parkmerced

sustainability plan

06.23.11

The Parkmerced Sustainability Plan establishes specific goals, strategies and targets that will be incorporated into the transformation of Parkmerced into a model 21st century healthy neighborhood. The Plan addresses the conservation and management of energy, water and other natural resources. In addition, it establishes goals for green building standards, solid waste management and sustainable construction strategies. Together with the accompanying Vision Plan, Design Standards and Guidelines, Transportation Plan, and Infrastructure Report, The Parkmerced Sustainabilty Plan provides a comprehensive vision for all future improvements at Parkmerced.

- The Vision Plan lays out the vision and conceptual frameworks for all proposed improvements at Parkmerced.

- The Design Standards and Guidelines prescribe urban design controls for land use, open spaces, streets, blocks and individual buildings. It also outlines a process for project implementation.

- The Transportation Plan provides a framework and management plan for addressing transit and vehicular travel to and from the neighborhood.

- The Infrastructure Report establishes an outline for anticipated site-wide improvements to all streets and public rights of way, underground utilities and site grading.

This vision for Parkmerced has been developed through a collaborative process with input from community members, local agencies and departments, public advocacy organizations and design and engineering experts.

parkmerced

sustainability plan

a new vision

parkmerced sustainability plan: addressing urban sustainability at the neighborhood scale

The new vision for Parkmerced represents a bold and unparalleled opportunity to transform an entire WWII-era San Francisco neighborhood into an international model for a sustainable 21st-century green community. The goal of a regenerated Parkmerced will be to create a vibrant, verdant and sustainable neighborhood. Parkmerced will be a neighborhood with an increased number of residential units and commercial/retail services and an increased amount of open space dedicated to natural ecological systems and recreational uses, all while reducing the per capita impact on our environment. A key goal to this sustainability-focused neighborhood is targeting a project-wide net-zero increase in greenhouse gas production from buildings while providing for more homes. A regenerated Parkmerced will contribute towards San Francisco's stated goal to be among the world's most sustainable cities.

The Parkmerced Sustainability Plan is able to address some of the most critical environmental issues of our time including climate change, resource overconsumption and reinvigoration of ecosystems at the critical scale of an entire neighborhood, allowing the community as a whole to accomplish more than a single parcel or building could on its own. This Plan has been developed to address these issues while working within the framework and specific conditions of Parkmerced's location, microclimate, topography, ecosystems and historical and design circumstances.

The Parkmerced Sustainability Plan establishes the goals, strategies and targets that will lead to a substantial decrease by each household in energy and water consumption, waste production, and automobile dependence, and will focus on state-of-the-art sustainable building materials systems and strategies. Parkmerced's environmental focus will also be enhanced by a renewed urbanism that will provide and integrate open spaces and natural ecosystems into the neighborhood in unique, sustainable and regenerative ways. The final result will ultimately be the incremental replacement of a development based on the consumptive, suburban, car-centric approaches of the past with a neighborhood built around the principles of a productive, socially active, walkable community.

Craig W Hartman, FAIA

June 2011

unique opportunity

Parkmerced's large scale, single ownership and location within the City of San Francisco, with close proximity to public transit, make this a once-in-a-lifetime opportunity to create the prototype for a 21st century eco-neighborhood. It offers a chance to counter prior, obsolete, car-centric urban planning principles, high maintenance landscapes, and inefficient buildings consumptive of natural resources.

Parkmerced is one of eight large-scale, planned community developments built by Metropolitan Life throughout the country around the time of WWII. These communities were designed to introduce what was then considered to be a highly desirable, suburban lifestyle into some of the nation's most densely settled urban areas. It was close to the cultural amenities of the City while offering wide open spaces and room to spread out. Parkmerced was noted for its innovative garden apartment blocks built around shared courtyard green spaces that gave residents the feel of enjoying their own suburban green backyards.

Parkmerced was able to provide considerable open space with residences removed from the City's density and public transportation because the planning strategy of the time favored automobiles as a primary mode of transportation. The automobile allowed an escape from the City and represented independence. However, our dependence on the automobile has been a key component of our society's ecological footprint exceeding our environment's carrying capacity and sustainability. Suburbs and communities removed from the city center have faced increased social challenges with many people spending more time alone in a vehicle than engaging with other people in their community.

Similarly, Parkmerced has seen diminished activity and social engagement in its public realm. Services and amenities originally intended to support the residents of Parkmerced such as playing fields, a school, and retail space have either been sold off by previous owners or closed, because they were not positioned to be an integral part of the community. This is further compounded by the design of the garden apartments which are configured with primary living spaces opening inward towards semi-private courtyards, with only hallways and bathrooms facing the public right-of-way. This has created a condition of insufficient 'eyes on the street' and a general sense of a lack of security.

Redeveloping Parkmerced offers a chance to change these unintended social effects of past planning principles, and in their place foster a vital community. The uninsulated garden apartments, which now contain inefficient fixtures and appliances and cannot accommodate the people with disabilities, can be replaced with accessible buildings that not only consume less, but also produce renewable energy.

Perhaps most importantly, Parkmerced's location within San Francisco makes this development a unique opportunity to address the current environmental pressures of our increasing greenhouse gas emissions. By reversing its current land use and transportation trends, Parkmerced can become a community fully connected with the City through public transportation and engaged with its surrounding neighborhoods through pedestrian and bicycle networks, offering San Francisco the ability to showcase forward thinking urban planning and sustainable development for the 21st century.

Suburban Living

ONLY MINUTES FROM DOWNTOWN SAN FRANCISCO

PARKMERCED is just east of the Pacific Ocean—ideally located, within easy driving distance of downtown San Francisco, and with convenient public transportation, including express bus service for Parkmerced residents exclusively. In the surrounding area, residents can visit the famous Fleishhacker Zoo and enjoy Sunday afternoon concerts in the inspiring natural setting of Sigmund Stern Grove. A model elementary school adjacent to the property has recently been opened, and the adjoining San Francisco State College provides cultural advantages to part and full time students with both day and evening classes. Parochial and private schools are easily accessible, as well as junior and senior high schools. Theatres and churches are nearby. Shopping facilities are exceptional, including Parkmerced's own shopping center. Residents will enjoy sandy Pacific beaches, parks, bridle paths, and countless scenic drives. A choice of four golf courses are adjacent to Parkmerced.

Residents can enjoy restful suburban living in the heart of the fabu-

approach

Ecological Urbanism: integrating the built and natural environments into a single interrelated system which is mutually beneficial and supportive, and nurtures a vibrant self-sustaining neighborhood.

The transformed Parkmerced will be built on a strategy of ecological urbanism, which can be defined as the re-thinking and re-structuring of the built environment in response to and in collaboration with the natural environment. Urban development and natural ecosystems need not be mutually exclusive, nor are people and their activities separate from nature. To support our increasing population and the inevitable growth of our cities, it has become more and more critical to manage and sustain the ecological systems that are the backbone of the cities and places we inhabit. The conservation of our natural resources has become the highest priority in order to provide for ourselves and future generations.

Parkmerced is modifying its relationship with its natural ecosystems by restoring original watersheds and replenishing a diminishing Lake Merced, rebuilding local wildlife habitats, and integrating agriculture into the urban environment. The buildings and infrastructure will be carefully designed to function in tandem with nature to capture sunlight, mitigate strong winds, allow rainwater infiltration and conveyance, and reduce waste. The landscape will include usable green spaces for gathering and recreation while supporting food production and the management of micro-ecosystems for indigenous wildlife, and the buildings will not only conserve resources, but also have the potential to produce renewable clean energy.

By constructing new housing within an existing urban environment, Parkmerced will decrease the demand for new, sprawling, suburban development and the destruction of natural habitats associated with those developments. Parkmerced residents will be able to rely on the existing urban infrastructure, including the City's public transportation system, and as a result will produce fewer GREENHOUSE GAS emissions than their suburban counterparts. Moreover, because Parkmerced will contain mixed-use and multi-family buildings and will connect to existing utility networks, the project will require fewer building materials than would a new suburban development project providing the same number of dwelling units.

strategies

connection of built and natural infrastructure

The neighborhood street network at Parkmerced will work in conjunction with the topography and natural watershed. Streets will not only convey vehicles and people, but also collect and transport stormwater through a system of bioswales, streams and ponds. This interlacing of urban and ecological systems will reinforce Parkmerced's connection to nature and regenerate the neighborhood's underlying watershed.

neighborhood street alignment

The primary streets into the neighborhood will be oriented north-south in order to capture as much sunlight as possible. East-west streets will be staggered to help block the winds coming off the Pacific Ocean from the West. Hedgerows planted on the West side of the streets will provide protection from the wind. Careful consideration will be given to working with nature to provide the most comfortable environment to promote increased social activity within the community.

usable open space

Green spaces will offer a variety of scales and uses and will be strategically positioned to bring people together. A vibrant, concentrated urban fabric will support the active use of open spaces including individual terraces and balconies, semi-private courtyards, neighborhood commons, community oriented recreational fields, community gardens, and unprogrammed open space.

social heart

A retail and services ‘social heart’, concentrated close to public transportation, will link Parkmerced to the City and will nurture a strong sense of community and identity.

socially and ecologically dynamic buildings

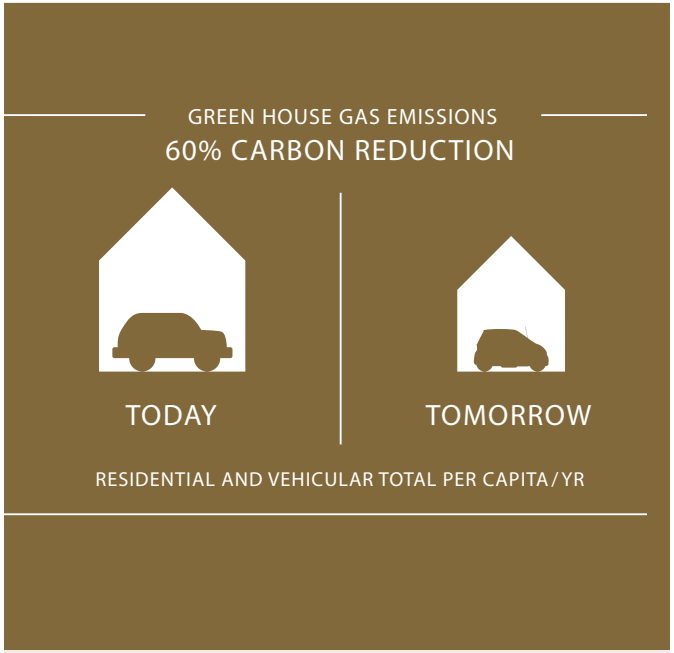
Buildings will be socially dynamic with areas for communal gathering, places of commerce, and gardens for food production, while also collecting rainwater, conserving resources, and producing energy through the use of wind turbines, photovoltaics and cogeneration.

conservation of resources and reuse

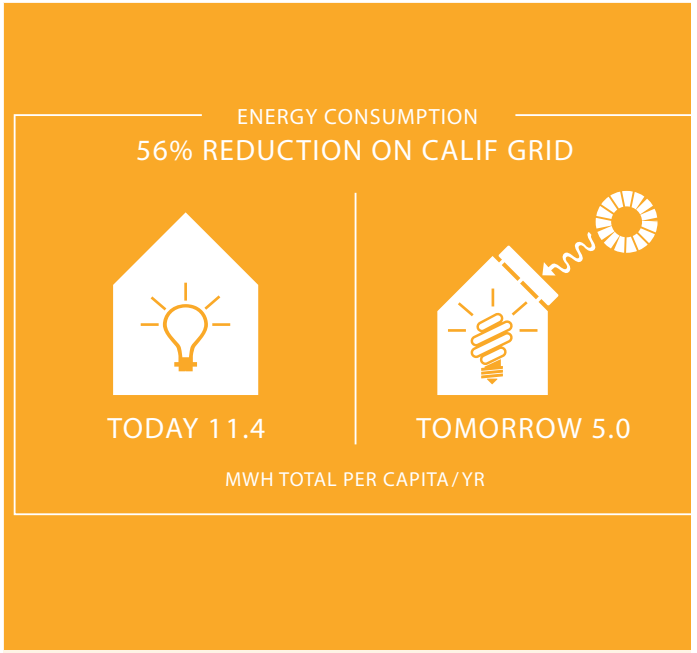
By constructing high performance buildings, many natural resources will be conserved. Existing building materials, which can be reclaimed and reused, will also help to lessen the impact of Parkmerced on local and global ecologies.

goals
more homes, less consumption

One of the key benefits of creating a pedestrian-focused neighborhood that is well served by local transit is that it provides an opportunity for Parkmerced residents to reduce their impact on local and global ecologies. Utilizing sustainable design strategies in conjunction with those of compatible urban design, the re-invented Parkmerced will nearly triple the number of dwelling units with virtually no change to the neighborhood's natural resource consumption. This will translate into a reduced ecological impact for all Parkmerced residents while making a significant contribution to San Francisco's objective of reducing its overall carbon footprint.



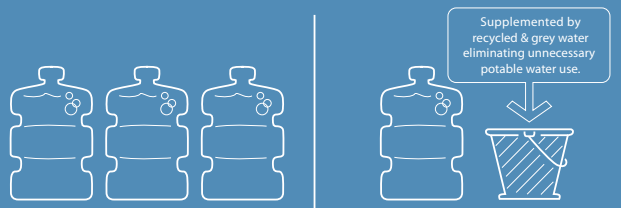
With a goal of reducing the average per capita carbon footprint by approximately 60%, Parkmerced is targeting to only increase its project-wide annual carbon footprint by approximately 18% while nearly tripling the number of residents. This represents a significant reduction of the annual carbon footprint associated with housing and transportation for each Parkmerced resident.



One of Parkmerced's goals is to achieve net-zero new energy consumption from the grid. If one were to build the same number of new homes in a suburban setting, these new homes, when combined with the existing 3,221 Parkmerced units, would consume 200% more energy than this project is designed to consume.

POTABLE WATER CONSUMPTION

60% REDUCTION



TODAY 30,000

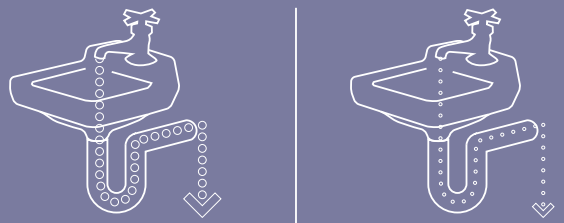
TOMORROW 12,000

TOTAL GALLONS PER CAPITA / YR

Through a combination of strategies, including the use of recycled water, an estimated per capita 60% reduction in potable water usage represents a significant reduction of potable water usage, dramatically reducing demand on the City and State's taxed water supply systems.

WASTE WATER

60% REDUCTION



TODAY 27,000

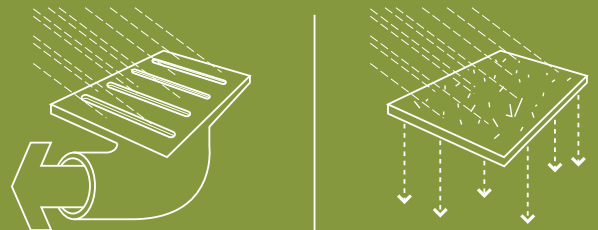
TOMORROW 11,000

TOTAL GALLONS PER CAPITA / YR

Parkmerced plans to reduce wastewater by approximately 60% per person while increasing project-wide wastewater generation by approximately 2%.

STORM WATER

100% REDUCTION



TODAY 100%

TOMORROW 0%

STORMWATER TO COMBINED SEWER SYSTEM

Treating stormwater runoff on-site, using a combination of bioswales, biogutters, ponds and streams rather than diverting it to the combined sewer system, would result in an estimated 20 million gallon average annual decrease in combined sewer discharges to Ocean Beach (a 6% reduction).

Neighborhood Design

ND

Reduce auto emissions and dependence on fossil fuels by providing conveniently located neighborhood services and amenities as well as by designing public streets to encourage people to walk and ride transit

"The Climate Action Plan for San Francisco" reports that 50% of the city's greenhouse gas emissions are from transportation, and 24% are attributed to road vehicles in the city. In 2000, road vehicles emitted 2.23 million tons of CO_2e, and it is predicted that by 2012 the emissions will rise to 2.41 million tons.[1] While commuting to work accounts for many of these trips, a significant percentage are attributed to services and amenities. Parkmerced conducted a transportation survey of its residents and discovered that an average of 6 daily car trips per unit were for non-work related activities and of those trips 34% were to supermarkets and 18% to schools.

Residents' carbon footprints can be drastically reduced by providing daily services within walking distance and close to public transportation, eliminating the need for these vehicle trips. Careful urban planning not only will reduce traffic and lower greenhouse gas emissions, but it will also foster a greater sense of community and augment local economies by activating the pedestrian public realm.

[1] Climate Action Plan for San Francisco. September 2004. San Francisco Department of the Environment, San Francisco Public Utilities Commission.

ND.01
existing conditions

When it was first proposed in the late 1930's, Parkmerced was conceived of and marketed as 'suburban living in the city'. The desire for suburban-style living within the urban boundaries of San Francisco led to the creation of an auto-oriented neighborhood. With services and amenities pushed to the perimeter, large block sizes, roundabouts, and segregated zoning shaped daily life patterns of Parkmerced residents, making them almost wholly dependent upon the car to meet their daily needs. At the same time, residents living in other areas of the city such as Russian Hill, Cow Hollow, Laurel Heights, and West Portal enjoy mixed-use, transit-rich lifestyles served by centrally-located commercial centers, schools, and other neighborhood services within walking distance. Once in their cars, most residents of Parkmerced travel to competing services and amenities, further reducing the viability of what few services and amenities still remain at the periphery of the neighborhood. Previous owners sold off and lost control of those parcels as residents drove their cars to more easily accessible and comprehensive services and amenities outside the neighborhood. Over the years, this pattern of daily life simply reinforced the residents' increasing dependence on cars.

As a low-density neighborhood, Parkmerced is predominantly comprised of two-story buildings and mid-rise towers with virtually identical architectural facades throughout that create a maze of undifferentiated buildings and streets. Further complicating movement through the neighborhood is a radial street configuration where streets wind and bend while maintaining the same name. These factors contribute to the lack of orientation and hierarchy within the neighborhood. Residential buildings with units that have living spaces oriented towards the interior courtyards turn their backs on the streets leading to limited social activity in the public realm and a greatly reduced sense of security. In addition, Parkmerced has few direct access points, isolating residents from surrounding neighborhoods and disconnecting Parkmerced from the greater city urban fabric.


Residential
Retail
Administration
School
Playing Fields
Undeveloped
Service
Parcels Sold Off

ND.02 land use + community

goal Provide a broad mix of environmentally, economically, and socially sustainable land use options at Parkmerced to enable a complete and vital community that promotes diversity and supports local businesses and agriculture.

strategies

diverse uses

A variety of convenient land uses within walking distance of all residences will encourage social vibrancy, including:

- 8,900 new or existing homes
- 230,000 square feet of retail use
- 80,000 square feet of commercial use
- 64,000 square feet of fitness/community center use
- 25,000 square feet of pre-school/school/day care use

The concentrated neighborhood 'social heart' is intended to include a grocery store, coffee and sandwich shops, restaurants, dry cleaners, and other small businesses to meet the daily needs of Parkmerced residents. The 'social heart' will also include office space for professional services, such as medical and dental practices, that offer residents additional access to services and the possibility of working within walking distance of their homes. Parkmerced will strive to include eleven different uses from Table 1 – Diverse Uses, with a minimum of one use from each category.

Additionally, each of the six Neighborhood Commons, distributed throughout the neighborhood, will contain neighborhood serving retail and amenities and take advantage of adjacency to open space for cafe seating or other gathering spaces.

create a compact walkable community

Introducing neighborhood services and amenities within walking distance of all residents helps to reduce dependence on cars and encourage people to walk or bike to meet their daily needs. This strategy plays a major role in reducing fossil fuel consumption, and therefore the overall carbon footprint of each individual and the neighborhood as a whole.

In keeping with the walkable community design, a child care facility, pre-school or elementary school will be sited within a 1/2-mile walk of all residents. Currently, a number of existing middle and high schools are within a mile walk of the neighborhood.

vibrant neighborhood

Increasing the number of dwelling units at Parkmerced to a total of 8,900 units over the next 20 to 30 years will increase the neighborhood population, which in turn will help improve the viability of supporting services and amenities. These services and amenities are located on or around Crespi Drive creating a vibrant 'social heart' adjacent to public transit stops and accessible to surrounding neighborhoods. The 'social heart' will be within no more than a ten-minute walk of all residences and a five-minute walk of approximately half the residences.

implementation actions and metrics

- Comply with the requirements of Chapter 01 (Land Use) of the “Parkmerced Design Standards + Guidelines”.
- Provide a farmer’s market that operates weekly for five months annually with firm commitments from vendors to sell only items grown within 150 miles of the neighborhood.

TABLE 1 - Diverse Uses

CATEGORY	USE
Food Retail	• Supermarket • Other food store with produce
Community-Serving Retail	• Clothing store • Convenience store • Farmer’s market • Hardware store • Pharmacy • Other retail
Services	• Bank • Gym, health club, exercise studio • Hair care • Laundry, dry cleaner • Restaurant, café, diner (excluding establishments with drive-throughs)
Civic + Community Facilities	• Adult or senior care (licensed) • Child care (licensed) • Community or recreation center • Cultural arts facility (museum, performing arts) • Educational facility (including K–12 school, university, adult education center, vocational school, community college) • Family entertainment venue (theater, sports) • Government office that serves public on-site. • Place of worship • Medical clinic or office that treats patients. • Police or fire station • Post office • Public library • Public park • Social services center

ND.03 site design

goal Promote walkability and vitality by designing an appropriately-scaled, pedestrian-focused, safe, and environmentally comfortable neighborhood that will encourage the building of community.

strategies

fine grain
Small blocks with frequent intersections provide a number of routes for pedestrians and bikes, making walking a more attractive and viable mode of transportation. Existing blocks at Parkmerced will be reduced in size by introducing a series of new, pedestrian-focused streets, alleys and paseos.

street orientation
In order to provide a comfortable environment for residents to enjoy the outdoor amenities and to encourage walking, the primary neighborhood linkages will be oriented north-south to capture the most sunlight and break the gusty westerly winds with tall, densely foliated trees.

sidewalks
To encourage pedestrian activity and help Parkmerced build a sense of community, generous sidewalks will be designed to provide a greater area of the public right-of-way for pedestrians rather than vehicles. Shared streets will give priority to pedestrians and help to calm traffic for a safer neighborhood. Seating and planted areas are planned along sidewalks to provide areas for gathering.

street trees
Designing streets to include planted areas and street tree species chosen specifically to thrive in Parkmerced's microclimate will enhance the visual quality of the urban environment while helping to mitigate wind, maximize sunlight penetration, and manage stormwater run-off. Only native or acclimated street trees will be planted.

intuitive way finding
A clear hierarchy of street types with differentiated street configurations, street trees and planting will aid in intuitive way finding. It will help establish clear traffic patterns to dissipate congestion and slow traffic speeds, making for a safer pedestrian environment. A richness in neighborhood character will develop as the diversity encourages local identities to emerge.

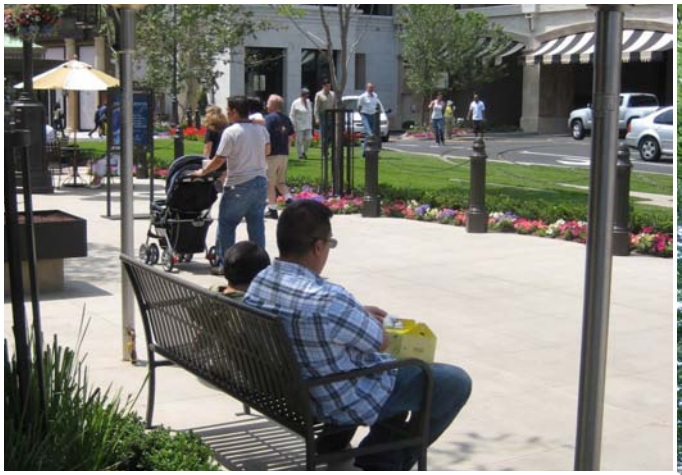
integrated fabric
With few direct access points to surrounding neighborhoods, Parkmerced currently resembles a gated community. This condition breeds a sense of isolation for Parkmerced residents, presents a barrier to surrounding neighborhoods and discourages walking. A number of new and reconfigured access points would transform Parkmerced into a more integrated part of the City and increase connectivity with adjacent neighborhoods.

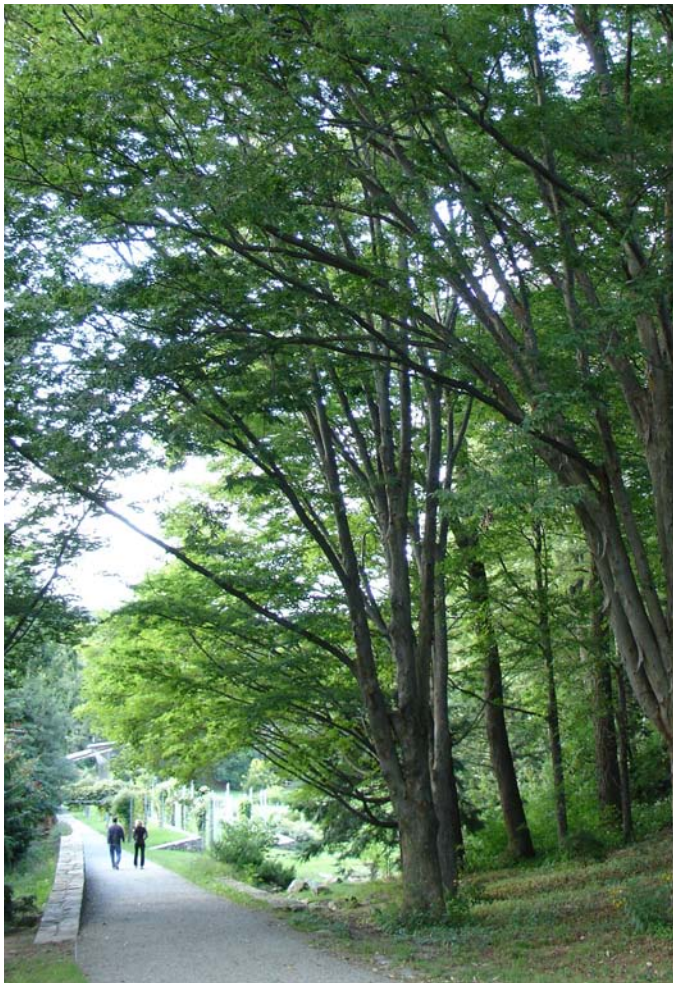
socially engaging buildings
When Parkmerced was first designed, the social activities of the buildings were oriented away from the public realm toward semi-private courtyards. This led to the design of residences that effectively turned their backs on the street, leaving bathroom windows, stairwells and blank facades fronting the streetwall, depriving the public realm of critical "eyes on the street" and thereby reducing the sense of security. To re-establish relationships between private and public areas, and to create a more comfortable pedestrian environment, the "Parkmerced Design Standards + Guidelines" Building Design chapter provides a framework (including requirements for stoops, individual entries and balconies) for having buildings re-engage the social life of the street.

pedestrian scale
To create a visually stimulating pedestrian environment, building facade heights will be in complementary proportion to public right-of-way widths and adjacent facades. By incorporating variations in facade lengths and depths, the buildings will relate to the scale of a person. Including front porches or creating a rhythm of small architectural bays will reinforce the pedestrian realm as a place for people. By providing a pedestrian scaled environment, the site design will encourage walking as a primary mode of transportation.

implementation actions and metrics

- Meet the requirements of Chapters 02.01 through 02.15 (Neighborhood Controls and Streets) of the “Parkmerced Design Standards + Guidelines.” The requirements set forth in these chapters have been crafted to encourage walking by creating a pedestrian-scaled, socially vibrant streetscape that provides a high degree of human comfort.
- Meet the requirements of Chapters 02.31 through 02.38 (Off-Site Improvements) of the “Parkmerced Design Standards + Guidelines”.





ND.04 transportation

goal Reduce auto trips by promoting sustainable alternative means of transportation to lower the dependence on fossil fuels and further Parkmerced in achieving greenhouse gas neutrality, while creating a more vital, connected sense of community.

The “Parkmerced Transportation Plan” sets forth the strategies to be used to achieve the above goal. This chapter provides an overview only of such strategies. The “Parkmerced Transportation Plan” should be referenced for greater detail regarding the proposed transportation improvements and programs.

strategies

improve access to public transit

Parkmerced will encourage the use of public transit alternatives by modifying the existing Muni light rail route to better link the neighborhood to the remainder of the City and by focusing development intensity around new and existing stops. Parkmerced plans to work with the City and Caltrans to re-route the M-Oceanview light rail line into the neighborhood to increase accessibility. A new transit plaza station is planned at the southwest corner of the intersection of 19th Avenue and Holloway Avenue adjacent to both San Francisco State University and the north end of the neighborhood ‘social heart’. The transit plaza will also serve a number of local-serving bus lines for convenient transfers. Additional new transit stops will be located on Diaz Avenue adjacent to the south end of the retail core and further south on Font Boulevard. Information technology will relay real-time arrival information to riders at all transit stops within Parkmerced.

TDM strategies

To further increase the attractiveness and convenience of public transit, Parkmerced will provide a state-of-the-art Transportation Demand Management (TDM) Plan. A full-time transportation coordinator will provide commute planning services to help integrate transit into the daily lives of residents and visitors. Parkmerced residents will meet with the Transportation Coordinator to review multiple, sustainable non-auto commute options, including the relative costs and schedules for various transit modes. The Transit

implementation actions and metrics

- Meet the requirements of the “Parkmerced Transportation Plan”.
- Meet the requirements of Chapter 04 (Parking, Loading + Servicing) of the “Parkmerced Design Standards + Guidelines”.

Coordinator will also implement and administer the various TDM Plan elements and coordinate with the City, transit agencies, and transportation companies. As one of Parkmerced’s transit-related amenities, residents may purchase a discounted pass to all Muni transit systems serving the site, as provided for in the Transit Pass Subsidy Program. Additional TDM Plan elements are described in the “Parkmerced Transportation Plan”.

neighborhood shuttle with access to BART

Free, low-emissions shuttle services will connect Parkmerced residents to regional transit options and local shopping destinations. With multiple stops within the neighborhood, the BART shuttle will provide direct, frequent, peak time service to the Daly City BART station and M-Oceanview stations. An off-peak shopper shuttle will provide service to the Stonestown Galleria and Westlake shopping centers. By enabling access to regional destinations and transit hubs, Parkmerced’s shuttle services will help reduce the number of car trips taken, minimizing the neighborhood’s overall carbon footprint.

bicycle network + bike share

Sustainable transportation at Parkmerced will rely on a network of bicycle routes, with parking and other amenities for cyclists provided throughout the site. A comprehensive wayfinding signage program supporting the network will include a map highlighting all bike routes and parking spaces. Each of Parkmerced’s new buildings will house secure bicycle parking. On-street bicycle parking racks will be available at major destinations, and loaner bicycles will be available at bikeshare stations located throughout the site. Non-residential buildings with over 30,000 square feet of space will provide showers and changing areas for the convenience of bike commuters. This internal bicycle network will be integrated into the existing San Francisco Bike Route System.

unbundled parking

Parking strategies at Parkmerced are intended to accommodate expected demand while fostering a pedestrian-focused, transit-oriented neighborhood. In order to encourage walking and transit use, a large number of parking spaces will be located further from transit, functioning more as ‘car storage’ than a typical garage. Residents must lease or purchase all off-street parking spaces separately from the rental or purchase price of their dwelling units.

car share

Parkmerced’s Transportation Coordinator will work with local car-sharing organizations to provide a network of vehicles available throughout the site.

electric vehicle infrastructure

To promote the use of electric passenger vehicles, a minimum of 1% of off-street residential parking spaces will be constructed with electric wiring conduits to permit wiring and hook-up of an electric vehicle charger. In addition, at least one publicly accessible fast-charge station will be installed at Parkmerced.

Landscape + Biodiversity

LN

Develop a captivating landscape that re-establishes biodiversity and natural habitats, promotes the conservation and efficient use of natural resources and meets community needs for recreation, open space, and local food production.

Depletion of natural resources worldwide and an increasing water shortage threatening California make conservation efforts an imperative. As the population continues to grow, development must be planned to protect and manage limited natural resources. The development of land must meet human needs while preserving ecosystems and their resources to provide not only for the present, but also for many future generations to come. In order to re-integrate the natural and urban environments at Parkmerced, restoring the site's original hydrology patterns will allow for the re-establishment of local habitats supporting biodiversity and an ecosystem reconnected to Lake Merced. This landscape will not only create an environment for plants and animals to flourish, but also will support recreational activities, provide enjoyment of the open spaces, and encourage the building of community among residents.

LN.01 existing conditions

When Parkmerced was initially developed in the 1940's, the site's natural topography was graded into a flat table top that tilted slightly toward the west. The natural drainage system was filled in and replaced by an underground system that transferred stormwater off-site through the City's combined sewer-stormwater system to the waste water treatment facility. As a result, during storm events, the site, Lake Merced, and the underground aquifer are deprived of much of the annual rainfall. In addition, 74 acres of manicured, non-native grasses within the open space replaced the natural habitats of indigenous plants and animals. These planted lawns require approximately 55 million gallons of potable water per year for irrigation, adding a significant demand to the City's water supply system.

ORIGINAL

A natural drainage system allowed for the infiltration and filtering of rainwater, channeling runoff into Lake Merced.

EXISTING

The site was graded into a flat tabletop for development in the 1940s. Currently all stormwater is piped off-site to treatment facilities or overflows into the bay.

PROPOSED

A proposed drainage system of rain gardens, bioswales and biogutters will mimic the natural system. Water is channeled to the new stream corridor, and a riparian corridor filters water and restores a connection to Lake Merced.

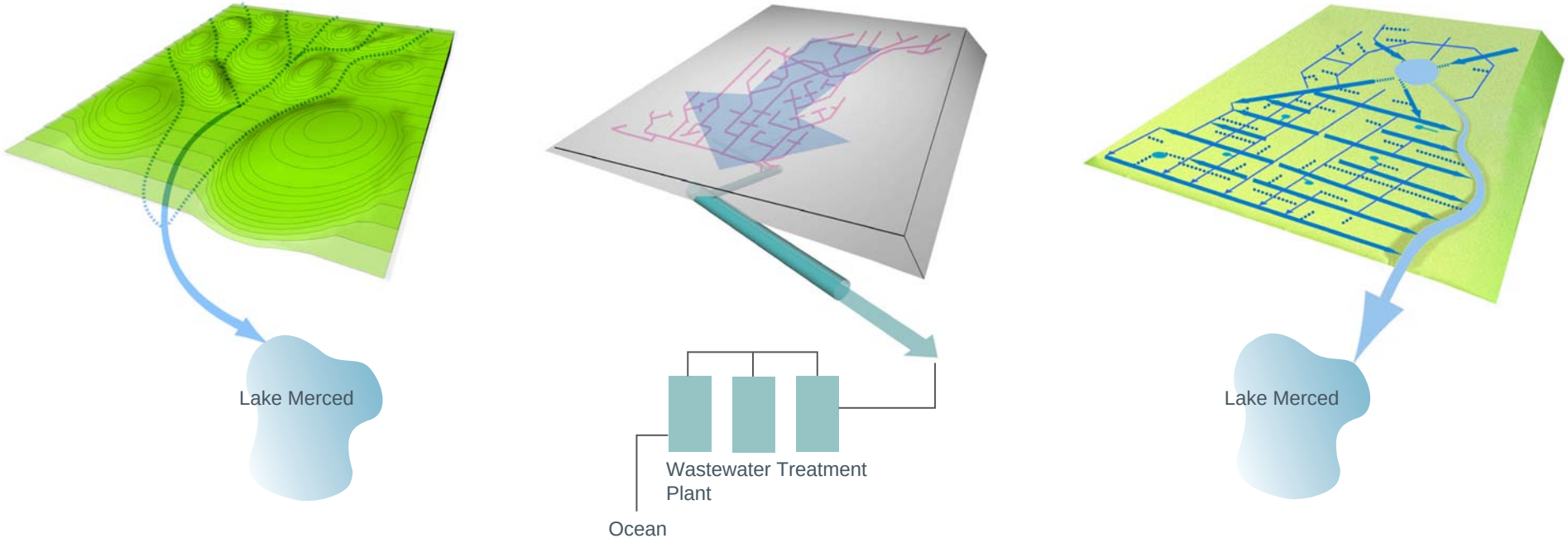
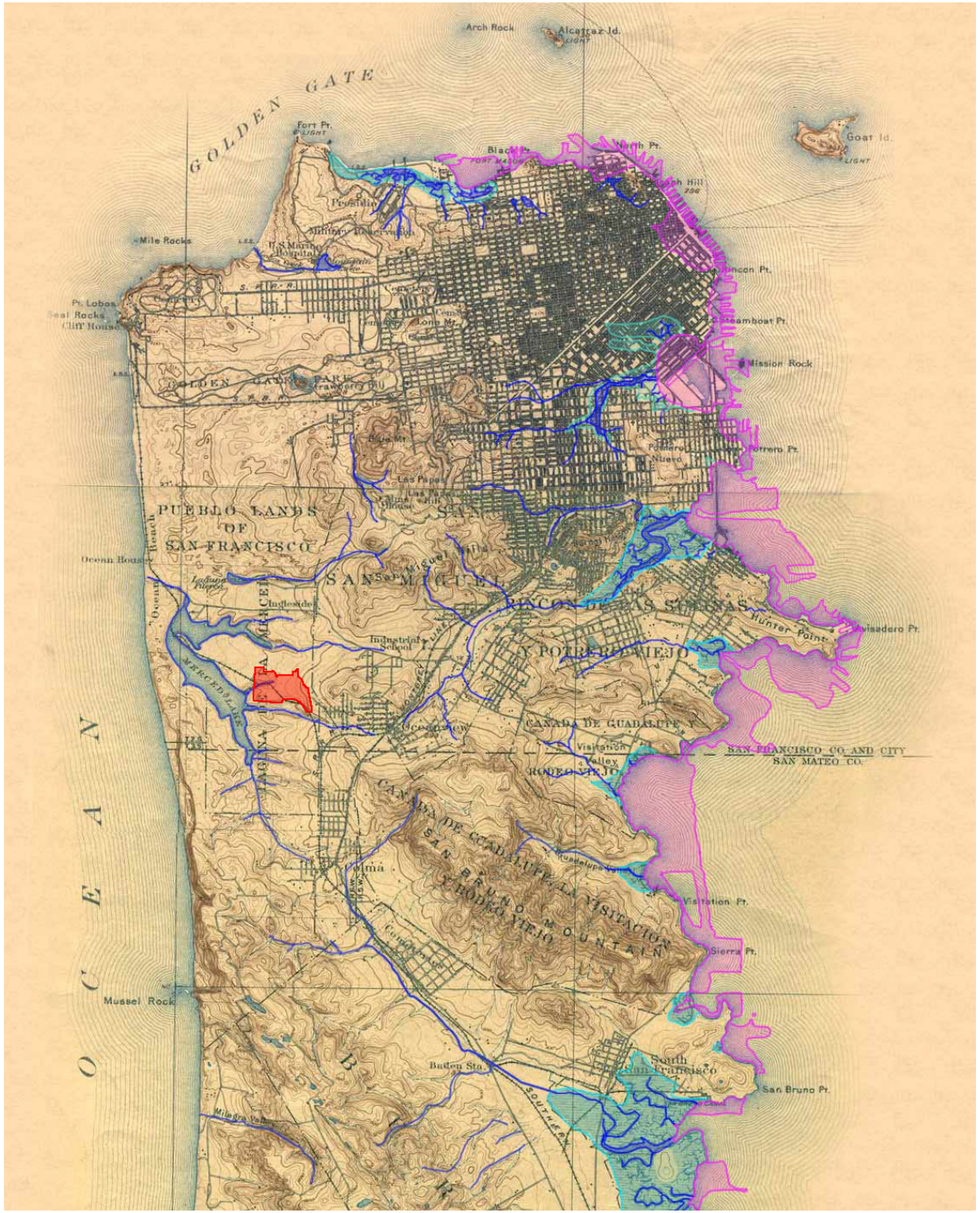


Figure LN.01.01: Parkmerced Drainage Systems
Source: Tom Leader Studio



LEGEND

- Modern Landfill
- Original Marshes
- Original Creeks

Figure LN.01.02: Historic San Francisco Creeks and Wetlands
Source: San Francisco Bay Area Historic Topographic Quadrangles, UC Berkeley Library

LN.02 hydrology

goal Restore the natural watershed, replenish Lake Merced, reduce the impact on the City's waste water treatment plants, prevent erosion and provide local habitats.

strategies

stormwater collection

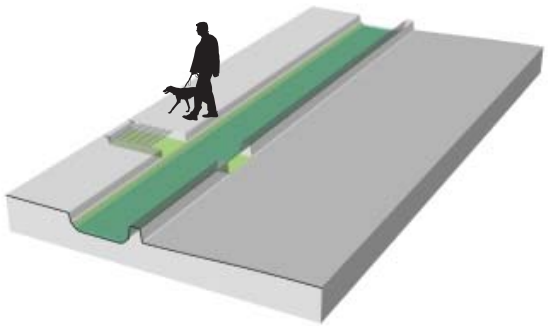
Currently, the San Francisco Code dictates that the pipes of the combined stormwater/sewer system be sized to convey the peak flow from a 5-year storm. Rather than using these traditional pipes and pumps to convey this flow, Parkmerced will incorporate green infrastructure consisting of bioswales and other low impact measures that will retain, detain, and convey runoff to the underlying aquifer and to Lake Merced. The bioswales will be natural amenities that increase biodiversity, improve air quality, and enhance community spaces while simultaneously managing runoff and reducing the potential for flooding. Hardscape infrastructure, such as pipes and drain inlets, will only be necessary to convey flow beneath intersections to the next downstream swale. The reduction in piping will also decrease the amount of infrastructure that must be manufactured, installed, and maintained.

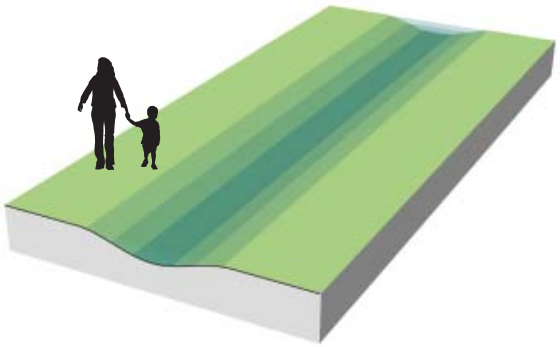
The phasing of construction of the LID measures will be such that the most upstream, parcel-level measures will be sized to satisfy the Stormwater Design Guidelines (SDG) requirements of individual buildings as included in the Parkmerced Infrastructure Plan. The Right of Way (ROW) LID measures will be constructed simultaneously with the street improvements or construction of new streets. The site-wide LID measures will be constructed as the overall site work is completed. If the ROW LID measures downstream of a parcel have yet to be constructed, the parcel runoff will be temporarily direct to the combined sewer, and the requirements of the SDG in combined sewer areas will be met. If the ROW LID measures downstream of a parcel have been constructed, the requirements of the SDG in separated sewer areas will be met. However, as each segment of the bioswale network is completed, the adjacent buildings will be required to tie into the Parkmerced stormwater collection system and sever the buildings' temporary connection to the City's combined sewer-stormwater system.

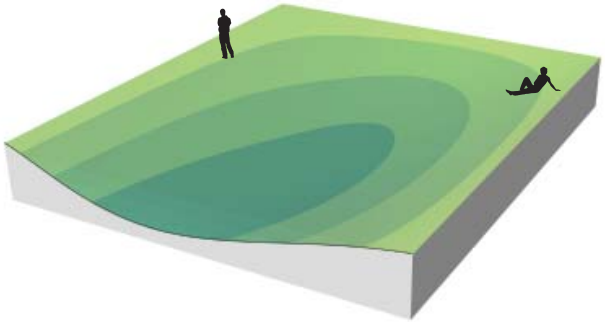
cistern capture

In addition to infiltration through green infrastructure, a cistern will be installed at the Juan Bautista pond to maintain its moisture levels during the dry season. This rainwater collection will help to establish a healthy ecosystem to support native plants and animals within the pond.

BIOGUTTER → BIOSWALE → POND







implementation actions and metrics

- Design each building to divert, upon completion of the hydrology system, 100% of stormwater for at least a 5-year storm event with a duration of 3 hours to the Parkmerced hydrology system without discharge to the City's combined sewer-stormwater system.
- Install a cistern that is designed to provide moisture to Juan Bautista pond throughout the year (approximately 100,000 gallons in total capacity).
- Comply with the requirements of the San Francisco Building Code Chapter 13C (Green Building Requirements).
- Comply with the requirements of the Stormwater Management Ordinance (Ordinance 83-10; File No. 100102).

restore wetlands

The hydrology system at Parkmerced will include the restoration of an original wetland at the southeast corner of Lake Merced Boulevard and Brotherhood Way. Utilizing this low area as part of stormwater management will help clean the rainwater runoff before it reaches Lake Merced. This wetland along with the stream corridor will also provide important habitat for local flora and fauna.

permeable paving and tree-well infiltration

Permeable paving will be installed in Crespi Drive, alleys, on-street parking lanes and dedicated pedestrian paths to accept stormwater and help re-charge the aquifer. In addition, tree wells will be designed to infiltrate water. These systems will help prevent excess storm water from entering the City's combined sewer-storm water system during large storm and flood events.

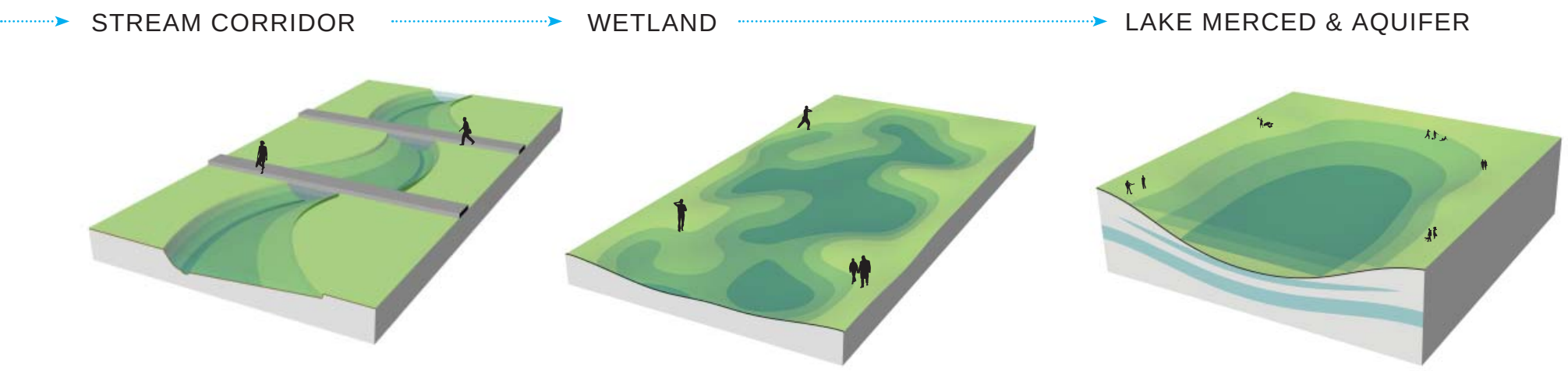


Figure LN.02.01: Parkmerced Green Infrastructure
Source: Tom Leader Studio

LN.03 habitat

goal Extend and create local habitats to encourage biodiversity, support a self-sustaining ecosystem, and increase environmental awareness

implementation actions and metrics

- Meet the requirements of Chapters 02.16 through 02.26 (Open Space) of the "Parkmerced Design Standards + Guidelines".
- All operations and maintenance of stormwater control facilities will be in compliance with the Operation and Maintenance requirements described in the Stormwater Design Guidelines (SDG).

strategies

a diverse stream corridor

Parkmerced will include a stream corridor intended not only to treat stormwater before its final deposit into the underlying aquifer and Lake Merced, but also to help attract native wildlife to the site, including amphibians, insects and birds. By installing a series of check dams along the stream, a steady and slow water flow rate is intended to maintain micro ecosystems and provide beautiful stopping points along a trail system that increases residents' awareness and appreciation for nature.

habitat management plan

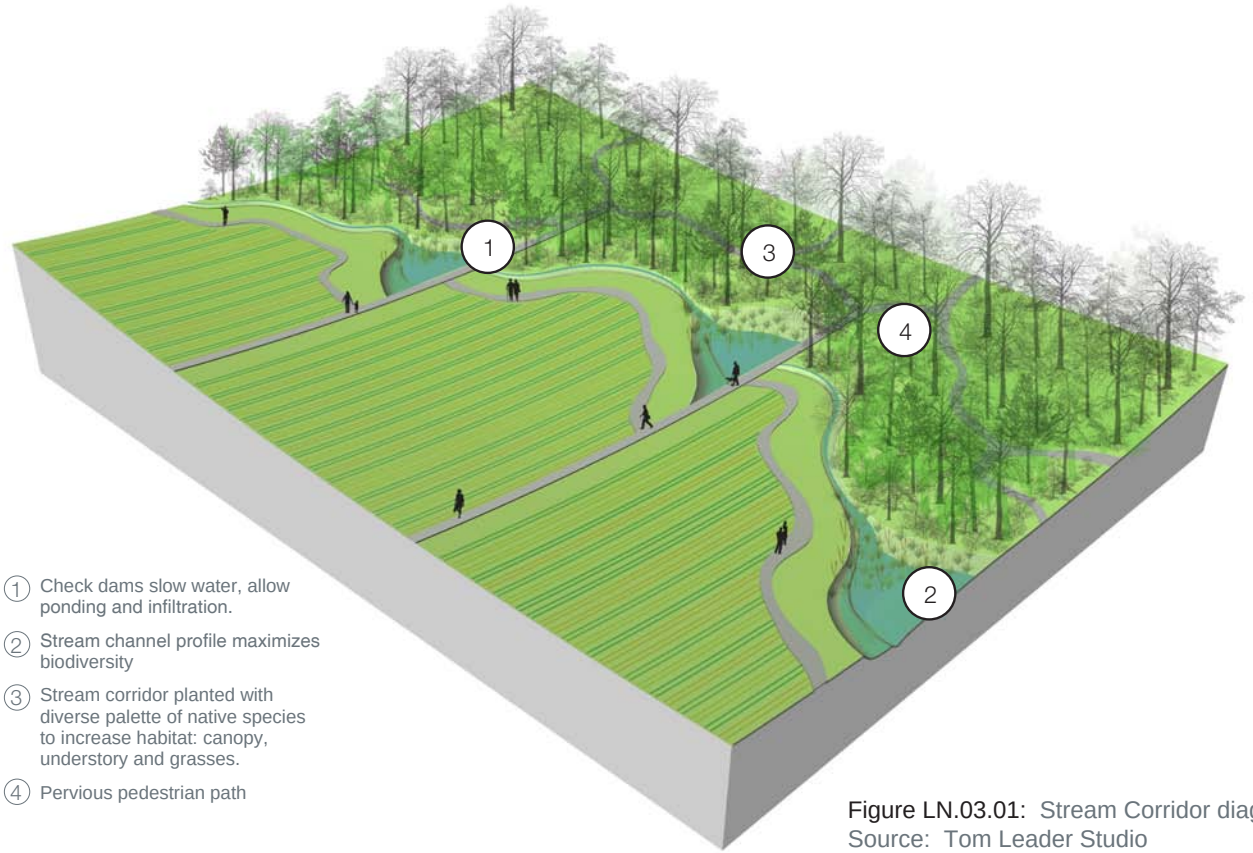
A habitat management plan will be developed to maintain ecological areas within the stream corridor and investigate threats that the project poses for habitat and/or water resources within these areas, such as the introduction of exotic species or destruction through human impact.

native or regionally appropriate species

Native and regionally appropriate species help to maintain healthy and rich ecosystems without using unnecessary amounts of natural resources. Drought tolerant species will be planted at Parkmerced to reduce the need for irrigation and help conserve potable water. Invasive species that out-compete native and acclimated species, and therefore pose a threat to the ecosystems, will be prohibited in order to prevent unhealthy competition amongst species and to allow the success of all plants and animals dependent on the native and acclimated habitat.

education

The natural habitats created along the stream corridor could provide educational opportunities for both children and adults to learn about conservation and the local ecosystem. The proposed school use site is located adjacent to the stream corridor to offer the opportunity for direct access to the stream corridor as an educational resource.



1. Check dams slow water, allow ponding and infiltration.
2. Stream channel profile maximizes biodiversity
3. Stream corridor planted with diverse palette of native species to increase habitat: canopy, understory and grasses.
4. Pervious pedestrian path

Figure LN.03.01: Stream Corridor diagram
Source: Tom Leader Studio

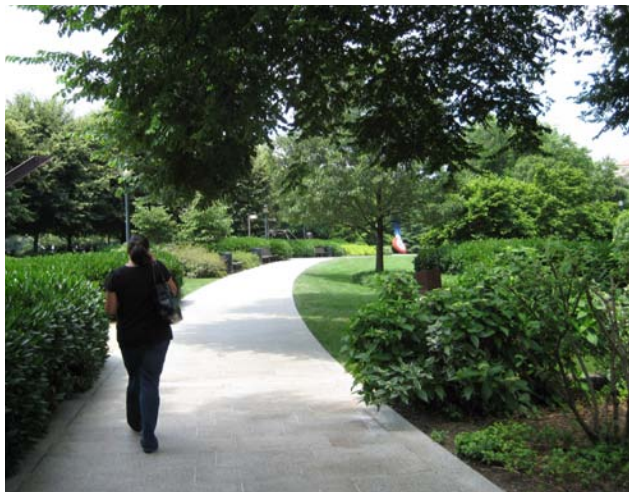
LN.04 open space

goal Integrate a network of positive open spaces within comfortable walking distance of all residents that support a variety of activities to promote a healthy, active lifestyle at Parkmerced, create productive landscapes, and enrich the social life of the neighborhood.

strategies

diversity of open spaces

The Parkmerced Vision Plan and Design Standards + Guidelines include a hierarchy of community recreational and open spaces created at various scales to support a variety of recreational activities for groups and individuals. Private open space for individual units will be provided through elements such as a generous setback zone, which transitions into semi-private courtyards to foster community building amongst neighbors bordering the courtyard. Neighborhood Commons will be conveniently located within a short walk of all residences to provide places for people to gather such as cafes and neighborhood-serving retailers, playgrounds and/or flexible spaces for recreation or gatherings. Larger dedicated public open spaces will offer opportunities for a variety of recreational activities including playing fields, cycling and nature paths.



community gardens

In addition to the farm, the neighborhood will provide a variety of opportunities for residents to cultivate plants and vegetables in small individual plots, community herb gardens, terrace planters, and greenhouses on the roofs of some buildings.

connection to pedestrian network

Pedestrian paseos and paths will weave together the various open spaces at Parkmerced, encouraging residents to actively use these dedicated open spaces. A widened pedestrian path along Gonzalez Boulevard will provide additional recreation opportunities and connect the stream corridor amenities to the organic farm and fitness center. This pedestrian network is intended to allow residents to easily and quickly integrate outdoor activities into their daily lives.

implementation actions and metrics

- Design the site such that all Parkmerced residents live within a quarter-mile walk of open spaces such as parks, community gardens, Neighborhood Commons and plazas.
- Provide outdoor and indoor recreational facilities such as play fields, a fitness center, ‘tot-lots’, and other similar facilities, within a quarter-mile walk of all residents at Parkmerced, as more particularly described in the “Parkmerced Design Standards + Guidelines”.

LN.05 operations + maintenance

goal Ensure the proper functioning of the hydrological system to manage stormwater volumes successfully and support dependent ecosystems, as well as provide adequate maintenance of public open spaces.

implementation actions and metrics

- Comply with San Francisco's IPM Ordinance (Environment Code, Chapter 3) (City Ordinance 171-03, File No. 030422) for all pest management activities.

strategies

open space management plan

An open space management plan will regulate maintenance of all public spaces and the proper functioning of the hydrology system at Parkmerced. It will provide for regular inspections of the infiltration rates of bioswales, water levels of the seasonal stream and pond, monitoring of the irrigation system for leaks, integration of a pest management plan, facilitating composting efforts and mulching, and general landscaping procedures.

pest control

An integrated pest management (IPM) plan will furnish a knowledgeable and environmentally sound approach to control pests by studying plant morphology, resistance levels, infestation thresholds, and pest biology. Pest damage levels and environmental risks will be assessed and mitigated without using highly toxic chemicals posing serious health concerns for residents, employees, and visitors.

Water

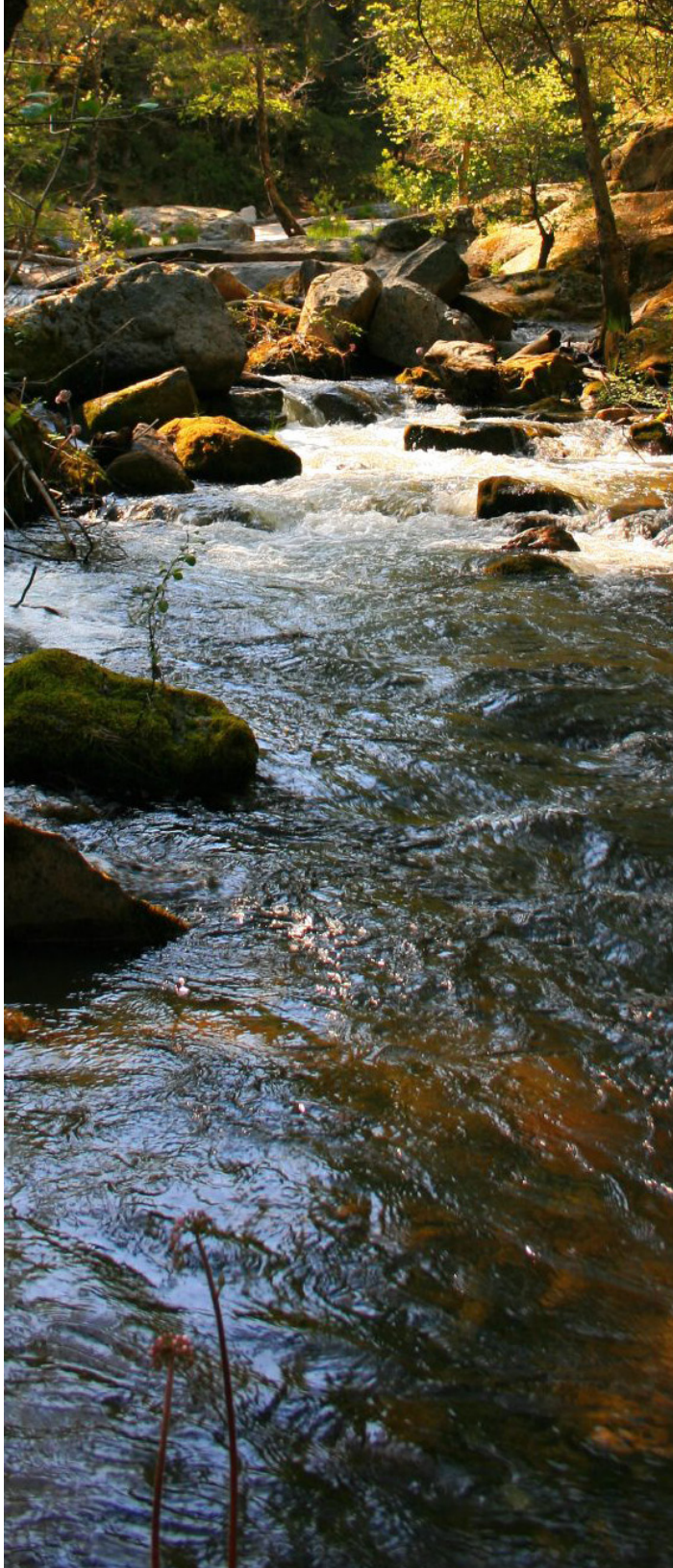
WA

Conserve potable water and reduce energy demand on treating wastewater

Most of San Francisco's potable water is supplied by the Hetch Hetchy reservoir in the Sierra Nevada Mountains, charged by springtime snow melt. Global warming poses a serious threat to the amount of snow melt the Sierra Nevada produces each year. As temperatures rise, more winter precipitation in the mountains reaches the ground as rain rather than snow. Winter rainwater that fills the Hetch Hetchy reservoir must be released for flood control and cannot be stored for the summer and fall seasons. Due to this dramatic shift in when precipitation is available for capture, combined with less water released in the springtime from a lack of snow melt, the Bay Area faces potential water shortages during the dry summer and fall seasons. It has been projected that by the middle of this century the snow pack in the Sierra Nevada will have declined 25-40%.[1]

The dwindling Sierra Nevada snow cap combined with an expected 400,000 more people per year moving to California make it imperative to implement smart planning and design techniques that are focused on conservation of potable water and that pursue strategies for identifying and capitalizing on alternative sources of water.

[1] Sierra Climate Change Toolkit, Planning Ahead to Protect Sierra Natural Resources and Rural Communities. 2007. Sierra Nevada Alliance.



WA.01 existing conditions

San Francisco faces a diminishing supply of potable water from the Hetch Hetchy reservoir and is taking measures to reduce both the consumption of potable water through more stringent code requirements for lower flow fixtures, as well as the use of alternative water sources for the City's irrigation of park and recreation land. The City has a combined sewer system which accepts stormwater in addition to wastewater for treatment. This means that during strong storm events, sewage is being let into the bay and ocean due to overflow.

Parkmerced, with its vast lawns, outdated construction, and inefficient fixtures and plumbing, draws a significant amount of the City's potable water, and therefore releases a high quantity of wastewater back into the combined sewer. According to Parkmerced billing records, irrigation with potable water alone consumed approximately 55 million gallons per year from 2005 to 2006, and individual residents consumed 89 gallons per day from 2006 to 2007, whereas the average consumption of an average U.S. citizen is 56 gallons per day.

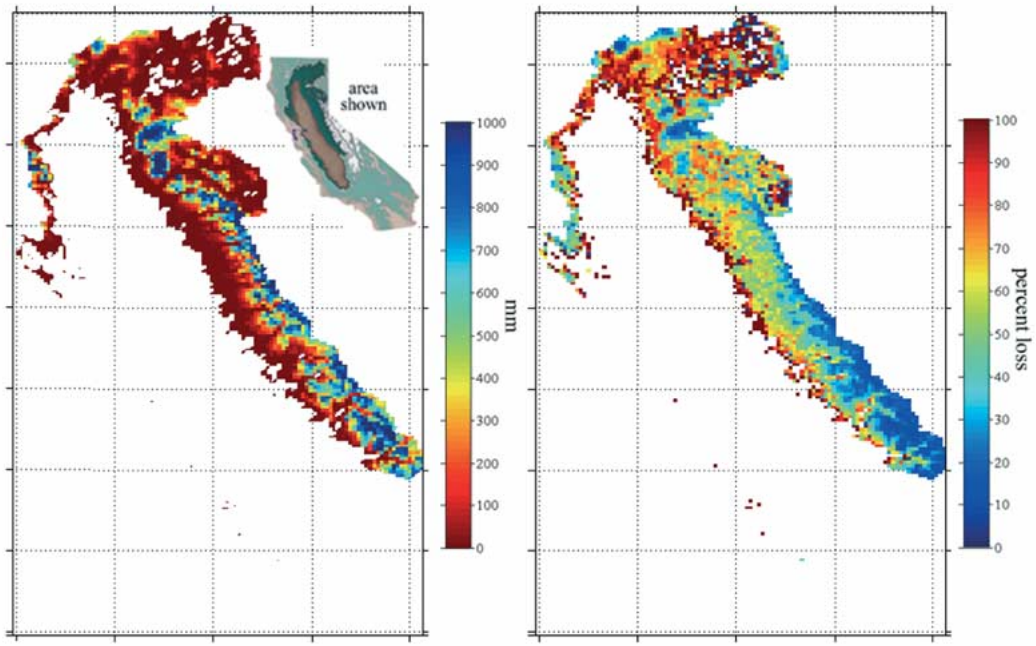


Figure WA.01.01 Projected 2060 snow pack changes in the Bay-Delta watershed resulting from climate warming. Left: Present-day April snow water equivalent in mm. Right: Percent SWE lost by 2060.

Source: Elevation Dependence of Projected Hydrologic Changes in the San Francisco Estuary and Watershed, N Knowles and D. Cayan, 2004


DRAINS TO
WATERWAYS
DUMP NO
WASTE!
EAST JORDAN IRON

WA.02 water supply

goal Minimize water use and only use potable water where absolutely necessary to conserve diminishing regional water supplies

strategies

utilize low-flow fixtures and appliances

The use of high-performance water fixtures will reduce water consumption and lower the demand on the water supply. Through the installation of low-flow water fixtures in appliances such as toilets, sinks, and showers in both new and existing units, the average daily residential water use at Parkmerced is projected to decrease to 38 gallons of potable and non-potable water per capita per day compared to the San Francisco average of 57 gallons per capita per day.

recycled water

Recycled water, or reclaimed water, is former wastewater that has been treated to remove solids and impurities through multiple stages of treatment. In California, recycled water must also meet the stringent health standards of Title 22 relating to tertiary recycled water, developed by the California Department of Public Health.

The Parkmerced project is located in a designated recycled water use area as defined in the City of San Francisco's Recycled Water Ordinances (effective November 7, 1991, and amended in 1994). The ordinances require property owners to install dual-plumbing systems for recycled water uses (including irrigation, commercial toilet flushing, air-conditioning and laundry facilities) within the designated water use areas for new or remodeled construction over 40,000 gross square feet. On November 18, 2009, the Building Standards Commission unanimously voted to approve the California Dual Plumbing Code that establishes statewide standards for installing both potable and recycled water plumbing systems in commercial, retail, and office buildings, theaters, auditoriums, condominiums, schools, hotels, apartments, barracks, dormitories, jails, prisons, and reformatories. The new code is effective Jan. 11, 2011. Website address: http://www.water.ca.gov/recycling/DualPlumbingCode/

grey water

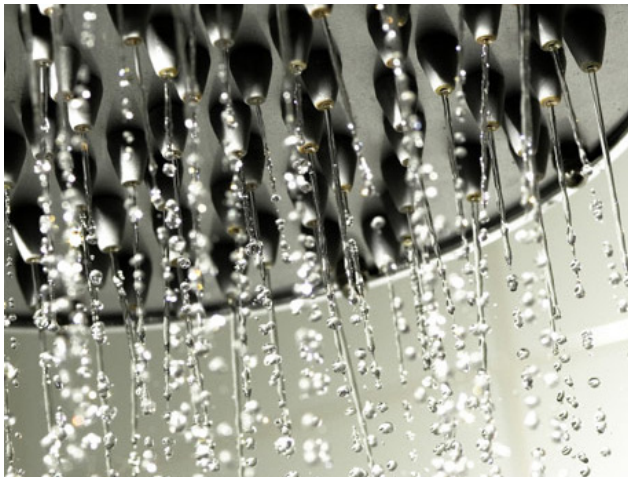
Wastewater generated from domestic sources such as sinks, showers, and laundry machines compose 50-80% of all wastewater produced. Under-the-counter systems could be installed to direct wastewater from bathroom sinks to adjacent toilets for flushing. Laundry facilities using non-toxic biodegradable detergents could also be connected to cisterns for irrigation.

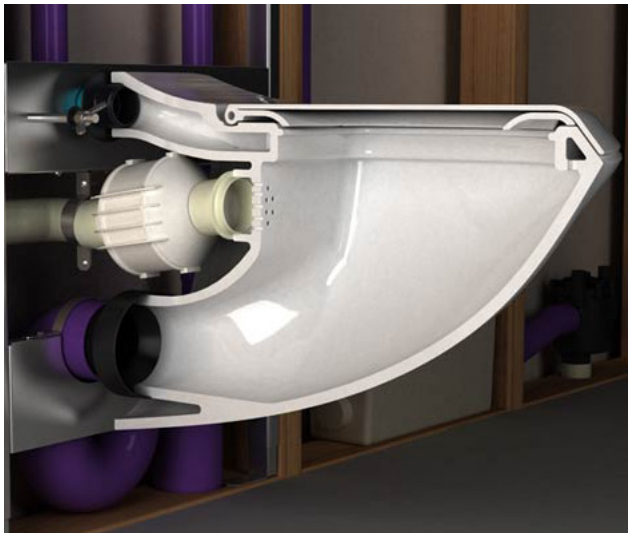
rain water

Rainwater at Parkmerced will be captured in a cistern to supply moisture to Juan Bautista pond during the dry summer and fall seasons.

fog catchers

Fog catchers are synthetic mesh nets that can be stretched like sails on tower rooftops to capture moisture from the fog, allowing condensation to occur in the mesh. This water then drips into collection basins and can be piped to a rainwater collection cistern to contribute to irrigation water supply. Parkmerced may consider installing fog catchers in the future.





implementation actions and metrics

- If a recycled water source is made available to Parkmerced from a municipal source in quantities sufficient for irrigation, toilet flushing and laundry, design new buildings to have 60% less designed demand for potable water as compared to existing buildings.
- If a recycled water source is made available to Parkmerced from a municipal source in quantities sufficient for such purposes, use 100% recycled water for irrigation.
- Install low-flow water fixtures in all new residential and on-residential buildings that meet or exceed the following efficiency standards:

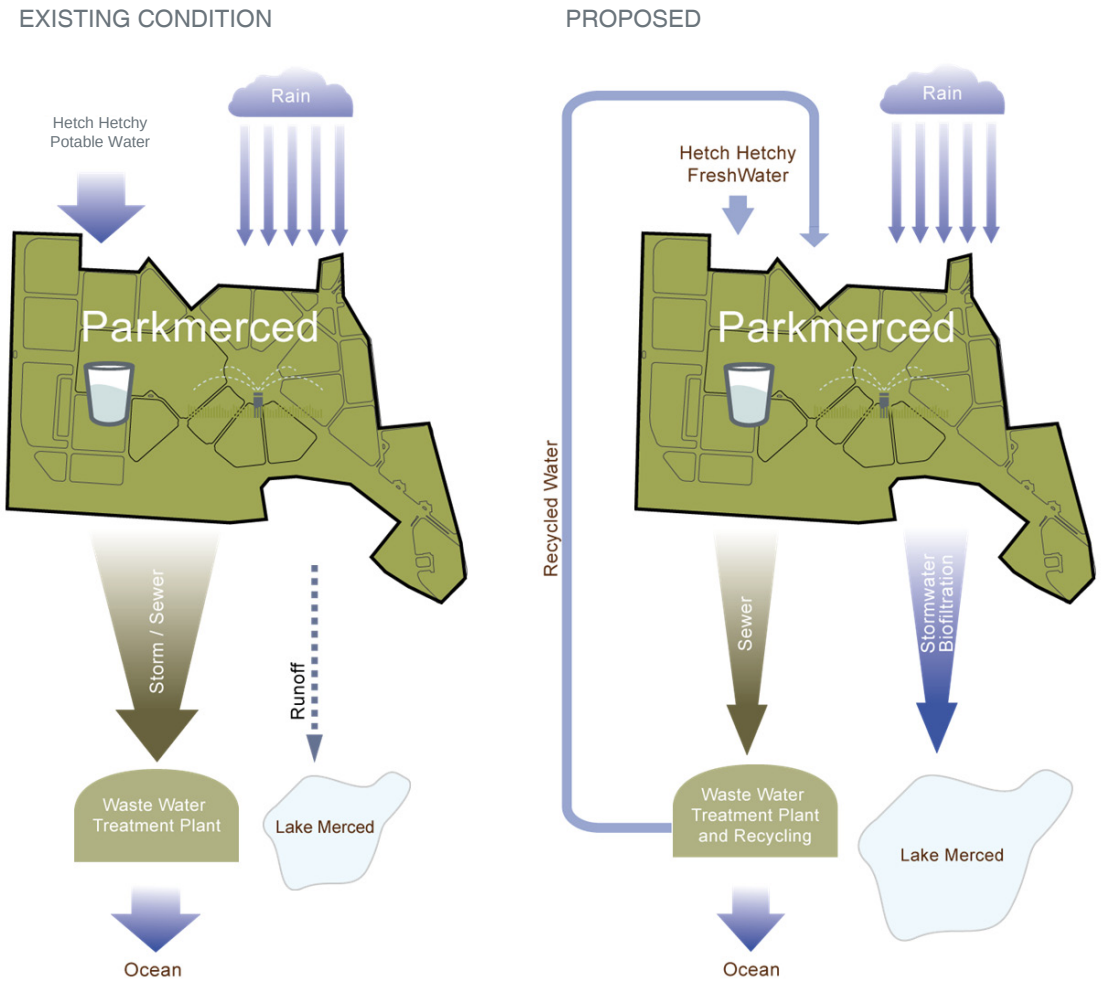


Figure WA.02.01: Existing vs. Proposed Water Flows
Source: Hydroconsult Engineers Inc.

WA.03 wastewater

goal Reduce energy to treat wastewater and help neutralize Parkmerced's carbon footprint

strategies

reduce wastewater

By treating all stormwater on-site and by installing low-flow fixtures which reduce the volume of water consumed, Parkmerced will reduce the amount of wastewater entering the combined sewer system.

disconnect from combined system

Sewer separation allows stormwater to be treated as a resource rather than as a waste product. Parkmerced will collect stormwater runoff from roofs and streets through a combination of low impact development (LID) techniques such as bioswales, ponds, rain-gardens, and other biofiltration systems. This implementation will help to reduce wastewater flows to the Oceanside treatment plant. Removing Parkmerced's stormwater from the City's combined sewer system will help reduce surges that periodically overwhelm the system's capacity and discharge to Ocean Beach.

The phasing of construction of the LID measures will be such that the most upstream, parcel-level measures will be sized to satisfy the Stormwater Design Guidelines (SDG) requirements of individual buildings as included in the Parkmerced Infrastructure Plan. The Right of Way (ROW) LID measures will be constructed simultaneously with the street improvements or construction of new streets. The site-wide LID measures will be constructed as the overall site work is completed. If the ROW LID measures downstream of a parcel have yet to be constructed, the parcel runoff will be temporarily direct to the combined sewer, and the requirements of the SDG in combined sewer areas will be met. If the ROW LID measures downstream of a parcel have been constructed, the requirements of the SDG in separated sewer areas will be met.However, as each segment of the bioswale network is completed, the adjacent buildings will be required to tie into the Parkmerced stormwater collection system and sever the buildings' temporary connection to the City's combined stormwater/sewer system

implementation actions and metrics

- Upon completion of the hydrology system, divert 100% of stormwater deposited within Parkmerced from at least a 5-year storm event with a duration of 3 hours from the City's combined stormwater/sewer system.

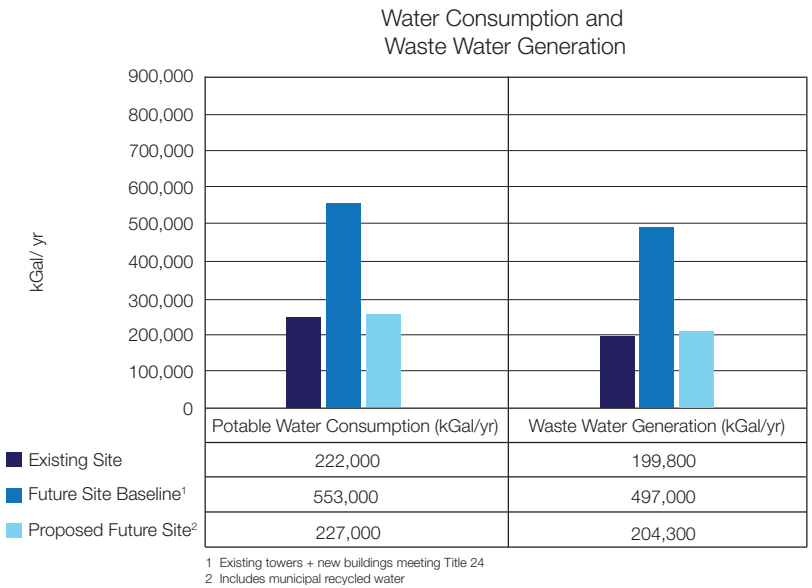


Figure WA.03.01: Water Consumption and Waste Water Generation

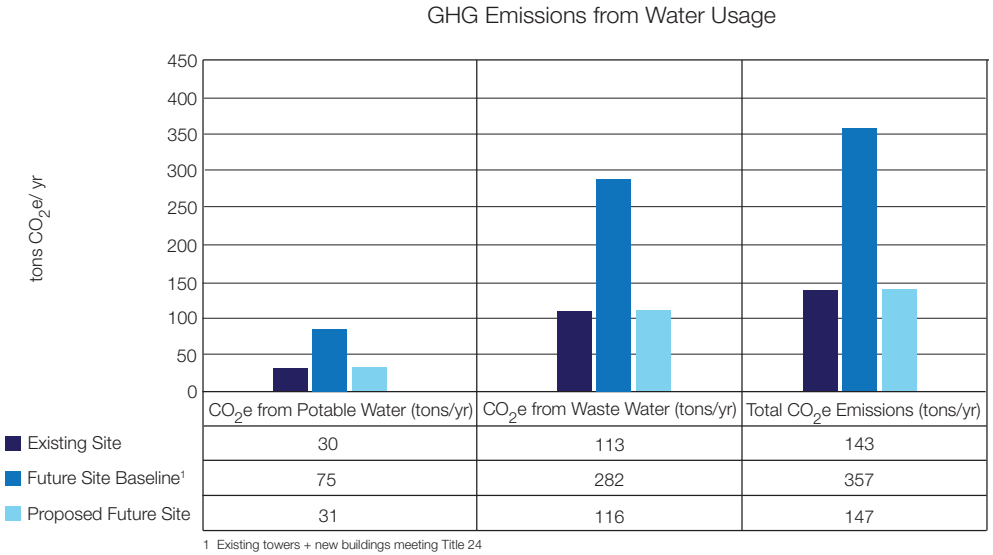


Figure WA.03.02: Greenhouse Gas Emissions Associated with Water Usage

Energy

EN

Reduce energy consumption, promote renewable energy production, and adapt to future energy sources to achieve greenhouse gas neutrality

San Francisco has put in place the 2 Ton Challenge to reduce its greenhouse gas emissions 20% below 1990 levels by 2012 and join the other world-leading cities to set an example of how to achieve the lowest carbon footprint possible.1 Parkmerced can greatly advance the City's challenge by designing a community that will enable residents to live within much smaller carbon footprints than other San Francisco neighborhoods, save money on energy bills, and reduce their reliance on resources from local to global levels. Over the coming years, as energy resources evolve, adaptability will become an increasingly important value. Parkmerced's ongoing goal of energy efficiency will thus enable it to accept and adapt to those changes.

[1] Climate Action Plan for San Francisco. September 2004. San Francisco Department of the Environment, San Francisco Public Utilities Commission.

EN.01 existing conditions

Energy used to construct and maintain the world's infrastructure has been responsible for over one-third of global greenhouse gas emissions. At Parkmerced, this factor has led to a focus on energy reduction strategies and associated greenhouse gas emission reductions. It is a focus directed at improving the energy efficiency of existing buildings and at the same time developing high-performance new residential and commercial structures.

Unfortunately, Parkmerced's existing garden apartments are approaching the end of their lifespan. Therefore, demolishing the garden apartments and constructing new units in their place is more energy efficient, reducing long term energy consumption and greenhouse gas emissions.

Heat

With outdated construction techniques and technologies, Parkmerced's existing buildings are inherently inefficient by current standards. Both the existing garden apartments and towers have no insulation. Attic insulation is provided in a minority of garden apartments, and no additional wall or roof insulation is present on site. The original single-pane windows have been replaced with aluminum framed double-pane glass, which only has modest insulating value particularly when compared with today's higher performance windows.

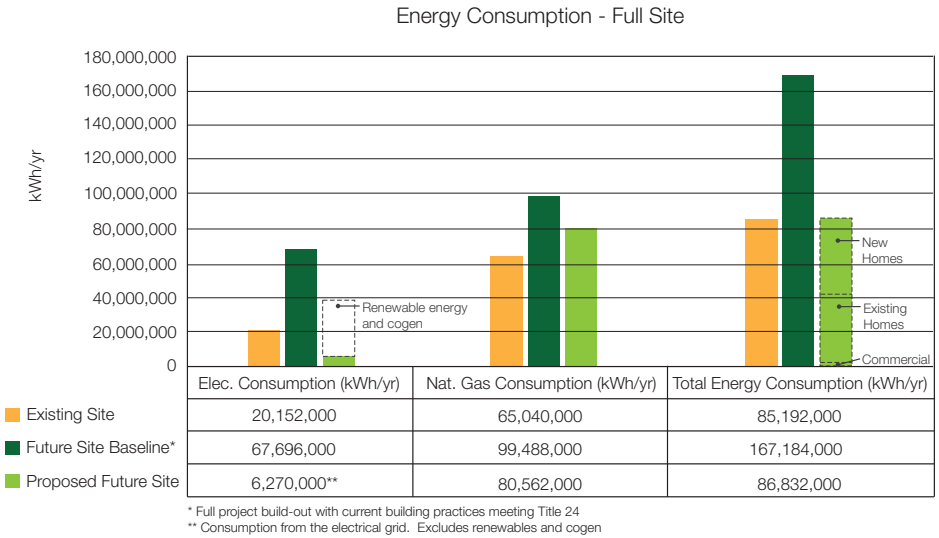
In Parkmerced's garden apartments, heating is currently provided by individual gas furnaces. The majority of these are the original furnaces, circa 1950, that have been maintained with no major upgrades. In tower apartments, heat is provided to the residential units via steam radiators from a central boiler. Steam systems are inherently inefficient, prone to heat loss from pipes and leaking steam traps. In recent years, the original boilers have been rebuilt with new burners, firetubes, and controls. Efforts have also been made to eliminate leaks in the system with the implementation of an improved maintenance program.

Hot Water

Currently, domestic hot water is provided from central water heaters for both garden apartments and towers. Gas heated water and steam heat is commonly metered, which means that there is no economic incentive for residents to conserve. The plumbing, which affects the delivery of hot water, contains a mixture of new and old fixtures throughout Parkmerced. Although some of these fixtures have been retrofitted, they are typically only of moderate efficiency.

Lighting

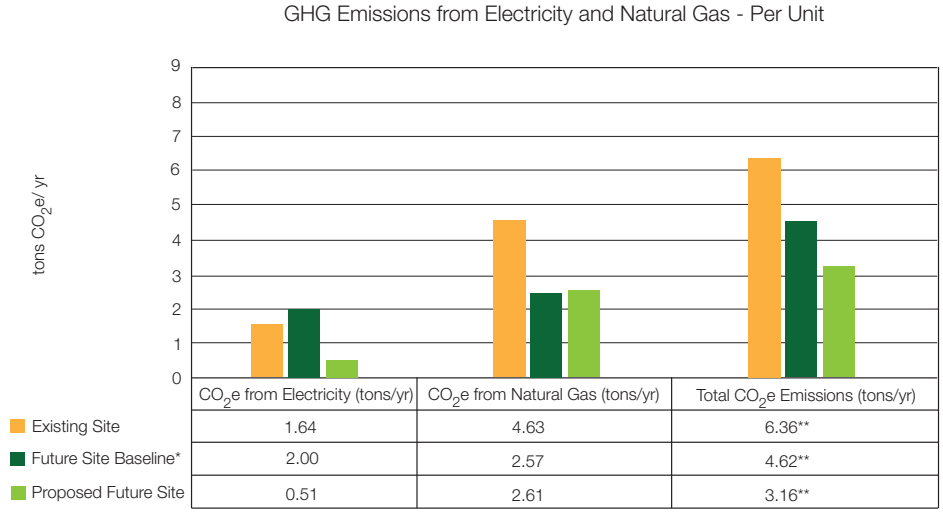
Lighting in Parkmerced's common areas has already been replaced with more energy-conserving fixtures. In residential suites, permanent lighting fixtures are provided only in the bathrooms, kitchens and halls. Approximately 5% of units have had kitchen and bath upgrades that include lighting.



	Elec. Consumption (kWh/yr)	Nat. Gas Consumption (kWh/yr)	Total Energy Consumption (kWh/yr)
Existing Site	20,152,000	65,040,000	85,192,000
Future Site Baseline*	67,696,000	99,488,000	167,184,000
Proposed Future Site	6,270,000**	80,562,000	86,832,000

* Full project build-out with current building practices meeting Title 24
** Consumption from the electrical grid. Excludes renewables and cogen

Figure EN.01.01: Electrical and Natural Gas Consumption



	CO_2e from Electricity (tons/yr)	CO_2e from Natural Gas (tons/yr)	Total CO_2e Emissions (tons/yr)
Existing Site	1.64	4.63	6.36**
Future Site Baseline*	2.00	2.57	4.62**
Proposed Future Site	0.51	2.61	3.16**

* Full project build-out with current building practices meeting Title 24
** Includes carbon associated with water and solid waste

Figure EN.01.02: Greenhouse Gas Emissions from Electricity and Natural Gas

The graphs to the left show both energy consumption and GHG emissions associated with electrical and natural gas for the existing site, the future site baseline (meeting Title 24 with current building practices) and the proposed future site.

Current Parkmerced residential units use approximately 40% more energy than a new unit meeting Title 24 would. New residential units are expected to be 60% more efficient than Title 24 with 18% of new residential energy being provided through renewables and cogen. Thus new units will consume approximately 76% less energy from the City grid than exising units.

Future Parkmerced units will emit 42% less carbon than the average San Francisco household. Carbon emissions from the residential units at Parkmerced will be approximately 3.2 tons CO_2e per household compared to 5.5 tons CO_2e for the average San Francisco household.

EN.02 energy reduction + consumption

goal Reduce energy consumption to preserve finite energy sources and achieve greenhouse gas neutrality

strategies

heating and cooling systems

Due to the unique microclimate at Parkmerced, the predominant year round energy demand of residential units is for space heating. In order to meet or exceed Title 24 (2008), radiant wall panel systems or radiant in-floor heating could be installed.

high performance building envelopes

To help meet or exceed Title 24 (2008) evolutionary standards for both new residential and commercial buildings, the design and construction of high-performance building envelopes is critical. Walls, roofs and floors will be insulated to exceed the requirements of California Code of Regulations, Title 24 (2008). There must be a maximum of 40% glazing, and additional glazing in excess of this allowance must be compensated by improved glazing and wall performance. Clear, insulated glazing and low-conductivity window frames are especially useful in admitting sunlight while minimizing heat loss. High performance building envelopes are capable of saving nearly 50% of heating energy relative to code requirements for residential buildings.

energy dashboards

Increasing awareness of energy consumption is the first step towards conservation. Energy dashboards are encouraged to be installed in individual units to help occupants monitor their electrical and natural gas usage in real time and allow them to see exactly how much they are spending each month on utilities.

vampire power switches

Vampire power is the electric power appliances consume when they are in standby mode and plugged into a socket but not actually in use. Vampire power switches provide an easy way to cut power usage while still being in control of when the power is cut.

appliance efficiency

A minimum of Tier 1 energy-efficient appliances will be installed in new construction as well as in the retrofitted existing towers at Parkmerced.

lighting efficiency

Because natural daylight is the most efficient lighting strategy, new buildings will be constructed to maximize daylight exposure in both private and commons areas. Though the latter makes up only a small fraction of the building's total area, common areas are typically responsible for using nearly half of the building's lighting energy because the lights are on at all times. Common area lighting controls will respond to daylight and human occupancy to ensure that artificial lighting is used only when needed. Permanent high-efficiency lighting fixtures could also be installed in all rooms, including residences. In existing buildings, installation of ceiling-mounted lights (which are more efficient than switched outlets) and upgrading lighting fixtures as new technologies become available will be possible as the rental units turn over.

heat recovery ventilation

Considerable energy savings may be achieved with heat recovery in the central ventilation systems of both new residential and commercial buildings. Rather than venting warm exhaust air outside, heat in the exhaust stream could be captured and used to preheat incoming air.

air source heat pumps

Commercial buildings can benefit by implementing air source heat pumps that take outside air and use it either as a heat source or a heat sink by transferring the temperature to the heating or cooling system in the building. These pumps should be considered as they are recommended over traditional condensing boilers and chiller plants because they significantly reduce energy consumption and associated greenhouse gas emissions.

exterior lighting

Exterior lighting efficiency at Parkmerced will be improved by upgrading the existing exterior building lighting to either light emitting diodes (LED)), high pressure sodium (HPS), or other energy-efficient technology.

on-going measurement + verification

In order to establish efficient performance of a building's energy systems, a measurement and verification plan could be implemented to install and use metering equipment to track and compare actual building performance against its targeted performance.

implementation actions and metrics

- Design new residential building envelopes to perform a minimum of 15% more efficiently than current Title 24 (2008) standards and all other buildings and building components to exceed current Title 24 (2008) standards by a minimum of 10%. In the future and as technology continues to advance, the Project Sponsor will endeavor to improve upon updated Title 24 standards.
- Design renovations to existing buildings so that the renovations meet or exceed the then-applicable Title 24 standards.
- Design all new infrastructure installed and maintained by Parkmerced including, but not limited to, common area lighting and water and wastewater pumps, to achieve an annual energy reduction of at least 10% below the current Title 24 (2008) minimum efficiency standards. In the future and as technology continues to advance, the Project Sponsor will endeavor to improve upon updated Title 24 standards. To the extent that such infrastructure is installed by the City, Parkmerced will encourage the City to meet this metric.
- Install one vampire outlet per room controlled by one master switch near the front door to the dwelling unit.
- Install Tier 1 or better appliances in residential units.
- A measurement and verification plan should be implemented.

EN.03 energy production + distribution

goal Reduce the demand for finite energy resources and peak grid-source energy with high emissions to help the local power company supply cleaner energy and help Parkmerced achieve greenhouse gas neutrality

strategies

photovoltaics

Photovoltaic panels (PV) utilize the sun's energy to produce electricity and could generate a substantial portion of the site's overall electrical demand if installed either on-site on the roof's of new and existing buildings at Parkmerced or off-site within the City. While PG&E has a relatively clean energy profile compared to other power companies in terms of greenhouse gas emissions, on- or off-site renewable energy like PV produces no carbon and reduces line loss caused by lengthy distribution lines. Parkmerced is targeting 10% of the total estimated site energy consumption through renewables (which could include PV, wind turbines, as described below, or other renewable technology). With current technologies, the ability to produce renewable energy at Parkmerced is limited given the nature of the site's specific micro-climate and significant fog cover achieving the target of 10% means producing 10,395,000 kWhr/yr of electricity.

wind turbines

Wind turbines are rotating machines that enable the conversion of the kinetic energy of wind into mechanical energy, which then in turn is converted to electricity. There are two types of wind turbines: Horizontal Axis and Vertical Axis Wind Turbines. Vertical Axis (VAWT) turbines should be considered at Parkmerced because their revolution is unidirectional, which allows for operation on sites where the wind flow is volatile and better protects against bird strikes.

cogeneration

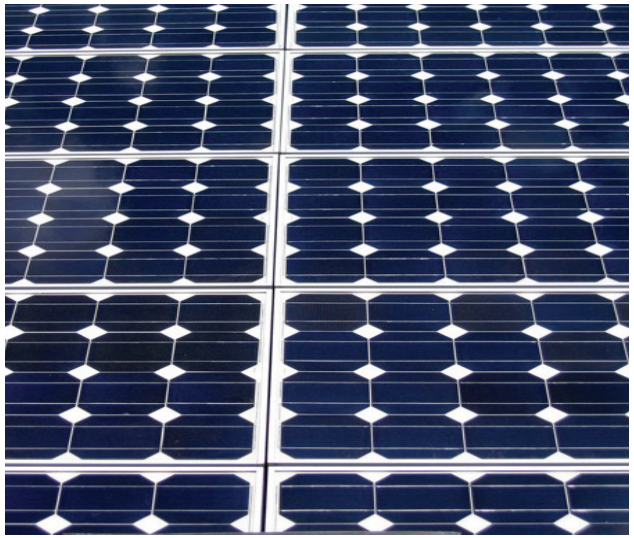
Domestic hot water could be heated from cogeneration: a process in which heat is produced as a by-product from an engine creating electricity. It is an effective strategy to reduce electrical consumption from the grid and ultimately reduces overall greenhouse gas emissions. Fueled by natural gas, cogeneration systems can generate electricity more cleanly than the conventional power plants providing electricity to the grid. Another benefit of using cogeneration is that it generates electricity during peak times of use, which will help address California's need for more and cleaner power during these periods. Cogeneration presents opportunities in the future to switch to alternative fuel sources as they become more viable. While various types of small cogeneration units could be used to supply each building individually, a centralized cogeneration option is best suited to a district heating approach. Heat generated by the cogeneration system could be used for space heating, heating domestic hot water and heating non-base building loads, such as the swimming pool at the Fitness/Community Center. Parkmerced anticipates achieving 10% of the total estimated energy consumption, producing 10,395,000 kWhr/yr of electrical generation through co-generation based on a heat load following cogeneration strategy.

district energy system

The benefit of installing a district energy system at Parkmerced is that it establishes a slightly more efficient infrastructure for space heating and domestic hot water that will help further reduce green house gas emissions and provide opportunities to implement centrally-located, innovative new energy saving technologies at various points in the future. While a district energy system fed by natural gas fired boilers has minimal energy savings and greenhouse gas emission reductions, those savings and reductions are further improved when alternative thermal systems such as cogeneration are connected to the district energy system. There are three configuration alternatives that could be considered for district energy at Parkmerced, including an energy loop with either one centralized plant or a number of decentralized plants located throughout the neighborhood, or micro-centralized plants within individual buildings or blocks.

carbon offsets

Photovoltaics, cogeneration and other energy generation strategies could create excess electricity during peak hours, when consumption on-site is low. This electricity could be sold back to the power company for carbon offsets, helping to supply more renewable energy to the grid for other users during peak demands.



implementation actions and metrics

- The commitment to producing at least 10,396,625 kWhr/yr of renewable energy and 10,396,625 kWhr/yr electricity through a cogeneration facility, or some combination of both, but in no event less than 20,793,250 kWhr/yr, or otherwise satisfying this same 20,793,250 kWhr/yr commitment through energy efficiency and conservation measures is a significant benefit.
  - By full build-out, provide, either on- or off-site, renewable energy generation systems, such as solar, wind, hydrogen fuel-cells, small-scale or micro hydroelectric, and/or biomass, with production of at least 10,396,625 kWhr/yr of the estimated total annual energy consumption;
  - By full build-out, generate 10,396,625 kWhr/yr of the estimated total annual energy consumption from an on-site cogeneration system; or
  - Providing a combination of power from the above two sources, or satisfying the combined 20,793,250 kWhr/yr requirement through energy efficiency or conservation savings.

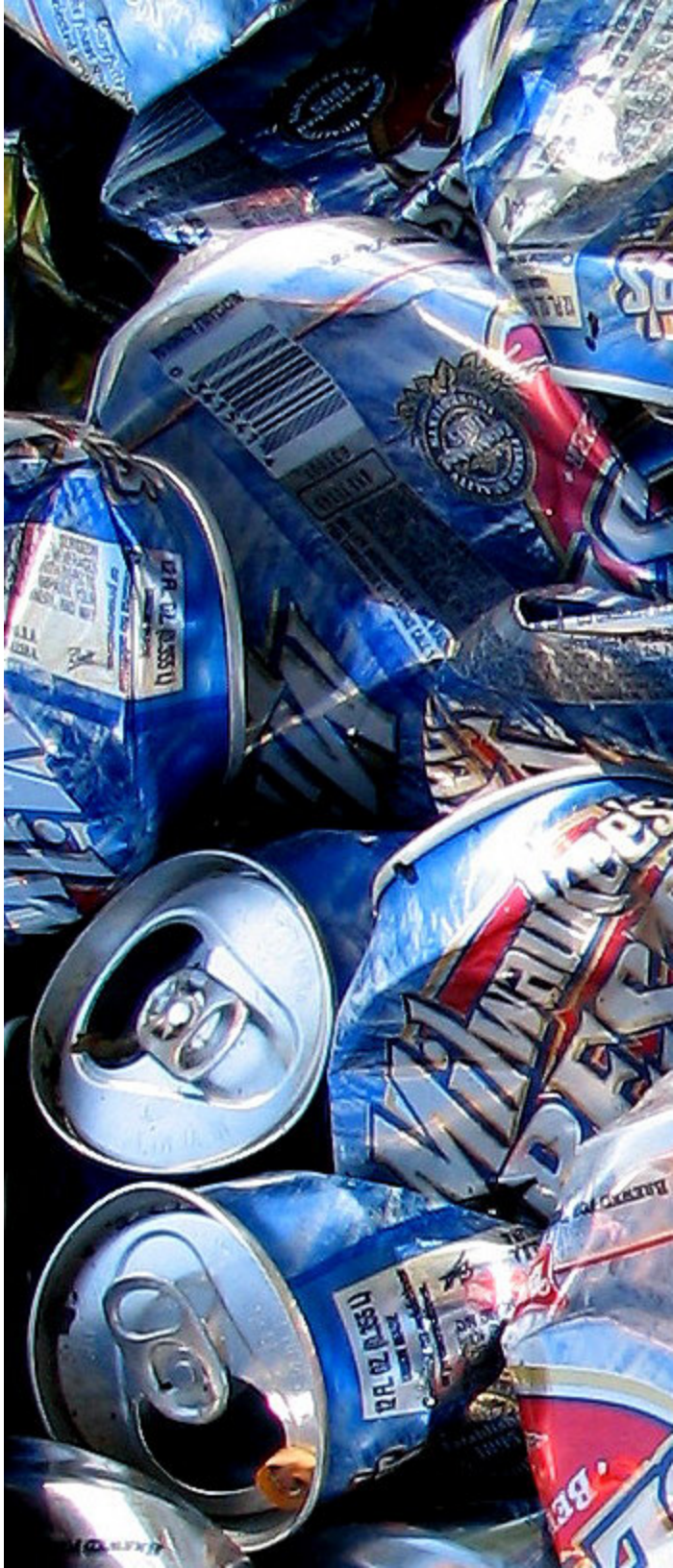
Solid Waste

SW

Become a model sustainable San Francisco residential community by minimizing the amount of solid waste sent to landfills and maximizing the reuse of organic waste

In addition to facing a space shortfall crisis for landfills as increasing volumes of waste is generated, landfills also produce environmentally damaging emissions that off-gas into the atmosphere and leach into the soils and waterways. These gases and toxins accumulate as the waste breaks down, and therefore must be trapped and sealed to prevent contamination of soils and ground water. It can take landfill waste hundreds of years to decompose and stop off-gasing.

The United States is one of the greatest contributors to landfill. According to the Environmental Protection Agency, the average American produces 4.5 pounds of garbage a day, or 1,600 pounds per year.1 While San Francisco is well under the American average, diverting 70% of its waste from landfills, the city still hauls away 1,800 tons of garbage to landfill each day.2 San Francisco has made it a goal to send "zero waste to landfill by 2020" in order to eliminate the City's impact on local landfills and reduce its carbon footprint. Through innovative waste collection systems and by educating residents to separate waste, compost and recyclables, Parkmerced can be a key contributor in helping the City achieve its ambitious goal.



[1] Municipal Solid Waste Generation, Recycling and Disposal in the United States: Facts and Figures for 2008. 2008. Environmental Protection Agency.

[2] Municipal Solid Waste Generation, Recycling and Disposal in the United States: Facts and Figures for 2008. 2008. San Francisco Department of the Environment, San Francisco Public Utilities Commission.

SW.01
existing conditions

Currently, 28% of solid waste at Parkmerced is diverted from landfill, which falls short of the goal of "Zero Waste to Landfill by 2020." The current solid waste collection system at Parkmerced consists of residential garbage and recycling collection and transport to off-site facilities. Overall, Parkmerced currently generates a total of approximately 3,920 tons of solid waste per year: 2830 tons that are directed to landfills; 840 tons of recyclables; and Parkmerced's landscaping generates 250 tons of organic matter, or green waste, per year. This equates to 0.88 tons of solid waste directed to landfills and 0.26 tons of recyclables per housing unit per year.

Parkmerced's waste composition breakdown numbers are actually typical of many California communities. This is true for both types and amounts of waste, according to the results of studies done by the California Integrated Waste Management Board's Statewide Waste Characterization Study prepared in December 2004 by the Cascadia Consulting Group, Inc.

The same study showed that transport of solid waste from Parkmerced in 2007 required 550 vehicle trips to collect garbage and recyclables for transport to a transfer station, and then on to a landfill. Each trip averaged 1.5 tons of waste collected and hauled off-site. That same year, ninety-nine vehicle trips were required to collect green waste, and each trip for compostable green waste averaged 2.54 tons collected and hauled off-site. This translates to a total of 134 tons of CO_2e produced from waste transportation.


COMPOST

SW.02 waste reduction

goal Reduce waste and divert as much material from landfill as possible to help conserve resources, achieve greenhouse gas neutrality and preserve natural ecosystems

strategies

waste separation
A rigorous recycling and composting system for Parkmerced will encourage diversion of as much waste from landfills as possible. Separate receptacles for recyclables and compost will be provided at all collection locations.

centralized waste collection
Centralized waste, recycling and compost pick-up locations will reduce truck traffic throughout the neighborhood and reduce truck idling time, as trucks will be required to make fewer stops within Parkmerced to pick up waste. This reduction in truck traffic and idling will likely reduce the project's carbon footprint. As an alternative to multiple pick-up locations, an automated waste collection system could also be installed that pneumatically transports waste, recycling and compost from multiple drop-off locations to one or more centralized pick-up location.

mulching
Mulching and leaving grass clippings where they fall returns nutrients to the soil and reduces irrigation and fertilizer requirements. Implementing this strategy, along with an on-site composting program, will help eliminate approximately ninety-nine vehicle trips per year, reducing overall transportation-generated greenhouse gas emissions.

organic farm composting
Collecting and directing "green waste" to an on-site organic farm composting facility will significantly reduce overall transportation-generated greenhouse gas emissions. The matured compost will fertilize organic farm crops and community garden plots at Parkmerced, creating an on-site, closed-loop green recycling system.

hazardous waste drop-off
To promote proper disposal of potentially hazardous waste, an on-site drop-off location will be provided for residents to dispose of materials such as paints, solvents, oil, and batteries.

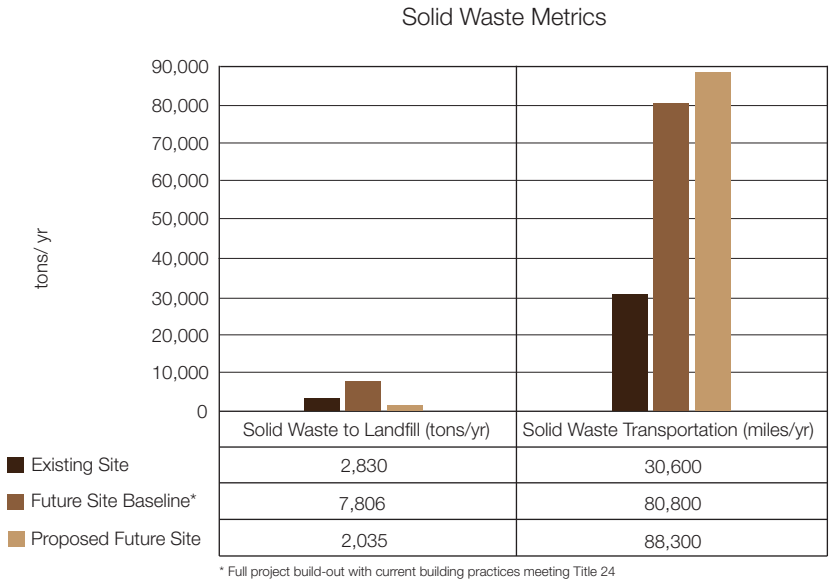
green operations
To further reduce the amount of waste produced at Parkmerced, the apartment leasing office will send communications and maintain records electronically to the extent feasible. Local business will be encouraged to do the same. For those operations requiring printing, recycled paper will be used.

neighborhood re-use box
Establishing a neighborhood re-use box will give residents an opportunity to salvage discarded items before they are sent to landfill.

education + awareness program
An education and awareness program will inform Parkmerced residents of the neighborhood's recycling and composting programs. Residents will be instructed to use all waste receptacles to increase awareness of the importance of separating waste.

implementation actions and metrics

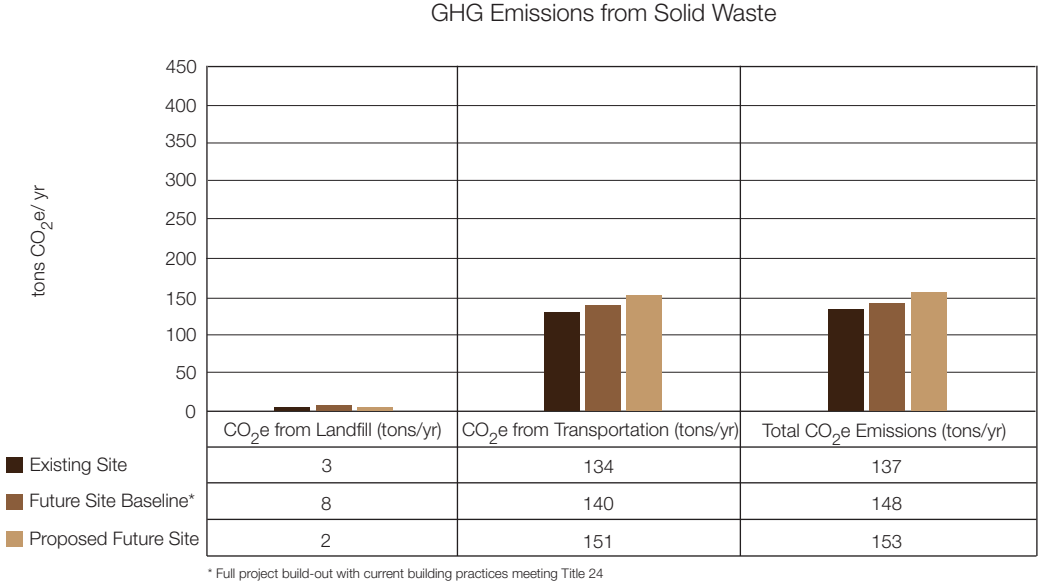
- Meet the requirements of the City's Mandatory Recycling and Compost Ordinance (Ordinance No. 100-09, File No. 081404).
- Provide a minimum of one centralized waste pick-up location on each block.
- Provide one hazardous waste drop-off location within each Neighborhood Commons.



	Solid Waste to Landfill (tons/yr)	Solid Waste Transportation (miles/yr)
Existing Site	2,830	30,600
Future Site Baseline*	7,806	80,800
Proposed Future Site	2,035	88,300

* Full project build-out with current building practices meeting Title 24

Figure SW.02.01
Solid Waste to Landfill and Associated Transportation



	CO_2e from Landfill (tons/yr)	CO_2e from Transportation (tons/yr)	Total CO_2e Emissions (tons/yr)
Existing Site	3	134	137
Future Site Baseline*	8	140	148
Proposed Future Site	2	151	153

* Full project build-out with current building practices meeting Title 24

Figure SW.02.02
Greenhouse Gas Emissions Associated with Solid Waste

Materials + Construction

MC

Use sustainable materials and construction techniques to reduce the consumption of natural resources and slow climate change

Harvesting and manufacturing materials for building construction affects both the quality and regeneration of natural ecosystems as well as energy consumption associated with extraction, manufacturing and transportation. There are two categories of this consumption, or embodied energy: initial and recurring. Initial embodied energy is defined as the non-renewable energy consumed in the acquisition of raw materials, their processing and manufacturing into building products, and their subsequent transportation to the job site. Recurring embodied energy is the non-renewable energy consumed to maintain, repair, refurbish or replace the material. Therefore, the total energy consumption and associated carbon emissions of a building material are evaluated by a life-cycle analysis, which takes into account both the building's initial and recurring embodied energy to determine its environmental consequences.

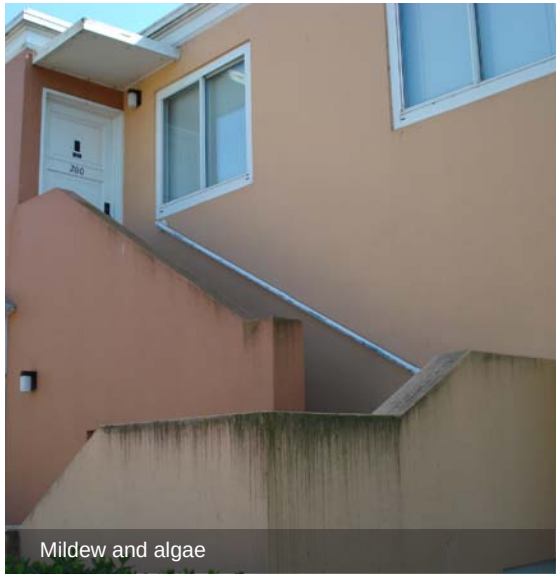
Parkmerced's goal to minimally impact the natural environment and lower greenhouse gas emissions takes the total life-cycle analysis of materials into consideration by reusing existing materials in new construction where feasible. This not only leads to less extraction of virgin material, but also extends the embodied energy by re-purposing. In addition to reusing materials, Parkmerced is committed to choosing rapidly renewable resources or those with high recycled content.

The construction process also plays a significant role in energy consumption and greenhouse gas emissions. A sustainable construction process includes proper staging, appropriate phasing, responsible choices of materials, indoor air quality management, waste disposal and recycling. Construction practices will have a significant impact on the health of the existing residents and local environment during construction and will also determine if the building is able to achieve its long-term sustainability goals.

MC.01 existing conditions

The majority of Parkmerced's buildings were constructed in the 1940's using standard wood stud construction. Due to the scarcity of materials and the urgency and high demand for housing during wartime, Parkmerced was built quickly. Insulation or flashing was not installed during initial construction on a majority of the buildings, so today the buildings suffer from water infiltration, mold, and dry rot due to their poor construction and Parkmerced's damp marine climate. In order to keep the existing garden apartments for another 60+ years, the required maintenance and repairs would increase the recurring embodied energy beyond the total embodied energy consumed with their demolition and new construction.

The mid-rise towers, however, were built with concrete and better structural materials making their renovation viable. By keeping the mid-rises, and either reusing or recycling much of the existing garden apartment materials in the new construction, Parkmerced intends to achieve a lower carbon footprint than the current existing site.


Mildew and algae


Framing repairs


Dry rot and leaky windows


Chipped and crumbling stucco

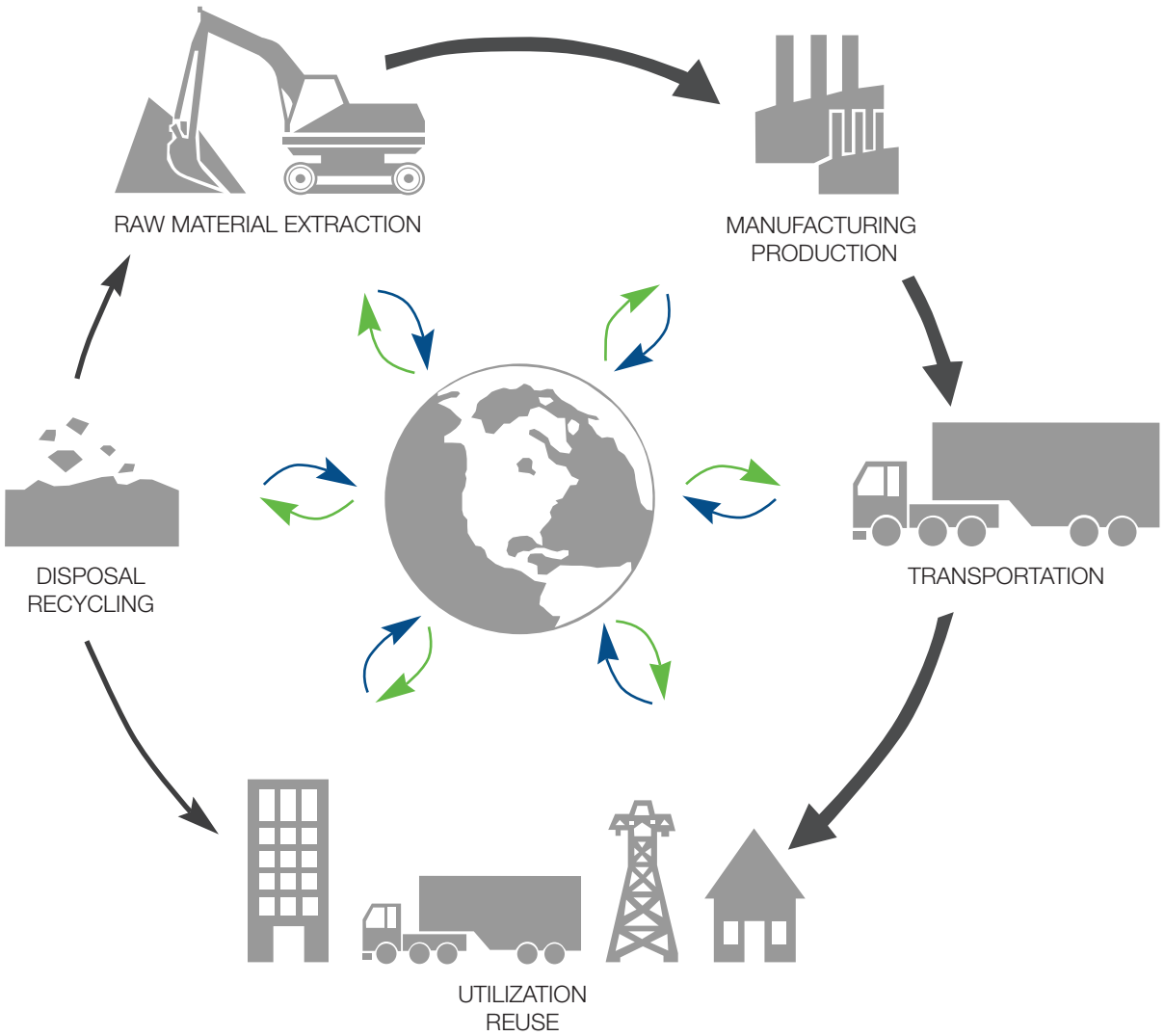


Figure MC.01.01: Life-Cycle Analysis

life-cycle analysis (LCA)

Life-cycle assessment or more commonly referred to as "LCA" is the process of evaluating the effects that a material, product or system has on the environment over the entire period of its life thereby increasing resource-use efficiency and decreasing negative environmental impacts. LCA can be used to study the environmental impact of either a material or the function the material is designed to perform. The goal of LCA is to compare the full range of environmental and social damages assignable to products and services, to be able to choose the least burdensome one. For example, in some cases materials that fall outside the LEED standard 500-mile regional boundary may technically have a larger initial embodied GHG impact, however, in comparison may have greater longevity and increased use-phase thereby reducing replacement frequency and cutting GHG over time.

MC.02 materials

goal Eliminate material extraction from mature ecosystems, use materials with reduced embodied energy, minimize toxins and improve the quality of interior environments for occupants

strategies

materials reuse

Reusing existing building materials at Parkmerced to the greatest extent feasible is intended to reduce the need to extract virgin material, helping both the global environment as well as the project's carbon footprint. Additionally, reusing materials will support local reuse businesses, and a reduction in demolition waste transported from the property will contribute to a lower overall project carbon footprint.

recycled content

Incorporating recycled content in building materials will reduce the need to extract virgin material, not only lowering Parkmerced's carbon footprint, but also helping to reduce demand for virgin materials. Recycled content will include both post-consumer material (waste material generated by households or commercial activity) and pre-consumer material (material that is diverted from the waste stream during the manufacturing process). In addition to using recycled content in building materials, recycled materials will be used where feasible for roadways, sidewalks, unit paving, water retention tanks, and piping for water, sanitary sewer, and steam energy distribution.

regional materials

Much of the greenhouse gas emissions associated with building materials is due to the burning of fuel during transportation to its suppliers and then to the job site. Using locally extracted and supplied materials limits greenhouse gas emissions. To the extent practicable, materials will be extracted and manufactured no more than 500 miles from the job site.

certified wood

Using certified wood supports and encourages environmentally responsible forest management and helps ensure that virgin resources remain available for generations to come. To the extent practicable, wood-based materials used for construction will be certified in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria. These products may be used for structural framing, flooring, sub-flooring, doors, and many finish applications, where feasible.

rapidly renewable materials

Incorporating rapidly renewable materials helps to encourage environmentally responsible management of finite raw materials. Using products made from plants that are typically harvested within a ten-year cycle or shorter helps to preserve old growth forests. Such materials include bamboo, wool, cotton insulation, agrifiber, linoleum wheatboard, strawboards, and cork. To the extent practicable, rapidly renewable materials will be used.

low VOC's

Volatile Organic Compounds (VOC) in materials off-gas toxic, odorous contaminants that potentially harm and irritate building occupants. To ensure the health and safety at Parkmerced, paints and coatings will meet the VOC levels of the Green Seal Standards, all adhesives will comply with South Coast Air Quality Management District (SCAQMD) Rule #1168, all carpet will meet the requirements of the Carpet and Rug Institute's Green Label Plus program, and composite wood and agrifiber materials will contain no added urea formaldehyde resins.

CO2e capture in concrete

Innovative technologies are currently being developed to capture massive volumes of CO_2e and other gases like SOx, acid gases and mercury from coal plants and convert them into calcium and bicarbonate minerals used to make aggregate for concrete. This process actually produces a negative carbon footprint as CO_2e will be recaptured and turned into clean water and aggregate. As this technology becomes more readily available, using this concrete could help Parkmerced achieve carbon neutrality and may actually facilitate a negative carbon footprint for the entire site.

Renewable materials


Rapidly renewable materials

implementation actions and metrics

- Use materials for new infrastructure with a goal that the sum of post consumer recycled content, in-place reclaimed materials, and one-half of the pre-consumer recycled content constitutes at least 50% of the total mass of infrastructure materials. Count materials in all of the following infrastructure items as applicable to the project:
  - Roadways, parking lots, sidewalks, unit paving, and curbs.
  - Water retention tanks and vaults.
  - Base and subbase materials for the above.
  - Stormwater, sanitary sewer, steam energy distribution, and water piping.
- Recycled content is defined in accordance with ISO IEC 14021, Environmental labels and declaration, Self-declared environmental claims (Type II environmental labeling).
- Buildings will generally use a minimum 5% salvaged, refurbished or reused materials, based on cost, of the total value of materials on the project.
- Buildings will generally use materials with recycled content such that the sum of post-consumer recycled content plus 1/2 of the pre-consumer content constitutes at least 10%, based on cost, of the total value of the materials in the project.

MC.03 construction

goal Practice responsible construction management to protect surrounding natural habitat, respect existing residents, and ensure the health and safety of construction employees. Divert as much construction waste from landfill as possible and lower the impact on greenhouse gas emissions

strategies

erosion and sedimentation control plan

Reducing construction related pollution is especially important at Parkmerced as construction will be continuous for over 20 years and will include stockpiling of excavated soil which could lead to increased dust. Damage done to the local watershed could also be significant if an erosion and sedimentation control plan is not put in place. Techniques to stabilize soils may include seeding, mulching, filter socks, stabilized site entrances, and the preservation of existing vegetation.

reduce construction noise

Agreed upon working hours will be diligently adhered to in order to ensure a livable neighborhood for existing residents during construction. Limiting construction site access to controlled points of entry and establishing truck routes will help to manage noise as will maintaining an organized construction schedule to use equipment and group tasks efficiently.

reuse excavated soils for fill

Parkmerced will store and reuse excavated soils on site for fill during construction, as feasible. This will greatly reduce the number of truck trips needed for off-haul, which will help to reduce impacts to air quality and the project's carbon footprint. For unavoidable off-haul, local soil recipients will be given priority to shorten all truck trips.

salvage and recycle construction waste

By salvaging and recycling construction waste, a significant amount of debris will be diverted from landfills and will support local reuse businesses. This will help both the global environment and the project's carbon footprint. A portion of the material will be redirected back to the manufacturing process or will be donated to other building sites. Salvageable or recyclable materials may include cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet, insulation, doors, windows, trim materials, fixtures and hardware.

prefabrication

Fabricating construction installations and welding steel in the controlled environment of a shop and delivering complete systems to the construction site helps to reduce the amount of equipment and number of construction vehicles needed, therefore reducing emissions. Prefabrication also allows more material reuse and generates less waste, aiding in lowering the carbon footprint associated with construction.

maintain and test indoor air quality

For the benefit of the health and well-being of both construction workers and building occupants, an indoor air quality management plan should be implemented during construction. Installed absorptive materials should be protected from moisture damage, and permanently installed air handlers should not be used for temporary heating and cooling during construction. If this is not possible, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 should be used at each return air grille.

implementation actions and metrics

- Create and implement an erosion and sedimentation control plan for all new construction activities associated with the project. The plan should incorporate practices such as phasing, seeding, grading, mulching, filter socks, stabilized site entrances, preservation of existing vegetation, and other best management practices (BMPs) to control erosion and sedimentation in runoff from the entire project site during construction. The plan should list the BMPs employed and describe how they accomplish the following objectives:
  - Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including but not limited to stockpiling of topsoil for reuse.
  - Prevent sedimentation of any affected stormwater conveyance systems or receiving streams.
  - Prevent polluting the air with dust and particulate matter.
- Recycle or salvage a minimum of 50% of construction waste by identifying materials to be diverted from disposal and whether the materials will be sorted on-site or co-mingled. Calculations can be done by weight or volume, but must be consistent throughout.
- Meet the requirements of the San Francisco Building Code Chapter 13C (Green Building Requirements).

Measurement + Verification

Goals + Strategies

MV

Measure and verify performance of building systems and materials to ensure accountability

Parkmerced's Sustainability Plan aims to incorporate the most rigorous and innovative methods for reducing consumption of natural resources and to making a significant contribution to stabilizing climate change. It is imperative that building systems and materials continue to be evaluated and improved during the course of the project's 20 to 30 year build-out. As technologies advance, better methodologies will be implemented at Parkmerced to ensure it continues to reduce its environmental impact and is a model for sustainable urban design.

MV.01 performance

goal Ensure sustainable measures are successfully employed and are achieving optimal results

strategies

participatory design process

Engaging all local stakeholders and eliciting their concerns and suggestions at every stage of design helps to create a neighborhood that reflects the hopes and desires of all community members. The Parkmerced Vision Plan was developed over the course of many years and has greatly evolved due to the participatory process that was engaged. The design and development team met with all local stakeholders to solicit and document their input on the proposed project prior to commencing and during the entire design process. Communication between the project owner and the community will continue throughout the remainder of the design process, into construction phases, and during the post-construction phase.

healthy development tool

The Healthy Development Tool by the San Francisco Department of Public Health is a list of sustainable measures used to evaluate how the developed urban environment can improve human health. The measures are broken down into the following eight categories: environmental stewardship, sustainable and safe transportation, social cohesion, public infrastructure/access to goods and services, adequate and healthy housing, healthy economy, demographics, and health outcomes.

on-going measurement + verification

An on-going measurement and verification plan could be implemented to evaluate both building and energy systems to make sure they are performing according to specification and to guarantee the indoor environment is satisfactory for the occupants. The plan could also include the evaluation of building materials and systems during the project's construction to ensure the most sustainable and energy saving systems and materials are installed throughout the project build-out.

adaptation

While the sustainable strategies presented in this plan are the most innovative for today's building practices, many improvements will be made throughout the project's 20-30 year build-out. It is important that the building technologies installed at Parkmerced continue to evolve and improve during the build-out.

evaluation

Parkmerced should biannually evaluate any improvements made to building material embodied energy calculations or the energy performance of buildings systems implemented at Parkmerced.

establish Air Quality Index

Parkmerced intends to work with the Bay Area Air Quality Management District (BAAQMD) to develop a long range air quality plan to ensure that the project is in compliance with BAAQMD's Clean Air Plan (CAP), the San Francisco Health Code, and the California Environmental Quality Act (CEQA).


nework Plan

appendix

AP

appendix

definition of terms

The following definitions apply to certain terms used in the Sustainability Plan.

5-Year Storm Event A storm event having a 20% probability of being equaled or exceeded in any one given year. It is the design storm San Francisco uses to size stormwater pipes, their minimum and maximum depths, and how full the pipes can flow.

Air Source Heat Pump A heat exchanger over which outside air is blown, and the heat is extracted from the air and transferred into a hot water tank or heating system.

Aquifer An underground layer of permeable rock that holds groundwater.

Bay Area Air Quality Management District (BAAQMD) A public agency entrusted with regulating stationary sources of air pollution in the counties surrounding San Francisco Bay: San Francisco, Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma.

Biodiversity The variety of plant and animal life in a particular habitat or ecosystem.

Biogas Gas produced by the breakdown of organic matter without oxygen.

Biogutter A narrow channel containing water tolerant vegetation to collect and clean stormwater.

Biomass Organic material or waste burnt as a fuel source.

Bioswale A low depression in the ground with water tolerant vegetation to collect and clean stormwater.

California Environmental Quality Act (CEQA) A California statute passed in 1970 to institute a statewide policy of environmental protection.

Carbon An organic compound present in the molecule carbon dioxide, which affects the ozone layer of the atmosphere.

Carbon Footprint The collection of greenhouse gas emissions associated with either a person, an organization, a process or a material.

Carbon Offset A financial trade-off for reducing greenhouse gas emissions and is measured in metric tons of carbon dioxide-equivalent (CO_2e). One carbon offset equals the reduction of one metric ton of CO_2e.

Certified Wood Wood used for building construction that is harvested using sustainable forestry practices, and protecting trees, wildlife habitats, soils and streams.

Cistern A waterproof vessel used for storing liquids.

Clean Air Plan (CAP) A control strategy prepared by the Bay Area Air Quality Management District to reduce emissions and decrease ambient concentrations of harmful pollutants to safeguard public health.

Cogeneration (Cogen) An engine or powerstation that generates electricity and produces waste heat which is captured for either domestic, commercial or industrial heating purposes.

Compost The decomposition of organic material primarily without oxygen to create nutrient-rich soil.

Condensing Boiler A boiler that extracts heat from the flue gases to preheat the water in the boiler increasing its efficiency.

District Energy A large heating and cooling system that distributes either hot or cold water to multiple buildings from either a central plant or collection of plants.

Ecology The environment as it relates to living organisms.

Ecological Urbanism Integrating the built and natural environments into a single interrelated system which is mutually beneficial and supportive of a self-sustaining neighborhood.

Embodied Energy Energy associated with the manufacturing of a material.

Energy Star International standard for the efficiency of consumer products.

Environmental Protection Agency (EPA) A government agency that enforces regulations protecting the health of human beings and the environment.

Forest Stewardship Council (FSC) An international non-profit that sets standards for responsible management of forests and independently certifies and labels forest products.

Geothermal Heat from the interior of the earth.

Green Seal Standards The metrics that must be met by the non-profit eco-labeling organization, Green Seal, which standardizes and certifies consumer products that meet EPA standards.

Greenhouse Gas Emissions (GHG) Gases in the atmosphere that absorb and emit radiation and effect the temperature of the Earth.

Greywater Wastewater generated from sinks, showers and laundry facilities that can be recycled and used for irrigation.

Habitat A natural environment in which an organism lives.

Hazardous Waste Waste that poses a substantial threat to public health due to its tendency to ignite, corrode, or be reactive or toxic.

Heat Recovery Ventillator A heat exchanger that takes heat from the exhaust stream and uses it to preheat incoming air.

Hedgerow A line of closely planted trees to form a barrier or to block wind.

High Pressure Sodium A lighting lamp technology which uses both sodium and mercury in an excited state to produce light. The addition of mercury gives the lamp a better color rendering than low pressure sodium which does not include mercury.

Horizontal Axis Wind Turbine A rotating device capturing energy from the wind and converting it into electricity with horizontally rotating blades.

Hydrology The study of the movement, distribution and character of water.

Initial Embodied Energy The non-renewable energy consumed in the acquisition of raw materials, their processing, manufacturing and transport to the job site.

Life-Cycle Analysis (LCA) The assessment of a material's embodied energy as it passes through the various phases and stages of construction. This includes the associated energy and carbon in the extraction of raw materials used in its construction, that associated with its manufacturing, its transportation to the job site, and its disposal or recycling to its reuse.

Low-Flow Fixtures Plumbing products that meet the water efficiency standard of the Energy Policy Act of 1992 and use less water than standard fixtures without compromising on performance.

Mercury Vapor A gas discharge lamp that uses mercury in an excited state to produce light.

Microclimate A local atmospheric zone that has a different climate from the surrounding area.

Minimum Efficiency Reporting Value (MERV) A measurement scale developed by ASHRAE to rate the effectiveness of air filters.

Net Zero The portion of a tower above the roof of the highest occupied floor used to screen rooftop elements and to enhance the tower design.

Non-Native Species A species living outside its native distributional range that has been introduced by human activity. These species tend to compete aggressively with those that are native.

Organic Produced without the use of pesticides, insecticides, herbicides, or products that have not been genetically modified.

Paseo A path dedicated solely to pedestrians.

Permeable Paving A paving material that allows water to infiltrate.

Photovoltaic Array A linked collection of cells that convert solar energy into direct current electricity. An inverter then converts the DC power into alternating current, or AC electricity.

Post-Consumer Waste material from households or commercial, industrial, and/ or institutional facilities that can no longer be used for its intended purpose.

Potable Uncontaminated water suitable for drinking.

Pre-Consumer Material that is diverted from the waste stream during the manufacturing process.

Prefabrication The assembly of building components in a factory rather than on the job site which are then transported to the site for quick and more efficient assembly.

Recurring Embodied Energy The non-renewable energy consumed to maintain, repair, refurbish or replace material.

Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Offers members of the association professional assistance in labor relations, legislative assistance, research and technical standards development, safety as well as other industry issues.

Social Heart A neighborhood concentration of commercial and retail uses connected to public transit.

Solar Thermal Collector A device that absorbs heat from sunlight in a collecting fluid (either water or an antifreeze mixture) which is then used to heat domestic hot water.

South Coast Air Quality Management District (SCAQMD) Rule #1168 Regulations on the VOC content and limits for adhesives, adhesive bonding primers, or any other primer.

Stream Corridor A seasonal stream and its supported habitats originating in Juan Bautista Pond and terminating at Lake Merced Boulevard and Brotherhood Way.

Sustainability Development that does not deplete natural resources or undermine its physical or social systems of support, but instead allows resources and ecologies to continue to renew.

Tier 1 The energy efficiency standards established by the California Energy Commission to become effective on January 1, 2011.

Title 24 (2008) Energy efficiency standards for residential and nonresidential buildings in response to a legislative mandate to reduce California's energy consumption.

Transportation Demand Management (TDM) Strategies and policies to reduce the demand for single-occupancy private vehicles or to redistribute the demand over a time period.

Vampire Power Power that is consumed by electronic appliances when they are operating in standby mode or are switched off.

Vertical Axis Wind Turbine A rotating device capturing energy from the wind and converting it into electricity with vertically rotating blades.

Volatile Organic Compounds (VOC) Organic chemical compounds that have significant vapor pressures and can affect the environment and human health.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