GREEN INFRASTRUCTURE PLAN

City of Pittsburg, California

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Acronyms

ABAG	Association of Bay Area Governments
AGOL	ESRI ArcGIS Online
BASMAA	Bay Area Stormwater Management Agencies Association
BMP	Best Management Practice
CCCWP	Contra Costa Clean Water Program
CCW SWRP	Contra Costa Watersheds Stormwater Resource Plan
CFD	City of Pittsburg Community Facilities District
CIP	Capital Improvement Project
GHG	Greenhouse Gas
GI	Green Stormwater Infrastructure
GIS	Geographic Information System
HSG	Hydrologic Soil Group
IPM	Integrated Pest Management
IRWMP	Integrated Regional Water Management Plan
LID	Low Impact Development
MRP	Municipal Regional Stormwater Permit
MTC	Metropolitan Transportation Commission
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyls
RAA	Reasonable Assurance Analysis
ROW	Right-of-way
RWQCB	California Regional Water Quality Control Board for the San Francisco Bay Region
TMDL	Total Maximum Daily Load
WLA	Waste Load Allocation

1 Introduction and Overview

1.1 Regulatory Mandate

The City of Pittsburg is one of 76 local government entities subject to the requirements of the California Regional Water Quality Control Board for the San Francisco Bay Region's (RWQCB) Municipal Regional Stormwater Permit (MRP). The MRP was last reissued in November 2015[1]. The MRP mandates implementation of a comprehensive program of stormwater control measures and actions designed to limit contributions of urban runoff pollutants to San Francisco Bay Basin[2].

MRP Provision C.3.j.i. requires the City to prepare a Green Infrastructure Plan, to be submitted with its Annual Report to the RWQCB due September 30, 2019.

Green Stormwater Infrastructure (GI) refers to the construction and retrofit of storm drainage to reduce runoff volumes, disperse runoff to vegetated areas, harvest and use runoff where feasible, promote infiltration and evapotranspiration, and use bioretention and other natural systems to detain and treat runoff before it reaches our creeks and Bay. GI facilities include, but are not limited to, pervious pavement, infiltration basins, bioretention facilities or "rain gardens", green roofs, and rainwater harvesting systems. GI can be incorporated into construction on new and previously developed parcels, as well as new and rebuilt streets, roads, and other infrastructure within the public right-of-way.

Water quality in the Suisun Bay San Francisco Bay is impaired by mercury and by polychlorinated biphenyls (PCBs). Sources of these pollutants include urban stormwater. By reducing and treating stormwater flows, GI reduces the quantity of these pollutants entering the Bay and will hasten the Bay's recovery.

Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/year using GI by June 30, 2020. Regionally, Permittees must also project the load reductions achieved via GI by 2020, 2030, and 2040,

[1] Order R2-2015-0049

2 Hydrologic sub-basins in the San Francisco Bay Basin include Central, Lower and South San Francisco Bay, and Suisun and San Pablo Bays.

showing that collectively, reductions will amount to 3 kg/year PCBs and 10 kg/year mercury by 2040.

1.1.1 Further Background on Mercury and PCBs in San Francisco Bay

The MRP pollutant-load reduction requirements are driven by Total Maximum Daily Load (TMDL) requirements adopted by the RWQCB for mercury (Resolution No. R2-2004-0082 and R2-2005-0060) and PCBs (Resolution No. R2-2008-0012). Each TMDL allocates allowable annual loads to San Francisco Bay (a Waste Load Allocation, or WLA) from identified sources, including from urban stormwater.

The mercury TMDL addresses two water quality objectives. The first, established to protect people who consume Bay fish, applies to fish large enough to be consumed by humans. The objective is 0.2 milligrams (mg) of mercury per kilogram (kg) of fish tissue (average wet weight concentration measured in the muscle tissue of fish large enough to be consumed by humans). The second objective, established to protect aquatic organisms and wildlife, applies to small fish (3-5 centimeters in length) commonly consumed by the California least tern, an endangered species. This objective is 0.03 mg mercury per kg fish (average wet weight concentration). To achieve the human health and wildlife fish tissue and bird egg monitoring targets and to attain water quality standards, the Bay-wide suspended sediment mercury concentration target is 0.2 mg mercury per kg dry sediment.

A roughly 50% decrease in sediment, fish tissue, and bird egg mercury concentrations is necessary for the Bay to meet water quality standards. Reductions in sediment mercury concentrations are assumed to result in a proportional reduction in the total amount of mercury in the system, which will result in the achievement of target fish tissue and bird egg concentrations.

The PCBs TMDL was developed based on a fish tissue target of 10 nanograms (ng) of PCBs per gram (g) of fish tissue. This target is based on a cancer risk of one case per an exposed population of 100,000 for the 95th percentile San Francisco Bay Area sport and subsistence fisher consumer (32 g fish per day). A food web model was developed by San Francisco Estuary Institute (SFEI) to identify the sediment target concentration that would yield the fish tissue target; this sediment target was found to be 1 microgram (µg) of PCBs per kg of sediment.

Twenty percent of the estimated allowable PCBs external load was allocated to urban stormwater runoff. The Bay Area-wide WLA for PCBs for urban stormwater is 2 kg/yr by 2030. This value was developed based on applying the required sediment concentration (1 µg/kg) to the estimated annual sediment load discharged from local tributaries.

1.2 Objectives and Vision

Implementation of the City's Green Infrastructure Plan (GI Plan) will improve water quality and help the City achieve cleaner air and greener streets. This GI Plan presents alternative approaches to improving water quality by dispersing runoff to vegetated areas and reducing runoff volumes, promoting infiltration and evapotranspiration, and using natural processes to detain and treat runoff.

As required by Provisions C.3.a. through C.3.i. in the MRP, these "Low Impact Development" practices are currently implemented on land development projects in the City. Specific methods and design criteria are spelled out in the Contra Costa Clean Water Program's (CCCWP's) Stormwater C.3 Guidebook, which the City has referenced in Municipal Code Chapter 13.28, Stormwater Management and Discharge Control.

This GI Plan details how similar methods will be incorporated to retrofit existing storm drainage infrastructure using GI facilities constructed on public and private parcels and within the public right-of-way.

1.3 City Context

1.3.1 Geography

The City of Pittsburg is in north-central Contra Costa County. The City is located south of Suisun Bay, north of county unincorporated areas, east of Bay Point and west of Antioch. The City is a major thoroughfare for east county communities such as Antioch, Oakley, and Brentwood and central county communities like Concord, Martinez, and Pleasant Hill. Other major transportation corridors include BART, the Burlington Northern Santa Fe Railroad, and the Union Pacific Railroad.

1.3.2 Demographics

Pittsburg is primarily a residential community, with a population of over 72,000 people. There are 21,555 households and 16,649 families in the City. The City is among the most ethnically diverse in the county with a population consisting of 20% White, 16% Black, 17% Asian, and 40% Hispanic. The City has a large proportion of young people, with close to 25% under 18 years old and a median age of 35. Generally, educational attainment is

limited; with about half of residents having a high school degree or less. The median household income ($66,739) is lower than the county average ($88,456).

1.3.3 Economic and Social Trends

Pittsburg's economy is historically tied to heavy industry and manufacturing. While it is still a strong sector, the City continues its transition to an economy based around services. Currently the top principle employers in the City include Pittsburg Unified School District, Los Medanos Community College, USS-Posco Industries, Dow Chemical Company, City of Pittsburg, Walmart, Ramar Foods, Angelica Corporation, Target, and WinCo Foods. Unlike most central county communities, Pittsburg lacks large business commercial centers.

One issue in the City is the jobs to housing ratio. In 2010 Association of Bay Area Governments (ABAG) estimated 14,180 jobs in Pittsburg as opposed to 27,800 employed residents, meaning most residents worked outside the City. With the increasing demand for services and the availability of space in the City, employment is projected to outpace increases in population. The retail trade and services sectors saw rapid growth, and the City is continuing to see modest signs of recovery from the recession. Overall unemployment rates have gone down, from 17.4% during the peak of the recession to 3.7% in 2018. Sales and property taxes have also been improving.

1.3.4 Development and Redevelopment Trends

Pittsburg's history as an industrial center has much to do with its land use patterns (Figure 1). The industrial waterfront and historic Downtown are situated along the shores of the Sacramento River, which served as a major transportation corridor alongside the Northern & Santa Fe and Southern Pacific railroads. While the waterfront continues to be dominated by steel, petroleum, and chemical industries, Pittsburg's transformation to a residential community is evident. Railroad Avenue, which was a major railway corridor is now the City's main north-south arterial. Currently Railroad Avenue contains retail, commercial, office, and light manufacturing uses.

Situated near the crossroads of Railroad and SR 4 are several important facilities; City Hall, Pittsburg High School, and City Park. Heavy pedestrian and vehicle traffic combined with the newly built BART extension (eBART) has provided opportunities for transit-oriented development in the area. As highlighted in the Railroad Avenue Specific Plan, this development will be supported through "a safe, efficient and accessible transportation network that embraces pedestrians, bicyclists, buses, autos and eBART." This includes the construction and widening of roadways, pedestrian improvements, bus lanes and parking lots, parks, and other streetscape improvements.

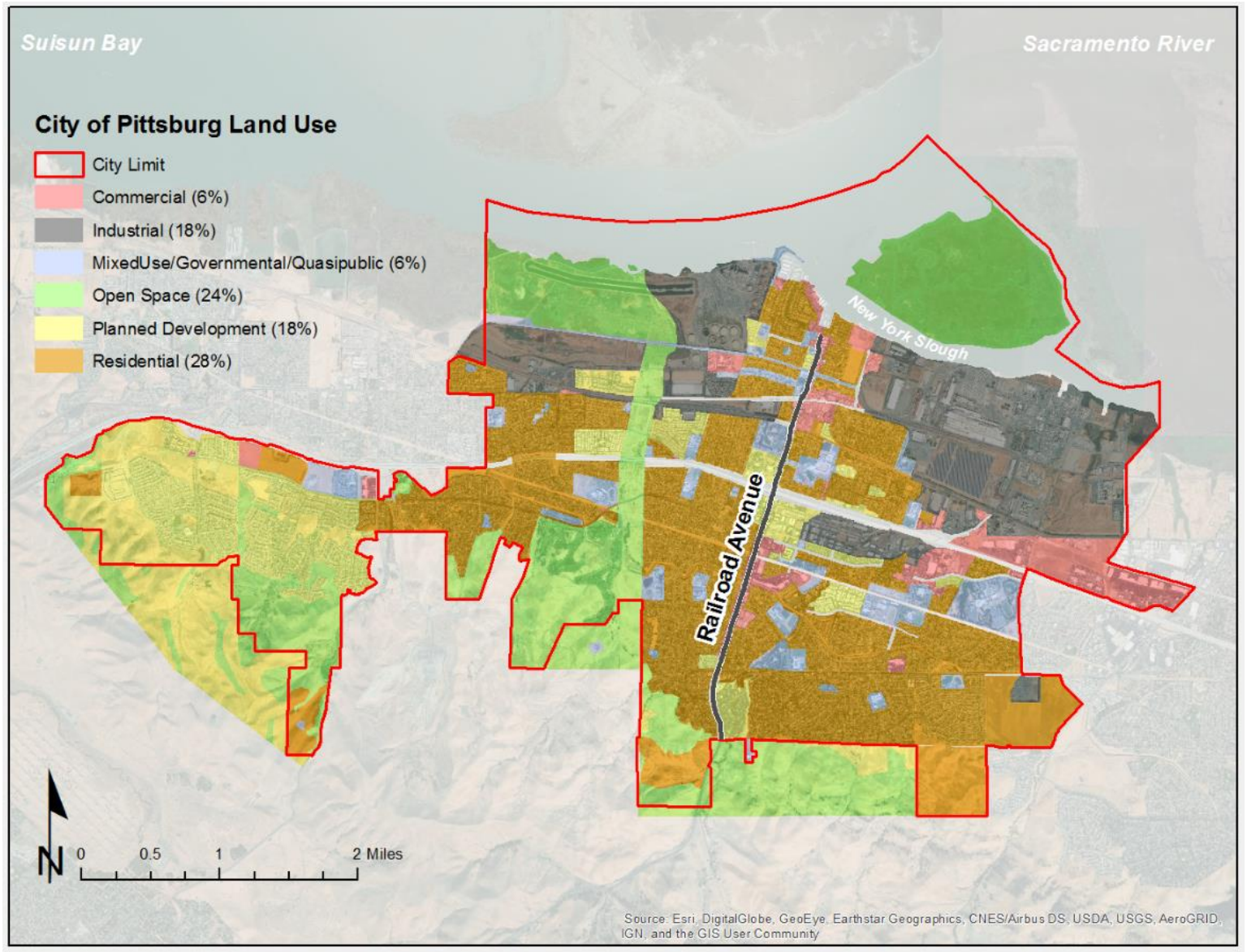

Figure 1: City of Pittsburg Land Use

The City's Downtown is envisioned to serve as a mixed-use center, integrating retail, office, restaurant, public, and residential uses with the unique aspects of the historic waterfront. Recent development downtown includes; Vidrio Condos (2008), Siena Ct. Apartments (2008), John Buckley Square (2016), and Marina Vista Elementary School (2007). Vacant and underutilized buildings still exist downtown, but the current layout of downtown offers many opportunities for pedestrian facilities; the need for buffering areas between heavy industrial and residential can be met through park construction, greenways, trails, and other open space strategies.

The City has completed three GI projects as described below. These projects serve multiple community uses and implement standard GI measures consistent with MRP Provision C.3.b.

John Buckley Square

John Buckley Square is a multipurpose community park located in the center of downtown Pittsburg. Since its opening in 2016, the park has served community events including the Farmer's market. The park has a large central lawn that also captures the runoff from most of the park's impervious areas. To the north, curb openings allow street runoff to be treated by a bioretention feature consisting of Biofiltration Sod™.

John Buckley Square permeable pavement

The main park walkway is constructed with permeable pavement and has underlying Silva Cells for 14 Ginkgo trees. These GI facilities treat approximately 50,000 square feet of impervious area.

Marina Commercial Building

The Marina Commercial Building is a redeveloped open lot at the Harbor Promenade which has commercial, retail, and office space. The project was completed in 2010. The site has several infiltration planters that treat approximately 10,600 square feet of impervious area. The planters receive runoff from the roofs through pipes and from adjacent patios.

BART Multimodal Transfer Facility

Opened in May 2018, the BART Multimodal Transfer Facility serves as a transportation hub for the new rail station. Located adjacent to SR 4 and along Railroad Avenue, the facility features short term parking, drop off, bus transfer, and bike parking. The project includes two bioretention areas treat approximately 47,000 square feet of impervious area.

In terms for future private redevelopment, the City has a significant number of residential projects planned, with around 5,000 units under construction, approved, or pending approval. Most of this residential development is occurring along the hillside City limits to the south. There are also plans to develop a linear parkway along West Leland to connect the southwest hills residents to the Pittsburg/Bay Point Bart Station.

1.3.5 Commitment and Actions for Sustainability

As the City continues to grow, an increasing emphasis is placed on sustainability. The City has an obligation to ensure that current and future generations can meet their environmental, economic, and social needs. Preserving natural resources, minimizing environmental risk, promoting clean transportation methods, promoting sustainable land use, building affordable and green housing, creating a sustainable local economy, and fostering community engagement are all part of this obligation.

The 2020 General Plan provides a good outline of the City's sustainability goals and policies. The resource conservation element of the General Plan describes the City's commitment to preserve its biological resources and habitats through various programs and regulations. Emphasis is put on the protection and reclamation of wetlands and marshlands along the city's waterfront, regulation of urban growth in the southern hills, and preservation of riparian resources.

In 2007, the City adopted the East Contra Costa Habitat Conservation Plan (Ord. 07-1293) which is intended to protect the native and endangered plant and animal species of eastern Contra Costa County. The City also plans to work with other agencies to expand the regional-open space system in the southern hills to preserve annual grassland habitat.

City-wide standards have been established for construction adjacent to riparian zones to reduce erosion and sedimentation. As part of the California Environmental Quality, design review, grading permit, and project review processes, requirements are set for Best Management Practices (BMPs) for flood control mitigation, and downstream drainage. Because trees provide valuable soil stabilization along creeks and watersheds, Pittsburg adopted a tree preservation ordinance (Ord. 15-1390) that established regulations for preservation of mature trees within the City.

Water quality is a vital part of preserving water resources in the City. Kirker Creek, New York Slough, and Suisun Bay have significant recreational and habitat value in Pittsburg and are high priorities for restoration. To address water quality issues in the City, a set of BMPs was developed that focus on controlling stormwater runoff. These BMPs also fall under the City's municipal NPDES permit and have ongoing implementation. Reducing non-point sources of pollution is a priority in preventing water resource degradation. In

many of the Bay Area communities, these sources include illegal dumping, homeless encampments, urban runoff, and pesticides.

To address trash in creeks and waterways, the City maintains and cleans several creek hotspots annually. The city also sponsors volunteering and outreach programs like Civic Pride Day, Adopt a Spot, and the Green Footprint Festival. In 2006 Pittsburg established a citywide program to address illegal dumping in its neighborhoods which included outreach, installation of cameras, shouting boxes, and signage. Currently, the City is drafting a direct discharge plan that would address current issues with illegal dumping and homeless encampments contributing to degradation of creeks and waterways. The City has begun this process by forming a Homeless Response Team consisting of environmental affairs, public works, police department, successor agency, and community development.

The City is making ongoing efforts to reduce toxic chemical use in landscaping within the City. Living green gardens is a tool developed by the City to educate and help residents use Integrated Pest Management (IPM) strategies. Pittsburg's City Hall has a display garden highlighting these strategies, which includes educational signage and a turf garden demonstrating drought-resistant grasses.

The City of Pittsburg is also engaged in climate action activities and in 2009 completed its greenhouse gas (GHG) emissions inventory. The inventory identified transportation, energy use, and waste as the leading emission sources in the City. The GHG measurement is the first step in implementing a climate action plan that will be aimed at reducing greenhouse gas emissions. Many climate action strategies tend to be multi-benefit and improve the health, safety, and aesthetics of a community.

The City is currently drafting an Active Transportation Plan, which will increase the connectivity and safety of the streets for pedestrians and bikers. At the same time, the City's Traffic Division is continuously working to improve the City's transportation and pedestrian network. While Pittsburg has a heavy industrial sector, emissions from the residential and commercial communities add up to a significant amount.

Through the City's website, homeowners and businesses can find programs and opportunities to reduce their energy use and utilize renewables. In 2009 the Pittsburg Power Company partnered with Rising Sun Energy Center to train youth to serve homes with green house calls; which involved assessing homes for efficiency, installing free energy and water efficient equipment, and providing recommendations. Smart Lights is an ongoing program that has helped over a hundred Pittsburg businesses become more energy-efficient by offering free technical assistance and instant rebates for equipment upgrades and repairs. The City is also upgrading its own systems to more energy-efficient ones, such as LED Streetlights and the City Hall HVAC system.

The City offers a complete garbage and recycling program which includes additional curbside pick-up services for oils and batteries. In addition, the City conducts outreach on waste reduction, composting, and safe disposal of hazardous materials to residents and businesses. Many of these resources are available as pamphlets during outreach events and on the City's website.

The City's monthly Development Review Team Meetings continues to be a forum to discuss upcoming and proposed discretionary projects, and opportunities to incorporate GI features. In addition, as the yearly Capital Improvement Program Projects lists are updated, projects with GI potential will be re-prioritized based on available funding and department goals.

1.3.6 Watersheds and Storm Drainage Infrastructure

The City of Pittsburg can be divided into eight watersheds (Figure 2). The Kirker Creek Watershed (Watershed 8) drains most of the eastern portion of the City. Watershed 7 is a smaller watershed northeast of the City and includes lands in both Pittsburg and Antioch. Watersheds 1 through 6 drain the western portion of the City. Watershed 3 is called Lawlor Creek, while other adjacent drainages are unnamed.

Kirker Creek Watershed

Kirker Creek is the largest watershed, with an area of about 14.5 square miles. The creek originates in the foothills south of the City and flows north into the Bay Delta at New York Slough. The intermittent stream is mainly fed by precipitation, groundwater, and the City's drainage system. On its way north, it crosses through park and ranch land, residential neighborhoods, commercial areas, waterfront industrial, and the DOW wetlands preserve.

Most of the drainage system is open channel, though culverts and pipes take the creek underground at Highway 4 and across the Pittsburg-Antioch Highway. The creek then turns east into a man-made channel along the north side of Pittsburg-Antioch Highway before discharging into New York Slough. The downstream section of the watershed north of the Union Pacific Railroad is a very flat area and historically had issues with flooding. The section of Kirker Creek that flows under Highway 4 west of the Loveridge interchange had periodically flooded due to undersized culverts. In addition, the channel above Pittsburg-Antioch Highway was inadequate for high flows and would flood the road. Improvements to the culverts under Highway 4 were completed by Caltrans in 2005 and the City widened the man-made channel along Pittsburg-Antioch Highway in 2004. Since then, there have been no major issues with flooding in those areas.

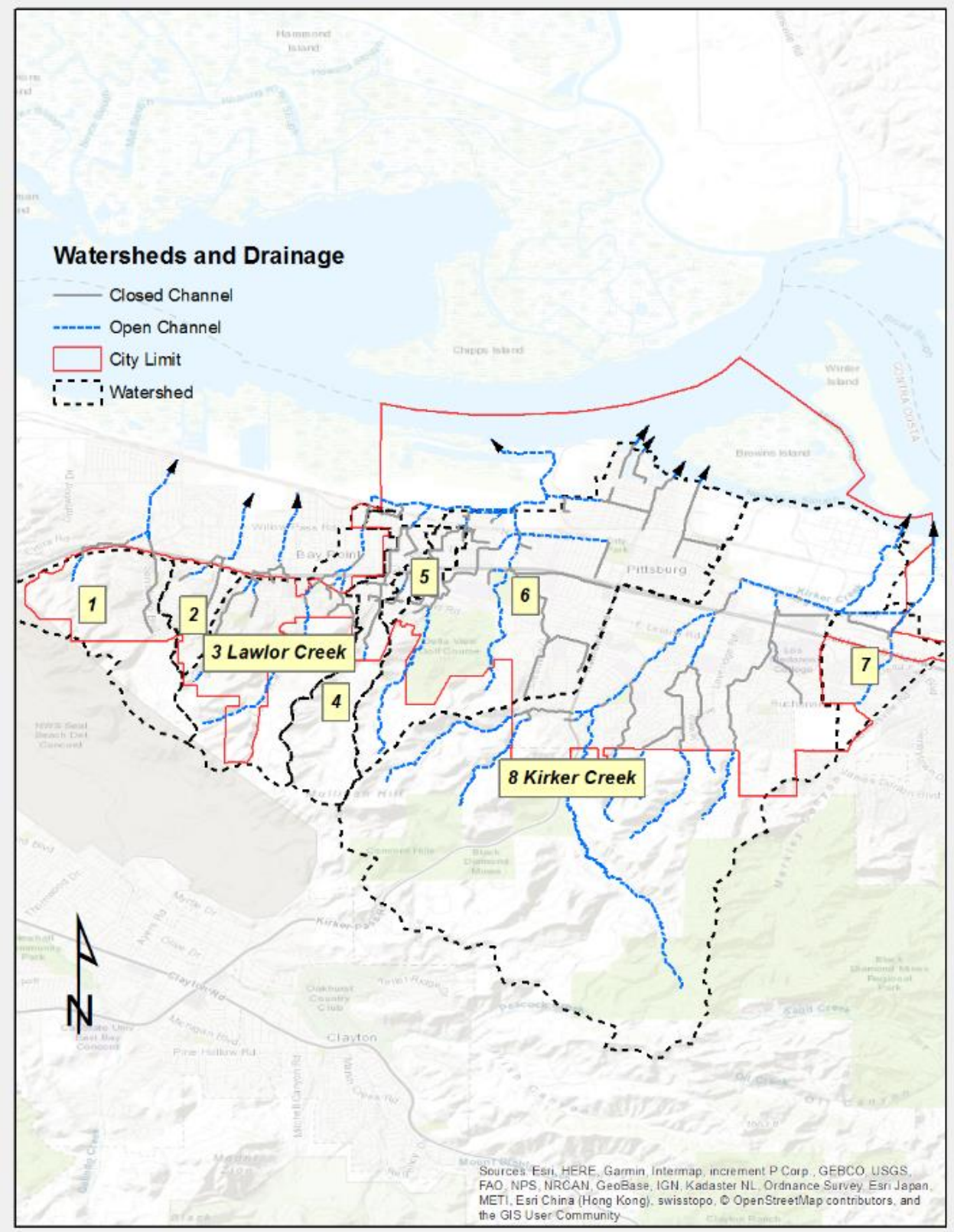

Figure 2: City of Pittsburg Watersheds

Lawlor Creek Watershed

The western portion of the City is drained by Lawlor Creek, through Lawlor Ravine, south of SR 4. Willow Creek drains the portion north of the highway, encompassing Bay Point. The greater watershed area is called Willow Creek. Lawlor Creek runs along Bailey Road and originates in the foothills west of the Keller Canyon Landfill. The upstream portion of the watershed consists of undeveloped land, while downstream south of SR 4 consists of residential and commercial development.

Lawlor Creek is primarily open channel until it goes under SR 4 where it becomes Willow Creek. Willow Creek is primarily an open channel until it reaches Willow Pass in Pittsburg. The creek goes through double-box culverts in the California Seasons housing subdivision then meets the open channel at the Southern Energy Delta marshland. At Suisun Bay.

Other Watersheds

Watersheds 1 and 2 consist primarily of new residential development. These areas drain via storm drainpipes and swales north to SR 4. In addition, there are bioretention areas just south of SR 4 for the San Marco and Alves Ranch properties. The drainage is carried across SR 4, through stretches of natural channels in Bay Point, until it drains northeast to Suisun Bay.

Upstream of Watershed 4 is the Keller Canyon Landfill, dedicated open space lands adjacent to the landfill that drain through a natural channel to the Hillsdale residential development. Stormwater is then conveyed north through underground pipes, crossing the Contra Costa Canal, going under SR 4, through the Willow Landing residential development, and across Willow Cove Elementary School, before crossing Willow Pass Rd. An open channel then carries stormwater under the Union Pacific and BNSF railroads, northeast where it meets Willow Creek.

Watershed 5 consists primarily of residential developments and drains via underground pipes, northeast through SR 4, Contra Costa Canal, Union Pacific and BNSF Railroads, before draining to Willow Creek along Willow Pass Road.

Watershed 6 includes downtown Pittsburg and areas north of the BNSF Railroad, and areas west of Railroad Ave. The southern portion of the watershed is primarily residential communities and open spaces, with institutional and commercial uses along Railroad Ave. The western divide of the watershed is drained primarily by two natural channels on both sides of the Delta View Golf Course. The western channel runs through primarily park and residential space, while the eastern channel runs along an undeveloped PG&E corridor. Both streams cross the Contra Costa Canal, West Leland Road, SR 4, the BNSF and Union Pacific Railroads, and finally Willow Pass Rd before entering Willow Creek.

The southeast portion of Watershed 6 is drained through underground pipes and terminates northwest at Willow Creek. The northeast portion of the watershed that encompasses downtown Pittsburg is a mixture of industrial, residential, and commercial developments. The drainage consists of underground pipes which go to various outfalls north along New York Slough. There is a segment of ditch west of Herb White Way that takes runoff from nearby neighborhoods and runs west to a pump station to a portion of Willow Creek.

1.3.7 Storm Sewer System

The City's stormwater system is comprised of both open and closed pipe drainage conveyance systems. The City's drainage system flows generally south to north and ultimately discharges into New York slough. The City's storm drain conveyance system is interrupted by the Contra Costa Canal, which runs east to west through the City limits, as well as SR 4.

Incorporating GI in these areas of the City is a challenge due to existing grades. In addition, the majority of the City's soils consist of expansive clays with moderate to high expansion potential, inhibiting infiltration potential. The developed portions of the City offer very limited areas within the existing right of way to install GI.

1.3.8 Flood Zones

As with a majority of Contra Costa County's creeks and shoreline, portions of Pittsburg's waterways and shore lie within the 100-year flood plain (Figure 3). Areas along Suisun Bay and along the Sacramento River have the greatest flood risk; most of these areas are marshland and undeveloped sites. This includes Browns Island in the northeast portion of the City, and the marshes along Suisun Bay. Other areas within the 100-year flood zone include portions of the industrial shoreline, some residential areas near the harbor and downtown, undeveloped areas along New York Slough, along the banks Kirker Creek, segments of Lawlor and Willow Creeks, and the northern portion of the PG&E corridor near Americana Park.

In general flood hazards are limited north of SR 4 and upstream portions of Kirker Creek. Undersized culverts under SR 4 and along Kirker Creek were identified in the Stormwater Management Plan prepared in 1999. Potential areas that are affected by Kirker Creek include residential neighborhoods, Buchanan Park and the nearby Highlands

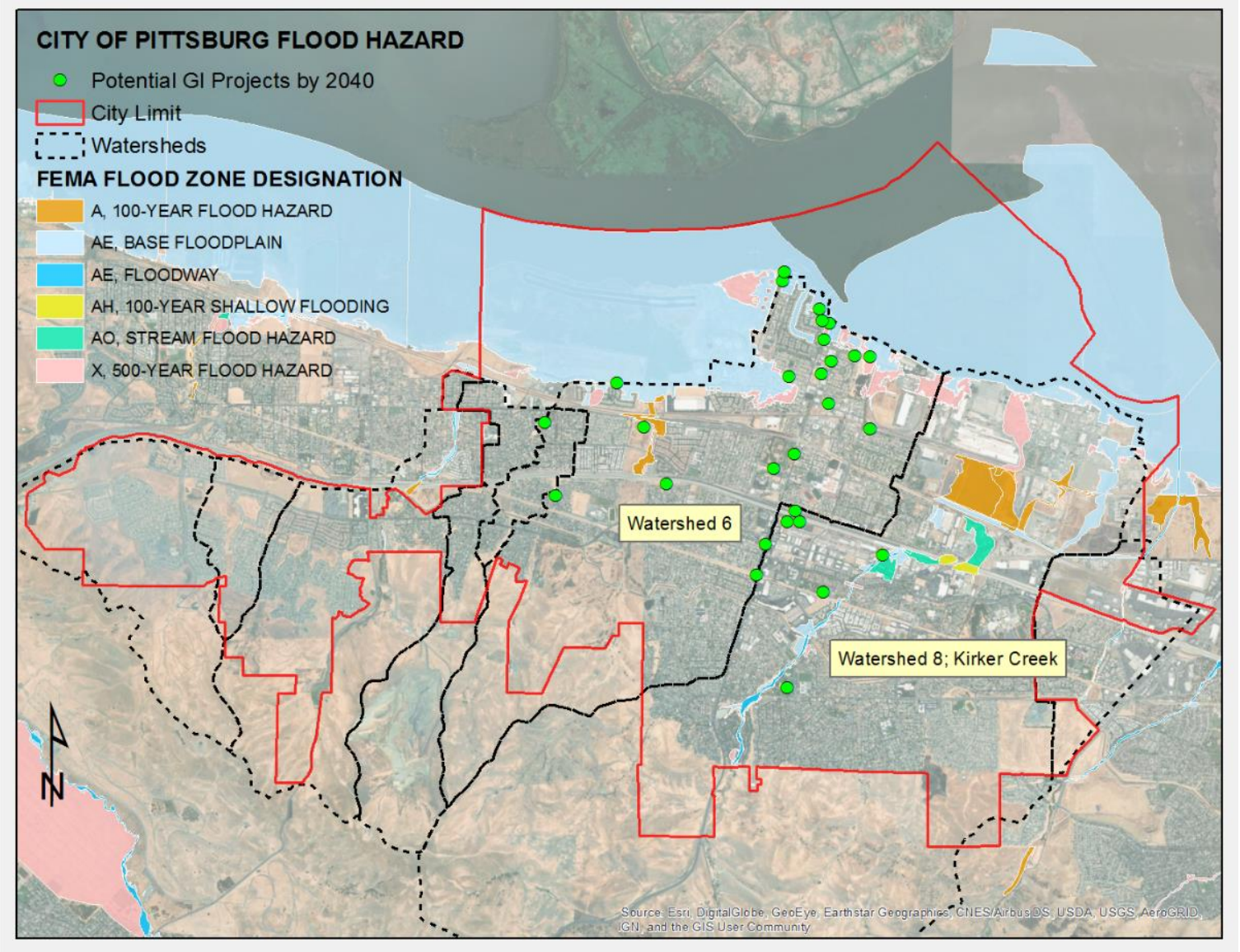

Figure 3: Pittsburg Special Flood Hazard Areas and Potential GI Projects through 2040

Elementary School, Hillview Junior High, and Small World Amusement Park. In addition, there are industrial areas along SR 4 that are in the 100-year flood zone. The downstream portion of Kirker Creek that runs through the eastern portion of Dow Chemical Company is also a flood hazard. Included in the 100-year flood is the Dow Wetlands Preserve. At high flows, the Los Medanos Wasteway carries floodwater east into Antioch City limits then north to the New York Slough. There are six proposed GI projects that are located within the 100-year flood areas, which will help to alleviate localized flooding.

1.3.9 Flood Control Development Policies

The Kirker Creek watershed is the City of Pittsburg's most vulnerable flood area because of its size and location. For example, a flood event occurred in 1998 that closed off access to the City of Pittsburg and neighboring communities for one week. Through the Stormwater Management Plan improvements study, it was determined that in order to increase capacity and eliminate flooding, the need for channel improvements, culvert and bridge modifications, and detention basins for storage would be required. In conjunction with the City Council's approval of the study, an amendment to the City's municipal code was adopted, requiring new development in the Kirker Creek Watershed to either permanently mitigate stormwater flow or pay a fee calculated in proportion to the creation of new impervious surface within the drainage area.

1.3.10 Recent and Planned Drainage Improvements

In 2004 and 2005, downstream Kirker Creek improvements were completed which included widening of the channel that runs along Pittsburg-Antioch Highway. Double box culverts now carry stormwater under MLK Jr. Elementary school to Kirker Creek north of the school. A concrete weir also runs along the channel and a detention basin was constructed adjacent to the channel to accommodate excess flows. Other storm drainage improvement projects completed within the past decade include increasing the capacity of the drainage system in the downtown area, installing a storm drain on East Leland and Railroad, relocating a pump station controller, and repairing a landslide on a portion of the Kirker Creek drainage channel.

Implementation of drainage improvements identified in the Stormwater Management Plan is ongoing throughout the City. Most improvements entail replacement of undersized pipes in the Kirker Creek watershed, Lawlor Creek watershed, Watershed 4, Watershed 5, and Watershed 6. Most of the projects have no identified funding sources. In the downtown area, there is a need to install a dewatering pump station to remove standing water in a box culvert that remains full year-round. Areas that need new storm drain pipelines to prevent flooding or accept additional stormwater flows include West Leland Road and East of Loveridge Road.

One project in Watershed 6 that is under design and is included in this GI Plan will alleviate flooding on North Parkside Drive by retrofitting an existing detention basin at Americana Park. The project will include a new vegetated swale to convey low flows, educational signage and improvements in the park adjacent to the basin (refer to Section 4.2, Early Implementation Project).

1.3.11 Funding for Maintenance and for Capital Improvements

Operation and maintenance of stormwater facilities is funded by the City's Annual Stormwater Utility Area Fee and supplemented with the City's Solid Waste Fund. The budget is limited and generally not enough to construct drainage improvements identified in the Stormwater Management Plan. Federal and state grants have helped fund capital improvement (CIP) projects; this includes the Americana Drainage project on the current CIP list. Another source of funding are development contributions through subdivision requirements and development impact fees such as the Kirker Creek Drainage fee.

The City currently allows alternative compliance for C.3 requirements via credits for stormwater treatment facilities built offsite from the project location. Developers that choose to meet their stormwater treatment and or flow control requirements through alternative compliance measures have the option to construct facilities on City parcels. Developers annex their project sites into the City's Community Facilities District (CFD) to fund the long-term maintenance of these stormwater treatment features. The funds received through the CFD pay for City staff to maintain the stormwater features in perpetuity.

1.3.12 Related Regional and Countywide Plans and Planning Documents

This GI Plan has been coordinated with the following regional stormwater documents:

- The Contra Costa Watersheds Stormwater Resource Plan (CCW SWRP). The CCW SWRP was funded by State Water Resources Control Board under a Proposition 1 Grant, with matching contributions provided by Contra Costa municipalities individually and collectively through the Contra Costa Clean Water Program (CCCWP). The CCW SWRP identified and prioritized potential multi-benefit stormwater management projects, including GI projects in watersheds and jurisdictions throughout Contra Costa County. Projects identified within the CCW SWRP are eligible to apply for future state funding. Many of the projects included in this GI Plan were drawn from the CCW SWRP project opportunity lists.
- The Contra Costa Countywide Reasonable Assurance Analysis (RAA). The RAA for GI is being prepared by Contra Costa municipalities collectively through the CCCWP and is consistent with guidance prepared by the Bay Area Stormwater Management Agencies Association (BASMAA). The RAA for GI uses a water

quality model coupled with continuous simulation hydrologic output to estimate baseline loadings of pollutants and the reductions that might be achieved through GI implementation in 2020, 2030, and 2040 under various scenarios, which include implementation of projects identified in this GI Plan. Results pertinent to GI planning and implementation are discussed in Section 2 of this GI Plan.

1.3.13 Related Local Planning Documents

The City plans to integrate GI into a wide diversity of public and private projects. To facilitate GI being considered and supported in the range of project planning and design processes, the City has reviewed or is currently updating the following planning documents to appropriately incorporate GI requirements:

- General Plan Pittsburg 2020
- Railroad Avenue Specific Plan (2009)
- Kirker Creek Watershed Management Plan (2004)
- Stormwater Management Plan (1999)

A status summary of these documents and workplan for future updates is included in Appendix A. Table A-1 includes information on planning documents that require updates to incorporate GI requirements and provides a schedule for the updates. The incorporation of GI language into plans requiring updates will be accomplished by implementing the following steps:

Step 1: Draft Text to Incorporate in the Planning Documents. City staff will develop draft text to incorporate into the identified plans and planning documents. The draft text will set forth GI requirements for projects that are identified in the applicable plans or planning documents, and for projects that may be developed to meet the planning goals, objectives, and policies articulated in the documents.

Step 2: Coordination and Outreach to Update Planning Documents. City staff will prepare draft revisions of relevant sections of planning documents to ensure that the GI implementation text prepared in Step 1 is included in the scheduled updates of applicable plans and planning documents. This step will include coordination with and outreach to departments within the City, stakeholders, decision-making bodies, and the general public. Proposed updates to planning documents are anticipated to be circulated for public review prior to the final approval of the documents that are updated to include GI requirements.

Step 3: Track and Record the Update of Planning Documents. Throughout the process of updating plans and planning documents, and after the documents are updated, City staff will document coordination with and outreach to departments

within the agency, stakeholders, decision-making bodies, and the general public, including the final approval of the documents that are updated to include GI requirements. This includes tracking and recording the dates on which draft planning documents are circulated for review, the dates on which public hearings or other public meetings are held, and the dates when final planning documents are approved.

In addition, the City is currently in the process of developing an active transportation policy called the Pittsburg Moves Plan, which is intended to encourage more foot and bicycle traffic through the City. Input from the general public identified the top concern for bicyclists and pedestrians is the high speed of cars, which make bikeways unsafe, and pedestrian crossings of large streets uncomfortable. When the City's Pittsburg Moves Plan is finalized, priority projects identified in the plan will also be screened for GI opportunities to support the development of safer biking and pedestrian corridors.

1.3.14 Outreach and Education

The Contra Costa Clean Water Program developed the Contra Costa Stormwater Resource Plan (CCW SWRP) in collaboration with the Contra Costa County Flood Control District, unincorporated Contra Costa County, the 19 incorporated cities and towns within Contra Costa County and other stakeholders. Education, outreach and public participation was conducted following the CCW SWRP Stakeholder Outreach, Education and Engagement Plan. The CCW SWRP serves as the basis for public project selection.

The City's GI Plan development process engaged a wide variety of stakeholders, including both government staff and community members who will live, work, and play near future GI projects, as summarized in Table 1.

Table 1. Outreach Conducted on Green Infrastructure Plan

Event	Date	Topic
City Council Meeting	May 1, 2017	GI Plan Framework
CCCWP C.3. Workshop	April 24, 2018	C.3. workshop for municipal staff and land development professionals
CCTA Planning Director's meeting	May 10, 2018	CCCWP GI Plan presentation by Dan Cloak
Contra Costa Planning Directors meeting	January 11, 2019	CCCWP GI Plan presentation by Dan Cloak
Contra Costa City/County Engineering Advisory Committee	January 17, 2019	CCCWP GI Plan presentation by Dan Cloak

Land Use Subcommittee	June 18, 2019	Staff presentation on GI Plan

The City also intends to engage relevant government staff and community members as projects move forward towards design and implementation. The City has standing monthly interdepartmental Development Review Team meetings, which will continue to be a forum for educating staff and discussing the implementation of GI projects. The City will continue to coordinate within and between City departments to develop concepts for integrated projects to serve multiple objectives.

The GI concepts have been presented to the public via the Pittsburg Moves forum as well as the City newsletter. The City developed a website called Livin Green that currently promotes Integrated Pest Management and provides information about water efficient gardening practices; the City plans to expand this platform to promote GI projects and concepts.

1.3.15 Policies, Ordinances, and Legal Mechanisms

On August 19, 2019, the City Council adopted Resolution 19-13669 Approving the Green Infrastructure Plan as the guidance for implementation of green infrastructure projects, as required by the Regional Water Quality Control Board through National Pollutant Discharge Elimination System permit No. CAS612008.

2 Green Infrastructure Targets

Provision C.3.j.i.2.c of the MRP requires the City's GI Plan to identify impervious surface targets to be retrofitted with potential GI projects by 2020, 2030, and 2040.

This planning process developed and assessed projections for the square footage of impervious surface to be retrofitted and treated with GI from private projects within the City's jurisdiction by 2020, 2030, and 2040. It also incorporates targets for the square footage of impervious surface to be retrofitted and treated with GI through potential public projects within the City's jurisdiction by 2020, 2030, and 2040.

2.1 Private Development Projections

To forecast private development, the City participated in a regional process coordinated through the CCCWP and shared with BASMAA member agencies. This process utilized the outputs of UrbanSim, a model developed by the Urban Analytics Lab at the University of California under contract to the Bay Area Metropolitan Transportation Commission (MTC). UrbanSim is a modeling system developed to support the need for analyzing the potential effects of land use policies and infrastructure investments on the development and character of cities and regions. The Bay Area's application of UrbanSim was developed specifically to support the development of Plan Bay Area, the Bay Area's Sustainable Communities planning effort.

MTC forecasts growth in households and jobs and uses the UrbanSim model to identify development and redevelopment sites to satisfy future demand. Model inputs include parcel-specific zoning and real estate data; model outputs show increases in households or jobs attributable to specific parcels. The methods and results of the Bay Area UrbanSim model have been approved by both MTC and ABAG Committees for use in transportation projections and the regional Plan Bay Area development process.

The CCCWP process used outputs from the Bay Area UrbanSim model to map parcels predicted to undergo development or redevelopment in each Contra Costa jurisdiction at each time increment specified in the MRP (2020, 2030, and 2040). The resulting maps were reviewed by local staff for consistency with the City's local knowledge and local planning and economic development initiatives. The maps were revised, and each revision documented.

It is assumed that multifamily residential and commercial/industrial developments will incorporate stormwater treatment facilities (typically bioretention) in accordance with MRP Provisions C.3.b., C.3.c., and C.3.d. Because of high land values, it is expected that more than 50% of the existing impervious area in each parcel will be replaced if a parcel is developed, and therefore the entire parcel will be subject to Provision C.3 requirements

(that is, will be retrofit with GI), consistent with the "50% rule" requirements of MRP Provision C.3.b.

Existing impervious surface for each affected parcel was estimated using the 2011 National Land Cover Database. Estimates were spot-checked and revised based on local knowledge and available satellite imagery.

Based on these assumptions and the revised maps, the amounts of existing impervious surface forecast to be retrofit with GI via private development are as shown in Table 2.

Table 2. Estimates of Cumulative Impervious Surface to Be Retrofit via Private Development

2020	2030	Cumulative 2020-2030	2040	Cumulative 2020-2040
54	29	83	22	105

2.2 Targets for Public Projects

Forecasted impervious surface to be retrofit via public projects is in two categories:

1. Estimated tributary impervious surface area for specific GI projects identified in this GI Plan.
2. Additional tributary impervious surface associated with projects yet to be identified. These projects are associated with general geographic areas (neighborhoods or blocks) but specific facility locations have not yet been identified.

These forecasts are summarized in Table 3.

Table 3. Estimates of Cumulative Impervious Surface to Be Retrofit via Public Projects

Year	2020	2030	Cumulative 2020-2030	2040	Cumulative 2020-2040
Area Tributary to GI Projects Included in This GI Plan [Acres]	39	25	64	39	103
Additional Area Associated with Projects Yet to be Identified [Acres]	0	67	67	39	106
Total [Acres]	39	92	131	209	209

2.3 Projected Load Reductions

MRP Provisions C.11/12.c.ii.(2) require Permittees to prepare a Reasonable Assurance Analyses (RAA) for mercury and PCBs, respectively, that achieve the following objectives:

a) Quantify the relationship between areal extent of GI implementation and load reductions, taking into consideration the scale of contamination of the treated area as well as the pollutant removal effectiveness of likely GI strategies;

b) Estimate the amount and characteristics of land area that will be treated through GI by 2020, 2030, and 2040;

c) Estimate the amount of load reductions that will result from GI implementation by 2020, 2030, and 2040; and

d) Quantitatively demonstrate that PCBs reductions of at least 0.5 kg/yr and mercury reductions of 1.7 kg/yr will be realized within the County by 2040 through implementation of GI projects.

The CCCWP Annual Report includes a memorandum prepared by Geosyntec Consultants, “Reasonable Assurance Analysis [RAA] Countywide Attainment Strategy”. The memorandum summarizes the objectives and methodology for the CCCWP RAA analysis that will be submitted with the Fiscal Year 2019-2020 Annual Report to meet each of the objectives noted above.

The CCCWP also developed a Countywide Attainment Strategy memorandum that describes potential next steps for County Permittees to implement projects collectively to meet the MRP load reduction requirements. The RAA analysis includes a scenario

outlined in the Countywide Attainment Strategy that evaluates PCBs and mercury loads reduced by public projects in each Permittee's GI Plan. This demonstrates how PCBs and mercury load reduction goals could be achieved at the countywide level. The Permittees collectively, believe that a countywide strategy will be the most effective and efficient way to achieve the PCBs and mercury load reduction goals.

3 Public Project Identification, Prioritization, and Mapping

3.1 Tools for Public Project Identification and Prioritization

Publicly owned parcels and ROWs that could potentially be retrofit to include multi-benefit stormwater capture facilities were identified as part of the CCW SWRP (CCCWP, 2018). These potential project locations were used as the basis for identifying future public retrofit locations within the City. A summary of the project identification and prioritization process conducted for the SWRP is described herein; additional details may be found in the SWRP (CCCWP, 2018).

3.1.1 SWRP Project Opportunity Identification

The SWRP identified public retrofit opportunities through a request for planned projects, sent to the Contra Costa County Permittees, along with a geographic information system (GIS)-based project opportunity analysis, conducted using data received from the Permittees through a data request. Information related to the identification of potential projects was received from 25 jurisdictions, government agencies, non-governmental organizations, and watershed groups that were contacted with potential project requests.

The desktop GIS analysis entailed screening for publicly owned parcels and ROWs without physical feasibility constraints that would preclude implementation of a stormwater capture project. The project opportunity analysis consisted of the following steps:

1. Identify publicly owned parcels through parcel ownership and/or tax-exempt status.
2. Screen identified publicly owned parcels to identify those at least 0.1 acres in size; and with average slopes less than 10%.
3. Identify ROW using the county-wide roadway data layer. Roadways considered were state and county highways and connecting roads, as well as local, neighborhood, and rural roads.
4. Identify land uses associated with identified parcels and surrounding identified ROWs with a combination of ABAG land use categories and use codes provided by the Contra Costa County Assessor.
5. Screen all identified locations (i.e., parcels and ROWs) for physical feasibility. The following screening relating to physical constraints was applied to identified sites (to the extent that the necessary data had been provided or obtained):
    a. Regional facilities were not considered for parcels that were greater than 500 feet from a storm drain, due to limited feasibility in treating runoff from a larger drainage area;

b. Parcel-based facilities were not considered for sites that were more than 50% undeveloped land uses, due to the limited potential for pollutant of concern load reduction;
c. Parcels with significant drainage area outside of urbanized areas were removed, as these sites would not provide opportunity for significant pollutant of concern load reduction;
d. Sites more than 50% within environmentally sensitive areas (ESAs) (designated wetlands, biologically sensitive areas) were removed so as not to disturb these habitats;
e. Sites with more than 50% overlying landslide hazard zones were removed to avoid the potential for increasing landslide risk.

The remaining identified public parcels and ROWs were considered preliminarily feasible for installation of stormwater capture facilities and were analyzed using a metrics-based multi benefit analysis. The results of the metrics-based multi-benefit analysis provided some information helpful for consideration of GI priorities within the City. A summary of the project opportunity classification and scoring conducted for the SWRP is provided in the following section.

3.1.2 SWRP Project Opportunity Metrics-Based Multi-Benefit Analysis

To conduct the SWRP project opportunity metrics-based multi-benefit analysis required as part of the SWRP, additional data was analyzed, and classifications were made regarding the project opportunities. First, all project opportunities (i.e., including those identified through the GIS opportunity analysis and the stakeholder potential projects process) were classified using the following information:

1. Stormwater capture project type;
2. Infiltration feasibility;
3. Facility type; and
4. Drainage area information.

Details regarding each of these classifications are provided in the following sections.

Stormwater Capture Project Type

All physically feasible project opportunities that did not include a previously defined non-GI stormwater capture facility (e.g., stream restoration projects provided by Stakeholders as part of the SWRP project request) were assumed to be feasible for GI implementation as part of the SWRP project opportunity classification. The projects identified through the GIS opportunity analysis and stakeholder stormwater capture projects process were

categorized as parcel-based, regional, or ROW/green street projects, as summarized in Table 4.

Table 4. Green infrastructure Project Types and Characterization Criteria

GI Project Type	Definition	Description
ROW/green street projects	Treating the road and portions of adjacent parcels	All street-based projects
Regional Projects	Treating a large area draining to the parcel.	The parcel contains at least 0.5 acre of undeveloped or pervious area 9 as identified through land use class); and The drainage area is larger than the parcel itself and the location is sufficiently close to a storm drain (i.e., within 500 feet where storm drain data is available.)
Parcel-based projects	Treating the Drainage area only on the identified parcel	All other parcel locations

Infiltration Feasibility

All SWRP project opportunity locations were categorized as feasible, infeasible, or partially feasible for infiltration, based on underlying hydrologic soil group, depth to groundwater (as data was available), nearby soil or groundwater contamination, and presence of underlying geotechnical hazards, as described in Table 5.

Table 5: SWRP Project Opportunity Infiltration Feasibility Categorization Criteria

Infiltration Feasibility Category	Description
Hazardous/infeasible for infiltration	Projects that are located: • More than 50% overlying liquefaction hazards; or • Within 100 feet of a site with soil or groundwater contamination (e.g., based on proximity to active GeoTracker or EnviroStor sites)

Infiltration Feasibility Category	Description
Infiltration safe but only partially feasible	None of the above constraints exist, but the soil underlying the facility is relatively poorly draining (identified as hydrologic soil group (HSG) C or D)
Infiltration feasible	The site has none of the infiltration hazards present and the soil underlying the facility is relatively well draining (identified as HSG A or B).

For the purpose of SWRP project opportunity multi-benefit scoring (i.e., the metrics-based analysis conducted), locations feasible for infiltration were assumed to retain the full water quality capture volume. At locations that are partially feasible for infiltration, it was assumed that infiltration would be promoted in the facility, but the full water quality capture volume would not be infiltrated due to poor drainage. These areas were assumed to infiltrate to the extent possible using a raised underdrain. Locations that are hazardous for infiltration were assumed to implement non- infiltrating GI projects (i.e., lined bioretention) and were assumed to retain no volume.

SWRP Project Opportunity Facility Type

Each SWRP project opportunity location was assigned a facility type. For potential projects identified by the Permittees and/or stakeholders, a facility type was assigned based on the facility description or classification provided by the agency or project proponent. For project opportunities identified through the GIS analysis, the facility type was assumed to be GI, with infiltration capability defined based on the infiltration feasibility screening. The resulting SWRP multi-benefit stormwater capture project types that were considered for the GI Plan included:

- Capture and Reuse
- Constructed Wetland
- Lined Bioretention
- Unlined Bioretention
- Unlined Swale
- Water Quality Basin

SWRP Project Opportunity Drainage Area

For each identified project opportunity, the drainage area was identified and characterized as follows:

1. All project opportunities with identified drainage areas were characterized as provided by project proponents.
2. For ROW project opportunities for which the drainage area had not been characterized, the roadway and an assumed tributary width (e.g., 50 feet per side) that extends into the adjacent parcels was considered the drainage area.
3. For parcel-based project opportunities for which the drainage area had not been characterized, the entire parcel was assumed to make up the drainage area.
4. For regional project opportunities for which the drainage area had not been characterized, the drainage area characterization (i.e., slope and land use) was approximated.

SWRP Project Opportunity Metrics-Based Multi-Benefit Analysis Scoring

Using the information compiled in the identified project opportunity database, each SWRP identified project received a score using a metrics-based multi benefit analysis. A description of each scored project component is provided below, and the scoring criteria are presented in Table 6:

- Parcel area (for regional and parcel-based GI projects only) - This scoring component awarded more points for larger parcels.
- Slope – This scoring component awarded more points to flatter slopes and is related to ease of construction and implementation.
- Infiltration feasibility – More points were awarded to projects that overlie infiltrating soils.
- PCBs/mercury yield classification in project drainage area – This scoring component is related to the influent TMDL pollutant loads; higher potential load reduction achieved higher points.
- Removes pollutant loads from stormwater – Points were awarded to facilities designed as GI or treatment control facilities for this scoring component.
- Augments water supply – Increasing points were awarded based on potential water supply provided for this scoring component.
- Provides flood control benefits – Flood control facilities received points specific to providing flood control benefits for this scoring component.
- Re-establishes natural water drainage systems or develops, restores, or enhances habitat and open space – Hydromodification control, stream restoration, and habitat restoration projects received points specific to providing these environmental benefits, for this scoring component.
- Provides community enhancement and engagement – Projects that specifically provide public use areas or public education components with potential opportunities for community engagement and involvement were given points specific to providing community benefits, for this scoring component.

Table 6: CCW SWRP Projects Metrics-Based Multi-Benefit Scoring Criteria

Project Component	Benefit Addressed	Points		
		0	1	2
General Stormwater Management Performance/Implementation Feasibility				
Parcel area (for regional and parcel-based projects only)	All	<1 acre	1-<4 acres	>4 acres
Location slope	All	7-10%	3-7%	0-3%
Infiltration feasibility	All	No	Partial	Yes
Individual Benefit Performance				
PCBs/Mercury yield classification in project drainage area[1]	Water Quality	New Urban, Agriculture/Open Space, or Other	Old Urban	Old Industrial or Source Property (+1)
Removes pollutant loads from stormwater	Water Quality	Trash Capture Devices	Non-GI and Non-Infiltrating GI Treatment Control	Partially and Fully Infiltrating GI Project or Regional Project (+1)
Augments Water Supply	Water Supply	--	Infiltrating GI of Infiltrating Flood Control Project over Potential Water Supply Aquifer	Harvest/Use of Other Water Augmentation Project[2]
Provides Flood Control Benefits	Flood	--	Fully and Partially Infiltrating GI Project	Flood Control Project[2]
Re-establishes Natural Water drainage systems	Environmental	--	Fully and Partially Infiltrating GI Project	Stream Restoration or Hydromodification on Control[2]
Develops, restores of enhances habitat and open space	Environmental	--	GI Project	Habitat Restoration Project[2]
Provides enhanced or created recreational and public use areas with potential opportunities for community involvement and education	Community	--	GI Project	Public Use Area or Public Education Project Component[3]

1. Includes parcel yield classification for parcel-based projects; drainage area yield classification for regional projects; and adjacent parcel yield classification for ROW projects. Scores will be weighted on the portion of the drainage area in each yield classification.
2. As identified by the project proponent.
3. Defined as providing "enhanced or created recreational and public use areas, community involvement, or employment opportunities" per the State Storm Water Resource Plan Guidelines (SWRCB, 2015) per Permittee/Stakeholder project information. Typically, and added project feature.

All classified and scored SWRP projects were compiled into a master database as part of the SWRP. The SWRP identified projects located within the City's jurisdictional boundary were provided to the City for review. The project classification information and SWRP score were provided to the City for informational purposes.

A total of 977 project opportunities were considered through the SWRP preliminary ranking process. The lowest scoring projects earned five (5) points; and the highest scoring project earned 14 points out of a possible 20 points. The average project score was 11 points.

City Prioritization Process

The City conducted an independent project opportunity ranking process of the identified SWRP projects in collaboration with the Public Works Director, Capital Improvement, and Traffic Engineers. A total of 56 projects were ranked, some of which corresponded to existing CIP projects, some were former redevelopment agency properties, and others potential public/private collaboration projects. The projects were prioritized according to the likelihood of construction based on anticipated funding and consistency with City development goals.

SWRP projects were then reviewed for the GI Plan, focusing on areas within the Kirker Creek Watershed and the unnamed Watershed 6. These two watersheds are in the central portion of the City and have the highest concentration of commercial, industrial and residential land uses, which correlates to pollutant loading. In addition, previous analyses have identified storm drainage system capacity issues within the watersheds. Currently identified CIP within the watersheds were reviewed for potential GI opportunities. Through this process, the City selected additional projects to include in the GI Plan that best enhanced the existing CIP list.

Map and Project List

A list of potential public GI Projects to be implemented is provided in Appendix B. The GI projects are grouped according to the anticipated construction completion by 2020, 2030, and 2040. Potential public GI projects to be completed by 2040 are also shown on Figure 3.

4 Early Implementation Projects

4.1 Review of Capital Improvement Projects

MRP Provision C.3.j. ii. requires the City to prepare and maintain a list of public and private GI projects planned for implementation during the 2015- 2020 permit term, and public projects that have potential for GI measures. The City submitted an initial list with the FY 15-16 Annual Report to the RWQCB and updated the list in the FY 16-17 and FY 17-18 Annual Reports.

The City is moving forward with incorporation of GI elements into the Americana Storm Drainage Capital Improvement Project, CIP Project SD-9

The creation and maintenance of this list is supported by guidance developed by BASMAA: "Guidance for Identifying Green Infrastructure Potential in Municipal Capital Improvement Projects" (May 6, 2016). The City used the BASMAA guidance to screen the 5-year CIP list for FY17-18 through FY20-21. The screening process removed projects that did not involve construction and/or have the potential for GI implementation. For the remaining projects, the screening identified if the project is a C.3-regulated project, evaluated the potential for the project to include GI components, and evaluated the project funding status.

4.2 Early Implementation Project

The Americana Park Storm Drainage Project (CIP Project SD-9) has been identified as an early implementation project. The 2.5-acre neighborhood park is located in the Americana subdivision adjacent to North Parkside Drive and is engineered to function as a detention basin. The project will alleviate localized flooding on North Parkside Drive caused by discharges from the undersized detention basin by constructing a high flow bypass channel across the PG&E utility corridor. Therefore, the project requires obtaining an easement from PG&E. GI measures include:

- A retrofit of the existing detention basin to increase storage capacity and rate-control the outlet discharge;
- Construction of a vegetated swale that will replace the existing undersized North Parkside Drive ditch and convey low flows from the retrofitted basin; and
- Educational signage

The drainage area treated by the project is 14 acres. A conceptual design for this project was included in the SWRP as one of ten project opportunities selected for conceptual design.

4.3 Workplan for Completion

Tasks and timeframes for constructing the Americana Park Storm Drainage CIP Project are included in Table 7.

Table 7: Early Implementation Project Workplan

Project Name	Schedule							
	Planning		Preliminary Design		Final Design		Construction	
	Start	Finish	Start	Finish	Start	Finish	Start	Finish
CIP Project SD-9. Americana Park Storm Drainage Project	09/2016	09/2016	12/2016	02/2017	04/2019	TBD	TBD	TBD

Project Name	Budget	Funding Source	Responsible Party
CIP Project SD-9. Americana Park Storm Drainage Project	$700,000	Community Capital Improvement Fund (CCIF) Infrastructure Repair and Replacement Fund (IRRF)	City of Pittsburg

5 Tracking and Mapping Public and Private Projects Over Time

5.1 Tools and Process

The CCCWP has developed a county-wide GIS platform for maintaining, analyzing, displaying, and reporting relevant municipal stormwater program data and information related to MRP Provisions C.10 (trash load reduction activities) and C.11/C.12 (mercury and PCBs source property identification and abatement screening activities). This tool is also used to track and report on GI project implementation.

The CCCWP's stormwater GIS platform features web maps and applications created using ESRI's ArcGIS Online (AGOL) for Organizations, which accesses GIS data, custom web services and reports that are hosted within an Amazon cloud service running ESRI's ArcGIS Server technology.

The C.3 Project Tracking and Load Reduction Accounting Tool within the CCCWP AGOL system is used to track and report on GI project implementation. It is currently used to track and map existing private and public projects incorporating GI; in the future it may also be used to map planned projects and will allow for ongoing review of opportunities for incorporating GI into existing and planned CIPs. The AGOL system can be used to develop maps that can be displayed on public-facing websites or distributed to the public. These maps can be developed to contain information regarding the GI project data input into the AGOL system.

The C.3 Project Tracking and Load Reduction Accounting Tool is intended to be used to allow for estimates of potential project load reduction for PCBs and mercury and presently supports the BASMAA Interim Accounting Methodology for certain load reduction activities. In the future, the tool is planned to be updated with the RAA methodology developed for the County. That functionality is planned to be active by the end of the current permit term.

The City actively engages with the AGOL tool and maintains up-to-date project data as facilities are constructed. The City purchased Cityworks to replace its current asset management system and is currently in the process of migrating to the new platform. This new system will be used to track maintenance and inspection of GI facilities.

6 Design Guidelines and Specifications

6.1 Guidelines for Streetscape and Project Design

GI retrofits of existing streets and public parcels within the City will consider the following principles, as applicable:

- Ensure projects design and construct adequate conveyance facilities that meet local drainage standards and consider the potential for flood risk;
- Whenever possible integrate GI with bicycle, pedestrian and transit needs of the right of way or parcel;
- Maximize GI opportunities in parking lots and other large paved areas;
- Preserve trees and mature vegetation whenever possible and promote the planting of native trees into project designs;
- Ensure that appropriate design standards and guidelines are followed when designing and implementing GI;
- Promote internal and external communication prior to and during construction to minimize the impact of construction activity on GI.

For projects not regulated under MRP Provision C.3.b that incorporate GI into an existing roadway segment or a previously developed public parcel, the City will use the following guidelines. The guidelines provide high level recommendations for managers/designers/contractors related to drainage conveyance, soils/geotechnical; vegetation, utilities and other infrastructure, and constructability.

San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, January 2009. The guidebook provides practical information on creating low impact development (LID) roadways and parking lots. The guidebook focuses on San Mateo County conditions but much of the guidance is applicable to the City. Roads and parking lots offer significant opportunities for managing stormwater with GI because they constitute as much as 70 percent of the total impervious cover in ultra-urban landscapes. The guidebook contents include:

- Principles of sustainable stormwater design for green streets and parking lots;
- A stormwater design “toolbox” with various site layout strategies and stormwater facility options;
- A description of how varying street and parking lot conditions may provide GI opportunities;

- Design details for green streets and practical advice on how to design and construct green street and parking lot projects; and
- Key considerations for implementing green street and parking lot projects/programs.

National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide, 2017. This resource was developed collaboratively by practitioners and professionals across the United States and provides planning and design guidance for GI on city streets to achieve multiple benefits. The guide was developed using other design guidance, city case studies, best practices in urban environments, research and evaluation of existing designs, and professional consensus. These sources, as well as the specific designs and elements included in the guide, are based on North American street design practice.

In addition, the City may refer to guidance for GI facilities included in Chapters 3 and 4 of the CCCWP Stormwater C.3 Technical Guidebook, 7th Edition (CCCWP 2017).

6.2 Specifications and Typical Design Details

The City will use the typical design drawings and standard specifications for GI projects that are referenced below, to be approved on a project-specific basis by the City Engineer. GI projects may also utilize design guidance included in Chapter 4 of the CCCWP Stormwater C.3 Technical Guidebook, 7th Edition manual (CCCWP 2017) for other types of LID stormwater treatment facilities, subject to City Engineer approval.

- BASMAA Urban Greening Standard Details (See Table 8)
- CASQA updates to the Central Coast Low Impact Development Initiative Details and Specifications: *https://www.casqa.org/resources/california-lid-portal/standard-lid-design-plans-specifications*

Table 8: BASMAA Urban Greening Standard Details- Index of GI Typical Designs

Type of GI Facility	Type of Document	Name of Document	Date Prepared	File Type	Weblink
Bioretention Area	Plan View	C-1.1 Bulbout Alternative 1: Sloped Sides, Inline Overflow Structure, Curb Cut Inlet Type A	April 2017	PDF, CAD	PDF file: http://www.sfestuary.org/wp-content/uploads/2017/07/FinalGIDetails_Compiled.pdf CAD files: http://www.sfestuary.org/wp-content/uploads/2017/07/GI-Details_CAD-20170714T182742Z-001.zip
Bioretention Area	Plan View	C-1.2 Bulbout Alternative 2: Walled Bioretention on Both Sides of Corner, Curb Cut Inlets Type A & B	April 2017	PDF, CAD	
Bioretention Area	Plan View	C-1.3 Bulbout Alternative 3: Sloped and Walled Sides, Curb Cut Inlet Type B, Curb Cut Overflow Only	April 2017	PDF, CAD	
Bioretention Area	Plan View	C-1.4 Bulbout Alternative 4: Midblock Bulbout with Raised Bike Lane and Pedestrian Crossing	April 2017	PDF, CAD	
Bioretention Area	Section	S-A-A Section A-A: Sloped Sides / No Curb Walls	April 2017	PDF, CAD	
Bioretention Area	Section	S-B-B Section B-B: Walls on Both Sides, Utility Main Protection	April 2017	PDF, CAD	
Bioretention Area	Section	S-C-C Section C-C: Raised Bike Lane, Overflow Structure	April 2017	PDF, CAD	

6.3 Sizing Requirements

MRP Provision C.3.j.i.(2)(g) requires GI projects to meet the treatment and hydromodification management sizing requirements included in Provisions C.3.c and C.3.d. Provision C.3.c also requires the use of LID stormwater controls. To meet the MRP definition of LID, bioretention facilities must have a surface area no smaller than what is required to accommodate a 5 inches/hour stormwater runoff surface loading rate, and infiltrate runoff through biotreatment soil media at a minimum of 5 inches per hour.

Provision C.3.d of the MRP includes volume-based, flow-based, and the combination volume-and flow-based hydraulic sizing criteria. Bioretention areas may be sized using a simplified flow-based hydraulic sizing method, known as the “4 percent method,” in which the surface area of the bioretention area is 4 percent of the effective impervious surface area that is treated.

Instructions for how to size facilities are provided in Chapter 3 (LID Site Design Guide) of the CCCWP Stormwater C.3 Technical Guidebook, 7th Edition (CCCWP 2017). Chapter 3 of the C.3 Technical Guidebook includes an LID design procedure, equations for sizing facilities and a format for documenting facility sizing calculations. Sizing factors for “Treatment and Flow Control” are provided in Table 3-6 of the C.3 Technical Guidebook and Appendix E of the C.3 Technical Guidebook provides background on stormwater facility sizing criteria. The guidebook uses the 0.2 inches per hour criterion for flow-based facilities to develop a consistent countywide sizing factor for bioretention facilities used for stormwater treatment only and not for flow control. The sizing factor is based on a design maximum surface loading rate of 5 inches per hour (per Provision C.3.c). The sizing factor is the ratio of the design intensity of rainfall on tributary impervious surfaces (0.2 inches/hour) to the design percolation rate in the facility (5 inches/hour), or 0.04 (dimensionless). The CCCWP has also created a sizing calculator (i.e., IMP Sizing Calculator) to be used in conjunction with Chapter 3 of the Stormwater C.3 Guidebook.

Provision C.3.j.i.(2)(g) of the MRP allows the MRP Permittees to develop an alternate sizing approach for street projects that are not subject to Provision C.3.b.ii. (non-Regulated Projects) in which project constraints preclude fully meeting the C.3.d sizing requirements. This approach is described in the BASMAA Guidance for Sizing Green Infrastructure Facilities in Street Projects with companion analysis: Green Infrastructure Facility Sizing for

Non-Regulated Street Projects, (June 2019)[3]. The document states that bioretention facilities in street projects should be sized as large as feasible and meet the Provision C.3.d sizing criteria where possible. The guidance further states that bioretention facilities in street projects smaller than what would be required to meet the Provision C.3.d criteria may be appropriate in some circumstances and provides guidance that may be applied to those circumstances.

[3] https://www.cccleanwater.org/userfiles/kcfinder/files/BASMAA_Guidance%20for%20Sizing%20Green%20Infrastructure%20Facilities%20in%20Street%20Projects%20with%20companion%20Analysis%20June%202019.pdf, Accessed July 29, 2019.

7 Funding Options

7.1 Funding Strategies Developed Regionally

BASMAA developed the “Roadmap of Funding Solutions for Sustainable Streets” that addresses the need for traditional single-benefit transportation project funding sources to have flexibility to fund multi-benefit GI projects. The Roadmap outlines the existing barriers for obtaining funding for GI projects through traditional grants that currently limit the use of grants to limited projects. The document also includes tables of strategic actions that agencies and organizations could collaboratively work together to implement.

The City will use the Roadmap to evaluate funding strategies for the potential public GI projects identified in this GI Plan.

7.2 Local Funding Strategies

The Kirker Creek Watershed is the City’s most vulnerable flood area because of its size and location. A Stormwater Management Plan improvements study was created that identified needed drainage improvement projects within the Kirker Creek Drainage area to increase capacity and eliminate flooding. On October 16, 2000, the City approved the Environmental Impact report and Mitigation Plan for the SR 4 / Loveridge Road Flood Relief Project. Subsequently the City’s municipal code was updated to include a Kirker Creek Drainage Area Fee that requires new development in the Kirker Creek Watershed to either permanently mitigate stormwater flow or for developers to pay a fee calculated in proportion to the creation of new impervious surface area within the drainage area.

The City plans to update the Stormwater Management Plan for the Kirker Creek Watershed and re-evaluate the current developer fee as GI projects are incorporated with projects identified in the plan.

8 Adaptive Management

8.1 Pursuing Future Funding Sources

The City intends to pursue stormwater grants as they become available to fund GI projects, or portions of projects, when combined with funding of CIP projects.

8.2 Alternative Compliance and Credit Trading Investigations

As mentioned in previous sections, the City currently has a mechanism in place to allow for private development to exercise alternative compliance with regard to their regulated projects.

The Clean Water Program is also exploring the idea of alternative compliance for construction of stormwater treatment facilities elsewhere within the County for projects that will produce regional stormwater benefits. The City is open to the concept and is supportive of the concept of credit trading.

APPENDIX A

Summary of Planning Documents Reviewed for Green Infrastructure

Table A-1
Summary of Planning Documents Reviewed for Incorporating Green Infrastructure Requirements

Name of Document	Department Responsible for Document	Contact Person in Department	Do Policies, Guidance, or Requirements in Document Create…		Describe Opportunities and/or Conflicts	Is Document Appropriate to Update?				Estimated Update Schedule
			Opportunities to Install GI? (Y/N)	Conflicts with GI? (Y/N)		Yes	Additional GI Opportunities, if Yes	No	Reason, if No	Draft Text Circulate Draft Outreach/Final Approval
General Plan Pittsburg 2020: A Vision for the 21st Century (2004) Elements: 4. Urban Design; 5. Downtown; 7. Transportation; 8. Open Space, Youth, and Recreation; 9. Resource Conservation; 10. Health and Safety; and 11. Public Facilities	Planning	Kristin Pollot	Y	N	Several General Plan sections currently include language requiring protection of creeks from runoff and erosion through BMP implementation as part of development plans. • Urban Design section states: 4-P-29: medians can be used to collect drainage flows. • Resource Conservation section states: ○ 9-P-17: To prevent flood hazards in the Kirker Creek watershed, ensure that new development minimizes paved areas, retaining large blocks of undisturbed, naturally vegetated habitat to allow for water infiltration. Additional flood control mitigation may include intermixing areas of pavement with the naturally vegetated infiltration sites to reduce the concentration of stormwater runoff from pavement and structures. ○ 9-P-19: As part of the City's Zoning Ordinance, establish regulations for the preservation of mature trees. Include measures for the replacement of all mature trees removed. • Health and Safety section states: ○ 10-P-26: Reduce the risk of localized and downstream flooding and runoff through the use of high infiltration measures, including the maximization of permeable landscape. ○ 10-P-29: During the review of development plans, require all commercial projects to construct on-site retention facilities. Such facilities could be in the form of landscape features or underground swells. ○ 10-P-30: Encourage residential development that includes post-construction Best Management Practices to minimize runoff from the site to the storm drain system (for example, using permeable surfaces for parking lots, sidewalks, and bike paths, or using roof runoff as irrigation).	Y	5.3 Design and Development; Goals: Design and Development: Add GI to the bulleted list of streetscape improvement such as: "install GI such as bioswales, and other landscape designs that allow for water infiltration". Add a similar policy under Policies: Design and Development. 10.2 Flood Control; Flood Control Management; Flood Control: include GI strategies in drainage improvements. Add language to promote GI in Transportation and Public Facilities sections.			City Council Authorized a Consultant Service Agreement for the Preparation of the General Plan Update and Environmental Impact Report in November 2018.

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			Opportunities to Install GI? (Y/N)	Conflicts with GI? (Y/N)		Yes	Additional GI Opportunities, if Yes	No	Reason, if No	Draft Text Circulate Draft Outreach/Final Approval
Railroad Avenue Specific Plan (2009)	Planning		Y		2.3.2 Utilities; Storm Drain; Page 37: "The existing drainage system in Pittsburg is comprised primarily of channelized creeks fed by groundwater, surface run-off and City maintained underground storm drains." … "To help keep the system below capacity, the Specific Plan addresses methods to reduce run-off generated by new development by including pervious surfaces where possible." 4.1 Design and Development Goals; Page 73: "Environmental sustainability also plays an important role in the urban design of the area, and a range of sustainable building techniques and practices are encouraged with the Specific Plan. The Plan promotes creativity in design practices that use energy efficient materials, incorporate stormwater treatment on-site, and incorporate natural elements." 4.1 Design and Development Policies; Page 74: 4-P-4: Develop incentives to support environmentally sustainable practices in site and building design such as improved insulation, operable windows, energy efficient lighting and appliances, solar access, natural ventilation, and permeable paving materials. 4.4 Development Standards; Transit Oriented Development High (TOD-High); Medium (TOD-M); Residential (TOD-R); Business Commercial; and Community Commercial; Pages 83, 86, 88, 91, and 94: Landscape Requirements: Incorporate permeable surfaces and pavers for parking lots, driveways and alleys where feasible. "Permeable pavers in parking lots and other areas help improve drainage and can be an attractive screen for spaces." 7.1 Utilities and Infrastructure Policies; Page 143: 7-P-5: Encourage developers to utilize low-impact development (LID). LID addresses stormwater treatment through small, cost-effective landscape features located at the site level. These landscape features, known as Integrated Management Practices (IMPs) are the building blocks of LID. IMPs include planter strips, rooftop gardens, planter boxes, and pervious concrete pavers. 7.1 Utilities and Infrastructure Policies; Page 143: 7-P-6: Encourage developments on adjacent and/or contiguous lots within the Specific Plan Area, and particularly within the Transit Village and Civic Center sub-areas, to jointly meet Provision C3 requirements through shared swales and other integrated management practices.	☐		☒	Changes to the Railroad Avenue Specific Plan will only occur only if the Pittsburg Moves Policy recommends changes for the transit-oriented development areas.	

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					7.1 Utilities and Infrastructure Policies; Page 144: 7-P-12: Provide incentives to private developers to incorporate green building practices. Such incentives may include accelerated project review, rebates or low interest loans for green building improvements, or other programs designed by the City (Mitigation Measure CC-1.1). 7.3.3 Storm Drainage; Page 150: "Swales can be used to add green space and treat flow control to reduce the burden on traditional utilities."					

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			Opportunities to Install GI? (Y/N)	Conflicts with GI? (Y/N)		Yes	Additional GI Opportunities, if Yes	No	Reason, if No	Draft Text Circulate Draft Outreach/Final Approval
Kirker Creek Watershed Management Plan (2004)	Engineering Division	Richard Abono	Y	N	Summary of Water Quality Recommendations; Pages 20, 24: Actions in the Watershed 6. Ensure that new development utilizes latest standards and technology for stormwater management. "Development projects should be required to incorporate best management practices (BMPs) to minimize water-quality impacts in accordance with NPDES program requirements. They could distribute information on best management practices, such as the "Start at the Source" literature." "As new controls are put in place, their cost and effectiveness at improving water quality should be evaluated. The Los Medanos College water-quality monitoring program could assist with such evaluation." Chapter 2- Flood Management; Pittsburg Stormwater Management Plan; Page 28: Downstream of the Pittsburg-Antioch Highway, the Stormwater Management Plan recommends building a wetland as a detention facility on the Dowest Slough. This would benefit water quality and wildlife and alleviate the need to do extensive channel modifications downstream where Dow facilities are located along this waterway. Chapter 2- Flood Management; NPDES Requirements; Page 31: Because this program derives its jurisdiction from the Clean Water Act, its primary objective is to minimize pollution of stormwater runoff. However, it also has implications for flood management because most stormwater treatment methods work by slowing runoff and allowing pollutants to settle out. These treatments, such as detention basins and grassy swales, have the beneficial side effect of reducing flood flows. Chapter 2- Flood Management Summary of Flood Management Recommendations; Pages 32, 34: Actions in the Watershed 3. Update water-management practices to comply with current standards and state-of- the-art technology. For example, if a parking lot needs to be repaved, it could be redesigned to include additional pervious surfaces or biofilters that would improve water quality of stormwater runoff. Also, any water detained from entering the drainage system helps to relieve flood pressure downstream.	x	The City is planning to update the Storm Water Management Plan for the Kirker Creek Watershed. Revisions to the plan may affect project opportunities in the Kirker Creek Management Plan			See schedule for Storm Water Management Plan
Stormwater Management Plan, Phase Seven and Phase Eight (1999)	Engineering Division	Richard Abono	N	N		☒	City plans to update the Kirker Creek watershed portion of the Plan. GI projects will be identified a part of the process			Estimated 2020

APPENDIX B

List of Potential Public Green Infrastructure Projects

Table B-1 Potential Public Green Infrastructure Projects

SWRP ID db Index	Project Type	Project Description	Impervious Area Treated (acres)	% Impervious	Development Timeframe	Watershed
planned_434	Planned Unlined Swale	CIP project for swale through PG&E corridor. GI portion = Americana Park basin retrofit and bioretention behind sidewalks, signage @ park.	20.1	48	2020	6
Parcel_367705	Parcel-Based Opportunity	DeAnza Park Improvements to incorporate bioretention, remove impervious surfaces.	0.9	25	2030	4
Parcel_372360	Regional Opportunity	Making Waves north campus	1.3	67	2030	6
Parcel_359460	Regional Opportunity	75 Bliss C.3 to be incorporated with new development	0.7	100	2030	8
Parcel_374006	Parcel-Based Opportunity	47 Marina Boulevard C.3 to be incorporated with new development	2.7	36	2030	6
Parcel_368984	ROW Opportunity	Will be combined with a regulated project, parking lot for Veterans Square.	2.1	64	2030	8
ROW_15492	ROW Opportunity	Railroad Avenue (10th thru 3rd) retrofit landscaped bulb out areas to receive runoff from concrete valley gutters.	2.5	65	2030	6
Parcel_374195	Regional Opportunity	Berm Parcel	0.6	44	2030	6
Parcel_343390	Regional Opportunity	Buchanan Park	1.6	56	2030	8
Parcel_362441	Regional Opportunity	Dover Way corridor GI opportunity	0.5	18	2030	6
ROW_20408	ROW Opportunity	CIP project is for improvements for undersized pipes to address drainage issues from RR to outfall at Montezuma slough. Potential to improve drainage at park and/or eighth street linear park corridor.	1.9	62	2030	6

Table B-1 Potential Public Green Infrastructure Projects

planned_432	Planned Unlined Swale	East Third Street streetscape improvements	1.3	67	2030	6
planned_430	Planned Unlined Swale	Railroad Avenue Class I Trail	0.9	72	2030	6
CIP Project	Parcel-Based Opportunity	State Route 4 ADA Pathway Improvements	1.5		2030	8
ROW_3088	ROW Opportunity	Vehicular Parking Improvements for BART cener station	10.5	65	2030	8
PARCEL_372018	Parcel-Based Opportunity	Parking lot on E 5th St. Railroad to Cumberland	0.2	79	2040	6
Parcel_373147	ROW Opportunity	Convert planter areas in portion of Marina Parking Lot to bioretention	1.0		2040	6
ROW_21119	Regional Opportunity	Willow Pass Road - portion of landscape area to be improved with bioretention by developer. Remainder by City.	0.5	28	2040	6
Parcel_365119	ROW Opportunity	Parcel adjacent to City Park at snack shack - retrofit for sidewalk through drains, bioretention in lawn area.	5.5	39	2040	6
ROW_4273	Regional Opportunity	City Park landscaped areas adjacent to Civic Avenue north side. Bark to bioretention, receive water from Civic and park parking.	0.3	52	2040	6
ROW_20740	Parcel-Based Opportunity	Range Road (S/Hwy 4) 3.5 ac	1.5		2040	6
Parcel_367048	Regional Opportunity	Diversion of stormwater to landscaped areas along perimeter of parking lot. Convert landscaping to bioretention areas to treat runoff from portion of PA Hwy bypass.	1.1	56	2040	6

Table B-1 Potential Public Green Infrastructure Projects

ROW_16008	ROW Opportunity	Riverview Park Drive - opportunity to create bioretention along west side of Riverview Drive at parking area.	1.5	53	2040	6
Parcel_374942	Regional Opportunity	Only portion of Riverview Park	0.7	34	2040	6
Parcel_352320	Regional Opportunity	Environmental Center opportunities to divert runoff to bioretention facility.	0.8	33	2040	8
planned_435	ROW Opportunity	Kirker Creek (portion between Hwy 4 to Garcia) potential for a demonstration project to restore portion of incised creek channel and promote infiltration.	2.9	55	2040	8
CIP Project	ROW Opportunity	PROGRAMMATIC PROJECT - Citywide traffic calming improvements	1.2		2040	6
ROW_11834	ROW Opportunity	Marina Master Plan Phase III road diet	1.8	43	2040	6
CIP Project	ROW Opportunity	PROGRAMMATIC PROJECT - Citywide median/landscaping improvements	1.5		2040	6