



SUSTAINABILITY FRAMEWORK FOR THE BAYLANDS

FINAL REPORT

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Glossary

AB	Assembly Bill
ABAG	Association of Bay Area Governments
AD	Anaerobic Digestion
ASU	Arizona State University
BART	Bay Area Rapid Transit
BBCAG	Brisbane Baylands Community Advisory Group
BD+C	Building Design and Construction
BedZED	Beddington Zero Energy Development
BPS	Bisphenol A
BSD	Building Science Digests
C+D	Construction and Demolition
CalEEMod	California Emissions Estimator Model
CalPERS	California Public Employees' Retirement System
CCA	Community Choice Aggregation
CCOF	California Certified Organic Food
CEQA	California Environmental Quality Act
CFC	Chlorofluorocarbon
CNG	Compressed Natural Gas
CO₂e	Carbon Dioxide Equivalent
CPP	Community Proposed Plan
CPP-V	Community Proposed Plan - Recology Expansion Variant
CSI	Construction Specifications Institute
CVPC	Chlorinated Polyvinyl Chloride
DEIR	Draft Impact Environmental Report
DSP	Developer Sponsored Plan
DSP-V	Developer Sponsored Plan Entertainment Variant
DTSC	Department of Toxic Substances Control
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
EUI	Energy Use Intensity
EV	Electric Vehicles
FEMA	Federal Emergency Management Agency
FSC	Forest Stewardship Council
GDP	Gross Domestic Consumption
GHG	Greenhouse Gas Emissions
GNH	Gross National Happiness

GPI	Genuine progress Indicator
HCFC	Hydrochlorofluorocarbon
HCP	Habitat Conservation Plan
HSR	High Speed Rail
IDc2	Innovation in Design Credit 2
IPCC	Intergovernmental Panel on Climate Change
I-SEED	Institute for Sustainable Economic, Educational, and Environmental Design
KPI	Key Performance Indicators
LCA	Life Cycle Assessment
LCCA	Life Cycle Cost Analysis
LEED	Leadership in Energy and Environmental Design
M+V	Measurement and Verification
NBI	New Buildings Institute
ND	Neighborhood Development
NIST	National Institute of Standards and Technology
NPDES	National Pollutant Discharge Elimination System
PCA	Planned Conservation Area
PCB	Polychlorinated Biphenyl
PDA	Priority Development Area
PFC	Perfluorinated Compounds
PG&E	Pacific Gas and Electric Company
PV	Photovoltaic
PVC	Polyvinyl Chloride
PVDC	Polyvinylidene Chloride
RFP	Request for Proposals
RFQ	Request for Qualifications
RWQCB	Regional Water Quality Control Board
SamTrans	San Mateo County Transit District
SB	Senate Bill
SFPUC	San Francisco Public Utilities Commission
SMC	San Mateo County
SMC	San Mateo County
SOMO	Sonoma Mountain Village
TDM	Transportation Demand Management
UPC	Universal Paragon Corporation
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
WBDG	Whole Building Design Guide
ZNE	Zero Net Energy

SUSTAINABILITY FRAMEWORK FOR THE BAYLANDS

October 2015

The citizens of Brisbane have widely expressed the importance of environmental responsibility and its application to the Brisbane Baylands project. In response, the City Council formed a Baylands Sustainability Committee to provide this guiding document, which is organized around the ten One Planet Living principles developed by BioRegional. In parallel with this effort, the project is also under review in an Environmental Impact Report (EIR), and this framework will be updated to reflect information coming out of that process as appropriate.

The purpose of a Sustainability Framework is to create an approach to achieving sustainable development at the Brisbane Baylands. The principles, key performance indicators and implementation strategies in the Framework are aspirational and do not represent a contract for specific results, however, it is meant to inform the negotiation of binding understandings between the City and the Developer in a Development Agreement. This document will continually evolve over the course of the Baylands project to reflect new information, new funding mechanisms, new policies and technologies, and improvements to the project design. The Baylands planning horizon is understood to be roughly 20 years, or through 2035. Thus it is termed a “living document.”

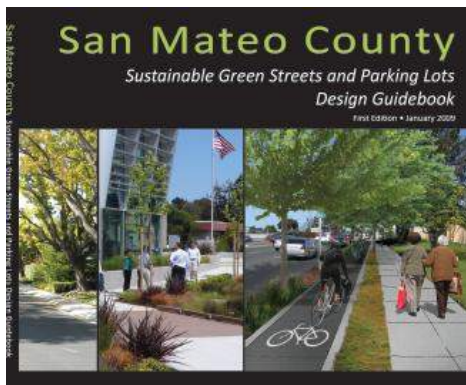


Figure 1. Sustainable Streets program created for San Mateo County as great example of design guideline.

http://www.flowstobay.org/files/greenstreets/GreenStreets_booklayout_Guidebook.pdf

With this draft, the City invites input from the public and the developer to make this framework effective and to create the strategies that will be used to achieve the sustainability goals articulated here.

The Sustainability Committee holds this vision for the project:

The Baylands presents an opportunity to create a development that begins to heal the land, contributes to prosperity that is fair and equitable, strengthens our relationship with nature, and enhances Brisbane’s commitment to community values. The core pillars of sustainability—environment, economics and social equity—will be woven into every building, park and transportation mode, creating a balanced approach to development that will be safe, engaging, and within the means of the Earth’s resources.



Figure 2. The Brighton & Hove, east Sussex, England, Sustainability Action Plan received independent accreditation from BioRegional in April 2013, marking its debut as the first One Planet Living City. As well as greening the city council's own operations, it aims to enable 280,000 seaside citizens to live well within a fairer share of the earth's resources. <http://www.bioregional.com/one-brighton/>

Background

To achieve our sustainability goals, the Sustainability Committee investigated the use of four different sustainable development programs¹²³⁴ and chose to use the framework of the One Planet Communities program and adapt it to this particular project. BioRegional's One Planet Community projects have received worldwide acclaim for their ingenuity in design, thoughtfulness towards local issues, and understanding the importance of harmony between development and nature – they recently teamed up with the city of London to create the first "One Planet Olympics." The One Planet framework is a set of ten principles designed to achieve an ecological footprint based on the resources available on one planet—hence, One Planet Living—and includes the social and economic aspects of sustainability as essential elements to achieving and sustaining the environmental outcomes. The following suggested framework is based off the One Planet Living principles, with slight adjustments specific to the Baylands Brisbane project mission and goals.

1. **Zero Carbon Buildings** -- Making buildings more energy efficient and delivering all energy with renewable technologies.
2. **Zero Waste** -- Reducing waste, reusing where possible, and ultimately sending zero waste to landfills.
3. **Sustainable Transportation** -- Using low carbon modes of transport to reduce emissions and reducing the need to travel with good planning.
4. **Local and Sustainable Materials** -- Using sustainable healthy products, with low embodied energy, sourced locally, made from renewable or waste resources.
5. **Local and Sustainable Food** -- Choosing low impact, local, seasonal and organic diets and reducing food waste.
6. **Sustainable Water** -- Using water more efficiently in buildings, landscaping, and in the products we buy, and addressing local flooding, as well as wetland and stormwater pollution.

1 The U.S. Green Building Council's Leadership in Energy and Environmental Design for Neighborhood Developments (LEED-ND)

2 The International Living Future Institute's Living Building Challenge

3 BioRegional's One Planet Communities program

4 The International EcoCity Framework and Standards

- 7. **Open Space and Habitat** -- Protecting and restoring biodiversity and natural habitats through appropriate land use and integration into the built environment.
- 8. **Culture and Heritage** -- Reviving local identity and wisdom; supporting and participating in the arts.
- 9. **Economic Vitality with Equity and Ecology** -- Creating ecologically-based economies that support equity and inclusive communities.
- 10. **Recreation, Health, Safety and Happiness** -- Encouraging active, safe, meaningful lives to promote good health and well-being.

The use of an ecological footprint is the underlying metric for physical sustainability within the One Planet Communities program. The goal is to set criteria that will ensure the Baylands development is truly sustainable, so that if everyone in the world modeled themselves after the proposed principles for the Baylands, the Earth would have a one-planet ecological footprint.



Figure 3. One Planet Living Principles <http://www.bioregional.com/oneplanetliving/>

What makes this approach significantly different from most traditional green building programs is that the goal isn't to achieve "green points" on a checklist or showcase particular green practices, but rather to understand the connectivity of all uses within a development. Sustainability is more than just a green building, or solar panels, or an organic piece of fruit – it's the relationship of these and many other green products and services, that when tied together form a system that increases economic efficiency, adds to the quality of life, and respects the environment and the Earth's resources.

Some may declare that a new building that is 50% more energy efficient than required by code should be recognized as extremely green, but if it runs on fossil fuels, it still increases global emissions and harms the climate. Applying an ecological footprint approach to development offers a greater opportunity to understand the ramifications of a building or a particular use on

the development as a complete system. The ecological footprint developed by the Global Footprint Network measures how much land and water area a human population requires to produce the resources it consumes and to absorb its carbon dioxide emissions. The tool has been in use since 1990. If the global population lived the lifestyle of the average American, we would need about 5 planet Earths to support us, according to the Global Footprint Network.

Each of the ten principles will be addressed in five categories: Common International Targets, Context, Summary Approach, Key Performance Indicators, and a suggested Implementation Approach.

The Common International Targets are goals that every development anywhere in the world must achieve in order to be approved as a One Planet Development by Bio-Regional.

The Context section acknowledges legislative and scientific data that explains why the Principle is a core value in the Sustainability Plan. It also identifies projects (built or in the planning stages) that demonstrate examples of what can be achieved within a particular Principle, which provides tangible evidence and support for implementation. Examples may be local, regional, national or worldwide.



Figure 4. The London 2012 Olympic and Paralympic games is a great example of a sustainable approach, using the One Planet Living framework by Bioregional. Remediating a contaminated brownfield site, the City of London & Bioregional said "we want to build on that contribution by helping organizers of sports events to reduce environmental impacts, boost the local economy and help surrounding communities to secure long term benefits." <http://www.bioregional.com/one-planet-sport-3/>

The Summary looks at the information in the Context, and puts forth goals to help bring these “best practices” into the planning of the Baylands development.

The second stage is to identify Key Performance Indicators, which will provide the metrics by which we will track the Baylands’ progress toward sustainability. Good indicators are simple, easy to use and explain, and strongly linked to the sustainability goals. They are not intended to measure all impacts, but rather to “indicate” progress on the most important aspects, and many projects use just one or two for each principle. Additional targets will be set within the Implementation Plan.

The One Planet Communities program uses a set of Common International Targets against each of the 10 One Planet Living principles to ensure that projects are guided towards a one-planet footprint and to establish the level of performance required for a development to be endorsed. Individual projects then identify Key Performance Indicators for each of the 10 One Planet principles to ensure the projects will achieve the Common International Targets and any other critical sustainability goals within their particular local context.

The **Implementation Approach** is the set of suggested actions and approaches necessary to achieve the sustainability goals and meet Key Performance Indicators, and is the part of the Sustainability Framework that evolves over time as we learn, as policy changes, as new technologies are developed and applied.

The One Planet Living Sustainability Framework could apply to any of the proposed plans for the Baylands, and is not tied to the Developer-Sponsored Project, the Community Alternative Project, or the Renewable Energy Alternative Project. The Sustainability Goals for the Baylands should be applied not only to the operational stage of the completed project, but also to the construction phase. Issues of energy, waste, water, health and safety must be taken into consideration throughout the life cycle of the Baylands development.

LEED for Neighborhood Development (ND) is a certification system that is generally supportive of and aligned with One Planet Living goals. It is implemented by the US Green Building Council and is currently in version 3.0 (2009), with plan to upgrade to version 4.0 in October of 2015. LEED ND is certified in two parts, in the Master Plan phase and after construction is completed. LEED has a high rate of acceptance of green building and sustainability rating systems, locally and globally. Use of LEED ND v4 could be valuable in providing implementation targets and metrics that could be applied to Brisbane Baylands through the project entitlements and construction processes. The Sustainability Committee could consider the following approaches as discussion points with the project sponsor:

1. LEED v4 for Neighborhood Design with a Platinum rating required.
 - a. LEED ND certification of Master Plan
 - b. LEED ND certification of completed project, or phase, with system that is current at that time.
2. Require LEED v4 for New Construction of commercial and mixed use buildings with a Platinum rating required.

3. Require achievement of certain credits that align with the One Planet Living Key Performance Indicators (KPI) goals.
4. Require achievement of two of the One Planet Living principles, in addition to LEED ND certification:
 - a. Health, Safety and Happiness,
 - b. Economic Vitality with Equity and Ecology
5. Meet California energy code goals of Zero Net Energy for Residential by 2020 and Zero Net Energy for Commercial by 2030, including for any buildings permitted prior to code requirements being enforced.

As an addendum to this Sustainability Framework we have prepared a preliminary LEED ND v4 scorecard for Brisbane Baylands indicating where LEED ND and One Planet Living align.

1. ZERO CARBON BUILDINGS

Our vision for the Baylands is that all buildings will be energy efficient and will run completely from locally generated renewable energy.



Figure 5. The California Energy Commission and the California Public Utilities Commission have adopted alignment with policy guidelines for all new California homes to be constructed to net-zero energy standards by 2020 and for all new commercial buildings to be net-zero energy by 2030. [Kilroy real estate is trying to be the first San Francisco in-fill net zero office building.](#)

Common International Targets

All buildings are designed to be energy efficient to country-specific best practice standards, including passive and active elements, and will be served by 100% renewable energy.

Renewable energy will be generated on site with solar, wind, geothermal and biomass. If needed, off-site local renewable energy capacity will be used. Financial reserves will be

established to fund future maintenance and replacements of all renewable energy systems so that they are a permanent asset.

Context

The City of Brisbane adopted a Green Building Ordinance in November 2007 requiring a checklist demonstrating LEED Silver for city-sponsored non-residential projects, and mixed-use and commercial projects over 10,000 square feet. Brisbane actively encourages LEED certification on a voluntary basis. New residential projects and additions or modifications to residential projects with 20 or more units must provide a GreenPoint Rated checklist showing 50 points or more. The City is considering raising the rating target to Gold.

Assembly Bill 32 (AB32), California's comprehensive climate change legislation, requires the State to reduce greenhouse gas emissions (GHG) to 1990 levels by 2020 - a reduction of about 25%, and then to reach 80% below 1990 levels by 2050. If all the world's countries were to achieve these objectives, it is estimated that global temperatures would increase about 2°C (3.6 degrees Fahrenheit) for the 21st century, avoiding the effects of the 6°C (10.8 degrees Fahrenheit) rise predicted for our present course. This magnitude of climate change is predicted to cause major increases in the frequency and severity of extreme weather, significant loss of food production capacity on land and in the oceans, and substantial sea level rise. In addition, for California, it is predicted to result in many more fires and increasing water insecurity. Some consider these threats to be catastrophic in terms of impacts on water security and food crop yields.

Currently in the United States about 45% of GHG emissions are associated with constructing and operating buildings. Consequently, reducing the carbon footprint of buildings makes a major contribution toward the reduction of GHG emissions and therefore limits the extent of climate change.

Average greenhouse gas emissions per person per year in California is 17.7 tons, with a significant fraction of that footprint affected by how we plan, construct and operate our neighborhoods. Transportation and housing make up the majority of our California carbon footprint—two categories directly impacted by development. How and where we shop and eat are strongly influenced by development patterns as well.

New development has a special obligation to go beyond the AB32 goals because it is less expensive to avoid emissions through constructing efficient, renewably powered buildings than it is to reduce emissions through retrofitting existing buildings.

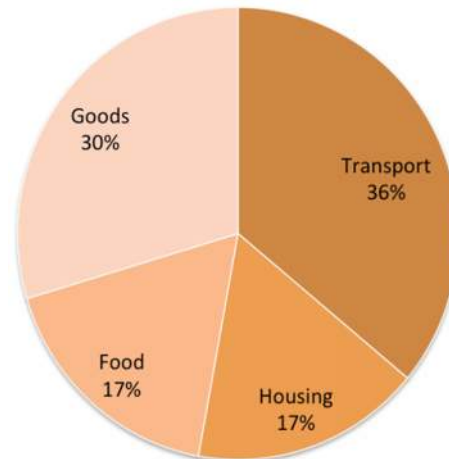


Figure 6. 2010 California Average Individual GHG emissions of 17.7 tons/yr (Source: CARB)

The State of California’s mandatory green building code, CAL Green, contains two optional tiers for performance above the minimum standard. The current Tier 2 requirement is that buildings use 30% less energy than allowed by code. The energy code is expected to get significantly more stringent with the adoption of each update.

The State of California’s energy code, Title 24 Part 6, requires that all buildings be constructed “Net Zero Energy” beginning in 2020 for homes and 2030 for nonresidential buildings. A number of “Energy Plus” or “Energy Positive” buildings are being tested around the world, including some larger commercial projects, such as those in Freiburg, Germany. An advanced energy plan was studied in the EIR and in a National Renewable Energy Laboratory study to determine feasibility and compatibility with overall sustainability objectives.



Figure 7. Four and five-story buildings can now produce more energy than they use, Freiburg, Germany <http://www.theguardian.com/environment/2008/mar/23/freiburg.germany.greenest.city>

There are many examples of innovative local power systems that reach beyond traditional solar and wind. Hummingbird Energy and Arizona State University (ASU) have signed a Letter of Intent to build a 2.4 MW urban biomass facility on the ASU campus at Tempe—the first of its kind in North America. The City of San Antonio converts their human waste into energy, while San Francisco converts its dog waste into alternative energy by using the dog feces in a methane digester.

Significant incentives for renewable power are available in California, and the cost of solar power continues to drop rapidly with increasing competition from Chinese producers and advances in technology.



Figure 8. The 2014 list of Zero Net Energy (ZNE) verified buildings includes 32 buildings and one district for a total of 33 projects. These projects are located in 36 states covering all climate zones and include a variety of building types. <http://www.bdcnetwork.com/report-32-us-buildings-have-been-verified-net-zero-energy-performers>

Summary Approach

Building design in the Baylands will emphasize passive reductions in energy loads first. Daylighting will be used throughout, as well as strategies to reduce heating and cooling loads like proper orientation, insulation, and glazing selection. In some buildings, air filtration systems and passive ventilation should be used.

After minimizing loads through passive design, rigorous energy efficiency measures will be used to reduce loads further. Buildings in the Baylands will be designed to exceed City green building ordinance requirements and meet California's CAL Green Tier 2 prevailing requirements for energy efficiency. In addition, an on-going operations and maintenance program will be implemented to monitor building energy performance in line with best practices in retro-commissioning.

Finally, all energy for space conditioning, ventilation, water heating, lighting and plug loads will be generated on site from solar on buildings, and possibly from an on-site solar farm, wind energy, heat exchange technologies, and biomass.



Figure 9. The Bullitt Center in Seattle, WA - The greenest office building in the world, achieving Living Building Challenge certification. <http://jessicarobinthomas.wordpress.com/2011/12/15/the-bullitt-center-the-greenest-office-building-in-the-world/>

The project will be designed to produce its entire annual energy needs, meaning that it will likely produce more than it uses in the summer, feeding power to the nearby community. Loads separate from these categories, such as industrial process loads, will also be met with on-site renewable energy sources if they are electric. For industrial loads using natural gas, a plan will be created to convert to a renewable fuel over time.

As proposed by the Open Space & Ecology Committee in their Guidelines for the Baylands, Brisbane is committed to achieving energy neutrality for the entire development. Furthermore, the Committee recommended in its February 2011 Update to its Scoping Comments: “Consideration should be given to whether the Baylands has the potential to generate renewable energy beyond the project’s needs, so that the Brisbane community could reduce its reliance on energy generated by fossil fuels.” A thorough analysis of best practices for generating alternative energy will be evaluated to determine appropriate types and locations. Converting waste into energy should be studied.

In collaboration with Principle 6, Sustainable Water, opportunities should be explored to capture wastewater heat or otherwise convert waste from the sewage system into an alternative energy source.



Figure 10. ZHome in Issaquah, Washington – Townhome project designed to achieve Zero Net Energy, as well as a number of other environmental benchmarks, which will become affordable housing in 2016. <http://living-future.org/case-study/zhome>

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. All buildings should be designed for zero carbon emissions by using best practices in passive design, energy efficiency, and renewable energy resources.
2. At a minimum, all buildings shall meet current CAL Green Tier 2 standards for energy usage (currently set at 30% below the prevailing code). Preferably, Energy Use Intensity (EUI) targets, which are kilowatt hours per square foot per year (kWh/sf/yr metric), would be established for each building type as basis of design.
3. Design with a transit-oriented development planning approach that encourages broad use of public transit, electric vehicles, and shuttles and promotes non-vehicular trips such as walking and biking for commuting and personal use. The plan shall incorporate mixed-used buildings and centers, and street and building layouts that maximize energy efficiency, passive design strategies, and renewable energy generation that support a zero carbon building goal.
4. Establish a maintenance fund or performance contract to maintain and upgrade all renewable energy systems throughout the development.

5. Consider waste-to-energy, cogeneration and biogas for heat and electric source energy.

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Zero Carbon Buildings Implementation Strategies:

1. Establish Energy Use Intensity (EUI) targets for each building type that are lower than current code requirement. Fifty percent lower than code is often a target for zero carbon buildings. This will require energy benchmarking of building types.
2. Perform feasibility study and cost/benefit analysis of renewable energy potential on site. Configure buildings where possible to maximize solar energy generation. Update for each phase of design and construction.
3. Determine net energy and carbon budget by building or building cluster, and site wide. Identify off-site renewable energy that may be installed or purchased if there is a gap. In order of acceptance:
 - a. Determine capacity for waste-energy or biogas cogeneration to fill the gap of renewable energy for buildings, as well as generation site wide.
 - b. Determine if additional off-site community scale renewable energy is feasible within Brisbane.
 - c. Consider use of Community Choice Aggregation (CCA) program to purchase renewable energy if it becomes available to the City of Brisbane. An example of a successful CCA program is Sonoma Clean Power. <https://sonomacleanpower.org/> San Mateo County is currently investigating a Community Choice Energy program, a variant of a CCA, and it appears to have strong support. If it moves forward and is adopted by the City of Brisbane, it could become available to the project.
4. Where feasible, all energy for space conditioning, ventilation, water heating, lighting and plug loads will be generated on site from solar, wind turbines, heat exchange technologies, and biomass on and within buildings.
5. Consider District Heating and Cooling systems as appropriate for clustered buildings.

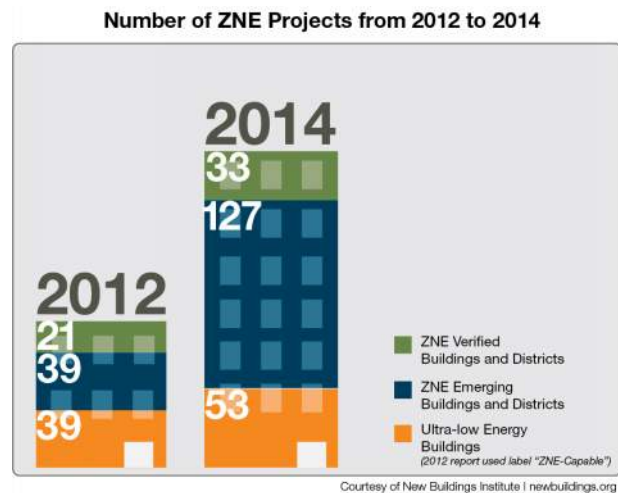


Figure 11. The 2014 Getting to Zero Status Update from New Buildings Institute (NBI).

<http://newbuildings.org/2014-zne-update>

6. Review master plan for transit oriented development approach using mixed use, clustered buildings conducive to transit usage. If housing is allowed in the project, establish minimum target of 75% of commercial and residential population within $\frac{1}{4}$ to $\frac{1}{2}$ mile radius of transit opportunities, and alternative modes of transit (e.g. Electric Vehicles/EVs, bikes) are planned for. (Implementation of transportation strategies to be addressed in Sustainable Transportation). We recognize that this Implementation Approach is not directly related to Zero Carbon Building principle, however it is strongly related to land planning of the buildings and as such we considered it to be most appropriately located in this section in order to make a direct connection between land use and transportation goals.
7. Applicable LEED ND Credits include:
 - a. Certified Green Building
 - b. Minimum/Optimize Building Energy Performance
 - c. Solar Orientation
 - d. Renewable Energy Production
 - e. District Heating and Cooling
 - f. Infrastructure Energy Efficiency



Figure 12. The David & Lucile Packard Foundation Project in Los Altos, California achieved Zero Net Energy certification in 2013. <http://www.packard.org/about-the-foundation/our-green-headquarters/>

Discussion

Though the cost of renewable energy is currently higher than grid energy, high performance energy efficient design of new buildings can reduce loads to the point that buildings with renewable energy systems can have similar costs to buildings with conventional energy systems. On a life-cycle cost basis when energy efficiency, passive design, and renewable energy are taken into account the cost to operate a building is lower than traditionally designed, grid connected buildings. Photovoltaic (PV) and renewable energy financing options are

becoming very viable and cost effective and are expected to continue to improve over the short and long term.



Figure 13. San Francisco infrastructure tunnel to help house utility distribution below grade, allowing opportunity for deeper efficiency through shared systems. [HTTP://GIZMODO.COM/8-MASSIVE-TUNNELS-BEING-BUILT-RIGHT-NOW-UNDER-A-CITY-NE-1493440](http://gizmodo.com/8-massive-tunnels-being-built-right-now-under-a-city-ne-1493440)

Initial verification of these Key Performance Indicators (KPIs) can be made by looking at the estimated energy use for each building permit application as reported in the Title 24 report. For the first KPI, the process would be to add the estimated Title 24 energy to the engineer's estimate of any unregulated loads and compare that usage to the installed rated output capacity of on-site renewable systems. For the second KPI, ensure that the overall energy savings reported in the Title 24 report is at least 30% relative to the baseline. Ideally, Energy Use Intensity (EUI) targets, kWh/sf/yr, would be established for each building type and would include anticipated plug and process loads.

If desired, ongoing verification can be done by comparing the metered energy use with the metered output of on-site systems. It is important to note that ongoing verification represents an additional reporting effort, but measurement and verification technology is improving rapidly and is nearly standard practice in some sectors. At a minimum, buildings should be commissioned and a verification to the initial estimate of energy use and generation should be made.



Figure 14. California Public Employees' Retirement System (CalPERS) headquarters complex in Sacramento covers two city blocks and includes 555,000 square feet of office space, 25,000 square feet of retail space, and parking for 1,000 cars; using district scale central system. http://greensource.construction.com/projects/0704_calpers.asp

2. ZERO WASTE

Our vision for the Baylands is of a future where resources are used efficiently, and ultimately zero waste is sent to a landfill. The "byproducts of consumption" should be the materials of tomorrow's uses.



Figure 15. Recology's plan for advanced resource recovery facility neighboring the Brisbane Baylands site to help City of San Francisco achieve goals of zero waste by 2020.

http://www.arup.com/Projects/Recology_advanced_resource_recovery_facility.aspx

Common International Targets

The less waste that is generated in the first place, the less there is to deal with. Best practice standards in waste minimization during construction should be employed, and a clear set of time-specific targets should be established in order to achieve an ultimate zero waste outcome. The project must demonstrate a rapid, verified progress toward the zero waste target, especially given current rapid advances in the introduction of waste processing globally.

At least 70% of baseline waste by weight generated by operations within the development should be reclaimed, composted or recycled. This is a minimum goal, with the expectation that

the diversion rate increases over time to near zero. The zero waste goal aims for no more than 2% sent to a landfill.

Context

Through Assembly Bill (AB) 939 California has mandated an ultimate goal of zero waste to landfills. Diversion rate targets were included in this legislation, and all cities have to report their progress toward these targets. Currently, Brisbane has a 77% diversion rate of waste generated by Brisbane residents and businesses.

For purposes of solid waste collection, Brisbane is divided into zones and the City has zone-specific franchise agreements with South San Francisco Scavenger Company and Recology. The City has curbside pick-up for recyclables and food waste collection, and has implemented a polystyrene bag ban. San Francisco's waste management provider, Recology, has its recycling operation located in the Baylands. Plans are being implemented to expand this operation at the Baylands in order to achieve San Francisco's "Zero Waste" mandate.

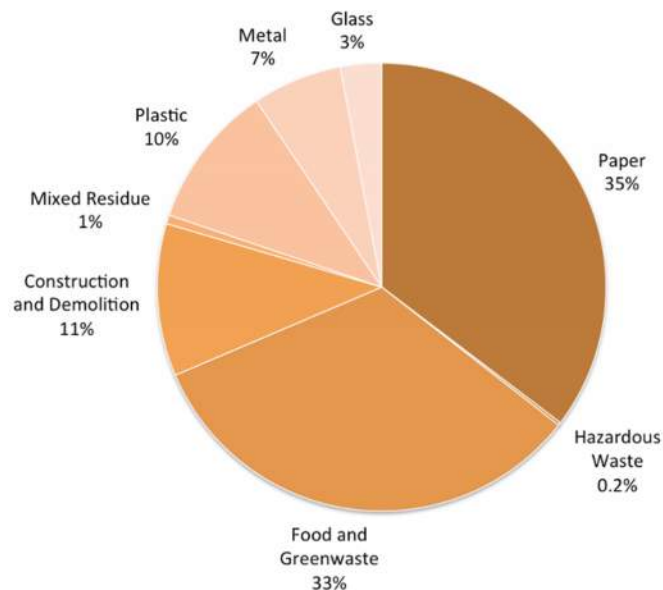


Figure 16. 2010 California Average Nonresidential Waste Stream (Source: CalRecycle)

In cooperation with its Scavenger Company, Brisbane has been meeting its targets for collection of recyclables, though residents have been doing better than businesses. Brisbane has a Construction and Demolition Debris Ordinance that mandates recycling targets for materials generated from construction and demolition projects. The building department provides information on how to meet these targets and where to take materials for recycling.

Many cities throughout the Bay Area are instituting laws that prohibit the use of packaging material that is not easily biodegradable or reusable, and requiring merchants to deliver their products in containers that are less harmful to the environment. The City of Brisbane adopted the County's polystyrene ordinance as well as the ordinance banning single-use plastic bags. A recyclable plastic bag collection site is located at the Post Office, and is operated by South San Francisco Scavenger Company. Waste-energy conversion technologies in California have typically involved the use of incineration, which have been and continue to be strongly opposed because of the air quality concerns. By a vote of its citizens, Brisbane denied a waste

incineration plant project in the Baylands in the early 1980s. Recent advances in gasification and plasma pyrolysis could provide a clean way to reduce the volume of solid waste from the Baylands while generating energy.

The South San Francisco Scavenger Company broke ground in late 2013 on their new Anaerobic Digestion (AD) facility in South San Francisco, which is now operational. The AD facility will process over 11,000 tons of food scraps and plant waste per year, converting the material to compost and generating a significant amount of compressed natural gas – enough to fuel 10 to 12 CNG vehicles. According to the South San Francisco Scavenger Co., “It is estimated that each collection vehicle will collect enough organic waste during just one route to fuel it for an entire day, creating a true closed loop system.



Figure 17. In partnership with Blue Line Transfer, Inc. – Sunset Scavenger has designed and developed the Blue Line Biogenic CNG (compressed natural gas) facility to produce over 100,000 diesel equivalent gallons of CNG per year. <http://zerowasteenergy.com/what-we-do/our-projects>

There are currently 3 definitions of ‘Zero Waste’ that are recognized today. Development projects have an opportunity to select what ‘Zero Waste’ means to them and which program they want to be recognized by.

1. Third Party Certification through Zero Waste Business Council – recognizes facilities that that have a zero waste policy, achieve >90% over all diversion from landfill and incineration.
2. Third Party verified through UL Environment – recognizes zero waste to landfill for facilities that achieve fully 100% diversion; 2nd tier of ‘virtually zero waste’ to landfill for those facilities that achieve >98% diversion; or diversion rate certification for facilities that meet >80% diversion from landfills.
3. Zero Waste by One Planet Living – recognizes communities that achieve >98% diversion of total waste from landfills and incineration, but does not require third party certification.

The City and County of San Francisco, in partnership with Recology, which is the waste management contractor, has set goals to achieve Zero Waste by 2020, but does not plan to use

a third party certification program. The Zero Waste program aims to maximize waste prevention, recycling and composting so that nothing is sent to landfill or high temperature material destruction. Tons to disposal from San Francisco is already a measure they report to the State of California and can calculate in-house.

City of Oakland is working in partnership with Waste Management toward a zero waste plan, and using the UL Environment certification program to track progress towards their goal of 100% diversion from landfill.

San Mateo County (SMC) reported in 2007 a diversion rate of 55% waste from landfills. SMC, now in partnership with Recology, is working towards zero waste targets, but has yet to define program details. It is expected that the Baylands project would adhere to any goals that SMC and the City of Brisbane would set for Recology. Additionally, the City of San Mateo has recently launched a Zero Waste Events program which may include additional waste operations practices to consider.

Summary Approach

Achieving Zero Waste will require strong and committed action in policy, infrastructure, and individual action. Provision must be made to manage waste materials brought onto the site from outside. Through education and recruitment of appropriate businesses, we will encourage zero-waste practices and the sale of recycled content and easily-recycled or composted products on site. Provision for handling, storing, and processing materials will be closely coordinated with the local agencies responsible for such work to improve diversion rates.

Since California already has strong legislative commitments to move toward zero waste, the challenge is to get cooperation from waste-makers, especially businesses. San Francisco, Palo Alto, and Alameda County have strong zero waste programs, which will be studied to create the detailed Baylands Zero Waste Plan. While this goal may be aspirational in 2015, it is expected to develop and become a strong priority for many bay area cities and counties in the future.

With San Francisco adopting an ambitious “Zero Waste” mandate, it has looked to its current waste management provider to implement its waste diversion goals. The Baylands development should look for opportunities to use advanced waste reduction practices, from simple ideas like adding food waste collection and a local toxics drop-off center, to more sophisticated ideas like vacuum tubes to connect buildings directly with a collection facility, thereby reducing truck traffic.

Public and private sector, as well as individual commitment, creativity and action will be needed to develop and maintain sustainable programs to reduce, reuse and recycle all materials generated on site. An ongoing educational focus to create a culture of efficiency and understanding of the life cycle of products should be the mantra for engagement in the Baylands.

The project developers and occupants will work with the City of Brisbane to support standards and policies that create a more environmentally responsible approach to packaging and containers used in the supply chain and by consumers.



Figure 18. Vacuum Waste Collection Systems eliminate need for waste hauling trucks driving across site daily, and support higher waste diversion rates, and opportunities for additional graywater supply from organics. Communities such as Hudson Yards and Roosevelt Island both in New York are using these systems. <http://motherboard.vice.com/read/should-new-york-city-expand-its-network-of-trash-sucking-vacuum-tubes> ; <http://www.greenerideal.com/lifestyle/0213-automated-waste-collection-sucks-but-thats-good/>

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. Recycle, reuse or otherwise divert from landfill at least 95% of all construction and demolition waste. This target exceeds the local Construction and Demolition (C+D) ordinance but has been achieved on many projects in the San Francisco bay area at no extra cost, and with some savings due to reduced landfill tipping fees.
2. Adopt and support waste management practices that target a zero waste goal, defined as >98% diversion of total waste from landfills and incineration. Similar standards and goals implemented by San Francisco and Recology will be considered. Incorporate waste prevention, recycling, composting, toxic and electronic waste collection, and community education and training. Consider reuse of materials on tenant improvements to reduce material usage and waste to landfill.

3. Show steady progress toward the zero waste goal of >98% diversion of total waste from landfills and incineration by 2030.
4. Show steady progress toward creating energy production from bio-waste material by 2030.
6. Construct buildings for durability to minimize damage in disaster and resulting waste. Such standards as Building Science Digests BSD-144: Increasing the Durability of Building Constructions, Joseph Lstiburek, 12/21/2006 should be consulted.
7. Working with Recology on the planned expansion and upgrade of the Brisbane waste management facility, optimize the opportunities for Zero Waste to include:
 - a. Comprehensive recycling, composting, and waste reduction program
 - b. Bio-energy opportunities from local sources to support renewable energy use at the Brisbane Baylands site.



Figure 19. Programs like STOPWASTE.ORG, Alameda County waste management authority, provide guidance to residents and businesses on how to reduce waste at the source by implementing packaging and purchasing policies. <http://www.stopwaste.org/>

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Zero Waste Implementation Strategies:

1. Establish and require construction waste recycling program consistent with local bay area best practices with target of 95% diversion.
 - a. Provide construction waste accounting during construction.

2. Promote Zero Waste goal by implementing recycling best practices and diversion of all materials.
 - a. Design the ability to recycle or compost all types of solid waste consistent with local and regional zero waste policy, practices and waste management facility handling. Consider spatial requirements necessary to provide adequate area for sorting and storage of waste.
 - b. Consider use of vacuum tube collection systems (such as Envac) in areas of development with sufficient scale to be cost effective, such as high density mixed use and high density residential.
 - c. Establish practices to encourage waste reduction at building level and implement a requirement for tenants to monitor and report waste diversion rates.
 - d. Include zero waste goals and strategies in commercial and mixed-use tenant guidelines.
 - e. Require reporting of waste management goals, targets and achievements. The South San Francisco Scavenger and Recology franchise agreements may include measurement and verification (M+V) requirements for commercial properties.
 - f. Monitor on-site waste production, building by building, to provide feedback to end users.
 - g. Train all workers on site to be trained in sustainable waste management practices.
3. Annually, provide third party certified diversion rates using the Underwriters Laboratories UL Environment standard. Show progress year over year toward the One Planet Living goal of 98% diversion rate. Reporting is likely to be the responsibility of the waste operator.
4. Prepare feasibility study of bio-waste potential for site. If materially significant and cost effective, consider as renewable energy component.
5. Identify an appropriate Building Durability approach and implement strategies to ensure that the project is built for durability to reduce waste from building maintenance. Possible approaches include:
 - a. Use of BSD-144: Increasing the Durability of Building Constructions, Joseph Lstiburek, 12/21/2006
 - b. Use of Canadian Standards Board S478-95 (2007) and development of a Building Durability Plan, such as:
<http://www.morrisonhershfield.com/newsroom/technicalpapers/Documents/Morrison%20Hershfield%20Sample%20Building%20Durability%20Plan.pdf>

- c. Development of a Durability Risk Evaluation to identify moderate and high risk-durability issues for the building enclosure. Development of specific measure, details, construction standard, and inspection requirements that are implemented in construction. See the LEED BD+C (Building Design and Construction) IDc2credit (Innovation in Design Credit 20 as an example: <http://www.usgbc.org/credits/homes-mid-rise/v2008/idc2>
6. Work with the developer to design and provide a robust educational focus to create a culture of efficiency and understanding of the life cycle of products throughout the Baylands.
7. For the City of Brisbane to consider:
- a. Work with Recology to implement capability of Zero Waste handling at new site. This goal is in alignment with the City of San Francisco goal at the Recology site.
8. Applicable LEED ND Credits include:
- a. Solid Waste Management
 - b. Wastewater Management

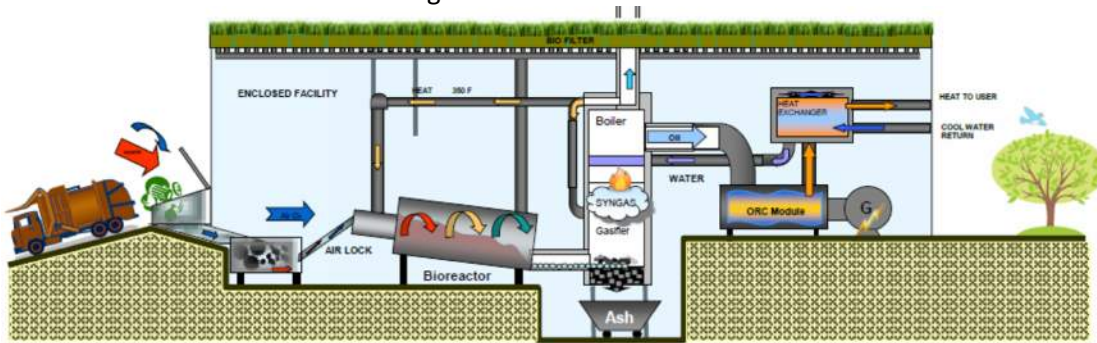


Figure 20. Examples of urban scale biomass and biodiesel productions by companies such as Hummingbird Energy. With Recology’s location and future development, a similar program can be set up directly to support their new advanced technology facility. State of California has developed policy on biomass and biofuels <http://www.energy.ca.gov/biomass/>

Discussion

What is left out of these KPIs is any metric for minimizing future waste. Materials that are combined so that the resulting product is impossible to reuse or recycle create a waste problem in the future at the end of their life. Other future waste issues could include a protection against waste from fire, flood and earthquakes. Life safety codes are designed to protect human life and not structures, so after major earthquakes many buildings are condemned and subject to total removal. It is conceivable—though likely fairly expensive—to create a standard that goes beyond the life safety code provisions to better protect structures from fire, flood and earthquakes.

3. SUSTAINABLE TRANSPORTATION

Our Baylands vision is one where the need to travel has been reduced, public transportation is easily accessible, and low and zero carbon modes of transport are provided.



Figure 21. Caltrain's plans for a greener commuting corridor including the plan for blended stations and electrification. <http://www.greencaltrain.com/2014/11/fta-planner-blended-station-designs-may-benefit-bay-area/>

Common International Targets

The ecological footprint arising from transport has to be consistent with the overall target of achieving a one-planet footprint from all impacts. BioRegional considers transport targets on a case-by-case basis. Projects need to demonstrate low and improving rates of carbon emissions from transport within as well as into and out of the project area.

Context

The site is located between the two major regional employment centers of San Francisco and Silicon Valley. It sits just to the west of Highway 101 and the Caltrain commuter rail line bisects the property today.

San Mateo County has an auto-dominated transportation system, but there are many potential options for improving transit and ridership in the area. The county currently has infrequent bus service, limited car share programs and only limited success with existing rideshare commuting. However, it also has basic passenger rail service, well-used park-and-ride lots in several

locations, including at Old County Road in Brisbane, and paratransit services for the elderly and disabled.

A free shuttle service linking Brisbane with the Balboa Park Bay Area Rapid Transit (BART) station in San Francisco provides a transportation alternative for citizens working along the BART corridor and in Brisbane, and San Francisco’s Muni Third Street rail line terminates near the north end of the Baylands project at Geneva Avenue. San Mateo County Transit District (SamTrans) offers a free shuttle service from central Brisbane to the Caltrain station.

A study is underway to determine the best location for the Bayshore Caltrain station, which could conceivably serve as a multi-modal transit hub with San Francisco Muni buses running east/west on the extension of Geneva Avenue and SamTrans buses running north/south. San Francisco is also considering the extension of its Third Street light rail line to this same transit hub. To build a new multi-modal station that brings these forms of public transportation under one roof will be expensive; Caltrain itself is in financial difficulty. With the demise of Redevelopment Agencies, large infrastructure projects will likely need financial assistance from the private sector.



Figure 22. Kyoto Station in Japan is an example of how we can connect old railway stations with future high speed rail technology.

[HTTP://WWW.HSR.CA.GOV/DOCS/PROGRAMS/GREEN_PRACTICES/SUSTAINABILITY/URBAN%20DESIGN%20GUIDELINES.PDF](http://www.hsr.ca.gov/docs/programs/green_practices/sustainability/urban%20design%20guidelines.pdf)

California has a law (Senate Bill SB 375) that encourages development around transit hubs. As part of the implementation of this law, regional transportation funding agencies will prioritize projects that have approved transit hubs.

In 2008, California voters passed Proposition 1A to link the major cities of California by high-speed rail. To develop High Speed Rail (HSR) in San Mateo County, the current rail system needs to be electrified. Funds from HSR will provide half of the \$1.5 Billion cost tag. Bicycle routes are available, but are limited. There are no existing community bicycle sharing programs such as those in New York and Washington DC. Such programs have been implemented in San Francisco and are currently under study by other Bay Area communities.

Brisbane's Baylands area is part of a regional Priority Development Area (PDA) that also encompasses the Schlage Lock housing development site in San Francisco, Executive Park, Candlestick and Hunter's Point. Schlage Lock and the Baylands are projects of the same company, Universal Paragon Corporation.



Figure 23. Multimodal uptown station in Normal, Illinois spurred impressive growth in transit ridership and mixed-use private downtown investment. <http://bettercities.net/article/multimodal-station-and-plan-spur-town%E2%80%99s-revival-21378>

Summary Approach

A comprehensive transportation study will be completed during the course of the Environmental Impact Report (EIR) preparation. While we have identified some preliminary approaches in this Sustainability Framework, we fully expect to modify and improve our

approach to transportation as a result of this comprehensive study. At a minimum, we will look for ways to set appropriate targets for vehicle miles travelled, greenhouse gas emissions, and level of service for traffic.

We will reduce emissions from transportation first by reducing the need to move long distances and also by reducing the need for fossil fuel based modes. We will create an easy pedestrian and bicycle lifestyle, where the location of jobs, restaurants, retail, services and recreation are in close proximity to each other. If housing is allowed, it will be incorporated into this web of mutual efficiency.

For public transportation to be a significant part of the Baylands, it needs to be safe, reliable and easily accessible from all parts of the development and tied together by a variety of transportation modes. Mobility opportunities for all members of our society will be incorporated into the final transportation plan.

The multi-modal station is the heart of the development. To fully utilize the potential of the multi-modal station, a minimum of a ¼ mile radius of combined uses must surround the station. This may require relocating the station to a point south of its currently planned site, and integrated into the Geneva Avenue extension—a prospect that is currently being studied.

To help finance the construction of the multi-modal station, efforts should be investigated to partner with the private sector. Perhaps by integrating retail, hotel and entertainment elements into the design of the station, it may provide the incentive for the private sector to offset some of the infrastructure costs of the station. A great example of this type of public/private partnership is the multi-modal station in Kyoto, Japan; this station is highlighted in the HSR EIR.

It will be important to establish strong lines of communication with the various transportation authorities such as SamTrans, Caltrain, Muni and the various private companies. We will assert our desire that all public transportation be electric powered by renewable sources or use low- or zero-carbon alternative forms of fuel.

We will work with San Francisco to connect transit systems that further the city's program goals of sustainability for this project.

The Project will provide infrastructure to support a low-carbon transportation system with alternative fuel filling stations, electric car charging, plug-in hybrid carshare programs, minimal parking areas to encourage public transportation use, incorporating shared parking between uses and promoting a successful rideshare program.

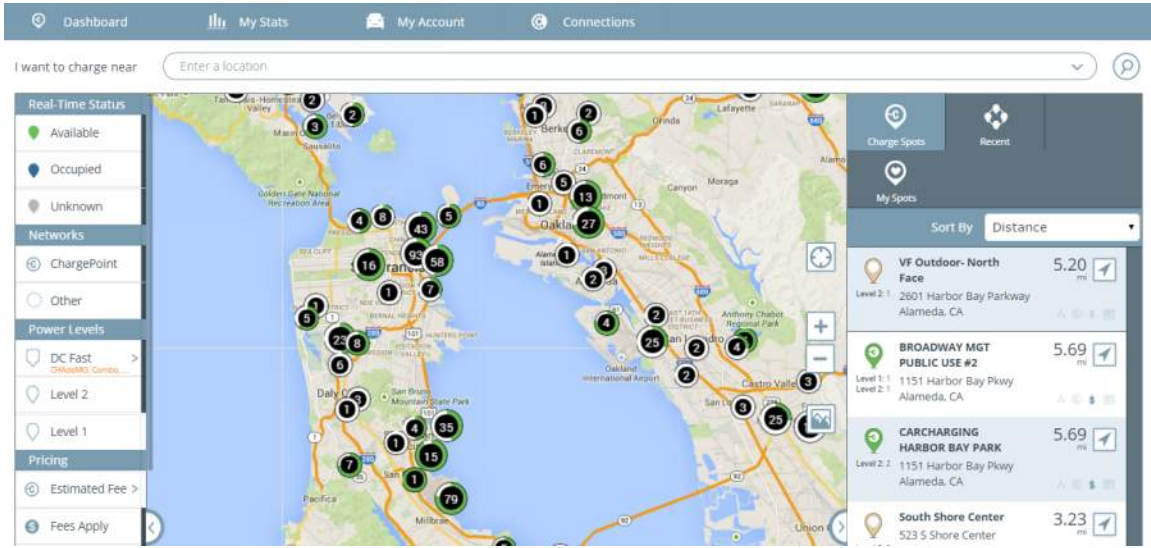


Figure 24. With programs like ChargePoint, interactive maps and phone applications make it easy to find EV charging stations. https://na.chargepoint.com/charge_point

An elaborate bicycle and walking path system will be incorporated throughout the Baylands, providing opportunities for exercise, passive and commuter bicycle use. Class 1 and Class 2 bicycle paths will be constructed. Consideration for efficient and direct pedestrian and biking paths should be given so that time-effective bike transit options are available.



Figure 25. Bay Area Bike Share program launched in 2013 and has seen great success, with stations splashed all over the downtown district and pilot programs expanding to Redwood City, Palo Alto, Mountain View and San Jose. [HTTP://WWW.BAYAREABIKESHARE](http://www.bayareabikeshare)



Figure 26. Free Ride (Route 4) downtown shuttle in the City of Walnut Creek (<http://www.walnut-creek.org/about/qualitylife/transit.asp>)

We will support the creation of a bicycle sharing system that will provide free bicycles for anyone in the Baylands. To reduce theft and vandalism, we will incorporate programs that have been initiated in other parts of the country as well as in Europe and Asia. The program will be subsidized through business programs and advertising.

The current free shuttle route connecting Brisbane with the Balboa Park BART station will be expanded to include the Baylands. Traffic calming strategies should be considered on local streets to improve safety for pedestrians and cyclist. Such strategies include narrowed roads, speed humps and traffic circles.

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. Steady year-on-year progress toward greenhouse gas emissions of 0.282 tons CO_{2e} per employee per year for commuting by 2030.
 - a. See discussion section for how this metric was established.
 - b. This metric is extremely aggressive for bay area cities.
2. Develop Transportation Demand Management Plan that targets achievement of the GHG goals.

3. Information provided in the Draft Environmental Impact Report (DEIR):

Development Scenarios	Transportation Mitigated Project Baseline CO ₂ e	Est. Jobs ⁵	CO ₂ e /Employee Including Mitigations
Developer Sponsored Plan (DSP)	39,457 ⁶	17,540	2.25*
Developer-Sponsored Plan – Entertainment Variant (DSP-V)	27,199 ⁷	15,466	1.76*
Community Proposed Plan (CPP)	45,053 ⁸	16,187	2.78
Community Proposed Plan – Recology Expansion Variant (CPP-V)	64,213 ⁹	16,069	4.00
Renewable Energy Generation Alternative	7,750 ¹⁰	2,400 ¹¹	3.23

4. Design for a ¼ to ½ mile radius of diverse, multi-use development that provides basic services and amenities in convenient locations on site within this radius. Design to encourage walking, biking and non-auto use within this radius. This means at a minimum grocery store, pharmacy, one restaurant per 600 employees, hotel, cultural/art/recreation facility, daycare facility, park space, and trail access.
5. Complete a Level of Service analysis for cycling and walking to ensure a Level B or better grade for all sidewalks, paths, roads and intersections. Include at least the following metrics in the analysis: safety, accessibility (e.g., obstructions in sidewalk, mid-block access), convenience (e.g., shortest path, minimal wait at intersections), signage and navigation, parking availability and convenience, and comfort. Accessibility is defined by building code and is meant to apply to all public ways such that people of all mobilitites can benefit from the experience.
6. Survey of Baylands employee home ZIP codes shows annual progress toward creating a local workforce and an average one-way commute of less than 7.3 miles, which is

⁵ Source: DEIR, Chapter 4.k, Population and Housing, Table 4.K-12, Estimated Project Population and Number of Jobs, page 4.K-25.

⁶ Source: DEIR, Chapter 4.F, Greenhouse Gas Emissions, Table 4.F1, Estimated Emissions of Greenhouse Gases (2040) From Operation of the DSP and DSP-V Scenarios, p. 4-F.17.

⁷ Ibid.

⁸ Source: DEIR, Chapter 4.F, Greenhouse Gas Emissions, Table 4.F1, Estimated Emissions of Greenhouse Gases (2040) from Operation of the CPP and CPP-V Scenarios, p. 4-F.18.

⁹ Ibid.

¹⁰ Source: DEIR, Chapter 5, Alternatives, Table 5-5 Estimated Emissions of GHG Emissions from the Renewable Energy Generation Alternative Operations, and includes Motor Vehicle Trips (7,002) and Recology Truck and Vehicle Trips (748).

¹¹ Source: DEIR, Chapter 5, Alternatives, page 5-41.

50% of the San Mateo County average. Future plans shall promote and facilitate ride-sharing, electric vehicle charging, bike use, pedestrian pathways, shuttles and connectivity, electric (renewable energy) shuttles, etc.

7. Implement electric vehicle, biofuel, and emission-free delivery and fleet vehicles in the commercial sector.
8. Provide an annual transportation survey of residents and businesses to determine level of public transit and non-auto modes.



Figure 27. City of Brisbane currently does not have a gas station. Consider, in partnership with Recology's operations, providing CNG fueling.

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Sustainable Transportation Implementation Strategies:

1. Develop Brisbane Baylands Project Transportation Demand Management (TDM) Plan.
 - a. Incorporate Transit Oriented Development approach and resulting Vehicle Miles Traveled (VMT) counts.
 - b. Establish year/year targets for VMT reductions that will lead toward greenhouse gas emissions per target set in tons CO_{2e} per employee per year for commuting by 2030. CalEEMod (California Emissions Estimator Model) may be an appropriate modeling tool.

- c. Implement TDM strategies in the master plan addressing the following strategies at a minimum:
 - i. Transit oriented development
 - ii. Alternative modes of transportation
 - iii. Alternative fueled delivery vehicles in mixed use and commercial uses
 - iv. Bike and pedestrian networks and pathways
 - v. Company housing
 - d. Provide an annual transportation survey of employees to the City based on zip codes.
 - e. Integrate alternative fuel types and transportation modes into the master plan for commercial and residential uses. [this can be a revenue generation strategy]
2. City of Brisbane to develop a green transport plan that results in carbon emission reductions that are consistent with the targets of the State of California and Brisbane's Climate Action Plan. The Baylands TDM Plan will be a significant piece of the City's green transport plan.
 3. Work with Commute.org to expand the area's shuttle system connecting the Baylands with BART and the Third Street Light Rail (SF MUNI).
 4. A free shuttle system, such as the Emery-Go-Round in Emeryville, will be explored. The Emery-Go-Round is a free shuttle bus operated by the City of Emeryville Transportation Management Association to connect the distributed shopping and residential areas to the MacArthur BART Station—a "last mile" bus route. It runs 7 days/week from roughly 6 a.m. to 10 p.m. <http://www.emerygoround.com/phone/index.html>
 5. Collaborate with the developer to implement a bicycle sharing program that could be subsidized through businesses and or other means such as advertising, to provide a free and healthy way for people to navigate the Baylands.
 6. Create an easy pedestrian and bicycle lifestyle, where the location of jobs, restaurants, retail, services, recreation and housing (if permitted) are in close proximity to each other.
 7. Consider relocating the Bayshore Train Station to the south, so that it intersects with the Geneva Ave. Extension - reconfigure it to be a multi-modal station.
 - a. Work with San Francisco and regional transportation agencies to create better connectivity with the Geneva Ave BRT and the multi-modal station
 - b. Work with San Francisco to bring the MUNI Third St. Light Rail to the multi-modal station.
 - c. Investigate partnering opportunities with the private sector to integrate retail, hotel and entertainment elements into the design of the multi-modal station.
 - d. Work with the developer to envision the multi-modal station being the epicenter of the development, ensuring a ¼ mile to a ½ mile radius of diversified uses.
 8. Consider Class 1 bicycle paths where feasible when creating the bicycle and pedestrian path system to reduce engagements with motorized vehicles.
 9. Applicable LEED ND Credits include:
 - a. Smart Location

- b. Access to Quality Transit
- c. Bicycle facilities
- d. Walkable Streets
- e. Connected and Open Community
- f. Reduced Parking Footprint
- g. Transit Facilities
- h. Transportation Demand Management



Figure 28. The San Francisco Bay Area has been expanding the number of EV charging stations rapidly. <http://venturebeat.com/2010/08/10/bay-area-soon-to-be-home-to-5050-ev-charging-stations/>

Discussion

According to CoolCalifornia.org, the average business-related transportation emissions are 4.7 tons CO₂e per person for both San Mateo County and San Francisco County, and the average total transportation emissions from all types of trips is 16.6 tons CO₂e per person. Research by the IPCC (Intergovernmental Panel on Climate Change) and BioRegional shows that a sustainable level of greenhouse gas emissions is around 3.9 tons CO₂e per person from all impacts, including food, goods, energy, services, materials, and transportation. This number will decline as the world population increases and as the biocapacity of the planet to absorb carbon decreases.

Given all this, around 1.0 ton per person is a good target for transportation to allow enough latitude to stay within a one-planet footprint while still supporting a high quality of life. That

represents a 94% reduction in total transportation emissions (from 16.6 to 1.0 tons CO_{2e} per person per year). By applying that same percentage reduction to the commercial sector, it is possible to conclude that transportation emissions should be 94% lower than 4.7 tons CO_{2e} per person, or about 0.282 tons CO_{2e} per person per year.

To put this metric into practical terms, 0.282 tons CO_{2e} is the amount of emissions from 31.6 gallons of gasoline, which can deliver 1,580 miles of total driving in a Prius, or about 8 miles per workday for an entire year—far less than the average commute of 26 miles per day. This metric also includes personal driving. Clearly, to achieve this goal, a combination of walking, cycling, transit, carpooling and electric vehicle use will be necessary.

It is acknowledged that this metric sets an extremely aggressive target and likely to be unachievable for many bay area cities because achievement is very dependent on strong local and regional transit, dense and local housing, and a high proportion of non-fossil fuel based transportation. We may wish to reconsider this target and instead base it on a reduction from the regional GHG per capita emissions. One Planet Living has endorsed projects with a target of 1 tons CO_{2e} per employee per year for commuting by 2030. Developing an achievable, deep set of reductions for a sustainable transportation plan requires further study and deeper analysis of regional and local conditions.

Tracking the approximate commute distance for employees can be done with mandatory home zip code reporting, however, this reporting requirement may not be popular with small businesses unless connected to some benefit.

Additionally, California Environmental Quality Act (CEQA) has relied on the Level of Service definition to govern transportation planning, applied to highways and local roadways. Roadways are graded from A (free flow) to F (forced or breakdown flow). Level of Service is acknowledged to be a blunt instrument that encourages free flow of automobiles and effectively discourages pedestrian, bicycle and non-auto forms of transportation planning. Recognizing that this metric is at odds with policy intentions, such as SB 375 Sustainable Communities Act, CEQA recently adopted the Vehicle Miles Traveled (VMT) metric which is a measure of the miles traveled by vehicles in a specified region, over a specified time period. The VMT metric enables transportation plans and alternatives to capture the value of non-auto transportation methods, with plans that are lower in VMT rendering lower emissions, lower congestion, and generally resulting in a more sustainable transportation approach.

4. LOCAL AND SUSTAINABLE MATERIALS

Our Baylands vision is one where all goods and materials used for construction and property management are made from renewable, reclaimed, or recycled resources with low embodied energy and, wherever possible, sourced locally. As new technologies and methods present themselves, every effort will be made to implement these new products and practices.

Common International Targets

Via the common process guidelines at the One Planet Communities website, country-specific targets should be determined to increase and optimize the use of local, reclaimed, renewable, recycled, durable, healthy and low environmental impact materials for construction and property management.

Context

National protocols for sustainable materials are rapidly developing. Examples include wood from FSC-certified (Forest Stewardship Council) forests, products that are free of formaldehyde and volatile organic compounds, products made without the use of toxic chemicals, materials that are produced with low amounts of energy, etc. Attention is increasingly being dedicated to making buildings and products more easily recyclable at the end of their useful lifetime.



Figure 29. Internationally acclaimed and recognized stamp of approval for sustainability harvested wood via the Forest Stewardship Council (FSC). <https://us.fsc.org/>

Brisbane was one of the first cities in California to adopt a Green Building Ordinance.

Though mostly undeveloped, the Baylands does have a few existing building sites—one is occupied by Golden State Lumber, which has expressed interest in relocating to another area of the Baylands, while San Francisco’s waste management company, Recology, conducts their

recycling operation in the Baylands, but has plans to expand their program with buildings that will be LEED Platinum.

A large portion of the Baylands is currently being used for recycling concrete, aggregate, soil and rocks.

With the rapid growth in popularity of LEED, a national protocol on sustainable materials is emerging. The focus is two-fold:

- look towards using materials that are reclaimed, locally sourced, locally manufactured, containing wood from FSC-certified forests, and containing recycled content, and
- discouraging the use of materials that are harmful to the environment and human health.

While the LEED standard is excellent, it has some notable gaps which are widely recognized. Specifically, it does not recognize the benefit of avoiding the use of materials (e.g., finished concrete flooring rather than carpet), it does not give credit for avoiding materials that require toxic cleaning compounds, it does not restrict materials to those which are known to have little or no toxicity (e.g., per the REACH protocols Registration, Evaluation, Authorization and Restriction of Chemicals), it does not restrict the use of materials which have toxic production byproducts (e.g., dioxin from PVC manufacturing), and it does not give credit for the use of materials which are fully recyclable at end-of-life or for materials with product take-back programs.



Figure 30. Programs like Calrecycle, the Environmental Protection Agency (EPA), and Whole Building Design Guide (WBDG) have developed material to support the exploration of green building materials to support designers on product selection and analysis of different environmental factors.

[http://www.calrecycle.ca.gov/greenbuilding/materials/;](http://www.calrecycle.ca.gov/greenbuilding/materials/)

<http://www.epa.gov/greenhomes/SmarterMaterialChoices.htm;>

<http://www.wbdg.org/design/sustainable.php>

The Alameda County-based Stopwaste.Org has established standard jobsite waste recycling practices and guidelines (e.g. Specification Construction Specifications Institute CSI 01505) and is an excellent regional resource for information about waste reduction.

Summary Approach

Use LEED Platinum standards for the project baseline material practices and add other criteria as they become practical.

Since the Baylands will be built-out over the course of several decades, a process will be established that ensures the increasing use of local and sustainable materials as the opportunities become available. As much fabrication as possible should be done on site, and materials already available on site (e.g., clay, concrete, asphalt, mulch, topsoil, trees, etc.), should be used to the extent this can be done safely.

Work with a sustainable materials consultant to identify buildings and developments throughout the world that have created innovative structures with the use of sustainable materials. Use this information to form the basis of a comprehensive approach to materials, and establish protocols for sustainable materials in construction and property management.

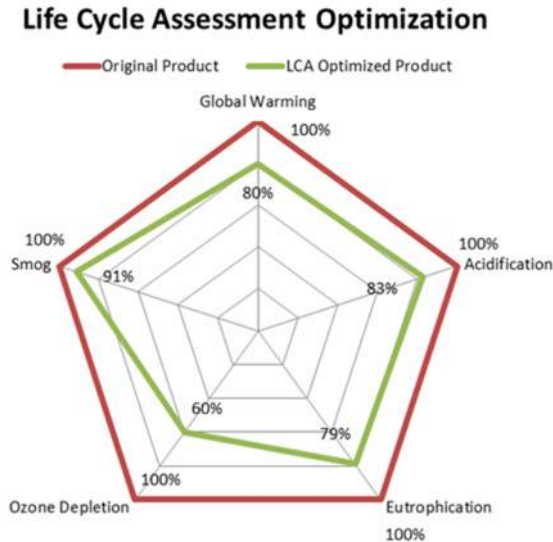


Figure 31. Programs like LEED are now updating their material credits to support the more holistic approach to evaluating building materials, such as Life Cycle Assessment (LCA) optimization. <http://www.usgbc.org/articles/life-cycle-leed-out-now-edcs-january-issue>

Use Life Cycle Assessment (LCA) for selecting materials and making process decisions in the construction and maintenance of buildings and infrastructure. LCA involves calculating the total environmental costs of any construction or production process from its beginning in raw material extraction to its completion in the disposal of building or product components. For recycled materials such as simple metals, the analysis looks at the costs from extraction through production, use and the eventual recycling and remanufacturing of new materials. The ultimate objective is to bring the construction, production, product and building management cycles within the biological capacity of the earth.

Establish guidelines for sustainable materials in consumer goods and packaging that are designed for the home and workplace.

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. Meet or exceed the LEED for New Construction v4 criteria for the following credits:
 - a. Environmental Product Declarations
 - b. Life Cycle Assessment
 - c. Building Product Disclosure—Sourcing of Raw Materials
 - d. Building Product Disclosure for Material Ingredient Transparency (health/toxicity)
 - e. Low Emitting Materials
2. The project may not contain any of the Living Building Challenge v3 Red List materials or chemicals unless a request for waiver is granted by the City of Brisbane or its designee.
3. Report the total and per-square-foot embodied energy of all buildings for six major materials: concrete, masonry, ceramics, steel, aluminum and plastic. Establish a target of 10% reduction from standard construction code-compliant baseline to minimize embodied energy and show progress toward that target. A 10% reduction is generally accepted as an initial target for relatively new and innovative supply chain modifications. Many green building rating systems use 10% as a key threshold and increase from there when evidence of change becomes apparent. Higher targets are established once the ability of the market to respond is demonstrated.
4. Applicable LEED ND Credits include:
 - a. Building Reuse
 - b. Recycled and Reused Infrastructure
 - c. Solid Waste Management

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Sustainable Materials Implementation Strategies:

1. Require use of LEED v4 New Construction to define materials requirements for:
 - a. Environmental Product Declarations
 - b. Life Cycle Assessment
 - c. Building Product Disclosure—Sourcing of Raw Materials
 - d. Building Product Disclosure for Material Ingredient Transparency (health/toxicity)
 - e. Low Emitting Materials

2. Incorporate a design approach that:
 - a. Reduces the need for finish materials (e.g. dropped ceilings, floor coverings, architectural treatments, etc.) and promotes source reduction goals
 - b. Specifies materials that do not require toxic cleaning compounds
 - c. Restricts the use of materials with toxic production and byproducts
 - d. Specifies materials that are fully recyclable, have take-back programs, or other strategies and programs that support the goal of reuse.
3. Suggest/reward Living Building Challenge v3 Red List approach for key priority buildings.

Discussion

The Living Building Challenge v3 Red List currently includes the following materials and chemicals. Note that there are temporary exceptions for numerous Red List items due to current limitations in the materials economy. If Red List alternative materials are not available, an advocacy effort is desired; i.e. request manufacturers to provide transparency and remove Red List chemicals from the product.

- | | |
|---|---|
| 1. Alkylphenols | 14. Halogenated Flame Retardants |
| 2. Asbestos | 15. Lead (added) |
| 3. Bisphenol A (BPS) | 16. Mercury |
| 4. Cadmium | 17. Polychlorinated Biphenyls (PCBs) |
| 5. Chlorobenzenes | 18. Perfluorinated Compounds (PFCs) |
| 6. Chlorinated Polyethylene | 19. Phthalates |
| 7. Chlorosulfonated Polyethylene | 20. Polyvinyl Chloride (PVC) |
| 8. Chlorofluorocarbons (CFCs) | 21. Polyvinylidene Chloride (PVDC) |
| 9. Hydrochlorofluorocarbons (HCFCs) | 22. Short Chain Chlorinated Paraffins |
| 10. Chloroprene (Neoprene) | 23. Wood treatments containing
Creosote, Arsenic or
Pentachlorophenol |
| 11. Chromium VI | 24. Volatile Organic Compounds (VOCs)
in wet applied products |
| 12. Chlorinated Polyvinyl Chloride (CPVC) | |
| 13. Formaldehyde (added) | |



Figure 32. Declare label by the International Living Future Institute promotes product manufacturers that are fully transparent with their ingredient list, with goals of meeting the Red List requirements. <http://declareproducts.com/>

5. LOCAL AND SUSTAINABLE FOOD

Our Baylands vision is one where healthy diets are promoted through local, seasonal, and organic produce, and that all food should be minimally processed and packaged, and that its availability is not at the detriment of others

Common International Targets

Healthy diets should be promoted and minimum targets achieved for supply of organic or low environmental impact food and local sourcing.

Sustainable agriculture involves food production methods that provide safe working conditions, do not degrade the environment, are humane to animals, support farming communities, and produce healthy food.

One Planet Communities throughout the world will develop strategies to enable and encourage people to adopt a One Planet diet, through education and agreements with onsite retailers and caterers.

On-site facilities, including retail and catering facilities, will strive to minimize packaging in line with zero waste targets, and minimize consumption of processed foods which have a large ecological footprint. Food waste from all residents, tenants, businesses, restaurants and shops will be minimized, and remainder will be collected and processed in the anaerobic digester.

Food growing will be integrated onsite where appropriate. Strategies will be put in place to enable food growing on site. Local food mapping will be undertaken and partnerships will be developed with local producers to establish regular supplies and to work with them to further reduce their impacts.

Purchasing systems will be established to ensure food provided does not contribute to deforestation, over-fishing or pollution and minimizes other negative impacts.



Figure 33. Urban farming
<http://www.motheearthliving.com/green-living/americas-top-10-urban-farms.aspx>

Context

With an increasing awareness of where and how our food is produced, more consumers are purchasing organic products. National organic standards and a more stringent set of California organic standards help consumers to identify organic products. We also have a number of organic farms in San Mateo County and the surrounding region, making seasonal organic produce readily available.

For products coming from areas with poor working conditions, such as coffee, tea, sugar, chocolate, vanilla and fresh fruit, the Fair Trade Certified™ program is an effective labeling system for promoting good practices in the international food industry and is widely used in local stores.

Over the past twenty years, farmers' markets featuring local foods have become widespread and popular in California, and the desire to eat local food is steadily increasing.

No "food miles" standards have been established in California, but there are restaurants advertising that none of their ingredients come from more than 100 miles away. Google (headquartered in Santa Clara County) has Cafe 150 that claims its food ingredients come from within 150 miles.

The U.S. Department of Agriculture estimates that food production and distribution use 15% of all energy in the United States and contributes an equal share of air pollution and greenhouse gases. However, the emissions impact of food is complex and involves much more than transportation. Figure 34 shows how the greenhouse gas emissions related to food breakdown, making it clear that other objectives like reducing the use of petroleum fertilizers and reducing food waste in grocery stores and restaurants are also very important. To be clear, approximately 44% of emissions related to food occurs before it arrives at the household, food services, and wholesale/retail locations. Hence, local food sourcing can significantly reduce emissions associated with the food lifecycle.

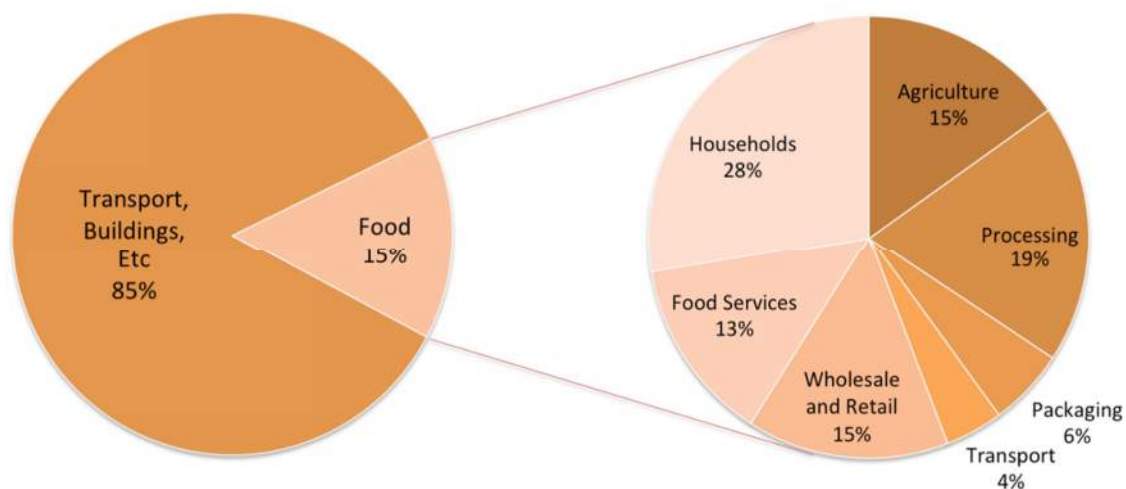


Figure 34. Breakdown of Energy and Emissions in the U.S. Food Industry.
http://www.ers.usda.gov/media/136418/err94_1_.pdf

Local counties are home to dozens of organizations, farms and programs dedicated to healthy local and organic food. Within a 200 mile radius, one will find some of the highest quality food sources in the world: seafood from the Pacific Ocean, grasslands supporting grains, dairies and beef, fertile soil supporting fruits and vegetables and much more.

There are also national and State standards for healthy diets that many restaurants highlight in their menus. California is a leader in this movement.

Portions of the Baylands are not suitable for in-ground gardening or farming because of soil contamination, but engineered raised gardens can be studied and perhaps found feasible.



Figure 35. Programs like Greenhearts Family Farm CSA is San Francisco and San Mateo’s only farmer owned local farm providing a 'veggie box' home delivery service. <http://greenheartsfamilyfarm.com/our-service/>

Summary Approach

Brisbane will set standards and incentives for local, sustainable and affordable food in the restaurants and food markets that will be established in the Baylands. When a viable commercial level is reached, a farmers' market featuring locally grown foods will be established.

Promote healthy diets high in local seasonal, organic and low-environmental impact foods.



Figure 36. The Local Food Wheel; for more details, see link <http://www.localfoodswheel.com/san-francisco-bay-area>

A significant proportion of food should be locally sourced from low environmental impact farming with reduced packaging from a radius of 50-100 miles from the center of the site. Given the importance of food to ecological footprints, “stretching goals” that are essential to achieving a one-planet footprint. Restaurants and supermarkets in the Baylands could offer vegetarian, vegan and sustainable food options.

Key Performance Indicators should be set for certified organic and Fair Trade food.

Several techniques will be considered to increase consumption of locally-produced and low-impact food including fruit trees on site on both public and private land, a year-round

farmer’s market, and strong incentives in lease agreements for grocers and restaurants to source local, affordable, organic, fair trade and low-impact foods.

Brisbane already has a community garden for residents. Another could be established in the Baylands, taking great care to use techniques that protect against introducing soil contaminants into foods (e.g., raised beds with imported soil). The feasibility of urban farming should be investigated and pursued. Ice House Hill and the adjacent “corral” provide an opportunity to create a highly productive and diversified urban farm. Not only could this area provide a great source of produce, honey and eggs to the community, it could help re-establish our agricultural roots with the land. An effort will be made to consult with local farmers who specialize in high yield, low impact farming, including the best methods for minimizing irrigation water. The farm may be established in partnership with a local school or a community-supported agriculture (CSA) farmer.



Figure 37. Portland, OR has launched a very successful "Go Box" program for re-usable & compostable containers for to-go food. Go Box is coming to San Francisco, Bay Area. <https://goboxsfbay.com/>

Research the potential for aquaponics, a sustainable food production system that combines traditional aquaculture (raising aquatic animals such as fish in tanks) with hydroponics (cultivating plants in water) in a symbiotic environment.

Work with San Mateo County's Health System to conduct community workshops on healthy eating practices, and establish healthy guidelines for restaurants. Create public events and outreach, such as a possible annual “Sustainable Food Fair” to promote local and healthy food.

Restaurants and stores will be required to use re-usable or compostable

containers for to-go food, and to develop methods to reduce food waste per ordinance. Restaurants can offer vegetarian and vegan options, which are low-carbon diets.

In general, the San Francisco Bay Area has access to local, organic, high quality food and has a “foodie” culture that values a high quality and sustainable food ethic. This condition is viewed as a strong value that is supportive of the Sustainable Food principle at the Baylands project.

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. Operate or facilitate the operation of a local food restaurant in a prominent location, serving foods grown and raised within 150 miles of the site for a minimum of 25% of food by weight, and a goal of 50% by 2030.
2. Obtain feedback from restaurants, cafes and stores that sell food grown or raised within a 150 mile radius, as well as monitor output and sales from food production on site.
3. Strive to ensure that all restaurants on site have at least one meal option that is made from organic ingredients. Establish targets to increase options to 100% by 2030.
4. Ascertain the percentage of food that is certified organic and Fair Trade. Establish annual targets for increasing this percentage to 100% by 2030.
5. Feature a weekly farmer’s market at the largest transit node on site.
6. Encourage development of a grocery store that sells organic, local food.

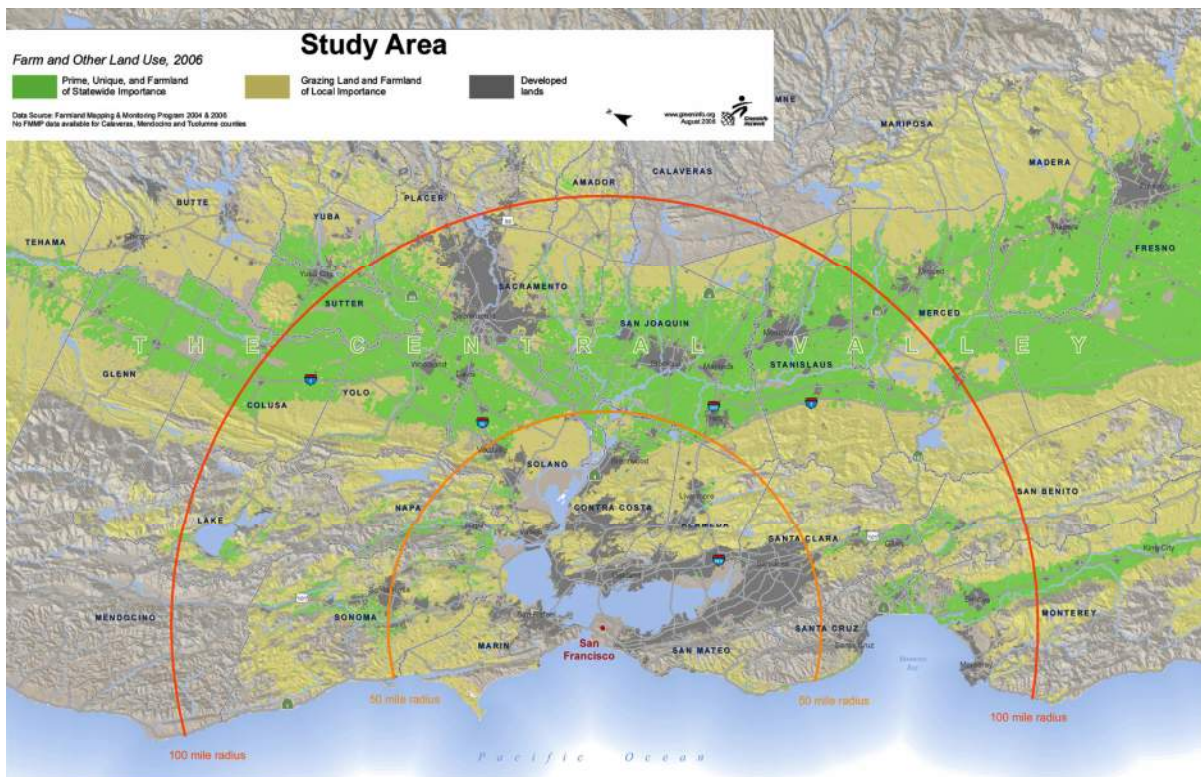


Figure 38. **San Francisco Foodshed** Report. “Agriculture within this “foodshed,”... produces 20 million tons of food annually, compared with annual food consumption of 935,000 tons in San Francisco and 5.9 million tons in the Bay Area as a whole.” <http://www.sagecenter.org/projects/new-ruralism/san-francisco-foodshed-assessment/> Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Sustainable Food Implementation Strategies:

1. Establish a goal of local and food procurement for restaurants in Brisbane Baylands. To set the framework for meeting this goal, consider such strategies as:
 - a. Including at least one restaurant in the first phase of development that has local and organic food as described above to establish the practice for achieving this principle.
 - b. Over time, promoting and encouraging local, organic food procurement for restaurants in future phases with a goal of 100% local/organic food procurement by 2030.
 - c. Obtaining feedback from restaurant operators on successes and challenges meeting these goals.
 - d. Requiring reporting of local and organic food sourcing from restaurants.
2. Incorporate a farmer's market site close to a transit node in the project plan and require a minimum of weekly operations.
3. If housing is allowed for inclusion in the project, include at least one grocery store that carries organic and local food in the project, and encourage organic local food in all food procurement locations in project. Organic standard is California Certified Organic Food (CCOF).
4. Evaluate feasibility of urban farming on and near Ice House Hill and other sites in the Baylands to allow people to grow their own food
5. Make an effort to consult with local farmers who specialize in high yield, low impact farming.
6. Explore potential partnerships with local schools, 4-H Clubs and other local agriculture and gardening groups for developing and managing a small urban farm and community garden adjacent to Ice House Hill.
7. Engage San Mateo County's Health System to promote public awareness about healthy eating practices.



Figure 39. Farmer's Markets are the "People's Market" - with huge success in San Francisco, such as the Alemany Farmer's Market, founded in 1943.

<http://sfgsa.org/index.aspx?page=1058>

8. Applicable LEED ND Credits include:
 - a. Agricultural Land Conservation
 - b. Local Food Production

Discussion

Areas for growing food, including fruit trees, may need special analysis to ensure the safety of the soil for that purpose, so this is left out of the KPIs for now. If zoning is changed to allow housing on site, this issue will need to be resolved.

* Habitat should be taken into consideration when evaluating urban farming.

6. SUSTAINABLE WATER

Our Baylands vision is that we manage water using best practice standards in water conservation, water efficiency, recycling and surface water management with an integrated system that achieves self-sufficiency, while enhancing wetlands with no damage to the surrounding water environment.



Figure 40. Phipps Conservatory and Botanical Gardens (Pittsburgh, Pennsylvania) has a goal of enhancing wetlands and reducing water use in the buildings. <http://www.world-architects.com/en/projects/42835-Phipps-Conservatory-and-Botanical-Gardens-Center-for-Sustainable-Landscapes>

Common International Targets

Water efficiency and recycling must be promoted in line with country-specific best practice.

All facilities must provide access to safe potable water. Projects in areas of flood risk and sea-level rise should have an acceptable 100-year flood risk strategy.

Context

The Baylands is adjacent to the San Francisco Bay and most of it was historically part of the Bay. These low-lying areas are subject to flooding and are at risk of damage from future sea-level

rise. The proximity to the Bay is also of importance when considering the impacts of runoff from a site containing contaminated soil.

Brisbane receives its water and wastewater treatment services from the San Francisco Public Utilities Commission (SFPUC). There is currently no water allocated from the SFPUC for the Baylands project, although a framework for future negotiations with the Oakdale Irrigation District for a potential water transfer agreement has been approved by City Council.

Water efficiency and recycling are top priorities. Because of the scarcity of fresh water, the recycling of wastewater and stormwater is essential. The most effective means of achieving these targets is with an integrated system built into a new development. Wetlands can be incorporated into the waste and stormwater processing system.

The collection of rainwater is a practice encouraged by the City of Brisbane, though it is only allowed under federal law in certain narrow instances.



Figure 41. In times of drought and water scarcity, cities such as San Diego have already begun to explore recycling wastewater to potable water standards.

<http://www.cnn.com/2014/05/01/world/from-toilet-to-tap-water/>

In April 2015, San Jose unveiled plans for expansion of the Santa Clara Water District's existing municipal reclaimed water plant to include the first water recycling facility that processes sewage to drinking water standards. This is an indicator to other water districts that non-potable water may become a valuable water resource in the near future.

Water security in drought years is an issue throughout the Western U.S. Some arid areas of the State, such as Orange County in Southern California, treat wastewater using a reverse osmosis process, which produces drinking water. The standards to purify this water exceed all U.S. standards.

Desalination is being considered and implemented by some municipalities in California as a hedge against future water shortages. While ocean water is abundant and easily accessible along the coastline of California, desalination is a major infrastructure investment and there are concerns about the high quantities of energy used to produce desalinated water, which further exacerbates greenhouse gas emissions, the high salinity of the solid by-products, and the relatively high costs of plant construction. California is now in its fourth year of drought and the future of water security in the State is highly uncertain. There is further concern that California may even be entering a mega-drought phase of 30 years or more as a result of climate change impacts. Governor Brown recently issued an emergency executive order calling for a 25% mandatory water use reduction statewide, with variable ranges from 8% to 36% reduction targets for cities and water agencies, in addition to other water reduction measures. This policy is currently being implemented through water districts and local jurisdictions throughout the state and which impacts water use by all households and businesses.

Organizations such as the Greywater Alliance are leading the effort to educate Bay Area local agencies and the public about the reuse of greywater as an integral part of water conservation. Legislative efforts are underway to expand the allowed use of greywater to single family homes and businesses, making safety controls achievable as in Arizona or New Mexico.

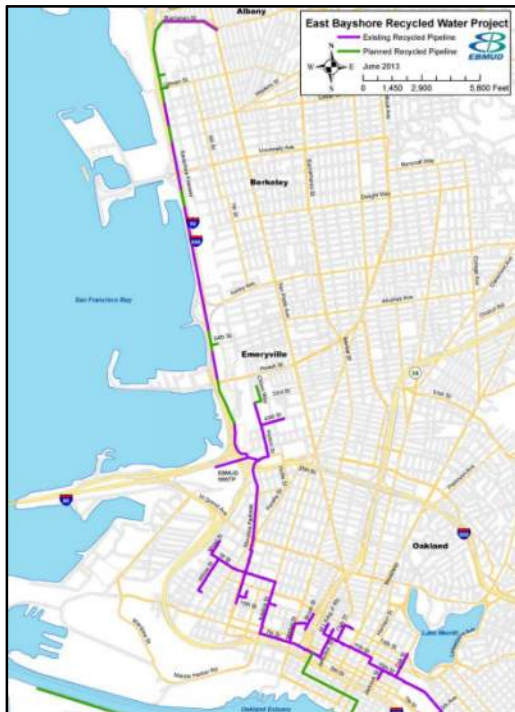


Figure 42. East Bayshore recycled water project via East Bay Municipal Utility District (EBMUD) to supply recycled water for landscape irrigation areas of Oakland and Emeryville.
https://www.ebmud.com/sites/default/files/pdfs/EBRWP_Fact_Sheet_and_Map_June_%202013_1.pdf

The cost of water has risen dramatically over the past decade in the State of California, and for the citizens of Brisbane. This increase is not just the result of increased demand, but it is also from the costs related to maintaining the infrastructure. In the Bay Area, sewage lines and treatment plants must be constructed to a size required to treat the inflow and infiltration of rainwater—often more than 50% of the peak winter flow.

The Visitacion-Guadalupe Valley Watershed moves water from San Bruno Mountain, McLaren Ridge and Bayview Hill to the San Francisco Bay. There are several watercourses that pass through the Baylands. Organizations such as the California Native Plant Society, the Watershed Project, Clean Water Action, and San Mateo County Parks have been instrumental in restoring waterways on San Bruno Mountain, around the lagoon, on site and in the PG&E (Pacific Gas and Electric Company) marsh.

The California EPA and the State of California have strong wetland and bay protection standards under the National Pollution Discharge and Emissions Standards or NPDES (National Pollutant Discharge Elimination System).

The site has known soil contamination. Dr. Fred Lee¹² contends that State and Federal limits on concentrations of toxins may not be stringent enough to prevent damage to human health, safety, and the environment. He further notes that current regulatory and monitoring programs consider only a fraction of the potentially hazardous chemicals that may be present on the Baylands site.

Sea level rise could compound and complicate the difficulty of containing contaminants. Lands that are adjacent to the sea or in bodies of water connected to the sea must not on the one hand send pollutants into the sea nor on the other hand fail to take precautions against the rise in sea levels anticipated from global climate change.



Figure 43. Engineered wetlands to support symbiotic relationship between sensitive ecological areas with development. <http://hoffman-realty.com/properties/services/wetland-mitigation-bank/>

Summary Approach

The integrated water system planned for the Baylands will reduce the need for imported fresh water. We will create a Water Balance Study to investigate the optimal ways to use the four sources of water: rainwater, greywater, reclaimed water and municipal drinking water. It should be noted that data relevant to a Water Balance Study was developed during the EIR process. It may be useful to investigate local sources of water such as springs and rainwater in combination

12 Dr. Fred Lee prepared an assessment for the Brisbane Baylands Community Advisory Group on November 1, 2010, entitled "Report on the Adequacy of the Investigation/Remediation of the Brisbane Baylands UPC Property Contamination Relative to Development of this Property"
<http://www.gfredlee.com/Landfills/BrisbaneBaylands.pdf>

with a recharge plan, but no extraction should endanger local groundwater or water flows required for the local habitat.

In our effort to use water in a more efficient manner and to establish greater local control over sewer treatment rates, we will investigate the construction of a local sewage treatment plant on site at the Baylands that would serve all of Brisbane. Whether sewage is treated on site or elsewhere, reclaimed water will be used for all non-food irrigation, commercial toilet flushing and other non-potable uses. Landscaping will follow the Bay Friendly Landscape Guidelines to promote water conservation, soil health and other environmental outcomes.

Water conservation will be integrated into all uses throughout the Baylands. An aggressive strategy for informing the public about water conservation will be implemented.

The restoration and expansion of Visitacion Creek will complement the existing wetlands of the Lagoon and will provide greater habitat for Bay species. Close collaboration with local organizations, which have missions to restore wetlands around San Bruno Mountain, will be a major part of the ecological strategy for the site.



Figure 44. Green infrastructure such as bioswales are example to treat stormwater runoff.
http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm

To minimize stormwater runoff that flows into the Bay, an extensive network of bioswales will be used. Vehicle washing areas will drain to the sewer, the use of synthetic man-made pesticides and herbicides will be prohibited, and large cohesive areas of open space consisting of native plants and grasses will help filter toxins from the storm water.

Water fixtures will meet the 1992 Energy Policy Act flow and flush rate requirements by a minimum of 50% when modeled using the method in the Leadership in Energy and Environmental Design's program for Building Design and Construction, also known as LEED BD+C.

Design and build water and sewer utilities to a seismic standard above current code.

Recognize that the current 100-yr floodplain map may become obsolete. Use the most up-to-date information from the evolving knowledge on climate change and sea level rise, as noted by BCDC and other reports. Build to avoid major flood risk by keeping the lowest finished floor at least 1 foot above the 100-yr floodplain.

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. All buildings and parks shall meet water use reduction targets from baselines of both indoor and outdoor water use.
 - a. Indoor water use baseline is based on CALGreen fixture flow rates. Target is 40% below baseline.
 - b. Outdoor water use baseline is a calculated baseline using midsummer or the month with highest water demand. Target is 50% below baseline.
 - c. Consider installing non-grass (artificial turf) playing fields.
2. Develop an integrated water supply and demand plan to achieve zero net water by 2030.
 - a. Consider the following water sources to supply water onsite:
 - i. Municipal water
 - ii. Rainwater
 - iii. Municipal reclaimed water (recycled, treated water supplied by the local municipality)
 - iv. Greywater (reused water at the site, such as shower and sink water reused for landscape irrigation)
 - v. On-site treated wastewater, such as membrane bioreactor or other modular wastewater treatment system (technology located on-site that treats wastewater to reusable standards)
 - vi. biological wastewater treatment systems (such as constructed or engineered wetlands)
 - vii. On-site wastewater treatment plant
3. Landscape irrigation will not use any potable drinking water.
4. Sewage conveyance (e.g. flushing) will not use any potable drinking water.
5. Ensure that no overflow of stormwater or sewage enters any waterway.
6. Where appropriate in light of contamination as a former landfill site, use only low impact development strategies such as bioswales and other integrated strategies that

promote retention and percolation of stormwater on site, improved stormwater runoff quality, and reduce impact on infrastructure where appropriate.

7. No buildings shall be constructed within areas subject to high flood risk or sea-level rise. Specifically, all areas within the Federal Emergency Management Agency (FEMA) Zones A and B must be avoided.
8. The monitored levels of chemicals of concern in stormwater discharges to the Bay shall remain 30% below the most stringent individual thresholds established by the San Francisco Bay Regional Water Quality Control Board or any other agency having jurisdiction.
9. Monitor the volume of reclaimed water, and track its new uses.



Figure 45. San Antonio Water System (SAWS) converting wastewater into biogas energy source.
<http://www.ameresco.com/solution/biogas>

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Sustainable Water Implementation Strategies:

1. Perform a Water Balance Study considering optimal uses of rainwater, greywater, reclaimed water, building system reject water (e.g. cooling tower, condensate), on-site blackwater treatment and municipal drinking water. Use study results to identify and implement key strategies that meet the Zero Water goal and measure performance in

attaining this goal. Install metering infrastructure to measure and report usage. Data developed in the EIR process is likely to be useful for the Water Balance Study. Implement the following water conservation strategies:

- a. To meet 40% reduction target in water use from baseline standard code for plumbing fixtures, consider these strategies:
 - (1) Require use of low and ultra-low flow fixtures, and waterless urinals as appropriate.
 - (2) At a minimum use fixture flow rates that meet City of Brisbane Indoor Water Conservation Ordinance 543, <http://www.ci.brisbane.ca.us/sites/default/files/uploads/indoor-water-conservation-ordinance.pdf>:

Fixture	Residential	Non-Residential
Toilets	≤ 1.28 gpf, and ≥ 350 gm	≤ 1.28 gpf, and ≥ 350 gm
Urinals	≤ 0.5 gpf	≤ 0.5 gpf
Showers	≤ 2.0 gpm	≤ 2.0 gpm
Bathroom faucets	≤ 1.5 gpm	≤ 1.5 gpm
Kitchen faucets	≤ 2.2 gpm	≤ 2.2 gpm
Clothes washers	≤ 6.0 Water factor	≤ 6.0 Water factor
Dishwashers	Energy Star Qualified	Energy Star Qualified
Cooling towers	≥ 5 – 10 cycles, or ≥ 2.5 LSI	≥ 5 – 10 cycles, or ≥ 2.5 LSI
Food steamers	--	Boiler-less, or self-contained
Ice Machines	--	≤ 25 gal/100 lbs ice, or Air-cooled
Pre-rinse spray valves	--	≤ 1.15 gpm
Automatic vehicle wash facilities	--	≥ 50% of water that is recycled on site
Commercial refrigeration	--	Closed loop, or Air-cooled
Meters	Submeters for RMF, and Separate meter for outdoor if landscape >5000 sq. ft.	Submeters for RMF, and Separate meter for outdoor if landscape >5000 sq. ft.

- b. To meet 50% reduction target in landscape water requirements, consider these Implementation strategies:
 - (1) Implement xeriscape landscaping approach
 - (2) Minimize use of turf grass. Consider artificial turf for playing fields.
 - (3) High efficiency and smart, weather-sensored irrigation devices
 - (4) At a minimum use approaches that meet City of Brisbane Water Conservation in Landscaping Ordinance 544,

<http://www.ci.brisbane.ca.us/sites/default/files/uploads/water-conservation-ordinance.pdf>:

- (a) Options include:
 - (i) Planting Restrictions
 - 1. Turf area not more than 25%
 - 2. At least 80% of plants in non-turf areas must be native plants, low-water using, or no-water using plants
 - (ii) Water Budget Calculation
 - 1. Use methods and values included in Brisbane Municipal Code Section 15.70.070
- c) Meter water usage at all buildings and landscape areas. Sub meter in commercial buildings to the tenant level.
- d) Provide annual water supply and demand report to the City.
- 1. Applicable LEED ND Credits include:
 - a. Wetland and Water Body Conservation
 - b. Indoor Water Use Reduction
 - c. Outdoor Water Use Reduction
 - d. Rainwater Management
 - e. Wastewater Management

Discussion

The three categories of conservation, risk and pollution stand out as the most important aspects of water for this site. FEMA Zone A refers to a 1.0% annual chance of flood (commonly called the 100-year zone), and FEMA Zone B refers to a 0.2% annual chance of flood (500-year zone).

Details of the pollutant monitoring plan should be developed prior to development agreement negotiations, but should include some process by which new chemicals can be added to the monitoring program if substantial new information arises leading to concern.

If the feasibility of energy production from waste solids is promising, monitor its contribution to the alternative energy system.

7. OPEN SPACE AND HABITAT

Our Baylands vision includes provisions for significant open space and open areas that enhance biological connectedness and habitat preservation.



Figure 46. San Bruno Mountain, the nation’s first Habitat Conservation Plan.

<http://parks.smcgov.org/documents/san-bruno-mountain-habitat-conservation-plan-hcp>

Common International Targets

The development will make a net positive contribution to local native biodiversity and natural habitats. Any imperiled species must be identified and monitored as part of a local conservation plan. A site-specific action plan to maintain, enhance or revive valuable aspects of biodiversity and nature stocks must be prepared.

At least one opportunity must be identified to regenerate degraded local natural resource stocks (wetlands, lagoon, etc.) and a plan implemented. At least two programs should be showcased, one for biodiversity and one for natural resource stocks.

Context

The citizens of Brisbane have a strong reputation for being environmental stewards of the land around them. They’ve worked hard over the years to restrict development on San Bruno Mountain, and have invested funds to acquire open space, remove invasive plant species and enhance endangered butterfly habitat.

Brisbane was influential in creating the first Habitat Conservation Plan (HCP) in the country for San Bruno Mountain.

Brisbane’s General Plan states that a minimum of 25% of the Baylands will be dedicated as open space/open area. The City submitted an “Alternative Plan” to UPC’s specific plan to be analyzed in the EIR process, in which almost 50% of the land would be dedicated to open space/open area. The lagoon will not be counted toward any open space calculations.

Two of the project alternatives studied in the Environmental Impact Report (“Community Proposed,” and “Renewable Energy”) include a community formulated open space/open area, wetlands and riparian park.

Though surrounded by urban sprawl from neighboring cities, Brisbane still has a rural-like quality. Horses still graze on the slopes of Ice House Hill.

The Baylands is home to a variety of small and medium-sized animal species, including frog habitat. Occasional sightings of coyote and jackrabbits occur on and around the site. The annual Audubon Christmas bird count records an amazing amount of land and water bird species in the San Bruno Mountain, Baylands and Lagoon area, as the wetlands of the San Francisco Bay are on a major migratory bird flyway.

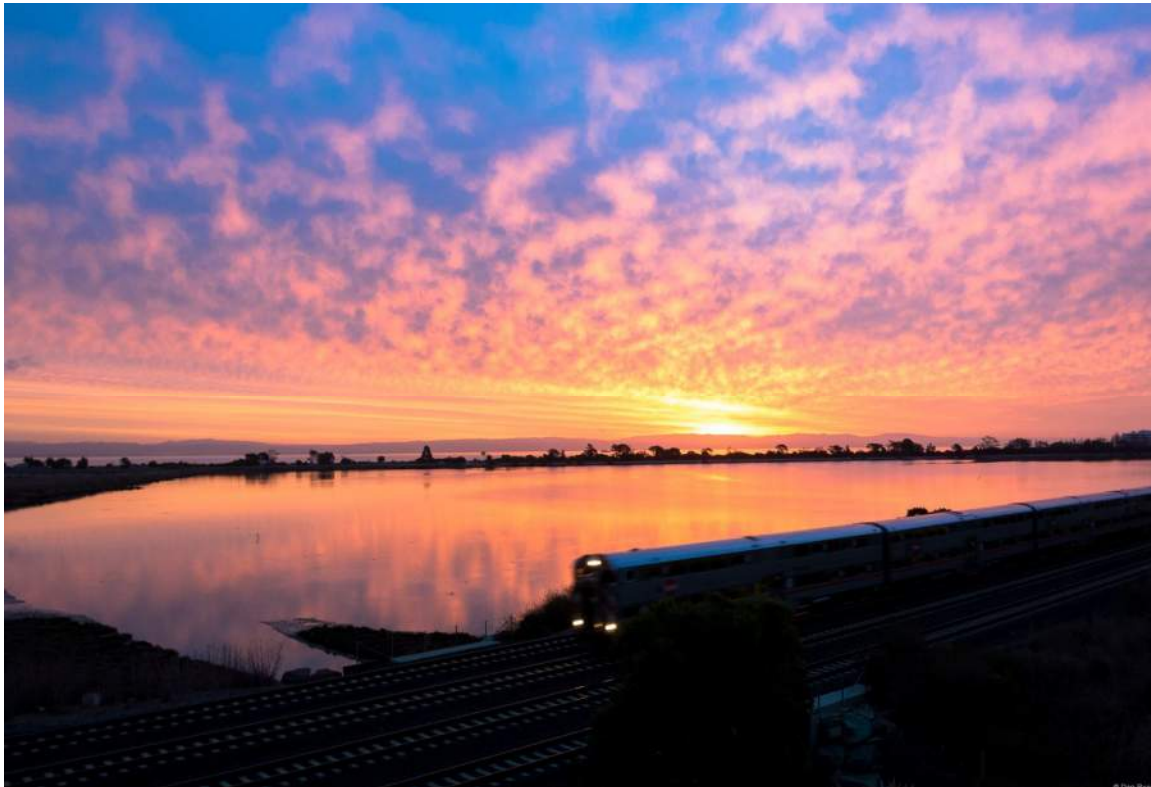


Figure 47. Brisbane lagoon at sunset, with Caltrain passing by. <http://www.tripomatic.com/United-States/California/Palo-Alto/Baylands-Nature-Preserve/>

Summary Approach

Brisbane's relationship with the natural environment is deeply rooted in respect, and it provides a strong sense of identity and pride for the City. One only needs to walk the neighborhoods and commercial areas to realize Brisbane's wonderful balance between development and nature. It is this balance that will be one of Brisbane's greatest gifts to the Baylands development.

Just as in other parts of Brisbane, recreational open space/open area should be easily accessible to anyone in the Baylands. A comprehensive trail system will connect with natural habitats and create a stronger bond between existing Brisbane and the Baylands.

There will be a diversity of trees and shrubs on the site with open spaces/areas planted with native species. The project will create restored wetland areas and research the potential for setting up a Restoration Zone with the State Fish and Wildlife Department. Butterfly and bee habitat will be fully integrated into the landscaping. A large number of native plants will be used throughout the project. Create a riparian zone to connect the existing wetland areas with each other, and use multiple means of connecting San Bruno Mountain to the Baylands.

The Brisbane Baylands project provides a unique opportunity to employ constructed wetlands to replicate the function of natural wetlands and filter pollutants. Constructed wetlands and bioremediation would not only serve to treat wastewater and minimize additional contamination, but could markedly improve the quality of the land and water in the lagoon and bay. In this way, the Baylands project could help redress the historical contamination and damage that has been done to the site. A study should be conducted to evaluate the potential for bioremediation on the Baylands.

Establishing a larger natural pathway to connect open space on San Bruno Mountain with open space/open area in the Baylands could provide an opportunity to better manage the natural habitat of the overall area for animal movement and the control of invasive plants. Consider the concept of a natural bridge or habitat connection that is wild and not combined with human activity. The Baylands will financially support the development of an expanded natural pathway and regional habitat management and restoration.



Figure 48. City of Portland, OR actively looking to connect the great outdoors to their ever growing city. <http://www.travelportland.com/collection/outdoors/>

One of the biggest challenges to achieving open space connectivity is the commuter railway line that divides the site into Eastern and Western sections. Creating “green” bridges and/or tunnels to allow trail users and wildlife to safely cross the tracks will be implemented.

The local eco-system could be enhanced with the use of bio-swales to slow down stormwater runoff and treat it for pollutants while creating habitat for local plant and animal species. Controlling light pollution is another important objective as it has deleterious effects on both humans and animals.

The final project plan will incorporate major elements from the renewable energy alternative, as well as the community proposed alternative, including a community formulated plan for open space/open area, wetlands and riparian park. This plan elaborates on the City's adopted Open Space Plan.

Brisbane has a strong record of purchasing property to be dedicated as open space. Continued efforts should be made to create funding mechanisms to purchase property on the slopes of San Bruno Mountain to increase protected habitat area. Organizations such as The Nature Conservancy and land trusts are very skilled at aggregating property and funding for natural preservation areas.

Conduct a study on Ice House Hill to determine the significance of butterfly habitat for the endangered Mission Blue and Callippe Silverspot butterflies. If significant habitat exists, explore the possibilities of expanding the San Bruno Mountain HCP to portions of the Baylands.

Collaborate with members of the community and environmental groups that are already working to improve local habitat preservation. Seek out native plant nurseries, and enhance the capabilities of the Mission Blue Nursery to provide greater biodiversity for local seed stock.

The Association of Bay Area Governments has designated the Baylands area as a Priority Development Area. San Bruno Mountain, and parts of the Baylands, have been designated as a Priority Conservation Area (PCA). The PCA designation and/or San Francisco Bay Area Restoration Authority should be explored as potential funding resources for wetlands restoration.



Figure 49. San Bruno Mission Blue nursery <http://www.mountainwatch.org/stewardship-nursery-container/>

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. Establish baseline of existing butterfly habitat on Ice House Hill and show a steady annual increase in butterfly habitat.
2. Develop a biological conservation and restoration plan based on an expert biological assessment of the site including the lagoon. Preserve and enhance habitat that supports important species identified in the EIR. The plan will require regular and ongoing monitoring of biological health to determine the measurable results of the plan.
3. Educate the public about the healthy local ecosystem, stewardship of its health, and the benefits ecosystems provide to the natural and human community.
4. Contribute to development of an open space plan that provides connectivity to community-wide natural resources. Project landscape plans will provide connectivity to the open space plan and be supportive of the conservation and restoration plan.
5. Provide quality native or adaptive landscaped open space that is usable by the community.

6. Protect the migration corridors for birds.
7. Identify key risks due to impacts of climate change on habitat, infrastructure, buildings, economic activity, safety and mobility. Develop an environmental adaptation plan that anticipates future changes in habitat.

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Sustainable Open Space and Habitat Implementation Strategies:

1. Prepare a Biological Enhancement Plan.
 - a. Develop the inventory of biological resources within the project boundary.
 - b. Develop a habitat conservation plan that:
 - i. Ensures that sensitive areas are protected and placed in permanent conservation
 1. Specifically, the existing lagoon is to be protected.
 2. Restore habitat on 20% of the remaining site area.
 3. Restore Ice House Hill to support the growth of the butterfly population.
 - ii. Protects bird migration corridors
 - iii. Enhances butterfly and bee habitat
 - iv. Uses native or adaptive vegetation in all newly planted areas
 - v. Relies primarily on Stormwater and other natural flows of water for irrigation. Coordinate the water use in the open space plan areas with the water balance study to ensure that water usage is included and managed.
 - c. Monitor the biological resources of the Baylands site and provide an annual report to the City of Brisbane.
2. Protect the 111-acre lagoon and restore habitat on a minimum of 20% of the remaining site area by creating an aquatic protection area with a permanent source of funding for management. Create public parks and open space on an additional 20% or more of the whole site. Consider developing a wetland river park as a preservation zone.

3. Explore the feasibility of using only native or adaptive vegetation for all landscape plantings, and integrate with low impact water management strategies. Seek consultation with the Mission Blue Nursery.
4. Encourage open space accessibility for people of all mobilities to be within a short five minute walk (1/4 mile) of all buildings. Promote connectivity with nature throughout the project site.
5. Work with Mountain Watch and other environmental organizations to improve habitat conditions for endangered butterflies such as the Mission Blue and Callippe Silverspot on Ice House Hill.
6. Understand potential for including open space areas of the Baylands into the San Bruno Mountain PCA.
7. Where feasible, create open space corridors that connect San Bruno Mt. with the bay and lagoon.
8. Work with the developer to promote open space as a major asset for marketing the Baylands.
9. Explore the feasibility of removing large concrete rocks along the lagoon, and establishing wetlands habitat.
10. Minimize light pollution for humans and animals.
11. Provide usable open space to the inhabitants
 - a. Create public parks and useable open space on an additional 20% of the site.
 - b. Provide access to usable and walkable landscaped and/or natural areas
 - c. Provide usable, quality landscaped areas within the residential, commercial and mixed-use project areas.
12. Develop an Adaptation Plan responding to risks of climate change at the project site. Areas of concern include habitat, infrastructure and buildings.
 - a. Valuable resources include:
 - i. Adapting to Rising Tides, Developing An Adaptation Response: The Plan Step report, December 2013
<http://www.adaptingtorisingtides.org/project-reports/>
 - ii. Cal Adapt various resources at <http://cal-adapt.org/publications/>
13. Applicable LEED ND Credits include:
 - a. Steep Slope Protection
 - b. Site Design for Habitat or Wetland and Water Body Conservation

- c. Restoration of Habitat or Wetlands and Water Bodies
- d. Long-term Conservation Management of Habitat or Wetlands and Water Bodies
- e. Connected and Open Community
- f. Access to Civil & Public Spaces
- g. Access to Recreation Facilities

Discussion

The targets for open space and parks should be scrutinized to ensure they can be achieved. The status of the additional 49 acres of total site area in the Community Preferred Alternative is unclear, so the required open space and park areas might better be reported in acres rather than percentages.

8. CULTURE AND HERITAGE

Our Baylands vision is one where a culture of sustainability, small-town community values, respect for local history, and a sense of place coexist in harmony with each other.

Common International Targets

A site-specific action plan to maintain, enhance or revive valuable aspects of local culture and heritage (everything from local buildings to cultural and natural history) must be produced. At least two areas should be showcased.



Figure 50. Brisbane Bayshore Roundhouse in need of restoration and revitalization.
<http://shawnclover.com/2011/11/05/the-old-abandoned-bayshore-roundhouse/>

Context

Brisbane prides itself for being independent, community oriented, and environmentally aware. The citizens of Brisbane manifest a high degree of civic pride and community identity. They strongly support open space, sustainability, education, and the arts. While most cities in the Bay Area favored expansive growth after WWII, Brisbane valued its rural qualities, and incorporated nature into the City's identity. Because of the community leadership of Brisbane, most of San Bruno Mountain is preserved as permanent open space.

The history of human habitation in the Brisbane area dates back to the Ohlone people. Shell mounds remain as relics of the first inhabitants who used the plant life of the mountain and bay for food, fiber, and medicine.

By the 1800's, most of the territory around Brisbane was ranch land. After the 1906 Earthquake, a few hardy families decided to put down roots and develop the land, calling their new home Visitacion City. Up until 1929, the City of Visitacion was a sleepy, rural community, with only sparse development. However, that year brought to town a man by the name of Arthur Annis, who would later be known as the 'Daddy' of Brisbane.

Mr. Annis was a realtor, who believed the area was full of potential, but lacked proper guidance. According to "A Town Called Brisbane," "Annis's idea was extremely simple – to permit good citizens of small means to build their homes, without unreasonable restrictions, as soon as they contracted to purchase their lots. The era during the Great Depression saw rapid growth, and established many basic amenities for the city; post office, library, public school, and volunteer fire department. Arthur Annis also gave the City its new name: Brisbane.

Though Brisbane was establishing itself as a city, its affairs were still being managed by the County. It wasn't until 1961 that the citizens finally decided to become a general law city, voting to become incorporated and electing a city council to help govern them. A year later, the City annexed the unincorporated Southern Pacific Rail Yard, which would eventually be known as the Baylands.

Originally, the Baylands were water and marshland, but near the start of the 20th century, the area began to take on an industrial transformation, concentrating with railroad activity and landfill operations for San Francisco. The first filling took place very early in the 1900's, with a straight berm carrying two rail lines between Visitacion Point (now called Ice House Hill) and the southern entrance to "Tunnel 4" which went underground near Candlestick Point. Tailings from the tunnel and the cut through Visitacion Point provided material to fill west of the rail. The rail line opened in the fall of 1908, making a higher speed rail connection between San Jose and San Francisco, saving five miles and twenty minutes from the original route which went west of San Bruno Mountain. By 1917, the completion of the landfill west of the rail line saw the build out and operation of a rail yard and rail maintenance facilities. There, Southern Pacific employees performed maintenance and heavy industrial rebuilding of engines, passenger and freight cars, as well as sorting incoming and outgoing railcars. It was one of the busiest terminals in the Southern Pacific Railroad system, employing as many as 4,000 skilled workers consisting of machinists, welders, carpenters, pipe fitters, engineers and brakemen.

According to common historical lore, the open water east of the rail yard site was filled with debris and garbage from San Francisco that originated from the 1906 earthquake. However, photographic documentation from this period does not provide evidence to support this claim. Not long after the rail yard was built, San Francisco started dumping their garbage directly into the bay and onto bay mud. Early pictures from 1930's show the landfill starting in the north with semicircular railroad tracks to facilitate dumping. By the 1950's, the Bayshore Freeway (Highway 101) opened along the eastern edge of the landfill.

The waste disposal site caused much anger and discontent from the citizens of Brisbane, and many protests were conducted to have it closed. Landfill operations ended in the 1960's and the rail yard was abandoned in 1982. Both uses left the land contaminated. Since it has been non-operational, the landfill area has been surcharged with presumably clean soil from several debris recycling operations on site.



Figure 51. Recology's Artist in Residence program created in 1990 an outdoor garden art exhibit. "It insists that we change our ways and our thinking and become guardians of the resources of the earth which supports our life and is more fragile and endangered than we used to believe possible." –Artist and activist Jo Hanson (1918–2007) <http://www.flysfo.com/museum/exhibitions/art-recology-artist-residence-program-1990-2013#sthash.MLz3NJ1a.dpuf>

The Brisbane City Council adopted the "Public Arts Ordinance" in 2014. For private nonresidential projects, including new and remodeled buildings, with development costs over \$1 million are required to contribute at least 1% of their development costs into the Brisbane Public Art Fund. Projects over \$5 million may put the 1% contribution directly into publicly accessible art on site. Private residential projects between 10 and 20 units contribute 0.5% to the fund, and projects over \$10 million contribute 1% to the fund, or may invest this contribution on publicly accessible art on site. City building projects with development costs over \$500,000 will either contribute 0.5% to the fund or install public art on site. Brisbane's General Plan emphasizes the desire to have architecture that is inspiring.

Summary Approach

One of the most important components of a complex and sustainable culture is that it is a living culture. The present actively connects the past to the future. Some legacies of the past will be showcased and built upon in the nucleus of culture in the Baylands – the encouragement of contemporary public art in the Baylands will showcase Brisbane's living culture.

The Roundhouse, a nationally registered historic place, could be our cornerstone in showcasing Brisbane's legacy as a social hub of the Baylands. Its brick structure links the present to the Baylands' rail yard past in a meaningful way. The Lazzari Fuels building, formerly the railroads "Tank and Boiler" Shop, has not been researched or nominated for historic registry but is of similar significance. Also on site are the remains of the turntable, powerhouse and other foundations or artifacts. This valuable area can play an important role in preserving the history and skilled tradesman culture of the site. Standards of the National Trust for Historic Preservation and US Secretary of the Interior should be referenced when revitalizing and rebuilding. A local preservation ordinance may need to be enacted to define standards and procedures.

Another area to showcase is the City's relationship with the landfill. It will be an informative journey to explore the history, the confrontations, and the healing of the land. Since the Baylands was previously part of the Bay, the history of the early indifference to the

consequences of filling the Bay to the present awareness of its ecological importance should be taught. A possible historical exhibit could be incorporated within the Recology campus, and a museum showcasing the history of Brisbane and the Baylands could be considered.

Though man-made waste played a major role in the creation of the Baylands, and is considered by many a part of history not to be repeated, waste may still play a significant role in the future development of the Baylands. With the recycling expansion of Recology, and the recent technological breakthroughs for converting waste into energy, the Baylands could be a shining example of responsible waste management and ecological economics.



Figure 52. Brisbane Baylands as seen from San Bruno Mountain.

The Baylands should be designed to emphasize the connection between San Bruno Mountain and San Francisco Bay, utilizing the natural watershed as well as a connecting trail network. Informative signs throughout the trail network can help people understand the transformation of the land beneath their feet. A Master Trail Plan could be developed.

Besides the concern for an aesthetically pleasing and compatible development profile, the role of public art has been included in the Baylands development through the implementation of the newly adopted Arts Ordinance.

Though small town Brisbane cannot be duplicated in the Baylands, the Community's values will be woven throughout the development. Buildings will be esthetically creative, enhance open space and public areas, convey the appearance of an organic/independent development process, rather than large scale development based on generic standards and generally enhance the esthetic and cultural value of Brisbane. Design guidelines that are descriptive of these goals will be developed so that they can be applied in a flexible framework approach as architectural design occurs.

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

To the greatest extent feasible, maintain and enhance as much of the social, cultural and environmental heritage of Brisbane as possible. Key features, as indicators to be fulfilled, include:

1. Restoring the Roundhouse and make it an important part of the social center of the Baylands project.
2. Creating a permanent exhibit describing the history of Brisbane, the Baylands site and indigenous cultures and the intention to create a positive future through specific sustainability efforts.
3. Creating an outdoor on-site exhibit of historic sea level and anticipated sea level rise.
4. Based on the City's Public Art Ordinance ensure all areas of the site have access to Public Art, that is integrated with buildings and landscape, and that is harmonious with the natural environment.
5. As a reflection of Brisbane's agricultural heritage, investigate the possibility of a community garden with highly diversified production including but not limited to organic produce, eggs, honey, small livestock (goats), using low impact farming techniques, water conserving practices, and use of locally produced compost at an appropriate location.
6. Work with design firms that are knowledgeable and experienced with sustainable design and demonstrate a respect for local culture, heritage and high quality community design.

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, "you shall" type directives, or to convey agreement or negotiation as to how principles may be achieved.

Culture and Heritage Implementation Strategies:

1. Restore the Roundhouse as a key community resource in the Baylands project.
 - a. Restore the Roundhouse to a level of restoration that is representative of its former use and condition.

2. Install a permanent historical exhibit depicting the history of the Baylands and its indigenous culture.
 - a. Integrate an exterior exhibit that communicates and educates on the historic sea levels and anticipated sea level rise and climate change.
 - b. Present restoration and exhibitry to the City for review and approval
3. Tell the story of Brisbane's rich cultural and living history including:
 - a. The early Indigenous cultures in the Brisbane area
 - b. The biological history of the lagoon and its relationship the San Francisco Bay and the watershed
 - c. The history of the Southern Pacific Railyard and its transformation to a modern-day multi-modal transit hub that supports a mixed-use, vibrant community
 - d. The evolution of a former landfill site at the Baylands to a valuable resource that supports a thriving community, demonstrating how we, as a society, can reclaim former industrial land
 - e. The economic development history of Brisbane's small business culture, how it has survived and adapted, and how measured growth has been a key strategy to promote both economic resiliency and a high quality of life
4. Integrate culturally relevant public art into the project including:
 - a. Landscape art features
 - b. Art features in building façades and entries
 - c. Present the public art plan to the City for review and approval.
 - d. Incorporate art into the way finding system.
 - e. Use art to soften utility structures.
 - f. Work with Recology regarding their museum and artist in residency program.
5. Integrate the agricultural past of Brisbane by dedicating area(s) for community gardens.
 - a. Community gardens shall be capable of supporting organic vegetable gardening, fruit trees, eggs, honey, and small livestock.
 - b. Community garden shall be located in logical and locations accessible to people of all mobilities in the project.
 - c. Consider raised-bed gardening so that people of all mobilities can participate in community gardening.

- d. Gardening practices shall be required to be organic and use methods that conserve water.
 - e. Include an area in the community garden for harvesting and processing.
 - f. If housing is included in the project, consider community gardens as an amenity and a local economic development/small business opportunity. Encourage the relationship of local farming to sustainable food restaurants in Brisbane.
6. Engage developers and design/construction teams that are knowledgeable and have a track record of sustainable design that supports and reflects the local climate, the cultural heritage of Brisbane.
- a. Include these requirements in RFQ/RFPs (Request for Qualifications/Request for Proposals) and include sustainability and cultural sensitivity as selection criteria.
 - b. Include sustainable design requirements in development & project agreements.
7. Evaluate signage standards to minimize advertising pollution.
8. Applicable LEED ND Credits include:
- a. Historic Resource Preservation and Adaptive Reuse
 - b. Community Outreach and Involvement

Discussion

There may be a need to add additional KPIs for Culture and Heritage if the zoning is changed to allow housing in the project. The plan for park designs, a farmer's market and site art would likely need to be significantly different.

9. ECONOMIC VITALITY WITH EQUITY & ECOLOGY

For the Baylands we envision a thriving, diverse and resilient economy that supports equity in employment, green business products and practices, socially responsible business behavior, locally-oriented business enterprises, and ecologically based measures of performance.



Figure 53. The Hudson Yards project located at New York City's railyard and its neighbor, the Highline Park project, are both milestones in sustainable building, adaptive reuse. Hudson Yards also features a pneumatic vacuum waste elimination tube system.

[https://nyintl.net/article/hudson_yards_sustainable_building_milestone;](https://nyintl.net/article/hudson_yards_sustainable_building_milestone)

<http://www.nycgovparks.org/parks/the-high-line>

Common International Targets

One Planet Communities are expected to create a social environment where business, nature, and daily life are in harmony with each other. The three dimensions of sustainability - ecological economics, social equity, and environmental health - are woven into every decision regarding the infrastructure, types of approved uses, building sites, and open space/areas.

Too many times short-term market valuations create negative long-term social and environmental consequences. A sustainable economy creates a framework based on respecting the Earth's resources and the areas from which these resources have been acquired, facilitating diversity in the market place, striving to achieve a closed loop product stream, building structures that are highly energy efficient, and reinvesting in the local community.

Targets should be set to boost achievements in these three dimensions of sustainability—economy, equity, ecology. At least three case studies should be showcased – one from each dimension.

Context

The San Francisco Bay Area is recognized throughout the world as a beacon of creativity and innovation with an abundance of businesses that offer jobs with good pay and benefits. Many

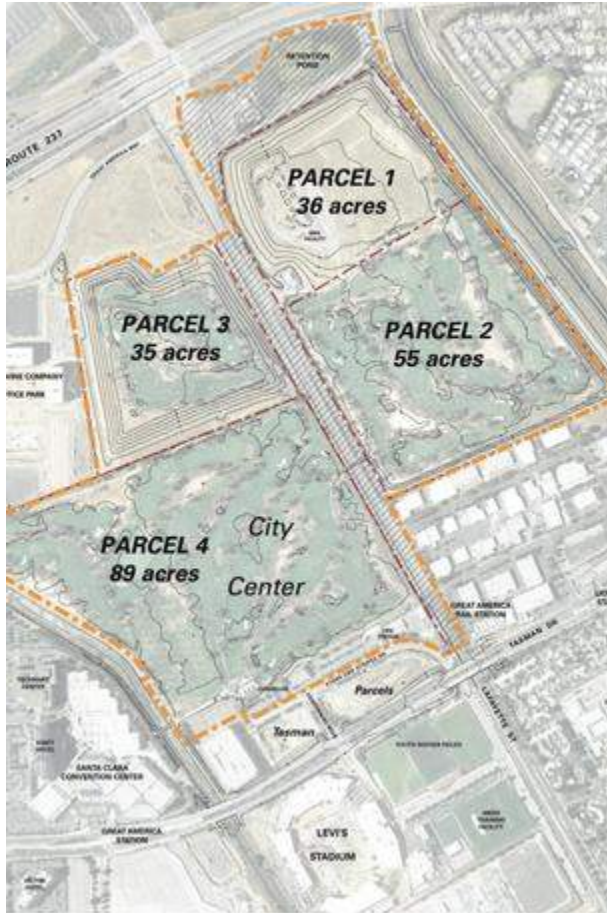


Figure 54. This map shows the City of Santa Clara's Montana/Lowe project and the first phase of Related California's City Place project, dubbed Parcel 4, near the new Levi's Stadium. The other three parcels will be built out later. The site sits on 4 capped landfills. <http://www.bizjournals.com/sanjose/news/2014/06/30/relateds-santa-clara-megaproject-new-details-on.html?page=all>

of them have also been recognized in the areas of ethnic diversity, gender equality, and giving back to their communities. The region has the largest number of public benefit corporations in the world.

The region supports some of the finest institutions for higher learning in the country. Universities such as Stanford, UC Berkeley, San Francisco State, as well as dozens of other universities and community colleges, provide a highly educated work force to the area, inspire research and development for many sectors of the economy, and produce an amazing number of successful entrepreneurs.

Located between San Francisco and the northern portion of Silicon Valley, the Baylands is well positioned to accommodate a variety of businesses, cleantech, biotech, cloud computing, financial -- the list is endless. Companies come to the Bay Area because of the talent pool, established infrastructure, temperate weather, natural beauty, cultural opportunities, and entrepreneurial spirit. Since the Baylands is mostly an undeveloped site, it offers a unique opportunity to plan and implement a state-of-the-art sustainable infrastructure that should attract these businesses.

The City Place Santa Clara is a great example of current development occurring on a large scale in on the San Francisco Bay Area Peninsula of similar approach – on top of 4 capped landfill parcels. The development includes over 9 million square feet of development including

corporate office parks, retail, entertainment, food & beverage, residential, and hospitality. This project is a representation of economic vitality and job creation for the city of Santa Clara. With respect to fair trade practices, the region is a leader. Cities such as Berkeley and San Francisco have become “fair trade cities,” bringing local awareness to securing justice and equity for producers, artisans, farmers and workers in developing countries.

Though the area thrives in creating high tech economic opportunity, there are many individuals who do not possess the skills necessary to be hired for these jobs. On the other hand, our society has many individuals who work jobs that do not require a college education, but their labor is still valuable to the community.

Like so many places in and around the San Francisco Bay Area, San Mateo County has high housing costs that are unaffordable to many working class people. Combined with a high percentage of single-family homes in the existing housing stock, there is a shortage of affordable housing. This shortage is considered by the Association of Bay Area Governments (ABAG) to be an impediment to sustainable economic development.

At the policy level, recently approved State legislation, SB 375 - Sustainable Communities Act, encourages housing and mixed use located near transit. The law ties funding assistance for infrastructure projects to transit oriented mixed-use development (Priority Development Areas).

Brisbane's General Plan prohibits housing in the Baylands. Many residents have expressed concern that housing in the Baylands would not be safe because of potential exposure to toxic materials that have been used and disposed of in the landfill and former rail yard. On the other hand, there are many studies that show that housing can safely be built on formerly contaminated sites, such as the Schlage site in neighboring San Francisco. There is also the argument that there will be ample housing in the new developments planned across the border in San Francisco for those working in the Baylands who wish to live nearby, though this housing does not contribute directly to Brisbane's housing stock. It is not clear how much of that housing will be affordable, especially with the recent demise of redevelopment agencies and their support for affordable housing.

California has the highest green building standards in the country. Despite perceptions among some in the real estate and financial sectors that green buildings cost a lot more to build than conventional buildings, the major studies of this issue conclude that the "green premium" is negligible (1-2%) or non-existent, especially if an integrated sustainable approach is taken early in the design process (*The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Task Force: 2003*). The integrated approach recognizes that spending more on one component, such as passive solar, may be compensated for by spending less on another component, such as the HVAC system. Furthermore, this same study concludes that in 20 years the initial green investment will yield returns of over ten times in operational and productivity savings.



Figure 55. There is potential for wind power generation along US-101, known for its consistent strong winds – as seen in San Francisco at the Crissy Field site <http://www.nps.gov/prsf/planyourvisit/crissy-field-center.htm> , as well as in Esbjerg, Denmark’s largest fishing port. https://nyintl.net/article/learning_from_copenhagen_smart_city

The Baylands project is expected to bring thousands of jobs to Brisbane and be a showcase of sustainability that provides socially and environmentally useful goods and services. The infrastructure planning and construction will incorporate sustainability principles across the board, so that economic vitality with equity and ecology becomes the way business is done. To achieve this, an ecological perspective must inform the planning, construction, operation, and evaluation of the development over its lifetime. In addition, attention should be given to making way for internships and apprenticeships in the design, construction and operations phases of the project as a means to expanding the job pool in Brisbane.

At the heart of our approach is an acknowledgement of the tension between short-term and long-term decision making. For-profit organizations often focus on meeting short-term financial targets rather than long-term economic development. The public interest perspective focuses on avoiding long-term irreversible negative impacts to land, air quality, the Bay and our community’s health and well-being. While both ways of thinking co-exist, the concerns of sustainability require that we introduce long-term decision-making into the for-profit process.

A tool for helping make decisions with long-term benefits is called Life Cycle Cost Analysis (LCCA), which is recognized by the National Institute of Standards and Technology (NIST) to evaluate the acquisition/construction, owning and disposing of a building or building system. According to the NIST, "performing an LCCA greatly increases the likelihood of choosing a project that saves money in the long run." A truly energy efficient building that is powered by renewables is not only much less costly to operate over its lifetime, a substantial benefit for its occupant, but it also emits few if any greenhouse gases, a major benefit for society. Reduction in

pollution and less contribution to climate change are not only major public benefits, but also sound business practices.

The business areas of the Baylands will be designed to best support local, small, and public benefit companies. These companies will be given priority in leasing and purchase.

Throughout the San Francisco Bay Area, the possibility of being able to live where you work is an option that many working class people can no longer achieve. With the lack of affordable housing and jobs that pay well enough to keep up with the high cost of living, the diversity of our neighborhoods is eroding because so many people are priced out; it's becoming increasingly difficult for sons and daughters, seniors who want to downsize, and people with average wages to live in the communities they've called home for many years. Many cities in the region are behind in the provision of affordable and work force housing, as well as market rate housing that is affordable to the middle class. There is a strong tension between the lack of housing, let alone affordable housing, and sustainable communities, which are best served by a strong relationship between housing, jobs and transportation. The question of whether housing will be allowed as part of the Baylands development has important impacts on sustainability and the approach to creating an economic plan. The Baylands is currently planned for commercial and industrial uses in the City's General Plan, and citizens have expressed strong concerns about changing the plan to allow housing because of soil contamination and apprehension that remediation would not render the site safe for people living there.

Because the developer has requested a General Plan change to allow housing, this issue has been studied in the Draft Environmental Impact Report (DEIR). It thoroughly explores the sufficiency of the proposed remediation and also the potential benefits of including housing, such as reducing traffic and helping create a strong Baylands community.

The housing issue is further complicated by disagreement over the adequacy of the regulatory standards that would be applied to the determination of safe living environments.

The residents of Brisbane will determine the future of housing in the Baylands. As survey of Brisbane voters on Baylands development issues including housing was conducted recently and its results will be used to inform the decision-making process. If housing is allowed, it may be appropriate to emphasize alternative forms of housing for the Baylands that address the needs of seniors, students, artists, and those wanting to live in "community-based" live-work environments. By looking at housing from the view of what is needed, and then structuring it in a way that is affordable, community focused, safe, and sustainable, it may be possible to provide living opportunities that are compatible with existing Brisbane.



Figure 56. Fisher Fields Park is a feature of Miami’s “Billion Dollar Baby” project to revitalize the convention center district. The park plans to sit on the north end of the convention center and rises 80 feet to conceal parking and loading below the hill.

<http://media.miamiherald.com/static/media/projects/convention-center-comparison/>

Development works best when the needs of individuals and corporations are compatible with each other. The maintaining of a sustainable sense of place is the responsibility of all, and thus financial mechanisms need to be created so that social benefits such as art, health, nature, legal and spiritual, thrive in perpetuity for all Brisbane citizens and workers.

By creating this type of economic paradigm, we’ll create greater awareness of the earth’s resources, the working and social conditions of people, the life cycle of the products we use, and the connectivity that truly binds us all together. Opportunities for a diverse, creative and robust development, supported by residents, workers and businesses can only be achieved through the empowerment of all.

Much can be learned about promoting fair trade from San Francisco and Berkeley, as well as organizations such as Fair Trade Towns USA.

The more locally owned small businesses located on the site, the better. A program should be established that attracts businesses that understand the value and benefits of green practices as being a part of a truly sustainable development.

Social equity can be measured by quantitative ecological measures, such as living incomes and adequate health insurance. Employers should be encouraged to provide fair wages and benefits. Employers who have bad records in these respects should be discouraged from locating in Brisbane. Employment spaces should be safe and work enhancing. Green certification with existing third-party programs should be the objective of all businesses in the Baylands.

The Baylands should be a model of sustainability. That can only happen if an ecological perspective informs the planning, construction, operation, and evaluation of the development over its lifetime. Conventional economics and financing should not be allowed to undermine the attainment of long-term sustainable development.

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. Provide an ecologically informed cost benefit analysis of economic outcomes generated by green building as it relates to energy savings, health-related issues, and worker productivity.
2. If housing is approved by the citizens of Brisbane, create a live work site based on the principles established by the BedZED (Beddington Zero Energy Development) in England.
3. If housing is approved by the citizens of Brisbane, establish a threshold of affordable housing serving diverse income groups based on current local data. The City will establish this threshold. Affordable housing should be integrated, not separated, into the development.
4. Encourage all employers on site, regardless of size (including construction companies) to pay area standard wages that make it affordable for workers to live and work within the region.
5. Promote green and socially diverse business and local green jobs. Incorporate opportunities for green jobs and skilled labor in Brisbane Baylands plan.
6. Encourage employers to incentivize living locally, hiring locally and using public transportation options.
7. Quantitatively evaluate feasibility of the entire land use plan including infrastructure with ecological economic measures in addition to fiscal and economic measures. Analysis will include lifecycle costs and value of ecosystem resources. Use as guide in the approval process.
8. Applicable LEED ND Credits include:
 - a. Imperiled Species and Ecological Communities



Figure 57. I-SEED is a startup based in Oakland, CA that strives to build an ecosystem of “solutionists” to solve our communities’ most pressing social problems. www.iseed.org

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Economy, Equity and Ecology Implementation Strategies:

1. Incorporate lifecycle costing approach for sustainable green building and infrastructure decision making.
2. Incorporate strategies that include the value of Ecosystems Services, which can be understood as benefits people obtain from ecosystems. This approach considers four categories of ecosystem services:
 - a. **Supporting services:** ecosystem services that are necessary for the production of all other ecosystem services, including nutrient recycling, primary production and soil formation. These services make it possible for the ecosystems to provide services such as food supply, flood regulation and water purification.
 - b. **Provisioning services:** or products obtained from ecosystems (from the land), such as:
 - i. Food
 - ii. Raw materials (e.g. lumber, organic matter, fertilizer)
 - iii. Water

- iv. Minerals
 - v. Medicinal resources
 - vi. Energy
 - c. **Regulating services:** or benefits obtained from the regulation of ecosystem processes, such as:
 - i. Carbon sequestration and climate regulation
 - ii. Waste decomposition and detoxification
 - iii. Purification of water and air
 - iv. Pest and disease control
 - d. **Cultural services:** such as the non-material benefits that accrue from healthy ecosystems:
 - i. Cultural, including motifs, film, painting, art, etc.
 - ii. Spiritual and historical
 - iii. Recreational experiences, including tourism, outdoor sports and recreation
 - iv. Science and education, including natural systems for school trip and scientific discovery
3. If housing is included in the plan, include live-work and affordable housing in the project.
- a. Quantity of live-work to be determined by a local market analysis determining viability of live-work at Baylands
 - b. Levels of affordability shall be determined by level of need for the subregion, such as low income, very-low income and moderate income per ABAG designations. City still needs to identify levels of affordability.
4. Encourage employment practices that:
- a. Pay prevailing wages that facilitate employees living locally within a 10 mile radius of where they work
 - b. Address corporate sustainability and facilities management
 - c. Promote green jobs
 - d. Hire locally within a 10 mile radius of the site

- e. Incentivize public transportation by providing such things as commuter checks or other employer incentives



Figure 58. North America’s first One Planet Community is Sonoma Mountain Village (SOMO) – a \$1billion redevelopment of an 81 hectare, ex-industrial site, forty miles north of San Francisco. <http://www.bioregional.com/sonoma-mountain-village/>

Discussion

The major challenge with this principle is to capture the most important metrics while keeping the KPIs simple. This draft focuses on localization as a proxy for improving living standards, creating employment opportunities and reducing environmental impacts.

Note that the survey KPI included in Principle 10 Health, Safety and Happiness is also an indicator for this principle. That survey should include questions relating to economic security and the opportunity for meaningful and satisfying work.

10. RECREATION, HEALTH, SAFETY & HAPPINESS

Our Baylands vision is to create a future where it is easy, attractive and affordable for people to lead happy, safe and healthy lives within a fair share of the earth's resources.



Figure 59. Grow Community is a new urban One Planet Living neighborhood on Bainbridge Island, just a 35-minute ferry ride from downtown Seattle. With beautifully designed solar-powered homes, shared community gardens and clean transportation options, Grow allows all generations to enjoy a high-quality and healthy lifestyle. <http://growbainbridge.com/>

Common International Targets

A plan for promoting health, safety and happiness for all who engage the Baylands must be created, building on emerging findings from credible research. Satisfaction levels and concerns must be regularly monitored and evaluated. The feasibility of adopting UN standards for health, security and environmental quality should be explored. At least two examples of strategies to promote health, safety and happiness must be showcased.

Context

The Baylands is a brownfield site, comprised of a former Southern Pacific Railyard and San Francisco's municipal landfill. During the past couple of decades, extensive remediation efforts have taken place to reduce the exposure levels of the contamination that is found in the railroad part of the site. There have been no remediation plans in the unregulated garbage landfill section other than methane removal. Another source of contamination on the Baylands is the Kinder Morgan Tank Farm. There have been documented leakages and air pollution. Efforts to address both have been instituted including the installation of a "vapor barrier."

The concern over contamination exposure is one of the main reasons why the citizens of Brisbane in their General Plan have prohibited housing as a land use in the Baylands. In 2006, the Brisbane Baylands Community Advisory Group (BBCAG) was formed, so that citizens could engage the agencies that will ultimately be responsible for approving a plan for remediating

contamination found at the site. The lead agencies assigned to the site are the Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board. The DTSC is responsible for the northerly portion of the former rail yard, identified as Operable Unit 1.



Figure 60. BedZED is the UK’s first large-scale, mixed use sustainable community built on a contaminated brownfield site, with 100 homes, office space, a college and community facilities. Completed in 2002, this pioneering eco-village in south London suburbia remains an inspiration for sustainable neighborhood, using the one planet living framework. <http://www.bioregional.com/bedzed/>

The Water Board is responsible for the southerly portion of the rail yard, identified as Operable Unit 2, and the landfill site easterly of the Caltrain line. The Environmental Health Division of the San Mateo County Health Services Agency also regulates closure of the former landfill easterly of Caltrain.

In an effort to provide an independent analysis of the contamination found at the site, the BBCAG enlisted the help of Dr. Fred Lee. Dr. Lee gave a Baylands remediation presentation to the Community in 2010, and also provided a report that gave an assessment of the *“adequacy of past studies of the pollutants in soil, water, and gaseous releases, to adequately define the presence and public health/environmental quality implications of potentially hazardous chemicals in each of the major areas of the [Universal Paragon Corporation] UPC Brisbane Baylands area...”*

Without proper understanding of the contamination that exists at the site, and an adequate plan to remediate and monitor this contamination, Health, Safety and Happiness cannot be

achieved with a clear conscience. The need for an experienced, citizen respected, independent firm to ensure proper remediation and monitoring of the contamination for the community is critical to the safety and success of this development.

The Baylands has the potential to provide opportunities for people to be engaged and empowered, whether they are an employee, consumer, student, or if allowed, resident.

The region is known for its high quality of life, yet with the high cost of housing and transportation, many residents have limited opportunity for leisure and recreation activities. Our vision for the Baylands creates an opportunity to enjoy leisure and recreation every day with a walk to nearby restaurants, cafés, services, entertainment, as well as recreational opportunities and open space.



Figure 61. The innovative Marin Health and Wellness Campus brings a spectrum of services and clinics together in one inviting place. It is a result of local individuals, organizations, businesses, and government pulling together in the spirit of cooperation and neighborhood revitalization. The project involved the design and renovation of approximately 74,000 square feet in five buildings. <https://www.marinhhs.org/marin-health-wellness-campus>

Historically, the United States spends more money on health care than any country in the world, but the high cost of coverage has left many Americans uninsured, which has resulted in thousands of unnecessary deaths. Many of these deaths were caused by not having access to basic medical advice and observation, where preventive measures could have been implemented before terminal medical conditions took hold. The Affordable Care Act and expansion of MediCare seek to correct these systemic deficiencies by providing access to affordable healthcare to all Americans. Local universities such as San Francisco State University, have a Student Health Service that provides basic care for acute and chronic problems, promotes health awareness, educates students about preventive care, disease management and therapeutic choices, and helps students develop the skills to manage their own health. Local health providers, such as Seton and Kaiser, have extensive wellness programs.

Hiking trails on San Bruno Mountain and along with the Bay Trail not only provide recreational opportunities for Brisbane citizens, they also connect them to the natural environment. HCP was created on San Bruno Mountain which is funded by properties located in the area.

Summary Approach

The Baylands EIR as well as other sources such as Dr. Fred Lee's report will be used to better understand regulator recommendations for testing, remediation, and monitoring the contamination that exists at the Baylands. The independent peer review will assist the City in formulating the mitigation findings and requirements that will be included in the conditions of approval.

The Baylands could be showcased as a demonstration site for bioremediation, the process of harnessing micro-organisms to metabolize and remove some pollutants in contaminated soil or groundwater.

The Baylands project offers the opportunity to employ constructed wetlands to treat wastewater, to improve the quality of water in the Bay and lagoon, and to begin to redress the damage that has been done to the site in the past.

Community meetings will be used to get input on what works and what doesn't work and what the larger community would like to see happen at the Baylands. We will use *play* and *fun* to generate ideas and seek to keep a light heartedness when evaluating our success.

The San Mateo County Health System could play a major role in helping the Community to adopt health standards to the uses it feels should be implemented at the Baylands. The possibilities of providing basic healthcare for Brisbane residents and workers under the Covered California program should be fully explored.

The Baylands development should enhance the standard of living that currently exists in Brisbane. The Baylands should be a destination, a source of pride and engagement for the community, rather than just a location on the outskirts of town.

The Baylands sponsor has recently completed a Remedial Action Plan for the former Schlage site at which the sponsor recently began redevelopment in Visitacion Valley of San Francisco. The sponsor has committed to ongoing monitoring of the site. Strategies employed at the Schlage site may be suitable for the Baylands.

San Mateo County (SMC) has developed the Shared Vision 2025, a community-based vision for 2025 of a healthy and safe, prosperous, livable, environmentally conscious, and collaborative community plan. SMC has established a dashboard to measure data and progress toward the goals. <https://performance.smcgov.org/shared-vision>. It uses data provided by local governments in SMC. The Baylands project could perform annual surveys and contribute further data to this growing database.



Figure 62. The San Francisco Bay Trail is a bicycle and pedestrian recreational trail that will eventually allow continuous travel around the shoreline of San Francisco Bay. As of 2014, approximately 340 miles (550 km) of trail have been completed. When finished, the Bay Trail will extend over 500 miles (805 km) to link the shoreline of nine counties, passing through 47 cities and crossing seven toll bridges. It is a project of the Association of Bay Area Governments (ABAG). <http://www.baytrail.org/>

A pedestrian friendly design will encourage activity and mobility with the majority of buildings located within ½ mile of the proposed Multi-Modal Station. Sports fields, hiking trails, and bicycle paths can offer healthy, physically active recreational opportunities.

The natural beauty of the area will be enhanced by complementary architecture, community gardens and comfortable public spaces for community activities.

The Baylands should bring out the best a society has to offer by providing a variety of job skill opportunities with living wages, ample opportunities for recreation and leisure within the open space and open areas, and ensure that the health and safety for all who engage it is never compromised

Recommended Key Performance Indicators

Key Performance Indicators are included as a general set of indicators and targets that can be established in the planning phase of the project that set a direction and intention. They are not

meant as prescriptive requirements as alternate methods may be appropriate to achieving the goals of the Principles.

1. Show annual progress from an agreed upon baseline survey in improving overall self-reported recreation, health, safety and happiness for the people within the Baylands.
2. Create periodic assessment evaluations to determine social, economic and environmental effects on currently developed areas of Brisbane caused by the construction and eventual build out of the Baylands project.
3. Adopt principles of Active Design in the community plan. The community should incorporate strategies that encourage active transportation and recreation, including walking, bicycling and all forms of activity and mobility. Building design should incorporate opportunities for daily physical activity. Consult the [Active Design Guidelines: Promoting Physical Activity and Health in Design](#) published by the Center for Active Design, 2010.
4. Determine the highest practical standard for remediation of the site to ensure human health. The developer will be required to consult an independent third-party credible source, acceptable to the City, for recommendations.
5. Seek regulatory recommendations for best practices for testing, remediating, and monitoring the contamination that exists at the Baylands. Install permanent testing and monitoring stations and engage a third-party testing body to perform regular testing and provide an annual report to the City of Brisbane. A financial mechanism for supporting long term monitoring should be built into the approved plan.
6. Develop an assessment district to support the social economic functions within the Baylands that the developer and future property owners would pay into at a negotiated rate and period of time.
7. Parks, recreation facilities, and trails should be within a reasonably close proximity of every building.

Recommended Implementation Approach

The Implementation Approach conveys best practices currently in use by high-performing buildings and communities. They are meant to give direction as to a possible pathway to implementing the principles. They are not meant to be prescriptive, “you shall” type directives, or to convey agreement or negotiation as to how principles may be achieved.

Health, Safety and Happiness Implementation Strategies:

1. Implement an annual survey of community health, safety, happiness. Financial Mechanism needs to be considered and established.

- a. Design a survey for community members to self-rate the level of recreation, health, safety and happiness experienced in the Baylands
 - b. Reference and incorporate the San Mateo County Shared Vision 2025 community health indicators <https://performance.smcgov.org/shared-vision> including:
 - i. Healthy and Safe Community
 - ii. Prosperous Community
 - iii. Livable Community
 - iv. Environmentally Conscious Community
 - v. Collaborative Community
 - c. Perform a baseline survey of the community using SMC Shared Vision 2025 indicators and metrics.
 - d. Use social media and other methods to reach the community.
 - e. Encourage the survey through commercial and mixed use property tenants.
 - f. Implement survey annually and provide data to the City of Brisbane and San Mateo County.
 - g. Publicize results.
2. Incorporate active design strategies in the project.
 - a. Walking and biking for local trips
 - b. Design buildings to encourage physical movement, such as using stairs instead of elevators
 - c. Provide access to walking trails and other recreational activities for all community members of varying mobility to use during the day (also addressed in Habitat and Open Space).
 - d. Develop additional strategies that support an active work and lifestyle.
 3. To ensure ongoing knowledge of site conditions that impact human health, consult an independent third-party credible source, acceptable to the City, for recommendations to determine appropriate monitoring protocols. Install toxics monitoring equipment and provide annual reporting of levels in locations required to be monitored by Department of Toxic Substances Control (DTSC), Regional Water Quality Control Board and/or San Mateo County Department of Environmental Health. Engage a third-party testing company, to be approved by the City, to provide annual testing and reporting. Demonstrate that there is an enforceable, ongoing financial mechanism to support the annual testing and reporting requirements.

4. Establish a commercial assessment district for the Baylands to support implementation of key sustainability strategies such as alternative transportation, bike-and car-sharing, electrical vehicle charging, open space management, public art and maintenance, etc.
5. Applicable LEED ND Credits include:
 - a. Community Outreach and Involvement

Discussion

The Gross National Happiness (GNH) index is a concept that includes and prioritizes non-economic aspects of well-being in a holistic view of sustainable development. It is a single number index developed from 33 indicators categorized under nine domains. As a metric, it quantifies these subjective measures of well-being so that they are useful in evaluating the overall quality of life. The current GNH index is calculated by averaging survey responses to questions about economic wellness, environmental wellness, physical wellness, mental wellness, workplace wellness, social wellness and political wellness—categories which are likely relevant for a neighborhood in a city as well.

<http://www.grossnationalhappiness.com/articles/>

The Genuine Progress Indicator (GPI) GPI is a metric that has been suggested to replace, or supplement, gross domestic product (GDP) as a measure of economic growth. GPI is designed to take fuller account of the health of an economy by incorporating environmental and social factors which are not measured by GDP.

<http://rprogress.org/publications/2007/GPI%202006.pdf>

The State of Maryland Department of Natural Resources has adopted the GPI to measure the health and economic productivity of its natural resources.

<http://www.dnr.maryland.gov/mdgpi/>

Background Information

The Lead Authority for the Operable Unit 1 (OU-1) portion of the site is the Department of Toxic Substances Control, DTSC. The Lead Authority for the OU-2 portion of the site is the Regional Water Quality Control Board (RWQCB). The former landfill portion of the site is under the authority of the RWQCB and San Mateo County Department of Environmental Health. There will certainly be differences in standards and application; standards and expectations will need to be negotiated with City, developer and agencies.

APPENDIXES

1. Proposals that have been studied in the EIR

DEVELOPER-SPONSORED Project Summary

Total Site Area	684 acres
Public Use/Open Space	206 acres
Lagoon	111 acres
Commercial/Industrial	6.9 million sq. ft.
Residential	4,434 units = 5.15 million sq. ft.

The total square footage proposed in the UPC Specific Plan is 12,096,300 of which 5,150,400 is housing. These figures are from Chapter 4 on Land Use, page 29. The link to the Plan is on the City website.



SOURCE: Wallace Roberts & Todd, LLC, 2010

Brisbane Baylands . 206069

Figure 4
Proposed Land Uses
Developer-Sponsored Project

2. Community Alternative Project Summary

Total Site Area	684 acres
Public Use/Open Space	330 acres
Lagoon	111 acres
Commercial/Industrial	8.3 million sq. ft.
Residential	0 units

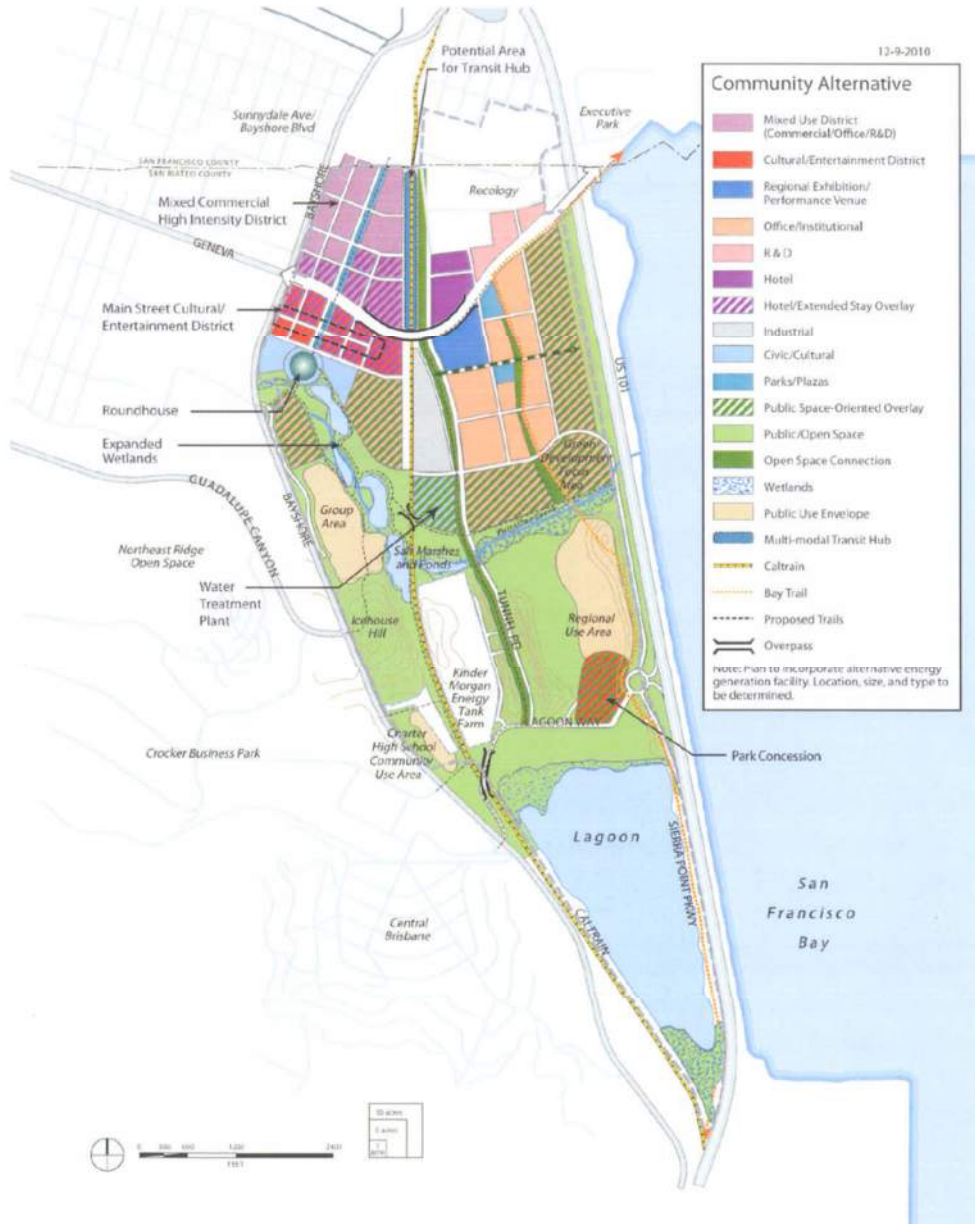


Figure 6
Proposed Land Uses
Community Preferred Plan

3. Renewable Energy Alternative Project Summary

Total Site Area	684 acres
Public Use/Open Space	330 acres
Lagoon	111 acres
Commercial/Industrial	1.0 million sq. ft.
Residential	0 units
Alternative Energy	170 acres



SOURCE: Dyett & Bhatia

Brisbane Baylands 206069

Figure 14
CEQA Alternative - Renewable Energy Land Use

4. LEED v4 for Neighborhood Development (ND) Scorecard

LEED v4 for Neighborhood Development Plan Project Checklist		Project Name: City of Brisbane - Baylands Date: 1/2/2015		INTEGRAL GROUP	
Yes	?	No	23	8	0
Smart Location & Linkage					
Y			21	7	0
Y			21	7	0
Y			21	7	0
Y			21	7	0
Y			21	7	0
6	4	3	21	7	0
2	0	0	21	7	0
7	3	3	21	7	0
2	0	0	21	7	0
0	3	3	21	7	0
1	0	0	21	7	0
1	0	0	21	7	0
1	0	0	21	7	0
1	0	0	21	7	0
1	0	0	21	7	0
Neighborhood Pattern & Design					
Y			28	10	3
Y			28	10	3
7	2	0	28	10	3
3	2	1	28	10	3
2	1	1	28	10	3
3	3	1	28	10	3
1	0	0	28	10	3
2	0	0	28	10	3
1	0	0	28	10	3
2	0	0	28	10	3
1	0	0	28	10	3
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2	0	0	28	10	3
2	0	0	28	10	3
2	0	0	28	10	3
0	1	0	28	10	3
1	0	0	28	10	3
2	0	0	28	10	3
0	1	0	28	10	3
Green Infrastructure & Buildings					
Y			23	8	0
Y			23	8	0
Y			23	8	0
Y			23	8	0
4	1	0	23	8	0
2	0	0	23	8	0
1	0	0	23	8	0
1	1	0	23	8	0
0	1	0	23	8	0
2	0	0	23	8	0
1	0	0	23	8	0
3	1	0	23	8	0
1	0	0	23	8	0
1	0	0	23	8	0
3	0	0	23	8	0
0	2	0	23	8	0
0	2	0	23	8	0
1	0	0	23	8	0
1	0	0	23	8	0
6	0	0	23	8	0
5	0	0	23	8	0
1	0	0	23	8	0
Innovation & Design Process					
3	1	0	23	8	0
1	0	0	23	8	0
1	0	0	23	8	0
1	0	0	23	8	0
0	1	0	23	8	0
PROJECT TOTALS (Certification estimates)					
81	26	3	PROJECT TOTALS (Certification estimates)		
Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+ points					