1 Carbon
1 Transportation
1 Materials
1 Landscape
1 Land Use and Site Development

Recommendations for these areas have been developed using a holistic, systems-based approach that provides Š 1 Œ ˜ – ™ › Ž ‘ Ž — œ ’ Ÿ Ž 1 ˜ Ÿ Ž › Ÿ ’ Ž 1 ˜ • 1 › Ž œ ˜ ž › Œ Ž 1 ˜ œ ð 1 • ’ — ” ’ — • 1 sources to end-use.

The sections on each topic are organized to provide information on goals or targets, existing conditions, relevant current initiatives, and references and codes, and details of the approach to achieving the proposed targets.

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Energy

Vision and Goals

The energy vision for the Hayward campus is to achieve a sustainable energy balance that is resilient, Ž Œ ’ Ž — • ð 1 Š — • 1 • Ž Š • œ 1 • ˜ 1 ˜ Ÿ Ž › Š • • 1 Œ Š › ‹ ˜ — 1 — Ž ž • › Š • ’ • ¢ 1 Š • 1 the campus by the year 2030. Included are a mix of concepts that apply to individual buildings and to the larger campus area as a whole.

For planning purposes, it is assumed that existing campus buildings will likely make up about half of the total building stock in 2030. Reduction of the energy

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installations.

Several existing buildings on the Hayward campus have energy saving window overhangs or sun shades integrated into the
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(upper)
: D U U H Q + D O O

(lower)
The Art & Education
% X L O G L Q J

1 Executive Order 987 calling for a 15% reduction in 2003/4 energy levels by 2009/10
1 Executive Order S-12-04 requesting that CSU campuses participate in State-wide energy conservation and reduced electrical demand
1 A total co-generation capacity increase from 24 MW to 40 MW by 2014
1 ¡ Ž Œ ž • ’ Ÿ Ž 1 › • Ž › , _ ^] 1 œ Ž 4 ’ — • 1 • ž ’ • Ž • ’ — Ž œ 1 • ˜ › 1
‹ ž ’ • • ’ — • 1 Ž — Ÿ Ž • ˜ ™ Ž 1 Š — • 1 • ‘ Ž 1 ž œ Ž 1 ˜ • 1 Ž Œ ’ Ž —
1 An overall renewable energy increase from 2 MW to 10 MW by 2014.

In addition to the above system-wide initiatives and the campus’ photovoltaic system, Cal State East Bay is in
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References and Codes

There are several nationally-recognized standards and rating systems that provide energy guidelines and performance assessments. The American Society for Heating Refrigeration and Air Conditioning (ASHRAE) publishes the national standard for energy use in buildings (Standard 90.1), and for indoor environmental quality (Standard 62.1). These standards are constantly updated and can provide valuable insights into the state of knowledge. ASHRAE standards are also referenced by the LEED™ rating system.

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meeting or exceeding ASHRAE standards for energy consumption. These can also provide useful guidance for the University .

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Energy Approach

The energy approach shown in Figure 12 illustrates design strategies that will ensure the greatest cumulative reduction in campus energy use. This approach outlines general building and site-level strategies that are applicable to both existing and new development.

Existing Buildings

Energy consumption in existing buildings will œ ’ • — ’ Œ Š — • • ¢ 1 ’ — ž Ž — Œ Ž 1 ˜ Ÿ Ž › Š • • 1 Œ Š – ™ ž œ 1 Ž — Ž › • ¢ 1 ž œ Ž ð 1 particularly in the near term during which the existing built size will outweigh new development. Many of • ‘ Ž œ Ž 1 ‹ ž ’ • • ’ — • œ 1 – Š ¢ 1 › Ž š ž ’ › Ž 1 œ ’ • — ’ Œ Š — • 1 Š › Œ ‘ ’ • Ž Œ • ž › Š • 1 and systems upgrades. The University will develop a

Current Initiatives

The Hayward campus is currently implementing
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The water approach shown in Figure X provides guidance for designing and developing strategies to minimize water consumption. The target goals set for the campus can be achieved through two categories of œžœ•Š’—Š‹•Ž1œ•›Š•Ž•’Žœñ1 Š•Ž›1Žó Ž À RDFK

for new development. New international and state

used in the past. At Cal State East Bay, new buildings

cycle clothes washing machines and 1.5 gal/minute faucets. Through incorporation of these measures in the new buildings, about 13% of the projected water consumption could be saved.

The water consumed by building air cooling systems accounts for about 3% of the total water consumption for Cal State East Bay. Strategies that improve building thermal performance (reducing the required cooling load of buildings) and building cooling systems

reducing water consumption.

The next step in reducing potable water demand is to use alternate sources. This strategy is most

rainwater will be available for use in landscaping and would decrease potable or recycled water needed for irrigation. Downspouts from building roof areas will not connect to sewer or storm drains, but will be directed to landscape or designed stormwater devices such as rain gardens or swales. In addition to supplying a portion of site's irrigation, this strategy will mitigate peak discharge during large storm events.

recycled water infrastructure discussed in the existing conditions section. The second option is an on-site

while standard drinking water should be used only for potable requirements. Recycled water distribution lines will be needed to serve toilets and laundry facilities in new buildings as well as irrigation. All future buildings

water when available on campus.

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Waste

Vision and Goals

The vision for waste is to develop a campus that leads
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• Š — • • • 1 • ’ Ÿ Ž › œ ’ ˜ — 1 Š — • 1 œ Ž • • , œ ž œ • Ž — Š — Œ Ž ï 1 ‘ ’ œ 1 › Ž š ž ’ › Ž œ 1
a balanced approach that involves design, policy and
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The waste goals are:

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full build-out

1 100% green waste to be composted on the campus.

Existing Conditions

While campus activities generate the full range of waste
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green waste), the academic activity – classrooms and
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large proportion of which is paper .

Waste generated on campus is currently source separated into the following streams:

Garbage

The University operates collector carts and trolleys that pick solid waste up from receptacles distributed across campus and deliver it to a centrally located compactor. As detailed in the current contract with Waste Management of Alameda County (WMAC), this allows for WMAC trucks to pick up solid waste from a single location on campus every 1 to 2 days. Student housing has separate collection bins for which pick-ups are scheduled more frequently.

Cardboard and Paper

Receptacles in academic and residential buildings are clearly marked and divert paper and cardboard to a
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pick-up. This is also contracted out to WMAC.

Bottles and Cans

distributed across campus in order to separate them from other recyclables. In partnership with East Bay
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• Š ” Ž — 1 ˜ 1 Œ Š – ™ ž œ 1 ‹ ’ , Ž Ž ” • ¢ 1 • ˜ › 1 › Ž Œ ¢ Œ • ’ — • ï

Green Waste

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generated from landscape maintenance to a pit located
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City of Hayward Initiatives

The City of Hayward has set an aggressive goal of
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‹ ¢ 1 • ‘ Ž 1 ¢ Ž Š › 1 X V W V ï 1 ˜ 1 Š Œ ‘ ’ Ž Ÿ Ž 1 ’ • œ 1 • ˜ Š • ð 1 • ‘ Ž 1 ’ • ¢ 1 ˜ Ž › œ 1
one of the most progressive recycling services in the Bay Area. Several of the commercial, residential and educational programs implemented by the City to achieve this target provide Cal State East Bay with working examples of waste mitigation measures.

The City collects mixed recyclables - paper, cardboard,
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waste is collected separately, at half the charge of garbage collection. The City’s Public Works department
˜ Ž › œ 1 • › Ž Ž 1 Š œ • Ž 1 Œ ˜ • • Ž Œ • ’ — • 1 Œ ˜ — • Š ’ — Ž › œ 1 • ˜ › 1 • Ž œ ” , œ ’ • Ž 1
Š — • 1 – Š ’ • › ˜ ˜ – 1 Š ™ ™ • ’ Œ Š • ’ ˜ — œ ð 1 Š — • 1 ˜ Ž › œ 1 • › Ž Ž 1 Ž • ž Œ Š • ’ ˜ — Š •
posters informing the users of best practices.

References and Codes

The California Integrated Waste Management Board (CIWMB) implements comprehensive laws regulating solid waste disposal for the State of California. Under its leadership, the state is nearly two-thirds of the way toward achieving the ambitious waste diversion goals set forth by the Legislature. These are detailed below

AB 939 - Recycling

In 1989, AB 939 established the organization and mission of the CIMWB.

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sorted on-site into the following streams:

1 Reusable construction aggregate (e.g., crushed concrete, interlocking pavers)

1 Landscape (e.g., timber, wood demolition)

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Carbon

Vision and Goals

The vision for carbon emissions is for the University to

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Target Carbon Emissions

Carbon Approach

) L J X U H
Carbon Approach

The approach to reducing carbon emissions encompasses general building guidelines, energy Ž Œ ' Ž — Œ ¢ 1 – Ž Š œ ž › Ž œ ð 1 • › Š — œ ™ ˜ › • Š • ' ˜ — 1 œ • › Š • Ž • ' Ž œ ð 1 Š — • 1 policy and climate neutrality-focused leadership. The model illustrated in Figure 20 shows the design strategies aimed at ensuring the greatest cumulative reduction in carbon emissions.

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The remaining steps in the model are applicable to new development and existing buildings, and to landscape and infrastructure on the campus. Table 2 provides examples of these strategies.

In addition to building and infrastructure design and transportation considerations, certain policy and/or long-term contractual decisions will be required to meet the carbon goals. In particular, the current energy contract between Cal State East Bay and Arizona Public Ž › Ÿ ' Œ Ž œ 1 ˜ › ™ ˜ › Š • ' ˜ — 1 ' œ 1 Š 1 ” Ž ¢ 1 ™ Š › Š – Ž • Ž › 1 Š Ž Œ • ' — • 1 • ˜ — • , term, campus-wide emissions.

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Carbon Emissions Strategies for New Development

Step	Focus	Strategies	Ž — Ž • œ
Reduce Building Carbon Emissions	Built Size	Obtain thorough understanding of space types and needs and use to optimize program square footage	Reduction in overall built size and site disturbance
			Additional area for open and green spaces
	Material Selection	Reuse materials	No new embodied carbon introduced
		Use local and regional materials	Avoid carbon emissions resulting from transportation activities
	Equipment Right-sizing	Obtain thorough understanding of space types and use to optimize required systems	Reduction in heat gain to space. Subsequent reduction in energy use
	Design for Flexibility	Develop multi-use or Ž ¡ ’ ‹ • Ž , ž œ Ž 1 œ	Reduction in overall built size and site disturbance
			Further construction avoided in future
Reduce Movement	Reduce Trips	Bring amenities closer	Reduction in transportation emissions
	Optimize Distances	Co-locate buildings with complementary uses Locate student housing on campus	

7DEOH

Carbon Emissions Strategies for New and Existing Development

Step	Focus	Strategies	Ž — Ž • œ
Make Œ ’ Ž — •	Building Systems	Incorporate progressive HVAC technologies	Reduction in energy use
		Incorporate centralized heating and cooling systems	
		Recommission existing building systems	
	Vehicles	Ž › 1 • › Š — œ ’ •	Reduction in transportation emissions
		Encourage carpools	
		Operate bio-diesel or other alternative fuel vehicles	
Renewable Generation	Solar	Roof & building integrated photovoltaics	Reduction in energy consumed from grid. Educational impact
		Solar water heaters	
	Wind	Open space and building-integrated wind turbines	
Sequester	Green Space	Encourage open and green spaces on campus	Carbon uptake through natural processes maximized. Load reduction and subsequent reduction in energy use
		Green roofs	
œ Ž • œ	Carbon	Identify preferred vendors	Move closer to carbon neutrality

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Figure 21 compares the carbon footprint projection with

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Carbon Emissions at
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Transportation

This section summarizes the approach to sustainable transportation at Cal State East Bay. More detail can be found in the Access, Circulation and Parking Framework chapter of this master plan.

Vision and Goals

The transportation vision for Cal State East Bay is to transition from a highly auto-dependent institution to one that provides, supports and encourages a wide range of transportation options.

The transportation goal for the Hayward campus is to reduce the percentage of drive alone vehicle trips from its existing 79% to 64%, through the implementation of various transportation demand management (TDM) programs and policies. This will concurrently be accompanied by an increase in public transit ridership from the existing 16% to 29%.

Existing Conditions

Today, the Hayward campus is accessed nearly exclusively by private automobile. While there is
downtown Hayward and although a BART station lies less than two miles away, an abundance of parking, low parking rates and a campus location that deters access by walking or bicycle all encourage a vehicle-oriented transportation system.

On campus, however, the compact nature of the site and historic development that includes peripheral roads and parking, results in a campus that is easy

topographic changes in certain areas. These
issues for disabled access.

References and Codes

Several recently released documents provide

Transportation Approach

Materials

The nature and source of building materials is a very important component of sustainable design. The production of building materials requires extraction, processing and transportation, activities which have the potential to pollute air and water, deplete natural resources, and destroy habitat.

Vision and Goals

The vision for materials at Cal State East Bay is to include sustainability criteria for the selection of building materials and for decisions regarding the reuse, renovation and demolition of buildings. Reusing

need for new bulding materials. When new materials are needed, the University should consider salvaged, recycled content, and rapidly renewable materials. In addition, sourcing building materials locally supprts the local economy and reduces the impacts of transportation.

Existing Conditions

Enrollment growth at the Hayward campus will require both the renovation of existing buildings as well as the construction of new buildings. As the campus grows, it will need to review each building to determine which are suited to renovation, can meet contemporary teaching requirements, and can match growing

costly to update.

Buildings should also be designed for reuse, using strategies such as deconstructable frames, which can then be used in a subsequent building project.

Reduce and Reuse Materials

Material reduction can be achieved in both structural and non-structural building elements. Hollow cores only save on building materials, but will also serve as an educational medium on the topic of sustainable building materials.

Reusing salvaged materials such as timber and steel reduces the need for virgin materials, and will be explored during building projects.

Recycle and Replenish

Materials with high recycled material content reduces

Landscape

This section summarizes the approach to a sustainable landscape at Cal State East Bay. More detail can be found in the Open Space and Landscape chapter of this Master Plan.

Vision and Goals

The sustainable landscape vision for Cal State East Bay is to evolve campus vegetation, over time, to a landscape that is suited to the unique characteristics of the region. This landscape will:

1 Create a visually pleasing and sustainable campus
1 Mimic the surrounding vegetation and landforms
1 Simulate plant community diversity
1 Encourage biologically healthy soils
1 [illegible]
1 Save energy in adjoining buildings through shading
1 Decrease or eliminate dependence on inorganic, toxic products and compounds.

Existing Conditions

Historically the Hayward campus included the oak grassland, riparian, and hard chaparral plant communities. As the region and immediate area of the campus have developed, much of this original landscape has been lost. On campus, it has been replaced with a landscape that while lush and green, is typical of an American university campus, and does [illegible]

In addition, since the campus and many of the original plantings were established over 40 years ago, much of the tree cover is reaching the end of its life cycle, and erosion and use have ravaged many slopes, edges and highly used corridors.

References and Codes

The LEED™ rating system provides a useful guide for landscape-related topics such as water use reduction and stormwater management.

The Sustainable Sites Initiative has developed a set of standards and guidelines for sustainable land development and management practices, and a rating system to recognize achievement. This collection of standards and guidelines is an excellent reference for sustainable landscape planning.

The California Stormwater Quality Association has produced a Stormwater Best Management Practice Handbook. Best Management Practices (BMPs) are
criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution."[2] BMPs include such landscape strategies as detention
constructed wetlands.

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The Landscape Approach shown in Figure 25 illustrates the key strategies for creating a sustainable landscape.

Educate Students, Faculty, Staff and Visitors

An awareness and appreciation of the native landscape requires education, interpretation and adjustment of maintenance practices. The University will develop a program of education and interpretation to
sustainable campus landscape.

Create Plant Palettes Emphasizing Drought-tolerant and Low Water Needs Plants, Suited to the Local Climate

Native trees, shrubs and groundcovers as well as non-native species well-adapted to the climate will be selected for the campus landscape. This will reduce irrigation needs and ensure a healthy, beautiful, low maintenance landscape.

Minimize Lawn Areas

Some areas on campus will continue to be planted in
will be strategically designated so as to be kept to a minimum to reduce irrigation demand.

Collect and Treat Stormwater

The stormwater in all improved areas will be collected and treated on-site with green roofs, planting areas, vegetated swales and detention basins. Green roofs should be considered with all new construction as

2 California Stormwater Quality Association (CASQA), *California Stormwater BMP Handbook*, January 2003.

Land Use and Site Development

Vision and Goals

The approach to land use and site development sets the foundation for sustainability at Cal State East Bay. The
aspects of sustainability such as minimizing the need for auto use and encouraging transit use, maximizing opportunities to design low-energy use, climate-responsive buildings, and developing a low water use landscape that celebrates the historic landscape of the East Bay.

The goal for the campus is to establish a long term
achievement of all of the sustainable campus elements.

Existing Conditions

The currently developed portion of the Hayward
proximity among uses. Beyond these developed areas, most of the remaining campus is too hilly to feasibly develop and will remain in a natural open space condition. There remains adequate space within the developed areas for further expansion and growth to 18,000 FTES can be readily accomplished.

The Hayward campus was largely developed in the 1960s and 1970s. Some of the original buildings were designed to be inherently climate-responsive, but lack the appropriate systems and elements to aid in achieving energy savings. While the campus is highly dependent on auto access at this time, it is well
of the campus and is also highly walkable due to its compactness.

The growth envisioned for the Hayward campus will result in the construction of many new buildings and in the development or redevelopment of many sites. These will provide excellent opportunities to further enhance campus performance in all aspects of sustainability.

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Development Approach

References and Codes

Many jurisdictions, including the City of Hayward, are
urbanized areas. Compact development, walkable districts, good transit access, and adequate densities are all aspects of “Smart Growth,” a concept that is being implemented throughout the country. Information on this can be found through numerous web sites and organizations such as the American Planning Association.

The LEED™ (Leadership in Energy and Environmental Design), sponsored by the U.S. Green Building Council has developed rating systems applying to sustainable development. LEED™ for Neighborhood Development, or LEED™,
criteria that address aspects of sustainable site development.

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Focus Area	Goals	Strategies	Targets	
Transportation	Reduce overall vehicle trips to and from campus, by housing more students on campus, and supporting and encouraging a wide range of transportation options.	**1.** Provide highly accessible [illegible] transit services **2.** Promote transit use through incentives **3.** Discourage auto use by residents and commuters through campus parking policies	1 Reduce trip generation rates for commuters, faculty and [illegible] 1 Increase transit ridership from 16% to 29% 1 Reduce parking supply per FTE to encourage alternative forms of transportation.	1 Reduced greenhouse gas emissions 1 Less congestion on campus and regional roads.
Materials	Minimize overall resource use and choose materials according to their contents and source.	**1.** Reduce energy use **2.** Increase building lifespan **3.** Reduce and reuse materials **4.** Recycle and replenish	1 Minimize resource use by retaining and reusing buildings whenever possible 1 Use materials high in recycled content, and those that are rapidly renewable 1 Salvage materials from demolition for reuse. 1 Locally source materials whenever possible.	1 Reduced use of virgin materials 1 Create markets for recycled and rapidly renewable materials 1 Reduced greenhouse gas emissions from production and transportation 1 Less solid waste produced.
Landscape	Create a beautiful and [illegible] to enhance the life of the University through a landscape that is suited to the unique characteristics of the region.	**1.** Understand soil and plant conditions **2.** [illegible] emphasis on drought-tolerant and low water use plants **3.** Minimize lawn **4.** Manage stormwater in the landscape **5.** Avoid using herbicides and pesticides **6.** Use recycled water for irrigation	1 Provide landscape improvements to all high visibility areas 1 Create a diverse community of drought-tolerant and low water use plants 1 Reduce toxic chemical use and increase organic product use.	1 Enhanced aesthetic value 1 Long lived plant communities 1 Reduced water use 1 A teaching tool for faculty 1 Reduced maintenance requirements.
Land Use & Site Development	Create a robust learning community that creates many opportunities for interaction. Keep the campus compact and walkable with abundant usable open space. Develop at adequate densities to [illegible]	**1.** Develop academic uses within a walkable core area **2.** Locate residential neighborhoods in close proximity **3.** Locate parking on periphery **4.** Provide generous and well furnished open spaces	1 Provide 5,000 student resident beds on campus 1 Provide appropriate balance of built and open space 1 Provide convenient access to public transit.	1 A vital and energizing campus community 1 A critical mass of activity which supports the learning environment 1 A compact academic environment 1 Flexibility for long term program growth or change.