites are safe buildings above the expected tsunami run up elevation where people can remain until it is safe to leave. Four shelter sites could be used for refuges. They include:

- Peninsula School,
- The New Emergency Services Building,
- The Manager's House, and,
- The Women's Club.

We recommend that the Peninsula School and the New Emergency Services building be constructed above Elevation 40 feet msl. Other buildings listed should also be located above Elevation 40 feet if they are designated as shelters. The buildings should be located so that people can travel by foot within approximately 5 to 8 minutes.

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. For areas below 26-foot elevation directional signage will be posted on designated paths that show non-vehicular evacuation routes to designated areas greater than Elevation 40 feet msl.

Safety Plan

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

- The tsunami evacuation route and plan will include information on tsunami warning devices and techniques and a public information and education program targeted at Samoa residents.
- 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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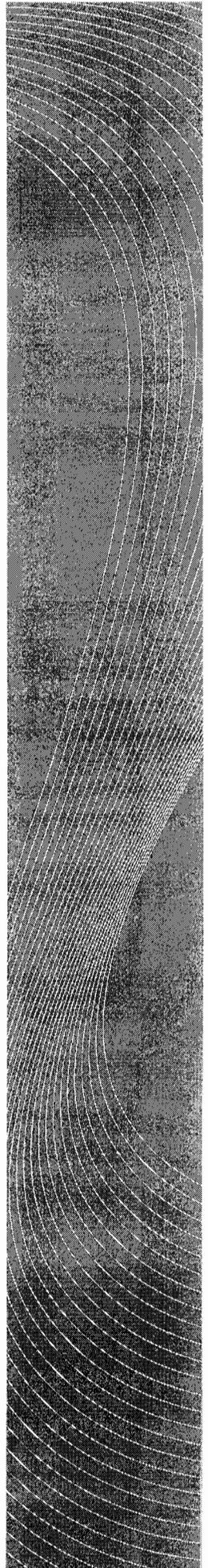
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APPENDIX A
BACKGROUND ON EMERGENCY PREPAREDNESS



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		3 - 10 m elev	10 - 35 m elev	above 35 m elev
Coastal Estuary	Low lying flat topography of river valleys and bottomlands		1.5 - 6 m elev	6 - 15 m elev	above 15 m elev
	Low lying flat Bay topography adjacent to Humboldt Bay		1.5 - 3 m elev	3 - 5 m elev	above 5 m elev
Special Study Zone	Area studied by PG&E		3 - 7.5 m elev	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.

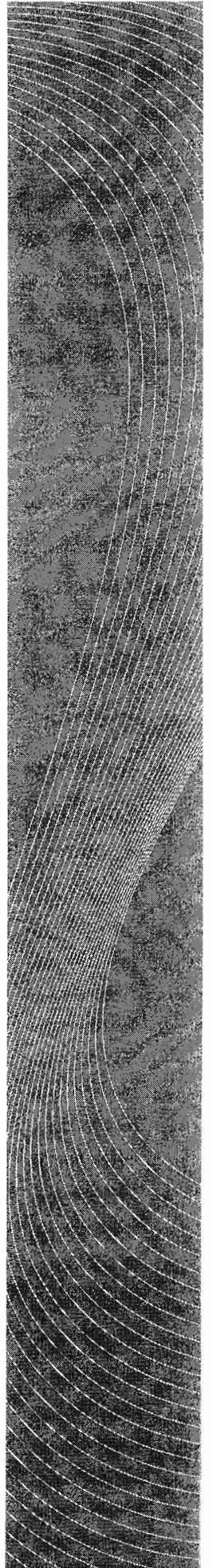
Paleotsunami studies

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.



APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE



APPENDIX B

REPORT LIMITATIONS AND GUIDELINES FOR USE³

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 perform 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.

Northwest at risk of megaquake like one in Chile

By ALICIA CHANG, AP Science Writer Alicia Chang, Ap Science Writer March 2, 2010, 26 mins ago

LOS ANGELES – Just 50 miles off the Pacific Northwest coast is an earthquake hotspot that threatens to unleash on Seattle, Portland and Vancouver the kind of damage that has shattered Chile.

The fault has been dormant for more than 300 years, but when it awakens — tomorrow or decades from now — the consequences could be devastating.

Recent computer simulations of a hypothetical magnitude-9 quake found that shaking could last 2 to 5 minutes — strong enough to potentially cause poorly constructed buildings from British Columbia to Northern California to collapse and severely damage highways and bridges.

Such a quake would also send powerful tsunami waves rushing to shore in minutes. While big cities such as Portland and Seattle would be protected from severe flooding, low-lying seaside communities may not be as lucky.

The Pacific Northwest "has a long geological history of doing exactly what happened in Chile," said Brian Atwater, a geologist with the U.S. Geological Survey and University of Washington. "It's not a matter of if but when the next one will happen."

The last one hit in 1700, a magnitude-9 that sent 30- to 40-foot-tall tsunami waves crashing onto the coast and racing across the Pacific, damaging Japanese coastal villages.

There's an 80 percent chance the southern end of the fault off southern Oregon and Northern California would break in the next 50 years and produce a megaquake, according to Chris Goldfinger, who heads the Active Tectonics and Seafloor Mapping Laboratory at Oregon State University.

Research presented last year at a seismology conference found that Seattle high-rises built before 1994, when stricter building codes took effect, were at high risk of collapse during a superquake.

Disaster managers in Oregon and Washington are aware of the risks, and work is ongoing to shore up schools, hospitals and other buildings to withstand a seismic jolt.

"We're definitely being proactive in trying to get those fixed, but we have a long way to go," said Yumei Wang, geohazards team leader with the Oregon Department of Geology and Mineral Industries.

Oregon has 1,300 schools and public safety buildings that are at high risk of collapse during a major quake. The state recently doled out \$15 million to two dozen schools and emergency facilities to start the retrofit process. State law requires that all poorly built public safety buildings be upgraded by 2022 and public schools by 2032.

The state is also helping its coastal communities — home to 100,000 residents — plan for vertical evacuation buildings that could withstand giant tsunami waves.

Seattle plans to retrofit its 34 fire stations. The city is also working on a plan to upgrade 600 buildings considered most at risk.

"We have been preparing aggressively," said Barb Graff, who heads the city's Office of Emergency Management.

Chile and the Pacific Northwest are part of several seismic hotspots around the globe where plates of the Earth's crust grind and dive. These so-called subduction zones give rise to mountain ranges, ocean trenches and volcanic arcs, but also spawn the largest quakes on the planet.

The magnitude-8.8 Chile quake occurred in an offshore region that was under increased stress caused by a 1960 magnitude-9.5 quake — the largest recorded in history, according to geologist Jian Lin of the Woods Hole Oceanographic Institution.

The temblor destroyed or badly damaged 500,000 homes and killed more than 700 people.

Similar tectonic forces are at play off the Pacific Northwest, where the Juan de Fuca plate is diving beneath North America. At some point, centuries of pent-up stress in the Cascadia subduction zone will cause the plates to slip. Scientists cannot predict when a quake will occur, only that one will happen.

The region is all too familiar with violent earthquakes. In 2001, a 6.8-magnitude quake centered near Olympia, Wash., rattled a swath of the Pacific Northwest, but remarkably caused no deaths. While it was not the type of quake that hit Chile, it was a reminder of how a big disaster could strike at any time.

To better understand megaquakes, a group of scientists planned to travel to Chile in May for a conference on giant earthquakes and their tsunamis. There are field trips planned to commemorate the 50th anniversary of the 1960 Chile quake.

MASTER PLAN FOR THE TOWN OF SAMOA

Humboldt County, California

Prepared for: Samoa Pacific Group, LLC

Prepared by: RNL Design

The PLANNING Studio of Kevin Young

Date: July 2002

EXHIBIT NO. 12A

APPLICATION NO.

HUM-MAJ-1-08 – HUMBOLDT
COUNTY LCP AMENDMENT
(SAMOA)

MASTER PLAN FOR TOWN
OF SAMOA (JULY, 2002)

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1. INTRODUCTION

This is a Development Master Plan for 174 acres of land comprising the town of Samoa and adjacent lands in Humboldt County, California. The town of Samoa is situated on a peninsula of land 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. In August of 2001, RNL Design was commissioned to make a physical assessment of the property and to test the initial program recommendations of the market consultant on the site. In February of 2002, RNL Design in collaboration with The PLANNING Studio of Kevin Young (TPSOKY) 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 chronicles the history of the town of Samoa 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.

2. 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 that 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, 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 be 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 Humboldt 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 Hostelry, will become a general store. These renovated houses should provide approximately 18,000 square feet of net leasable retail space. In addition, the new mixed-use structure on the northeast corner of Vance Avenue and Rideout Road will provide approximately 11,200 square feet of artist's studio, gallery and retail space.

The Master Plan proposes to create a 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 and utilized to provide approximately 23,000 square feet of space for "community uses" including a meeting hall, management company/association offices, recreation and professional office space. A portion of this space may also be utilized by the performing arts school for classrooms and performance space. The adjacent Gas Station will be reconstructed in a "historic" architectural style. A small church is proposed for the northeast corner of Cutten Street and Vance Avenue. An indoor recreation center containing an indoor soccer field, an indoor 50 meter swimming pool, restrooms, changing rooms and a snack bar will be developed on a 2.2-acre parcel of land located to the south and east of the Samoa Block. There will be an 8,350 square foot mini-storage site to the east of the vacation cottages.

Proposed tourist-oriented accommodation and uses include a 75-room lodge that will have an associated 500-person conference center, 250-person performing arts center and a spa; 19 vacation cottages; and a 71-space recreational vehicle park. The lodge, conference center and spa are located on the current site of the General Manager's House. In addition to the lodge, 19 of the existing houses, all located along and below Fenwick Avenue, will be fully renovated and turned into vacation cottages. These cottages will be rented and serviced through the lodge, and will contain living, sleeping and cooking facilities. An R.V. Park will be located on a 9.3-acre site across New Navy Base Road. The proposed R.V. Park will contain 71 spaces.

A business park will be situated to the south of *Samoa Avenue* and to the west of the extension of Vance Avenue. The area available for the business park totals of 47 acres. Fifteen acres is designated as the future sewage treatment plant site. The business park will initially contain 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. There are 7.7 acres of land located to the south of the business park and to the east of Vance Avenue that are designated for coastal dependent industrial uses. Uses permitted in these areas are limited by County zoning to industrial uses that require direct access to the coast and Bay.

These lands are immediately adjacent to a 64-acre parcel of land owned by Simpson-Samoa that will likely remain in coastal dependent industrial zoning and usage in the future. In addition, the master plan maintains a 1,000 foot by 1,000 foot square of unimpeded land on and behind the existing dock on the bayside. There is also an additional 400 foot setback corridor of lands that extend behind the shoreline and will provide access to the existing dock from the coastal dependent industrial Lands. This land will remain in coastal dependent industrial zoning for the foreseeable future, controlled by the Harbor Commission.

In order to accommodate the later phases of development, a new sewage treatment facility will need to be constructed. To provide for this, a 15-acre site is provided for the development of a new sewage treatment plant and the associated aeration ponds. This site is located in the southwest corner of the business park. The actual treatment facilities will likely cover \pm 4 acres of land, with the remaining 11 acres functioning as filtration areas consisting of aeration ponds and natural landscape.

To make room for construction of the new building and below-grade parking at the corner of Vance Avenue and Rideout Road the existing Samoa Park will need to be replaced. The small playground located just north of Sunset Avenue will be retained, as will the existing gymnasium and tennis courts. A new park will be developed at the corner of *Samoa Avenue* and Vance Avenue. It will be approximately 3 acres in size and will contain new play equipment as well as open grass areas. A second new park will be situated within the open space extending from the Women's Club, around the sunset Avenue neighborhood to the location of the existing playground. Approximately 17.2 acres of land that will remain in coastal dependent zoning and set aside for possible future development will be preserved initially as open space. Pending County approval, these lands will be temporarily developed as play fields for use by the residents of Samoa. Excluding the R.V. Park site, which has previously been disturbed, all of the beach and dune areas along the west side of New Navy Base Road will not be disturbed. 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.

3. HISTORY OF THE TOWN 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 its 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.

4. 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 (S.R. 255) 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 partitioned into small rooms, is currently vacant. Adjacent to the Cookhouse is a small gift shop. 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.

Further 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 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, wood shop and storage buildings.

The Woman's Club 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.

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 beyond the 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 interrupt ocean views from the town. The remaining pulp mill smokestack to the south of the town 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 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 be 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 Humboldt 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.

5. Opportunities and 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 ocean 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;
- Major water and utility lines that already serve 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 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 and business park 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 been identified during the market and master planning studies. These include the following:

- Development of the site is subject to multiple regulatory jurisdictions and processes;
- The weather in Samoa is cool for much of the year. Average high temperatures range from 54-58 degrees from November through May, and 60-63 degrees from June to October. Average precipitation ranges from 6 inches November through January to one inch or less from June to September. The area is quite often overcast.
- The potential for the development of a significant tourist trade will be impacted by the seasonality of the area's climate;
- Samoa is relatively isolated in relation to large metropolitan areas including San Francisco (275 miles) and Portland (415 miles);
- The nearby town of Manila is in generally poor condition and negatively impacts the potential arrival sequence from the airport and Arcata;

- Samoa is perceived in some circles as remote and isolated;
- There may be 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;
- New Navy Base Road separates the town from the beach;
- The adjacent, existing lumber storage yards are unsightly;
- The Humboldt County Harbor Commission controls the lands between the site and the bay;
- Old warehouse structures and expansive asphalt areas on Harbor Commission lands create a negative foreground view;
- High-tension wires and pylons detract from the views to the ocean;
- The existing pulp mill smokestack creates a negative visual impact on the town;
- The potential for development of a golf course as a tourist amenity is viewed negatively by several of the regulatory jurisdictions; and
- The County and the Harbor Commission generally favor the development of industrial uses due to the historical usage of the site and current zoning.

c. Highest and Best Use Study

In November of 2001, Economic Research Associates of San Francisco completed a highest and best use study for Samoa, entitled "Market Evaluation and Alternative Development Programs for Samoa Town Site". The objectives of that study were "to document market conditions and develop the most economically viable development program for the project."

That study reviewed the current site conditions, provided an overview of current market conditions in Humboldt County as they related to a variety of potential uses, and set forth an analysis of the highest and best uses for the site.

In the study, ERA developed a ranking analysis that showed the relative advantages and disadvantages of candidate uses for Samoa. This resulted in a list of candidate land uses ranked against the market and economic criteria. This ranking provided a basis for formulating the highest and best conceptual plan.

Based on their analysis, ERA suggested two conceptual land use programs for the site. The first was the "New Samoa Industrial Town" and included the following uses:

- Light industrial/R&D/incubator business park
- Coastal dependent industrial
- Housing
- Live/work housing
- Artisan community
- Neighborhood retail
- Coastal RV park

The second alternative land use program was the "Humboldt Bay Resort Town". It contained the following uses:

- Low density cottage resort and or lodge
- Limited conferencing facilities
- Business park/big box retail
- Coastal RV park
- Housing
- Neighborhood retail
- Optional golf
- Related amenities and facilities

Following the testing of these alternatives by RNL Design, ERA developed a preferred land use program. It included the following:

- Coastal dependent industrial
- Business park
- Flexible future commercial/industrial
- Resort lodge
- Conference center
- Coastal RV park
- Neighborhood commercial
- Renovated low cost housing
- New “for sale” housing
- Bed & breakfast
- Samoa Cookhouse
- Gift shop
- Art school
- Restaurant
- Parks
- Gymnasium
- Community support buildings (i.e. community center, fire house, meeting hall, etc.)

Based on ERA’s criteria, the planning team analyzed each of the proposed development programs to determine which overall program was the strongest in terms of the same economic and market criteria. This analysis is shown in Tables 1-6. Table 7 provides a summary of each of the program alternatives based upon each of their combined programs and ranked against both the economic and market criteria developed by ERA. While the criteria total of the “Resort Town” program is slightly higher, it was felt that the Preferred Program provided a greater degree of overall market penetration.

Insert Tables 1 – 7

6. Master Planning Methodology/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".

b. Refinement and Review of the "Preferred Development Concept"

Over the course of the next two months, the planning team undertook a series of refinements to the "Preferred Development Concept". As each refinement was completed, additional meetings were held with the client and representatives of the Humboldt County Planning Department, the California Coastal Commission, REACH (Redwood Empire Alliance for Cultural History), Northcoast Environmental Center, Audubon Society and Ms. Lori Dengler, Ph.D. (Tsunami Expert) of Humboldt State University to brief them on the refinements to the master plan and solicit additional input into the planning process.

c. Completion of Master Plan

Once a general concurrence was reached among all parties on the direction of the master plan, the planning team began to prepare pre-final plans and documentation of the planning process. In early-May 2002, a final series of meetings was held with many of the above-mentioned parties to review the pre-final plans and solicit any additional comments prior to the completion of the master plan.

7. Description of Plan Alternatives

In order to arrive at the Master Plan, the planning team examined a number of conceptual and more detailed land use alternatives. 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 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 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 the 18-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;
- Historic, cultural and recreation uses were condensed into a site that included and surrounded the Cookhouse and removed from the Simpson-Samoa dock area;
- Provision of a strong vehicular and pedestrian corridor along Vance Avenue that connected the northern and southern-most entrances to Samoa;
- The inclusion of an additional sixty-four acres of Simpson-Samoa owned land as additional coastal dependent industrial use; and
- Locating a fifteen-acre sewage treatment facility at the southern end of the property within the business park.

Over the next month, the planning team explored refinements to the preferred land use concept. During the week of March 11, 2002, the planning team returned to Samoa to review these refined plans with the developer and the various agency representatives. Primary refinements presented during this series of meetings included:

- The deletion of the equestrian center from the development program;
- The consolidation of the Historic/Cultural/recreation precinct to an area immediately surrounding the Samoa Cookhouse;
- The expansion of the business park;
- Refinements to the location of the lodge/conference center (on the Manager's House site) and the addition of vacation cottages along Fenwick Avenue; and
- The strengthening of the tourist/retail core of the town by creating a street of shops and galleries along the alley (Cadman Court) between Vance Avenue and N. Bayview Avenue.

In addition to plan refinements, detailed concepts for the R.V. Park and the Historic/Cultural Precinct were reviewed with owners.

The principal concerns expressed by participants of the various meetings were:

- The continuing need to maintain the size and integrity of coastal dependent industrial lands and the impacts additional residential development to the east of town would have on those lands;
- Concerns about the potential for tsunami inundation in the lower portions of the site;
- Concern on the part of R.E.A.C.H. about the timing of the master plan in relation to their on-going internal planning and the impacts that timing may have upon their participation in Samoa; and
- The owner's desire to include senior and affordable housing in the plan.

Following these meetings, additional refinements were made to the plan and presented to the owner's and local representatives the week of March 25, 2001.

One of the key elements incorporated in to the plan at this stage was a proposed "swapping" of newly designated coastal dependent industrial lands for lands that continued to be designated for residential development. The purpose of this swap was to provide, as closely as possible, an equal amount of coastal dependent industrial lands as were being designated for other uses.

In addition, the Historic/Cultural Precinct was expanded to include a portion of the flat land to the north of the Cookhouse and east of the railroad alignment. Proposed residential development to the east of the railway was limited to a two lot width from the Historic/Cultural area to the extension of the new entry road (to the east of the Samoa Block). This residential development was to include 60 "affordable" housing units and 40 "senior" housing units. The area to the north of the new entry road and east of the railway was designated as coastal dependent industrial, as was all of the land to the north of the extension of Vance Avenue.

8. Master Plan Description

-Insert Table 8-Land Utilization Schedule

As described above, the proposed Master Plan has evolved through the consideration of a range of conceptual planning and land use alternatives. It benefited from substantial input from the owners as well as representatives of various governmental agencies and community organizations.

The Master Plan is illustrated in Figure _____. The Master Plan reflects what is deemed to be the ultimate and optimum development of the site. The plan is not tied to a particular development timeframe or market demand level. It does reflect those uses and activities which are felt to be the most appropriate for the site as determined by the "Highest and Best Use Study", review of the various conceptual alternatives and input from various governmental and community organizations. Possible phasing of the development is discussed in Section 8C.

Table 8 provides the corresponding Land Utilization Schedule. This program reflects specific land uses and corresponding site areas, appropriate development densities and unit counts.

a. Circulation

There are three proposed entrances to the town of Samoa in the master plan. These include the existing entrance from New Navy Base Road at Cookhouse Road. This is considered the primary entrance for tourists and visitors and connects to Vance Avenue. The second entrance, which is the principal entrance for residents, is designated as *Samoa Avenue* in the Master Plan, and is located to the south of the Samoa Block. The third entrance is at the far southern end of the town and is the existing Simpson-Samoa entrance road. It connects to the extension of Vance Avenue and is the primary business entrance serving the coastal dependent industrial lands and the business park.

Vance Avenue forms the main street through Samoa. It will have a 56 foot right-of-way and a 24 foot pavement width. It will be heavily landscaped, forming a wide, tree-lined backbone for the town. Through the center of town, parallel on-street parking will be provided along Vance Avenue.

A portion of the right-of-way for the street running from the cookhouse entry road along the railway alignment to the eastern end of Fenwick Avenue will be removed. *Samoa Avenue* will connect New Navy

Base Road to Vance Avenue and beyond. A new roundabout will be constructed at the intersection of *Samoa Avenue* and Vance Avenue. New entry signage will be placed at this intersection atop a new water tower that will be located on the adjacent hillock. Vance Avenue will connect through the business park to the third entrance at the South end of the site.

A new road will potentially connect Cookhouse Road to the proposed new Marina, located adjacent to the existing dock.

Access to the proposed new residential areas and recreation facilities east of the railroad easement are accessed by *Samoa Avenue* and an extension of Cutten Street. The new residential development will face onto Lower Bayview Avenue that will have a 24 foot right-of-way. The residential units will also have 15 foot rear alleys.

In order to reduce vehicular traffic along Rideout Road, it will be terminated at the Women's Club. Access to Sunset Avenue will then be provided by a new connection to Rideout Road midway between Vance Avenue and the Women's Club.

All streets within the new residential areas to the west and east of the center of town will have 24 foot rights-of-way and will also have 15 foot alleys at the rear.

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.

The existing homes that will be retained are located along N. Bayview Avenue, Vance Avenue, Sanda Court and Sunset Avenue. Most, if not all of the existing residential units along Rideout Road and Cadman Court will be converted for use by a performing arts school. Existing residential units along Fenwick Avenue will be converted to vacation cottages.

Proposed new residential development is proposed in two areas, east of the railroad easement and west of Vance Avenue. The proposed residential development to the east of the existing town is accessed via *Samoa Avenue* and Cutten Street. Cutten Street is the primary access to "Lower Bay View Ave.", along which all of the proposed units are located. There is also a secondary access provided to the north at the northern end of N. Bayview Avenue near the bottom of Fenwick Avenue. Proposed development includes 56 senior housing units located within the two northernmost blocks. Senior units will be one-story and approximately 400 square feet in size. They will have single car garages.

The southernmost two and a half blocks of "Lower Bay View Avenue" will be developed with 68 affordable housing units. These units will generally be two-story units ranging from 1,200 to 1,600 square feet in size.

The remainder of the proposed residential development is situated to the north of *Samoa Avenue* and west of Vance Avenue. This area will include 136 "market" lots that will average 3,360 square feet. Typical lots will be 42 feet wide and 80 feet deep. Streets in this neighborhood will be 24 feet in width. Fifteen-foot wide alleys will be provided behind all lots.

Along the western and northern perimeters of this neighborhood there will be 18 larger "custom" residential lots that will average 5,000 square feet in size and have average dimensions of 50 feet by 100 feet. There will be an additional seven 5,000 square foot lots for "custom" homes located near the intersection of Vance Avenue and *Samoa Avenue*.

There will also be approximately 23 new multi-family units in the new structure to be located on the northeast corner of Vance Avenue and Rideout Road. These will range in size from 400 square feet to 1,000 square feet.

Commercial/Retail Uses

Currently, the only commercial use in Samoa is the Cookhouse. One of the goals of the Master Plan is to create a strong "tourist/retail" core for Samoa. In order to achieve this goal, the Master Plan proposes that existing uses along Rideout Road be changed from residential to retail. The existing residential structures along Cadman Court will be reused as part of a proposed performing arts school. Retail/commercial uses along Rideout Road will extend from the Women's Club, on the west, to the intersection with N. Bayview Avenue on the east.

Thirteen existing houses along Rideout Road will be converted to small shops and boutiques. It is anticipated that the large house at the corner of Rideout Road and N. Bayview Avenue, across from the

Hostelry, will become a General Store. Based upon these changes in use, a total of 18,000 square feet of new retail space will be provided.

Within the new mixed-use structure at the corner of Vance Avenue and Rideout Road, there will be approximately 12 artist's studio/gallery/retail units providing an additional 11,200 square feet of space.

Parking for this complex, as well as for most of the surrounding retail/commercial space, will be provided at ground level, below the building. Because the site, which is the existing park, is below street level, parking will easily be accommodated below-grade. Approximately 180 parking spaces will be provided.

There will also be a mini-storage facility located in the depression to the east of the vacation cottages. This facility will be accessed via a service road from N. Bay View Avenue. It will contain about 8,250 square feet of storage space.

Community Uses

Historically, the Samoa Block was the main commercial building in Samoa, containing the mercantile, butcher shop, and other commercial uses. As the population and vibrancy of the town declined, so did the viability of the commercial uses located in the Samoa Block. Currently the Samoa Volunteer Fire Department utilizes a portion of the ground floor to store their trucks and equipment. The upper floor is vacant except for a small area that the Fire Department utilizes for training. There is a parking lot directly across Cutten Street from the Samoa Block.

The Master Plan proposes that the parking lot be redeveloped as a landscaped town square similar in character to one found at the center of Arcata. The town square will form the center of the "Community Precinct". The Samoa Block will be renovated and utilized to provide approximately 23,000 square feet of space for "community uses" including a meeting hall, management company/association offices, recreation and professional office space. The adjacent gas station will be demolished and a new one constructed in a "historic" architectural style to blend with the character of the rest of the town.

To the southeast of the Samoa Block, is a 2.2 acre parcel that will be developed as an indoor recreation center. It will contain an indoor soccer field and an indoor 50 meter swimming pool. It will also have restrooms, changing rooms and a snack bar. Parking for the indoor recreation center will be located adjacent to the center and across Vance Avenue where it will share parking with the Samoa Block.

Tourist-oriented Uses and Accommodation

Tourist-oriented accommodation and uses proposed in the master plan include a 75-room lodge that will have an associated 500-person conference center, 250-seat performing arts center and a health spa; 19 vacation cottages; and a 71-space recreational vehicle park.

The Lodge is located on the current site of the General Manager's House. The lodge and conference center will be designed to step up the slopes that make up this site. Parking for the lodge and conference center will be placed in a low area or ravine to the north of Rideout Road. Approximately 325 parking spaces will be provided in this area. The back-of-house facilities for the lodge and conference center will be accessed at the same level as the parking (Elev. +18'). On the next level, above the back-of-house will be the conference center. It will be approximately 15,000 square feet in area and will be able to host banquets of up to 500 persons in addition to small and medium conferences. In conjunction with the conference center, there will be a 250-person performing arts center. Located on the next level at approximately elevation 45 feet will be the Lodge lobby. The lodge will be accessed from Vance Avenue and will have a porte cochere/drop-off and approximately 45 additional parking spaces on this level. Above this level will be three floors of rooms, averaging about 450 square feet per room. The lodge will contain a total of 75 deluxe rooms as well as lobby space, a restaurant and back-of-house facilities.

A stand alone health spa will be located on a small site to the north of the hotel, with panoramic ocean views. It intended that the owners will explore the feasibility of utilizing the General Manager's House as

a part of the spa complex. The spa will have a floor area of between 5,000 and 7,000 square feet. It will provide a full range of body care services including massages, aromatherapy, facials, scrubs, herbal treatments, and traditional body care. It will have an indoor pool and hot pools, cool dips and sauna.

In addition to the lodge, 19 of the existing houses, all located along Fenwick Avenue, will be fully renovated and turned into vacation cottages. These cottages will be rented through the lodge, and will contain living, sleeping and cooking facilities. They will also have access to lodge services including maid and room service.

The existing Hostelry will be maintained as corporate housing.

The R.V. Park will be located on a 9-acre site across New Navy Base Road. The site, known as the "Dog Ranch" is adjacent to the dunes area. The area has been the site of an operating ranch for many years and the land has been cleared. The R.V. Park will contain 71 spaces of varying sizes that will accommodate vehicles of between 35 and 65 feet in length. It will have utility hook-ups at each site, as well as parking provided for additional cars. There will be a main administration building for the park of about 5,000 square feet in area. It will contain offices, storage and a small pantry selling sundry items. There will be two restroom/shower structures. Adjacent to the main building, there will be a play field. Pathways will provide access from the R.V. Park to the beach and dunes areas, as well as to the existing tunnel for access under New Navy Base Road to the town.

Business Park

The business park is situated to the south of *Samoa Avenue* and to the west of the extension of Vance Avenue. It contains a total of 47 acres, of which 15 acres is designated for the future sewage treatment plant site. The business park is accessed from the southern end of the site along Vance Avenue and also from the *Samoa Avenue* entrance at Vance Avenue. The business park will initially contain 23 lots ranging in size from 1 acre to 2.2 acres. Additionally, there are 7.7 acres of land designated for coastal dependent industrial uses that can be developed in uses that meet the County zoning requirements for coastal dependent industrial uses. Once the first phase of business park development is sold out the owners may choose to reevaluate the option of rezoning the undeveloped Industrial/Coastal Dependent-zoned parcels to business park zoning if demand for coastal dependent industrial uses has not been sufficient to fully utilize the land designated for those uses. Rezoning of this land could potentially create up to 6 additional lots ranging in size from 1 acre to 1.2 acres.

Uses envisioned for the business park will be clean incubator and light industrial, warehousing, showroom, small commercial businesses. The owners intend to prepare design guidelines and deed restrictions that will insure that the architectural and landscape character of the business park will be maintained at the highest possible level. Anticipated streetscape amenities include street trees, high quality landscaping and adjacent pedestrian/bicycle paths.

Coastal Dependent Industrial Uses

There are 7.7 acres of land located to the south of the business park and to the east of Vance Avenue that are designated for coastal dependent industrial uses. There are also 17.2 acres of land located to the east of the existing town and proposed affordable and senior housing areas. Uses that are permitted in these areas are limited by County zoning to industrial uses that require direct access to the coast and Bay. Aquaculture activities are among the permitted uses.

The 7.7 acre parcel is immediately adjacent to a 64-acre parcel of land owned by Simpson-Samoa that will likely remain in Industrial/Coastal Dependent zoning and usage in the future. Also, the Master Plan maintains a 1,000 foot by 1,000 foot square of unimpeded land on and behind the existing dock. Humboldt County Harbor Commission lands extend to between 240 and 400 feet behind the shoreline which will provide access to the existing dock from the coastal dependent industrial lands. In addition, the

lands between the proposed affordable/senior housing and the Harbor Commission lands range in width from 200 to 400 feet in width. This land will remain in Industrial/Coastal Dependent zoning for the foreseeable future. Until a suitable usage is identified for this area, it will be maintained as landscaped park and open space.

Utilities

As mentioned above, water is currently provided by the Humboldt Bay Municipal Water District, but is not metered. As the town is redeveloped and residential units sold, water meters will be installed on each structure to allow owners to be billed individually for usage. Electric power is provided by Pacific Gas and Electric Company. PG&E carried out a system-wide upgrade of lines and poles in 1998/1999 and the system is capable of handling the new development proposed for Samoa.

Currently, the town has two wastewater collection, treatment and disposal systems. It is estimated by the project engineers that the system is operating at about 70% of capacity. The existing treatment units are located east of the railway easement. One is just below the Hostelry, and the other further to the south near the Samoa Block. There is also a wastewater filtration area located in the vacant land at the north end of the property.

Initially, the below ground water and sewer systems will need to be completely upgraded before new development can take place. Engineers estimate that most of the initial new development can be accommodated in the existing sewage treatment plant. However, in order to accommodate the later phases of development, a new treatment facility will need to be constructed. In addition, the existing treatment facilities and filtration areas will be need to be demolished to accommodate future development. To provide for this, a fifteen acre site is provided for the development of a new sewage treatment plant and the associated percolation ponds.

Natural gas is available only to the Samoa Cookhouse, but could be extended to more of the town.

Parks and Open Spaces/Dune Reclamation

As mentioned above, the existing Samoa Park at the corner of Rideout Road and Vance Avenue will be removed. The small playground located just north of Sunset Avenue will be retained, as will the existing Gymnasium and Tennis Courts. A new park will be developed at the corner of *Samoa Avenue* and Vance Avenue. It will be approximately 3 acres in size and will contain new play equipment as well as open grass areas. A second new park will be located within the open space lands stretching from just west of the Women's Club, around the Sunset Avenue neighborhood to the existing playground.

Also, approximately 17.2 acres of land that will remain in Industrial/Coastal Dependent zoning and be set aside for possible future development will be preserved initially as open space. This land is situated between the proposed Affordable/Senior Housing and the Harbor Commission land adjacent to the existing dock. Pending County approval these lands will be temporarily developed as play fields for use by the residents of Samoa.

In order to protect the existing dune and beach environments and to enhance them where possible, excluding the previously disturbed "Dog Ranch" site which will be developed as an R.V. Park, all of the beach and dune areas along the west side of New Navy Base Road will not be disturbed. Land located between New Navy Base Road and the residential areas will be maintained in open space and restored to a natural dune environment.

c. Project Phasing

Development within Samoa will be phased over time based upon several factors including entitlement processes, infrastructure requirements and market/economic influences.

Phase 1

The first phase of development will primarily include the existing town. The first step undertaken will be to upgrade water and sewer lines within the town and to review other infrastructure to make sure it is adequate to meet projected demand. Residential structures will be renovated and sold, or converted to other uses. This will include the relocation of some of the existing residences to other locations designated in the master plan. The Samoa Block will be renovated and retrofitted to accommodate proposed community uses. In addition, the town square will be constructed opposite the Samoa Block to provide a focus for the core area. The Samoa Cookhouse will be totally renovated.

New construction in the initial phase will include the 56 senior housing and 64 affordable housing units located to the east of N. Bayview Avenue. It will include the "signature" mixed-use building at the corner of Vance Avenue and Rideout Road. It is anticipated that Phase One would also include construction of the lodge, conference center, performing arts center and spa. Because of their relationship to the lodge, the 19 vacation cottages along Fenwick Avenue will also be renovated and prepared for rental as part of the lodge. The indoor sports and swimming complex, historic/cultural village and mini-storage facility will also be constructed in Phase 1. Finally, the R.V. Park will be constructed in Phase 1.

Phase 1A

Phase 1A will be limited to construction of a new sewage treatment plant located on 15 acres of land at the southern end of town adjacent to the business park.

Phase 2

Phase 2 development will include 70 of the total 136 new market residential units and 5 of the 25 custom residential units will be constructed. The actual number of units constructed and the exact phasing of those units will be subject to revision based upon the current market conditions at the time of implementation.

Phase 2A

Phase 2A will include the extension of Vance Avenue through to New Navy Base Road. This extension will be necessary to allow the construction of the first phase of the business park to be completed. The first phase of the business park will be focused on Vance Avenue and will encompass 11 lots covering about 17.5 acres.

Phase 3

It is envisioned that the remaining 66 market residential units and 18 custom residential units will be constructed in Phase 3 of the development. This will complete the new residential development proposed in Samoa. As new residential development in Samoa is completed, shops along Rideout Road will be retrofitted as market conditions allow.

Phase 3A

The second portion of the business park will be implemented in Phase 3A. This will include approximately 12 lots on 20.1 acres of land. This phase of the business park is situated between the first phase and the sewage treatment plant, as well as including the area to the south of Vance Avenue and southwest of the initial business park development.

Phase 4

Pending approval by the various County and State agencies, the marina and its associated facilities will be built in Phase 4.

Phase 5

Phase 5 is limited to the final phase of the business park that is located to the east of the phase 2A business park. Depending upon earlier phase demand, this area may be developed for coastal dependent industrial uses in a previous phase. However, if, as time progresses, this area has not been developed, the owner may attempt to rezone and develop this remaining area for additional business park sites. The additional business park area would be 7.7 acres and provide approximately 6 additional lots.

9. Implementation and Approval Processes

In order to implement the Samoa Master Plan, the owners will have to apply for and obtain several jurisdictional approvals prior to being the construction of any of the master planned facilities or improvements. Below is a brief description of the various steps in that entitlement process.

a. Project Description

The project description is the document that will be presented to the permitting agencies for approval. The project description must be written in a broad enough manner to cover all portions of the project for which approval is required. The description may be somewhat general to cover some minor changes, but not so vague that project specifics are omitted. After the owners approve the final design, the project description can be drafted. All members of the planning team will review the project description for content and accuracy prior to submittal.

At a minimum, the project description will include the following:

- General Plan Amendment
- Rezoning
- Subdivision
- Planned Development
- Conditional Use Permit for a new sewage disposal area
- Coastal Development Permit for the above plus all construction to be completed within at least the first phase

b. Environmental Impact Report

The County of Humboldt will contract directly with a qualified consultant for the preparation of the Environmental Impact Report (EIR). Although contracted by the County, it will be prepared at the expense of the owners. Generally this is done after the project has been submitted for County review. For this project, however, the owners have expressed the desire to have the EIR team working on the project at the time of the public introduction of the project in order to assess public opinions and concerns. The selection process for the EIR consultant can begin as soon as the project design is ready for submittal and a project description has been prepared. The EIR preparation and review period is approximately 9 to 12 months.

c. County Review of The Application

The first approval at the County level will be the amendment to the Local Coastal Plan. This must be approved by the Planning Commission, the Board of Supervisors and the California Coastal Commission prior to approval of any of the other portions of the project. The County may review the other portions of the project at the same time that the General Plan Amendment request is being reviewed, however the approvals will be separate from the General Plan Amendment. Public hearings will be held at the Planning Commission and at the Board of Supervisors. The County review and hearing period will be approximately 6 to 12 months after completion of the EIR.

d. California Coastal Commission

The California Coastal Commission will be a referral agency during County review. After the Planning Commission and the Board of Supervisors approve the amendment to the Local Coastal Plan, an application will be submitted to the Coastal Commission for approval by that agency. One of the owner's primary goals throughout the entitlement process will be to involve the Coastal Commission so that their concerns can be addressed at the beginning of their application process. The Coastal Commission review and hearing period will cover 6 to 12 months.

After the amendment to the Local Coastal Plan has been approved, the Coastal Commission will again be a referral agency for the Coastal Development Permit from the County.

e. Improvement Plans

Detailed engineering Improvement Plans will be required for construction of all utilities, roads and the sewage treatment facilities. The road and drainage plans will be reviewed by the Humboldt County Department of Public Works. Sewage treatment facility plans will be reviewed by the Division of Environmental Health and the Regional Water Quality Control Board.

These plans can be prepared prior to final Planning Commission and Board of Supervisors approval so that the plans will be approved for construction shortly thereafter.

f. Subdivision Approval

Tentative map approval will be included in the original project description. Approval of the Final Subdivision Map will be based on completion of the conditions of approval and/or possible bonding of some improvements. The preparation and review of the Final Subdivision Map may be concurrent with the construction of improvements.

Implementation of many of the land uses, and all of the lot sales, cannot take place until the Subdivision Map has been recorded. In addition, a public report from the Department of Real Estate must be obtained prior to lot sales.

10. Urban Design Character/Themeing

a. Overall Town Image and Character

The Town of Samoa has many positive attributes. There are strong historical links to the lumber and rail industries which have played a major role in the development of Northern California. The town is blessed with a highly scenic coastal environment with spectacular views to the Pacific Ocean and Humboldt Bay, as well as a mile of windswept beach and forest-covered sand dunes. The historic Samoa Cookhouse provides instant name recognition and the Hostelry and the Samoa Block provide architectural links to the past glory days of the town and the lumber industry. The town itself, while aging, has an endearing quality to it with narrow streets, quaint neighborhoods, small, brightly painted houses and a rugged landscape highlighted by tall, dark green pine trees.

While the fortunes of the town have declined in recent years and it has begun to slip into a state of disrepair, the opportunity to create a vital and scenic coastal town with residential and employment opportunities for local residents and vacation, recreation and sightseeing opportunities for visitors. The overriding purpose of this Master Plan is to set a course for an economic and lifestyle revitalization of the town.

The existing character of Samoa is a combination of a declining company town and a "Coastal Sea Town". The goal of future development should be to reverse the decline and maintain and enhance the "Coastal Sea Town" image. From a planning perspective, the existing fabric of the town, narrow streets

laid out predominantly on a grid, should be maintained. In order to accomplish this, the Master Plan takes a new urbanist approach to the plan for the town, incorporating narrow, pedestrian-friendly streets at the front of residential units with alleys in the rear.

In order to create a community of unique “coastal” character, lasting beauty and distinction, individual components should be considered an integral piece of the larger whole. Each component must fulfill programmatic needs with an understanding that each building, each pedestrian connection and each landscape directly impacts the progression of perceptions and events.

In order to enhance the appeal of the town and attract more visitors, the entry experience into the town should be improved and visually strengthened. The owners should work with the County to seek measures that will enhance the arrival experience from the Eureka-Arcata Airport and the town of Arcata. The streetscape along all of the major streets should make a strong landscape and visual statement. Vance Avenue should be developed as the “backbone” of the town. The pavement along Vance Avenue between Rideout Road and Cutten Street should be narrowed to 24', with limited parallel parking bays on either side. The additional space should be utilized to create landscaped front yards for the residences fronting on Vance Avenue. Landscaping along the length of Vance Avenue should be enhanced to create a significant green corridor that extends the length of Samoa.

b. Architectural Character

The Town of Samoa should strive to promote an architectural style that enhances its image as a “Coastal Sea Town”. Architectural design, detailing and building materials should complement and enhance the local coastal environment. The scale and style of all new and renovated buildings should complement the existing character of the town. Individual new buildings should be sited to contribute to the greater neighborhood. Architectural design should relate to the town’s unique history while providing a visual connection to the surrounding environment.

Residential Character

Renovations to existing residential units should preserve the building’s original character. New residential units should be sited and designed in a manner consistent with existing residential development. The height and bulk of new units should be regulated to ensure that new residential structures blend with the style and scale of existing residential neighborhoods. Design guidelines should be developed that provide a set of allowable exterior building colors that complement existing ones. Currently part of the town’s intrinsic charm relates to the range of “whimsical” paint colors on the existing houses. This theme should be maintained in the future, rather than muted. Roof forms should be consistent with the overall character of those found in existing Samoa neighborhoods. Allowable roof forms should be limited to hip, gable and shed roofs. Mansard and flat roofs should be prohibited. Exterior porches should be included on the street-facing exteriors of new residential units wherever possible to provide a human-scaled transition from street-edge to center of lot.

Retail/Commercial/Community Structures Character

The architectural character of retail, commercial and community buildings in the town core is extremely important in creating a high quality image and attractive visitor setting for Samoa. New structures, especially those situated along Rideout Road, Vance Avenue, Cadman Court and Cutten Street should be carefully reviewed to ensure their conformance to the Samoa’s desired unique urban design character. New development should utilize creative, place-making, street-sensitive architectural design that complements the town’s desired image. Building facades and individual building treatments should be sensitive to the adjacent streetscape and their surrounding urban environment. Excluding the proposed new complex at the corner of Vance Avenue and Rideout Road, all new retail development should take place in renovated existing buildings or small, individual new structures. If appropriate, buildings should be sited and designed to create positive exterior space as well as accommodate parking and site circulation. The scale of any new commercial development should be in keeping with existing development and streetscape.

Entrances to retail and community buildings should be clearly visible from, and relate to, pedestrian circulation paths. Where feasible, restaurants and other food establishments should provide outdoor seating spaces that lend themselves to maximum usage in Samoa's seasonal climate.

Graphics and signage should be creative, while complementing the town's image and streetscape.

Historic and Cultural Buildings

The principal historic structures within Samoa consist of the Samoa Cookhouse, the Gymnasium, the General Manager's House, the Hostelry and the Samoa Block. The Master Plan has made provisions for preserving all of these structures. Unless the economics of renovating and maintaining any of these structures proves prohibitive, all should be preserved, renovated and reused. The renovation and possible retrofitting of several of these structures should be sensitive to their historic architectural character and strive to maintain it.

The Samoa Cookhouse is in need of renovation. However, the existing restaurant use is viewed as a highly desirable one and should be continued. The second floor should be retrofitted to provide for some future tourist usage. The Master Plan proposes to create a village of cultural and museum uses that will surround the Samoa Cookhouse. All new buildings in this village complex should complement the architecture of the Cookhouse. New buildings should be of appropriate scale, architectural character, materials and colors to create a harmonious, yet playful, grouping or cluster of structures. Parking for the complex should be sited in a manner that minimizes negative impacts on the surrounding village and associated pedestrian circulation. Outdoor plazas, display areas, pedestrian walkways and seating areas should be incorporated into the design of the complex to create an inviting outdoor environment. An overall landscape plan for the village should be carefully developed that ties the complex together and enhances the exterior setting.

The gymnasium is proposed to remain in its original location and use. However, it is desirable that the exterior of the building be renovated and enhanced to create a higher quality architectural statement in conformance with overall character of the town.

The General Manager's house will need to be relocated. One scenario is to utilize it as part of the health spa facility. If this is determined not to be feasible, then another suitable alternative use should be explored, including the possible continuation of its use for residential purposes in another location.

Architecturally, the hostelry is the most exemplary structure in Samoa. Every effort should be made to maintain the existing architectural character and quality of the structure.

The Master Plan proposes that the historic Samoa Block be renovated to house a variety of community uses. In doing so, its architectural character should be retained and enhanced.

Character of Business Park and Industrial Uses

One of the key goals of the Master Plan is to increase the economic viability of the Town of Samoa. The introduction of the business park and industrial uses will be a primary means of accomplishing this goal. However, while the goal of including these uses is to maximize the economic benefit accruing from them; it will be important to minimize the negative impacts on adjacent town neighborhoods, roadways and natural areas. On a smaller scale, it is also important to provide site and building amenities that will create a pleasant working environment.

The initial step in realizing these goals will be to create aesthetically pleasing entries and a streetscape that will set the tone for the precinct. This should be done in a manner consistent with other entries and streetscape within the town. A comprehensive program of street tree planting should be undertaken. In addition, sidewalks and pedestrian pathways should be provided throughout the precinct to create

adequate connections between parking areas and buildings, building complexes and the business park, and the retail core of Samoa.

Next, the periphery of the business and industrial areas should have sufficient landscaping to visually buffer the area from surrounding uses, especially along *Samoa Avenue*.

All industrial and business structures should have adequate street setbacks. Building architecture should conform as much as possible to the proposed architectural character of the rest of the town. Street-facing facades should receive special treatment to create a pleasing visual streetscape. Buildings, which are of necessity, constructed of other less aesthetic materials should be screened from view wherever possible. The site planning and design of individual complexes should demonstrate sensitivity to surrounding uses and natural open spaces. Service functions should be internalized wherever possible to conceal operations and avoid unsightly views.

Each building or groups of buildings should be landscaped in a manner that creates an attractive environment along the edges of the development. Plant materials should be selected on the basis of their adaptability to the local climate. Landscaping should be consolidated wherever possible to create features such as plazas, entrances, corners and buffers rather than being thinly distributed throughout a site. Large parking areas should be landscaped and screened from view.

c. Streetscape and Landscape Character

A comprehensive streetscape and landscape master plan should be created for Samoa. The intent should be to create an attractive, planted environment at town entry points, along major roadways, along pedestrian corridors, at building entrances and along the perimeter of individual properties.

Street Sections and Streetscape

According to the master plan, all streets have a pavement width of 24 feet in order to preserve the character of the existing town. Typical recommended street sections are shown above. Where possible, sidewalks should be provided adjacent to the street pavement to facilitate safe pedestrian movement. It is preferable that on street parking be provided in parallel parking bays. All large, open parking lots should be adequately landscaped and screened from view to the maximum extent possible.

In conjunction with a landscape master plan, street trees should be provided throughout Samoa. This is especially important along the entire length of Vance Avenue, *Samoa Avenue*, Rideout Road and Cutten Avenue. Appropriate species of street trees should be selected such that they enhance the overall image of the town, but are clean and non-invasive.

It is intended that Rideout Road be paved using materials of special character, such as brick, paving blocks, etc. which will create a unique appearance, discourage extemporaneous vehicular traffic and promote pedestrian usage.

All street furniture including benches, portable planters, bollards, kiosks and trash receptacles should be coordinated throughout the town to be of consistent design, materials and coloration. Bollards should be used to reduce conflicts between vehicular and pedestrian activity.

General Landscape Character

The overall character of landscape plantings should enhance the town's image as a "Coastal Sea Town". New trees and plantings should utilize plant materials that are compatible with the local climate and setting. Public landscaping should be low maintenance. Design standards should address wall and fencing design to insure that it complements the desired image of the town and is compatible with building colors, materials textures and forms.

Seasonal plantings such as annuals, decorated trees, garlands and wreaths should be incorporated into civic landscaping plan to enhance the high quality image of the town and create a festive ambiance.

d. Graphics and Signage Character

One of the goals of the master plan is to create a strong identity and visual image for the town of Samoa. As the town is redeveloped, the inclusion of a strong, coordinated signage and graphics package will significantly enhance the image of the town.

A comprehensive graphics and signage program should be developed with the intent of encouraging signs that are sized and properly located to convey information and character. They should use colors and materials that contribute to the desired image of Samoa. In order to accomplish this goal, the following principals should be adhered to:

- A comprehensive graphics package should be created including logo design, appropriate fonts and compatible color combinations to convey Samoa's desired image and ambiance.
- Entry signage should be strategically located to inform visitors of their arrival into Samoa. As an example, the master plan proposes the construction of a new water tower located near the mid-town entrance that would become an architectural icon or landmark, enhance the town's image as a "Coastal Sea Town" and function as an arrival signage element.
- Directional and informational signage should be carefully located to convey easily followed directions and information. Maps and directional signage should be strategically placed near tourist parking and debarkation points.
- Retail signage should integrate with building facades. It should be carefully designed to be highly visible, but should not overwhelm building facades or detract from architectural detailing.
- All retail signage should be regulated to insure that it is consistent throughout the town and provides a coordinated image.
- All building signage should be externally lit. Internally lit and neon signage should be prohibited.

e. Lighting

Standards should be developed to regulate public lighting throughout the town. The intent of lighting standards should be to create uniform character and continuity throughout the town core. Vehicular, pedestrian, building and signage lighting should be provided to promote both vehicular and pedestrian safety. Street and pedestrian lighting should utilize fixtures which are of a design that is compatible with and enhance the overall image of the town.

f. Tsunami Evacuation Plan

As part of the planning process, the owners and the planning team met with Ms. Lori Dengler, Ph. D., a Professor of Geology at Humboldt State University, and an internationally respected expert on tsunami hazards.

Historic events in the area include a 1964 tsunami that hit Crescent City. That episode resulted in waves up to 16 feet in height and killed 11 people. According to scientific data, another major tsunami struck the Samoa peninsula in January of 1700. That tsunami overtopped the south end of the peninsula. There have also 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. The town of Samoa 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.

Given Samoa's location along a coastline that is believed to have a high probability of future tsunami occurrences, the planning team has taken a prudent approach to the possibilities and developed a conceptual Tsunami Evacuation Plan. According to Ms. Dengler, the State of California is currently in the process of developing tsunami inundation projections for the entire California coastline. Should these projections be completed, they will be reviewed by the owners and the planning team to determine what if any additional measures should be taken.

According to Ms. Dengler it is assumed by the scientific community that there is a reasonably high probability of a 9.0 earthquake striking the northern California coast. The resultant tsunami wave could be between 25 to 40 feet in height. The warning time could be as little as five minutes.

In order to address this potential scenario, the Tsunami Evacuation Plan designates three evacuation points within the town of Samoa. These are the lodge, the retail complex and an elevated site south of the Samoa Block. All of these evacuation points are situated above the 45' elevation. Three concentric circles of ¼ mile, or a five minute walking distance have been circumscribed around each location to insure that all areas within the town are within an easy five minute walk to one or more of these evacuation sites. The most critical of the proposed uses, the senior housing has been moved to within a very close proximity of two of the sites. Further, there are no critical facilities, such as police stations or hospitals proposed for Samoa. As the development of Samoa proceeds, the owners will further develop a comprehensive warning system in conjunction with the County to help insure the safety of all residents and visitors.

Appendix A

The Samoa Town Master Plan Planning Team

The following companies and key personnel have provided input into the master planning process for Samoa Town:

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Town of Samoa, California Sustainability Pilot

Recommendations for Sustainable Site Analysis

Final Report

March 2, 2009



Completed by *Vita Nuova LLC*

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FINAL REPORT

Town of Samoa, California Sustainability Pilot

Recommendations for Sustainable Site Analysis

Introduction

This project was selected by the U.S. Environmental Protection Agency's (EPA) Brownfields Program as a Brownfields Sustainability Pilot. Vita Nuova LLC, subcontractor to SRA and EPA, was assigned the task of assessing plans for development and reuse of the properties belonging to the Samoa Pacific Group. This report provides an analysis and scoring using the Leadership in Energy and Environmental Design (LEED) Neighborhood Development Rating System (NDRS) and the Land and Natural Development (LAND) Code in order to assess the proposed redevelopment Master Plan. The report represents the outcome of a site visit, December 13-16, 2008, by consultants Edward Mitchell, Vita Nuova architect and planner, and Tim Snyder, also of Vita Nuova. This analysis represents the Phase I report for the agreed upon Scope of Work (**Appendix A**).

As noted below in “Recommendations,” at the time of the site visit and writing of this report, the architectural and engineering plans of the projects are not advanced sufficiently to provide more than generalized recommendations. If the architectural and engineering work proceeds, as recommended by LEED guidelines, it will be possible to identify more exact specifications.

EPA Brownfields program

EPA's Brownfields program enables local communities to assess, clean up and revitalize key community properties through collaboration between relevant stakeholders. EPA's Brownfields Sustainability Pilots are intended to facilitate and encourage sustainable redevelopment of brownfields sites through technical assistance on sustainability practices. EPA defines brownfields sites as real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant.

Purpose

The LEED and LAND Code scoring systems are a means of formulating an objective basis for verifying sustainable development practices. However, a successful plan must balance the economic, environmental and cultural needs specific to a place. Precise design solutions are often difficult to evaluate by a generic table of values. While no method is ideal for assessment, these tools give a basic profile of the project's merits and suggest general areas for improvement.

The Samoa Town Master Plan is a unique development, characterized by both a complex ecosystem and a culturally valuable and historic neighborhood. As a result, many of the standards for more conventional development do not directly apply to this situation. Those exceptions are noted later in this text.

Scope

The scope of this analysis of the Samoa Town Master Plan includes 99 existing houses and commercial structures that were former properties of the Hammond Lumber Company and additional properties owned by the Samoa Pacific Group, outlined in the Master Plan and Environmental Review (MEIR) Recirculation Draft 3. A detailed report and series of recommendations for the rehabilitation of the 99 existing homes and existing historic structures will be included in Phase II of this report, “A Voluntary Green Code and Green Remodeling Guide.” Phase II is intended as a companion piece that reinforces and supplements this analysis and the general recommendations of this document.

In total, the Samoa Town Master Plan Area C is approximately 173.2 acres and is comprised of Assessor’s Parcels 401-031-038, 401-031-046, 401-031-055, 401-031-059, and 401-031-060. The physical project area is bounded by the Samoa Peninsula School and parcels owned by Simpson Samoa Company to the north; coastal industrial land along Humboldt Bay owned by the Humboldt Bay Harbor Conservation and Recreation District to the east; lumber storage yards owned by Simpson Samoa Company to the south; and New Navy Base Road and the Pacific Ocean to the west. In addition, the overall assessment includes the portion of APN 401-031-044, located west of New Navy Base Road, slated to be developed for visitor uses, coastal access improvements and mitigation measures. Approximately 1.5 acres of the 50.1 acre parcel are proposed for redesignation from Natural Resources (NR) to Public Recreation (PR) for camping and day use activities.

The Master Plan area is located within the coastal zone (pursuant to the California Coastal Act of 1970), and is subject to the regulations of the Coastal Act, under the jurisdiction of the California Coastal Commission.¹

Role of the report as guideline

This report is intended as a guideline only and has no role in directly determining any legal restrictions or design covenants for the future development of the area. Suggestions made in the “Recommendations” section serve only as a possible means for either reinforcing or improving the overall LEED scoring and sustainability of the project. In addition, the recommendations are intended to inform a strategy for realizing a reasonable phasing structure for the project. Phase II of this report is dedicated to the assessment of the existing homes and structures in the development area.

Due to the preliminary nature of the MEIR report and the accompanying design guidelines, assumptions have been made regarding the project’s implementation and construction. This document assumes that new construction will follow reasonable green building guidelines that are intended to support the economic limitations and cultural stewardship set forth in the MEIR proposal. All such assumptions are noted in the summary of the LEED and LAND Code scoring summaries.

Site description and background

Location and ecological factors

The Samoa Peninsula is located in northern California and is a 9.5 mile long, 1 mile wide land barrier between Humboldt Bay and the Pacific Ocean. Humboldt Bay is the largest of a string of natural lagoons (Big Lagoon, Stone Lagoon, etc.) which historically had an opening that appeared

¹ Proposed Master Plan and Environmental Review Process, pg. 1-3.

and disappeared as the lagoon breached the sand dunes. The dunes contain one of the most ecologically diverse habitats in California. The Town of Samoa, the study area of this report, is an unincorporated community situated between the Pacific Ocean and Humboldt Bay on the Samoa Peninsula. Samoa is located in Humboldt County, approximately three miles from the City of Eureka, and seven miles from the City of Arcata. Samoa is one of three communities located on the Samoa Peninsula. The weather is generally cool and overcast much of the year, with only modest daily and seasonal temperature fluctuations; the lowest daily mean is in January at 47.9 degrees and the high mean is in August at 58.7 degrees. Rainfall varies to a greater extreme with average monthly precipitation ranging from 6.35 inches in December, to only 0.16 inches in July.² The areas immediately bounding the study area include sensitive dune, vegetation and wetland areas.

Historic use

Samoa is one of the few remaining examples of a "Company Town." The Town's history dates back to the late 1800s and is closely tied to the rise and fall of the redwood lumber industry in Humboldt County. In 1892, several prominent citizens of Eureka formed the Samoa Land and Improvement Company. Two hundred and seventy acres were purchased to build the Town of Samoa. Beginning in 1893, the area was purchased by the Vance Redwood Company and used as a sawmill and railroad expansion facilities. After the 1900 purchase by Hammond Lumber, the sawmill operations were expanded to include a planing mill, moulding plant, dry kilns, logging camps, molding plant, sorting sheds, warehouse, shops, and a steamship dockage. The Hammond Lumber Company was one of the largest supplier of doors and windows from the late 1800s to the early 1900s. The site also included residential development for company housing. The Georgia-Pacific Lumber Company purchased the entire site in 1959 to develop a plywood mill. The sites were sold to Louisiana-Pacific in 1973 and in 1998 the area was transferred to the Simpson Timber Company. In 2001 the Samoa Pacific Group, LLC purchased 65 acres, including the Town of Samoa.³

The majority of Samoa's physical structures were built between 1892 and 1923 and reflect the social, physical, economic, and cultural characteristics typical of northern California company-owned lumber mill towns. Samoa is unusual because many of its historic structures remain intact. The arrangement and scale of the 99 existing houses and the supporting public and commercial buildings reflect the hierarchal structure of the mill organization. The Hammond Lumber Company limited building typologies and controlled the buildings' construction and detailing. This resulted in a neighborhood with a clear visual coherence.⁴ The earliest houses are simple variations of gabled or hip roofed cottages. Later additions to the community include bungalows. Exceptions to these building types are the "Owner's Mansion," the home of the former Vance Redwood Company owner, the "Samoa Block," a two story commercial building on Cutten Street, a small gas station, a small post office, and the Samoa Cookhouse complex. The Cookhouse is a family style restaurant that is outside the physical boundaries of the development plan, but part of the social fabric of the town.

The mill operations were located on the eastern boundary of the site on properties designated as Coastal Development Industrial. Only a relatively few bays of the larger structure and railroad

² U.S. Department of Commerce National Oceanic & Atmospheric Administration, National Environmental Satellite, Data, and Information Service 1971-2000 and the National Weather Service Forecasts.

³ Phase I Environmental Site Assessment for Assessor's Parcel Numbers 401-031-38, -44, -46, -55, -59, and -60, Winzler & Kelly Consulting Engineers, February 2004.

⁴ Design Guidelines: Old Town, Samoa, CA, Part I.

tracks remain of what was once the working operations of the mill. These properties, though integral to the historic program of the peninsula, are not part of the scope of this analysis.

Recent history

After changing owners numerous times, Samoa was purchased at auction by the Samoa Pacific Group in 2001. Currently Danco Property Management manages the 99 existing residences and the Samoa Women's Club.⁵

The design process for the peninsula began shortly after purchase. The developers have worked closely with the County of Humboldt to develop a draft Master Plan for the Samoa Peninsula. In July 2002, the Planning Studio completed the Samoa Town Master Plan. In March 2003, Planwest Partners began its Environmental Impact Report. The Master Plan Revision and Draft MEIR were completed in October 2004. Revisions were completed on the MEIR in February 2006. In March 2006, the Planning Commission recommended approval and in December 2006 the tsunami review and revisions to the Master Plan were completed. The last revisions, the MEIR Draft 3, were completed and recirculated in order to begin public hearings in 2007. The Samoa community is very politically active on environmental issues and has been very involved in the planning process. The draft Master Plan currently includes a plan to restore and preserve historic structures, while allowing for a mix of new housing, industrial and commercial development and tourist and cultural facilities. Throughout the planning process, concerns were raised about the intensity of development and the impact on the local environment and resources.

The residential properties are currently leasable year round homes, while a few of the commercial properties, such as leasable spaces in the Samoa Block, and the gas station are no longer in use.

Previous reports and recommendations

EPA reports

In 2004, the County of Humboldt received a Brownfields Hazardous Substances Assessment Grant from EPA. Using EPA funds, the County conducted Phase I and II Environmental Site Assessments (ESA) on the parcels comprising the Town of Samoa. The ESAs identifies 18 potentially impacted sites. Evaluation of the former gas station was not part of these investigations. The Phase II ESA found some indication of lead impacts and recommended notifying current residential tenants and capping certain other areas through the construction of parking areas.⁶

Two cleanup projects are currently underway. The Samoa Pacific Group plans to apply to the County of Humboldt's Brownfields Revolving Loan Fund in order to remediate soil surrounding the homes. As a company town, the mill owned the homes and workers rented the units. After cleanup is complete, the tenants will have the opportunity to buy their homes.

⁵ History of Samoa, Danco Property Management, http://www.danco-group.com/propertymanagement/history_of_samoa.

⁶ Phase II Environmental Site Assessment for Assessor's Parcel Numbers 401-031-38, -44, -46, -55, -59, and -60, Winzler & Kelly Consulting Engineers, June 2005.

Summary of the Samoa Pacific Group MEIR

Proposed land uses

The Master Plan site covers approximately 173.2 acres, excluding 2.4 acres of railway right-of-way that lie within the site. The Master Plan includes the following proposed zoning and land uses (see **Appendix B** for a land use map):

Residential - Residential Low Density/ Single-Family [RL/RS] and Residential Multi-Family [RM/RM]

53.3 acres of RL and 3.5 acres of RM land, including 88 of the existing residential units, will remain RL. An additional 293 residential units of a similar architectural character will be located west and east of Vance Avenue and south of the existing development. The Women's Club, at Rideout and Sunset Avenues, will remain in the residential area and continue to be available for community uses.

Industrial - Industrial/Coastal-Dependent [MC]

33.5 acres east of the NCRA railroad tracks, extending towards Humboldt Bay, will be retained. There is a proposal to rezone an area to Public Facilities (PF) and develop a new primary wastewater treatment plant, water storage tank and corporation yard.

Business Park - [MB]

19.2 acres on the west side of Vance Avenue in the south end of the site. The Arcata Community Recycling Center facility is already located in the Business Park.

Commercial - Commercial General [CG]

4.6 acres in two parcels are proposed. The first is along Cutten Street and Cadman Court; the existing post office site and building, both of which would be redesignated CG. The post office use will be relocated to the Samoa Block building. The existing gas station would be renovated, with a convenience store added. The second area of Commercial General land use includes the mini-storage facility at the north end of the site, between Vance Avenue and the NCRA railroad tracks.

Recreation and Conservation - Commercial Recreation [CR]

9.7 acres in three parcels proposed. One area in the northeast portion of the site includes the existing Samoa Cookhouse, a gymnasium, redesigned public parking, and the existing Maritime Museum. A new indoor soccer arena and parking lot are proposed on the present site of the Fireman's Hall, east of the existing railroad easement and Vance Avenue. The RV Park would be located north of the indoor soccer arena and Samoa Cookhouse. Other CR designated areas include the existing Hostelry on the corner of Rideout Road and North Bay View, and 22 proposed vacation rental units on the former soccer field opposite Samoa Park.

Public Recreation [PR]

4.4 acres in two parcels. The first area is Samoa Park, the Town's 2.9 acre main public park, located east of Vance Avenue. The second is a visitor area of approximately 1.5 acres, west of New Navy Base Road, which includes a tent camping area, day use area and a restroom.

Natural Resources [NR]

34.9 acres. This area includes a broad corridor east of New Navy Base Road and a band of open space north of the residential areas of Sunset and Park Avenues. These NR designated lands contain wetlands and native vegetation. A trail network runs through much of the larger NR-designated open spaces.

Public Facility [PF]

10.1 acres in three main areas. The largest area holds ponds for secondary wastewater discharge, located west of Vance Avenue and south of Soule Street, extending along the northern boundary of the Business Park to the bike trail at the west. PF-designated land also includes the primary wastewater treatment plant, including a water storage tank and corporation yard.

Roadways

A network of roads, pathways and a bike trail network are proposed throughout the site. The network mainly consists of residential streets and mid-block alleys for parking access.

Design Guidelines – Samoa Pacific Group

In addition to the MEIR, the Samoa Pacific Group issued Design Guidelines in March of 2007. The report is highly detailed, providing a document of all existing buildings, a features inventory, Secretary of the Interior Standards for Rehabilitation, and Guidelines for New Construction. The Design Guidelines encourage the preservation and sensitive rehabilitation of the existing structures, ecologically sensitive landscape planning and green building design. Assumptions as to the construction methods and best practices in the new development are based on the premises outlined in this document.

Analysis and tools

LEED Neighborhood Development criteria

LEED for Neighborhood Development is a rating system that integrates the principles of smart growth, new urbanism and green building into the first national standard for neighborhood design. It is being developed by U.S. Green Building Council (USGBC) in partnership with the Congress for the New Urbanism (CNU) and the Natural Resources Defense Council (NRDC). The system is currently under review for adoption.

Using the framework of other LEED rating systems, LEED for Neighborhood Development recognizes development projects that successfully protect and enhance the overall health, natural environment and quality of life of our communities. The rating system encourages smart growth, new urbanist best practices and promotes auto independent neighborhoods.

Two hundred and thirty-eight projects from thirty-nine states and six countries are now registered to participate in the pilot program. These projects are in the process of gathering documentation based on the rating system, which will be submitted to USGBC for certification. The information learned during the pilot program will be used to make further revisions to the rating system and certification process. The resulting draft rating system recently closed for public comment and is moving towards final approval and balloting.⁷ *This project is not currently registered in the program.*

Benefits of developing a LEED for Neighborhood Development community

In order to reduce the impacts of unplanned, uncontrolled development in areas outside of metropolitan regions, as well as create more livable communities, LEED for Neighborhood Development encourages infill development and projects constructed on previously developed sites, close to existing centers with good transit access. Typical sprawl development can harm the natural environment by fragmenting farmland, forests and wildlife habitat, degrading water quality through destruction of wetlands and increased stormwater runoff, and polluting the air with increased automobile travel.

LEED for Neighborhood Development emphasizes the creation of compact, walkable, vibrant, mixed-use neighborhoods with good connections to nearby communities. The rating system also encourages compact development patterns and the selection of sites that are within or adjacent to existing development. This helps to minimize habitat fragmentation, preserve areas for recreation,

⁷ LEED Frequently Asked Questions, U.S. Green Building Council, <http://www.usgbc.org/ShowFile.aspx?DocumentID=3357>.

and support the increase in transportation choices and decrease of automobile dependence.

Benefits to project developers of LEED for Neighborhood Development communities

There are three primary reasons for developers to use LEED standards: LEED certified projects can expedite permitting processes; certified projects create a positive public image; and certified projects attract higher values. Municipalities are beginning to reduce fees or waiting periods associated with the approval process for community projects that can demonstrate a commitment to sustainability. Successfully completing the first stage of LEED for Neighborhood Development certification (pre-review approval) may assist projects in preliminary planning phases to gain the necessary approvals as expediently and cost-effectively as possible.

A LEED for Neighborhood Development certification can help projects explain the environmental and community benefits of a project to residents and businesses in nearby areas. The rating system also encourages projects to work collaboratively with the existing neighborhood to make sure their needs are taken into account. Rising demand for housing in highly walkable or transit-accessible areas can also result in higher tenancy rates.⁸

LEED Neighborhood criteria limitations

The LEED scoring system is intended to generate an objective evaluation process for new developments. The Samoa Town Master Plan includes the preservation of 99 existing homes and various commercial and public facilities, as well as the extension of an existing neighborhood with 293 additional units, an office park and various commercial properties.⁹

The LEED Neighborhood Development Ratings System consists of four major sections, “Smart Location and Linkage,” “Neighborhood Pattern and Design,” “Green Construction and Technology,” and “Innovation and Design Process.” The first two sections contain general prerequisite requirements necessary to be considered as LEED projects.

Prerequisites

Smart Location and Linkage

Prerequisite 1 Smart Location	Required
Prerequisite 2 Proximity to Water and Wastewater Infrastructure	Required
Prerequisite 3 Imperiled Species and Ecological Communities	Required
Prerequisite 4 Wetland and Water Body Conservation	Required
Prerequisite 5 Farmland Conservation	Required
Prerequisite 6 Floodplain Avoidance	Required

The Samoa Town Master Plan meets the prerequisite requirements despite its location within a coastal zone. For “Smart Location” it qualifies as an “Infill Site” (Option 1) with “Nearby Neighborhood Assets” (Option 4). The plan connects to existing water and wastewater infrastructure and has made preliminary plans for new services (Prerequisite 2). This report assumes that Prerequisite 3 for “Protection of Imperiled Species and Ecological Communities” has been met. According to the plans, all new development is on former developed property and outside of set limits for wetlands and water bodies, thus meeting Prerequisite 4.¹⁰ Because there is no agricultural land on the properties, the plan meets Prerequisite 5. While the plan notes that new

⁸LEED for Neighborhood Development, U.S. Green Building Council, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>.

⁹ Proposed Master Plan and Environmental Review Process, pg. 1-8.

¹⁰ Email response from Sean Armstrong, February, 26 2009.

development is constructed with habitable floors at or above the 30 foot elevation required by the Tsunami Safety Plan, the site is not in an official floodplain (Option 1) and is on a previously developed site (Option 2).¹¹

Neighborhood Pattern and Design

Prerequisite 1 Walkable Streets	Required
Prerequisite 2 Compact Development	Required
Prerequisite 3 Connected and Open Community	Required

Existing and new buildings are all entered off streets or public squares and more than 20% of streets have frontages at 1:3 ratios, meeting Prerequisite 1. However, prerequisites for Neighborhood Pattern and Design require that residential components have a density of seven dwelling units per acre (Neighborhood Pattern and Design Prerequisite 2). All other properties that are not zoned residential do not count against the project according to the LEED standards. The 2007 MEIR falls just short of the target densities required for LEED development. Counting only the residential areas of the plan, there are 56.8 acres designated RL or RM with 381 planned dwelling units. This equals 6.7 dwelling units per acre. Adding 2.3 acres designated CR for 22 vacation units, the ratio increases to 6.81 dwelling units per acre. Two factors that mitigate this shortcoming in the MEIR are the previous EIR study that had 406 units on 56.8 acres (7.15 dwelling units per acre) and was downsized by request and the planned new residential development appears to achieve required densities at levels approximating 8-10 dwelling units per acre on roughly 0.10 acre residential lots.^{12,13}

Neighborhood Pattern and Design Prerequisite 3 stipulates that at least one thoroughfare must intersect the project boundary at least every 800 feet.¹⁴ The land area is currently accessed from New Navy Base Road at the northern boundary and has only one new entrance to the development area, also on New Navy Base Road at the site's southwestern boundary. The NDRS allow for exceptions when, as in the case of the Samoa Town Master Plan, the site is bounded by either a steep slope or protected ecosystem. The native dune habitats on the sites western boundary prohibit the multiple entries that are a general prerequisite of Neighborhood Pattern and Design.

Green Infrastructure and Building

Prerequisite 1 Certified Green Building	Required
Prerequisite 2 Minimum Building Energy Efficiency	Required
Prerequisite 3 Minimum Building Water Efficiency	Required
Prerequisite 4 Construction Activity Pollution Prevention	Required

Because the project is not yet in development, all prerequisites for "Green Infrastructure and Building" are assumed to be met.

Conclusion

In conclusion, it is believed that the intention of LEED's NDRS is to encourage compact growth on existing urbanized areas. The intention of the Samoa MEIR is to sustain an important historic residential neighborhood by redeveloping a brownfields site. While there may appear to be a contradiction between two goals of the LEED ratings system, brownfields remediation and

¹¹ Proposed Master Plan and Environmental Review Process, pg. 1-8.

¹² Neighborhood Pattern and Design Prerequisite 2: Compact Development.

¹³ Calculated from the Samoa Town Master Plan Land Use Plan prepared by the Samoa Pacific Group.

¹⁴ LEED for Neighborhood Redevelopment Ratings System, October 31, 2008

limited development on coastal areas, the development of brownfields trumps any concerns with the limitations set on coastal development. The Samoa development MEIR is a special case and meets the intentions of the LEED system documents despite the relative isolation of the site, the limited number of connections to major urban centers and its coastal location.

Scoring summary

Smart Location and Linkage

Score: 12 of 27 possible points

Credit 1 Preferred Locations	5 of 10
Credit 2 Brownfield Redevelopment	1 of 2
Credit 3 Reduced Automobile Dependence	0 of 7
Credit 4 Bicycle Network and Storage	1 of 1
Credit 5 Housing and Jobs Proximity	1 of 3
Credit 6 Steep Slope Protection	1 of 1
Credit 7 Site Design for Habitat or Wetlands Conservation	1 of 1
Credit 8 Restoration of Habitat or Wetlands	1 of 1
Credit 9 Conservation Management of Habitat or Wetlands	1 of 1

- Issues of density and the access to an active public transportation network limit the scores for the project. Due to the geographic isolation of the site and the contextual density of the existing housing types, the project scores relatively low in this area. However, if the site is considered a “previously developed site,” three points are added to the cumulative score. The plan does relatively well in connectivity because of its small, walkable block sizes. Points may be added by achieving High Priority Status through federal programs listed in the NDRS.
- Bus service is properly located in the site plans, but the distance of the site from the cities of Eureka and Arcata do not support the goals of the NDRS. Current service in Eureka is limited to twelve stops per day, per stop in the Eureka Transit System (ETS).
- The project is awarded points for the redevelopment of brownfields sites.
- The project receives no points due to its isolation from employment centers.
- The project scores well in areas dedicated to the restoration and preservation of wetlands habitats.

Neighborhood Pattern and Design

Score: 23 of 44 possible points

Credit 1 Walkable Streets	9 of 12
Credit 2 Compact Development	1 of 6
Credit 3 Diversity of Uses	3 of 4
Credit 4 Mixed-Income Diverse Communities	3 of 7
Credit 5 Reduced Parking Footprint	1 of 1
Credit 6 Street Network	1 of 2
Credit 7 Transit Facilities	0 of 1
Credit 8 Transportation Demand Management	0 of 2
Credit 9 Access to Public Spaces	1 of 1
Credit 10 Access to Active Public Spaces	1 of 1
Credit 11 Universal Accessibility	1 of 1
Credit 12 Community Outreach and Involvement	1 of 2
Credit 13 Local Food Production	0 of 1
Credit 14 Tree-Lined and Shaded Streets	0 of 2
Credit 15 Neighborhood Schools	1 of 1

The project scores well due to its walkable streets, the relatively strong mixture of uses, the affordability of the existing housing stock, and access to public spaces. The project falls short in Compact Development because of its relatively low densities (see notes on prerequisites above) and the limited mixture of housing types.

- Three points were awarded for Affordable Housing (Neighborhood Pattern and Design Credit 4). This is dependent on the market targets for the existing housing stock and a more detailed analysis of the current markets in the area not provided in the current MEIR.
- No points were earned in the area of Transit and Transportation (Neighborhood Pattern and Design Credits 7 and 8).
- Certain criteria, such as the emphasis on shade trees (Neighborhood Pattern and Design Credit 14), are irrelevant to the specific climate and geography of the site.
- Additional points can be gained by including a farmer’s market (Neighborhood Pattern and Design Credit 13) and the development of a mass transit credit program (Neighborhood Pattern and Design Credit 8.)

Green Infrastructure and Buildings

Score: 17 of 29 possible points

Credit 1 Certified Green Buildings	5 of 5
Credit 2 Building Energy Efficiency	2 of 2
Credit 3 Water Efficient Landscaping	1 of 1
Credit 4 Existing Building Reuse	1 of 1
Credit 5 Historic Building Preservation and Adaptive Use	1 of 1
Credit 6 Minimize Site Disturbance in Design and Construction	0 of 1
Credit 7 Stormwater Management	4 of 4
Credit 8 Heat Island Reduction	0 of 1
Credit 9 Solar Orientation	0 of 1
Credit 10 On-Site Renewable Energy Sources	1 of 3
Credit 11 District Heating and Cooling	0 of 2
Credit 12 Infrastructure Energy Efficiency	0 of 1
Credit 13 Wastewater Management	NS of 3
Credit 14 Recycled Content in Infrastructure	NS of 1
Credit 15 Waste Management Infrastructure	1 of 1
Credit 16 Light Pollution Reduction	1 of 1

Much of this section of the NDRS could be incorporated in local building codes and programs that are not yet developed. Many of the conclusions for scoring are based on the assumption that the developer will adopt recommendations provided in Phase II of this report, which outlines programs and projects for improving the energy performance of the existing housing stock.

- No credit was given for Site Disturbance (Green Infrastructure and Buildings Credit 6) due to the project’s low density.
- Four points were awarded for Stormwater Management (Green Infrastructure and Buildings Credit 7). Further analysis of the Secondary Wastewater Discharge Area engineering is needed to verify this score.
- No points were awarded for Renewable Energy Sources (Green Infrastructure and Buildings Credit 10) due to recommendations being made in Phase II of this report. Costs associated with renewable energy systems, though beneficial, are outside of the current

budget targets of the project. Points can be gained if the Business Park was to utilize solar collectors or District Heating (Green Infrastructure and Buildings Credit 11).

- No score was awarded for Credit 14 or Credit 15 due to insufficient data at the time of the study.
- Points were awarded for Waste Management Infrastructure (Green Infrastructure and Buildings Credit 15) and Light Pollution Reduction (Green Infrastructure and Buildings Credit 16) in anticipation of the implementation of sound wastewater reuse and reuse of existing refuse in infrastructure development.

Summary

Project Scoring

Score: 53 of 110 possible points – LEED Silver

The minimum score for credit is 40 points. A score of 53 earns a LEED Silver rating. No points have yet been awarded for Innovation in Design or Regional Priority Credits. General findings indicate that the project loses points because of its low density and limited amount of public transit, two areas highly valued in the LEED system. See **Appendix C** for the full LEED scoring matrix.

What is LAND Code?

The Land and Natural Development (LAND) Code is a research-based guide to ecologically sound land development, created by Yale University faculty members Diana Balmori, School of Architecture, and Gaboury Benoit, School of Forestry and Environmental Studies. Many of the LAND Code principles appear in EPA guidelines and the LEED Green Building Rating System. However, the LAND Code, intended for large development sites, was created prior to the pilot study for the LEED Neighborhood Development and favors integrated design methods over cumulative scoring.

Categories of analysis are broken into 14 areas, with an emphasis on landscape planning and site development over building construction. LAND Code recommends ways to maintain or recreate natural processes through engineered methods (e.g., vegetated rain gardens) and uses a rating scheme that is weighted based on the environmental benefits and difficulty of implementation for a particular situation. Its rating system emphasizes permanent or long-term solutions over quick remedies.

Unlike LEED, the LAND Code system acknowledges that certain criteria are neither relevant nor achievable in a specific situation. Therefore points are not factored where they are not appropriate standards. Points are added and subtracted based on the conditions so that negative criteria, as well as positive criteria, are scored. The score, unlike LEED, which is cumulative, measures achievement as a percentage of viability.

Summary of Findings

Score: 68% – LAND Code Gold

The minimum score for credit is 40%. The project scores well for its carefully integrated development which avoids compromising the delicate ecosystem of the dunes. In addition, the compact lots, recommendations for low impact parking and plantings and the site's access to public transit are all assets. Points are lost because of the site's proximity to the shore and the lack of more costly front-end design features, like green roofs, renewable energy systems or pervious paving surfaces. It should be noted that in the LAND Code the sandy dunescape, which cannot sustain shade trees and is easily drained, does not hurt the project as it does in the LEED

guidelines. In fact this helps achieve the standards established by the code to preserve the existing ecology. In addition, the project's lower densities are not considered negatives. Where LEED's Neighborhood Development standards are weighted towards denser urban ecologies, LAND is slightly more favorable towards integrated landscape solutions. See **Appendix D** for LAND Code scoring matrix.

Recommendations

Scope and intentions of the report recommendations

Specific recommendations are preliminary and because the project scores well on both systems, there are no extensive changes necessary. To reiterate, the low-density level of development is the greatest prohibition against a higher LEED score. In addition, the apparent lack of front-end funding and the aesthetic qualities of the existing historic development prevent use of higher-end design solutions, such as renewable technologies.

General recommendations rely on continued compliance with the construction methods that are assumed in both standards. For the sake of clarity, the recommendations are restricted to improving the LEED score, if desirable, for the project.

Remediation issues

The primary remediation issues are due to lead paint contamination around existing homes. The developer will be subdividing the neighborhood into individual lots. Because the contamination issues are difficult to isolate on individual properties, due to wind born particulates and the relatively unstable, sandy conditions of the soils, it is highly recommended that remediation be completed before lot subdivision.

Private lots

Samoa Pacific Group may apply to the County of Humboldt's Brownfields Revolving Loan Fund in order to remediate the soil surrounding existing homes. It is highly recommended that the remediation efforts be done on a scale larger than the individual lot. The proximity to other contaminated areas will likely continue to impact individual properties. Once a single block has been remediated, those properties can be subdivided, sold and the profits from those sales used to fund the next step of the remediation process. The developer has scheduled the existing residential areas as the first phase of work. The blocks to the east and west of Vance Avenue have the highest profile and may be the best starting point for remediation.

In addition, minor site design issues are best addressed at this stage. These include minor contouring around the existing homes to avoid excessive runoff from accumulating under foundations, eradication of invasive species and re-landscaping using native species, and reinforcing minor steep slope areas through planting (Smart Location Credit 6). Capturing rain water in a climate with heavy rainfall is not an issue for Water Efficient Landscaping (Green Infrastructure Credit 3); however, improved landscape contouring and low impact development rain garden design could alleviate problems associated with standing water. This is particularly important in impervious public areas. In addition, it is highly desirable to turn downspouts away from building footings and either direct run off down slope or to areas of collection away from the homes.

Minor concerns are noted for the two homes at the north end of Vance Street, which are located on steep slopes and surrounded by native coastal coniferous forests. The development plan for both sites can be interpreted as working in contradiction to the LEED principles.

It is understood that rehabilitating the existing homes will largely become the responsibility of the homeowner. In order to achieve the goal of preserving these houses, more specific recommendations will be made in Phase II of this report. However, it should be noted that on a more community-scaled basis, a program for recycling redwood materials could be established in order to find appropriate replacement for damaged shingles, clapboard and siding. Many community members have suggested creating a program to designate potential material resources and to control workmanship on rehabilitating the private homes.

Public areas

The project has already outlined design changes for improvement of stormwater management. These changes include recontouring and adding a central swale along Vance Avenue (Street Section Scenario 1)¹⁵ and removing the large asphalt areas in the public square off Cutten Street and Cadman Court.

Many of the major streets are scheduled for tree planting, as shown in the Danco Group PowerPoint presentation, although they are not noted on the plan submitted in the MEIR. The addition of trees earns additional LEED points (Neighborhood Pattern and Design Credit 14). However, only native species should be used and trees should be evaluated for feasibility given the existing soil conditions.

Samoa Park is only in need of minor upkeep.

Commercial properties

At the date of this report there is not sufficient information for analysis of the new commercial properties noted as “Subject to Design Review” on the plans. Aesthetic concerns remain in regards to the proposal for a second floor boutique hotel above the Cookhouse and further study is needed on parking for both the Cookhouse and proposed indoor soccer facility. The structures on the west side of the Cookhouse property near Vance Avenue may be a logical source of materials for replacement of building parts for the residences.

Neighborhood renewable energy

Due to short-term expense, this report will not make recommendations for renewable energy sources within the project. However, renewable energy may be an advisable design suggestion for areas of the development, particularly the use of solar, which has been used in the County. Solar may be a useful technology, particularly in the Business Park, where any aesthetic compromises are less likely to affect the historic fabric of Samoa. While wind may not be feasible on the site due to the topography, it appears that small-scale wind energy may be possible within the region.

Oversight and implementation

A Community Service District and/or Homeowners Association has been considered for the Town of Samoa. The Association would be responsible for the care and maintenance of all community rights-of-way and open spaces. They would also enforce all codes, covenants and restrictions.¹⁶ In a meeting held in December 2008 this idea was discussed. Given the long-term involvement and positive community interest in the project, an association would be a productive means of extending the community outreach already established by the developers (Neighborhood Pattern and Design Credit 12).

¹⁵ Samoa Town Master Plan, Samoa Pacific Group, http://www.danco-group.com/site_documents/samoa_powerpoint-sample8_28_07.pdf.

¹⁶ Samoa Town Master Plan, Samoa Pacific Group, http://www.danco-group.com/site_documents/samoa_powerpoint-sample8_28_07.pdf.

Appendix A

Statement of Work for Samoa Peninsula Sustainable Redevelopment Project Sustainable Site Analysis and Voluntary Green Practices Guide

The following statement of work details the activities to be conducted by Vita Nuova under a subcontract with SRA International, an EPA contractor. Vita Nuova proposes to provide technical support for the Samoa Redevelopment Project, a brownfields redevelopment initiative located Humboldt County, California. Vita Nuova's work will result in two deliverables. One will address sustainable redevelopment of the entire brownfields site; the other will focus on green building guidelines that aid the developer and individual homeowners in upgrading the energy performance of existing houses on the brownfields site.

Task 1. Review existing documents.

Vita Nuova will review the existing plan and other pertinent documents including as-built drawings of structures, environmental reports, and other items provided by the developer. This overview of the redevelopment project will provide essential background for the two deliverables described below. The purpose of the review is to prepare to provide technical assistance to Humboldt County and the developer in designing appropriate cleanup and site-preparation activities, in order to facilitate sustainable redevelopment.

Task 2. Conduct site visit.

Vita Nuova will meet with key local contacts for a tour of the site. One architect and one building professional will tour the site. This tour will encompass the entire brownfields redevelopment area, but the main priority will be gathering information about houses targeted for renovation. During this visit, Vita Nuova will have an opportunity to discuss local construction resources, costs and common practices with the developer and other local contacts. The developer will provide local construction costs. The developer will also provide Vita Nuova with as-built plans for typical houses.

Task 3. Prepare Recommendations for Site Preparation and Redevelopment

Vita Nuova will produce a report that addresses site cleanup, site preparation and site redevelopment strategies that respond to local conditions and to the developer's desire to use sustainable design, remediation and development practices.

1st Deliverable: Recommendations for Site Preparation and Redevelopment

Based on accepted sustainable practices such as LEED for Neighborhood Development, these recommendations will overlay and augment the existing redevelopment plan, ensuring that the entire brownfields facility benefits from proven green practices.

Task 4. Recommendations for a Voluntary Green Code and Green Remodeling Techniques

Recognizing that state-mandated requirements for new construction are clearly defined, Vita Nuova will focus this task on the substantial stock of existing houses in the brownfields area.

These recommendations aim to improve energy efficiency and promote green building practices while also preserving the historical integrity of individual houses.

2nd Deliverable:

Recommendations for a Voluntary Green Code and Green Remodeling Techniques

This “best practices” report will enable the developer to establish user-friendly guidelines for tradespeople and homeowners. Recommendations will encompass the following topics:

- Optimum use of insulation (type, location, overall R-value, installation details) to improve energy performance.
- Improving energy performance with weatherstripping, air sealing techniques and storm windows and doors.
- Products and construction details that perform well in Northern California’s wet coastal environment.
- Replacement products that are green and historically appropriate.
- Construction details that promote the use of salvaged building materials.
- HVAC upgrades best-suited to the local climate and to energy-efficient performance.
- Additional energy-saving recommendations (photovoltaic panels, solar hot water systems, energy-efficient electrical fixtures and appliances)

DELIVERABLES	DATES
Site Visit	Within one month of receiving all background documents or notices to proceed from SRA.
1st Deliverable	Within one month of site visit
2nd Deliverable	Within three months of site visit

Appendix B

Land Use Map



Climate Change: Past, Present, and Future

PAGES 325–326

Questions about global warming concern climate scientists and the general public alike. Specifically, what are the reliable surface temperature reconstructions over the past few centuries? And what are the best predictions of global temperature change the Earth might expect for the next century?

Recent publications [*National Research Council (NRC)*, 2006; *Intergovernmental Panel on Climate Change (IPCC)*, 2007] permit these questions to be answered in a single informative illustration by assembling temperature reconstructions of the past thousand years with predictions for the next century. The result, shown in Figure 1, illustrates present and future warming in the context of natural variations in the past [see also *Oldfield and Alvarson*, 2003]. To quote a Chinese proverb, “A picture’s meaning can express ten thousand words.” Because it succinctly captures past inferences and future projections of climate, the illustration should be of interest to scientists, educators, policy makers, and the public.

Surface Temperatures in the Past

Surface temperatures for Earth are most reliably known for the period 1850 to present, the time interval for which there is reasonable global coverage of meteorological stations measuring temperature in a systematic manner [*Hansen et al.*, 2001; *Smith and Reynolds*, 2005; *Brohan et al.*, 2006].

The instrumental record part of Figure 1 represents global annual temperature anomalies for 1850–2008 [*Brohan et al.*, 2006]. Temperature during this time has increased by about 0.8°C, with much of the warming occurring since 1975. Annual records for individual stations and for groups of stations exhibit both large (~1°C) interannual variability and decadal or longer periods of both warming and cooling.

Because temperature reconstructions are generally made in terms of a temperature change, also referred to as a temperature

anomaly, the zero point on the scale is arbitrary. The reference level in Figure 1 is defined as the 10-year average of temperatures for the years 1995–2004, centered on 1 January 2000. It is a convenient reference for changes in past centuries and for viewing temperature change in this century.

Temperatures prior to the instrumental record are derived from various proxy estimates such as tree rings, corals, and sediments; from observations and inferences of glacier length changes; and from subsurface temperatures measured at regular intervals within boreholes. The curves in Figure 1 are taken from *NRC* [2006] and represent different estimates of temperature for the Northern Hemisphere. Weighted to midlatitudes, they are also smoothed versions of actual temperature changes with the degree of smoothing unique to the particular

reconstruction method [*NRC*, 2006, and references therein]. Differences between the various curves represent different spatial sampling, latitudinal emphasis, seasonality, and methodologies. This collection of curves suggests that the Northern Hemisphere was relatively warm around 1000 C.E. (but not as warm as current temperature), that the period 1500–1850 was relatively cool, and that there has been considerable warming since 1900 [*NRC*, 2006].

Borehole Temperatures Confirm Long-Term Climate Change

Subsurface temperatures measured in boreholes register not only the steady state heat flowing out from the interior of the Earth but also transient departures attributable to past surface temperature changes [e.g., *Lachenbruch and Marshall*, 1986; *Harris and Chapman*, 2001]—in essence, the heat of the Earth’s atmosphere diffuses into the Earth’s crust such that progressively deeper regions hold signatures for the temperatures of progressively older times. Through the

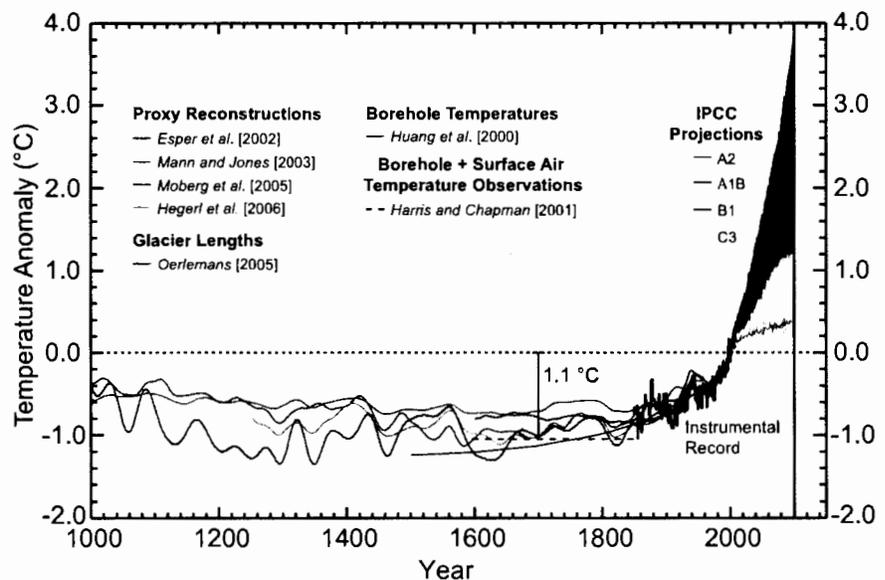


Fig. 1. Views of temperature change in the next century are informed by temperature changes in the past. For illustrative and educational purposes, three sets of surface temperatures have been assembled: 1000-year reconstructions of past temperature change based on proxies (tree rings, corals, etc.), glacier lengths, and borehole temperatures; the instrumental record; and Intergovernmental Panel on Climate Change (IPCC) projections for temperature change from 2000 to 2100. Figure modified from National Research Council [2006] and IPCC [2007].

process of thermal diffusion, short-term fluctuations in surface temperatures are filtered out, leaving behind decade- to century-long trends and averages. These data provide an independent estimate of surface temperature change but, unlike proxy measurements, are a direct measure of past temperatures.

An archive of borehole temperature profiles at 862 sites suitable for studying climate change exists at the University of Michigan [Huang *et al.*, 2000] (see <http://www.geo.lsa.umich.edu/climate/> for data and a map of borehole site locations). Boreholes at all sites in the archive extend to at least a 200-meter depth (Figure 2). Fewer than 10% extend more than 600 meters into the subsurface; these sites are primarily in northeastern Canada, central Eurasia, and South Africa. The depth distribution of boreholes is important because the depth of borehole temperature anomalies is related to the timing of past surface temperature changes (Figure 2).

The collection of borehole temperature profiles exhibits many characteristics of the meteorological record of climate change: hemisphere-scale variation, regional variation, local effects, and noise. Collectively, borehole temperatures show clear evidence of significant twentieth-century warming and a potential for quantitatively constraining longer-term climate changes of the past few centuries, a time prior to the instrumental record when temperature reconstruction is more difficult [Huang *et al.*, 2000].

One curve in Figure 1 not included in the NRC [2006] report represents an independent analysis of the borehole temperature reconstruction [Harris and Chapman, 2001]. This is a hybrid reconstruction utilizing both borehole and surface air temperature (SAT) information. The hybrid method yields a baseline temperature prior to the instrumental record, suggesting warming of about 1.1°C (Figure 1) since ~1750.

The borehole temperature archive serves yet another purpose in testing multicentury- to millennium-scale surface temperature reconstructions. Any surface temperature history can be used to generate a synthetic borehole temperature profile by computing the transient perturbation using surface temperatures as a boundary condition. The process requires a constant initialization temperature for the subsurface as a reference for temperature perturbations. All the temperature reconstructions based on proxies in Figure 1 produce fits within 0.05°C of the Northern Hemisphere observed borehole temperature anomaly (Figure 2). The reconstruction of Esper *et al.* [2002] yields a particularly good fit. It is possible that borehole temperature profiles could be used to pick winners in the temperature reconstruction stakes, but it would require a greater number of deep boreholes collocated with proxy sites.

Furthermore, the initialization temperature for each proxy, computed by minimizing the misfit between the synthetic profile and the global borehole observation, provides additional confirmation that current

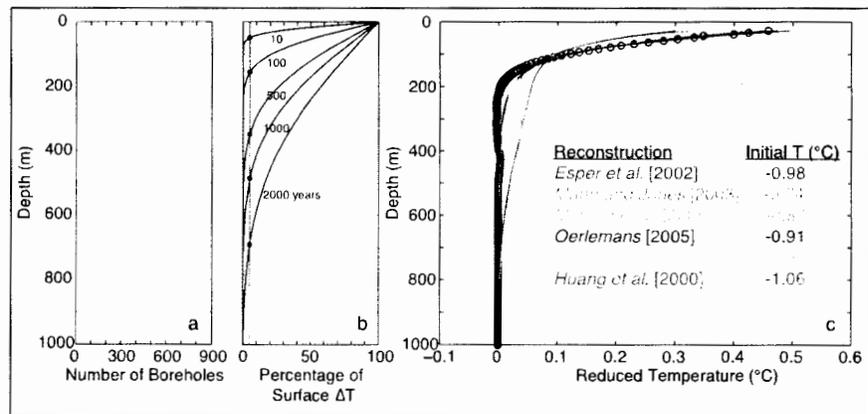


Fig. 2. Geothermics of climate change. (a) Cumulative number of boreholes in the global climate borehole database with temperature observations to a given depth (shaded region). (b) Temperature versus depth at times following a step change (ΔT) in surface temperature. Solid dots mark depths where the signal is 5% of the surface change, a rough estimate of the noise level (red line) for a ΔT of 1°C. Climate change in the past 100 years is seen primarily in the uppermost 150 meters of a borehole; the past millennium is recorded down to depths of nearly 500 meters. (c) Average transient temperature from borehole observations (circles; see Harris and Chapman [2001] for details). Curves show various synthetic profiles derived from diffusing multiproxy temperature reconstructions (Figure 1) into the ground. The legend shows the initialization temperature to obtain the synthetic profiles. Those reconstructions with relatively warm ninth to thirteenth centuries (the Medieval Warm Period) produce a positive excursion in temperatures in the synthetic profile between 200- and 600-meter depth. A greater number of deep boreholes from geographically dispersed sites would assist in resolving whether this climatic warm period was a global or a regional phenomenon.

surface temperature trends and future projections are unusual. All four proxy studies have initialization temperatures from -0.74°C to -0.98°C relative to the year 2000 reference temperature (Figure 2). All indicate that the twentieth-century warming is superimposed on centuries of considerably lower temperatures.

Surface Temperature in the Future

The IPCC [2007] assessment refines how global temperature might change in the future. The predictions are based on greenhouse gas emission scenarios and a link between greenhouse gas concentration and temperature through modeling.

The four scenarios shown in Figure 1 for future temperature trends combine different factors that influence how our atmosphere and surface temperature will change in this century. The factors include population growth, economic development, and technological change as well as cultural and social interaction among groups and countries. Differences between scenarios are considerable. For example, in scenario A2, population increases at current growth rates to 15 billion in 2100 accompanied by a heterogeneous economic theme of self-reliance and preservation of local identities. Global temperature increase with scenario A2 approaches 4°C by 2100. In contrast, the A1B story line has a population that grows from a current level to a peak at 8.7 billion at midcentury and decreases toward 7 billion at the end of the century. This scenario entertains efficient technologies and in particular a balanced technology emphasis

between fossil fuel and non-fossil fuel energy sources. Global temperature increase in scenario A1B is $\sim 2.5^{\circ}\text{C}$. B1 population follows A1B, but countries come together to use both technology and general environmental controls to decrease emissions, leading to a temperature increase of less than 2°C above the year 2000 level.

There is also a thermal consequence of the long response time of atmospheric carbon dioxide (CO_2). Curve C3 demonstrates that even if CO_2 concentrations are held at year 2000 levels, temperatures will increase throughout the century. This behavior is due to the lengthy response time of the climate system, both in the thermal inertia of the oceans, where it takes a long time to reach a new equilibrium state, and with unrealized warming due to the energy imbalance in the atmosphere as a result of current greenhouse gas concentrations. Holding CO_2 concentrations constant would allow for climate equilibration to occur; however, the complexity of the climate system, with the combination of inertial, memory, and feedback processes inherent in the system, means that equilibration would take an extended period of time.

The Path Forward

All of the emissions scenarios considered by the IPCC yield global warming in the 21st century that dwarfs warming seen in the past millennium. Immediate change to near-zero CO_2 emissions is required to restrict global temperature increases to less than the constant composition commitment, C3 [Matthews and Weaver, 2010].

Two additional points should be made. Whereas the most likely temperature increase is about 2°–3°C in the global average above levels in 2000, warming in high-latitude regions may be 3 times as much. Thus, the global average should be considered for what it is: a global average.

Second, the reconstructed temperatures for the past millennium indicate that temperatures for large regions, at least at the hemisphere scale, vary significantly at the multi-decadal time scale. For example, all periods in the past millennium show temperature variations of up to 0.5°C that last for 1–4 decades. Thus, similar natural fluctuations in the future should be expected [Easterling and Wehner, 2009; Lean and Rind, 2009].

One major challenge in formulating climate mitigation and adaptation policies is first convincing a skeptical public that global warming is real, that it exceeds in magnitude and pace the natural changes over the past millennium, and that it is rapidly moving into an uncharted future fraught with serious consequences.

Having the temperature history of the past thousand years displayed together with various future scenarios of a warming climate (Figure 1) provides the benefit of both hindsight and foresight simultaneously and makes the warnings of climate scientists ever more persuasive. Seeing where society is headed in terms of where it has been may help policy makers worldwide choose a sensible path into the future.

Acknowledgments

This work was funded through U.S. National Science Foundation grants EAR-0126029 and,

in the Paleo Perspectives on Climate Change (P2C2) program, ATM-0823516.

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NEWS

Goals for Near-Earth-Object Exploration Examined

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With Japan's Hayabusa space probe having returned a sample of the Itokawa asteroid this past June, and with NASA's Deep Impact spacecraft impactor having successfully struck comet Tempel 1 in 2006, among other recent missions, the study of near-Earth objects (NEOs) recently has taken some major steps forward. The recent discovery of two asteroids that passed within the Moon's distance of Earth on 8 September is a reminder of the need to further understand NEOs. During NASA's Exploration of Near-Earth Objects (NEO) Objectives Workshop, held in August in Washington, D. C., scientists examined rationales and goals for studying NEOs.

Several recent documents have recognized NEO research as important as a scientific precursor for a potential mission to Mars, to learn more about the origins of the solar system, for planetary defense, and for resource exploitation. The October 2009 Review of Human Space Flight Plans Committee report (known as the Augustine report), for example, recommended a "flexible path" for human exploration, with people visiting sites in the solar system, including NEOs. The White House's National Space Policy, released in June, indicates that by 2025, there should be "crewed missions beyond the moon, including sending humans to an asteroid." In addition, NASA's proposed budget for fiscal year 2011 calls for the agency to send robotic precursor missions to nearby aster-

oids and elsewhere and to increase funding for identifying and cataloging NEOs.

Multiple Benefits From NEO Exploration

At the August workshop, speakers focused on the current status of our understanding of NEOs, mission results, and planetary defense. Damon Wells, assistant director for space and aeronautics at the White House Office of Science and Technology Policy, commented on the 2009 Augustine report's flexible path approach, saying it would allow travel to deep-space destinations "without the trips down the gravity well, to the surface of a solar system body." He said that there are "several very interesting deep space destinations that have lower overall energy demands than would be required for a landing on the Moon."

Wells said, "The bottom line is [that] an asteroid mission leads to many useful and interesting outcomes in its broader context. That is why it's a key element of the president's plan. That is why it's in the National Space Policy. It's going to be important to think through how best to achieve those outcomes as we pursue our plans."

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