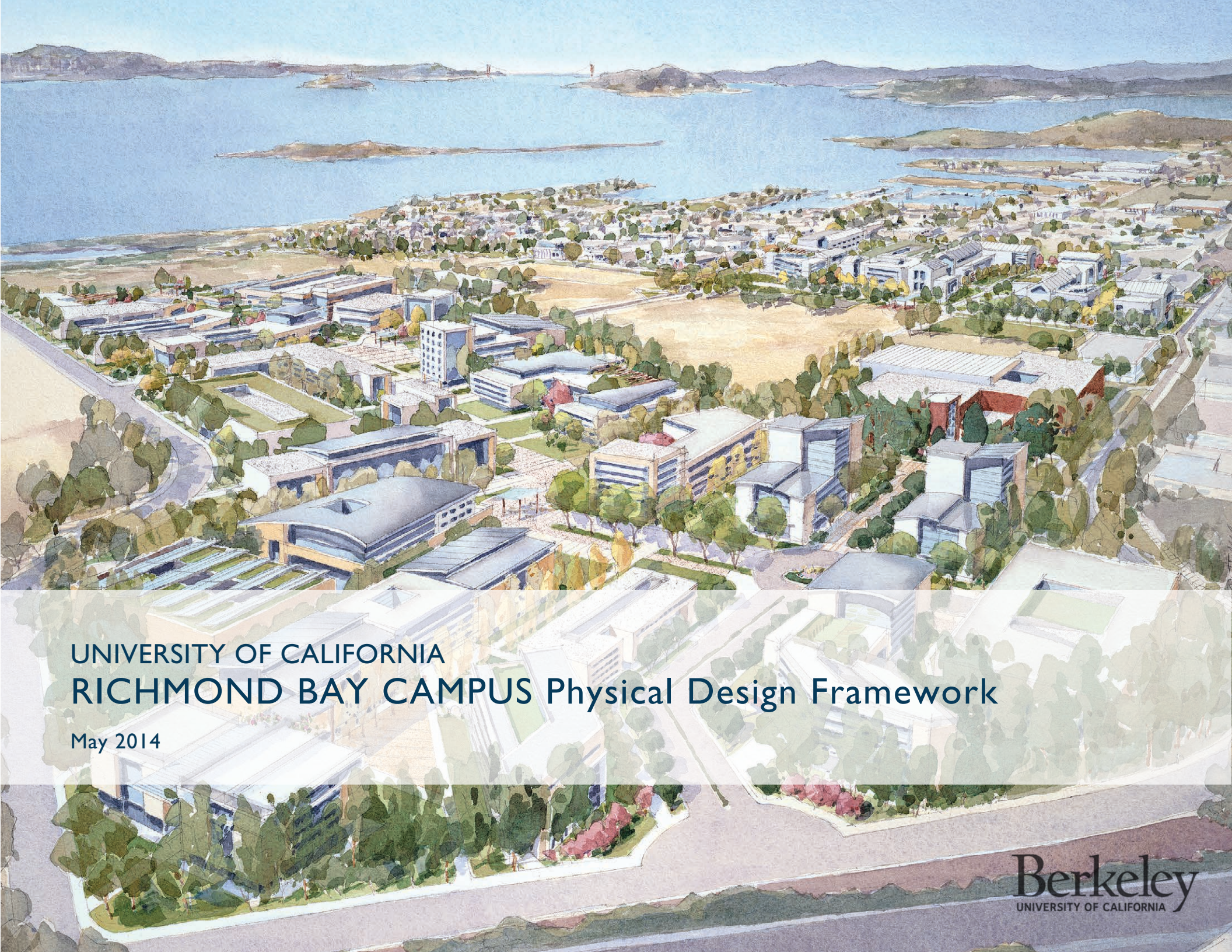
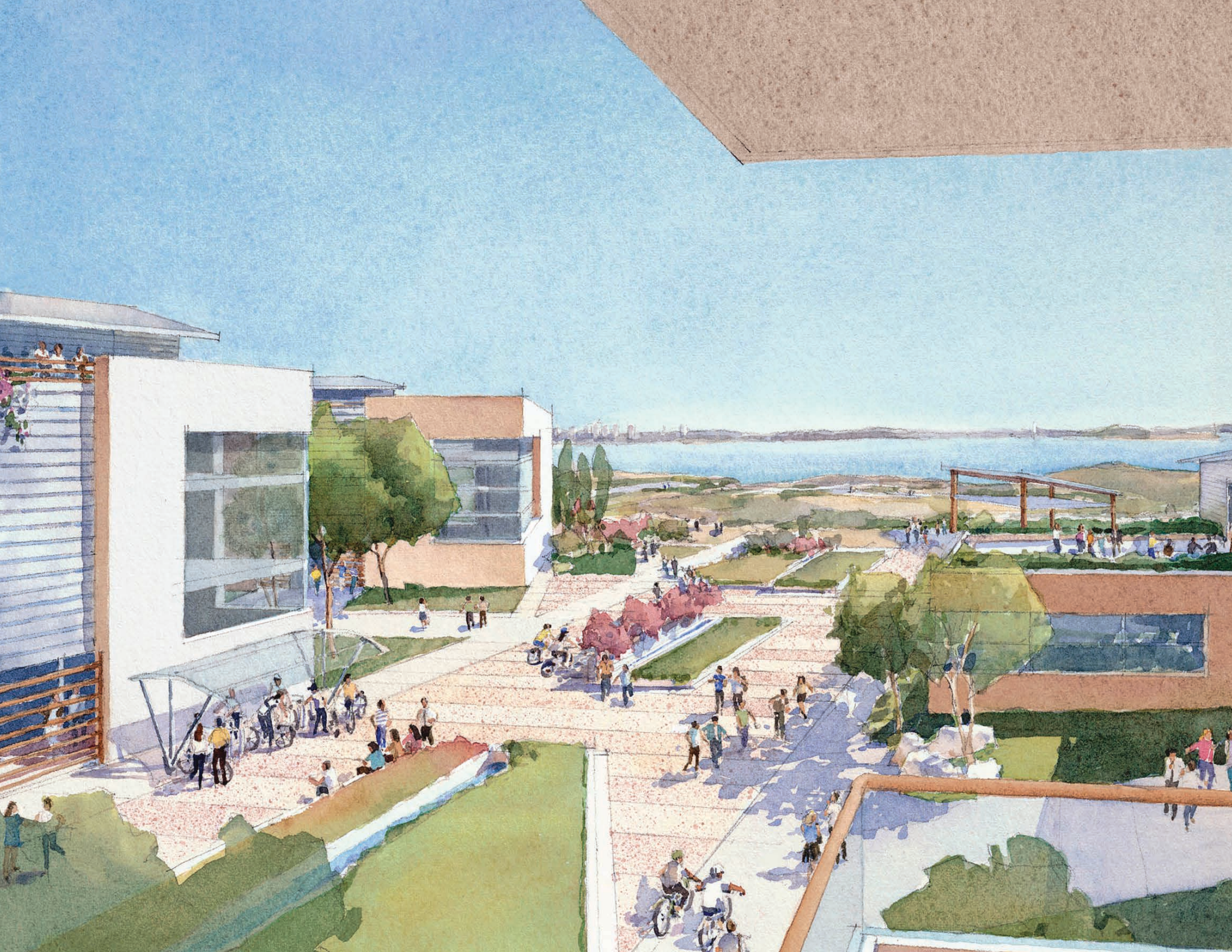


UNIVERSITY OF CALIFORNIA

RICHMOND BAY CAMPUS Physical Design Framework

May 2014

Berkeley
UNIVERSITY OF CALIFORNIA



THE CAMPUS EXPERIENCE

The Richmond Bay Campus will unify individuals from a broad set of backgrounds; contributing to its research, taking part in educational activities, or simply enjoying the open space and scenery. Some will be present on a daily basis while others will visit periodically. Each will have an inspiring and rewarding experience.

An ***employee who lives in the community*** will bicycle on the Bay Trail along the waterfront or take public transit to a convenient bus stop on the campus. Walking along the central spine, he will greet associates heading to various destinations, and will stop for coffee at one of the refreshment kiosks. Thus armed for the day's work, he will enter one of the lab buildings, stopping to chat with colleagues in the lobby or on the central stairs, and then proceed to his office for the day's undertakings.

The ***post-doc researcher*** who spends much of her time on campus, will travel there via BART and her bicycle on designated bike lanes through the local community, parking in a secured bike storage locker. Her lab building, located near the Bay edge, will welcome her with a view across the marsh and San Francisco Bay. At lunch she will sit outside with colleagues who came to campus on the shuttle and discuss their latest projects, taking in the panorama of the Bay and fog coming in through the Golden Gate. On other days, she will gather with several others after work and bicycle along the waterfront to a restaurant overlooking the marina.

The many ***scientists from other institutions*** who come for extended visits to take advantage of the advanced research facilities and equipment at the campus will stay at a nearby hotel or at the overnight accommodations on site. Driving to campus they will find convenient parking at the edge of the site. Walking into the campus, they will be impressed with the sustainable architecture, beautiful site, and the views down the central spine to the Bay and San Francisco. At noon, they will walk across the natural grasslands boardwalk for a lunch appointment on the west side of the campus, stopping to read the informative postings about coastal prairie management.

The ***local community members*** will come to the campus by bicycle, on foot, or in cars to enjoy the open space. With its informational and interpretive signage describing the natural environment, the campus will be an educational enhancement to the nearby Bay Trail. Others may come for an extended period for job training or internships. Special events, such as science fairs and lectures featuring speakers on a wide range of important scientific topics, will also draw the local and regional community members.

Throughout the year, local Richmond schools will bring ***classes of school children*** to the campus to be inspired by the day-to-day research, campus facilities and site amenities that exhibit state-of-the-art sustainability practices. In winter with its seasonal rains, students will see the drainage swales and detention basins filling with rainwater. Throughout the year they will see real-time energy use as displayed in a laboratory building lobby, incorporating energy derived from rooftop solar panels or small scale wind turbines. In addition, they may see how food and landscaping waste is delivered to the on-site anaerobic digester to generate sustainable energy for site operations.

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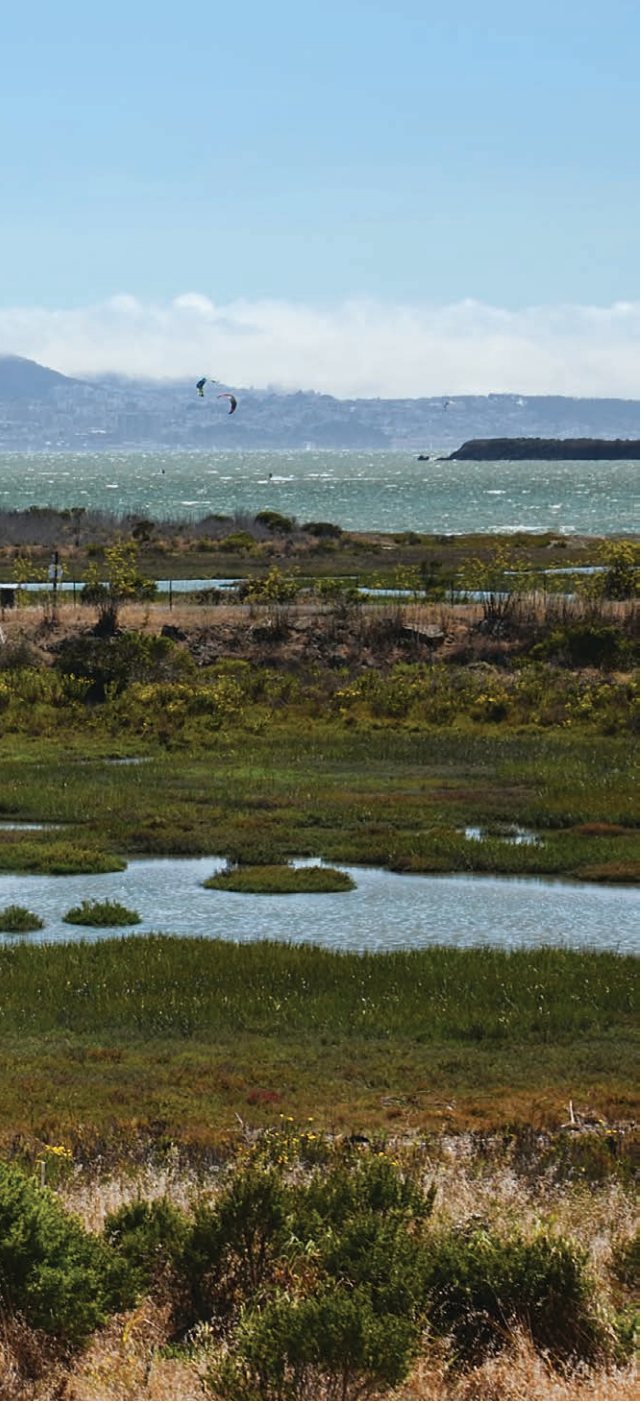


1 INTRODUCTION

The Richmond Bay Campus will serve as a model of new research campus development that manifests the values of its founding institutions. Through the design of buildings and spaces, the campus will convey the power of innovation embodied by these institutions. It will:

- Convey in its architecture the optimism of its scientific research, exhibiting forward thinking and progress.
- Promote respect for and understanding of the natural environment through protection of special ecological communities and the use of sustainable site development strategies.
- Foster creativity by providing opportunities for interaction and reflection in a versatile environment.
- Reflect institutional history and permanence as well as emerging research fields and endeavors, balancing conservation with evolution.
- Be an important asset to the community, providing education and resources through programs, site and building development, and interpretive activities.

PURPOSE

The Richmond Bay Campus Physical Design Framework grounds the University of California's vision of "a state-of-the-art, inspirational, and sustainable place to produce world-class collaborative science for healthy living and sustainable communities," in the opportunities associated with the unique physical environment. This Richmond Bay Campus Physical Design Framework describes the vision for the physical manifestation of the campus and articulates the planning and design principles necessary to build a cohesive and distinctive campus as development proceeds over time. Consistent with University of California policy, it provides guidance to decision-makers, campus staff, and design professionals who will be charged with site and building design.

The Physical Design Framework also outlines information and processes to satisfy Regental policy and guide Chancellor-level approval of capital investment at the Richmond Bay Campus (RBC) and to inform Regental approval for larger projects.

RELATIONSHIP TO OTHER DOCUMENTS

The Physical Design Framework accompanies and complements the Richmond Bay Campus 2014 Long Range Development Plan (LRDP). The LRDP is a comprehensive planning document, prepared on behalf of the long-standing institutional partnership of UC Berkeley and the University of California Lawrence Berkeley National Laboratory (LBNL), and establishes the land use pattern and policies to guide joint development of the campus. As these partners move to establish the new Richmond Bay Campus, the LRDP presents a land use plan to accommodate the University's projected research, education and support program while preserving significant open space on the site.

The Richmond Bay Campus 2014 LRDP sets forth the University's goals for the RBC and describes the current context for physical planning at the site. Highlights of the LRDP are presented herein, for further information readers are encouraged to review the LRDP itself.

While its development is not subject to municipal land use ordinances, the University strives to align its development plans with local goals. Work on the LRDP commenced shortly after completion of the City of Richmond's 2030 General Plan, where change areas 15 (Regatta/Marina Bay) and 16 (Southern Gateway) include the RBC site. Design principles in the General Plan (see excerpts in Appendix A) were considered in development of both the LRDP and this Physical Design Framework.

Development of planning documents for the RBC has proceeded apace with the City of Richmond's own work developing a specific plan for the vicinity of the project site, known as the South Shoreline Specific Plan. University staff is participating in the South Shoreline Specific Plan process and anticipate that the 2014 RBC LRDP, this Physical Design Framework, and the eventual South Shoreline Specific Plan will together facilitate desirable development that meets the expectations of the community, stakeholders, the City of Richmond, and the University for beneficial change in the South Shoreline Area.

DOCUMENT ORGANIZATION

This document presents the design intention and guidelines for the Richmond Bay Campus. It is intended to provide direction to architects, landscape architects, and planners as they implement the future buildings and neighborhoods of the campus.

The document is organized as follows:

Design Context: This section sets the basis for design guidance, discussing the conditions that may influence design. These include the Research Vision, input from researchers about the qualities that will be important to their work; Community Context, the character of the Richmond setting; Campus Context, the campus site and its physical and environmental conditions; and Site Inspiration, qualities of the site that provide a departure for campus design.

Campus Framework: The Campus Framework sets the basic organizing principles around which the plan for the campus is set. The Campus Parti explains the four key concepts, or big ideas, that have led to the layout of the campus. The Illustrative Development Scenario presents a possible future build out of the campus, incorporating the guidance of the LRDP and the guidelines in this document. The Long Range Development Plan Summary briefly discusses the various plan layout components, such as circulation and open space.

Design Guidelines: The guidelines address three major topics: Site Development—the overall layout of the buildings and open space—Building Design, and Open Space and Landscape Design. The guidelines are intended not to be overly prescriptive, but to provide direction and intent to designers and planners.

Implementation: The implementation section describes the process and procedures that will be used to ensure that site, facility and landscape design is in conformance with the intent of this document.

2 DESIGN CONTEXT

The location of the Richmond Bay Campus on the San Francisco Bay shoreline and the specific conditions and features of the site present a number of opportunities and challenges for the development of the campus. The design context, the factors that have influenced the content of this document, is discussed below in the following topics: Vision, Community Context, Campus Context, and Site Inspiration.

VISION

SCIENCE

The scientific vision for the Richmond Bay Campus is focused on the development of solutions for 21st century challenges in the areas of energy, the environment, health, and the global economy.

In the near-term, existing programs at the site in sustainable transportation and earthquake engineering, among others, will continue. New programs under consideration may establish the campus as a hub of joint research in advanced manufacturing, bioscience, and energy storage. Research conducted at the Richmond Bay Campus may ultimately span additional research disciplines at the core of the University of California Berkeley and Lawrence Berkeley National Laboratory programs. The Richmond Bay Campus will strengthen opportunities for partnerships with private industry.

Interdisciplinary collaboration or "team science" has been the foundation of the success that both LBNL and UC Berkeley have enjoyed in producing innovative research and technology in a broad array of disciplines. Development of the Richmond Bay Campus will provide opportunities for researchers, students, and staff to interact in meaningful ways on a daily basis: within laboratories and conference rooms, in building corridors and courtyards, and in outdoor preserved natural areas, recreation, and event spaces. The new site and facilities environment will support collaboration on many levels.

COMMUNITY

The Richmond Bay Campus is envisioned as the anchor of a center for innovation in the City of Richmond South Shoreline Area, serving as a catalyst for the development of other research facilities, both public and private, on nearby properties. While portions of the South Shoreline Area have been successfully developed in recent years, there remain many vacant or underdeveloped sites, particularly in the immediate vicinity of the campus. The City's pending South Shoreline Specific Plan will guide its long term growth and change with an emphasis on a diverse and dynamic mix of uses. Central to the area, the Richmond Bay Campus will significantly influence the development pattern and design quality throughout the area.

The program for the research campus is also of significance to the Richmond community. In 2013 Richmond High School was the first high school visited by then new UC Berkeley Chancellor Nicholas Dirks, partly in recognition of the importance of the new campus to the community. Ensuring that the campus is a community asset, accessible and welcoming and that it conveys the importance of education, stewardship, accomplishment, science, and innovation not only through programs but also through the care taken in developing the campus site and buildings, is a high priority.

PROGRAM

In order to successfully achieve the scientific and community visions, development at the Richmond Bay Campus will replace much of the existing stock of aging facilities and limited infrastructure with state-of-the-art infrastructure and research buildings designed to foster multi-discipline collaborations.

This will result in growth of research programs, population, and occupied space. The average daily population at the campus is projected to grow from 300 in 2013 to 10,000 by 2050. This population increase of 9,700 represents an average annual growth rate of 9.9 percent over that time period. The on-site population will include research scientists, faculty, and staff from LBNL and UC Berkeley as well as other public and private entities; graduate and post-doctoral students; undergraduate students and interns; administrative staff; and operational staff.

The projected net increase in occupied building area at the Richmond Bay Campus is 4,350,000 gross square feet (gsf), from 1,050,000 gsf in 2013 to 5,400,000 gsf in 2050. This net growth projection accounts for the demolition of 750,000 gsf of building space that is unsafe or beyond its useful life. The projected annual space growth rate of 4.5% is lower than the projected population growth rate due to the greater amount of underutilized existing space which will be recapitalized or replaced with facilities which support a denser population.

SITE AND FACILITIES

The vision for site and facilities at the Richmond Bay Campus will be achieved by applying nine principles inspired by the research enterprise to be conducted, the special qualities of the site, and the City of Richmond's vision for the South Shoreline Area. These principles are the foundation for achieving the vision to make the Richmond Bay Campus an inspirational, accessible, and sustainable place to perform world-class science.

- Organize for Inspiration
- Establish an Appealing Character
- Develop the Location of Choice
- Build Resilience
- Create a Living Laboratory
- Improve Accessibility
- Connect with the Community
- Plan for Growth
- Operate Safely, Reliably, and Responsibly

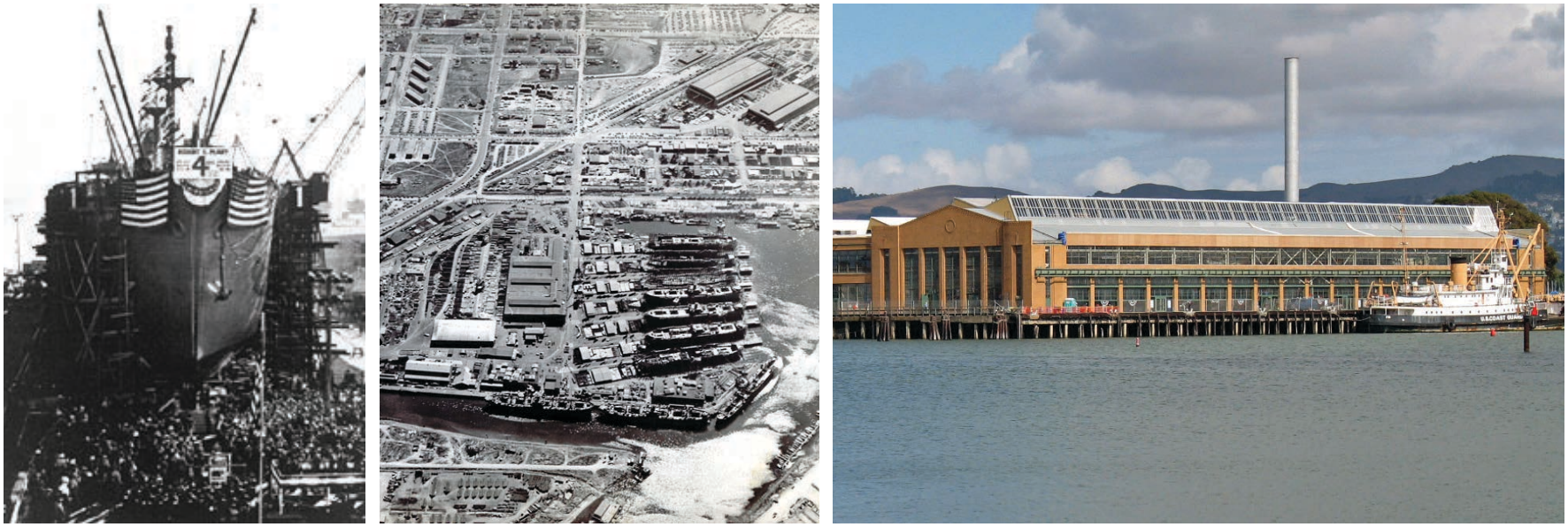
The Richmond Bay Campus vision is to serve as a community resource, providing jobs and educational programs (left). Developing the site as a "living laboratory" may include showcasing stormwater management systems (right).

COMMUNITY CONTEXT

The proposed Richmond Bay Campus is located on UC Berkeley-administered property fronting the San Francisco Bay in the South Shoreline Area of the City of Richmond (see Figure 2.1). This area is at the southernmost edge of the city between Interstate 580 (I-580) and the San Francisco Bay. Historically, this area has been the site of a variety of manufacturing and industrial uses, a number of which remain.

Richmond has a population of over 100,000 in an area of 34 square miles and over 32 miles of shoreline. The City is well known for its role in the World War II home front effort as it was the location of four Kaiser shipyards, the most productive in the nation, and launched 747 ships during the war. Tens of thousands of workers came from all over the United States to work in these wartime industries. During that period the City, particularly the downtown, was a thriving, bustling place. Following the war, many who had come for the war effort stayed, but employment declined precipitously.

In recent years, success in redeveloping portions of the waterfront, the Civic Center, and other parts of the City points to a revitalization of Richmond. Developing the Richmond Bay Campus will be an important and continuing part of this revitalization. The Ford Assembly Building, in particular, is a success story. Formerly the Ford Motor Company Assembly Plant, the largest Ford Plant built on the west coast, the building was converted to wartime production use during World War II. Now part of the Rosie the Riveter World War II Home Front National Historical Park, it has been completely renovated, houses several businesses, and includes a new conference center, restaurant, and a venue for special events. Additional waterfront parks, other restaurants, shopping centers, a marina, and



The Kaiser shipyards in Richmond (left and center) were highly productive facilities during World War II. The Ford Motor Company Assembly Plant (right) has a long history on the Richmond waterfront, and is enjoying a renewed purpose.

newer residential neighborhoods have been developed in the South Shoreline Area.

Land uses immediately adjacent to the Richmond Bay Campus are industrial, office, and transport, along with the Marina Bay single- and multi-family residential neighborhood immediately to the southwest. Arterial roadways, the Union Pacific Railroad tracks, and I-580 define the northern boundaries of the site. The California Department of Health Services is located to the northwest. A Pacific Gas and Electric (PG&E) service station and Bio-Rad Laboratories, a private research equipment manufacturing company, form the site's western boundary. The adjacent property to the east is the location of former chemical production operations previously owned by Zeneca. The Campus Bay Business Park is located on part of this site adjacent to the Bayview Avenue / I-580 interchange.

Major state and regional parks, the McLaughlin Eastshore State Park and the Point Isabel Regional Shoreline, lie to the southeast of the site and extend to the southern city limits. The San Francisco Bay Trail, a 300-mile (eventually to be 500-mile) bayfront multi-use trail that has been implemented regionally for more than the last two decades, passes along the Richmond South Shoreline Area, including along the bay frontage of the Richmond Bay Campus.

The Richmond Bay Campus is also close to a planned ferry landing near the Ford Assembly Building, which will provide a direct connection to and from San Francisco, and is located within three miles of three BART stations: Richmond (which also has an Amtrak station) and El Cerrito del Norte and El Cerrito Plaza (which have AC Transit and other bus system connections). The site is approximately six miles from UC Berkeley and the main LBNL campus.

The Marina Bay residential community (left) consists of single-family and multi-family homes. The San Francisco Bay Trail (right) is a popular route for walkers, joggers and bicyclists, and runs along the southern boundary of the Richmond Bay Campus.

Figure 2.1: Richmond South Shoreline Area

LEGEND

- Richmond Bay Campus
- Bay Trail
- Ferry Terminal
- Parks and Schools
- Restaurants and Retail

City of Richmond General Plan Land Use Designation

- Residential
- School
- Medium Density Mixed-Use (Commercial Emphasis)
- High Intensity Mixed-Use (Major Activity Center)
- Business/Light Industrial
- Port
- Parks & Recreation
- Open Space

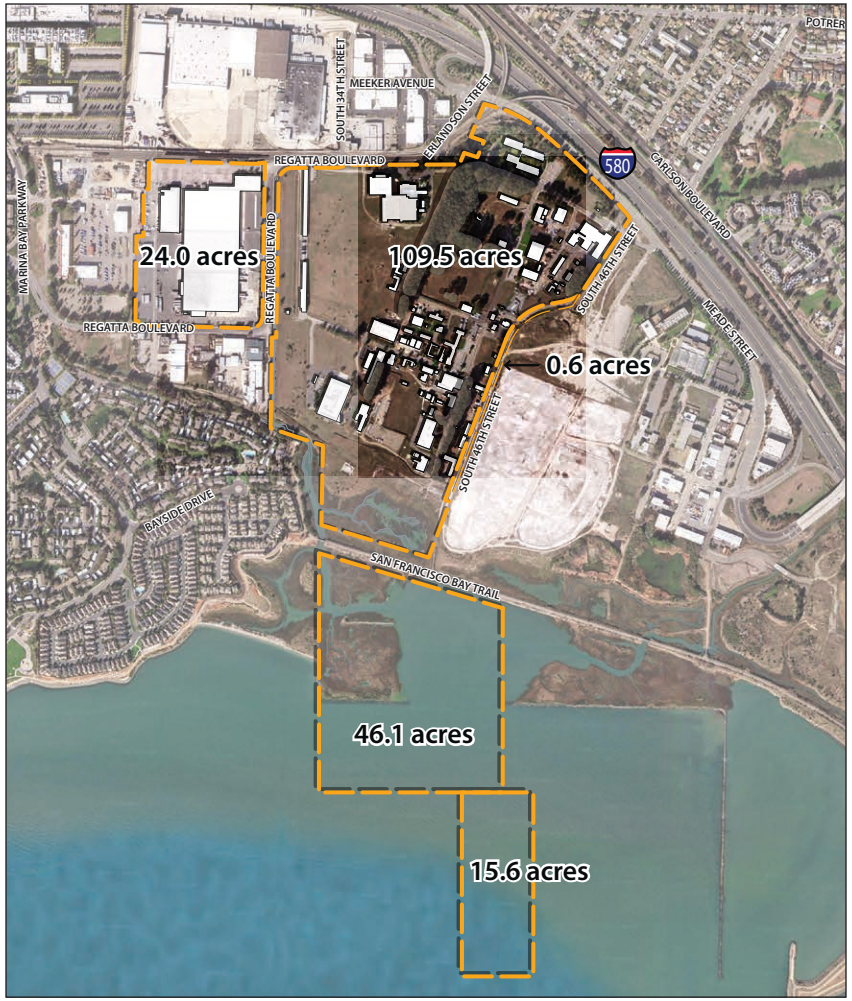
N NTS

CAMPUS CONTEXT

SITE SETTING

The Richmond Bay Campus is located directly south of the Regatta Boulevard / I-580 freeway interchange on University-owned property fronting the San Francisco Bay in the South Shoreline Area of the City of Richmond. The University owns four contiguous parcels in this location: a 109.8-acre parcel that contains the currently developed upland portion of the Richmond Field Station (RFS); a 24.0-acre developed parcel along Regatta Boulevard immediately west of the RFS, acquired in 2007 and currently referred to as the Regatta Site; and two parcels in the San Francisco Bay comprising 46.1 and 15.6 acres, respectively (see Figure 2.2). The University also has a 0.6-acre ownership interest in a portion of South 46th Street along the eastern border of the RFS. Under UC Berkeley's land use authority, LBNL and UC Berkeley propose to cooperatively develop portions of the RFS, Regatta, and South 46th Street properties, totaling approximately 134 acres, as the Richmond Bay Campus.

Figure 2.2: UC Berkeley Richmond Field Station Properties



SITE CONDITIONS

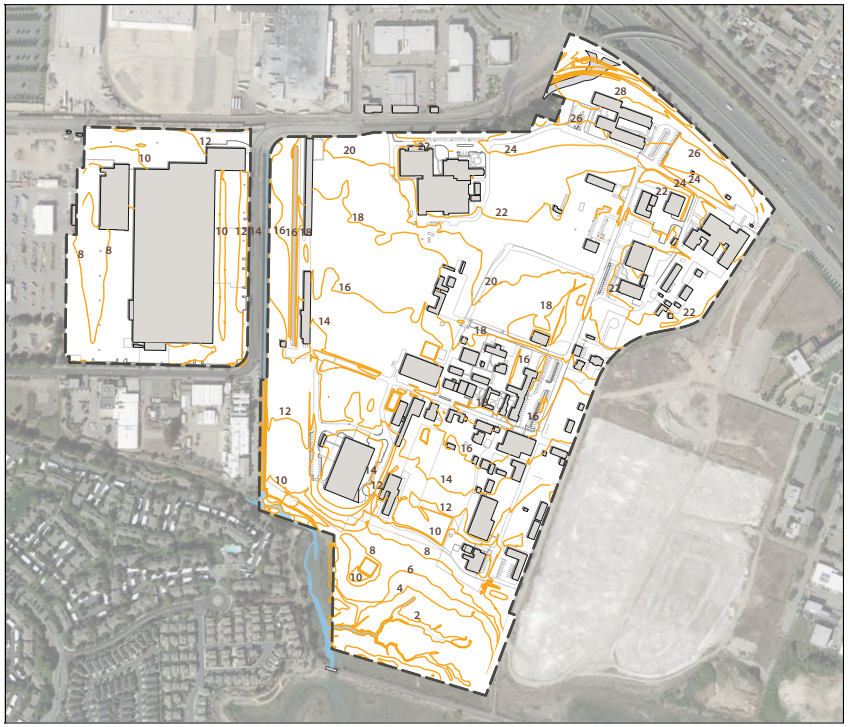
Topography and Hydrology

The Richmond Bay Campus site is nearly level, as shown in Figure 2.3, with a grade difference of 20 feet from the high point near Meade Street to the lowest areas near Western Stege Marsh. The terrain also slopes downward from east to west with the same 20 feet grade difference as north to south. The site's elevation is above the nearby freeway but is similar to adjoining properties in the South Shoreline Area. The gentle slope of the site allows gravity flow of all storm drainage ultimately to Meeker Slough. An existing City of Richmond storm drain channel adjoining Regatta Boulevard carries stormwater from the watershed area north of the site, and from the western portions of the campus, into Meeker Tidal Creek (see Figure 2.4). Meeker Tidal Creek is tidally influenced and discharges to Meeker Slough on City of Richmond property to the west of Western Stege Marsh.

Views

Off-site distant views from the campus are possible in nearly 360 degrees of orientation. To the west Mount Tamalpais and the Marin Headlands are visible; to the southwest the San Francisco skyline, Treasure Island, and Bay Bridge can be seen; and to the east and north are the hills above Oakland, Berkeley and El Cerrito. The low-lying and flat nature of the site, however, means that views of San Francisco Bay, the waterfront, and marshes are best experienced from viewpoints close to the marsh.

Figure 2.3: Site Topography



The Richmond Bay Campus commands dramatic views of San Francisco (top). From the NRLF building, the view west spans from Angel Island to Marin County, including Mount Tamalpais (bottom).

Existing Facilities

The existing buildings at the Richmond Bay Campus total to over 1 million gross square feet (gsf) of floor space (see Figure 2.4). These buildings range from older buildings that are remnants of previous site operations to newer structures that have been purpose-built for current research activities. Current facilities include one of the world's largest earthquake shaking tables, test facilities for advanced transportation research, the Northern Regional Library Facility (NRLF) - an archive facility of the University of California system - and a privately developed regional laboratory for the US Environmental Protection Agency (EPA). Current activities also include research and teaching in integrative biology and art practice. The Regatta site includes over 400,000 gsf of warehouse space, and houses UC Berkeley archives and museum collections and some private sector tenants. With the exception of the EPA and NRLF facilities, all of the existing buildings will be replaced as the Richmond Bay Campus is developed; existing programs in space to be demolished will be accommodated within other LBNL or UC Berkeley space.

Implementation of the LRDP will occur over a long period of time; for an extended interim period, the existing buildings and landscapes of the Richmond Field Station will be retained. Building 445, which was recently updated with assembly and community meeting space and a new café, will provide useful amenities in early stages of campus development. A cluster of buildings generally located between existing Lark and Crow Drives, which has an interesting scale and eclectic style, can also lend an informal sense of community as the campus begins to evolve. As the campus is developed over time, it will be essential to create a sense of critical mass by clustering facilities near one another in a similar manner to establish a community of people and spaces, and efficiently utilize existing and new infrastructure.

Some of the existing buildings on the Richmond Bay Campus site are likely to stay in use for some time. These include (from left to right): the Regatta Building, RFS Administrative Offices (ADMIN), and the Northern Regional Library Facility (NRLF).

Figure 2.4: Existing Site

LEGEND

- Property Boundary
- Disturbed Coastal Terrace Prairie
- Non Native Grassland & Mixed Ruderal Scrub
- Coastal Terrace Prairie
- Other Grasslands/Open Space
- Wetlands
- Restored Native Upland
- Surface Water
- Eucalyptus Stands
- Trees
- Existing Buildings

NRLF	Northern Regional Library Facility
EPA	US EPA Region 9 Laboratory
PEER	Pacific Earthquake Engineering Research Center
ADMIN	Richmond Field Station Administrative Office (formerly Forest Products Laboratory)
TSRC	Transportation Sustainability Research Center

Source: *Habitat and Wetlands Map, Current Conditions Report,* Tetra Tech, November 2008.

N

0 150 300 600'

Natural Features

Its waterfront location and natural features give the Richmond Bay Campus a distinctive character. The site and adjacent waterway feature are natural areas prized for their aesthetic, research, and habitat value, including coastal terrace prairie grasslands, Western Stege Marsh, and Meeker Slough (see Figure 2.4).

Perennial grasslands once dominated the California landscape, but the introduction of cattle, development, and competitive non-native species severely challenged the native grassland communities. A remnant of the original coastal grasslands, known as coastal terrace prairie, exists on the University's Richmond properties. These grassland areas are among the few remaining coastal terrace prairie on lowland clay soils in the greater East Bay region. The grasslands provide habitat for small species of reptiles and amphibians, as well as seed- and insect-eating mammals and birds. UC Berkeley students and faculty have long studied these resources, which provide unique opportunities for field research.

The Western Stege Marsh is located at the southern edge of the site and consists of approximately nine acres of waterlogged land including mudflats and tidal wetlands. Meeker Slough is the continuation of Meeker Tidal Creek, which flows from the west and bends southward at Western Stege Marsh where it drains to San Francisco Bay. UC Berkeley has completed extensive remediation and restoration of the Western Stege Marsh and

The coastal terrace prairie in the central part of the campus is a rare and valuable ecosystem (above left). Meeker Slough (above right), adjacent to the campus, and Western Stege Marsh (opposite left), are productive estuarine habitat types, attracting numerous birds and bats. The stands of eucalyptus trees (opposite right) are distinctive visual landmarks on the site.

monitoring of these natural areas continues. Western Stege Marsh and Meeker Slough provide nesting and foraging habitat for a number of birds and shorebirds, as well as foraging and drinking areas for bats. This tidal marsh is also known habitat for the special-status California Clapper Rail (Rallus longirostris obsoletus), which is a medium-sized bird that rarely flies.

The Richmond Bay Campus site has five stands of tall eucalyptus trees and a total of approximately 1,300 trees. The stands were planted as wind breaks and blast mitigation by the California Cap Company. While not native, the eucalyptus trees serve as a visual landmark on the site. The largest stand of eucalyptus provides habitat for raptors and wintering monarch butterflies.

The eucalyptus trees conflict with other biological values, are prone to limb breakage, and are a fire hazard.

Climate

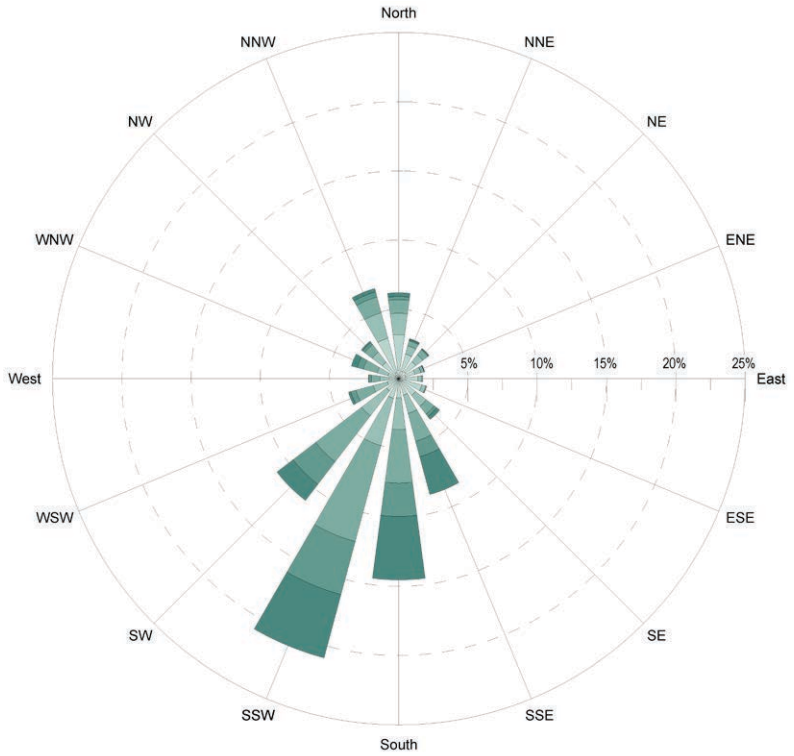
The Richmond Bay Campus site enjoys a very mild Mediterranean climate year-round, with average highs from 57 to 73°F and lows between 43 and 56°F year-round. The area enjoys more than 80% sunshine seven months out of the year and ten months with 60% or more. The site experiences periodically strong breezes coming from the San Francisco Bay (see Figure 2.5). It is generally windiest from March through August, and the strongest winds typically occur in June. The rainy season generally begins in late October and ends in April with some showers in May.

This climate is ideal for passive building design and energy conservation; however, occasional climatic conditions such as cold fog and the gusting winds can be harsh and uncomfortable. These conditions can be mitigated by siting of buildings to avoid wind-tunnel effects, and shaping of site form and landscaping to provide respite from wind and create comfortable, protected areas.

Sea Level Rise

Water levels in San Francisco Bay have risen nearly eight inches over the past century. Climate change is expected to increase the rate of sea level rise globally over the next century. The potential for sea level rise is a planning consideration due to the site's waterfront location, though it is not expected to pose development constraints for most of the site. Areas identified as having flooding potential or vulnerability to tsunamis are limited to the southernmost portion of the site and have been excluded from development. Additional infrastructure improvements may be needed to protect the southern edge of the site.

Figure 2.5: Wind Conditions (Richmond, CA)



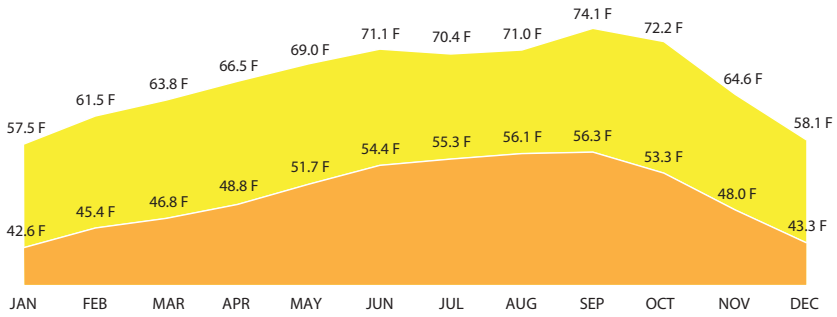
Wind Speed Categories (meters per second)

- > 0.5 - 2
- > 2 - 4
- > 4 - 6
- > 6 - 9
- > 9 - 11
- > 11

NOTES:
1) Orientation of wind rose is the same as the Richmond Bay Campus plans in this document
2) A wind rose is a graphical representation of the frequency of occurrence of wind speed ranges coming out of a given direction. Spikes indicate percent of time wind is blowing FROM the listed direction.
3) Average wind speed: 3.04 miles per hour
4) Maximum wind speed: 34.9 miles per hour ("maximum" represents greatest of the hourly averages; i.e., not a true wind gust)

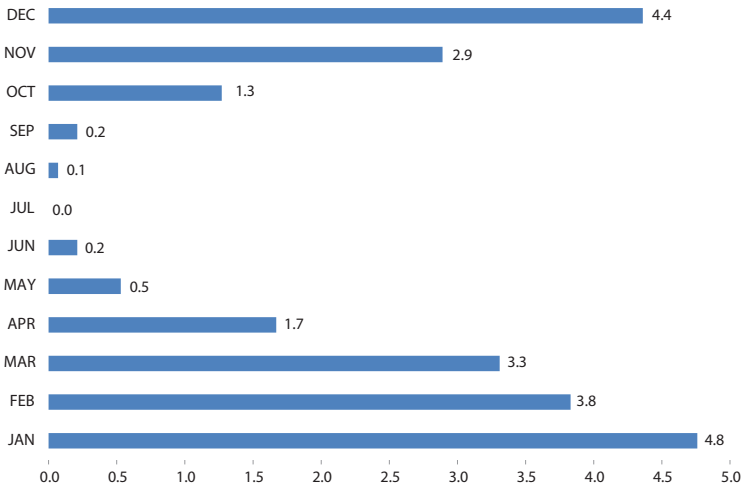
Source: Bay Area Air Quality Management District (BAAQMD). Data from monitoring site at Richmond Field Station, 2000-2005.

Figure 2.6: Average Minimum and Maximum Temperature for Richmond, CA



Source: Western Regional Climate Center

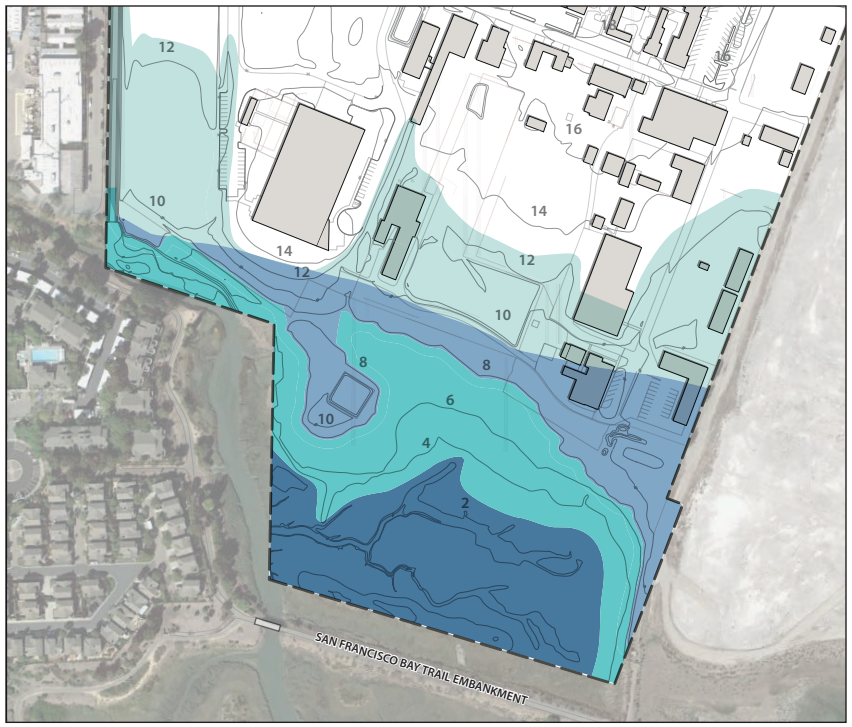
Figure 2.7: Average Minimum and Maximum Precipitation for Richmond, CA



Average Total Precipitation: 23.1 inches

Source: Western Regional Climate Center

Figure 2.8: Site Topography & Sea Level Rise Projection



LEGEND

- Property Boundary
- 18 Elevation Contour Line (feet)
- 2100 Projected Sea Level Rise + 100-year Event Inundation Flood Limit
- 2013 100-year Event Inundation Flood Limit (2009 FEMA FIRM Map, Zone VE)
- 2100 Projected Mean Higher High Water Tide Level
- 2013 Mean Higher High Water Tide Level

Note: Datums referenced to NGVD29.

SITE INSPIRATION

The natural environment of the Richmond Bay Campus site offers a wealth of inspiration for campus design. The following site characteristics inform the campus framework and design guidelines, supporting development of a campus with a distinct identity, rooted in place.

LAYERING

There is a layered pattern in the landscape that is evident from many vantage points. Distinct plant communities weave across the site in wide, overlapping bands. From the water's edge, this pattern illustrates the succession process, with marsh in the foreground, then grasslands, then scrub/shrub areas. The site's existing buildings sit on the ground plane beyond these layers against a vertical backdrop of tall trees, vestiges of historic site plantings.

NATURAL/URBAN CONTRAST

Views to the south across the bay offer a stark contrast between the site's natural communities and the urban San Francisco skyline. The interesting tension between the two in the juxtaposition of patterns and textures attracts the eye. These views suggest that the two forms—natural open space and dense built fabric—will integrate effectively at the Richmond Bay Campus.

HORIZONTALITY

The grassland meadows throughout the site have a simple horizontality in their composition. Some of the site's buildings are low and linear in form as well, highlighting the grasslands' horizontal nature. This low linearity and complementary relationship between open space and buildings could be repeated in future site development, especially around the edges of the campus to minimize visual impact.

VERTICALITY

In contrast to the frequent horizontal patterns across the site, stands of tall eucalyptus and pine trees are dramatic in their verticality. The interplay between the two patterns offers inspiration for the landscape design. The vertical tree stands also serve as orienting landmarks on the site. Tall trees or other vertical features could serve this function in the campus landscape design.

GEOMETRY

Prior to the site's current use, tree stands were planted on the site to provide a buffer between industrial activity areas. The stands were linear and orthogonal in their pattern, and this geometry is still evident on the site today. The intersection of these man-made patterns with the organic plant patterns that have evolved naturally on the site provides a potential precedent for the landscape design.

VIEWS

Long views from the site are characterized by the flat lowlands in the foreground, midfield expanses of water, and gently mounding hills – Mount Tamalpais, Angel Island, San Bruno Mountain, Yerba Buena Island, and the Berkeley hills – on the horizon. The campus landscape design could evoke these topographic relationships.

INFORMALITY

Informal site pathways are lined with plant layers that step back in height from the path's edge, directing the eye and framing views through the site. This arrangement, occurring naturally here, could be replicated in informal areas of the campus.

DRIFT PATTERN

There is a naturally occurring pattern of drifting colors across the site from inter-woven plant species. This pattern is most visible in the grassland meadows where drifting plant massings have a distinct visual quality which could inspire elements of building or landscape design.

DAPPLED SUNLIGHT

Tall evergreen tree canopies create a pleasant dappled pattern of darks and lights as the sunlight passes through the leaves. The spaces created on the ground are comfortable settings that are neither bleached with sunlight nor swallowed in shadow. The areas where this occurs would provide comfortable exterior contemplative and gathering spaces.

WATER

A distinct characteristic of the site is the San Francisco Bay edge and the ever-changing water level in the tidally-influenced Meeker Slough and Stege Marsh. The water's surface is sometimes roughly textured and sometimes smooth like glass, primarily depending on wind speed. Above the ground plane, fog is often visible in the summer and a variety of cloud types add visual interest in the winter, each with their own quiet beauty. Site materials might take their cues from these myriad qualities and textures.

COLOR

The dominant colors in the Richmond Bay Campus landscape are the many greens and golds of the varied grasses, shrubs, and trees. These colors shift and morph with the movement of the sun, fog, clouds, and the blow of breezes off the bay.

Complementing the landscape palette are hues of brown, blue, silver, and gray in the water, marsh and mudflats along the waterfront. The colors change with the tides, with the sky and fog, and with the time of year.

The bright warm colors of native wildflowers that spatter the site draw the eye and create interesting accents in the site's color palette. The oranges in the seasonal California poppy provide a pronounced counterpoint to the predominant earth tones. A palette of color families could be derived from these existing shades to elegantly blend future development with the natural environment.

3 CAMPUS FRAMEWORK

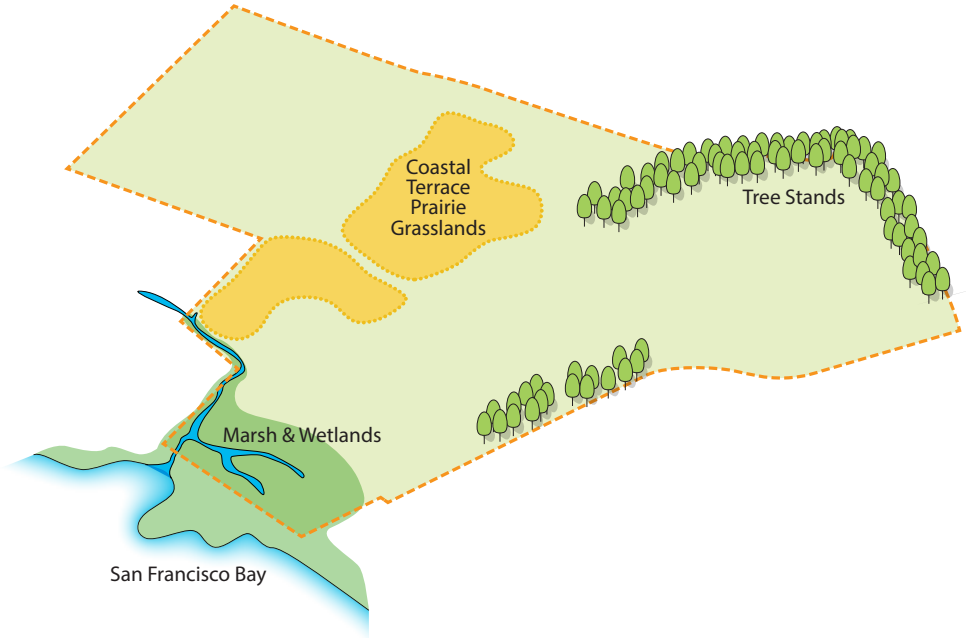
This chapter describes the organizing concepts for the layout of the campus, and sets the stage for the design of future site, building and landscape development projects. Included is the Campus Parti, the Illustrative Development Scenario, and a summary of the Long Range Development Plan.

CAMPUS PARTI

The concept of a parti is defined by one writer as “a map for future design activities in the form of a hierarchy of values and responding forms” and “an image that arouses expectations and provides motivation for all persons involved in the design process” (Laseau 1989, 155, quoted in www.williambenedict.com/design-education/parti.html).

The following four concepts are intended as the site-wide parti, or organizing framework, for the new Richmond Bay Campus.

Figure 3.1: Characteristic Zones



THE LAND AND SENSE OF PLACE

Embrace the natural setting; establish a sense of place.

The Richmond Bay Campus land use plan preserves important natural attributes of the site, particularly the grasslands and marsh which are essential to maintaining the site’s quality. Outstanding views on the site—towards the natural features of grasslands, tree stands, and the marsh; to the surrounding hillsides in Marin, Contra Costa, and Alameda counties; as well as to San Francisco Bay—provide visual interest and act as orienting landmarks.

Several different natural systems can inspire campus design. With changing site conditions from the bay edge to the upland areas of the site, the plant communities transition from tidal mudflats and marsh to grasslands, and ultimately a shrub layer of coastal scrub. Another landscape typology on the site is that of the introduced woodlands—primarily Blue Gum Eucalyptus and Monterey Pine—which serve as an orienting landmark and separate the site into outdoor rooms.

Views of the campus from surrounding neighborhoods and hillsides are dominated by green, blue, brown, yellow, and gray hues. As the Richmond Bay Campus is developed, a building context will be created and a new sense of place, linked to the built environment, will evolve. New buildings will relate to existing buildings and both will shape the campus identity as seen from beyond the campus boundaries.

Figure 3.1 highlights the most distinctive natural features of the site which will give identity and form to the campus.

NEIGHBORHOODS

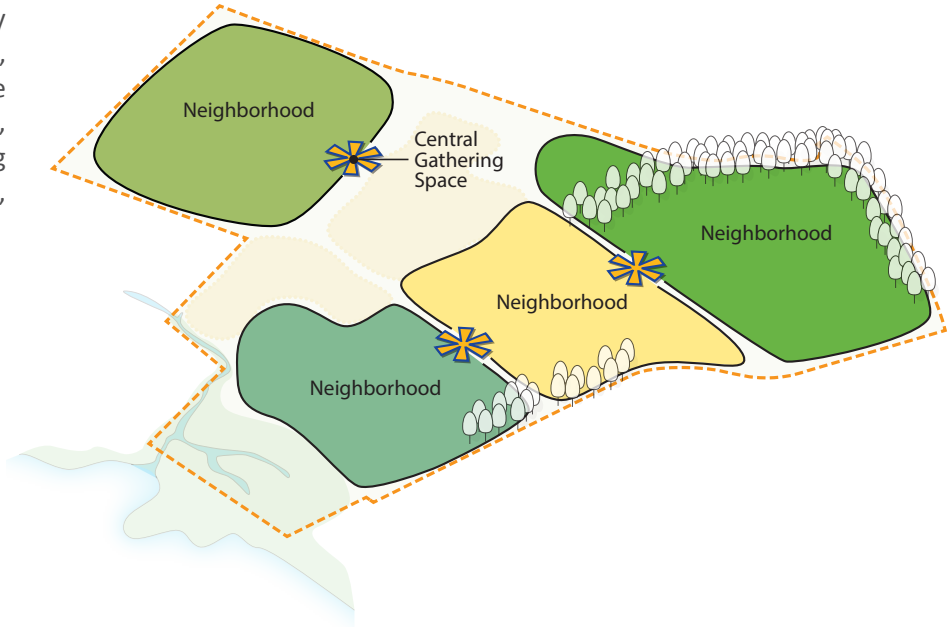
Establish distinct neighborhoods to provide scale and identity.

A large research or education campus benefits from having defined neighborhoods or precincts within the larger whole. This subdivision of the campus can help to create a more manageable scale of development for daily users, and can help with wayfinding by clustering like or related facilities together. Neighborhoods can be defined by the constraints imposed by natural features and can also derive from logical units of use or users.

Figure 3.2 suggests a conceptual design framework in which developed areas of the site take their character from adjacent natural and introduced landscapes, suggestive of ecological succession. The Richmond Bay Campus will be organized into four distinct "neighborhoods" or groupings of buildings and spaces surrounding the natural open space, with three neighborhoods to the east of the open space and one to the west. Each neighborhood may have a unique design theme or aesthetic identity expressed through common architecture or plant materials, open space, and landscaping design. Each neighborhood will have a central space around which concentrations of active uses—dining, meeting rooms, recreation or building lobbies—will be focused. The primary gathering spaces on the campus will be located at the intersection of neighborhoods, creating connections between districts.

The neighborhoods will vary somewhat in terms of density of development. Taller buildings will be more suitable at the north of the site, adjoining the eucalyptus trees, freeway, and regional roads, while lower buildings are more suitable near the Bay and the pedestrians and bicyclists using the Bay Trail. Throughout the campus, buildings similar in scale to those found at UC Berkeley and urban research campuses are suitable because they will allow the preservation of important natural open space, and they will generate a critical mass of population to encourage collaboration and idea exchange.

Figure 3.2: Land "Neighborhoods"



COLLABORATION AND INTERACTION

Bring people and programs together; provide for a range of activities.

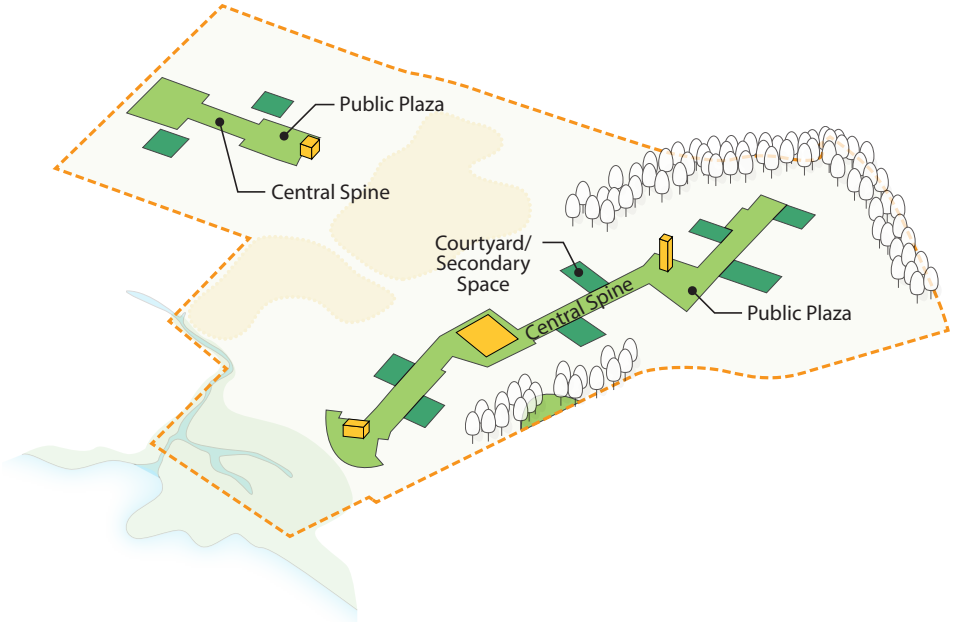
Team science and collaboration, hallmarks of LBNL and UC Berkeley from their founding to present day, will be defining characteristics of the research activities undertaken at the Richmond Bay Campus.

The campus will be designed to bring together staff, scientists, and guests from separate buildings to common spaces where they can interact on a daily basis. A north-south linear open space will be the primary pedestrian pathway connecting the central space of each neighborhood on the eastern side of the campus. Buildings will be arranged along this central spine with active social spaces such as building lobbies, dining venues, and meeting and special event spaces fronting the spine to enliven the center of the campus. The central spine will be the place to run into a colleague or to meet for an informal discussion.

On the western side of the campus, buildings will be organized around a similar east-west open space which will accommodate public events and campus programs.

Additional outdoor collaboration and interaction spaces such as recreation fields, courtyards, and small seating areas will supplement the primary campus spaces to offer a range of choices from large group interaction to a more solitary, contemplative experience.

Figure 3.3: Central Spines



CONNECTIONS

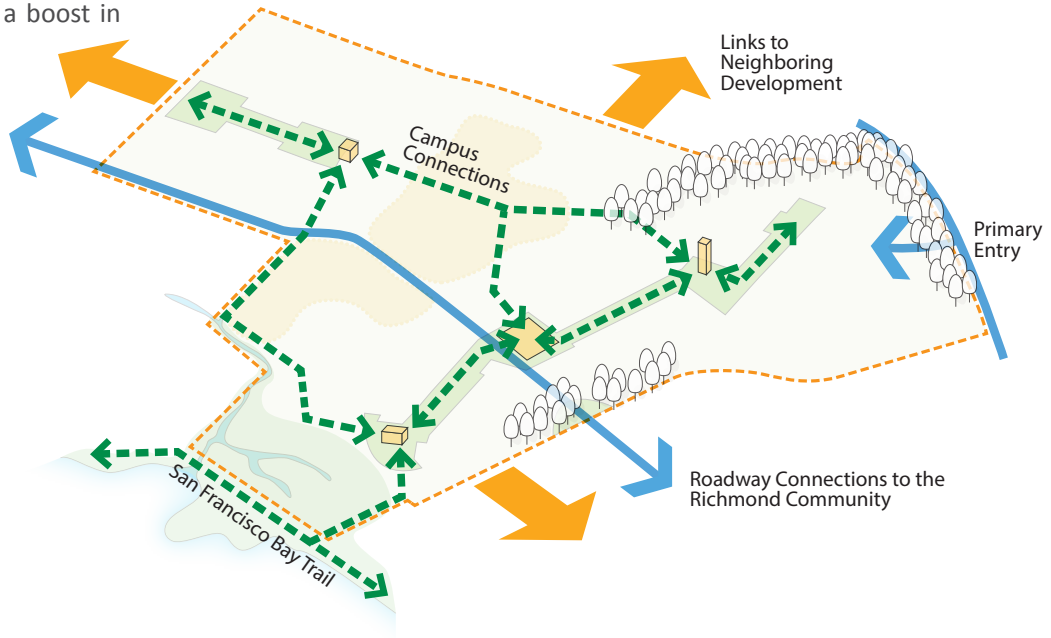
Create connections among the campus neighborhoods and with the Richmond community.

The Richmond Bay Campus will be the focus of a new mixed use district and future innovation hub in the City of Richmond. It will also be an invaluable resource to the community for education and for the appreciation of science in our lives. Ensuring that the campus welcomes the Richmond community is an essential aspect of site development.

As the campus grows, a critical mass of activity will be important to ensuring an attractive research environment. The campus will be developed at a density of facilities and population that is sensitive to the community context. Providing easy connections to nearby industry and research will facilitate opportunities for partnership and joint endeavors. The amenities of the Richmond shoreline and downtown will enhance the experience of those working at the campus and the campus will provide a boost in economic vitality for those places.

The shoreline location of the campus also mandates improving connections to the Bay Trail from the campus and from nearby neighborhoods. Connections along edges of the campus will provide this convenient access to this bayside amenity.

Figure 3.4: Campus Connections



ILLUSTRATIVE DEVELOPMENT SCENARIO

The Richmond Bay Campus Long Range Development Plan includes an Illustrative Development Scenario (see Figure 3.5) which demonstrates an approach to physical development of the site and facilities that achieves the scientific and community vision for the campus derived from an appreciation of the context of the site and surroundings.

Sensitive open spaces are set aside for conservation. These include the grasslands and wetlands found in the center and at the southern edge of the site. Only limited controlled access will be allowed in these areas. Within the developed parts of the site, the Illustrative Development Scenario accommodates the projected 5.4 million square feet of facility space, which includes research, office, and technical support space as well as amenities such as dining and cafe space. It also allows for special uses such as meeting rooms and assembly spaces.

The plan provides access to the campus from peripheral roads, with a main visitor entry off Meade Street, but only one additional road traverses the site - Lark Drive. This will keep most of the campus auto-free, with the exception of service and emergency vehicles. Parking, which will occupy surface lots initially, will ultimately be accommodated in structures which will be located off South 46th Street or Regatta Boulevard.

The building layout and configuration of site access and open space is consistent with the Campus Parti, responding to the land and sense of place, creating neighborhoods within the campus whole, facilitating collaboration and interaction, and ensuring connectivity throughout. The Design Guidelines chapter provides detail on these and other important design considerations.

Figure 3.5: Illustrative Development Scenario

LONG RANGE DEVELOPMENT PLAN SUMMARY

LAND USE

A Long Range Development Plan establishes the general parameters for growth or change at a University of California campus. The Long Range Development Plan for the Richmond Bay Campus, provided as a separate document and adopted by the University of California Regents, is summarized below.

Natural Open Space

The natural areas of the site are made up of valuable ecological communities such as the coastal terrace prairie grasslands and Western Stege Marsh. Campus natural areas will be managed to protect and enhance their ecological function. Invasive exotic plants will be replaced with appropriate native species and a protocol established for ongoing maintenance informed by professional biologists. Access to natural areas will be minimized except for purposes of research, education, and maintenance, and will be provided by trails, boardwalks, and bridges, designed according to conservation goals.

Research, Education & Support

The research, education, and support uses encompass the majority of the campus and include the developable portions of the site. All campus buildings and the bulk of the designed landscape on the campus will occur in this land use zone. A 25-foot buffer zone lies between the natural open space and the developable areas to protect the natural open space from unwanted access. The design guidelines for this area are the focus of this document.

Figure 3.6: LRDP Land Use Plan

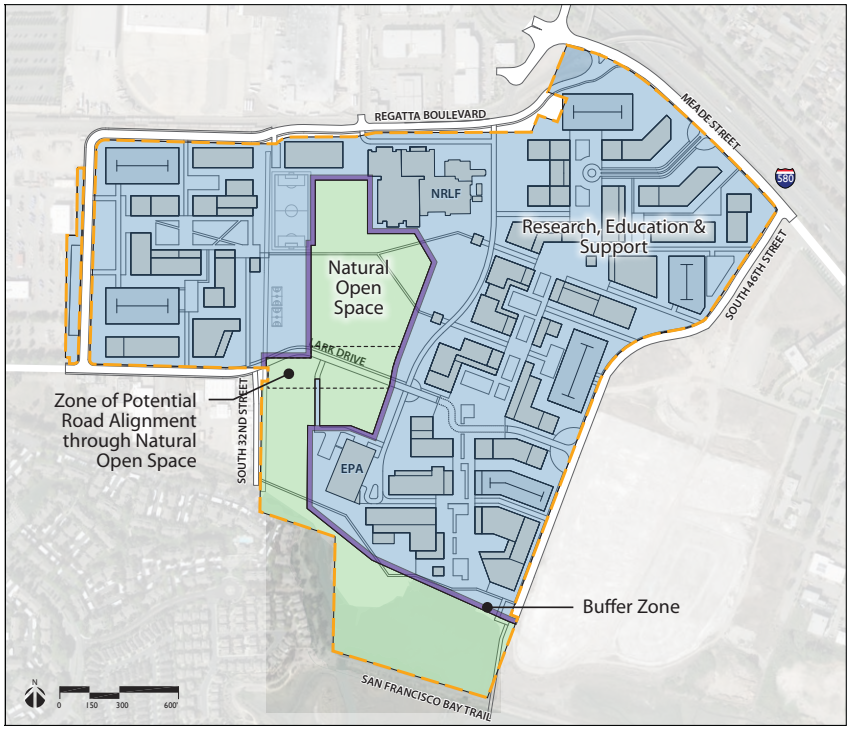
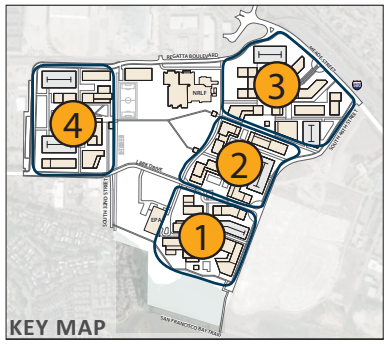


Table 3.1: Neighborhood Capacity

	GSF	Population
Neighborhood 1	813,000	1,700
Neighborhood 2	780,000	1,700
Neighborhood 3	1,880,000	4,000
Neighborhood 4	1,284,000	2,800
EPA & NRLF	651,000	70
TOTAL	**5,408,000**	**10,270**



ACCESS AND CIRCULATION

Visitor Entries and Site Access

The Richmond Bay Campus will be designed to provide convenient access from multiple directions and by all modes. The locations and configuration of visitor entries and public site access to the campus are important to ensure a strong community orientation and permeability of the campus.

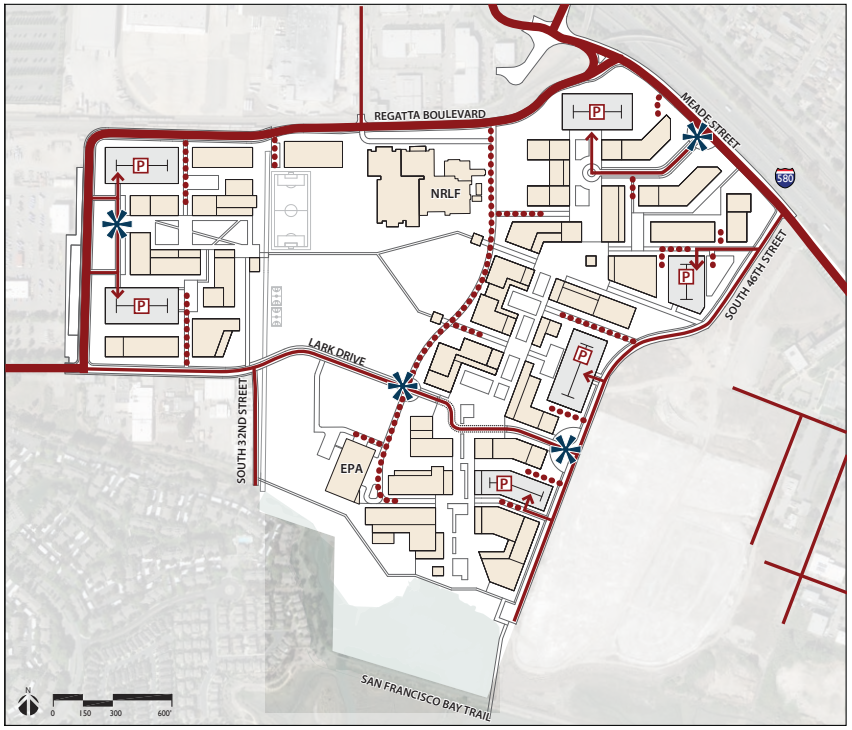
Visitors may include the Richmond community, school children, or researchers accessing user facilities. They will be directed to main entries with clear campus and directional signage, and with convenient parking readily visible. Gateway elements at all entrances will be designed to present a welcoming campus image (see Figure 3.7). Most regular users arriving by car will proceed immediately to peripheral parking garages, from which they can move into the center of campus or neighborhood to their destinations. Transit users will disembark at one of various transit and shuttle stops located throughout campus; pedestrians and bicyclists will proceed along the central spine or along walkways to destinations throughout campus.

Vehicular Circulation

While the Long Range Development Plan for the Richmond Bay Campus emphasizes access by bicycle and shuttle transit, the campus will also have a vehicular circulation framework that serves multiple entry points, facilitates convenient deliveries, and slows traffic to support pedestrian and bicycle safety (see Figure 3.7). Vehicular traffic is intended to remain mostly at the campus periphery to minimize conflicts between bicyclists and pedestrians.

Regatta Boulevard will be relocated to the western edge of the campus from its current north-south location east of the Regatta Building. Lark Drive will pass through the campus approximating its current alignment and will connect Regatta Boulevard at the western edge of the site with South 46th Street on the east side of the campus. Peripheral streets such as South 46th Street will provide access to parking structures and service lanes. These Service Access Streets will allow maintenance and delivery vehicles to access the service courts and loading docks of individual buildings (see Figure 3.7).

Figure 3.7: Vehicular Circulation

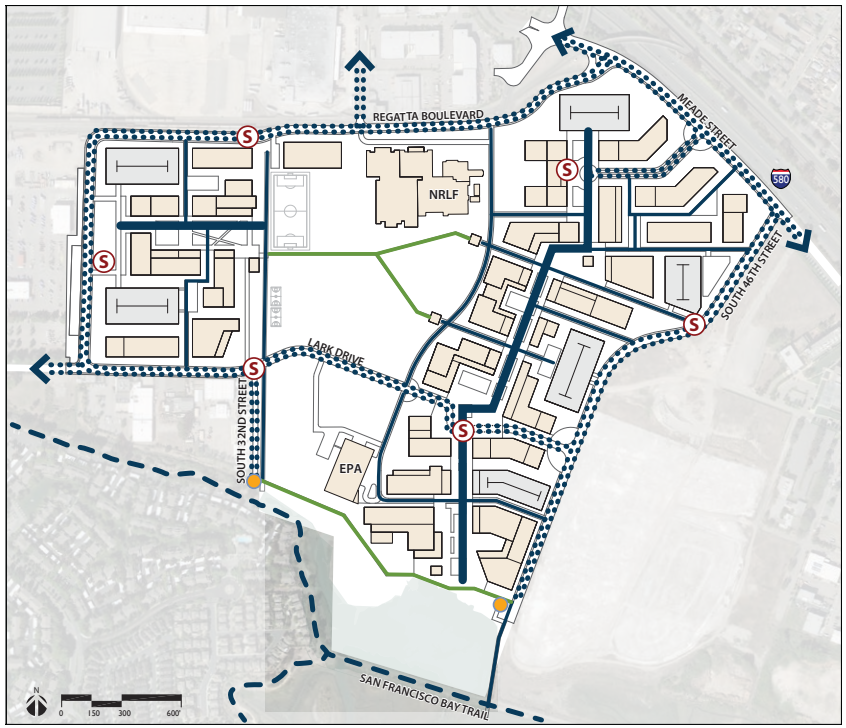


LEGEND

- Major Street
- Minor Street
- Service Access Street
- Campus Gateway
- Parking Structure

Note: Accessible parking will be provided proximate to each building.

Figure 3.8: Pedestrian and Cycling Circulation



LEGEND

- Street with Pedestrian & Bicycle Pathways
- Central Spine
- Pedestrian and Bicycle Pathway
- Boardwalk/Natural Area Trail
- San Francisco Bay Trail
- Trail Staging Area
- Potential Shuttle Stop

Pedestrian and Cycling Circulation

The street network is intended to create a pedestrian-friendly environment with narrow streets and traffic calming features. Pedestrian access will be accommodated virtually unimpeded throughout the campus (see Figure 3.8). A central pedestrian and bicycle spine will extend throughout the three eastern neighborhoods from the visitor entry in the north to the bayfront in the south as well as east-west through the western neighborhood. This spine is intended to be the primary pedestrian orienting and movement passageway for the campus, linking most buildings and users. The Bay Trail provides convenient access regionally along the bay throughout the Richmond, Albany and Berkeley waterfronts.

Parking

All parking at the Richmond Bay Campus site is provided in surface lots today. As the campus grows, it will become necessary and desirable to build parking structures to accommodate motor vehicles in a more compact footprint and release land for research facilities and support space. Parking structures will be located at the edges of the site to maximize a safe and collegial pedestrian and bicycle-friendly environment on the campus.

Transit

Convenient access to and from the Richmond Bay Campus by public or privately operated transit will be critical to the success of the campus and will help to minimize vehicle trips and their associated parking needs and greenhouse gas emissions. Figure 3.8 illustrates shuttle stops as they might be distributed at full implementation of the LRDP; they will necessarily be phased in as campus shuttles and regional transportation routes and ridership evolve. Providing well designed shuttle stops and shelters will encourage ridership.

OPEN SPACE

The natural environment of the Richmond Bay Campus today provides a starting point for the configuration and design of the future campus. The dominant Eucalyptus in the north, the grasslands in the center of the site, and the bay and marshes at the southern site edge all influence the perception of the site today and provide clues as to its future development.

The open space environment of a campus tremendously affects the visual quality and experience of the site to daily users as well as occasional visitors. The open space environment includes major pedestrian circulation elements such as malls or walkways, plazas and courtyards, edges and entries, and undeveloped, informal areas.

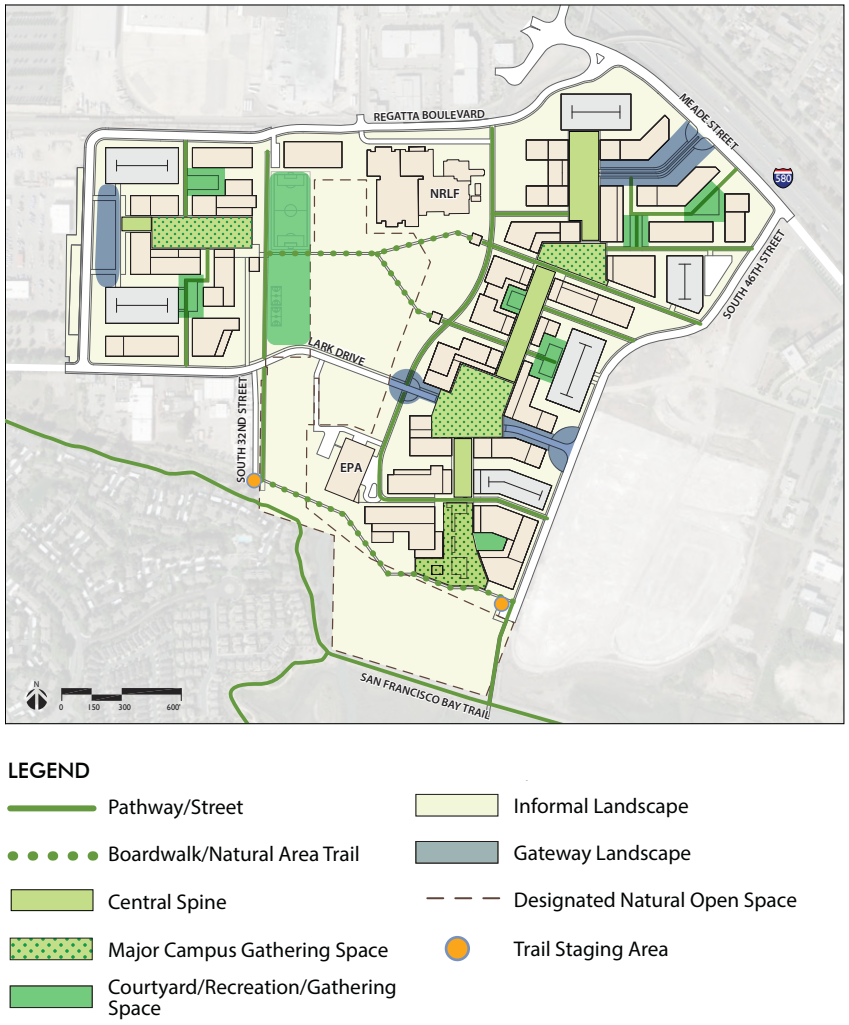
Figure 3.9 shows the open space framework for the Richmond Bay Campus. A central spine traverses the east portion of the campus from top to bottom, and is punctuated by major gathering spaces and courtyards. The open space framework also includes the trails that cross the natural grasslands, providing opportunities for education, as well as the Bay Trail access points and the areas surrounding the major campus gateways. Together the design of these elements will cohere to create the unique open space environment of the Richmond Bay Campus.

SUSTAINABILITY VALUES

The Sustainable Practices Policy of the University of California, updated in 2013, establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice and sustainable water systems. By 2020 the University has pledged to:

- Reduce greenhouse gas emissions to 1990 levels, which represents a reduction of approximately 50% compared to business as usual

Figure 3.9: Open Space Framework



- Achieve zero waste
- Purchase 20% sustainable food
- Reduce water consumption by 20%

Moreover, in a November 2013 speech to the UC Regents, President Napolitano stated a new University goal to be carbon neutral by 2025, which would make it the first public research university in the world to do so.

The vision for the Richmond Bay Campus includes becoming a model of sustainability and environmental stewardship. UC Berkeley and LBNL expect to test and showcase innovations in sustainable design and operations, to educate and inspire staff and visitors, and serve as a living laboratory through which research interests and sustainable facilities operations will align. Living laboratory opportunities will arise from all phases of planning, designing, financing, constructing, and operating the Richmond Bay Campus and span multiple disciplines—scientific research, urban planning, information technology, ecology, business management, and facilities design.

The planning, design, and operations of the Richmond Bay Campus will be subject to standards set by the State of California, the Regents of the University of California, and the Department of Energy, as applicable. Buildings will be designed to comply with the UC Sustainable Practices Policy, the UC Berkeley Campus Sustainability Plan, the LBNL Policy on Sustainability Standards for New Construction, and any relevant future sustainability policies. Given the role of programs at the campus in performing research and developing technologies directly related to energy and other elements of sustainability policy, development and operations at the Richmond Bay Campus will attempt to exceed these standards.

Sustainable design elements, such as this PV canopy (left) should be integrated into building designs and serve to improve the character and function of campus spaces. A raised boardwalk through the grasslands (center) can provide access to these valuable ecological areas year-round. Planting materials should take cues from adjacent natural areas and be attractive and drought tolerant (right).

Sustainability policy in the Long Range Development Plan (LRDP) is an essential companion to this section and should serve as the starting point for design teams. Sustainability measures are also integrated into guidelines throughout this document.

UTILITIES AND INFRASTRUCTURE

Today's Richmond Bay Campus facilities and operations are currently served by existing infrastructure and various utility providers. As noted in the LRDP, existing site infrastructure is inadequate to service the significant increase in facilities and activities that will occur on site. The LRDP describes the maximum projected utility demand and anticipated location of each component including water supply and distribution; sanitary sewer system; stormwater drainage; electrical power and distribution; telecommunications; natural gas distribution; and heating and cooling systems.

To the extent practicable, utility lines will be co-located and follow the campus road network. Wherever possible, drainage design for future development at the Richmond Bay Campus will utilize low impact surface conveyance solutions to minimize the scope of the underground distributions system.

Figures 3.10 through 3.14 are conceptual utility and infrastructure diagrams. Further study will be undertaken to determine the exact routing and phasing of utility systems improvements.

Figure 3.10: Domestic and Fire Water

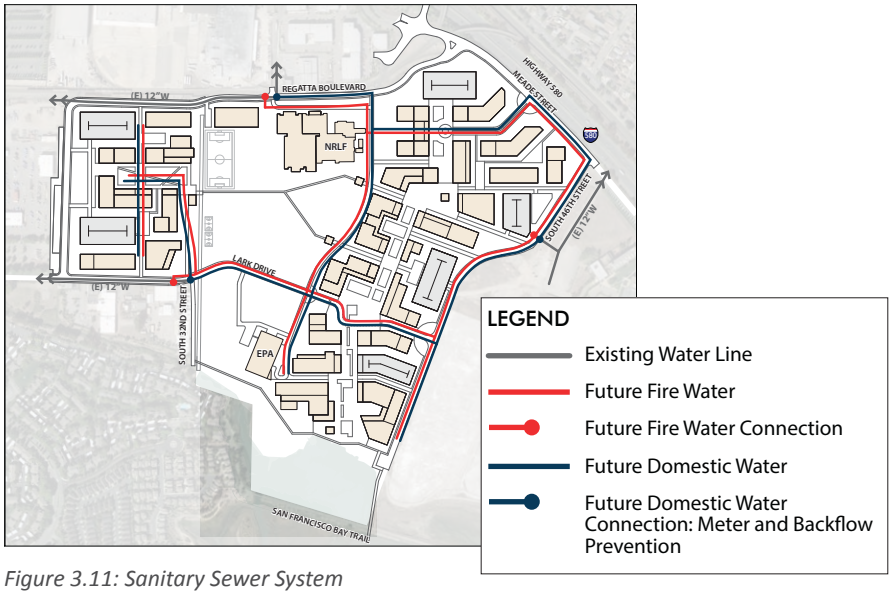


Figure 3.11: Sanitary Sewer System

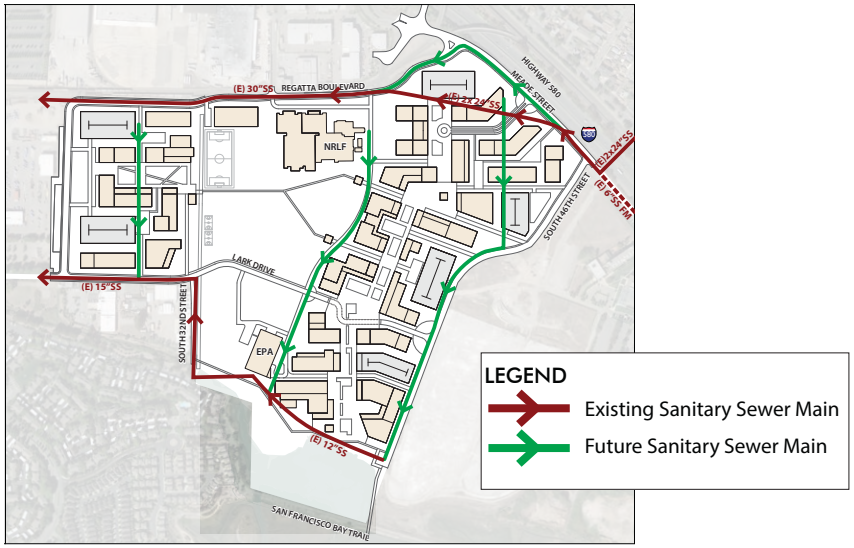


Figure 3.12: Storm Drainage

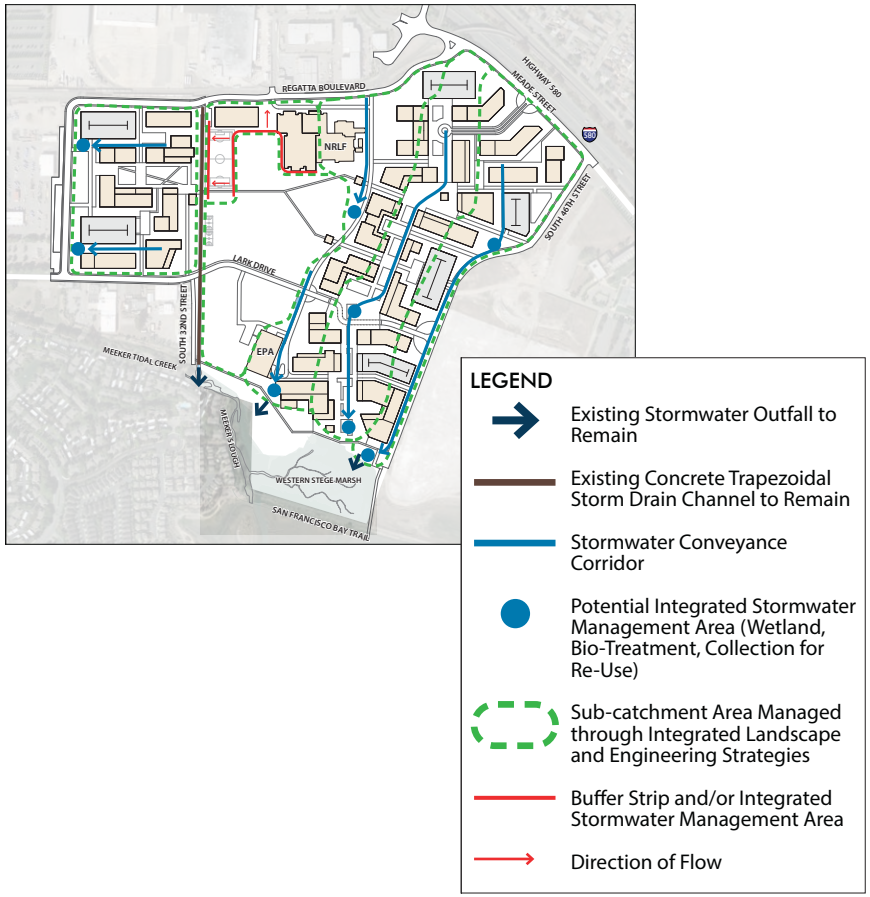


Figure 3.13: Electrical Power Distribution

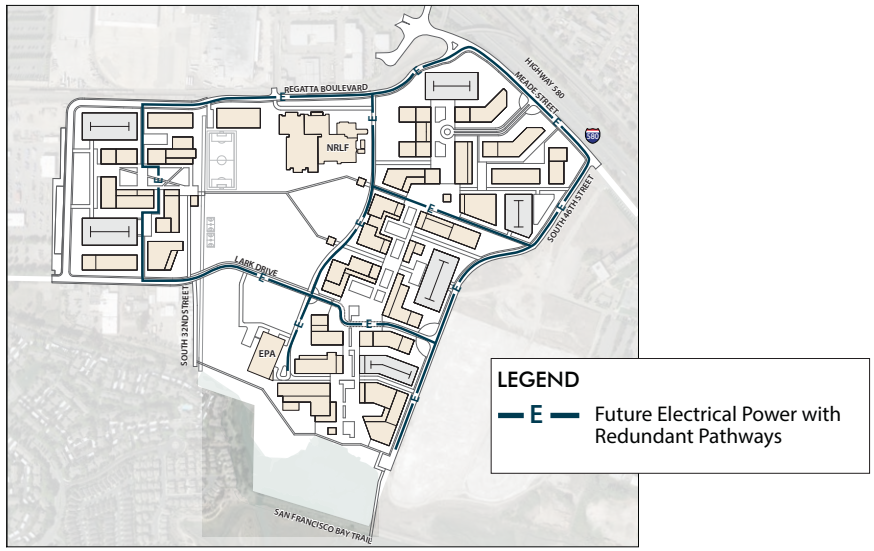


Figure 3.14: Natural Gas Distribution