

US EPA ARCHIVE DOCUMENT

Town of Samoa, California Sustainability Pilot

Recommendations for Sustainable Site Analysis

Final Report

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FINAL REPORT

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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 1.

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

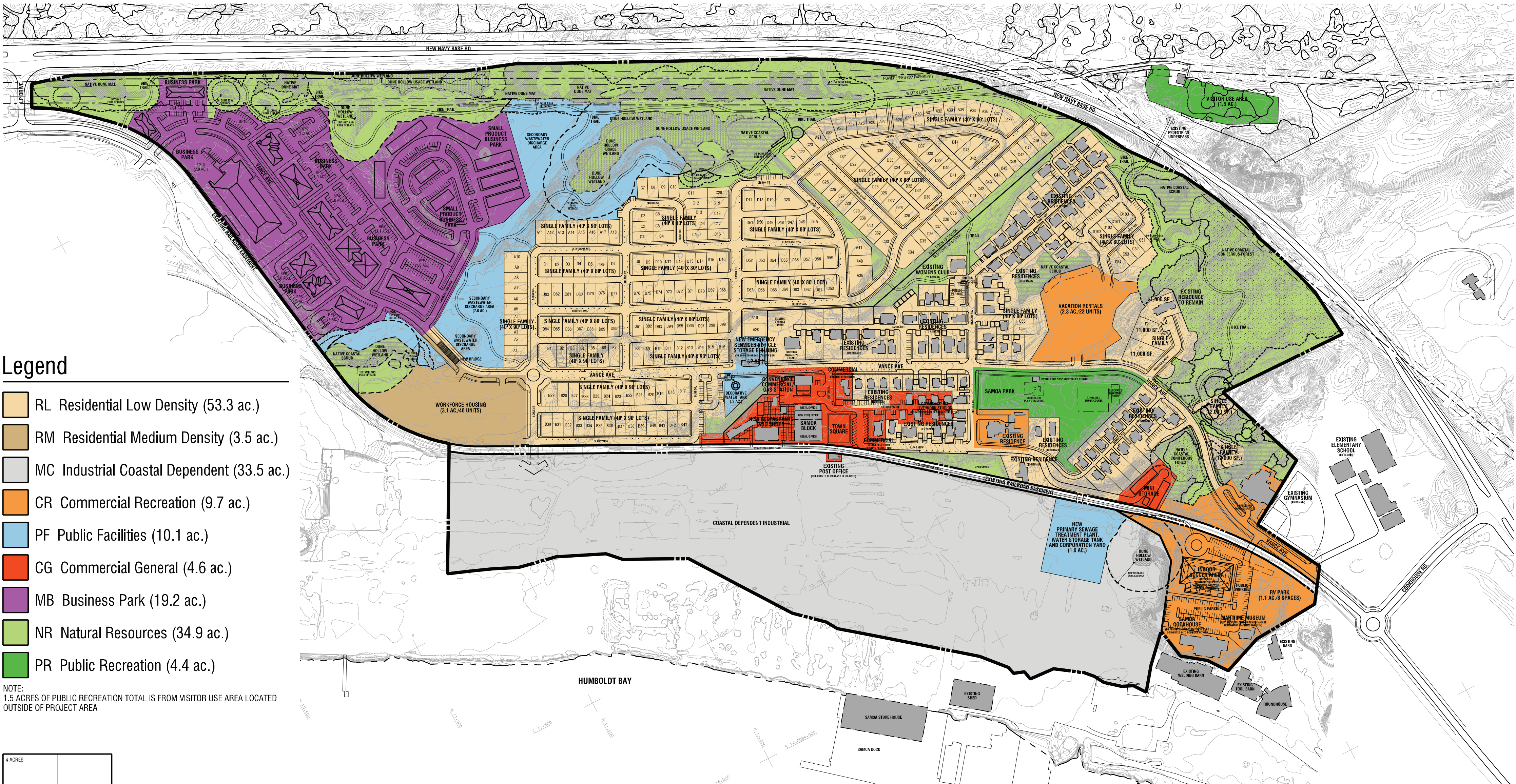
DATES

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

US EPA ARCHIVE DOCUMENT



Legend

- RL Residential Low Density (53.3 ac.)
- RM Residential Medium Density (3.5 ac.)
- MC Industrial Coastal Dependent (33.5 ac.)
- CR Commercial Recreation (9.7 ac.)
- PF Public Facilities (10.1 ac.)
- CG Commercial General (4.6 ac.)
- MB Business Park (19.2 ac.)
- NR Natural Resources (34.9 ac.)
- PR Public Recreation (4.4 ac.)

NOTE:
1.5 ACRES OF PUBLIC RECREATION TOTAL IS FROM VISITOR USE AREA LOCATED OUTSIDE OF PROJECT AREA

4 ACRES

1 ACRE

SEPTMBER 24, 2007

Land Use Plan
Samoa Town Master Plan
 Samoa, Humboldt County, California

Appendix C

LEED Scoring Matrix

US EPA ARCHIVE DOCUMENT



LEED for Neighborhood Development 2009 Project Scorecard

Project Name:

Yes ? No

12			Smart Location & Linkage	27 Points Possible
----	--	--	-------------------------------------	---------------------------

Y				Prereq 1	Smart Location															Required	
Y				Prereq 2	Proximity to Water and Wastewater Infrastructure																Required
Y				Prereq 3	Imperiled Species and Ecological Communities																Required
Y				Prereq 4	Wetland and Water Body Conservation																Required
Y				Prereq 5	Farmland Conservation																Required
Y				Prereq 6	Floodplain Avoidance																Required
5				Credit 1	Preferred Locations																10
1				Credit 2	Brownfield Redevelopment																2
0				Credit 3	Reduced Automobile Dependence																7
1				Credit 4	Bicycle Network and Storage																1
1				Credit 5	Housing and Jobs Proximity																3
1				Credit 6	Steep Slope Protection																1
1				Credit 7	Site Design for Habitat or Wetlands Conservation																1
1				Credit 8	Restoration of Habitat or Wetlands																1
1				Credit 9	Conservation Management of Habitat or Wetlands																1

Yes ? No

23			Neighborhood Pattern & Design	44 Points Possible
----	--	--	--	---------------------------

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

Yes ? No

17 **Green Infrastructure & Buildings** **29 Points Possible**

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

Yes ? No

Innovation & Design Process **6 Points**

			Credit 1.1	Innovation in Design: Provide Specific Title	1
			Credit 1.2	Innovation in Design: Provide Specific Title	1
			Credit 1.3	Innovation in Design: Provide Specific Title	1
			Credit 1.4	Innovation in Design: Provide Specific Title	1
			Credit 1.5	Innovation in Design: Provide Specific Title	1
			Credit 2	LEED® Accredited Professional	1

Yes ? No

Regional Priority Credits **4 Points**

			Credit 1.1	Regional Priority Credit: Region Defined	1
			Credit 1.2	Regional Priority Credit: Region Defined	1
			Credit 1.3	Regional Priority Credit: Region Defined	1
			Credit 1.4	Regional Priority Credit: Region Defined	1

Yes ? No

52 **Project Totals (Certification estimates)** **110 Points**

Certified: 40-49 points, **Silver:** 50-59 points, **Gold:** 60-79 points, **Platinum:** 80+ points

Appendix D

LAND Code Scoring Matrix

US EPA ARCHIVE DOCUMENT

Points Checklist

DIRECTIONS: For columns (b) and (c), fill in each box with 1 (yes) or 0 (no). Column (d) automatically multiplies point values in column (a) by column (b), then sums column (d) to get maximum achievable points for your site. Column (e) automatically multiplies point values in column (a) by column (c), then sums column (e) to get total points achieved for your site. The ratio of (e)/(d) determines the LAND certification level, either silver (40 - 60%), gold (60 - 80%), or platinum (80-100%). Enter a single value in blue or green boxes that link two or more rows and/or columns. In these cases, enter the value in any single one of the boxes. For alternatives that are linked by yellow boxes, enter no more than a single 1 in column (c).

(a)	(b)						(c)	(d)	(e)
	All sites	Large sites	Parking on site	Streets on site	Buildings on site	Special site conditions			
Req									
Req									
Req									
12	1						1	12	12
12	1						0	12	0
5	1						1	5	5
10	1						0	10	0
5				1			1	5	5
6				1			1	6	6
-4						0		0	0
3						0		0	0
7				0	x	0	0	0	0
4				1			0	4	0
6				1			1	6	6
8	1						0	8	0
7				1			1	7	7
5	1						0	5	0
10						1	0	10	0
3	1						0	3	0
4				0			0	0	0
4				1			1	4	4
2				1			1	2	2
2				1			0	2	0
						0			

Site Drainage

- Design a drainage plan.
- Model hydrology.
- Map site's hydrologic features.
- Implement drainage plan with swales, rain gardens, check dams, and so on.
- Preserve contour.
- Immediately stabilize new drainage structures with vegetation.

Impervious Surfaces

- Use or emulate < 10 percent impervious cover.
- Limit street widths to 22 feet.
- Optimize street network to limit length.
- Site design includes cul-de-sacs.
- Use smart cul-de-sac design (small diameter or center vegetated island).
- Place parking below buildings.
- Include parking spaces for compact vehicles and carpools.
- Limit parking spaces.
- Use pervious paving materials for all low-traffic areas incl. driveways.
- Leave 15 percent of parking areas as rain gardens.
- Isolate imperviousness to patches.
- Install green roofs.

Stormwater Quality

- Use mulching mowers and leave clippings, or use yard waste compost as fertilizer.
- Install catch basin inserts for advanced treatment.
- Clean out catch basins when 50 percent full.
- Use alternatives to NaCl for parking lot/road salting.
- Provide dog waste bag dispensers.
- Septic systems on site

Points Checklist

DIRECTIONS: For columns (b) and (c), fill in each box with 1 (yes) or 0 (no). Column (d) automatically multiplies point values in column (a) by column (b), then sums column (d) to get maximum achievable points for your site. Column (e) automatically multiplies point values in column (a) by column (c), then sums column (e) to get total points achieved for your site. The ratio of (e)/(d) determines the LAND certification level, either silver (40 - 60%), gold (60 - 80%), or platinum (80-100%). Enter a single value in blue or green boxes that link two or more rows and/or columns. In these cases, enter the value in any single one of the boxes. For alternatives that are linked by yellow boxes, enter no more than a single 1 in column (c).

	(a) Point Value	(b)					(c) Recommendation implemented	(d) (a) x (b)	(e) (a) x (c)
		All sites	Large sites	Parking on site	Streets on site	Buildings on site			
Maintain septic systems at least every 2 years.	3						0	0	0
Polish septic effluent (aerobic unit, sand filter, treatment wall).	4						0	0	0
Treat stored water from five-year storm if not reused or infiltrated on-site.	5	1					0	5	0
Construct wetlands for stormwater treatment.	7		1				1	7	7
Water Conservation and Reuse									
Redirect runoff during storms to water lawns and gardens.	5	1					1	5	5
Use native or noninvasive plants that do not require irrigation beyond natural rainfall amount.	4	1					1	4	4
Capture up to 5 year recurrence 24 hour stormflow and reuse or time release.	10	1					1	10	10
Erosion Prevention and Control									
Map site: slopes, buildings, disturbed soils, and flow paths.	Req								
Prepare erosion control plan.	Req								
Monitor turbidity in downslope streams.	Req								
Inspect and maintain erosion controls after every storm or at least every seven days.	Req								
Phase construction to minimize simultaneous soil disturbance.	9	1					1	9	9
Clear only building footprint and minimal construction envelope.	12	1					1	12	12
Site includes riparian zone						1			
Leave vegetation in > 15 m riparian zone during construction.	5					1	1	5	5
Install erosion control measures before soil disturbance	8	1					1	8	8
Development of sites with slopes over 7 percent	-6					1		-6	-6
On cleared slopes over 7 percent (4 degrees); protect same day with blanket, mulch, turf, hydroseed, and so on.	5					1	1	5	5
Development of sites with slopes over 17 percent	-6					1		-6	-6
Do not clear slopes over 17 percent (10 degrees).	5						0	5	0
Schedule construction to match growing season.	4	1					1	4	4
Soil Health and Integrity									
Remove and stockpile topsoil and replace after construction.	6	1					1	6	6
Avoid compaction to maintain soil hydraulic conductivity.	6	1					1	6	6

Points Checklist

DIRECTIONS: For columns (b) and (c), fill in each box with 1 (yes) or 0 (no). Column (d) automatically multiplies point values in column (a) by column (b), then sums column (d) to get maximum achievable points for your site. Column (e) automatically multiplies point values in column (a) by column (c), then sums column (e) to get total points achieved for your site. The ratio of (e)/(d) determines the LAND certification level, either silver (40 - 60%), gold (60 - 80%), or platinum (80-100%). Enter a single value in blue or green boxes that link two or more rows and/or columns. In these cases, enter the value in any single one of the boxes. For alternatives that are linked by yellow boxes, enter no more than a single 1 in column (c).

	(a) Point Value	(b)					(c) Recommendation implemented	(d) (a) x (b)	(e) (a) x (c)
		All sites	Large sites	Parking on site	Streets on site	Buildings on site			
Aerate compacted soils to restore structure and hydraulic conductivity.	5	1					1	5	5
Air Quality and Microclimate									
Prepare dust control plan.	Req								
Wet or rapidly stabilize disturbed soils.	3	1					1	3	3
Inventory mature trees on the site.	5	1					1	5	5
Retain all mature trees except those on building footprint and minimal construction envelope.	10	1					1	10	10
Plant native or naturalized (noninvasive) trees after construction.	7	1					1	7	7
Plant deciduous trees to south of buildings.	2				0		0	0	0
Plant native or naturalized (noninvasive) trees in parking lot rain gardens.	7		0				0	0	0
Determine wind rose for summer and winter conditions.	2	1					0	2	0
Plant evergreens to block prevailing wind direction in winter.	2				0		0	0	0
Leave open pathway for prevailing wind direction in summer.	2				0		0	0	0
Preserving and Restoring Habitat									
Living Resources Conservation Plan	Req								
Development site is a brownfield	25					1	25	25	
Development site previously developed, but not a brownfield	12					0	0	0	
Development of sites with ecologically sensitive areas	-10					1	-10	-10	
Do not disturb ecologically sensitive areas (steep slopes, ridgelines, and floodplains).	9					1	9	9	
Leave 70 percent of site undisturbed with existing native vegetation.	15					1	15	15	
Leave 50 percent of site undisturbed with existing native vegetation.	10					1	10	10	
Site has degraded habitat						1			
Restore 20 percent of damaged land to functioning habitat.	10					1	10	10	
Use cluster development to leave open space.	10				1		10	10	
Buffering Critical Habitats									
Development of site with wetlands, streams, lakes, or seashores	-25					1	-25	-25	
Leave an undeveloped buffer of 50 m around wetlands, streams, lakes, seashores, and nature preserves.	20					0	0	0	

Points Checklist

DIRECTIONS: For columns (b) and (c), fill in each box with 1 (yes) or 0 (no). Column (d) automatically multiplies point values in column (a) by column (b), then sums column (d) to get maximum achievable points for your site. Column (e) automatically multiplies point values in column (a) by column (c), then sums column (e) to get total points achieved for your site. The ratio of (e)/(d) determines the LAND certification level, either silver (40 - 60%), gold (60 - 80%), or platinum (80-100%). Enter a single value in blue or green boxes that link two or more rows and/or columns. In these cases, enter the value in any single one of the boxes. For alternatives that are linked by yellow boxes, enter no more than a single 1 in column (c).

	(a) Point Value	(b)					(c) Recommendation implemented	(d) (a) x (b)	(e) (a) x (c)
		All sites	Large sites	Parking on site	Streets on site	Buildings on site			
Leave an undeveloped buffer of 30 m around wetlands, streams, lakes, seashores, and nature preserves.	10						1		10
Development of sites with vernal pools	-20					0		0	0
Leave an undeveloped buffer of 100 m around vernal pools.	15					0		0	0
Site's roads cross streams	-8					1		-8	-8
Stream crossings by roads should be designed to minimize environmental impact.	6					1		6	6
Landscape Connectivity									
Provide 50 m-wide corridor across site connecting to habitat or corridor.	20					1	0	20	0
Provide 30 m-wide corridor across site connecting to habitat or corridor.	10						1		10
Road Placement and Design									
Provide migration passages under roads.	5			1			0	5	0
Optimize street network to limit length (see "Impervious Surfaces" above).	0								
Limit residential roads to 22 ft width (see "Impervious Surfaces" above).	0								
Native Species and Landscape Heterogeneity									
Use 100 percent native or naturalized (noninvasive) plants.	7	1					0	7	0
Preserve natural landscape heterogeneity.	6	1					1	6	6
Maintain spatial and age structure of undeveloped areas.	3		1				1	3	3
Invasive species present on site.						1			
Eradicate invasive species.	7						0	7	0
Site requires pest control						1			
Use Integrated Pest Management.	6						0	6	0
Energy									
Public transit available in region.						1			
Locate within half mile of public transit.	6						1	6	6
Locate within one mile of public transit.	3								0
Provide shuttle to public transit.	4								0
Provide dedicated parking for carpool and high-mileage vehicles.	4			1			1	4	4

Points Checklist

DIRECTIONS: For columns (b) and (c), fill in each box with 1 (yes) or 0 (no). Column (d) automatically multiplies point values in column (a) by column (b), then sums column (d) to get maximum achievable points for your site. Column (e) automatically multiplies point values in column (a) by column (c), then sums column (e) to get total points achieved for your site. The ratio of (e)/(d) determines the LAND certification level, either silver (40 - 60%), gold (60 - 80%), or platinum (80-100%). Enter a single value in blue or green boxes that link two or more rows and/or columns. In these cases, enter the value in any single one of the boxes. For alternatives that are linked by yellow boxes, enter no more than a single 1 in column (c).

	(a) Point Value	(b)					(c) Recommendation implemented	(d) (a) x (b)	(e) (a) x (c)
		All sites	Large sites	Parking on site	Streets on site	Buildings on site			
Provide bike racks.	2		1				1	2	2
Generate renewable energy on-site.	12	1					0	12	0
Use only full cutoff light fixtures.	5	1					1	5	5
Industrial Ecology and Materials									
Significant excavation of on-site material.	-12					1		-12	-12
Reuse excavated material on-site for fill.	10						1	10	10
Use recycled concrete and asphalt for paving materials or fill.	3			1			1	3	3
Compost or chip removed brush and trees for on-site reuse.	4	1					1	4	4
Use recycled crumb rubber for paved pedestrian paths.	3		0				0	0	0
Require packaging takeback by suppliers (e.g., pallets, containers, and shrink wrap).	3	1					0	3	0
Make construction waste and unused materials available for reuse by others.	3	1					1	3	3
Limit discards to 10 percent of construction materials delivered to site.	5	1					0	5	0
Purchase construction materials from sources within 100 miles of site (shipped by truck, or 300 miles if shipped by rail).	4	1					1	4	4
TOTAL								347	236
(e)/(d)								68%	
								Gold	