City of Campbell

Green Stormwater Infrastructure Plan

Approved on: July 16, 2019

Approved by: The City Council of the City of Campbell

Prepared by:
City of Campbell
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In compliance with Provision C.3.j.i.(2) of Order No. R2-2015-0049, NPDES Permit No. CAS612008

ACKNOWLEDGEMENTS

The City of Campbell acknowledges the following individuals and organizations that contributed to this Green Stormwater Infrastructure Plan:

City of Campbell

Public Works Department

- Roger Storz, P.E.
- Fred Ho, P.E.
- Amy Olay, P.E.

Community Development Department

- Stephen Rose

West Valley Clean Water Authority

- Sheila Tucker
- Julie Schaer

EOA, Inc.

- Jill Bicknell, P.E.
- Vishakha Atre
- Liesbeth Magna

The City would like to thank and acknowledge the City of Palo Alto and the City of San Jose for sharing text from their Green Stormwater Infrastructure Plans.

Cover photo: Hacienda Avenue Green Street Project (Credit: City of Campbell)

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LIST OF ACRONYMS

ABAG	Association of Bay Area Governments
BASMAA	Bay Area Stormwater Management Agencies Association
Caltrans	California Department of Transportation
CFD	Community Facilities District
CIP	Capital Improvement Program
DOF	Department of Finance
EPA	United States Environmental Protection Agency
FY	Fiscal Year
GI	Green Infrastructure
GIS	Geographic Information System
GSI	Green Stormwater Infrastructure
IRWMP	Integrated Regional Water Management Plan
LID	Low Impact Development
MRP	Municipal Regional Stormwater NPDES Permit
MS4	Municipal Separate Storm Sewer System
NOCA	North of Campbell Avenue
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
O&M	Operation and Maintenance
PDA	Priority Development Area
PICP	Permeable Interlocking Concrete Pavers
PP	Permeable Pavers
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SJWC	San Jose Water Company
SOCA	South of Campbell Avenue
STANP	San Tomas Area Neighborhood Plan
State Water Board	State Water Resource Control Board
STORMS	Strategy to Optimize Resource Management of Stormwater
SWRP	Storm Water Resource Plan
TIP	Transportation Improvement Plan
Valley Water	Santa Clara Valley Water District
Regional Water Board	San Francisco Bay Regional Water Quality Control Board

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EXECUTIVE SUMMARY

Urban development has traditionally involved replacing natural landscapes with solid pavements and buildings, and using storm drain systems to carry increased amounts of stormwater runoff and pollutants directly into local streams. To reduce the impact of urban development on waterways, Bay Area municipalities are augmenting traditional stormwater conveyance systems with Green Stormwater Infrastructure (GSI) features.

GSI features mimic nature, and use plants, soils, and/or pervious surfaces to collect stormwater, allowing it to soak into the ground and be filtered by soil. This reduces the quantity of water and pollutants flowing into local creeks. The City of Campbell began the process of incorporating GSI into the public right-of-way with the completion of the award-winning Hacienda Avenue Green Street Project in 2015.

The City of Campbell has prepared this GSI Plan to guide the siting, implementation, tracking, and reporting of GSI projects on City-owned land over the next several decades. Development of the GSI Plan is required by the City's Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit.

The GSI Plan describes the City's methodology to identify and prioritize areas for implementing GSI, and estimates targets for the extent of the City's area that will be addressed by GSI through 2040. The Plan includes maps of the City's prioritized areas and potential project opportunities, and lays out the City's GSI implementation strategy. Key elements of the strategy include: coordination with GSI regulations for private development and opportunities in adjacent public rights-of-way; identification of GSI opportunities in capital projects; and aligning GSI goals and policies with other City planning documents to achieve multiple benefits and provide safer, sustainable, and attractive public streetscapes. The Plan contains guidance and standards for GSI project design and construction, and describes how the City will track and map constructed GSI projects and make the information available to the public. Lastly, it explains existing legal mechanisms to implement the GSI Plan, and identifies potential sources of funding for the design, construction, and maintenance of GSI projects.

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1. INTRODUCTION

Urban development has traditionally involved replacing natural landscapes with solid pavements and buildings, and using storm drain systems to carry increased amounts of stormwater runoff and pollutants directly into local streams. Green stormwater infrastructure (GSI), however, uses plants and soils to mimic natural watershed processes, capture stormwater and create healthier environments. Bay Area cities and counties are required by State and regional regulatory agencies to move from traditional (grey) stormwater conveyance systems to GSI systems over time. This GSI Plan serves as an implementation guide for the City of Campbell (City) to incorporate GSI into storm drain infrastructure on public and private lands where feasible over the next several decades.

1.1 Purpose and Goals of the GSI Plan

The purpose of the City's GSI Plan is to demonstrate the City's commitment to gradually transform its traditional storm drainage infrastructure to green stormwater infrastructure. The GSI Plan will guide the identification, implementation, tracking, and reporting of green stormwater infrastructure projects within the City. The GSI Plan will be coordinated with other City plans, such as the Transportation Improvement Plan and the Neighborhood development and Master Plans, to achieve multiple potential benefits to the community, including improved water and air quality, improved walking, bicycling, and transit access, and a more pleasant urban environment.

Specific goals of the GSI Plan are to:

- Align the City's goals, policies and implementation strategies for GSI with the General Plan and other related planning documents;
- Identify and prioritize GSI opportunities throughout the City;
- Establish targets for the extent of City area to be addressed by GSI over certain timeframes;
- Provide a workplan and legal and funding mechanisms to implement prioritized projects; and
- Establish a process for tracking, mapping, and reporting completed projects

1.2 City Description

The City of Campbell occupies approximately six square miles of relatively flat land about 50 miles south of San Francisco in Santa Clara County. Campbell is bounded on the north, east and west by the City of San Jose and on the south by the Town of Los Gatos. The city was incorporated in 1952 and has a jurisdictional area of 3,772 acres. According to the 2010 Census, Campbell's population was 39,349, with a population density of 6,685 people per square mile and average household size of 2.42. As of 2019, according to the California Department of Finance (DOF)[1], the estimated population is 43,250.

Campbell has a traditional Downtown in the heart of the city, a natural creekside trail used by pedestrians and bicyclists both recreationally and for commuting, a beautiful collection of parks, a community center on a historic campus, a mix of housing types and a variety of shopping facilities that are accessible to neighborhoods and employment centers. Campbell's attractive living environment is enhanced by its central location in the Bay Area, and extensive regional transportation network including the Vasona Light Rail corridor.

[1] Source: State of California, Department of Finance, E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2018 and 2019. Sacramento, California, May 2018. Online at http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-1/.

1.2.1 Land Use

Campbell is predominantly built-out, with undeveloped properties for new development becoming exceedingly scarce. As a result, the majority of new projects are infill developments where older and less dense uses are being replaced with higher density projects. The character of some neighborhoods has been affected by this intensification trend, and as a result, the land use category of some neighborhoods has been changed to a lower density to reflect the existing housing types. Conversely, some neighborhoods have been identified as areas where density can increase due to factors such as proximity to light rail. In those areas, the land use category in the General Plan has intensified.

Land use classes within the City of Campbell are provided in Table 1-1. Descriptions of these classes can be found in the City's General Plan.

Table 1-1 Percentages of the City of Campbell's jurisdictional area within the City's primary land use classes (Source: City of Campbell, May 2019; Lynx GIS)

Land Use Category	Jurisdictional Area (Acres)	% of Jurisdictional Area
Residential	1,990	64%
Commercial	332	11%
Open Space	268	9%
Industrial	208	7%
Institutional	162	5%
Mixed Use (Residential/Office/Commercial/ Light Industrial)	117	4%
Other	38	1%

1.2.2 Growth Projections

The City of Campbell developed growth projections as part of its General Plan Land Use and Transportation Element update, adopted August 19, 2014. Tables 1-2 and 1-3, below, describe projection scenarios with years and estimated percent growth in population and/or additional square footage of residential and non-residential buildings. Current (2019) population estimates (43,250) have exceeded the predictions in Table 1-2. Campbell is currently working on a complete General Plan update, known as Envision Campbell, that will provide more accurate growth projections.

Table 1-2 Historic and Projected Population (City of Campbell General Plan – 2014 LUT Element)

	1980	1990	2000	2020
Population	26,910	36,048	38,138	41,946
Percent Increase	--	34%	5.80%	10%

According to the 2014 General Plan projections, non-residential building space in Campbell will increase nine percent from an estimated 10.2 million square feet in 2000 to nearly 11.2 million square feet in 2020, as shown in Table 1-3. This results from application of average assumed densities and floor area ratios to vacant sites and areas with potential redevelopment/intensification opportunities.

Table 1-3 Buildout Projections for Non-Residential Floor Space (City of Campbell General Plan – 2014 LUT Element)

Land Use	Existing (Sq Ft.)	Projected Net New Building Area at General Plan Buildout	Total (sq ft)
Auto-related	413,011	(115,223)	297,788
Retail/Restaurant/Hotel	2,813,528	167,392	2,980,920
Industrial	2,529,444	(64,888)	2,464,556
Prof. Office	3,002,303	986,924	3,989,227
Parking Structures	419,500	-	419,500
Quasi-Public	1,058,072	(34,116)	1,023,956
Auto-related	413,011	(115,223)	297,788
TOTAL	**10,235,857**	**940,089**	**11,175,946**

1.2.3 Roadways

The City's inventory of streets is classified based on capacity and intended purpose. City-owned streets include arterial streets, collector streets, neighborhood collector streets, and local streets. The City uses a Pavement Management System to identify and prioritize major preventive and corrective pavement maintenance needs. All city streets are surveyed and rated every five years for residential streets and arterials and collector streets every two years. Maintenance needs are identified by measuring observed pavement conditions against a city standard for system-wide average pavement surface conditions and standards establishing road repair strategies with the condition rating for individual street segments. Some Campbell neighborhoods maintain a rural character including local streets with no sidewalk, curb or gutter, where runoff from streets has the opportunity to infiltrate into non-pervious dirt and gravel areas located on private residential park strip areas.

In addition, Campbell has private streets that provide direct access to private properties within a particular subdivision or development. Private streets are maintained and operated by Home Owners Associations or individual private landowners.

California Department of Transportation (Caltrans) owns and maintains several freeways serving Campbell for regional mobility including Highway 17 (which is the southern extension of Interstate 880), Highway 85 and Interstate 280.

San Tomas Expressway is the only expressway in Campbell and is operated and maintained by the County of Santa Clara.

1.2.4 Water Resources and Water Supply

Protection of water quality and the provision of adequate water resources is critical for the health and quality of life of Campbell residents and employees. Water quality is a regional issue that is regulated at the county, state and federal levels. San Jose Water Company (SJWC) is the local water supplier in Campbell. The regional wholesale supplier of water to the South Bay Area is the Santa Clara Valley Water District (Valley Water), which derives water from local, recycled and imported supplies. Some of the Valley Water's water is supplied by local rainfall and groundwater. The rainwater is stored in ten local reservoirs and some of it is transferred to Valley Water's Groundwater Recharge Facilities. Valley Water owns and operates more than 30 groundwater recharge facilities, six of which are located in

Campbell and comprise a total of 122.4 acres. These facilities percolate both local and imported water into the groundwater aquifer.

Four municipal water pollution control plants located in Santa Clara County develop recycled water for outdoor use. Currently, recycled water is not supplied to retailers in the City and there are no projects planned for supplying water to retailers in the City. However, Campbell has a program to use recycled water (during drought years) for construction site dust control and street tree watering.

1.2.5 Flood Potential

A very small portion of Campbell, the land adjacent to the Los Gatos Creek, San Tomas Aquino Creek and Smith Creek, is subject to flooding. According to the City's General Plan (2014), localized flooding may also occur in low spots or where infrastructure is unable to accommodate peak flows during a storm event. In most cases, localized flooding dissipates quickly after heavy rain ceases. There are some streets in the San Tomas Area Neighborhood, annexed into the City in the 1970s, that have a rural character with no curb, gutter or paving, which precludes installation of storm drain facilities. Although some nuisance flooding results, the City anticipates preserving the rural character of the area.

Although natural factors such as overgrown brush and trees in creek channels can obstruct water flow and increase flood damage, development poses the highest potential to increase the magnitude and frequency of flooding. Campbell is primarily a suburban community with few undeveloped areas where stormwater can percolate into the ground.

1.2.6 Storm Drainage System

The City operates and maintains a storm drainage system and coordinates with surrounding jurisdictions and Santa Clara County to provide regional storm drainage for the Santa Clara Valley area. The storm drainage system consists of a series of inlets and pipes that channel stormwater runoff to various percolation ponds and Los Gatos and San Tomas Aquino Creeks. Los Gatos Creek joins the Guadalupe River and flows into San Francisco Bay, and San Tomas Aquino Creek becomes a concrete channel before discharging into the Bay.

1.2.7 Open Space

Within the City of Campbell, open space land consists primarily of City and Santa Clara County parks and recreation facilities, school recreation facilities (i.e. sports fields), regional groundwater recharge facilities and creek corridors. Given the limitation for acquisition of new parkland, the City places a high importance on the maintenance, modernization and renovation of existing open space, park and recreation facilities to ensure that they are efficiently utilized and keep pace with the evolving recreational demands of the community.

1.2.8 Soil

The National Resource Conservation Service (NRCS) offers data on existing soil types mapped in the US. In Santa Clara County, a majority of soil is classified Group D, meaning that it contains soil that is typically clay loam, silty clay loam, or sandy clays. Group D soils have very low infiltration rates; however, studies have indicated higher infiltrating soils in Campbell than other parts of the County. The southern part of the City, near Los Gatos Creek, is known to have areas of gravel-cobble soil composition (Groups A and B) with higher infiltration rates.

1.3 Regulatory Context

1.3.1 Federal and State Regulations and Initiatives

The U.S. Environmental Protection Agency (EPA) has authority under the Clean Water Act to promulgate and enforce stormwater related regulations. For the State of California, EPA has delegated the regulatory authority to the State Water Resources Control Board (State Water Board), which in turn, has delegated authority to the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) to issue National Pollutant Discharge Elimination System (NPDES) permits in the San Francisco Bay Region. Stormwater NPDES permits allow stormwater discharges from municipal separate storm sewer systems (MS4s) to local creeks, San Francisco Bay, and other water bodies as long as they do not adversely affect the beneficial uses of or exceed any applicable water quality standards for those waters. Since the early 2000's, the EPA has recognized and promoted the benefits of using GSI in protecting drinking water supplies and public health, mitigating overflows from combined and separate storm sewers and reducing stormwater pollution, and it has encouraged the use of GSI by municipal agencies as a prominent component of their MS4 programs.

The State and Regional Water Boards have followed suit in recognizing not only the water quality benefits of GSI but the opportunity to augment local water supplies in response to the impacts of drought and climate change as well. The 2014 California Water Action Plan called for multiple benefit stormwater management solutions and more efficient permitting programs. This directive created the State Water Board's "Strategy to Optimize Resource Management of Stormwater" (STORMS). STORMS' stated mission is to "lead the evolution of storm water management in California by advancing the perspective that storm water is a valuable resource, supporting policies for collaborative watershed-level storm water management and pollution prevention, removing obstacles to funding, developing resources, and integrating regulatory and non-regulatory interests."

These Federal and State initiatives have influenced approaches in Bay Area municipal stormwater NPDES permits, as described in Section 1.3.2.

1.3.2 Municipal Regional Stormwater Permit

The City is subject to the requirements of the Municipal Regional Stormwater NPDES Permit (MRP) for Phase I municipalities and agencies in the San Francisco Bay area (Order R2-2015-0049), which became effective on January 1, 2016. The MRP applies to 76 municipalities and flood control agencies that discharge stormwater to San Francisco Bay, collectively referred to as permittees.

Over the last 13 years, under Provision C.3 of the MRP and previous permits, new development and redevelopment projects on private and public property that exceed certain size thresholds ("regulated projects") have been required to mitigate impacts on water quality by incorporating "Low Impact Development" (LID) measures, including site design, pollutant source control, stormwater treatment and flow control measures as appropriate. LID treatment measures, such as rainwater harvesting and use, infiltration, and biotreatment, have been required on most regulated projects since December 2011.

Provision C.3.j of the 2016 MRP requires the City to develop and implement a long-term GSI Plan[2] for the inclusion of LID measures into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs, and other elements. The GSI Plan must be completed and submitted to the Regional Water Board by September 30, 2019.

While Provision C.3.j of the MRP contains the GSI program planning and analysis requirements, other provisions (C.11 and C.12) establish a linkage between public and private GSI features and required reductions of pollutants in stormwater discharges. Permittees in Santa Clara County (County), collectively, must implement GSI on public and private property to achieve specified pollutant load reduction goals by the years 2020, 2030, and 2040. These efforts will be integrated and coordinated countywide for the most effective and resource-efficient program. As an indication as to whether these load reductions will be met, Permittees must include in their GSI Plans estimated "targets" for the amounts of impervious surface to be "retrofitted" as part of public and private projects (i.e., redeveloped or changed such that runoff from those surfaces will be captured in a stormwater treatment system or GSI measure) over the same timeframes (2020, 2030, and 2040).

A key part of the GSI definition in the MRP is the inclusion of GSI systems at both private and public property locations. This has been done in order to plan, analyze, implement and credit GSI systems for pollutant load reductions on a watershed scale, as well as recognize all GSI accomplishments within a municipality. The focus of the GSI Plan is the integration of GSI systems into public buildings, parks, parking lots, and rights-of-way (e.g. road or bike path). However, the GSI Plan may also establish opportunities to include GSI facilities at private properties or in conjunction with private development, so they can contribute to meeting the target load reductions on a county-wide level as well as implement GSI on a larger scale.

1.4 GSI Plan Development Process

1.4.1 Regional Collaboration

The City of Campbell participates in the West Valley Clean Water Authority (WVCWA), a cooperative effort of the Cities of Campbell, Monte Sereno, and Saratoga and the Town of Los Gatos (www.cleancreeks.org). These four municipalities, also referred to as the West Valley Communities, work together as a group to control discharge of polluted stormwater into local creeks and the San Francisco Bay. The WVCWA also collaborates with the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), West Valley Sanitation District, and the Santa Clara County Fire District.

The West Valley Communities jointly prepared a GSI Plan Framework (Framework), a work plan describing the goals, approach, tasks, and schedule needed to complete their GSI Plans. Development of the Framework was a regulatory requirement (Provision C.3.j.i(1) of the MRP) to demonstrate the City's commitment to completing the GSI Plan by September 30, 2019.

The City of Campbell is also a member of SCVURPPP, an association of thirteen cities and towns in the Santa Clara Valley, the County of Santa Clara, and Valley Water that collaborate on stormwater regulatory activities and compliance. This partnership allows sharing of resources toward permit

[2] Although the MRP uses the term green infrastructure (GI), the agencies within Santa Clara County, including the City of Santa Clara, prefer to use the term green stormwater infrastructure (GSI). Therefore, the term GSI is used in this document.

compliance and collaboration on projects of mutual benefit. SCVURPPP provided technical guidance, templates, and completion of certain GSI Plan elements at the countywide level. SCVURPPP guidance and products are discussed in more detail in relevant sections of the GSI Plan.

The City, via SCVURPPP, also coordinated with the Bay Area Stormwater Management Agencies Association (BASMAA) on regional GSI guidance and received feedback through BASMAA from MRP regulators on GSI expectations and approaches. BASMAA members include other countywide stormwater programs in Alameda, Contra Costa, and San Mateo Counties, and area-wide programs in the Vallejo and Fairfield-Suisun portions of Solano County, whose participating municipalities are permittees under the MRP.

1.4.2 GSI Plan Development and Adoption

The GSI Plan development process began with the preparation of the GSI Framework. As discussed in Section 1.4.1, this was a collaborative effort by the WVCWA. The document, titled "Green Infrastructure Plan Framework, West Valley Communities: Campbell, Los Gatos, Monte Sereno, and Saratoga", was reviewed and approved for submittal to the Regional Water Board by the Campbell City Manager on June 16, 2017.

The City established a GSI Work Group, consisting of staff from the City's Public Works and Planning Departments. The GSI Work Group worked with a consultant team to develop the GSI Plan. The Plan was presented to the City Council on July 16, 2019.

1.4.3 Education and Outreach

One of the first and most important steps in the development of a GSI Plan is educating a municipality's department staff, managers, and elected officials about the purposes and goals of green infrastructure, the required elements of the GSI Plan, and steps needed to develop and implement the GSI Plan, and get their support and commitment to the Plan and this new approach to urban infrastructure. Another important first step is local community and stakeholder outreach to gain public support. The West Valley Communities, including Campbell, began this process as part of the GSI Framework Development in FY 15-16 and FY 16-17 by completing the following tasks:

- Convened interdepartmental meetings with relevant department staff and management to discuss GSI requirements and assigned tasks.
- Discussed with appropriate department staff the MRP requirements to analyze proposed capital projects for opportunities to incorporate GSI and completed the first list of planned and potential GSI projects.
- Provided training to department staff on GSI requirements and strategies using the GSI workshops and other training tools developed by SCVURPPP.
- Informed elected officials with an informational memo to raise awareness of the goals and requirements in the MRP and the concepts, intent and multiple benefits of GSI.
- Worked with WVCWA and SCVURPPP to study and possibly develop a GSI resource center within the West Valley Communities to demonstrate GSI projects specifically for smaller communities.
- Participated in the stakeholder working group for Valley Water and SCVURPPP project to develop a Storm Water Resource Plan (SWRP) for the Santa Clara Basin.
- Coordinated with SCVURPPP on a comprehensive outreach and education program. Key audiences include: the general public (countywide, and in the neighborhood or municipality

where GSI projects are located); the development community (e.g., developers, engineers, landscape architects, and contractors); and elected officials.
- Incorporated the materials produced by SCVURPPP into outreach efforts on the local level.

The West Valley Communities will continue to conduct the following education and outreach activities as part of the GSI Plan:

- Keep elected officials updated on GSI Plan implementation
- Maintain a webpage for GSI on the City's website to provide outreach to the local community and other stakeholders to get input and support for GSI projects
- Provide outreach to the general public and development community in coordination with SCVURPPP.
- Conduct internal training, as needed, and send staff to SCVURPPP trainings.

1.5 GSI Plan Structure and Required Elements

The remainder of the GSI Plan is structured as follows:

- Chapter 2 provides the definition, purpose, and benefits of GSI, and describes the different types of GSI facilities.
- Chapter 3 describes the relationship of the GSI Plan to other planning documents and how those planning documents have been updated or modified, if needed, to support and incorporate GSI requirements. For documents whose desired updates and modifications have not been accomplished by the completion of the GSI Plan, a work plan and schedule are laid out to complete them.
- Chapter 4 outlines the materials being developed by SCVURPPP and the City to provide guidelines, typical details, specifications and standards for municipal staff and others in the design, construction, and operation and maintenance of GSI measures.
- Chapter 5 presents information on the different types of GSI projects and the methodology and results for identifying and prioritizing areas for potential GSI projects.
- Chapter 6 outlines the City's strategy for implementing potential GSI projects within the next ten years and through 2040, discusses the variety of mechanisms to be employed by the City in order to implement the GSI Plan, and presents the estimated targets for the amounts of impervious surface to be "retrofitted" as part of public and private projects by 2020, 2030, and 2040.

The GSI Plan elements required by Provision C.3.j.i.(2) of the MRP and the section of the document in which each component can be found are summarized in Table 1-4 below.

Table 1-4 Summary of GSI Plan Elements required by Provision C.3.j.i of the MRP.

MRP Provision	GSI Plan Elements	GSI Plan Section
C.3.j.i.(2)(a)	Project Identification and Prioritization Mechanism	Chapter 5
C.3.j.i.(2)(b)	Prioritized Project Locations	Section 5.3
C.3.j.i.(2)(c)	Impervious Surface Targets	Section 6.6
C.3.j.i.(2)(d)	Completed Project Tracking System	Section 6.7
C.3.j.i.(2)(e,f)	Guidelines and Specifications	Chapter 4
C.3.j.i.(2)(g)	Alternative Sizing Requirements for Green Street Projects	Section 4.1
C.3.j.i.(2)(h,i)	Integration with Other Municipal Plans	Chapter 3
C.3.j.i.(2)(i)	Workplan for Integration of GSI Language into City Planning Documents	Section 3.1.3
C.3.j.i.(2)(j)	Workplan to Complete C.3.j. Early Implementation Projects	Section 6.2
C.3.j.i.(2)(k)	Evaluation of Funding Options	Section 6.5
C.3.j.i.(3)	Legal and Implementation Mechanisms	Section 6.4

2. WHAT IS GREEN STORMWATER INFRASTRUCTURE?

In natural landscapes, most of the rainwater soaks into the soil or is taken up by plants and trees. However, in urban areas, building footprints and paved surfaces such as driveways, sidewalks, and streets prevent rain from soaking into the ground. As rainwater flows over and runs off these impervious surfaces, this "urban runoff" or "stormwater runoff" can pick up pollutants such as motor oil, metals, pesticides, pet waste, and litter. It then carries these pollutants into the City's storm drains, which flow directly to local creeks and San Francisco Bay, without any cleaning or filtering to remove pollutants. Stormwater runoff is therefore a major contributor to water pollution in urban areas.

As urban areas develop, the increase in impervious surface also results in increases in peak flows and volumes of stormwater runoff from rain events. Traditional "gray" stormwater infrastructure, like most of the City's storm drain system, is designed to convey stormwater flows quickly away from urban areas. However, the increased peak flows and volumes can cause erosion, flooding, and habitat degradation in downstream creeks to which stormwater is discharged, damaging habitat, property, and infrastructure.

2.1 Green Stormwater Infrastructure

A new approach to managing stormwater is to implement green stormwater infrastructure. GSI uses vegetation, soils, and other elements and practices to capture, treat, infiltrate and slow urban runoff and thereby restore some of the natural processes required to manage water and create healthier urban environments. GSI facilities can also be designed to capture stormwater for uses such as irrigation and toilet flushing.

GSI integrates building and roadway design, complete streets, drainage infrastructure, urban forestry, soil conservation and sustainable landscaping practices to achieve multiple benefits. At the city or county scale, GSI is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the neighborhood or site scale, GSI comprises stormwater management systems that mimic nature and soak up and store water.[3]

2.2 Benefits of Green Stormwater Infrastructure

GSI can provide multiple benefits beyond just managing rainfall and runoff. These benefits include environmental, economic, and social improvements.

GSI measures can mitigate localized flooding and reduce erosive flows and quantities of pollutants being discharged to local creeks and the San Francisco Bay. Vegetated GSI systems can beautify public places and help improve air quality by filtering and removing airborne contaminants from vehicle and industrial sources. They can also reduce urban heat island effects by providing shade and absorbing heat better than paved surfaces, and provide habitat for birds, butterflies, bees, and other local species. When GSI facilities are integrated into traffic calming improvements such as curb extensions and bulb-outs at intersections, they can help increase pedestrian and bicycle safety and promote active transportation, which in turn can result in improved human health.

GSI facilities designed with extra storage can capture stormwater for later use as irrigation water or non-potable uses such as toilet flushing and cooling tower supply, thus conserving potable water supplies.

[3] https://www.epa.gov/green-infrastructure/what-green-infrastructure

Widespread implementation of GSI potentially offers significant economic benefits, such as deferring or eliminating the need for some gray infrastructure projects. By providing more storage within the watershed, GSI can help reduce the costs of conveyance and pumping of stormwater. When cost-benefit analyses are performed, GSI is often the preferred alternative due to the multiple benefits provided by GSI as compared to conventional infrastructure.

2.3 Types of Green Stormwater Infrastructure Facilities

Integrating GSI into public spaces typically involves construction of stormwater capture and treatment measures in public streets, parks, and parking lots or as part of public buildings. Types of GSI measures that can be constructed in public spaces include: (1) bioretention; (2) stormwater tree well filters; (3) pervious pavement, (4) infiltration facilities, (5) green roofs, and 6) rainwater harvesting and use facilities. A description of these facility types is provided below.

2.3.1 Biotreatment/Bioretention

Bioretention areas are depressed landscaped areas that consist of a ponding area, mulch layer, plants, and a special biotreatment soil media composed of sand and compost, underlain by drain rock and an underdrain, if required. Bioretention is designed to retain stormwater runoff, filter stormwater runoff through biotreatment soil media and plant roots, and either infiltrate stormwater runoff to underlying soils as allowed by site conditions, or release treated stormwater runoff to the storm drain system, or both. They can be of any shape and are adaptable for use on a building or parking lot site or in the street right-of-way.

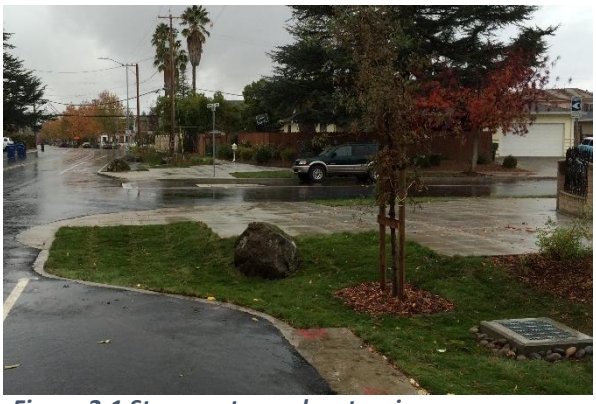


Figure 2-1 Stormwater curb extension, Hacienda avenue, Campbell (Source: EOA)

Bioretention systems in the streetscape have specific names: stormwater planters, stormwater curb extensions (or bulb-outs), and stormwater tree well filters (described in the next section).

A stormwater curb extension (Figure 2-1) is a bioretention system that extends into the roadway and involves modification of the curb line and gutter. Stormwater curb extensions may be installed midblock or at an intersection. Curb bulb- outs and curb extensions installed for pedestrian safety, traffic calming, and other transportation benefits can also provide opportunities for siting bioretention facilities. Parking lots can accommodate bioretention areas of any shape in medians, corners, and pockets of space unavailable for parking.

A stormwater planter is a linear bioretention facility in the public right-of-way along the edge of the street, often in the planter strip between the street and sidewalk. They are typically designed with vertical (concrete) sides. However, as shown in Figure 2-2, they can also have sloped sides depending on the amount of space that is available.

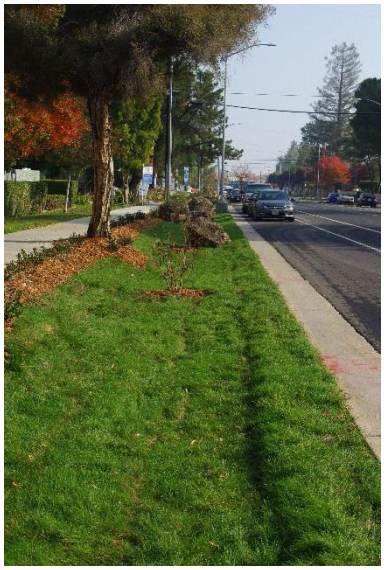


Figure 2-2 Stormwater planter, Hacienda Avenue (Source: City of Campbell)

2.3.2 Stormwater Tree Well Filters and Suspended Pavement Systems

A stormwater tree well filter is a type of bioretention system consisting of an excavated pit or vault that is filled with biotreatment soil media, planted with a tree and other vegetation, and underlain with drain rock and an underdrain, if needed. Stormwater tree well filters can be constructed in series and linked via a subsurface trench or underdrain. A stormwater tree well filter can require less dedicated space than other types of bioretention areas.

Suspended pavement systems may be used to provide increased underground treatment area and soil volume for tree well filters. These are structural systems designed to provide support for pavement while preserving large volumes of uncompacted soil for tree roots. Suspended pavement systems may be any engineered system of structural supports or commercially available proprietary structural systems.

Stormwater tree well filters and suspended pavements systems are especially useful in settings between existing sidewalk elements where available space is at a premium. They can also be used in curb extensions or bulb-outs, medians, or parking lots if surrounding grades allow for drainage to those areas. The systems can be designed to receive runoff through curb cuts or catch basins or allow runoff to enter through pervious pavers on top of the structural support.

Figure 2-3 Stormwater tree well filter conceptual examples: modular suspended pavement system (left), column suspended pavement system (right). (Courtesy of PWD)

2.3.3 Pervious Pavement

Pervious pavement is hardscape that allows water to pass through its surface into a storage area filled with gravel prior to infiltrating into underlying soils. Types of pervious pavement include permeable interlocking concrete pavers, pervious concrete, porous asphalt, and grid pavement. Pervious pavement is often used in parking areas or on streets where bioretention is not feasible due to space constraints or if there is a need to maintain parking. Pervious pavement does not require a dedicated surface area for treatment and allows a site to maintain its existing hardscape.

There are two types of pervious pavers: Permeable Interlocking Concrete Pavers (PICP) and Permeable Pavers (PP). PICP allows water to pass through the joint spacing between solid pavers, and PP allows water to pass through the paver itself and therefore can have tighter joints. Porous asphalt and pervious concrete are similar to traditional asphalt and concrete, but do not include fine aggregates in the mixture, allowing water to pass through the surface. All types are supported by several

Figure** 2-4 **Permeable Pavers, Mayfield Playing Fields, Palo Alto (Source: EOA)

layers of different sizes of gravel to provide structural support and water storage.

2.3.4 Infiltration Facilities

Where soil conditions permit, infiltration facilities can be used to capture stormwater and infiltrate it into native soils. The two primary types are infiltration trenches and subsurface infiltration systems.

Figure 2-5 Infiltration trench, San Jose (Source: City of San Jose)

An infiltration trench is an excavated trench backfilled with a stone aggregate and lined with a filter fabric. Infiltration trenches collect and detain runoff, store it in the void spaces of the aggregate, and allow it to infiltrate into the underlying soil. Infiltration trenches can be used along roadways, alleyways, and the edges or medians of parking lots. An example of an infiltration trench is shown in Figure 2-6.

Figure 2-6 Subsurface infiltration system (Source: Conteches.com)

Subsurface infiltration systems are another type of GSI measure that may be used beneath parking lots or parks to infiltrate larger quantities of runoff. These systems, also known as infiltration galleries, are underground vaults or pipes that store and infiltrate stormwater while preserving the uses of the land surface above parking lots, parks and playing fields. An example is shown in Figure 2-7. Storage can take the form of large-diameter perforated metal or plastic pipe, or concrete arches, concrete vaults, plastic chambers or crates with open bottoms. Prefabricated, modular infiltration galleries are available in a variety of shapes, sizes, and material types that are strong enough for heavy vehicle loads.

2.3.5 Green Roofs

Green roofs are vegetated roof systems that filter, absorb, and retain or detain the rain that falls upon them. Green roof systems are comprised of a layer of planting media planted with vegetation, underlain by other structural components including waterproof membranes, synthetic insulation, geofabrics, and underdrains. A green roof can be either "extensive", with 3 to 7 inches of lightweight planting media and low-profile, low-maintenance plants, or "intensive", with a thicker (8 to 48 inches) of media, more varied plantings, and a more garden-like appearance. Green roofs can provide high rates of rainfall retention via plant uptake and evapotranspiration and can decrease peak flow rates in storm drain systems because of the storage that occurs in the planting media during rain events.

Figure 2-7 Green Roof at Fourth Street Apartments, San José (Source: EOA)

2.3.6 Rainwater Harvesting and Use

Rainwater harvesting is the process of collecting rainwater from impervious surfaces and storing it for later use. Storage facilities that can be used to capture stormwater include rain barrels, above-ground or below-ground cisterns (Figure 2-9), open storage reservoirs (e.g., ponds), and various underground storage devices (tanks, vaults, pipes, and proprietary storage systems)(Figure 2-10). The captured water is then fed into irrigation systems or non-potable water plumbing systems, either by pumping or by gravity flow. Uses of captured water may include irrigation, vehicle washing, and indoor non-potable use such as toilet flushing, heating and cooling, or industrial processing.

Figure 2-8 Rainwater Harvesting cistern, Environmental Innovation Center, San José (Source: City of San Jose)

The two most common applications of rainwater harvesting are 1) collection of roof runoff from buildings; and 2) collection of runoff from at-grade surfaces or diversion of water from storm drains into large underground storage facilities below parking lots or parks. Rooftop runoff usually contains lower quantities of pollutants than at-grade surface runoff and can be collected via gravity flow. Underground storage systems typically include pre-treatment facilities to remove pollutants from stormwater prior to storage and use.

Figure 2-9 Subsurface vault (Source: Conteches.com)

2.4 Existing GSI Facilities

The City of Campbell has implemented one GSI project to date, known as the Hacienda Avenue Green Street Project. A brief description of the project is provided below. Projects such as this, completed prior to or during the current MRP term (2016-2020), are referred to as "Early Implementation" projects (see Section 5.1.1). In addition to this GSI project, the City has established a Community Facilities District (CFD) for the purpose of operating and maintaining stormwater treatment facilities treating runoff from new public streets created with land development projects. GSI projects constructed as part of land development projects within this CFD are described in Section 2.4.2.

2.4.1 Hacienda Avenue Green Street Project

The Hacienda Avenue project reconstructed a 1.1 mile stretch of Hacienda Avenue from Winchester Boulevard to Burrows Road and addressed existing concerns regarding pavement condition, missing sidewalks, improper drainage, as well as pedestrian and traffic safety in a manner that incorporates green street elements and sustainable design concepts. The project installed 63 biotreatment areas along both sides of the street for a total surface area of 26,000 sq. ft. New bulb-outs at intersections calm traffic and improved pedestrian safety by reducing crosswalk distance. Construction work started in Summer 2014 and was completed in Fall 2015. The project received recognition from the American Public Works Association, the California Stormwater Association, and SCVURPPP, and was the first in the State of California to receive a silver certification from GREENROADS[4].

Figure 2-10 Hacienda Avenue Green Street Project: Photo of completed project (left) and stormwater planter with tree well filter (right; tree losing foliage due to fall weather).

2.4.2 Community Facilities District for GSI on Public Streets

In 2013, the City of Campbell created Community Facilities District (CFD) Number 2 for the purpose of operating and maintaining GSI facilities treating the runoff from **new public streets** created with land development projects. Since that first project, known as Laurance Hill Court, two other residential subdivisions known as Jasmine Court and Meadows Court have been annexed into the CFD. With these two development projects, GSI facilities are being constructed in the public right-of-way to treat runoff from not only the new public street but also from the newly constructed single family homes within each of the projects.

The City collects the CFD taxes from the benefitting properties on the annual property tax bill and uses those funds to maintain the GSI facilities. The CFD has been set up to allow future projects anywhere in

[4] The Greenroads® Rating Program measures sustainability on transportation projects. The Program challenges projects to go above and beyond minimum environmental, social, and economic performance measures. Projects are evaluated by an independent, expert, third-party review. The Program is administered by the 501c3 nonprofit organization, Greenroads International (www.Greenroads.org).

the City of Campbell to annex into the District on an as-needed basis, providing flexibility for future GSI projects.

Figure 2-11 Stormwater treatment facility at Laurance Hill Court subdivision (Source: City of Campbell)

Figure 2-12 Stormwater treatment facility at Jasmine Court subdivision (Source: City of Campbell)

Figure 2-13 Stormwater treatment facility under construction at Meadows Court subdivision (Source: City of Campbell)

As part of the Meadows Court subdivision, the City also approved the construction of a **public street** cul-de-sac constructed entirely from pervious concrete at the northerly terminus of Abbott Avenue, as accessed from Hacienda Avenue.

Figure 2-14 Pervious concrete at the northerly terminus of Abbott Avenue, as accessed from Hacienda Avenue (Source: City of Campbell)

3. INTEGRATION WITH OTHER PLANNING DOCUMENTS

To ensure the success of the GSI Plan and its implementation, its goals, policies and implementation strategies should align with the City's General Plan and other related planning documents. The MRP requires that municipal agencies review such documents and include in their GSI Plans a summary of any planning documents aligned with the GSI Plan or updated or modified to appropriately incorporate GSI requirements. The GSI Plan must also include a workplan identifying how GSI measures will be included in future plans.

3.1 City Planning Document Review

The City completed a review of its existing planning documents to determine the extent to which GSI-related language, concepts and policies have been incorporated. The plans that were reviewed are listed below:

- General Plan
- Transportation Improvement Plan for the City of Campbell's Priority Development Area
- Campbell Village Neighborhood Plan
- Winchester Boulevard Master Plan
- East Campbell Avenue Master Plan
- Downtown Campbell Development Plan & Standards
- San Tomas Area Neighborhood Plan

The following sections provide a brief description of each plan and the text that supports GSI planning implementation. A prioritized workplan for the integration of GSI language into existing and future City planning documents is provided in Section 3.1.1.

3.1.1 General Plan

The City's General Plan was adopted November 6, 2001 and does not include language related to GSI. The Land Use and Transportation Element Update was adopted August 19, 2014, and the Housing Element was adopted February 17, 2015. The City is in the process of updating the General Plan, including the Land Use and Housing Elements. The update will incorporate references to GSI concepts and requirements.

3.1.2 Transportation Improvement Plan for the City of Campbell's Priority Development Area

The Campbell Transportation Improvement Plan (TIP) has developed a suite of transportation and urban design projects to improve walking, bicycling, and transit access for the Downtown Campbell Priority Development Area (PDA). The TIP was completed in February 2018 and includes language to support GSI concepts and requirements. For example:

> *Urban Design Approach (page 31): …. Improvements frequently used in the context of Complete Streets, such as curb extensions, widened sidewalks, pedestrian refuges or the elimination of slip lanes, routinely include the opportunity to integrate streetscape treatments that further increase pedestrian safety and comfort and, if carefully designed, provide additional aesthetic, economic, ecological, and community identity related benefits.*
>
> *Urban Design Approach - Green Infrastructure (page 33): The MRP requires the city to develop and implement a long-term green infrastructure (GI) Plan for the inclusion of Low*

> *Impact Development (LID) measures, such as green infrastructure, in storm drain infrastructure on public and private lands, including streets. Green infrastructure is a new approach to creating sustainable public streets that provide multiple benefits, such as improved water quality, traffic calming, increased pedestrian and bicycle safety, enhanced urban forests, and reduced flooding.*

The Green Infrastructure section of the plan includes references to design guidance such as the SCVURPPP C.3 Stormwater Handbook (2016), San Mateo County's Sustainable Green Streets and Parking Lots Design Guidebook (2009), the City of San Mateo's Sustainable Streets Plan - Design Guidelines (2015), and the San Francisco Public Utilities Commission's Green Stormwater Infrastructure Typical Details (2016) and descriptions of the following GSI measures : rain gardens, bioretention planters, and stormwater curb extensions. In addition, GSI elements are recommended for some projects included in a set of concept-level infrastructure improvements developed for the study area.

3.1.3 Campbell Village Neighborhood Plan

The Campbell Village Neighborhood Plan establishes land use policies, transportation policies, and development standards affecting both land use and transportation to further the residents' vision of the neighborhood's future. This neighborhood is mostly single-family residential, with some areas zoned for commercial uses. It includes some language to support GSI:

> *Appendix A Campbell Village Public Improvement Plan – Streets to Remain Without a Sidewalk (page 16): "If … the street does not have curb and gutter, the ten foot strip of right-of-way shall be improved consistent with the intent of Green Infrastructure -- improvements across the property's frontage that assist with stormwater drainage and treatment through the use of detention and infiltration methods."*

3.1.4 Winchester Boulevard Master Plan

The goal of the Winchester Boulevard Master Plan is to transform the segment of Winchester Boulevard from the northern City limits to Budd Avenue into a vibrant mixed-use, pedestrian-oriented street, lined with ground-level businesses with residential or office above. The plan was approved in 2009 and does not include language to support GSI.

3.1.5 East Campbell Avenue Master Plan

The intent of the East Campbell Avenue Master Plan is to tie historic Downtown Campbell to the Prune Yard office and shopping center, with a focus on creating a continuous, pedestrian-oriented downtown street corridor. The Master Plan establishes guidelines and policies for public improvements and private development in this area. The plan was approved in 2008 and does not include language to support GSI.

3.1.6 Downtown Campbell Development Plan & Standards

The Downtown Campbell Development Plan provides a vision for Downtown Campbell and a framework for the physical development, business development and preservation of the Historic Downtown. The plan was approved in 2006 and does not include language to support GSI.

3.1.7 San Tomas Area Neighborhood Plan

The purpose of the San Tomas Area Neighborhood Plan is to provide a framework for development in the San Tomas Area and establish land use and transportation policies. The San Tomas Area is a residential neighborhood located in the southwest portion of the City. The area is unique in that it

retains a more informal character than other parts of Campbell, in part due to the large, often irregular lots and to the lack of standard curbs, gutters and sidewalks along its streets. The plan was approved in 2000 and does not include language to support GSI.

3.1.8 Workplan for Integration of GSI Language into Existing and Future City Planning Documents

Although a number of City plans are generally aligned with and support the GSI Plan, others could benefit from the inclusion of additional GSI-related language. An update to the General Plan is in progress and is expected to be completed in 2020. The updated General Plan will incorporate GSI requirements and will include a workplan for updating/revising the other previously mentioned City planning documents to bring them into conformance with the updated General Plan, including the addition of GSI-related language as needed.

When preparing new planning documents, the City will review the GSI Plan requirements during the planning process to ensure that GSI requirements and policies are incorporated. Examples of GSI related language can be found in references such as SCVURPPP's Model Green Infrastructure Language for Incorporation into Municipal Plans (2016).

3.2 Regional Plans

The City is collaborating with SCVURPPP, Valley Water, and other agencies on several large-scale planning efforts including those described below.

3.2.1 Santa Clara Basin Stormwater Resource Plan

A collaboration between SCVURPPP and Valley Water during 2017 and 2018, the Santa Clara Basin Storm Water Resources Plan (SWRP) supports municipal GSI Plans by identifying and prioritizing potential multi-benefit GSI opportunities on public parcels and street rights-of-way throughout the Basin (i.e., Santa Clara Valley) and allows them to be eligible for State bond-funded implementation grants. The SWRP includes a list of prioritized GSI opportunity locations for each SCVURPPP agency, including Campbell. As described in Section 5.2, the City's GSI Plan builds on the SWRP output to further identify, evaluate, and prioritize potential projects.

3.2.2 Santa Clara Valley Water District's One Water Plan

Valley Water's Watershed Division is leading an effort to develop an Integrated Water Resources Master Plan to identify, prioritize, and implement activities at a watershed scale to maximize established water supply, flood protection, and environmental stewardship goals and objectives. The "One Water Plan" establishes a framework for long-term management of Santa Clara County water resources, which eventually will be used to plan and prioritize projects that maximize multiple benefits. The One Water Plan incorporates knowledge from past planning efforts, builds on existing and current related planning efforts; and coordinates with relevant internal and external programs. The One Water Plan has five goals:

1. Valued and Respected Rain – Manage rainwater to improve flood protection, water supply, and ecosystem health.
2. Healthful and Reliable Water – Enhance the quantity and quality of water to support beneficial uses.

3. Ecologically Sustainable Streams and Watersheds – Protect, enhance and sustain healthy and resilient stream ecosystems.
4. Resilient Baylands – Protect, enhance and sustain healthy and resilient baylands ecosystems and infrastructure.
5. Community Collaboration – Work in partnership with an engaged community to champion wise decisions on water resources.

Tier 1 of the effort, for which a draft plan was completed in 2016[5], is a countywide overview of major resources and key issues along with identified goals and objectives. Tier 2 (2016 to 2020) will include greater detail on each of the County's major watersheds. The City's GSI Plan aligns with the goals of the One Water Plan and may be able to coordinate with specific projects yet to be identified in the One Water Plan.

3.2.3 Bay Area Integrated Regional Water Management Plan

The Bay Area Integrated Regional Water Management Plan (IRWMP) is a comprehensive water resources plan for the Bay region that addresses four functional areas: 1) water supply and water quality; 2) wastewater and recycled water; 3) flood protection and stormwater management; and 4) watershed management and habitat protection and restoration. It provides a venue for regional collaboration and serves as a platform to secure state and federal funding. The IRWMP includes a list of over 300 project proposals, and a methodology for ranking those projects for the purpose of submitting a compilation of high priority projects for grant funding. The Santa Clara Basin SWRP was submitted to the Bay Area IRWMP Coordinating Committee and incorporated into the IRWMP as an addendum. As SWRP projects are proposed for grant funding, they will be added to the IRWMP list using established procedures.

[5] Santa Clara Valley Water District. 2016. One Water Plan for Santa Clara County. An Integrated Approach to Water Resources Management. Preliminary Draft Report 2016.

4. GSI DESIGN GUIDELINES, DETAILS, AND SPECIFICATIONS

The MRP requires that the GSI Plan include general design and construction guidelines, standard specifications and details (or references to those documents) for incorporating GSI components into projects within the City. These guidelines and specifications should address the different street and project types within the City, as defined by its land use and transportation characteristics, and allow projects to provide a range of functions and benefits, such as stormwater management, bicycle and pedestrian mobility and safety, public green space, and urban forestry.

The City, along with other SCVURPPP agencies, helped fund and provided input to the development of countywide guidelines by SCVURPPP to address the MRP requirements and guide the implementation of GSI Plans. The resulting SCVURPPP GSI Handbook (Handbook)[6] is a comprehensive guide to planning and implementation of GSI projects in public streetscapes, parking lots and parks. The Handbook consists of two parts, the contents of which are described in the following sections. The City intends to use this Handbook as a reference when creating City-specific guidelines and specifications to meet the needs of the various departments.

4.1 Design Guidelines

Part 1 of the Handbook provides guidance on selection, integration, prioritization, sizing, construction, and maintenance of GSI facilities. It includes sections describing the various types of GSI, their benefits, and design considerations; how to incorporate GSI with other uses of the public right-of-way, such as bicycle and pedestrian infrastructure and parking; and guidelines on utility coordination and landscape design for GSI. In addition, the Handbook also provides guidance on post-construction maintenance practices and design of GSI to facilitate maintenance.

Part 1 also contains a section on proper sizing of GSI measures. Where possible, GSI measures should be designed to meet the same sizing requirements as Regulated Projects, which are specified in MRP Provision C.3.d. In general, the treatment measure design standard is capture and treatment of 80% of the annual runoff (i.e., capture and treatment of the small, frequent storm events). However, if a GSI measure cannot be designed to meet this design standard due to constraints in the public right-of-way or other factors, the City may still wish to construct the measure to provide some runoff reduction and water quality benefit and achieve other benefits. For these situations, the Handbook describes (in Section 4.2) regional guidance on alternative design approaches developed by the Bay Area Stormwater Management Agencies Association (BASMAA) for use by MRP permittees.

4.2 Details and Specifications

Part 2 of the Handbook contains typical details and specifications that have been compiled from various sources within California and the U.S. and modified for use in Santa Clara County. The Handbook includes details for pervious pavement, stormwater planters, stormwater curb extensions, bioretention in parking lots, infiltration measures, and stormwater tree wells, as well as associated components such as edge controls, inlets, outlets, and underdrains. It also provides typical design details for GSI facilities in the public right-of-way that address utility protection measures and consideration of other infrastructure in that space.

[6] SCVURPPP (2019) Green Stormwater Infrastructure Handbook. February. Online at http://scvurppp.org/scvurppp_2018/swrp/resource-library/

4.3 Incorporation of SCVURPPP Details and Specifications into City Standards

The City plans to reference the SCVURPPP GSI Guidelines and Specifications for design of GSI projects. The City will review these for consistency with its own local standards, and revise existing guidelines, standard specifications, design details, and department procedures as needed. The City will also reference details and build on its experience from design and construction of the Hacienda Avenue Green Street Project.

5. GSI PROJECT PRIORITIZATION AND IMPERVIOUS TARGETS

To meet the requirements of the MRP, the City's GSI Plan must contain a mechanism to prioritize and map areas for potential and planned projects, both public and private, for implementation over the 2020, 2030, and 2040 milestones. The mechanism must include the criteria for prioritization and outputs that can be incorporated into the City's long-term planning and capital improvement processes.

This chapter describes different GSI project categories considered within the City, followed by a description of the process employed by the City to identify public lands that offer opportunities to implement GSI and prioritize those opportunities, and the results of the process.

5.1 Project Types

GSI project types that have been or may be implemented in the City fall into the following categories: Early Implementation Projects, C3 Regulated Projects, Green Streets, LID Retrofits, and Regional Projects. All categories, except C3 Regulated projects, are considered GSI capital projects, and are primarily public projects under control of the City. Green Streets, LID Retrofits, and Regional Projects are the focus of the prioritization process described in Section 5.2, but all five GSI project types are considered as part of the City wide GSI strategy presented in Chapter 6. Several factors, such as change in scope of work, funding, site conditions, etc. determine the ability of the City to implement GSI capital projects.

5.1.1 Early Implementation Projects

Early Implementation Projects are GSI projects that have already been implemented by the City or are already scheduled and funded for implementation during the permit term (i.e., through December 2020.) The City has already implemented the Hacienda Avenue Green Street Project, as discussed in Section 2.4. The City identified additional Early Implementation projects through a review of its Capital Improvement Program (CIP), as discussed in Section 5.2.2 below.

5.1.2 Regulated Projects

C3 Regulated Projects are those implemented as part of new and redevelopment within the City, both private and public, that must meet the post-construction stormwater treatment requirements per Provision C.3 of the MRP. Regulated projects include private development or redevelopment projects, such as multi-family residential buildings, commercial office buildings, or shopping plazas, as well as public projects, such as libraries, police stations, and parking lots, exceeding the impervious surface thresholds. Recent examples include: The St. Anton project on Railway Avenue; The Creekside Office Building project; The Barracuda parking lot expansion; and the Jasmine Court subdivision.

5.1.3 LID Projects

LID projects mitigate stormwater impacts by reducing runoff through capture and/or infiltration and treating stormwater on-site before it enters the storm drain system. LID projects may include bioretention facilities, infiltration trenches, detention and retention areas in landscaping, pervious pavement, green roofs, and systems for stormwater capture and use. For the purposes of the GSI Plan, LID projects are GSI facilities that treat runoff generated from a publicly-owned parcel on that parcel.

5.1.4 Regional Projects

Regional projects capture and treat stormwater runoff from on-site and off-site sources, including surface runoff and diversions from storm drains. Benefits of regional stormwater capture projects can

include flood risk reduction, stormwater treatment and use, and groundwater recharge. These projects may take a variety of forms such as detention and retention basins and subsurface vaults and infiltration galleries. The site characteristics will determine what types of regional projects are feasible, e.g., whether a project is on-line or off-line from the storm drain network, whether it is desirable to change the functionality of the site, whether the project is above ground or underground, and the size of the project.

5.1.5 Green Street Projects

Green street projects are GSI opportunities in the public right-of-way that capture runoff from the street and adjacent areas that drain to the street. The technologies used for green streets are similar to those used in LID projects but are limited to designs that can be used in the right-of-way. Green street projects may include bioretention (e.g., stormwater planters, stormwater curb extensions or stormwater tree filters), pervious pavement, and/or infiltration trenches. Green street GSI features can be incorporated into other improvements in the right-of-way, including complete streets designs and improvements for pedestrian and cyclist safety.

5.2 Identification and Prioritization Process

The City of Campbell GSI opportunity identification and prioritization process involved two steps. The first step was the screening and prioritization methodology used in the Santa Clara Basin SWRP (see Section 3.2.1) to identify and prioritize GSI opportunities on public parcels and street segments within the region. The second step in the process involved overlaying City-specific priorities, planning areas, and upcoming City projects onto the regional prioritization results to align the results of the SWRP prioritization process with the City's priorities. These steps are described in detail below.

5.2.1 Step 1: Stormwater Resource Plan Prioritization

Building on existing documents that describe the characteristics and water quality and quantity issues within the Santa Clara Basin (i.e., the portion of Santa Clara County that drains to San Francisco Bay), the SWRP identified and prioritized multi-benefit GSI opportunities throughout the Basin, using a metrics-based approach for quantifying project benefits such as volume of stormwater infiltrated and/or treated, and quantity of pollutants removed. The metrics-based analysis was conducted using hydrologic/hydraulic and water quality models coupled with Geographic Information System (GIS) resources and other tools. The products of these analyses were a map of opportunity areas for GSI projects throughout the watershed, an initial prioritized list of potential project opportunities, and strategies for implementation of these and future projects.

The process began by identifying and screening public parcels and public rights-of-way that can support GSI. Project opportunities were split into the three categories described above – LID, regional, and green streets projects -- because of fundamental differences in GSI measures used, project scale, and measures of treatment efficiency. Screening factors are presented in Table 5-1.

After the identification of feasible GSI opportunity locations, screened streets and parcels were prioritized to aid in the selection of project opportunities that would be the most effective and provide the greatest number of benefits. In addition to physical characteristics, several special considerations were included in the prioritization methodology to consider coordination with currently planned projects provided by agencies, as well as consideration of additional benefits that projects could provide. A discussion of the screening and prioritization process for each project category is presented in the subsequent sections. Figures 5-1 through 5-3 present the results of the various steps.

LID and Regional Stormwater Capture Project Opportunities

The screening criteria for LID and regional projects were ownership (focusing only on public parcels), land use, and site slope. As shown in Table 5-1, parcel size was used to determine whether a location could support a regional or LID project.

Parcels that met the screening criteria were prioritized based on physical characteristics such as soil group, slope, and percent impervious area, proximity to storm drains, proximity to flood-prone creeks and areas, proximity to potential pollutant sources, whether they were in a priority development area (PDA), whether they were within a defined proximity to a planned project, and whether the project was expected to have other benefits such as augmenting water supply, providing water quality source control, re-establishing natural hydrology, creating or enhancing habitat, and enhancing the community. Prioritization metrics for LID project scoring and regional project scoring are shown in separate tables in Appendix A. The result of the parcel prioritization was a list and map of potential project locations based on the above criteria.

Table 5-1 Screening factors for parcel-based and right-of-way project opportunities

Screening Factor	Characteristic	Criteria	Reason
Parcel-based			
Public Parcels	Ownership	County, City, Town, Valley Water, State, Open Space Agencies	Identify all public parcels for regional stormwater capture projects or onsite LID retrofits
	Land Use	Park, School, Other (e.g., Golf Course)	
Suitability	Parcel Size	≥ 0.25 acres	Opportunity for regional stormwater capture project
		< 0.25 acres	Opportunity for on-site LID project
	Site Slope	< 10 %	Steeper grades present additional design challenges
Right-of-Way			
Selection	Ownership	Public	Potential projects are focused on public right-of-way opportunities
Suitability	Surface	Paved	Only roads with paved surfaces are considered suitable. Dirt roads were not considered.
	Slope	< 5%	Steep grades present additional design challenges; reduced capture opportunity due to increased runoff velocity
	Speed	≤ 45mph	Excludes higher speed roads such as major arterials and highways

Green Street Project Opportunities

The screening criteria for green streets projects in the public right-of-way were ownership, surface material, slope, and speed limit (Table 5-1). The screened public right-of-way street segments were then prioritized based on physical characteristics, proximity to storm drains, proximity to flood-prone creeks and areas, proximity to potential pollutant sources, whether they were in a priority development area, whether they were in proximity to a planned project, and whether the project was expected to have other benefits (similar to LID and regional projects). Prioritization metrics for green streets projects are shown in Appendix A.

The initial prioritization process resulted in a large number of potential green streets project opportunities within the Santa Clara Basin. In order to identify the optimal locations for green street projects, the street segments in each municipality's jurisdiction with scores in the top 10 percent of ranked green street opportunities were identified and mapped. The public parcels and top 10 percent street segments in, and owned by, the City of Campbell with potential for GSI are shown in Figure 5-1. Although owned by the school districts and not the City of Campbell, public school properties are also shown on the map since there may be opportunities to coordinate on GSI projects in the future. The projects from the SWRP on property owned by the City or public school districts as shown on Figure 5-1 were carried over into Step 2 City-Specific Prioritization (Section 5.2.2).

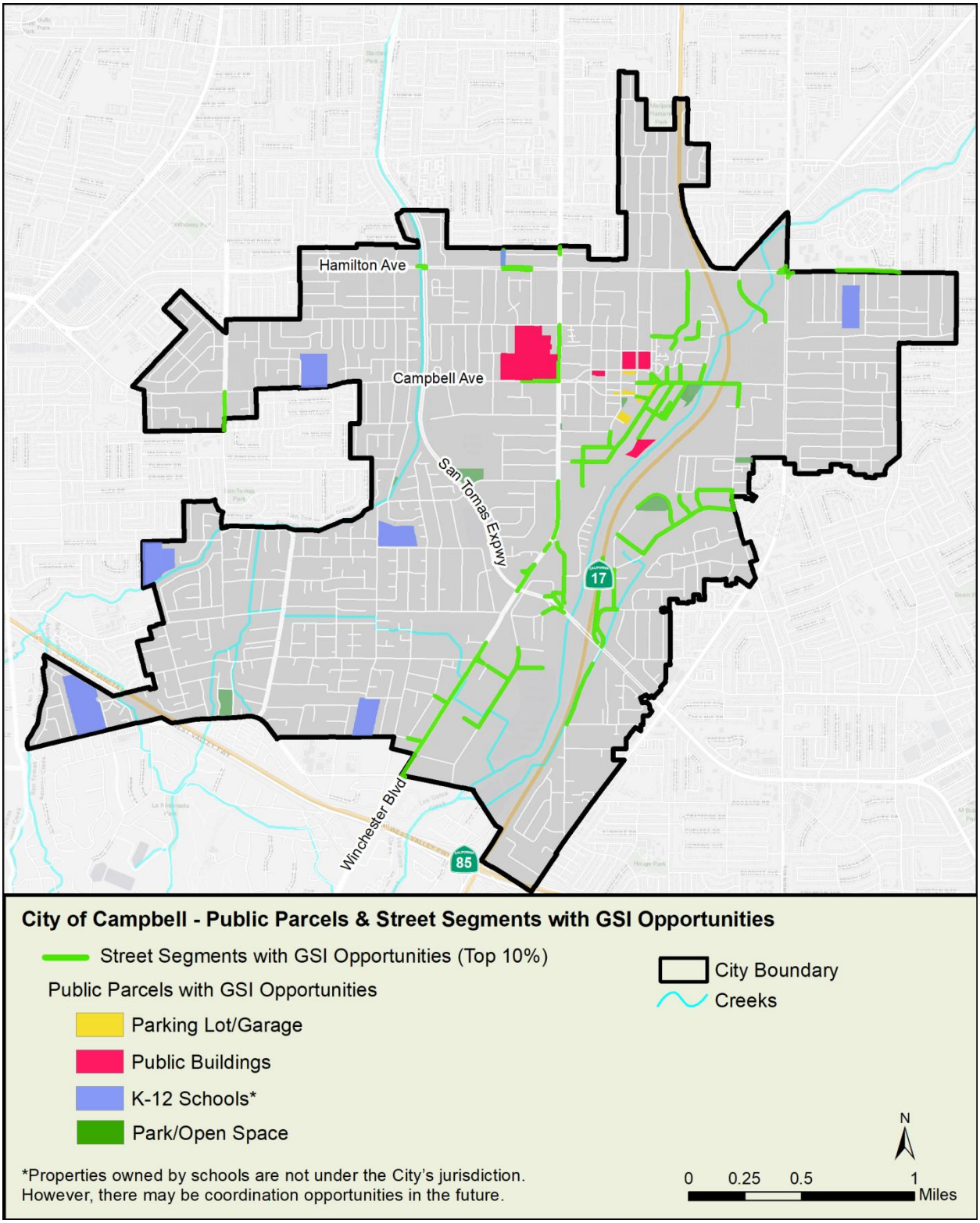


Figure 5-1 City of Campbell Public Parcels and Street Segments with GSI Opportunities. (Source: EOA, City of Campbell, and Santa Clara Basin Stormwater Resource Plan, 2018)

5.2.2 Step 2: City-Specific Prioritization

The City's local priorities for project implementation included: 1) opportunities to implement GSI projects in conjunction with anticipated areas of private development, and 2) upcoming capital improvement projects that could be combined with GSI projects.

Priority Development Areas

Priority Development Areas, commonly known as PDAs, are areas within existing communities that local city or county governments have identified and approved for future growth. These areas typically are accessible by one or more transit services; and they are often located near established job centers, shopping districts and other services. PDAs are expected to accommodate 77% of new housing production (over 500,000 units) and 55% of employment growth (almost 700,000 jobs) in the Bay Area through the year 2040[7]. As PDAs are developed, they offer good opportunities to construct GSI facilities.

The Central Redevelopment Area in the City of Campbell is designated as a PDA. It is shown in Figure 5-2.

Special Project Areas and Master Plans

The City's General Plan identifies seven Special Project Areas and outlines land use and development policies for each area. These Special Project Areas are listed below:

- Pruneyard / Creekside Commercial District
- North of Campbell Avenue (NOCA)
- South of Campbell Avenue (SOCA)
- San Tomas Area Neighborhood Plan (STANP)
- Central Campbell Redevelopment Project Area
- Downtown Campbell
- Downtown Neighborhood

In addition, the City has developed Master Plans to guide development in the following two areas:

- East Campbell Avenue Master Plan
- Winchester Boulevard Master Plan

The Special Project Areas and Master Plan areas are shown on Figure 5-3. Because these areas are where the most development is expected to occur, they will likely have the best opportunities to construct GSI facilities. The GSI projects could be part of private redevelopment projects or public improvement projects.

[7] These numbers were extracted from Table 4.2 and Table 4.3 of the Association of Bay Area Governments and Metropolitan Transportation Commission "Plan Bay Area 2040" Report, adopted July 26, 2017.

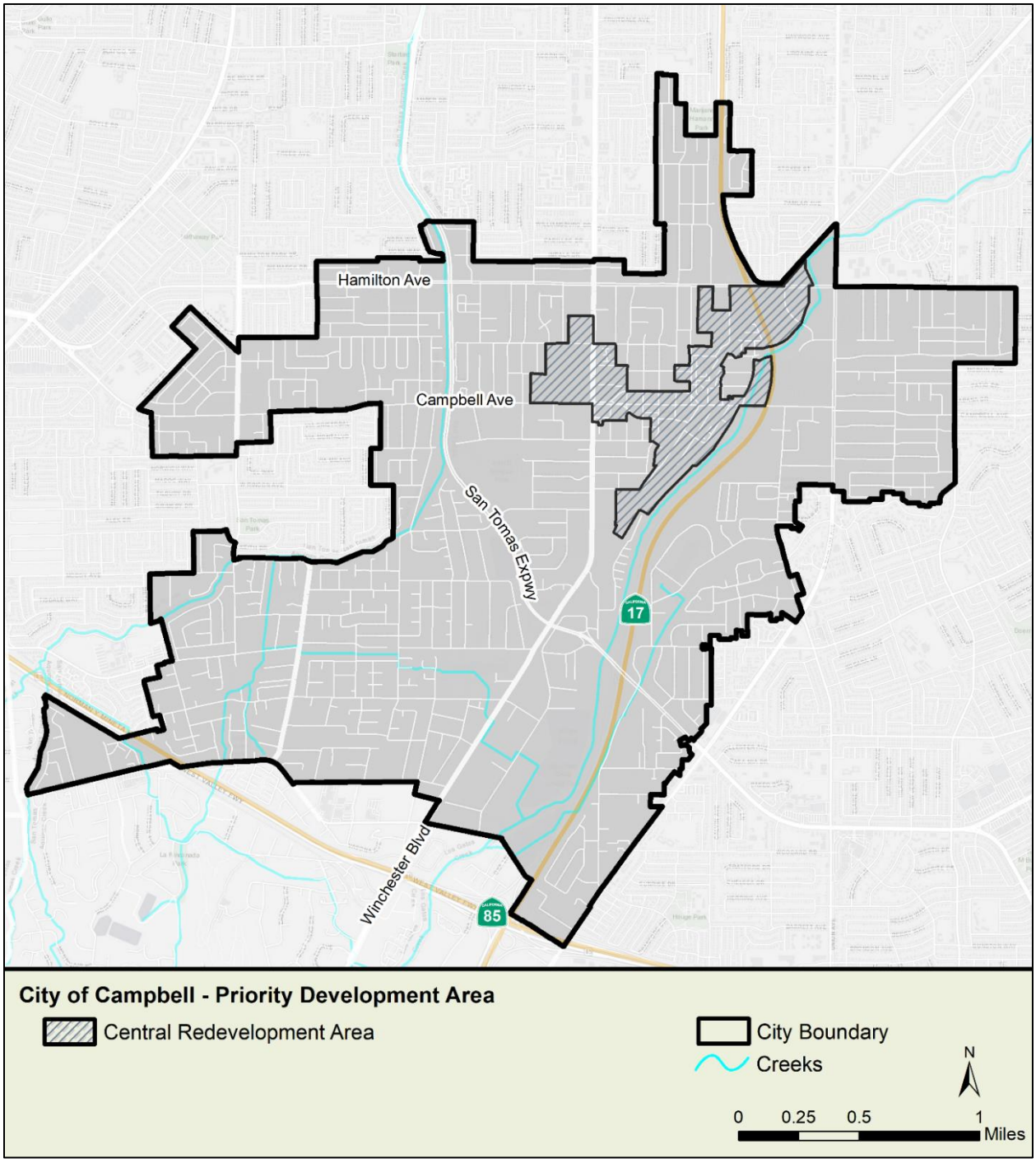


Figure 5-2 City of Campbell Priority Development Area (Source: City of Campbell General Plan)

Upcoming Capital Improvement Projects with Potential for GSI

As required by the MRP, the City reviews its Capital Improvement Program (CIP) project list annually to identify opportunities for GSI. Based on this review, the City prepares and maintains a list of any public GSI projects that are planned for implementation during the permit term and public projects that have potential for GSI measures. The City has identified the following CIP projects as having potential to include GSI:

- Campbell Park Improvements, South East corner of Campbell Ave/Gilman Ave
- John D. Morgan Park Improvements, on Budd Avenue
- Dell Avenue Green Street (SWRP Concept Only – not an approved CIP project)

The project locations are shown on Figure 5-4. A concept for the Dell Avenue Green Street project was completed for the SWRP and is provided in Appendix B of this GSI Plan. This project has the potential to treat stormwater runoff from one-mile of Dell Avenue with bioretention areas (a pilot phase treating runoff from approximately 1,000 linear feet of street right-of-way with five bioretention bulb-outs is currently proposed, with additional GSI facilities constructed as adjacent parcels are redeveloped). The concept design is intended to assist with the grant application process should the City decide to pursue funding via Proposition 1 or other State bond-funded grant program.

Green Stormwater Infrastructure in Industrial Areas

Stormwater runoff from industrial areas may contain higher levels of pollutants such as metals and chemicals than runoff from other land uses. GSI installations in public streets near industrial areas may help remove these pollutants from stormwater runoff. Old industrial areas located in the City of Campbell are shown in Figure 5-5. As these industrial areas are redeveloped, the City will explore installing GSI features in the public right-of-way.

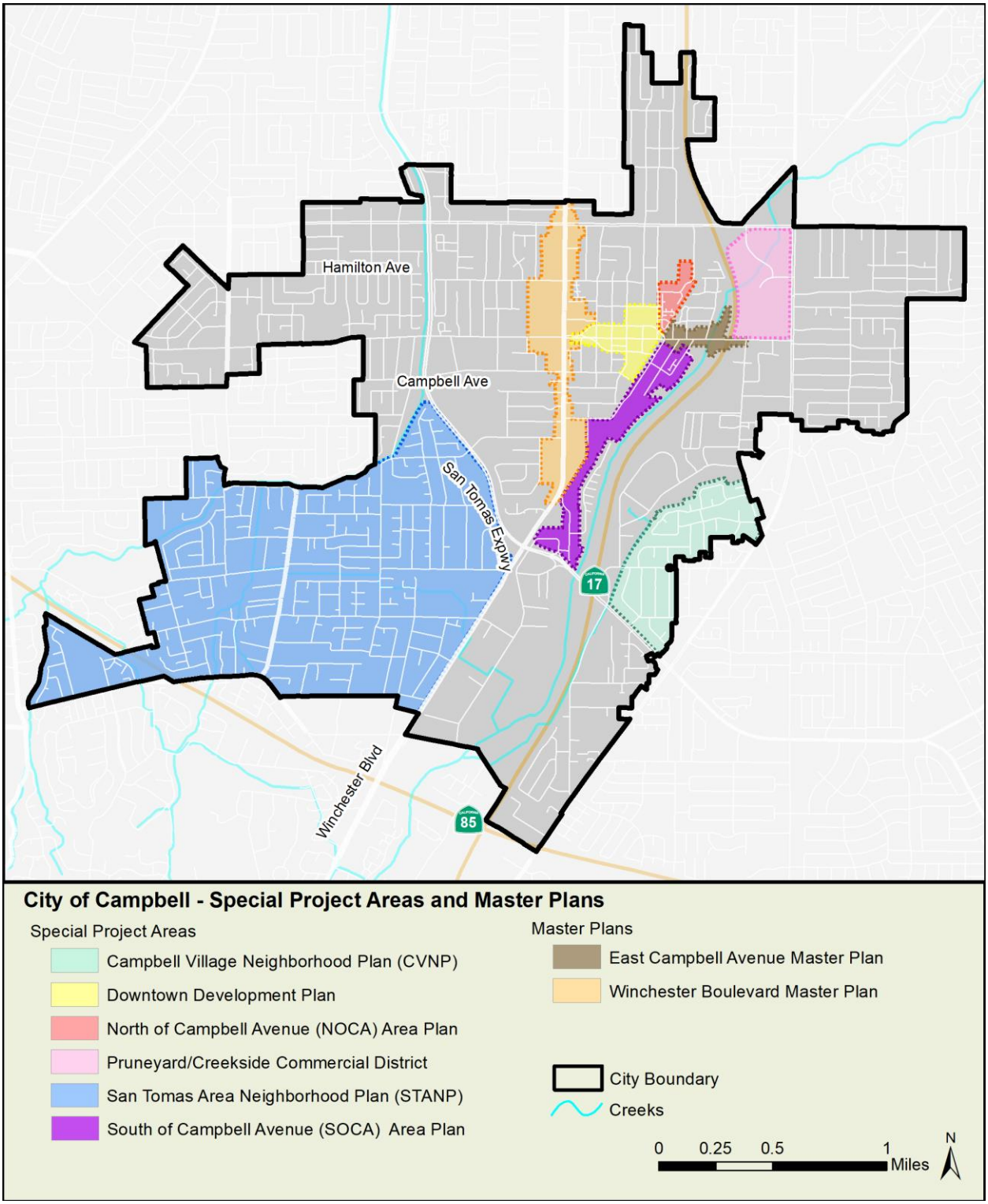


Figure 5-3 Special Project Areas and Master Plans (Source: City of Campbell General Plan)

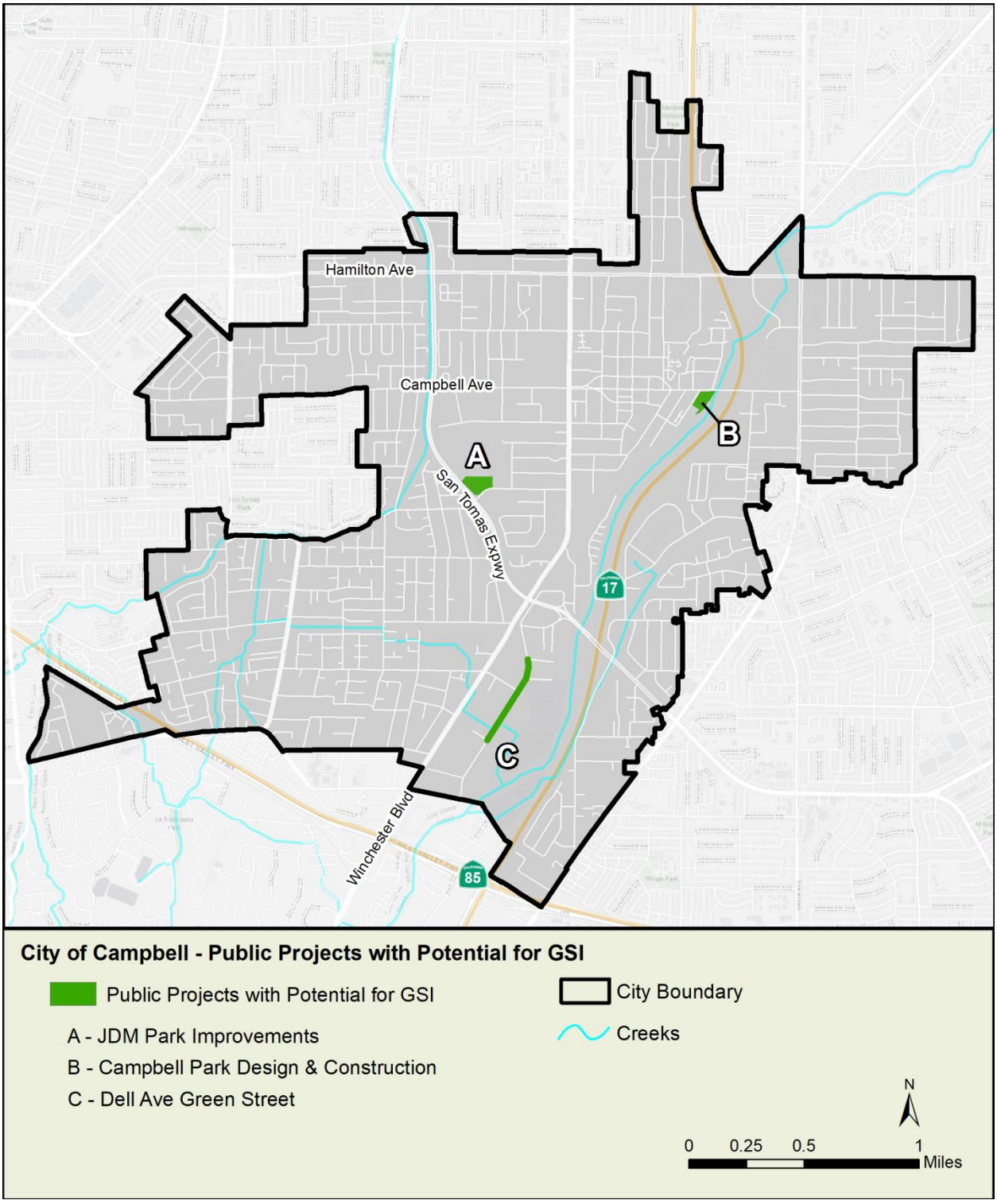


Figure 5-4 Public Projects with Potential for GSI (Source: City of Campbell FY 17-18 Annual Report, and 2018 Santa Clara Basin Stormwater Resource Plan)

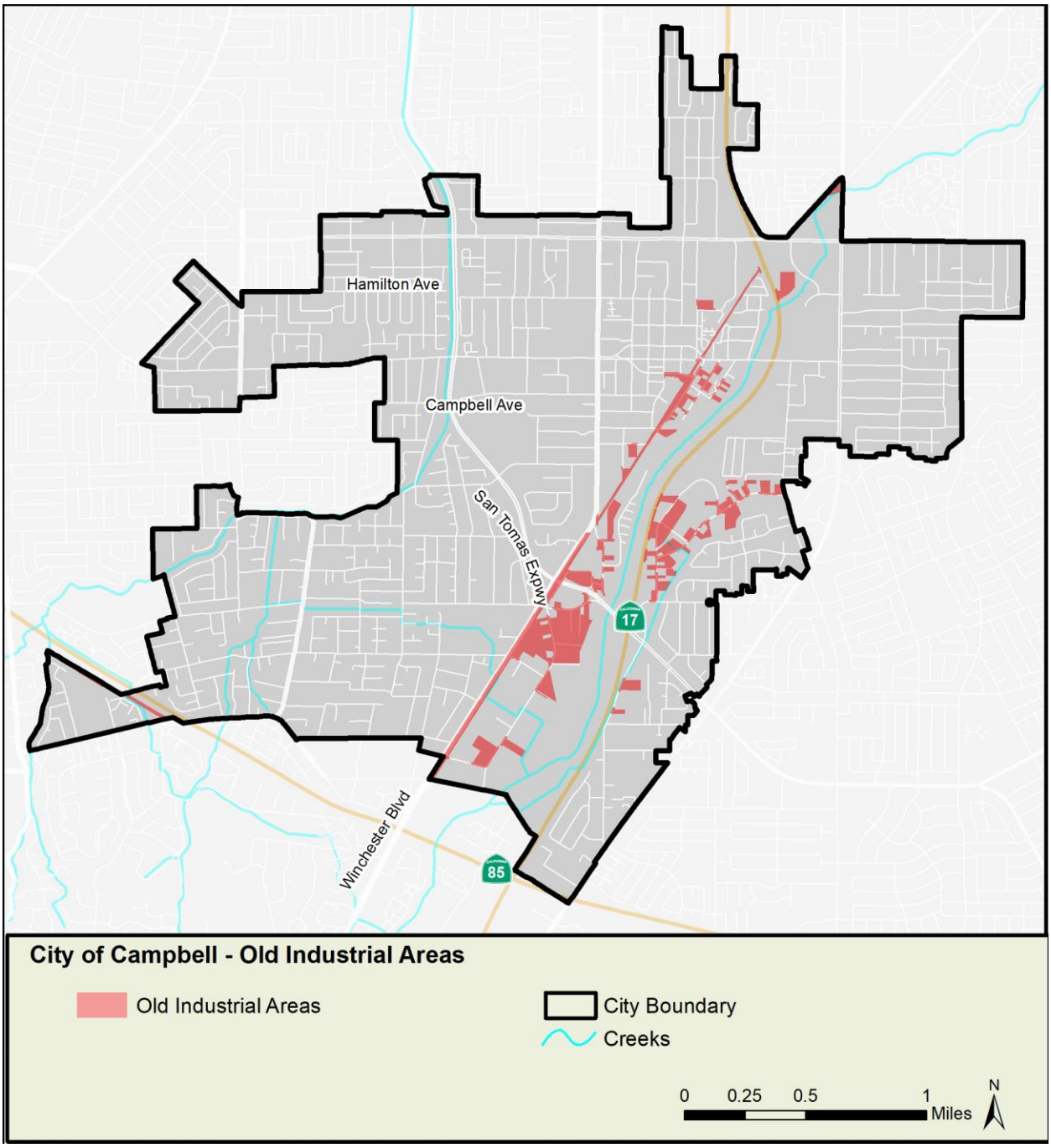


Figure 5-5 Old Industrial Areas (Source: SCVURPPP)

5.3 Prioritization Output

A compilation of the factors involved in prioritizing the City's opportunities for GSI projects is presented in Figure 5-6. The City-owned parcel-based and top 10 percent of green street project opportunities identified by the SWRP prioritization are overlaid here with the City's PDA, Special Project Areas, Master Plans, and public projects with potential for GSI. This overview shows how the SWRP project opportunities line up with potential development and identified CIP projects. Figure 5-6 also shows the GSI project that the City has already constructed.

Publicly owned parcels identified and ranked in the SWRP were compared with the planned public projects that the City has identified as having potential GSI (see Section 5.2.2 – Upcoming Capital Improvement Projects with Potential for GSI). The tables in Appendix C show public parcels identified in the SWRP that were associated with a public project with opportunity for GSI. These projects would qualify for State bond-funded stormwater capture project implementation grants (e.g., Proposition 1) because they are associated with a prioritized parcel in the SWRP.

An implementation plan is described in Section 6 to guide the development, design, and construction of GSI projects.

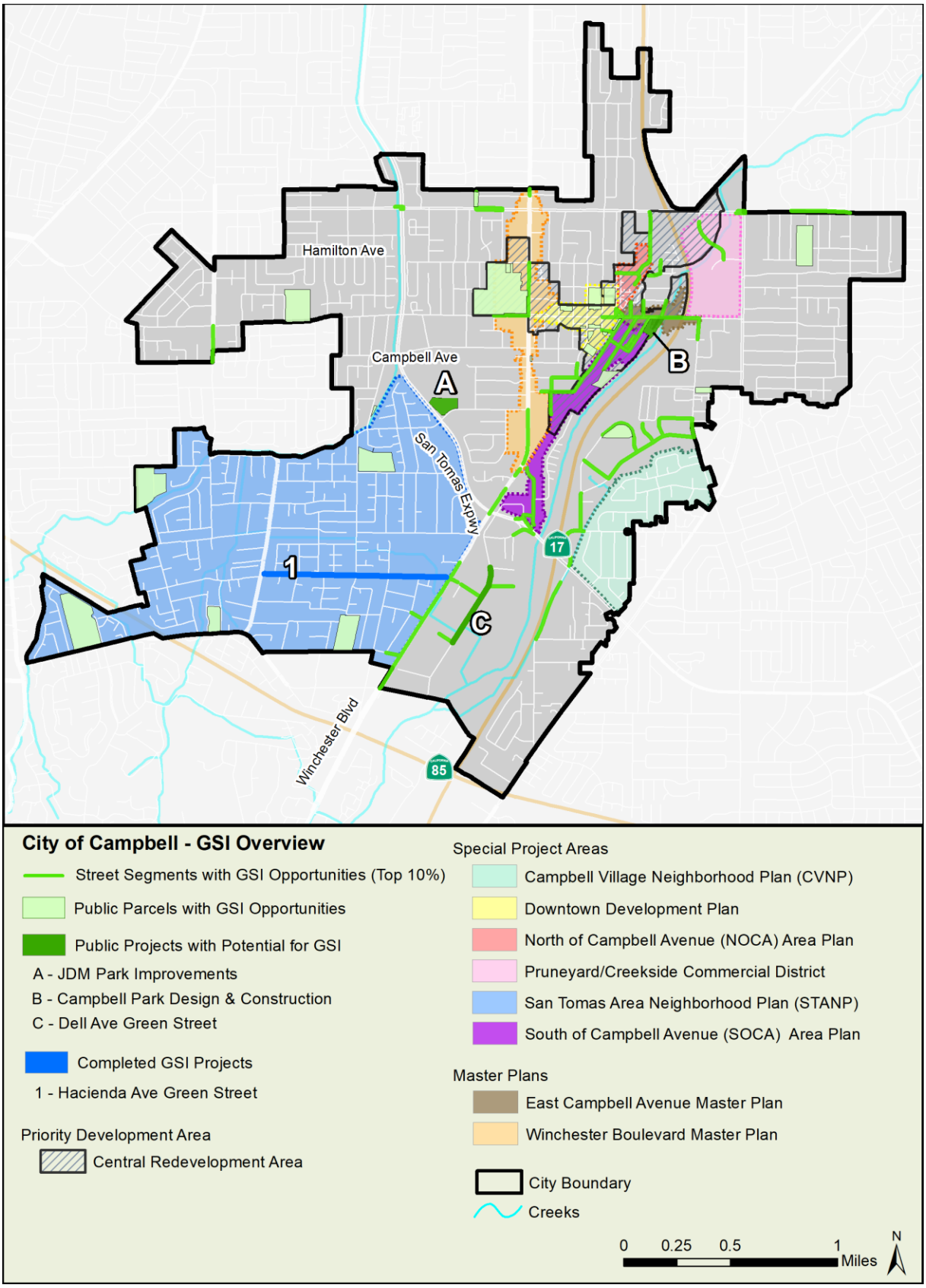


Figure 5-6 City of Campbell GSI Project Prioritization Overview.

6. GSI IMPLEMENTATION PLAN

This chapter provides an overall strategy and steps for implementing GSI within the City of Campbell over the long term. The implementation plan has the following components: (1) the Citywide GSI strategy; (2) a workplan to identify and complete Early Implementation projects (3) a workplan for identifying additional, future GSI opportunities (4) the legal and funding mechanisms that enable implementation, (5) estimated targets for the amounts of impervious surface to be "retrofitted" (i.e., redeveloped with GSI facilities to treat runoff from impervious surfaces), and (5) the technical tools that ensure the tracking of implemented projects.

6.1 City-wide GSI Strategy

As Campbell considers the future needs of the City and the community it serves, achieving environmental sustainability is an important goal. GSI is a concept and tool that Campbell will use to make the built environment more environmentally sustainable. The implementation of GSI jurisdiction-wide will occur over several decades and into the next century, therefore long-range planning is essential in determining the prioritization and strategy for the most cost-effective use of limited public funds.

The City of Campbell's GSI implementation strategy consists of the following:

- GSI in Planning Documents – As described in Section 3.1, the City will include GSI goals and policies in their General Plan and other planning documents. The City may also potentially create a policy for public works projects to consider GSI with all public projects.
- Streetscapes - The City will consider the use of GSI for all future street projects. Streetscapes present an important opportunity to achieve sustainability goals, as a well-designed project can provide multiple ecological and community benefits beyond circulation. Public street projects may provide the best method to implement the goal of retrofitting impervious surfaces. Goals and policies for well-designed streetscapes will be integrated into planning documents to work in harmony with other "complete street" elements which provide safer, more active, and more attractive public streetscapes.
- Coordination with Private Development – The City of Campbell will explore working with private property developers to install green infrastructure facilities in public rights-of-way near the properties they are developing, such as along street frontages.
- Evaluation of Opportunities Identified in the Stormwater Resource Plan – The public parcels and street segments identified in the SWRP (See Section 5.1 of this report) are opportunity areas for GSI projects. The City will use the SWRP list to help identify potential project locations for GSI implementation.
- Evaluation of CIP projects for opportunities – The City will continue to review its CIP list annually for opportunities to incorporate GSI into CIP projects and evaluate the feasibility of such projects. The City has established a process for CIP review to avoid missing GSI opportunities (see Section 6.2).
- Evaluation of non-CIP project opportunities - As awareness of GSI increases, municipal staff or local community members may also identify and recommend GSI project opportunities. These projects will be considered using the methodology described in Section 6.3.

- Regulated projects - The City will continue to implement requirements for regulated projects under Provision C.3 and track completed projects as described in Section 6.7.

6.2 Workplan for Early Implementation Projects

As discussed in Section 5.2.2 of this GSI Plan, Provision C.3.j. of the MRP requires that the City identify, prepare, and maintain a list of GSI projects that are planned for implementation during the permit term, and infrastructure projects that have potential for GSI measures. The list is reviewed and submitted with each Annual Report to the Regional Water Board. As discussed in Section 2.4, the City has already completed one major GSI project. Additional CIP projects identified by the City as having potential for GSI are presented in Table 6-1 below. The table also includes information on the status of each project, and the timeframe for construction.

Table 6-1 CIP Projects with Potential for GSI

Project Name	Status	Timeframe for Construction
Campbell Park Improvements South East corner of Campbell Ave/Gilman Ave	Design	2020
John D. Morgan Park Improvements Budd Avenue	Design	2020
Dell Avenue Green Street	Conceptual	Unknown

The City will continue to review its CIP list annually, using the SWRP prioritization, as well as the guidance developed by BASMAA[8] (Appendix D) for identifying opportunities to incorporate GSI into CIP projects.

6.3 Process for Identifying Additional GSI Projects

As stated in Section 6.1, the City will consider the use of GSI for all future street projects and will coordinate with private property developers to install green infrastructure facilities in public rights-of-way near the properties they are developing. Additional GSI project opportunities may also be identified by municipal staff or community members. The City will map these potential GSI projects to determine their proximity to green street or parcel-based project opportunities identified in the SWRP (Section 5.2.1), evaluate each project for GSI and inclusion in the CIP, and update the SWRP project list when applicable. The green street and parcel-based project opportunities identified and mapped in the SWRP provide a way to compare planned projects with the relative priority for green infrastructure implementation. By using this process, prioritization based on the SWRP process is augmented by the City's local priorities.

The City of Campbell's CIP plan is updated every year. Projects with a GSI component may be included in the CIP as funded or unfunded projects. An unfunded project's inclusion in the CIP demonstrates that it is a City priority pending adequate funding.

[8] BASMAA Development Committee (2016) Guidance for Identifying Green Infrastructure Potential in Municipal Capital Improvement Program Projects. May.

Projects with GSI measures may be submitted to the SWRP during the update process. This will allow those projects to be eligible for state bond funding. The SWRP will likely be updated in the 2022-2023 timeframe. SCVURPPP will reach out to all member agencies to provide their project lists for prioritization and inclusion in the updated SWRP.

6.4 Legal Mechanisms for GSI Implementation

Provision C.3.j.i.(3) of the MRP requires permittees to "Adopt policies, ordinances, and/or other appropriate legal mechanisms to ensure implementation of the Green Infrastructure Plan in accordance with the requirements of this provision."

As described in Section 1.3.2, the City of Campbell and other municipalities subject to Provision C.3 of the MRP must require post-construction stormwater control measures on regulated development projects. Post-construction stormwater controls reduce pollutants from flowing to streams, creeks, and the Bay and help address local flooding by reducing peak flows. Section 14.02 (Stormwater Pollution Control) of the City's Municipal Code provides legal authority for the City to require regulated private development projects to comply with MRP requirements.

GSI projects are typically not regulated projects (although they must conform to the sizing and design requirements contained in Provision C.3, except under certain circumstances) and they are primarily public projects under control of the City. As part of the GSI Plan development process, the City reviewed its existing policies, ordinances, and other legal mechanisms related to the implementation of stormwater NPDES permit requirements and found that it has sufficient legal authority to implement the GSI Plan. Adoption of the GSI Plan by the City Council will further strenghten the authority.

6.5 Evaluation of Funding Options

The GSI Plan prioritizes specific projects for near-term integration into CIPs and long-term integration into City planning efforts. Implementation of these projects is contingent upon the City identifying funding sources for GSI planning, design, construction, and maintenance.

The total cost of GSI includes costs for planning, capital (design, engineering, construction) and ongoing expenditures, including operations and maintenance (O&M), utility relocation, and feature replacement. It is likely that no single source of revenue will be adequate to fund implementation of GSI, and a portfolio of funding sources will be needed. There are a variety of approaches available to help fund up-front and long-term investments. This section discusses the City's current stormwater management funding sources and then describes additional funding strategies available to implement GSI that are being considered by the City for future funding.

6.5.1 Current Funding Sources for GSI Program Elements

The City of Campbell currently uses a combination of federal and state grants and local revenues to fund construction of projects in its CIP and other projects.

6.5.2 Potential Future Funding Options

As required by the MRP, the City analyzed possible funding options to raise additional revenue for design, construction, and long-term operation and maintenance (O&M) of GSI projects. The City used the guidance on stormwater funding options developed by SCVURPPP (2018) as a reference for conducting its analysis. Table 6-1 summarizes the funding options that will be considered by the City as the GSI Plan is implemented. For each type of funding mechanism, the table provides a brief overview

and specifics related to GSI, pros and cons, and applicability to funding planning, capital, and/or long-term O&M costs.

Table 6-2 Potential Funding Options

Funding Mechanism	GSI Specifics	Pros	Cons	Type of Funding
Parcel Taxes: revenue stream through taxing property or other system.	Can be used to set up, fund and maintain a stormwater program and MRP compliance.	• Well understood tax • Stable revenue stream over many years • Legally reliable • Can also be done by mail.	• High political threshold • Vulnerable to competition with other measures on the ballot. • Considerable effort and resources required with uncertain odds of success.	• Planning • Capital • O&M
Property-related Fees: fees on real property.	Fee on property contributing stormwater runoff to MS4. Can be used to set up, fund and maintain a stormwater program and MRP compliance.	• Most-commonly used mechanism for funding stormwater programs. • Easier to pass with 50% threshold and mailing process.	• Property-based fees must use a standardized methodology for calculating the fee. • Considerable effort and resources required with uncertain odds of success. • Approval process is more time consuming and expensive for staff. • Schools may have large fees and public schools may be exempt from fees depending on the agency's specific ordinance.	• Planning • Capital • O&M
Development Impact Fees: paid by an applicant seeking approval of a development project.	Could potentially be used to fund retrofits of adjacent public right-of-way areas with GI as part of development or redevelopment projects.	Cost for retrofitting streets can be leveraged through development activities.	If a fee is found to not relate to the impact created by the development project, or to exceed the reasonable cost of providing the public service, then the fee may be declared a "special tax" subject to approval by a two-thirds majority of voters.	• Planning • Capital

Funding Mechanism	GSI Specifics	Pros	Cons	Type of Funding
Grants: one time funds that require an application from a funding agency.	Can be used to plan, design and/or build GI.	Can fund programs or systems that would otherwise take up significant general fund revenues.	• Usually a one-time source of funding only. • May need to create new programs and systems for each grant. • Usually have strings attached for matching funds and other requirements. • Little control over timing of applications and payment can lead to difficulties in coordination with other programs and grants. • Can be very competitive and resource intensive to apply. • No guarantee of success. • Post-project O&M costs must be borne by the agency.	• Planning • Capital
Benefit Assessment and Community Facility Districts	Typically used to build and/or maintain facilities such as GI improvements and/or services.	Can be used to fund maintenance and operations.	Requires property owners and/or businesses to agree that the need is present and that they should be (at least partially) responsible for funding it.	• Capital • O&M
Integration with Transportation Projects: transportation funding is leveraged to cost-effectively include stormwater quality elements.	Installation and maintenance of GI facilities as part of integrated roadway programs.	• Roadway projects have more funding than stormwater programs and are generally more popular with the public. • Complete and green streets may be more popular with the public than traditional car-focused streets. • Green streets may be less expensive than traditional streets based on a life cycle cost analysis.	• Roadways have been designed in certain ways with expectations of costs and purposes for decades. • Many roadways are in poor condition and there is not enough funding to fix them all. • GI is perceived as an “added” cost which, could reduce the number of roadways that can be maintained. • Transportation funding is often restricted to certain roadway construction elements.	• Planning • Capital

Funding Mechanism	GSI Specifics	Pros	Cons	Type of Funding
Alternative Compliance: Allows developers the flexibility to build, or fund through payment of an in-lieu fee, off-site stormwater treatment systems for regulated projects or set up credit trading programs.	Leveraging development activities to build and maintain GI systems. In lieu fees can be used by developers who would rather make a lump sum payment and quickly complete their compliance requirements. Credit trading programs can incentivize non-regulated properties to retrofit impervious surfaces.	• Gives flexibility to site GI systems in locations that optimize pollutant loading reduction and other benefits to the community. • Allows for off-site stormwater treatment when stormwater management requirements can't be met within a regulated project site. • An in-lieu fee and/or credit trading system can be used to achieve additional retrofits and installation of GI.	• Can be difficult to come up with viable alternative locations for GI installations. • Can be difficult to quantify how much a developer should pay upfront for long-term maintenance costs that the municipality will bear. • May require agencies to modify the stormwater sections of their municipal codes to allow for the creation and/or use of the desired options/programs.	• Planning • Capital • O&M
Existing Permittee Resources: Utilize general funds for GI.	Could be used to plan, design, build and/or maintain GI.	Voter approval or new revenue sources not required.	• GI must compete with many other municipal priorities and essential services. • Normally not a viable option for substantial GI implementation.	• Planning • Capital • O&M
Volunteer Programs: provide community-based volunteer labor for specific tasks.	Use volunteer programs to help build or maintain GI facilities.	• A low-cost source of labor. • Educational program for community. • Can build support for a stormwater fee or other funding source.	• Can be time intensive for staff to set up and administer. • May not be dependable in the long run • May result in loss of municipal control depending on program specifics.	• Planning • Capital • O&M

6.6 Impervious Area Targets

As mentioned in Section 1.3.2, the focus of the GSI Plan is the integration of GSI systems into public rights-of-way. However, the MRP (Provisions C.11 and C.12) establishes a linkage between public and private GSI features and required reductions of pollutants in stormwater discharges. To help estimate the pollutant load reductions that can achieved by GSI during the 2020, 2030, and 2040 timeframes, the MRP requires that Permittees include in their GSI Plans estimated targets for the amounts of impervious surface to be "retrofitted" (i.e. redeveloped with GSI facilities to treat runoff from impervious surfaces) as part of public and private projects during the same timeframes.

The City worked with SCVURPPP staff to develop a methodology to predict the extent and location of privately- and publicly-owned land areas that will be redeveloped in their jurisdictions and whose stormwater runoff will be addressed via GSI facilities, and to derive impervious surface targets for GSI retrofits associated with these redevelopment projects. The methodology and results are described in Sections 6.6.1 and 6.6.2 below.

6.6.1 Methodology

The first step in the process used historic development trends to estimate the acres of redevelopment that will occur in the City by 2020, 2030, and 2040 from redevelopment of privately- and publicly-owned parcels that that would trigger C.3 requirements under the current MRP (i.e. C.3 regulated projects). Stormwater runoff associated with these parcels will be addressed via GSI facilities, as required by the permit.

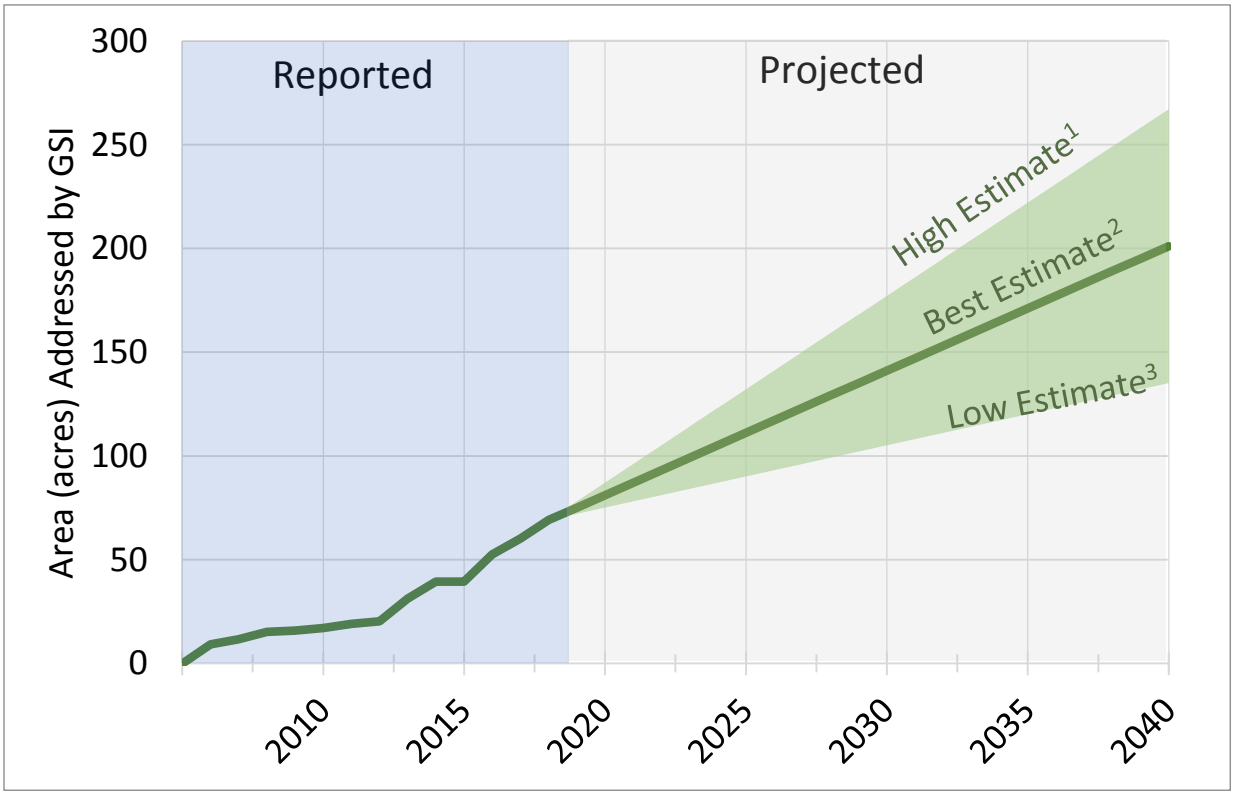
The second step was to estimate the acres of impervious surface associated with future redevelopment of these private and public parcels. To do this, it was necessary to predict the likely locations and types of land areas that are anticipated to be addressed by GSI in the future. Growth patterns and time horizons for development, along with algorithms to identify which parcels were likely to redevelop, resulted in preliminary estimates of the land area that is predicted to be addressed by GSI facilities in the City of Campbell by 2020, 2030, and 2040. Using the current land uses of the predicted locations of GSI implementation and associated impervious surface coefficients for each land use type, estimates of the amount of impervious surface that would be retrofitted with GSI on privately-owned parcels were developed.

The methodology focused on parcel-based redevelopment as the location and timing of projects in the public right-of-way is uncertain and the contribution to overall impervious surface treated by GSI expected to be minor relative to the acreage treated by C.3 projects.

6.6.2 Results

Using the methodology described above, a predicted redevelopment rate of 6.0 acres per year was calculated for the City of Campbell. "Best" estimates of the magnitude of land areas that is predicted to be addressed by future GSI facilities by the 2020, 2030, and 2040 milestones were calculated using the rate. "High" (i.e., 50% > "best") and "Low" (i.e., 50% < "best") estimates of future GSI implementation were also calculated to provide a range of potential redevelopment levels and account for uncertainty in the "Best" estimate. Figure 6-1 and Table 6-3 present the outputs of the analysis and represent the total

acreage known to be addressed by GSI[9] in Campbell through 2018, and the best estimate of the cumulative land area that will be addressed in 2020 (81 acres), 2030 (141 acres), and 2040 (201 acres) by GSI on private and public parcels in the City of Campbell.



[1]High estimate – projected from 150% of "Best Estimate; [2]Best estimate – rate of redevelopment based on 10-year average (2008-2017); and [3]Low estimate – projected from 50% of "Best Estimate"

Figure 6-1 Existing and projected cumulative land area (acres) anticipated to be addressed via Green Stormwater Infrastructure facilities installed via private redevelopment in the City of Campbell by 2020, 2030, and 2040.

Table 6-3 Projected cumulative land area (acres) anticipated to be addressed via Green Stormwater Infrastructure facilities via private redevelopment in the City of Campbell by 2020, 2030, and 2040.

Year	Low[1]	Best[2]	High[3]
Existing GSI[4]	-	**69**	-
2020	75	**81**	87
2030	105	**141**	177
2040	135	**201**	267

[1]Low estimate – projected from 50% of "Best Estimate"; [2]Best estimate – rate of redevelopment based on 10-year average (2009-2018); and [3]High estimate – projected from 150% of "Best Estimate"; [4]Total area addressed by parcel-based redevelopment projects with GSI completed through 2018 (excludes non-jurisdictional and green street and regional projects).

[9] This does not include the Hacienda Avenue Green Street Project, which was excluded because the methodology focused on parcel-based redevelopment and not GSI created by green-street or regional projects.

Table 6-4 lists the impervious surface percentage for each land use class, based on impervious surface coefficients typically utilized, and the estimated impervious surfaces that are predicted to be retrofitted by 2020, 2030, and 2040 in the City via GSI implementation on private and public parcels: 59 acres by 2020, 112 acres by 2030 and 164 acres by 2040. Note that these predictions do not include impervious surface that may be addressed by projects in the public right-of-way, and that these predictions have a high level of uncertainty because future redevelopment rates may increase or decrease relative to the historic development trends that the rate for Campbell was based on. Therefore, actual impervious surface addressed by GSI by the various milestones may increase or decrease relative to what is presented in Table 6-4.

Table 6-4 Actual (2002-2018) and predicted (2019-2040) extent of impervious surface retrofits via GSI implementation on private and public parcels in the City of Campbell by 2020, 2030, and 2040.

Previous Land Use	% of Area Impervious [a]	Retrofits via GSI Implementation									
		2002-2018		2019-2020		2021-2030		2031-2040		Total (2002-2040)	
		Total Area (acres)	Impervious Area (acres)	Total Area (acres)[c]	Impervious Area (acres)	Total Area (acres)	Impervious Area (acres)	Total Area (acres)	Impervious Area (acres)	Total Area (acres)	Impervious Area (acres)
Commercial	83%	15	12	0	0	11	9	11	9	38	31
Industrial	91%	9	8	4	3	3	3	26	23	42	38
K-12 Private Schools	67%	0	0	0	0	0	0	4	3	4	3
Residential - High Density	82%	4	3	3	2	24	20	8	6	38	31
Residential - Low Density	47%	11	5	2	1	3	1	0	0	16	8
Residential - Rural	10%	1	0	0	0	0	0	0	0	1	0
Retail	96%	24	23	0	0	21	20	10	10	55	53
Urban Parks	20%	0	0	0	0	0	0	1	0	1	0
Open Space[b]	1%	5	0	0	0	0	0	0	0	5	0
Totals		69	53	9	7	62	53	60	52	199	164
Cumulative [d]		69	53	78	**59**	139	**112**	199	**164**		

[a] Source: Existing Land Use in 2005: Data for Bay Area Counties, Association of Bay Area Governments (ABAG), January 2006

[b] Development totals from 2002-2018 may include new development of open space and vacant properties.

[c] The total area for 2019-2020 is based on facilities that are currently under construction or planned to occur prior to 2020 and not the Phase I redevelopment rate and may therefore deviate from the "Best" acres presented for 2020 in Table 1.

[d] Totals in this table differ slightly from predictions presented in Table 6-3 due to the inclusion of entire parcels in this table, as opposed to more generic "land areas" projections presented in Table 6-3.

6.7 Project Tracking System

A required component of the GSI Plan is to develop a process for tracking and mapping completed public and private GSI projects and making the information available to the public. The City will continue to implement existing internal tracking procedures for processing public and private projects with GSI, meeting MRP reporting requirements, and managing inspections of stormwater treatment facilities. In addition, the City will provide data to SCVURPPP for countywide tracking of completed public and private GSI projects. This countywide tracking tool can be used to document a project's pollutant reduction performance as well as overall total progress toward city or county-level stormwater goals

6.7.1 City Project Tracking System (Regulated and GSI)

The City is following the process described below to collect and track project information:

- Information on regulated projects is collected using the SCVURPPP C.3 Data Form. A table on the project plan sheets is used to collect data on site design or treatment measures installed for each drainage management area.
- Collected information is entered into a spreadsheet. This spreadsheet is updated as the project moves through the City's approval process. After the project is constructed, the spreadsheet is used to manage treatment measure inspections and enforcement actions.
- The same spreadsheet will be used to collect and track information on non-regulated (voluntary) GSI projects.

6.7.2 SCVURPPP Project Tracking System

SCVURPPP has developed a centralized, web-based data management system, with a connection to GIS platforms, for tracking and mapping all GSI projects in the Santa Clara Valley. The GSI Database provides a centralized, accessible platform for municipal staff to efficiently and securely collect, upload, and store GSI project data, and enhances SCVURPPP's ability to efficiently and accurately calculate and report water quality benefits associated with GSI projects. It also allows portions of the GSI project information to be made publicly available.

City staff will collect and manage information on GSI projects locally using the data management systems described in Section 6.7.1. City staff will directly enter project data into the SCVURPPP GSI Database annually through a web-based data entry portal for individual projects or upload data for multiple projects in batch using standardized formats.