



Green Infrastructure IMPLEMENTATION PLAN

Prepared for:

**City of Watsonville
Public Works and Utilities
250 Main Street
Watsonville, CA 95076**



City of Watsonville

Green Infrastructure Implementation Plan

3 December 2021

PRESENTED TO

City of Watsonville
Public Works and Utilities
250 Main Street
Watsonville, CA 95076

PRESENTED BY

Craftwater Engineering, Inc.
San Diego | Los Angeles
Tel 805.729.0943
www.craftwaterinc.com

Wateristas
Tel 510.778.4544
www.wateristas.com

2NDNATURE Software
Santa Cruz
Tel 851.426.9119
www.2ndnaturewater.com

KEY PROJECT PERSONNEL

Jackie McCloud, City of Watsonville
Project and Grant Manager

Alex Yasbek, City of Watsonville
Technical Lead

Cristy Cassel-Shimabukuro, City of Watsonville
Outreach Manager

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EXECUTIVE SUMMARY



*This **Green Infrastructure Implementation Plan** charts a path toward climate resilience that uses vegetation, soils, and natural processes to manage runoff, reduce temperatures, and meet community needs now and in the future.*

What is **GREEN** Infrastructure?

Projects that **SLOW**
SPREAD

and **SINK** water into the ground, and have additional benefits such as shade, safety, aesthetics and habitat enhancement.



These methods for slowing water infiltration go by a lot of different descriptions.

- Bioretention
- Bioswales
- Rain gardens
- Stormwater planters
- Edge-scaping

Planting trees give us many benefits: spreading the rainfall over a wide area, shading to reduce temperatures, beautifying our neighborhoods and increasing human health and well-being.

Rain friendly paving provides an alternative surface to streets, sidewalks and parking areas, so rain can soak into the surface instead of running off into the storm drain system.

Why is **GREEN** Infrastructure **GREAT** for Watsonville?



Where in Watsonville can we build **GREEN** Infrastructure?



PARKING LOTS



Before



After

PARKS & OPEN SPACE

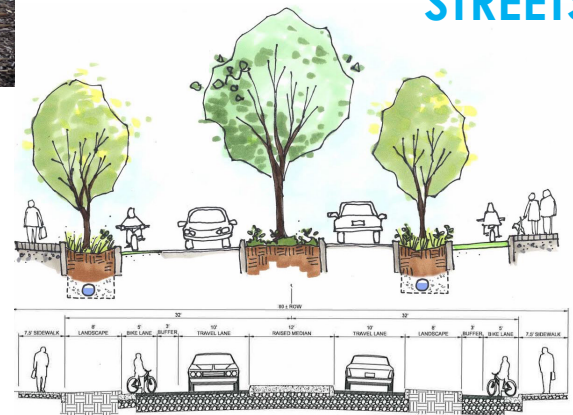


After



Before

STREETS



SCHOOLS



After



Before



How can we build more **GREEN** Infrastructure?

Our goal is to build and maintain green infrastructure projects throughout our town so we can address inequities, improve water quality, reduce heat island impacts, create recreation opportunities, and make our community safe and resilient.

ENGAGE THE COMMUNITY

Especially the diversity of stakeholders - such as investors, politicians and engineers - with potential to influence the implementation of projects and to share the advantages of implementing green infrastructure projects.

STRENGTHEN AND BUILD PARTNERSHIPS

Both internally, across City departments, and externally, with Watsonville Wetlands Watch and commercial or industrial developers.

ALIGN POLICIES

For example, by implementing a tree protection ordinance and an incentive program for residential and commercial tree planting.

BUILD AND MAINTAIN SUSTAINABLE PROJECTS

That address inequity in the community by understanding past and current patterns of exclusion and including remedies where appropriate. Projects will also address other climate change related impacts, such as providing shade and long-term maintenance funding.

How do we fund and finance **GREEN** Infrastructure projects?

GRANTS AND LOANS

Can originate from local, state, or federal sources and often require shovel-ready projects. Priority projects such as those identified in this plan can easily be made shovel-ready.

NEW REGIONAL FUNDING MEASURES

Such as a stormwater fee, would create a dedicated and reliable funding source instead of relying upon the general fund.

PUBLIC-PRIVATE PARTNERSHIPS

Could be especially beneficial to realizing the Watsonville Downtown Corridor green infrastructure vision by combining existing revenue streams with private funding.

CREDIT TRADING

Would allow private developers to fund offsite green infrastructure projects from a list, or “bank”, of pre-approved city of Watsonville projects.



Priority **GREEN** Infrastructure Projects

RAMSAY PARK - Use permeable pavement and bioretention in parking lots, green roofs, and channel naturalization to clean water flowing to Struve Slough.

Impervious Area Treated: 7.6 acres

Pollutant Load Reduction: 0.42 tons/yr

Runoff Reduction: 11.1 acre-ft/year

Cost: \$3.55M



DOWNTOWN CORRIDOR - Promote urban greening to enhance pedestrian passageways, improve stormwater quality, and reduce heat island effects in concert with the Watsonville Downtown Specific Plan.

Impervious Area Treated: 2.75 acres

Pollutant Load Reduction: 0.28 tons/yr

Runoff Reduction: 4.5 acre-ft/year

Cost: \$1.72M



DOWNTOWN PLAZA - Install permeable pavement and use bioretention features to clean water and slow traffic.

Impervious Area Treated: 2.55 acres

Pollutant Load Reduction: 0.18 tons/yr

Runoff Reduction: 11.1 acre-ft/year

Cost: \$245,000



ROLLING HILLS MIDDLE SCHOOL - Create a protected bike lane and sidewalk to create a safe route to school using bioretention features that also clean water and improve aesthetics.

Impervious Area Treated: 9.8 acres

Pollutant Load Reduction: 1.66 tons/yr

Runoff Reduction: 17.8 acre-ft/year

Cost: \$370,000



WATSONVILLE HIGH SCHOOL - Use permeable pavement, bioretention, and rainwater harvesting to create high visibility projects than enhance the environment - and integrate into educational programming (e.g., FFA).

Impervious Area Treated: 12.73 acres

Pollutant Load Reduction: 1.90 tons/yr

Runoff Reduction: 20.56 acre-ft/year

Cost: \$1.89M



What's next?

ENGAGE THE COMMUNITY

Short Term (1-2 years):

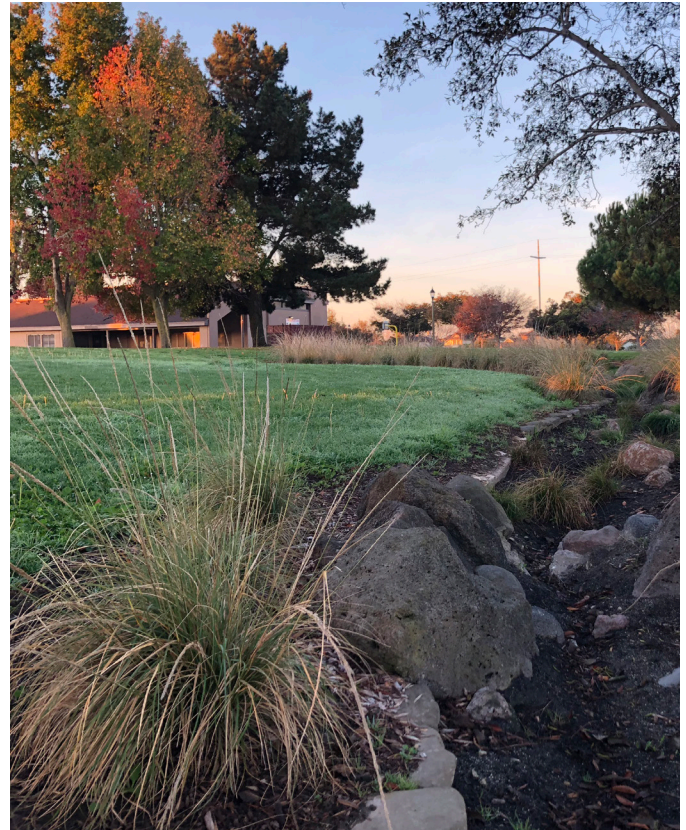
- Develop bilingual homeowner tree planting and maintenance guides
- Define target stakeholders (e.g., investors, politicians, engineers, local community and advocacy groups), their interests and needs and potential to collaborate or influence project outcomes
- Publish City approved standard engineering details and specifications for green infrastructure, including tree plantings within roads

Medium Term (2-5 years):

- Compile evidence and tailor key messages and evidence for target stakeholders

Long Term (5-10 years):

- Communicate the business case for building green infrastructure in our community to diverse audiences using a multi-sector and culturally appropriate strategy



STRENGTHEN & BUILD PARTNERSHIPS

Short Term (1-2 years):

- Expand City partnership with Watsonville Wetlands Watch for green infrastructure maintenance and outreach by, for example, consolidating existing contracts and funding sources or drafting a scope of work to extend over a longer time frame
- Build framework for regional collaboration for a new funding measure
- Identify key partners for Public-Private Partnerships in downtown development

Medium Term (3-5 years):

- Collaborate to draft a new stormwater funding measure with regional partners
- Implement 2 projects through Public-Private Partnerships

Long Term (5-10 years):

- Implement 5 projects through Public-Private Partnerships



Illustration by Amy West www.amy-west.com

What's next?

ALIGN POLICIES

Short Term (1-2 years):

- Draft a Tree Protection Ordinance
- Integrate green infrastructure into the Downtown Specific Plan
- Develop a residential and commercial tree planting incentive program

Medium Term (3-5 years):

- Expand the existing development buffer around wetlands and other natural areas in the City of Watsonville
- Adopt policies that ensure new construction includes tree planting requirements

Long Term (5-10 years):

- Pass and implement a new funding measure

BUILD & MAINTAIN PROJECTS

Short Term (1-2 years):

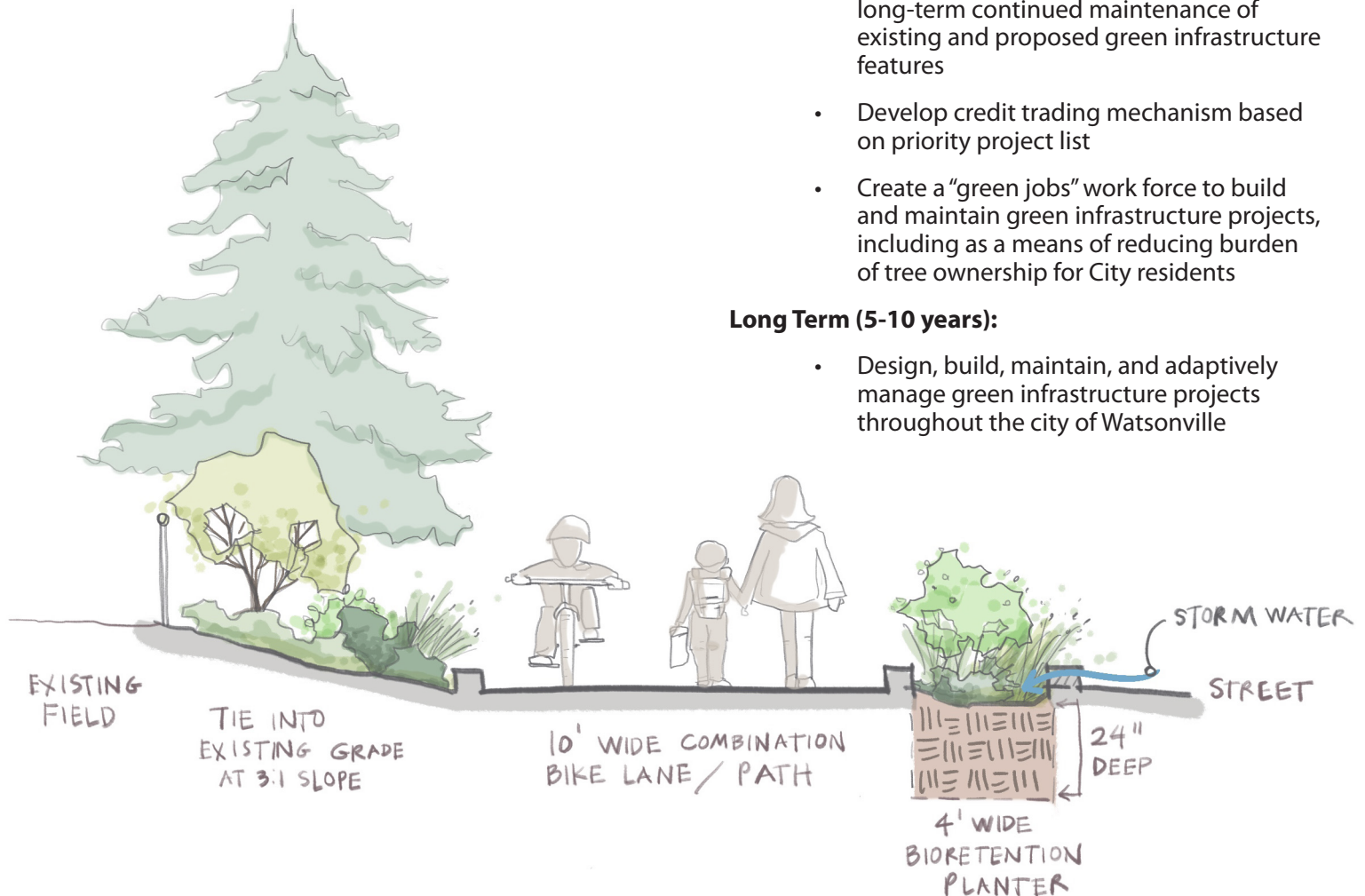
- Apply for grants and loans for the 5x high priority green infrastructure projects
- Design shovel-ready tree planting projects for City property or neighborhood areas
- Foster development of Watsonville Wetlands Watch commercial and residential tree planting pilot programs
- Create a database of existing green infrastructure features in the City that identifies maintenance responsibilities and costs

Medium Term (3-5 years):

- Expand list of high priority ("bankable") projects that address inequities, heat stress, and other climate change impacts
- Identify the current funding gap for long-term continued maintenance of existing and proposed green infrastructure features
- Develop credit trading mechanism based on priority project list
- Create a "green jobs" work force to build and maintain green infrastructure projects, including as a means of reducing burden of tree ownership for City residents

Long Term (5-10 years):

- Design, build, maintain, and adaptively manage green infrastructure projects throughout the city of Watsonville



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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
ac-ft	acre-feet
BMP	Best Management Practice
CAAP	Climate Action & Adaptation Plan
cfs	cubic feet per second
EPA	Environmental Protection Agency
ft	feet
GI	Green infrastructure
GIIP	Green Infrastructure Implementation Plan
hr	hour
IRWM	Integrated Regional Water Management
LHMP	Local Hazard Mitigation Plan
LID	Low Impact Development
MS4	Municipal Separate Storm Sewer System
NAIP	National Agriculture Imagery Program
NHD	National Hydrography Dataset
RAA	Reasonable Assurance Analysis
ROW	Right-of-Way
TMDL	Total Maximum Daily Loads
yr	year

1.0 BACKGROUND & CONTEXT

1.1 OVERVIEW

The City of Watsonville (City) has already taken deliberate, proactive steps to enhance community and environmental resiliency, including development of a Climate Action & Adaptation Plan (CAAP), Local Hazard Mitigation Plan (LHMP), Urban Greening Plan, receipt of an Urban Forestry Grant, and participation in the Santa Cruz Integrated Regional Water Management (IRWM) Plan, among other efforts. Local groups and advocates (including the Watsonville Wetlands Watch) have also taken active roles in implementing nature-based projects and programs. Each of these efforts point the City toward implementing green infrastructure (GI) as a multi-benefit climate adaptation strategy.

To accelerate GI implementation progress, the City was awarded the California Resilience Challenge Grant by the Bay Area Council to “...increase climate adaptation and community resiliency by increasing water quality and supply, reducing flooding, combating urban heat island effects, and improving neighborhood vitality and overall community aesthetics...” In response to this grant, the City developed this comprehensive GI Implementation Plan (GIIP). This GIIP contains the following critical elements and each are outlined in the following sections:

- **Outlines goals and objectives by which the City can monitor progress,**
- **Develops and deploys a site selection methodology that identifies green infrastructure priority areas including organizing results into a “living” and interactive format to enable future adaptive management,**
- **Identifies 4 feasible conceptual designs and 1 conceptual plan for priority areas,**
- **Positions the City for future funding strategies, and**
- **Meaningfully engage with key stakeholders to gain public buy-in and support.**



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1.2 PROJECT DRIVERS

The City has produced numerous plans that are relevant to green infrastructure, low impact development, and climate action and adaption. In review of these plans (full summary found in Appendix D) and during targeted interviews with City staff and public surveys (Appendix C), common themes for plan development emerged, inclusive of the most recent Watsonville 2030 CAAP. Based on the review of these past efforts and interviews, the key drivers for encouraging wider adoption of green infrastructure through this implementation plan are:

- 1) Water Quality Protection,
- 2) Urban heat island effects,
- 3) Climate and community resiliency, and
- 4) Complete streets including alternative transportation and pedestrian safety.

These drivers are described in further detail below.

1.2.1 Water Quality Protection

Watsonville is surrounded and interlaced with creeks, rivers, and sloughs of varying quality, but all serve as critical components to the City's ecology and economy. To protect these valuable water resources, the City is required to comply with the Municipal Separate Storm Sewer System (MS4) discharge limits and address identified water quality issues. The Environmental Protection Agency (EPA) has identified and listed the following water bodies as 'impaired' as per Section 303(d) of the Clean Water Act.

Table 1. Summary of local 303(d) listed waterbodies.

WATER BODY	IMPAIRMENT	WATER BODY	IMPAIRMENT
Pajaro River	Chlorpyrifos & diazinon (pesticides)	Watsonville Slough	Pathogen
	Fecal coliform	Corralitos Creek	Pathogen
	Nutrients	Salsipuedes Creek	Pathogen
	Sediment	Struve Slough	Pathogen

To address the listed impairments, various total maximum daily loads (TMDLs) have been designated to regulate the discharge of pollutant into water bodies near or within Watsonville. The TMDLs include the following:

Table 2. Summary of local TMDLs.

WATER BODY	TMDL	WATER BODY	TMDL
Pajaro River	Chlorpyrifos & diazinon (pesticides)	Watsonville Slough	Pathogen
	Fecal coliform	Corralitos Creek	Pathogen
	Nutrients	Pinto Lake	Phosphorus
	Sediment		

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In addition to local impairments and TMDLs, the State of California has directed that all jurisdictions are to fully capture trash from high priority trash generating areas through the Trash Implementation Program. Community surveys identified poor water quality as a top concern and desire improved sustainable building practices like GI.

1.2.2 Present Heat Island Effects

Throughout the City, the combination of significant imperviousness and lack of tree canopy contribute to elevated temperatures that can be multiple degrees warmer than the surrounding neighborhoods. This “heat island effect” contributes to increased energy consumption, compromised human health and comfort, elevated emissions of air pollutants and greenhouse gases, and impaired water quality. Elevated temperatures increase demand for air conditioning to cool buildings, which increases the overall electricity demand and the peak energy requirements. The elevated energy required increases the air pollutants and carbon emissions through the increased demand on electric plants burning additional fuels. Heat island effects also increase daytime temperatures, reduce nighttime cooling, and elevate air pollution levels that in turn contribute to heat-related illnesses and deaths; in fact, the Centers for Disease Control and Prevention report that extreme heat is the leading weather-related, yet preventable, killer in the United States. Finally, the warmer surfaces increase the runoff water temperatures leading to warmer receiving waters that impact aquatic life and water quality (EPA 2020).

Often times, Cities struggle to expand tree plantings to public right of ways or residential areas due to limited space, utility conflicts, inappropriate trees (used in the past leading to messes), and maintenance responsibility, amongst other issues. Trees play an important role in reducing heat island; gaining public acceptance will be a key driver to project success.

1.2.3 Climate and Community Resiliency

Climate change is projected to cause impacts to communities through rising temperatures, fewer but more intense rain events, and longer periods of drought and flooding. The State of California requires climate change adaptation strategies to protect communities and critical infrastructure from climate impacts. Various laws have been adopted to reduce greenhouse gas emissions within all communities throughout the state (AB 32 and EO S-3-05), and increasing focus is being placed on the impacts to the hydrologic cycle. In addition, the Governor’s office N-82-20 Executive Order requires the state to conserve 30% of the state land and coastal waters by 2030. Because managing stormwater with green infrastructure uses natural installations and processes to process stormwater, it is directly tied to how communities adapt to the impacts of climate change. Designing around these natural processes and the resilience and protections they can offer when integrated into the built environment should be an emphasis in any future stormwater plans.

A full discussion on the driver can be found within the Watsonville 2030 CAAP.

1.2.4 Complete Streets

Streets act as the means to connect communities and encourage unity throughout a city. Downtown Watsonville hosts many of the City’s major destinations and serves as the heart of the City, and has been heavily influenced by the presence of Highway 152, which has historically connected the major agricultural businesses to Downtown. However, highway design requirements set forth by the State prioritize the movement of automobiles over other modes such as pedestrians and cyclists, which has subsequently impacted the function and aesthetic of other streets within the Downtown area. Per the Downtown Watsonville Complete Streets Plan, the City ranks worst for pedestrian safety overall when compared to 103 other similar sized cities--only 3% of Watsonville trips are made by bicycle or foot while 75% of reported deaths and serious injury from automobile accidents occur to cyclists and

pedestrians (Watsonville 2019). Incorporating pedestrian and cyclist safety elements through the use of GI will encourage alternative transportation methods while increasing urban greening.

1.3 GOALS & OBJECTIVES

The local drivers above directed the development of overall programmatic goals, and these goals give the City meaningful targets with which to direct their efforts. The GI projects that are identified and prioritized within this Plan are intended to best meet the following specific objectives that will advance the City towards the specific goals laid out in associated initiatives:

- 1) Maximize pollutant reduction and runoff capture,
- 2) Reduce heat island impacts, and
- 3) Prioritize community enhancement and safety.

These objectives are described in further detail below, and metrics for measuring the impact of this GIIP are described in Section 3.0.

1.3.1 Maximize Pollutant Reduction & Runoff Capture

The primary objective of implementing GI is to maximize pollutant reduction and runoff capture. This provides progress towards water quality protection and increasing resiliency through augmentation of the local water supplies. GI projects are designed to target specific pollutants including those identified impairments outlined above. Part of this GIIP is to identify various types of projects to demonstrate the setting in which they can have the greatest impacts. Each project will evaluate the reduction in peak flow rates, volumes, and pollutant loading relative to the baseline conditions. The goal is to meet the mandated TMDL waste load allocations and implement 100% trash reduction strategies within high-priority trash generating land uses.

1.3.2 Reduce Heat Island Impacts

The secondary objective of implementing GI is to maximize the reductions of heat island impacts. This objective is met by increasing the tree canopy or vegetated cover within the City, especially within the highly impervious urban corridors. The increase in tree canopy or vegetated cover will provide much-needed shade and lower the overall temperatures. In addition to the lowering of the temperatures, the newly added trees/plants will provide added carbon sequestration as required by the Climate Action & Adaptation Plan. These added values from GI help create climate and community resiliency. The heat island offset can be measured through temperature monitoring or engagement with residents as additional trees are added throughout the City, and a tracking of the overall canopy/cover provides a meaningful metric to measure progress. The City has identified a greenhouse gas reduction goal of 80% of the 1990 levels within the 2030 CAAP and have an additional goal of increasing the present 8% tree canopy to the recommended 40% target as identified within the Street Tree Planting Plan. This ambitious target will be further refined within the forthcoming Urban Forestry Management Plan to establish an achievable, realistic goal for the City. Achieving progress towards these goals will reduce the heat island impacts.

1.3.3 Prioritize Community Enhancement and Safety

Placing projects within high trafficked areas and providing added community safety are the final objective of the GIIP. Identifying areas where people congregate and providing safe alternative transportation modes and traffic calming features will make the City's built environment safer and more enjoyable. Additionally, placing projects within highly visited areas afford the opportunity to provide public education and outreach. The City has adopted the Vision Zero goal of having zero fatalities by the year 2030 and adoption of GI practices can help the City in pursuit of this goal.

1.4 OVERCOMING BARRIERS TO IMPLEMENTATION

GI implementation by a municipality can potentially be inhibited by a variety of external and internal barriers, including limited resources, issues with public perception and a lower risk tolerance. The EPA identified the most common barriers municipalities deal with when adopting GI:

- Perception that Performance is Unknown
- Perception of Higher Costs
- Perception of Resistance within Regulatory Community
- Perception of Conflict with Principles of Smart Growth
- Perception of Conflict with Water Rights Law
- Unfamiliarity with Maintenance Requirements and Costs
- Conflicting Codes and Ordinances
- Lack of Government Staff Capacity and Resources

In addition to the barriers identified by the EPA, other possible challenges to implementation can include:

- Lack of adequate protection measures for existing green infrastructure
- Lack of construction standards and specifications for upgrading existing infrastructure
- Lack of requirements for implementation of GI within new construction

For Watsonville, no specific code and ordinance was identified that creates a barrier to implementation. However, zoning density standards, storm drain connection requirements, and minimum parking/road widths are items that can be further evaluated as new GI practices are identified and desired for implementation. The City is actively pursuing GI projects and have funding available from state and local grant agreements. In fact, the City has already established several Design Guidelines, Guiding Principles, and Standards, such as the Livable Community Residential Design Guidelines and Watsonville Urban Greening Plan, that recognize the benefits of and actively encourage the use of green infrastructure.

While ordinance and code barriers do not exist, interviews of the City staff and community were performed to gain greater insight into the local feelings of GI. These interviews indicated there is still an education effort that is warranted to streamline GI implementation. While GI is gaining momentum and is being adopted throughout the City, there exists a tendency by engineers to turn to conventional tools to solve a stormwater drainage issue which is exclusive of GI. Education efforts to overcome any hesitations can be employed to increase GI use throughout the City in both public and private projects. Further GI guidelines, standard details, and specifications can help provide specific direction for the adoption of GI on all new development and site retrofits. This consistency builds comfort, local capacity, and increases the likelihood of adoption.

In conjunction with the education of utilizing GI to overcome drainage issues, evaluation of local unit costs data can be pursued. Many costs of GI elements are misunderstood or misrepresented within engineer cost estimates, thus providing an unfair comparison between green and grey solutions. Robust research of GI unit costs can be undertaken to educate engineers on the real costs of implementing GI.

The final barrier facing the City is the uncertainty of the long-term operations and maintenance of GI. The City is actively intending to work to expand their partnership with Watsonville Wetlands Watch for maintenance and outreach activities over a longer time frame. The asset management database (2NFORM) serves as a repository of the responsible party, frequency, funding need, and funding source. As funding opportunities are pursued, the long-term care of these GI projects requires careful consideration.

Overall, the City is well-positioned to adopt green infrastructure as a standard approach to simultaneously manage stormwater and improve community resiliency. A full discussion on the barriers to implementation can be found in Appendix E.

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2.0 CITYWIDE ASSESSMENT

The following section summarizes the unique stormwater setting of the City of Watsonville, existing projects that are under design or construction, and how stormwater data was utilized in developing new opportunities for the City as a part of this Plan.

2.1 EXISTING STORMWATER SETTING

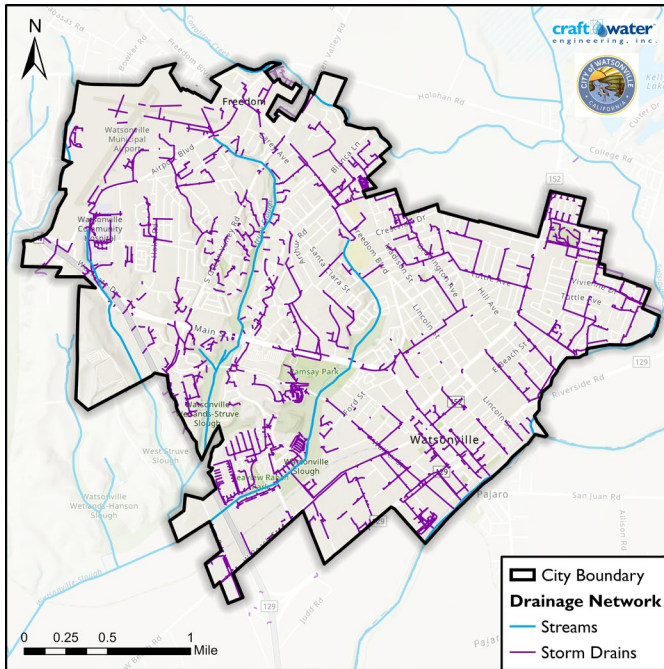


Figure 1. City of Watsonville storm drain network.

Storm drains and open channels in the City collect and ultimately convey stormwater runoff to both the Pajaro River and Watsonville Slough System. Approximately 60+ miles of storm drains within the City convey flows to these water bodies.

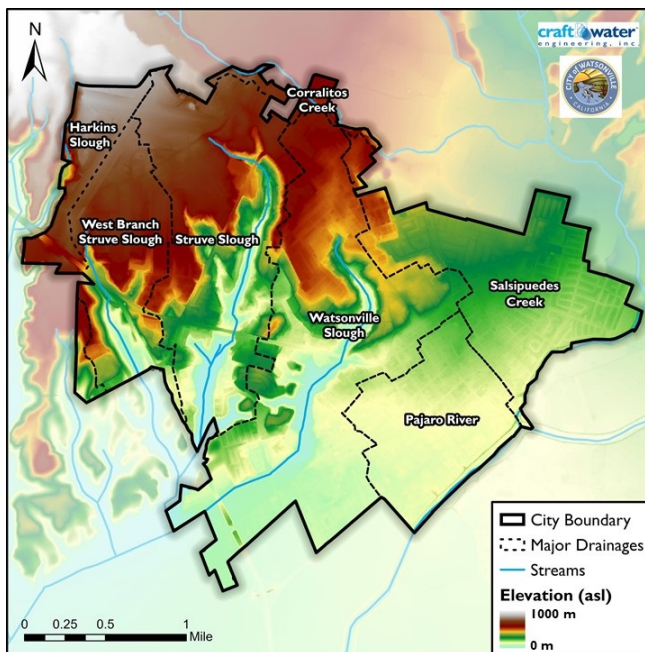


Figure 2. City of Watsonville elevation map.

Elevation in the City ranges from a high of approximately 170 ft. above sea level (asl) to as low as about 5 ft. asl. These elevations form multiple major drainage in the City, with flows predominantly along the Struve Slough, Watsonville Slough, and Pajaro River (moving west to east).

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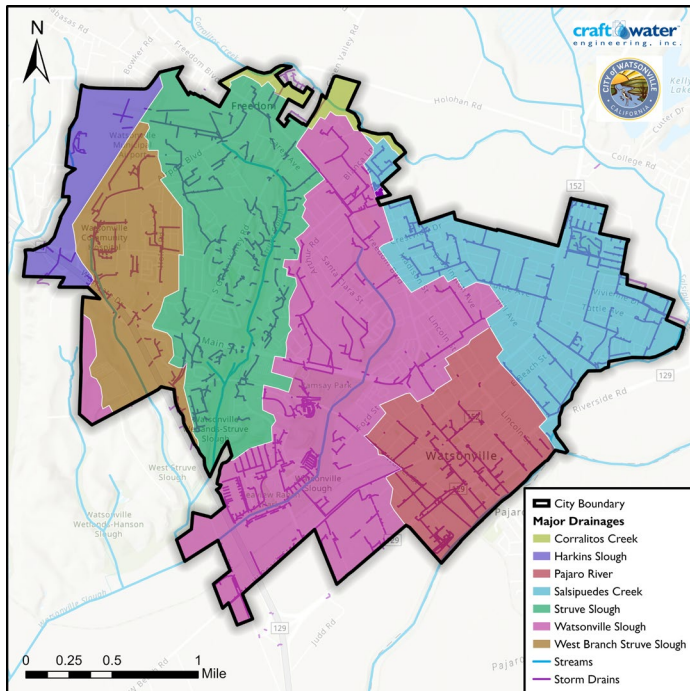


Figure 3. City of Watsonville major drainage areas.

Topography and the storm drain network combine to define urban drainage areas. Because of the topographical ridges in Watsonville, there are six major drainages; Pajaro River, Salsipuedes Creek, Harkins Slough, Struve Slough, Watsonville Slough, and West Branch Struve Slough. The northwestern portion of the City drains to the four sloughs and represents approximately 69% of the City area. The southeastern portion of the City (30%) drains along storm drains and eventually to the Salsipuedes Creek or Pajaro River before reaching the Monterey Bay.

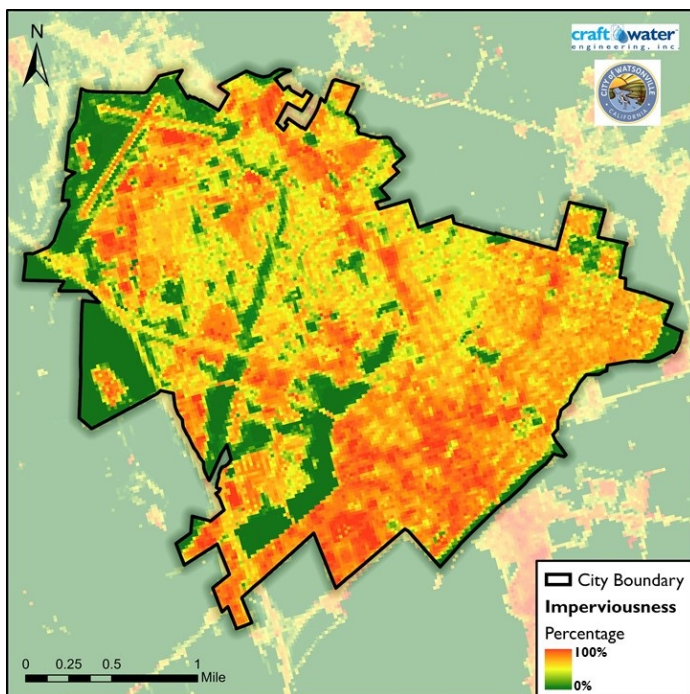


Figure 4. City of Watsonville imperviousness.

Imperviousness is typically correlated to runoff production and water quality impairment in urban watersheds, and areas of highest imperviousness often require greater levels of treatment with GI to effectively treat associated stormwater. Patterns of imperviousness across the City (as shown from the National Land Cover Dataset for 2016) are relatively evenly distributed, with highly developed urban areas intermixed with more residential patterns of development. Large areas of low imperviousness (green) are typically associated with parks and drainages.

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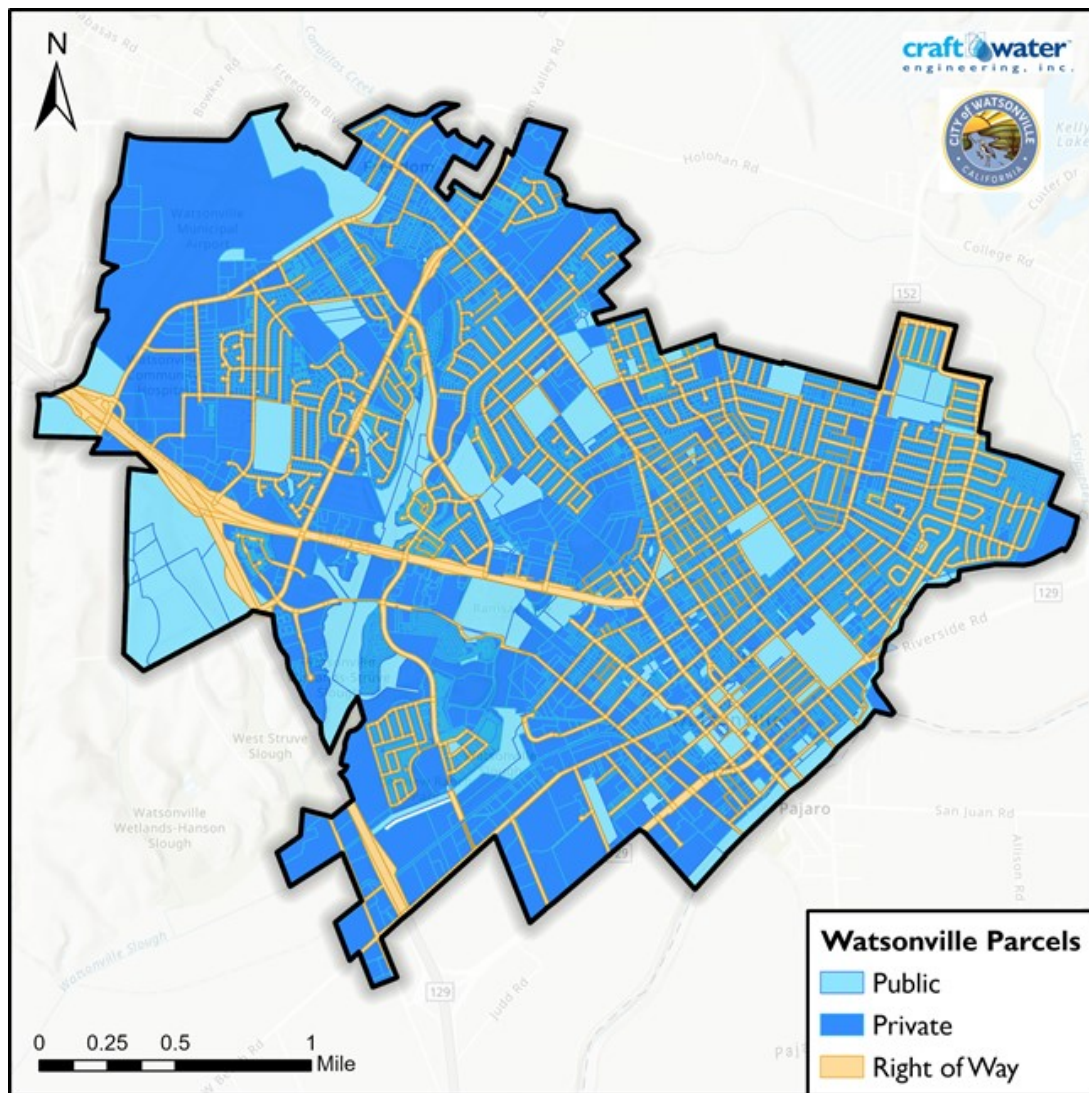


Figure 5. City of Watsonville parcels by ownership and right-of-way.

Public parcels and rights-of-way (ROW) often offer the most cost-effective project opportunity sites for urban GI retrofits due to existing civic ownership and management. Oftentimes the parcels are associated with parks and open space that have an even greater ease of redevelopment for stormwater purposes, with project funding typically made available to improve site amenities in conjunction with stormwater treatment projects. Cross-referencing the above map (**Figure 5**) with the previous map of imperviousness (**Figure 4**) demonstrates the overlap in these areas. These public parcels formed the basis for analysis to identify new GI opportunities for the City. However, it should be noted that if additional or site-specific best management practices (BMPs) are needed in the future, public ROW is an additional option. Opportunities in the ROW come with some challenges (traffic control/disruption, buried and overhead utility conflicts), but targeted BMPs can be implemented on a case-by-case basis at a typically smaller scale as identified in this Plan.

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2.2 EXISTING GI PROJECTS

The City presently has recorded 19 GI projects throughout the City that are under construction and 28 projects that are currently in design (as identified in 2NFORM). The parcels and rights-of-way associated with these opportunity locations were included in the BMP prioritization portion of the Plan, and modeling was utilized to size and quantify the potential total benefits alongside the newly identified opportunities. This allows for greater possible attention to be pressed on any opportunity that rose to the top of the Plan analysis. **Figure 6** provides the locations of these existing efforts within the City and a full listing of the projects can be found within the 2NFORM platform (<https://ram.2nform.com/>).

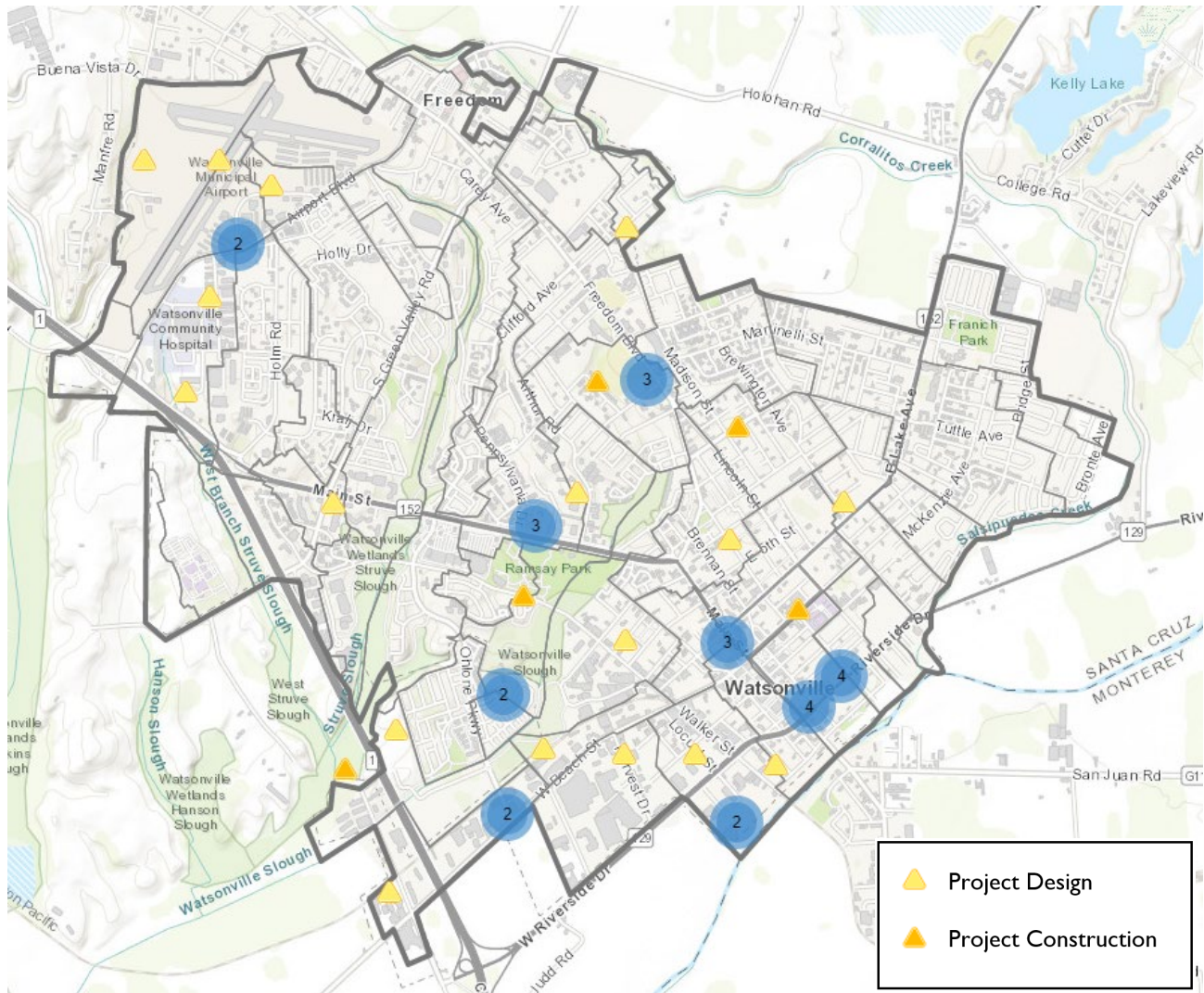


Figure 6. City of Watsonville GI in design or construction.

2.3 FINDING NEW PROJECT OPPORTUNITIES

All the above data were combined with geospatial analysis, pairing potential project types with potential locations with data informing the likelihood of success for a BMP opportunity at a given location (such as implementable parcel area, potential drainage area treated, imperviousness of potential drainage area, utility conflicts, etc.). This information was initially used to predict potential project success, then the following steps were conducted to further screen and define BMP opportunities.

2.3.1 GI Types – Defining the “What”

Different stormwater BMPs function best in different settings and some may be infeasible in certain locations due to constraints or engineering challenges, so the first step to identifying opportunities across the City is to focus on specific BMP types that will work best to meet programmatic goals. The barriers to GI study (Section 1.4) identified four major BMP types that could be implemented in pilot locations to garner increased buy-in from other City agencies and partners and would offer feasible scaling to city-wide implementation. These are as follows, and form the focus of the analysis to identify the best locations across Watsonville where these BMPs would best fit:

- **Green Roofs** – vegetated filtration/detention of rain falling on large impervious rooftops for full treatment and urban heat island cooling effects
- **Parking Lot Permeable Pavement** – on-site retention of runoff deriving from large parking areas that could be combined with small targeted bioretention cells in parking island areas
- **Green Streets** - street-scale implementation of sidewalk tree wells, bioretention bulb-outs, and parklets
- **Detention Pond Retrofits** – enhancing existing City detention basins/ponds for increased capture and treatment, sustainable maintenance, and possible expanded treatment opportunities

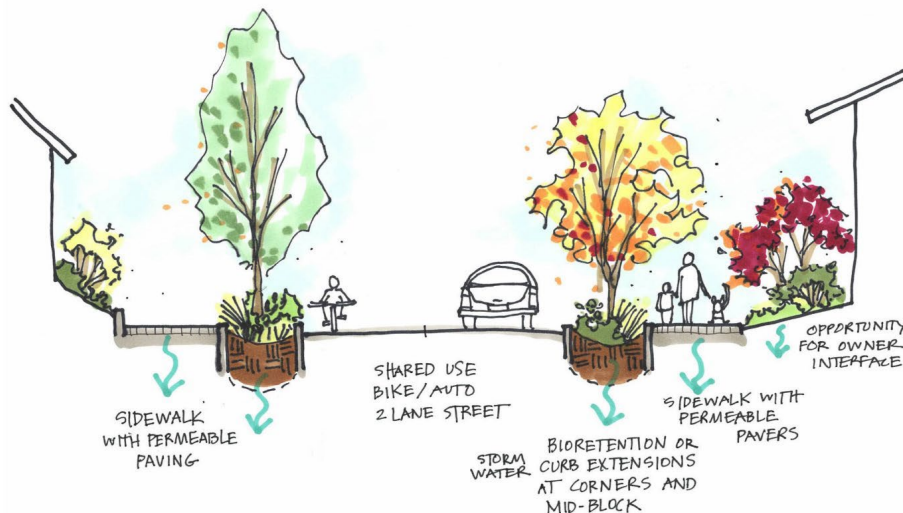


Figure 7. Example Green Street BMP that can manage stormwater with vast multi-benefits.

For more information on these different GI Types, their maintenance requirements, design considerations, and estimated unit costs, please refer to the San Francisco Stormwater Management Requirements & Design Guidelines¹ and the California Stormwater Quality Association Municipal BMP Handbook².

¹ <https://sfpu.org/construction-contracts/design-guidelines-standards/stormwater-requirements>

² <https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook>

2.3.2 Feasible Locations – Defining the “Where”

Once BMP types were determined, a feasibility analysis was conducted to determine where these BMPs could be best located across the City subject to site constraints and conditions. This assessment focused on publicly owned parcels and ROW areas (**Figure 5**) as these are the most readily available and cost-effective areas to implement infrastructure. The different BMP types each have different settings where they can be implemented, and some of these are inherent to each specific typology.

Green roofs must be sited atop buildings, so rooftop areas were identified from Santa Cruz County GIS data. Rooftop area was summarized at the parcel scale for further analysis. Parking lot permeable pavement is best suited in parcels with large areas of impervious surface. Spectral imagery classification using high-resolution imagery from the National Agriculture Imagery Program (NAIP) was used to classify land cover surfaces across the City (**Figure 8**). This analysis was augmented with Santa Cruz County rooftop data and water body delineation from the National Hydrography Dataset (NHD). City ROW areas were targeted for the potential incorporation of green streets and existing detention basins formed the focus of potential retrofit analysis.

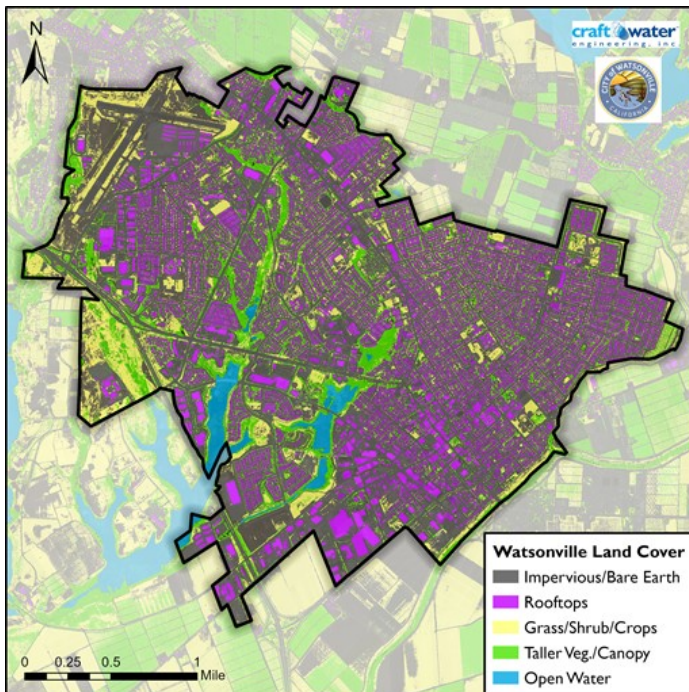


Figure 8. City of Watsonville land cover.

Certain GI practices require specific land use settings to ensure proper form and function. The land cover categories were broken up into impervious/bare earth, rooftops, grass/shrub/crops, taller vegetation/canopy, and open water. The data was developed using spectral imagery classification and supporting datasets provided by the City.

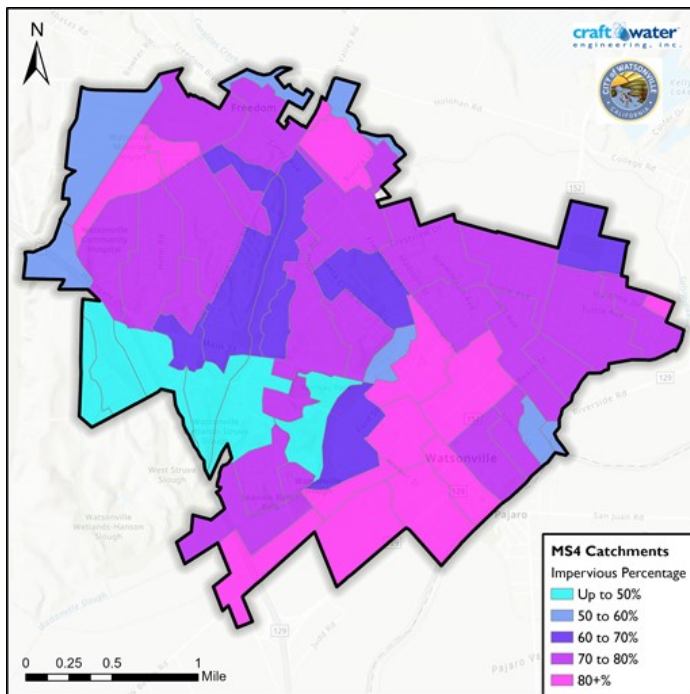


Figure 9. City of Watsonville catchment impervious.

In addition to the more granular imperviousness across the City highlighted in **Figure 4**, the MS4 catchment imperviousness helps to focus efforts where significant portions of runoff are anticipated to accumulate. The southern portion of the City has significant overall imperviousness leading to a heavy focus placed within these areas.

Feasible locations were assessed by BMP type using the derived land cover dataset (**Figure 8**) and the overall MS4 catchment imperviousness (**Figure 9**) to provide preliminary opportunity rankings at the relevant scale that would focus the detailed engineering review of site conditions and constraints and further narrow the field of evaluated options. For green roofs, parcels with higher rooftop coverage as well as those located in MS4 catchments with higher imperviousness were ranked highest to focus the full engineering review in these locations first in developing a more narrowed candidate opportunity list (**Figure 10**). A similar ranking was used for parking lot permeable pavement opportunities except these measured non-building footprint impervious areas on each parcel (**Figure 11**). For green streets, ROW parcels with the lowest percentage of canopy coverage were ranked highest (**Figure 12**). Again, ROW parcel rankings were balanced with MS4 catchment imperviousness using a geometric mean-based ranking to ensure that opportunities of similar parcel condition in catchments of highest imperviousness would be evaluated first and foremost. Finally, a spatial assessment of existing detention basins was conducted, but further engineering details of the existing conditions at these locations will be required for further review and will be provided by the City at a later date (**Figure 13**).

2.3.3 Interview Site Identification

In addition to the GIS analysis, interviews were conducted with representatives from the Public Works, Planning, Field Services, Parks and Recreation, and Engineering Services departments (in addition to the Watsonville Wetlands Watch) to identify possible synergistic projects with other known efforts that the City has planned. These interviews identified 16 additional project locations that were manually added to the engineering analysis to evaluate the possibility of GI elements. The projects deemed feasible were characterized and included within the prioritization modeling (discussed in Section 3.0). The full list of these projects and the summary of interviews including the corresponding slides can be found in Appendix C.

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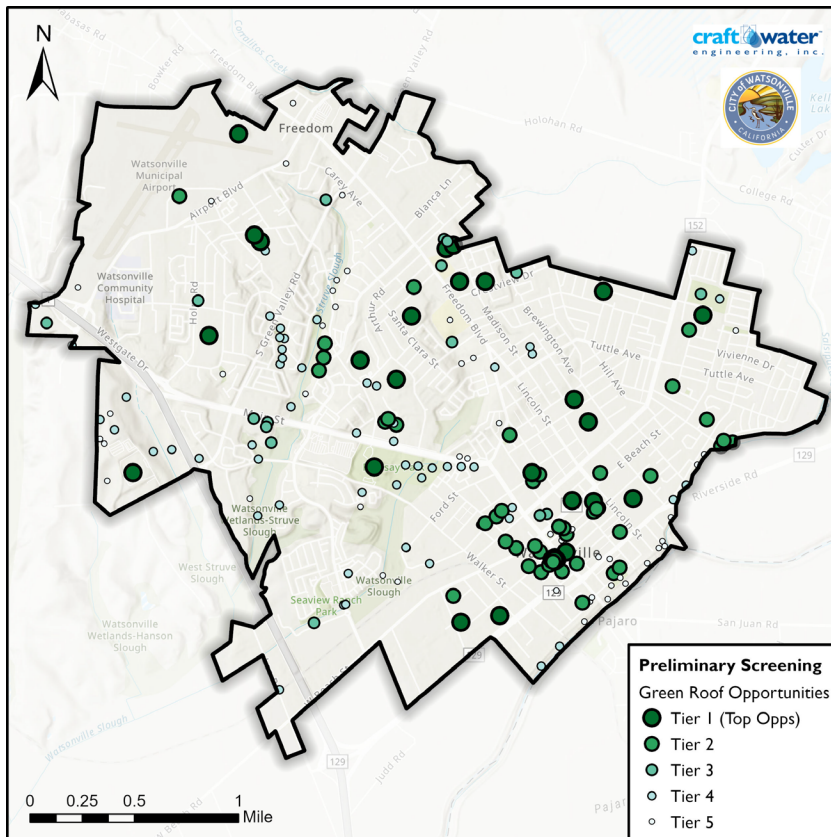


Figure 10. Preliminary opportunity screening for Green Rooves.

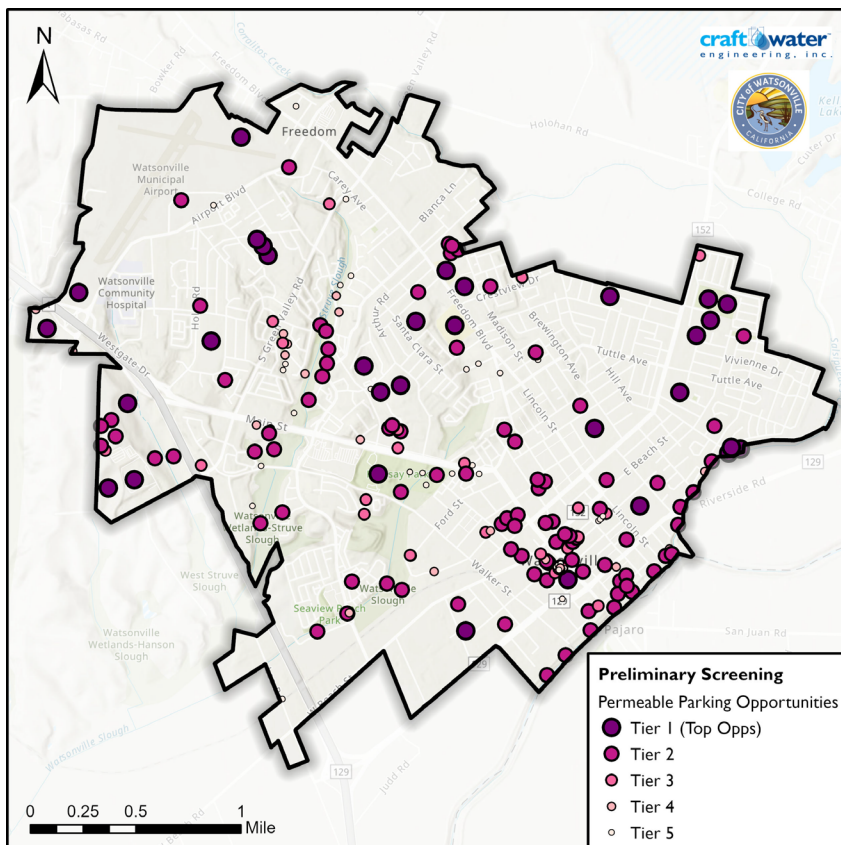


Figure 11. Preliminary opportunity screening for Parking Lot Permeable Pavement.

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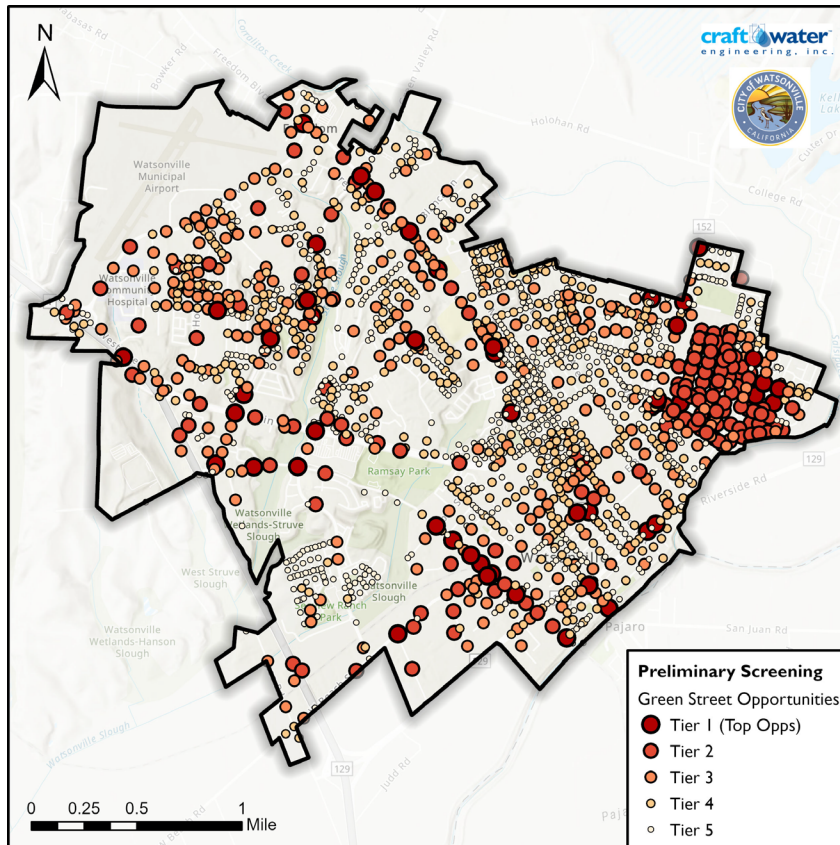


Figure 12. Preliminary opportunity screening for Green Streets.

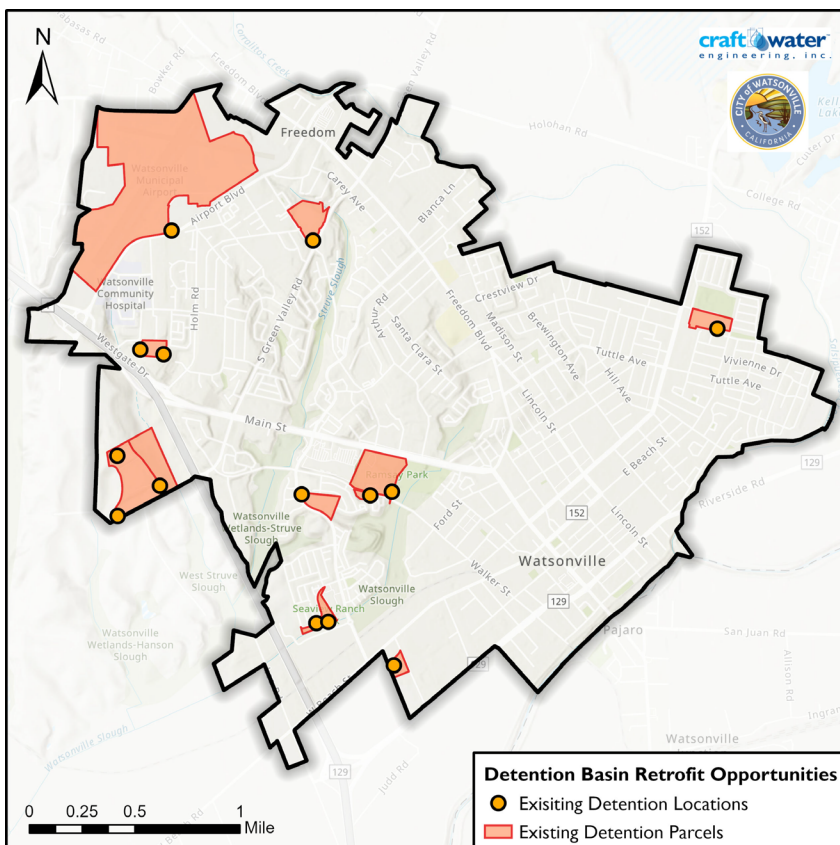


Figure 13. Preliminary opportunity screening for Detention Pond Retrofits.

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2.3.4 Detailed Engineering Feasibility Review

Preliminary screening analysis of the full candidate list of project opportunities were reviewed by the engineering team to screen out locations where site implementation of GI projects would be difficult, costly, or even infeasible. Preliminary opportunity rankings were used to order this review and focus on the top tiers of opportunities first with in-depth detailed desktop site review. This review employed all datasets provided by the City related to their stormwater infrastructure and other utilities as well as elevation datasets, previously mentioned land cover data, and both aerial and street-level site imagery. By reviewing each of the top sites with “engineering eyes”, more challenging or less impactful sites were screened out from the start. Also, site familiarity was developed within the engineering team through this analysis that led to informative conversation and feedback with City staff as well as a robust understanding of the City as a whole and where projects might be bundled across individual parcels to provide even greater breadth to the concepts to be developed as part of the overall GI Plan. The final roster of identified BMP opportunities across the City are shown below in **Figure 14**.

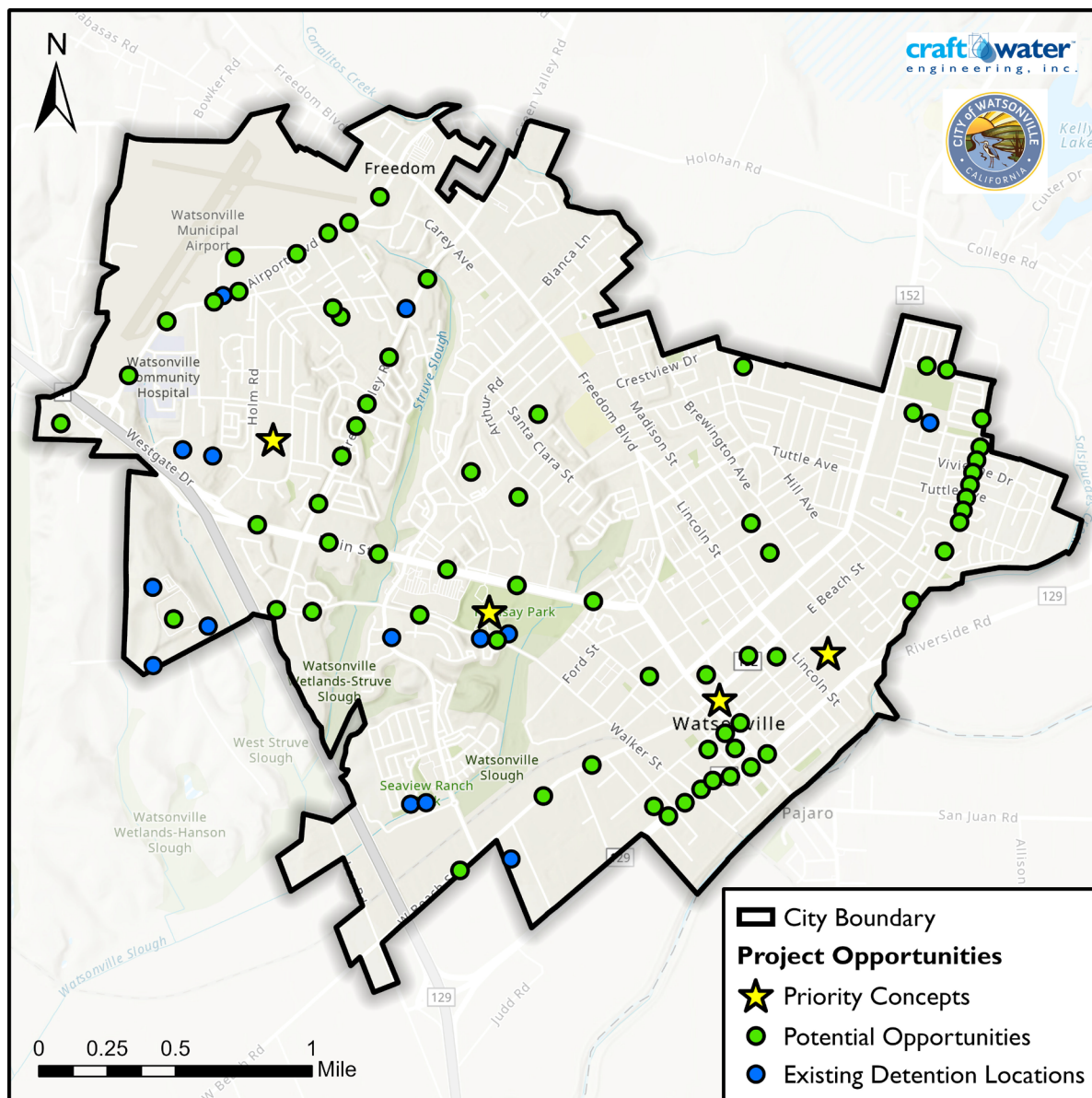


Figure 14. Final identified BMP opportunities.

3.0 PROJECT PRIORITIZATION

The results of the detailed engineering feasibility review provide a mix of the most readily implementable and impactful projects across the City for the priority BMP types. This more focused candidate list was then evaluated within the existing City 2NFORM platform to fully quantify the benefits of each project opportunity across a range of metrics to serve as the basis for prioritization and to narrow the field to the top tier projects that provide the greatest impact while also addressing the express goals of the City for GI implementation.

Project Prioritization consisted of two tiers of analysis:

- **Priority Concepts:** Those projects selected in discussion with the City as top performers and of greatest interest for advancement to Project Concept Fact Sheets (with further detail provided in Section 3.2)
- **Next Phase Concepts:** Craftwater-identified future opportunities found within the GI database that can be evaluated and designed in future efforts.

The Next Phase Concepts were assessed based on modeled performance for right-sized project configurations. Rankings were based on the following:

- **Pollutant Capture Potential**
- **Runoff Capture**
- **Urban Heat Island Reductions**
- **Greening Opportunity**
- **Pollutant Reduction Magnitude**

These five metrics were ranked for all projects and the geometric mean of those rankings was used as a final project prioritization ranking. This approach balances project impact across multiple objectives in a way that all are valued, and the final project prioritization provides a recommendation of the most impactful projects.

3.1 2NFORM INCORPORATION & QUANTIFICATION

The City of Watsonville already utilizes the 2NFORM platform for asset tracking and assessment activities related to their stormwater management program, so the evaluation of the candidate project opportunities within this platform provides the most seamless path between initial opportunity conception to further levels of feasibility study and design. This approach will ensure that at all steps along the way to project realization, the City can track these opportunities in parallel with existing stormwater assets and across equivalent metrics to enhance further planning efforts. The focused candidate list of projects was uploaded to the 2NFORM platform (**Figure 15**) using equivalent BMP types. Delineated drainage areas to each project were incorporated as well to help quantify potential project benefits within the platform using existing datasets already employed in programmatic City-wide assessment tracking.

City of Watsonville Green Infrastructure Implementation Plan

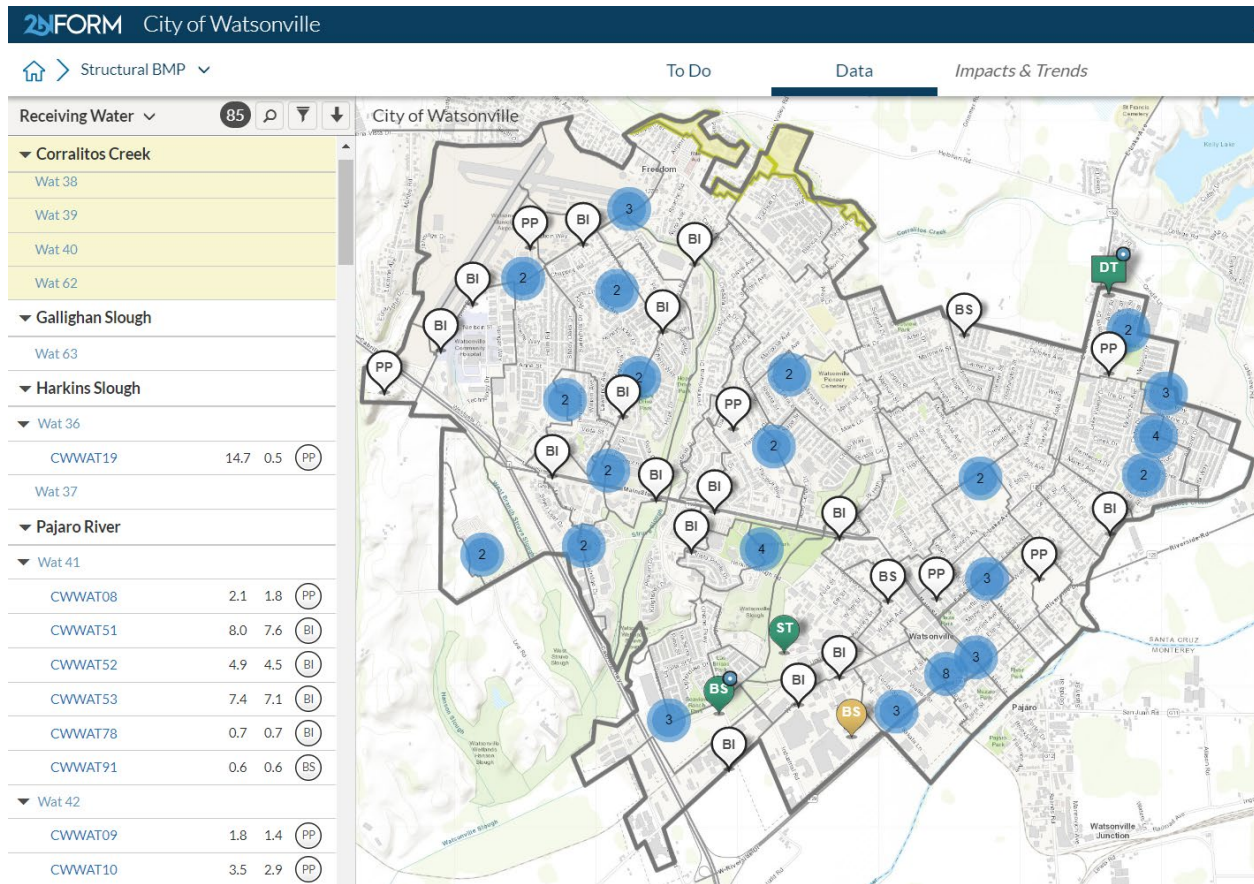


Figure 15. Overview of potential project opportunities in the 2NFORM platform.

The quantification of benefits that could be realized for each project opportunity was handled within the 2NFORM platform using several municipal datasets and evaluative metrics (**Table 3-1**). Potential projects across GI types were sized within the 2NFORM platform to enable full capture of the runoff from impervious areas of the associated project opportunity's drainage area for the 85th percentile storm event (as required by the California Central Coast Regional Water Quality Control Board Post- Construction Stormwater Requirements). Multi-benefits were quantified at the parcel scale or catchment scale where appropriate and in relation to the position of the potential opportunity within the City and existing catchments and stormwater infrastructure. Measured project benefits were calculated similarly using the 2NFORM platform's modeling system used to track progress across the City for all managed stormwater activities. Results of this benefit analysis form the basis for project prioritization. A public dashboard was developed to help communicate the results of the GI Implementation Plan in support of the City's future efforts (WatsonvilleAssetPortfolio.2nform.com).

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Table 3. Summary of project performance metrics generated by 2NDNATURE analysis.

CATEGORY	METRIC	DESCRIPTION
Multi-Benefit Goals	Runoff Opportunity	Catchment runoff priority (Very high to Very low)
	Pollutant Priority	Catchment pollutant priority (Very high to Very low)
	Impaired Receiving Water	Project drains to impaired waterbody (Yes/No)
	Managed Aquifer Recharge	Managed aquifer recharge suitability (High/Medium/Low)
	Flood Hazard	Flood hazard designation
	Urban Heat Island	Urban heat island condition (Very High to Low)
	Greening Opportunity	Opportunity to increase urban greenness based on current greenness levels (Very High to Low)
	Disadvantaged Community	Project in DAC (Yes/No)
	Public Exposure	Public exposure to project based on landuse type (High/Low)
Measured Project Benefits	Trash PLU Treated	Trash PLU acres treated by project (acres)
	Runoff Reduction	Estimated runoff reduction by project (ac-ft/yr)
	Pollutant Reduction	Estimated pollutant reduction by project (ton/yr)

Benefit metrics at the project scale were used to assess the full candidate opportunity roster and focus further project scale development on areas where opportunities could be bundled together to provide the City with greater concept detail of the highest impact projects that meet a range of goals. These results are provided below to highlight how these benefits vary across the City and the identified opportunities. Project scale pollutant capture opportunity (**Figure 16**), runoff capture opportunity (**Figure 17**), urban heat island opportunity (**Figure 18**), and greening opportunity (**Figure 19**) are shown. Finally, specific focus was placed on modeled pollutant reduction (**Figure 20**) to ensure final project concepts would be focused where they can provide the greatest water quality impacts along with the desired multi-benefits. **Figure 21** shows how these benefits vary among modeled projects in both impact (magnitude of reduction) and effectiveness (reduction vs. project size). These figures help identify the most productive projects to meet or exceed the City's water quality requirements for urban runoff management.

The results of the 2NFORM platform outputs and modeled project benefits were assessed across candidate project options, and opportunities were bundled at the parcel scale where multiple BMP types had been identified as well as along distinct ROW corridors that showed the potential for continuous project implementation across segmented portions of the ROW. The top eight project scale bundles are shown in **Figure 22** and were reviewed more fully defined engineering concept development.

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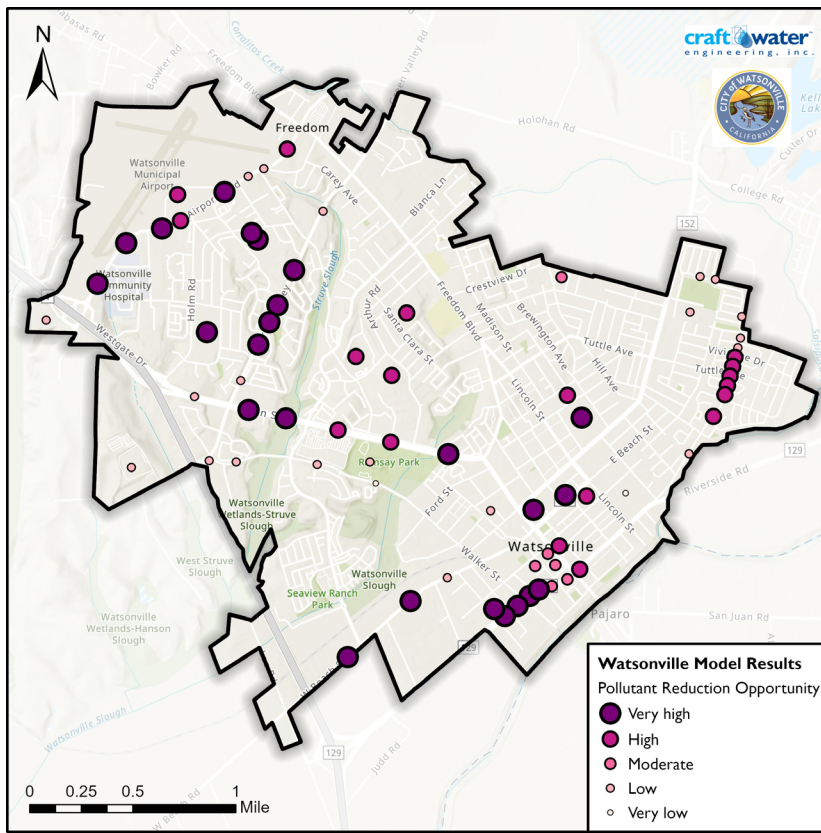


Figure 16. Pollutant capture opportunity by project from 2NFORM platform assessment.

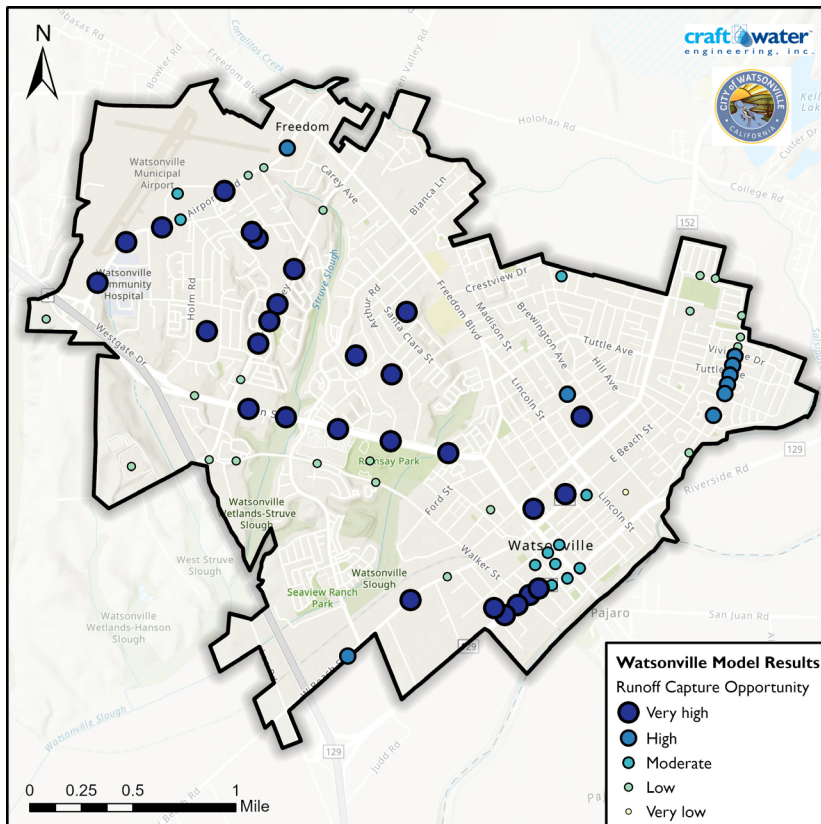


Figure 17. Runoff capture opportunity by project from 2NFORM platform assessment.

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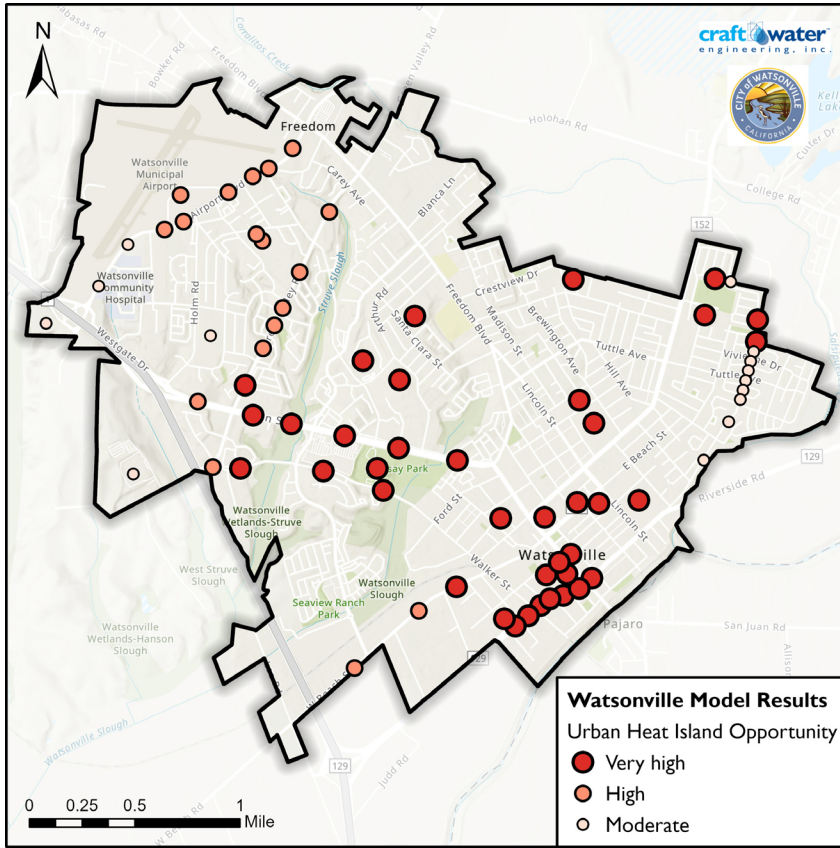


Figure 18. Urban heat island opportunity results from 2NFORM platform assessment.

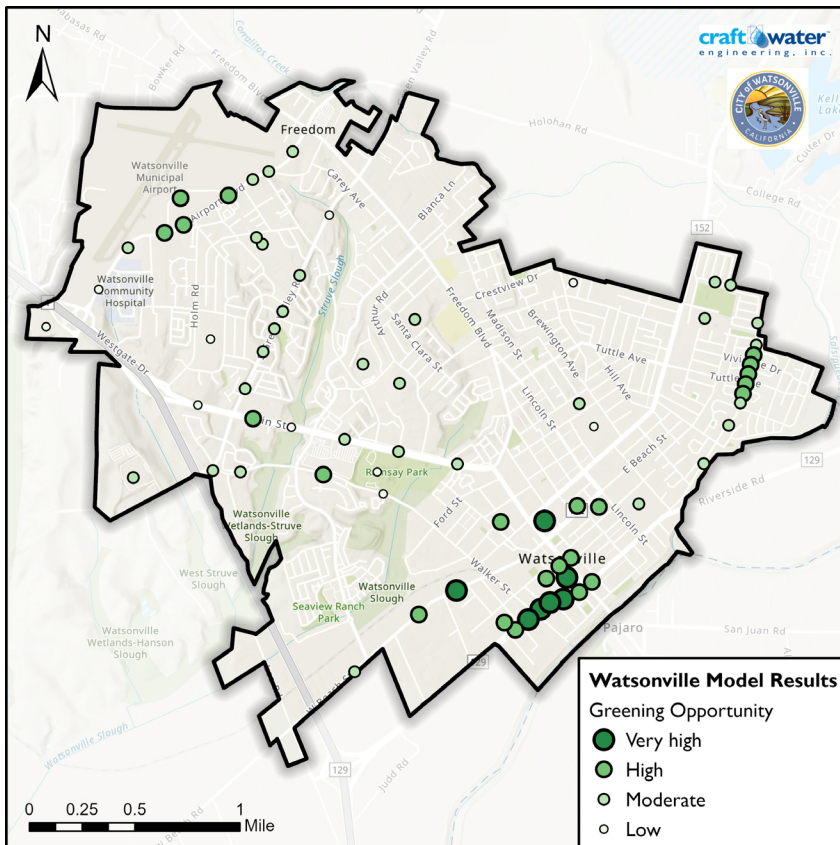


Figure 19. Greening opportunity results from 2NFORM platform assessment.

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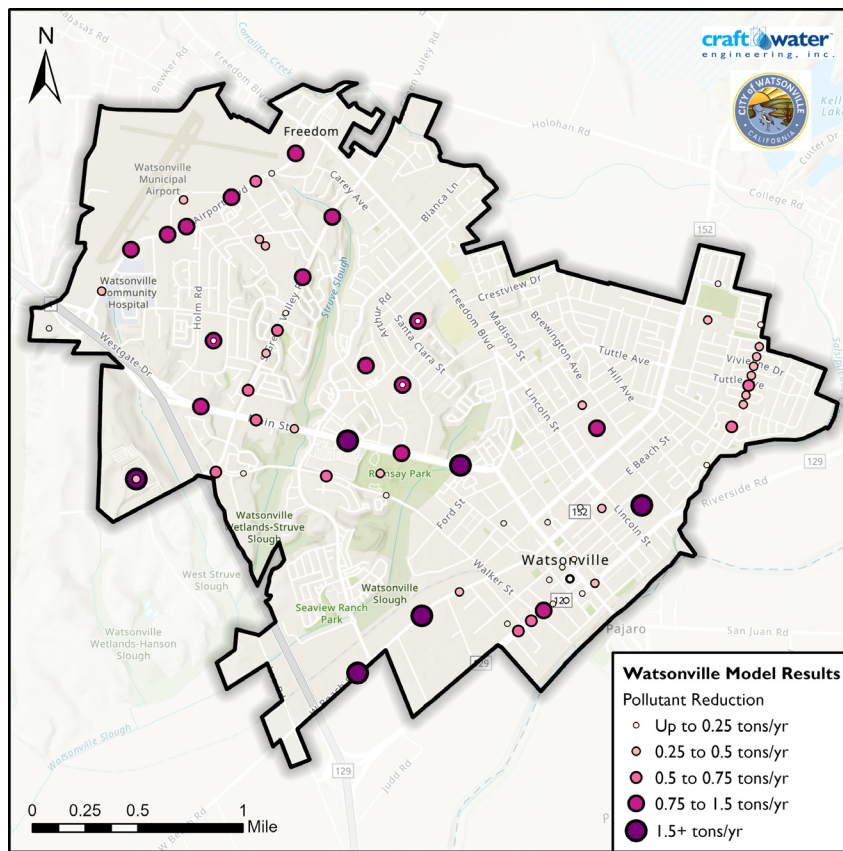


Figure 20. Modeled pollutant reduction magnitude across GI opportunities.

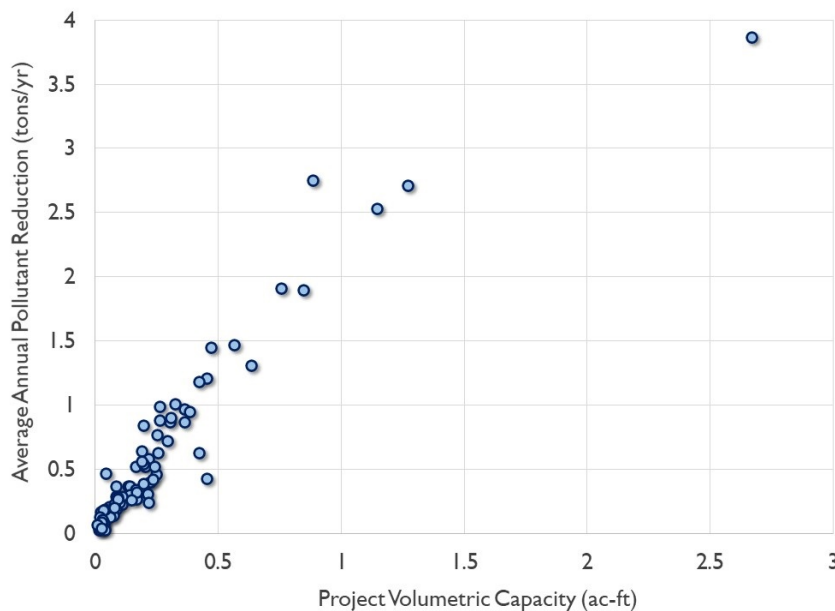


Figure 21. Modeled pollutant reductions vs. project storage sizes show a range of impact and effectiveness across candidate opportunities.

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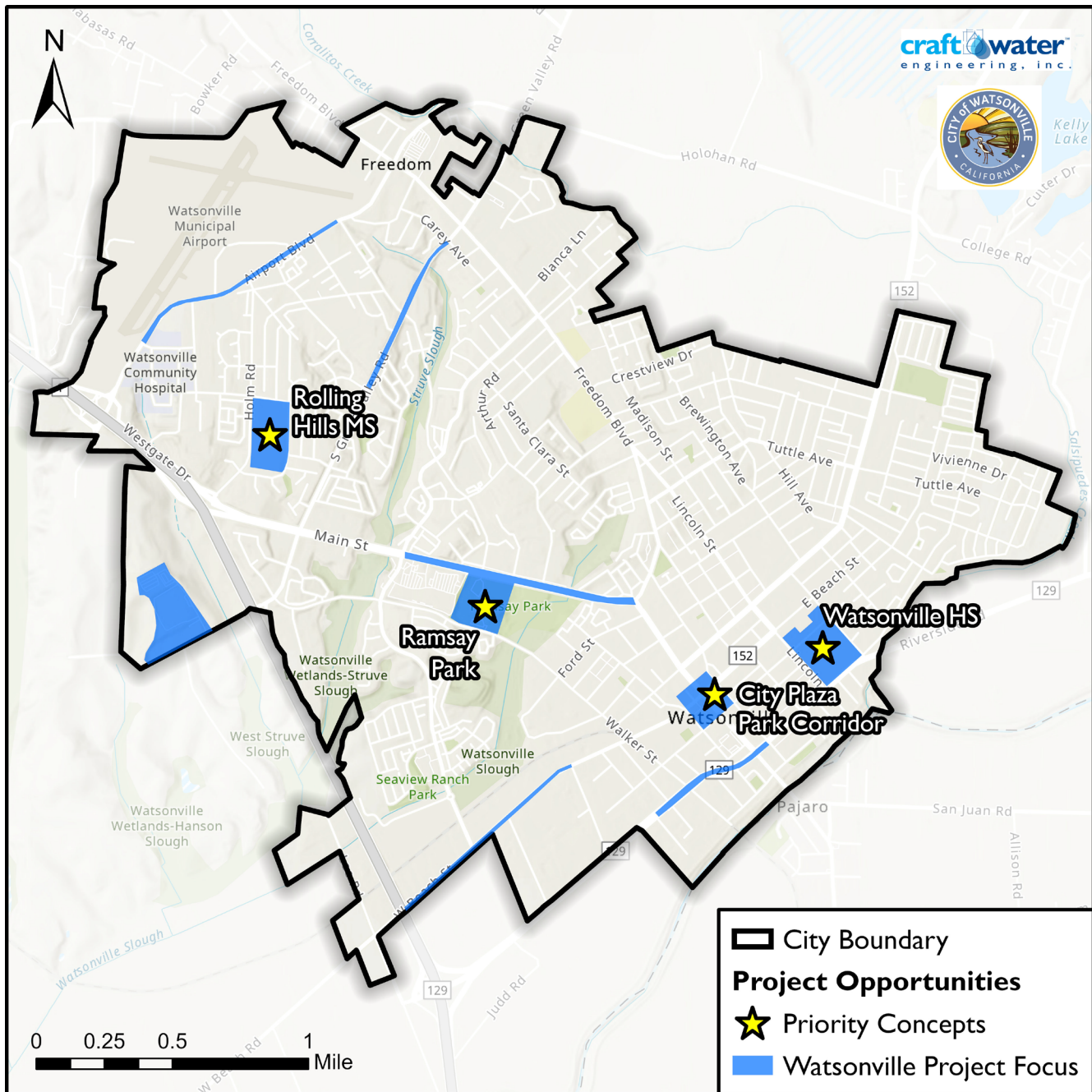


Figure 22. Prioritized BMP opportunities.

3.2 PROJECT DEVELOPMENT & PRIORITY CONCEPTS

The identification of the sites with the recommended GI practices are the initial step in the project development process. Every project has an opportunity to incorporate GI and the City can demand more from engineering designs and the construction process. In every project designers should be looking to address as many environmental and/or social issues as possible to gain the maximum positive impacts. The following questions can be asked during preliminary design:

- 1) Have we addressed every environmental opportunity?
- 2) Can this project be training for a future workforce, hire additional personnel, or create new jobs?
- 3) Is there an opportunity to educate the community about GI with this project?

Additional opportunities that can provide added benefits for minimal design adjustments include additional tree plantings, educational signage, and improved pedestrian safety. The project approach incorporates several GI practices and does not limit it to the specific types used in the identification process. With the goal of increasing GI acceptance, opportunities to test new ideas in a living laboratory setting or eco-innovation district can be given special attention to help overcome some of the barriers and challenges facing the City.

Using the project development process, Priority Concepts were identified for the City of Watsonville to include several GI practices within the identified locations. These projects represent GI opportunities that will help improve water quality for the City in an impactful and cost-effective way and will also work best given current infrastructure initiatives, needs, and desires of the City. Preliminary concept designs were developed for these projects and full details can be found in the Fact Sheets in Appendix A. The following provides a brief overview of the concept for each of the five Priority Concept locations.

3.2.1 Ramsay Park



Figure 23. Ramsay Park Conceptual Plan View

Ramsay Park is a public site that is owned and operated by the City of Watsonville and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. The site is a former dump site and has been converted to usable open park space and serves as the crowning park

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within Watsonville. The project affords multiple opportunities for various green infrastructure retrofits to be done in conjunction with the Park Renaissance effort including permeable pavement/bioretention parking lots and downspout disconnects/bioretention garden. Runoff within this corridor drains to the West Branch Struve Slough, which leads to nearby wetlands, ultimately leading to the Pacific Ocean. The project seeks to improve the water quality of stormwater runoff flows conveyed within the Pájaro River and Struve Slough through capture, storage, infiltration, and filtration before returning flows back to the channel. The project includes a downspout disconnection and bioretention garden at the new Exploration Nature Center in the park (which is proposed to be rented out for future events upon completion). Additionally, a series of bioretention swales and permeable pavement is suggested for the two parking lots for the Park. All these suggested changes are ideally suited for implementation at a park due to the opportunity they provide for education and outreach, as well as their potential to provide more green space and reduce heat island effect within the park itself. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives. Coordination with the Parks efforts can create synergy in implementation.

3.2.2 Watsonville High School

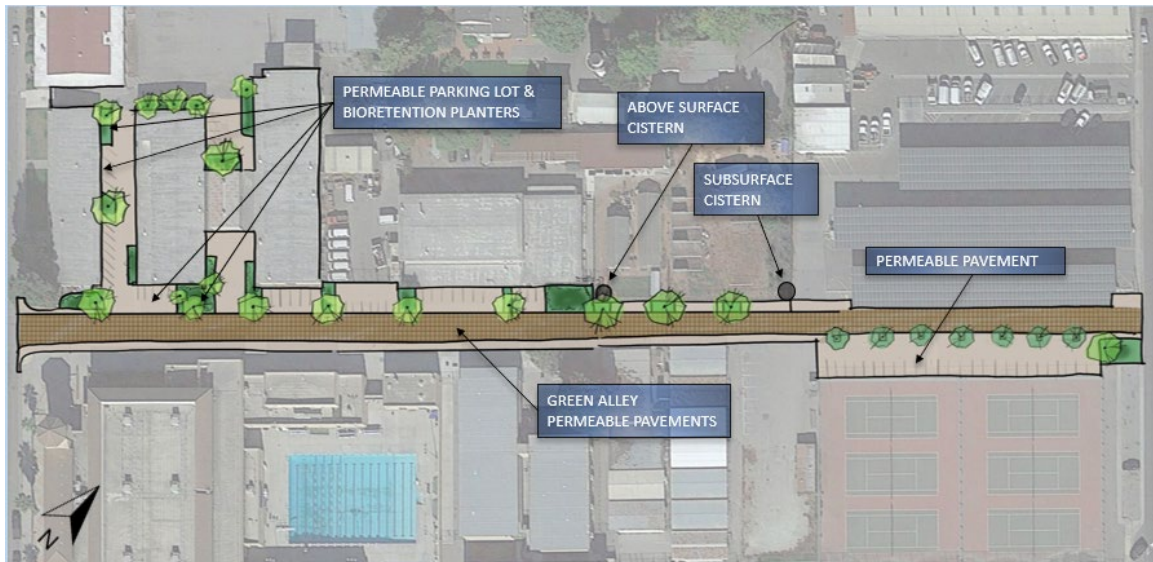


Figure 24. Watsonville High School Conceptual Plan View

Watsonville High School is a site that is owned and operated by the Pájaro Valley Unified School District and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Runoff within this corridor drains to the Pájaro River, which leads to the Monterey Bay, and the Struve Slough, which leads to nearby wetlands, both ultimately leading to the Pacific Ocean. The project seeks to improve the water quality of stormwater runoff flows conveyed within Pájaro River and Struve Slough through capture, storage, infiltration, and filtration before returning flows back to the channel. The project includes a “green alley” composed of a permeable pavement passageway lined by swales, section of permeable pavement parking strips, additional planters between classrooms, and a surface bioswale basin. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives.

3.2.3 Rolling Hills Middle School

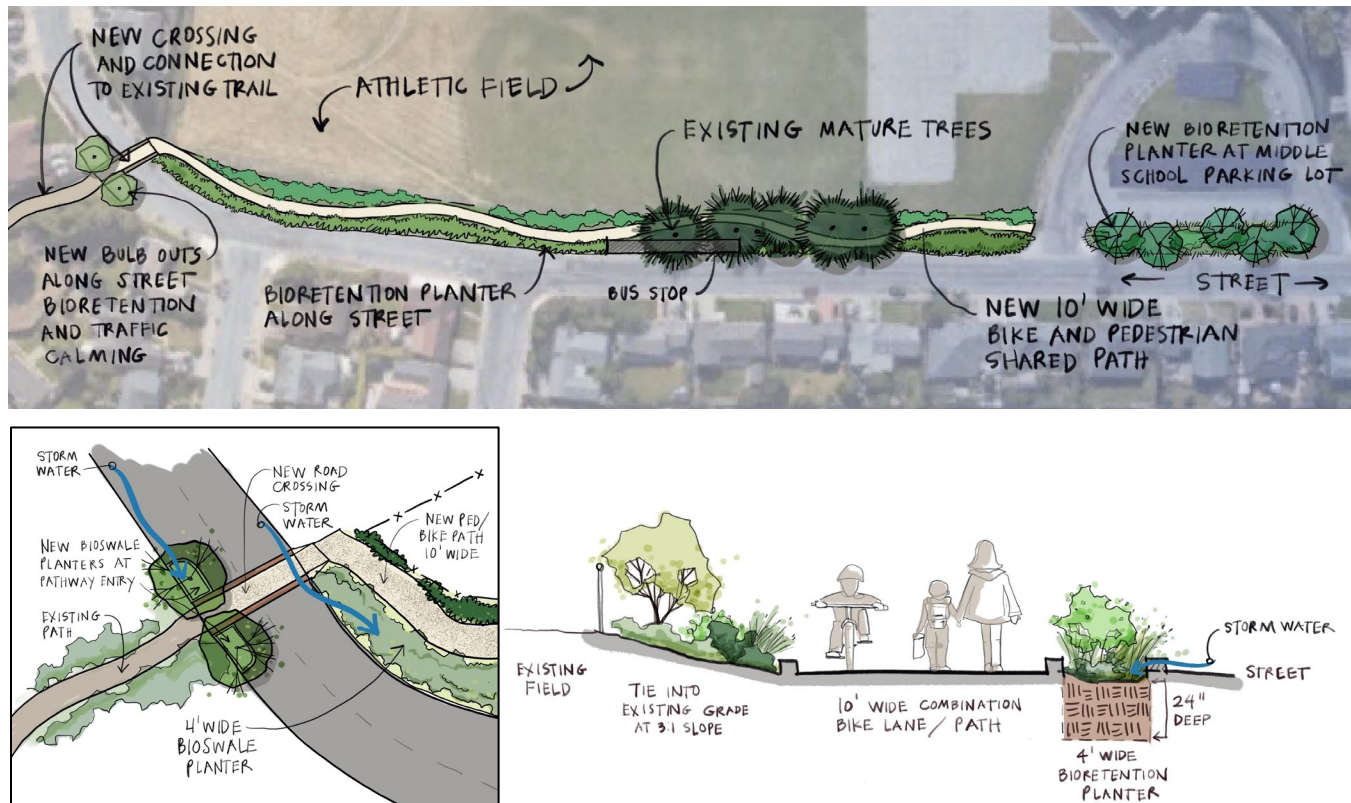


Figure 25. Rolling Hills Middle School Conceptual Plan & Section View

Rolling Hills Middle School is a site that is owned and operated by the Pájaro Valley Unified School District and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Ample space is available to the south of the school within the road right of way (on Herman Ave) to provide a combined protected pedestrian and bicycle facility to improve safe passageways to school while promoting alternative forms of transportation to the school site. The protective planter will be constructed as a bioswale that will capture, store, and infiltrate runoff from the surrounding neighborhood that then ultimately drains to the West Branch Struve Slough, which leads to nearby wetlands, eventually the Pacific Ocean. The swales will also improve the aesthetics of the middle school, as they will be placed along the drive-thru and drop off areas, and in the front of the school. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives. Collaboration for use and maintenance will be required with the school district.

3.2.4 Downtown Plaza

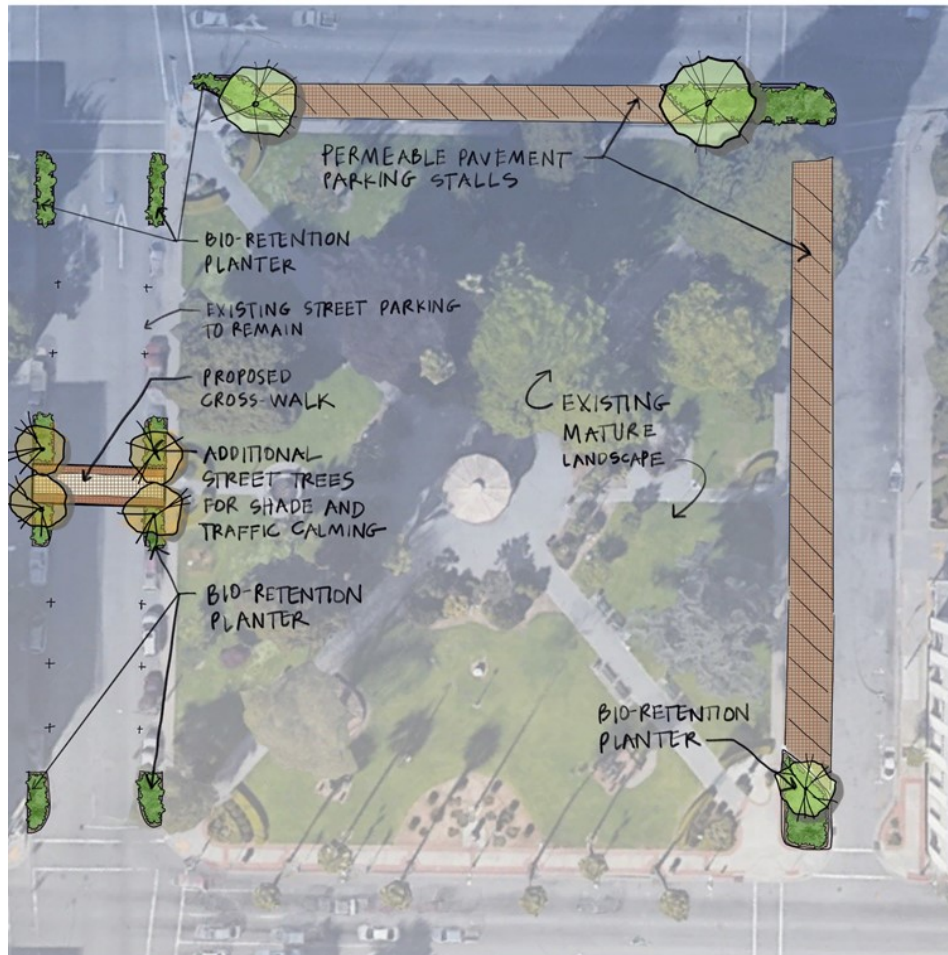


Figure 26. Downtown Plaza Conceptual Plan View

Downtown Watsonville Plaza is a public park site that is owned and operated by the City of Watsonville and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Research has shown this plaza to be a highly sought-after destination for visitors to the downtown district and various traffic incidents occur around the park. The proposed improvements aim to improve pedestrian safety, increase walkability through the downtown area, improve local runoff quality, and reduce the urban heat island effects. Pedestrian safety is improved through shortening the crossing distances with corner bulb-outs and high visibility crosswalks. The runoff within this corridor drains to the Pájaro River, which leads to the Monterey Bay, and ultimately, the Pacific Ocean. The project includes a series of bioswales on the corners of the plaza, as well as the placement of permeable pavement within the parking stalls along the North-East and South-East sides of the park to capture, store, and infiltrate/filtrate local surface runoff around the park plaza. In addition, locations have been specified as ideal for tree planting in order to combat heat island effect coming from some of the busier streets bordering the park. The project is ideally suited for implementation in this widely used public area as it will provide educational opportunities for residents of all ages, while also providing safer crossing through the additional green space within the heart of the city.

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3.2.5 Downtown Corridors Plan

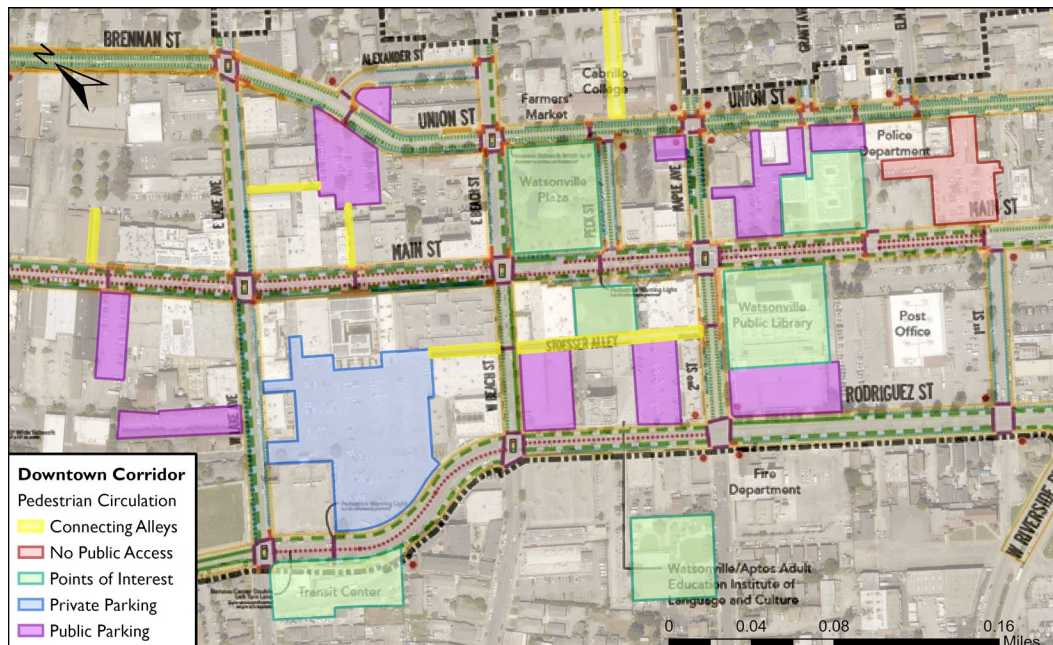


Figure 27. Downtown Corridors Conceptual Plan View

The downtown district of Watsonville provides a unique opportunity to promote urban greening that enhances pedestrian passageways, improve storm water quality, and reduce heat island effects while emphasizing outcomes for environmental justice, safety, and aesthetics. The Watsonville Plaza and Farmers' Market, in addition to the Public Library and City Offices, are all highly destined areas in the downtown corridor with limited connectivity between them. The Downtown Parking study has indicated that sufficient off-street parking is available which presents an opportunity to convert on-street parking stalls. The Downtown Complete Streets plan has identified several circulation possibilities and improvements that could be incorporated along the streets. This downtown corridor connection plan works in conjunction with that plan and will link the identified circulation with the parking lots and alley ways to find new possible pathways of travel. The downtown corridor connections will create an inventory of high value uses including parking stalls, tree count, impervious area treated, and volume capture to create a 'bank' of urban greening credits that the City can further evaluate for a private developer market. This concept creates a uniform landscape template for the parking lots, implements better pedestrian connections between lots and destinations, and provides opportunity and incentive to engage with private parking lot owners to participate. This project has the potential to be developed into an Urban Sustainability Area. This concept is an addendum concept to the various downtown City plans.

3.3 FUNDING STRATEGIES

GI implementation has historically limited funding sources with the primary funding coming from transportation or parcel redevelopment efforts. The GI portions are often after-thoughts in project implementation and do not serve as the primary project driver. The goal of this GIIP is to change this narrative and identify funding sources and strategies that will prove opportunity to specifically implement green infrastructure in a primary role and not just a secondary objective. The primary funding strategies investigated for this effort include:

- 1) Grants & Loans
- 2) New funding measure
- 3) Public-Private partnerships
- 4) Credit trading

3.3.1 Grants & Loans

Federal and State grant programs serve as a potential funding source for the City to fund GI projects identified within this GIIP. Project eligibility is dependent on the grant being sought. Funds can be useful in design and construction of GI projects. A preliminary listing of grant and loan programs identified as available for GI implementation are listed in Appendix B. A specific grant of interest is the new Caltrans Clean California Local Grant Program that prioritizes beautifying and improving local streets and roads, tribal lands, parks, pathways, and transit centers to clean and enhance public spaces.

One of the largest challenges with grant and loan programs is the required local match and project readiness. Many of the grant and loan programs are looking for shovel-ready designs and creating of those designs requires use of alternate funds by the City. The programs are also competitive and are only a one-time source of funding for construction and do not account for long-term operations and maintenance costs.

3.3.2 New Funding Measure

The City does not have a paid utility for stormwater requiring that all stormwater related projects be funded through the general fund. Various municipalities throughout the state have implemented a funding measure that provides a steady funding source that can be utilized to fund GI projects. These programs have been institutionalized within the existing framework of the local government through service-related fees or property taxes.

These funding measures prove to be challenging in implementing as new taxes and fees often require public approval through a ballot initiative. Careful collaboration with legal counsel to determine the most feasible, appropriate, and beneficial program for implementation. Success can also be had in a Countywide-measure versus a City-specific assessment but requires close collaboration with County offices.

3.3.3 Public-Private Partnerships

Public-private partnerships (P3) are contractual agreements between the public and private sectors that could allow for greater private sector participation in the financing, construction, and operation of watershed projects. They represent a potential funding source for GI projects on private property. P3 projects provide the City with the ability to combine existing revenue streams with private commercial debt thus increasing the ability to fund match and position for additional grant opportunities already discussed above.

P3 projects are not without their challenges and require establishing a formal program, identifying institutional constraints, efficacy of GI practice, and understanding of legal implications. Some projects do not generate long-

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term revenue and are less attractive as a partnership opportunity. The P3 programs for stormwater are still a growing field but serve as a possible funding source for future GI projects.

3.3.4 Credit Trading

Credit trading is the practice of allowing developers to perform offsite mitigation within areas that the City has deemed in most need of project improvements. The City has a bench of prioritized projects and these projects can serve as the basis for identification of offsite credits for new development. The program could fund design and construction of more cost-effective measures that better meet the City objectives.

Establishment of a credit trading program takes significant time and investment to establish the currency, framework, and supply/demand. The credit trading in stormwater is still relatively new and is constantly evolving to ensure the best projects proceed forward and are implemented.

3.4 INTERACTIVE DASHBOARD FEATURES

The interactive database accompanying this Plan provides locations, 85th percentile sizing, and expected benefits for the project concepts identified as a part of the Watsonville Green Infrastructure Implementation Plan. These include all locations identified within the City limits that might be suitable to site an impactful GI practice based on the assessment of the overall stormwater setting in the City of Watsonville and a robust project engineering analysis. Also included are potential concepts that had been previously identified, and these concepts were assessed through GI modeling in the same manner as the novel concepts identified.

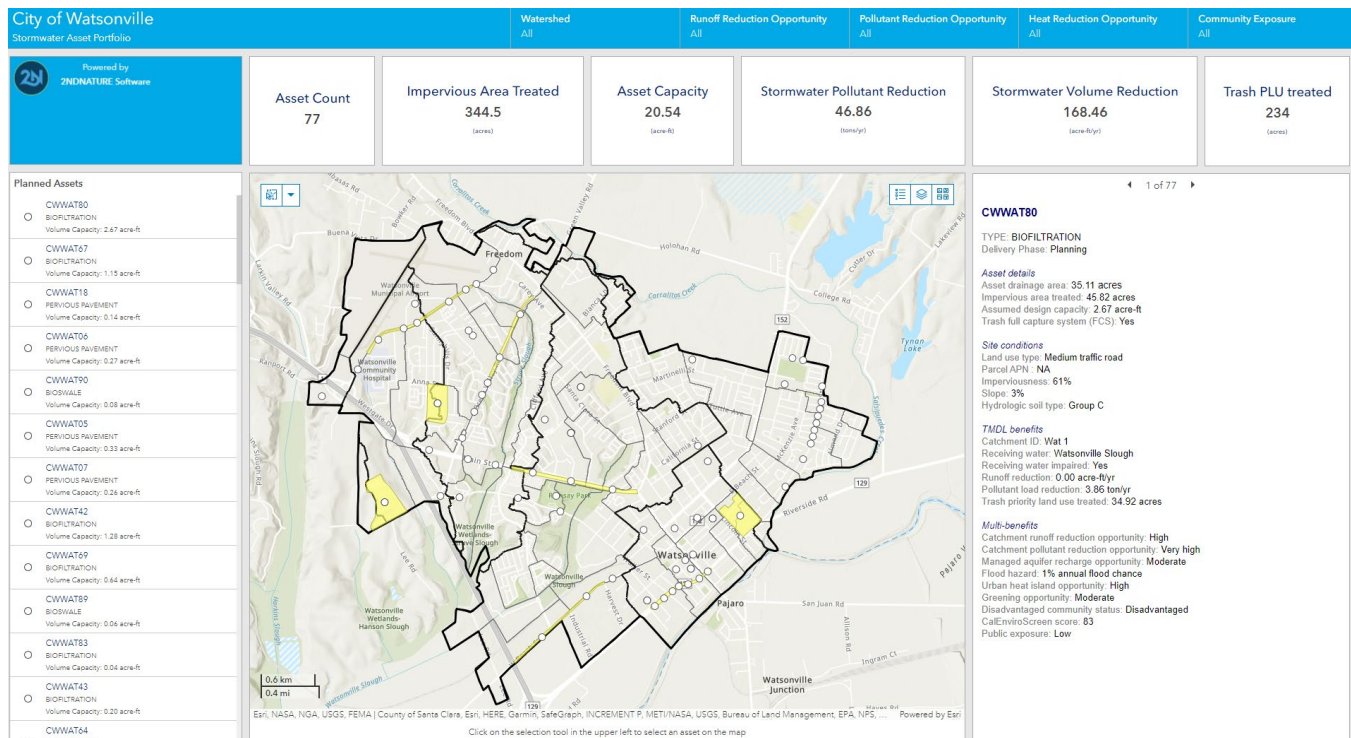


Figure 28. Interactive Dashboard for GI Opportunities. (WatsonvilleAssetPortfolio.2nform.com)

While project concepts have been identified, sized, and prioritized according to a balance of impact and effectiveness, these expected performance metrics may not always be the deciding factor on whether a given

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Green Infrastructure Implementation Plan

project is the most desirable for implementation and construction. A wide range of factors come into play when deciding what is the right project to pursue next, so this database has been set up in a way to assign projects priority groupings to enable a more flexible, pick-and-choose methodology so that the City is not locked into any one singular implementation pathway. Rather, projects can be chosen from anywhere in the list with the knowledge that higher priority grouping projects are more impactful and effective yet may not be the most realistic for the City to ultimately implement. Here you have a menu of "courses" from which to pick projects and the accompanying data to compare and weigh these decisions against other more intangible municipal goals and emphases.

One of the difficulties of modeling stormwater BMPs and decision-making alternatives is that some combinations of BMPs may be synergistic while other combinations may be less so, and to accurately quantify all the possible combinations of the 77 project concepts presented here would amount to an exorbitant number of individual assessments. BMP prioritization performed in the development of this Plan utilized algorithms to focus only on the BMP combination assessments that make a difference in the overall plan performance, and the results provided the data used to assign priority groupings. The performance data presented in the database is the most conservative estimate of water quality benefits that each of these potential concepts might achieve. Because not all the BMPs will be constructed, the actual benefits of those chosen may exceed these estimates and provide even greater benefit to the City's stormwater program. Monitoring and adaptive management activities can be used to refine these estimates as project selection and implementation are carried forth. This database provides a starting roadmap for how the City can move forward in selecting projects that meet its full suite of goals and needs and move these concepts forwards into design, construction, and overall program success.

4.0 NEXT STEPS

This GIIP serves as a steppingstone to carrying out the construction of strategic GI opportunities throughout the City and coming closer to meeting the goals and objectives of improving water quality; reducing heat island impacts; and prioritizing community enhancement and safety. The next steps to carry out this plan and continue the advancement of GI within Watsonville include:

- Education of the community, decision makers, stakeholders, and parallel programs to inform on the multiple benefits of GI and the utility of this GIIP to advance all their goals
- Advancement of the priority opportunities to full design and construction to demonstrate the value of GI and tangibly enhance community and watershed health in Watsonville
- Develop standard design details and specifications for GI elements (i.e. bioretention, swales, permeable pavement, bump-outs, etc.) to streamline future GI concepts, and
- Further exploration of alternative funding sources to expedite GI implementation and community resilience
- Improve local ordinances that can support GI, such as measures to protect existing green infrastructure and trees, including expansion of the existing development buffer around wetlands and other natural areas.
- Develop new construction standards that can be implemented for stormwater, permeable pavement, and tree canopy cover
- Evaluate and implement strategic tree planting opportunities to reduce heat island effect in the community
- Develop a residential and commercial tree planting incentive program
- Address the connection between green infrastructure and equity in the community by prioritizing green infrastructure projects that improve climate change resiliency measures in those areas that will most benefit those with the greatest vulnerability to heat stress and other climate change related impacts.

5.0 REFERENCES

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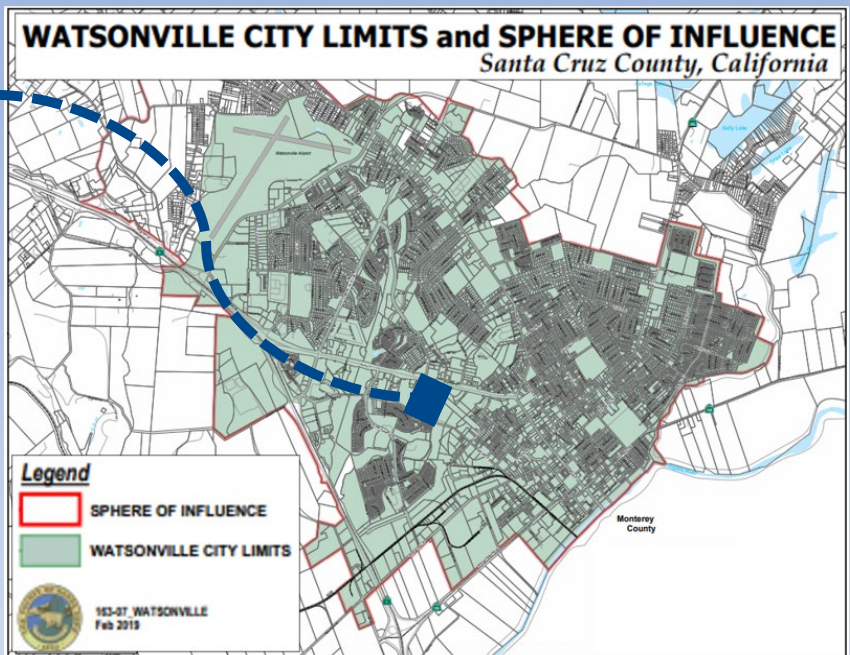
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APPENDIX A: CONCEPT FACT SHEETS

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WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Ramsay Park



PARCEL DRAINAGE AREA CHARACTERISTICS	
TOTAL DRAINAGE AREA	26.14 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	36 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	15.6 acre-ft

- ### HIGHLIGHTED PROJECT FEATURES
- **Green Parking Lots** – Combines permeable pavements and bioretention to reduce site runoff and provide shade
 - **Bioretention Garden & Downspout Disconnection** – Treats flows around the new Exploration Center to demonstrate native planting and stormwater use from roof areas



PROJECT DESCRIPTION

LOCATION: Ramsay Park, 1301 Main St, Watsonville, CA 95076

DESCRIPTION: Ramsay Park is a public site that is owned and operated by the City of Watsonville and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. The site is a former dump site and has been converted to usable open park space and serves as the crowning park within Watsonville. The project affords multiple opportunities for various green infrastructure retrofits to be done in conjunction with the Park Renaissance effort including permeable pavement/bioretention parking lots and downspout disconnects/bioretention garden. Runoff within this corridor drains to the West Branch Struve Slough, which leads to nearby wetlands, ultimately leading to the Pacific Ocean. The project seeks to improve the water quality of stormwater runoff flows conveyed within the Pájaro River and Struve Slough through capture, storage, infiltration, and filtration before returning flows back to the channel. The project includes a downspout disconnection and bioretention garden at the new Exploration Nature Center in the park (which is proposed to be rented out for future events upon completion). Additionally, a series of bioretention swales and permeable pavement is suggested for the two parking lots for the Park. All these suggested changes are ideally suited for implementation at a park due to the opportunity they provide for education and outreach, as well as their potential to provide more green space and reduce heat island effect within the park itself. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives. Coordination with the Parks efforts can create synergy in implementation.

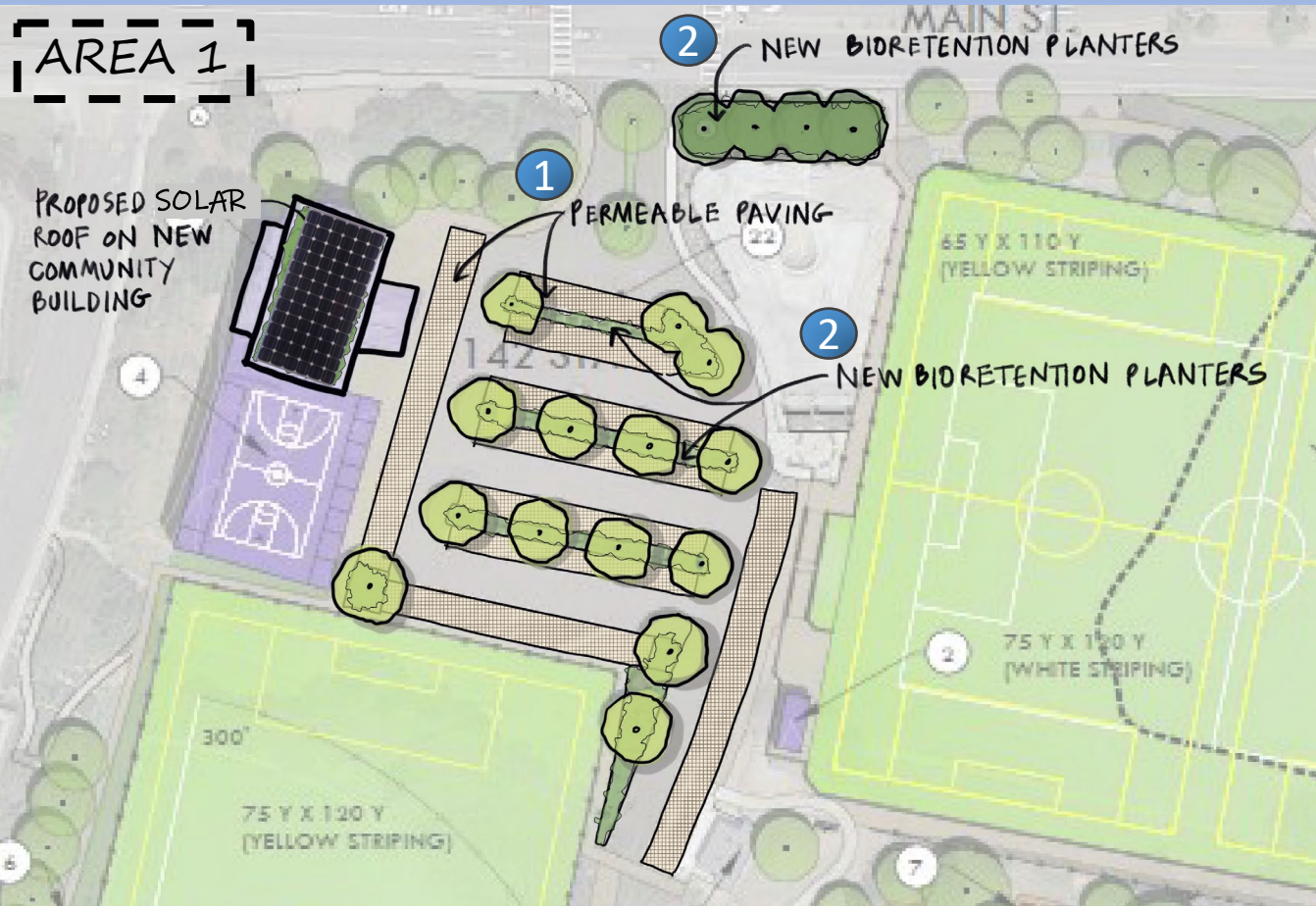


WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Ramsay Park



AREA 1



Main Parking Lot & Bioretention

Drainage Area	92,000 sq ft
Impervious Area	90,000 sq ft
Runoff Volume	4,600 cu ft
BMP Volume	5,750 cu ft

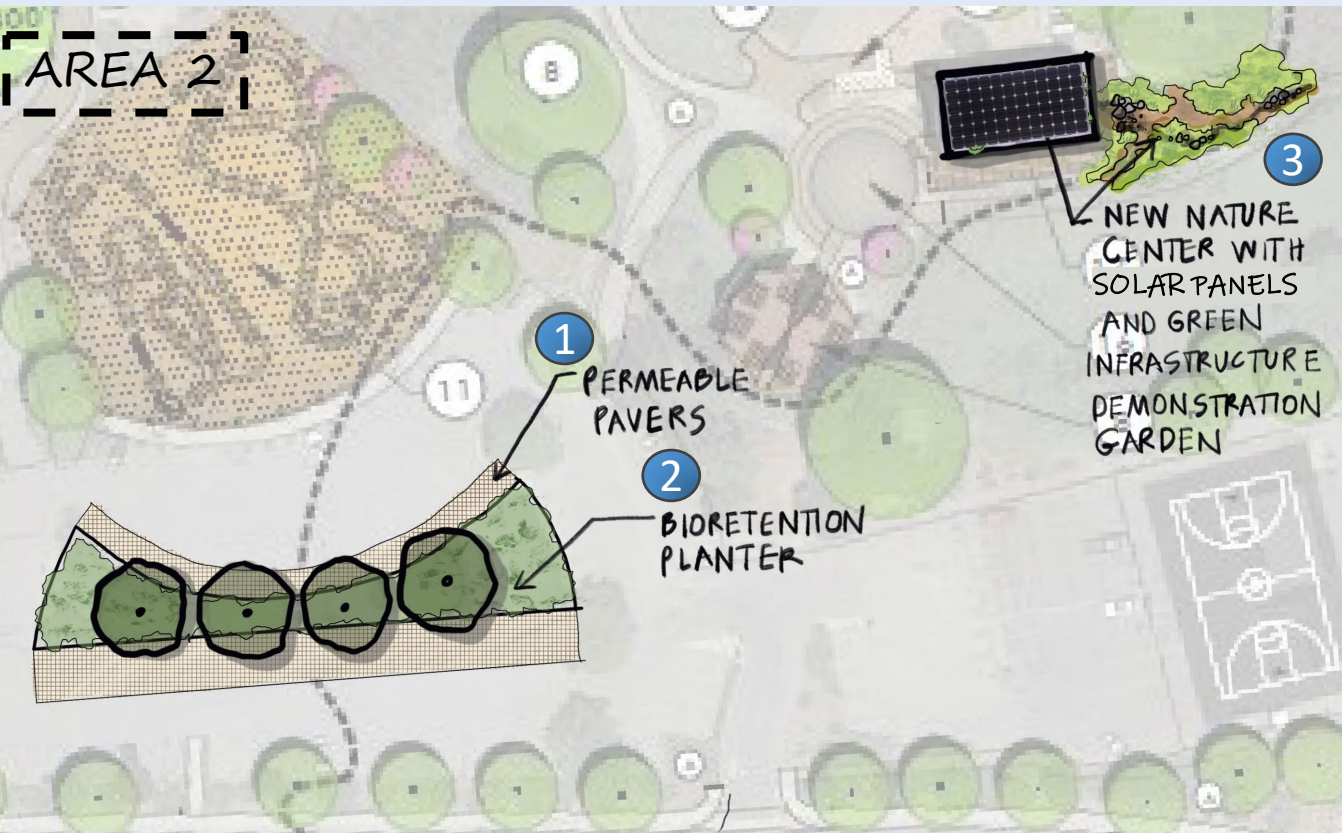
Nature Center Bioretention Garden

Drainage Area	2,380 sq ft
Impervious Area	2,380 sq ft
Runoff volume	150 cu ft
BMP Volume	320 cu ft

Lower Parking Lot & Bioretention

Drainage Area	97,000 sq ft
Impervious Area	64,000 sq ft
Runoff Volume	4,000 cu ft
BMP Volume	4,375 cu ft

AREA 2



PROJECT BENEFITS

TYPE: PERVIOUS PAVEMENT

Delivery Phase: Planning

Asset details

Asset drainage area: 26.14 acres

Impervious area treated: 7.6 acres

Assumed design capacity: 3.42 acre-ft

Trash full capture system (FCS): No

Site conditions

Land use type: Other/Open Space

Parcel APN : 018-261-23

Imperviousness: 29%

Slope: 8%

Hydrologic soil type: Group C

TMDL benefits

Catchment ID: Wat 61

Receiving water: Watsonville Slough

Receiving water impaired: Yes

Runoff reduction: 11.1 acre-ft/yr

Pollutant load reduction: 0.42 ton/yr

Trash priority land use treated: 0.00 acres

Multi-benefits

Catchment runoff reduction opportunity: Low

Catchment pollutant reduction opportunity: Low

Managed aquifer recharge opportunity: High

Flood hazard: Very low

Urban heat island opportunity: Very high

Greening opportunity: Low

Disadvantaged community status: Disadvantaged

CalEnviroScreen score: 84

Public exposure: High



BIORETENTION GARDEN



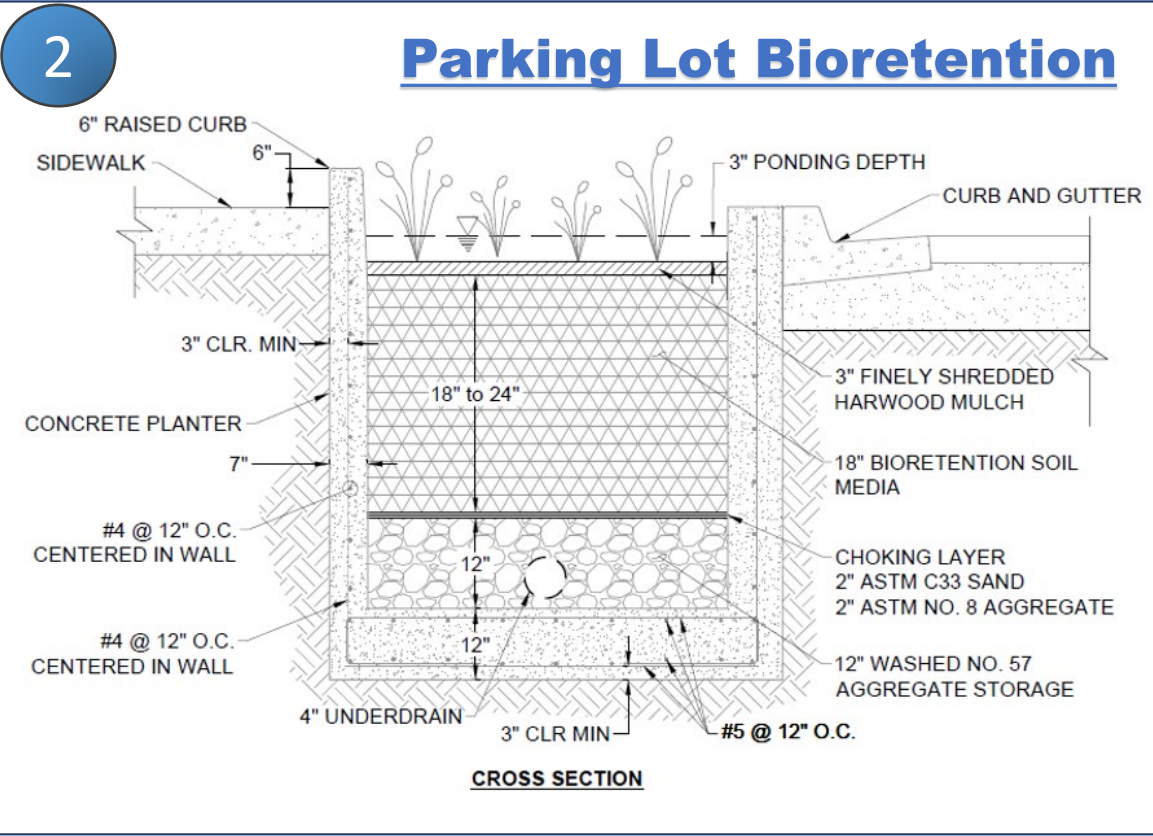
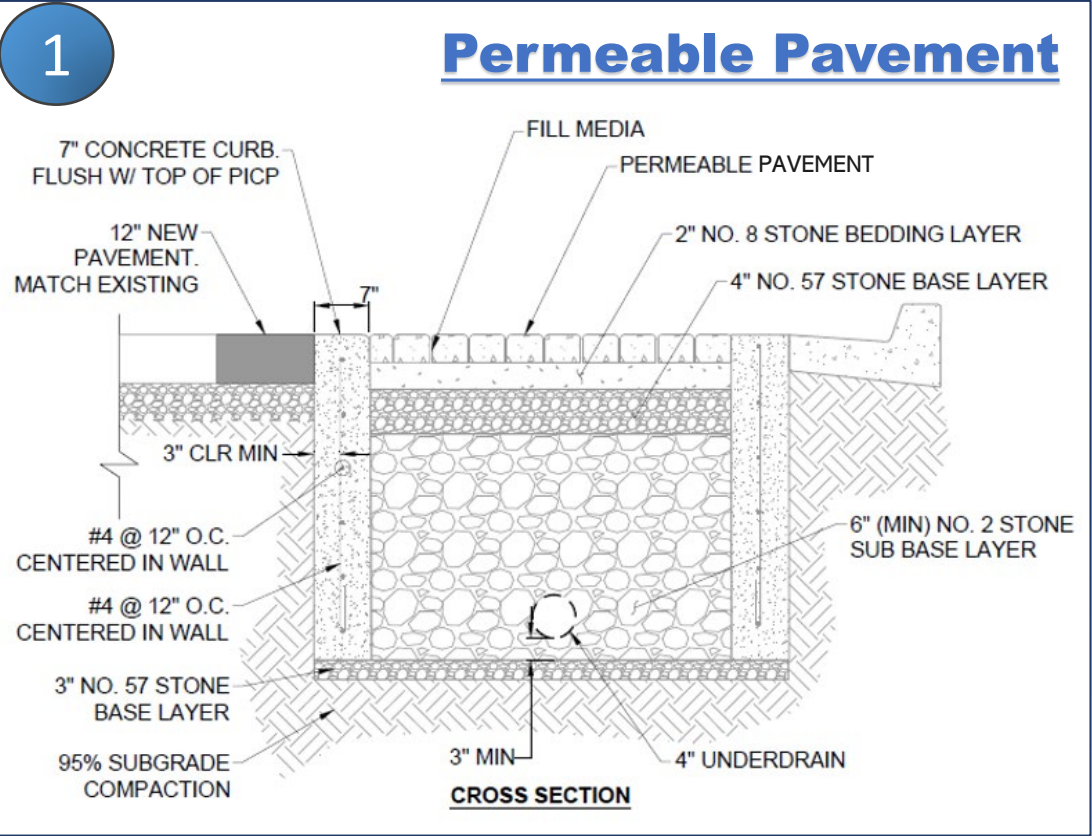
BIORETENTION PLANTER



PERMEABLE PAVEMENT

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Ramsay Park



Site constraints/Environmental Concerns:

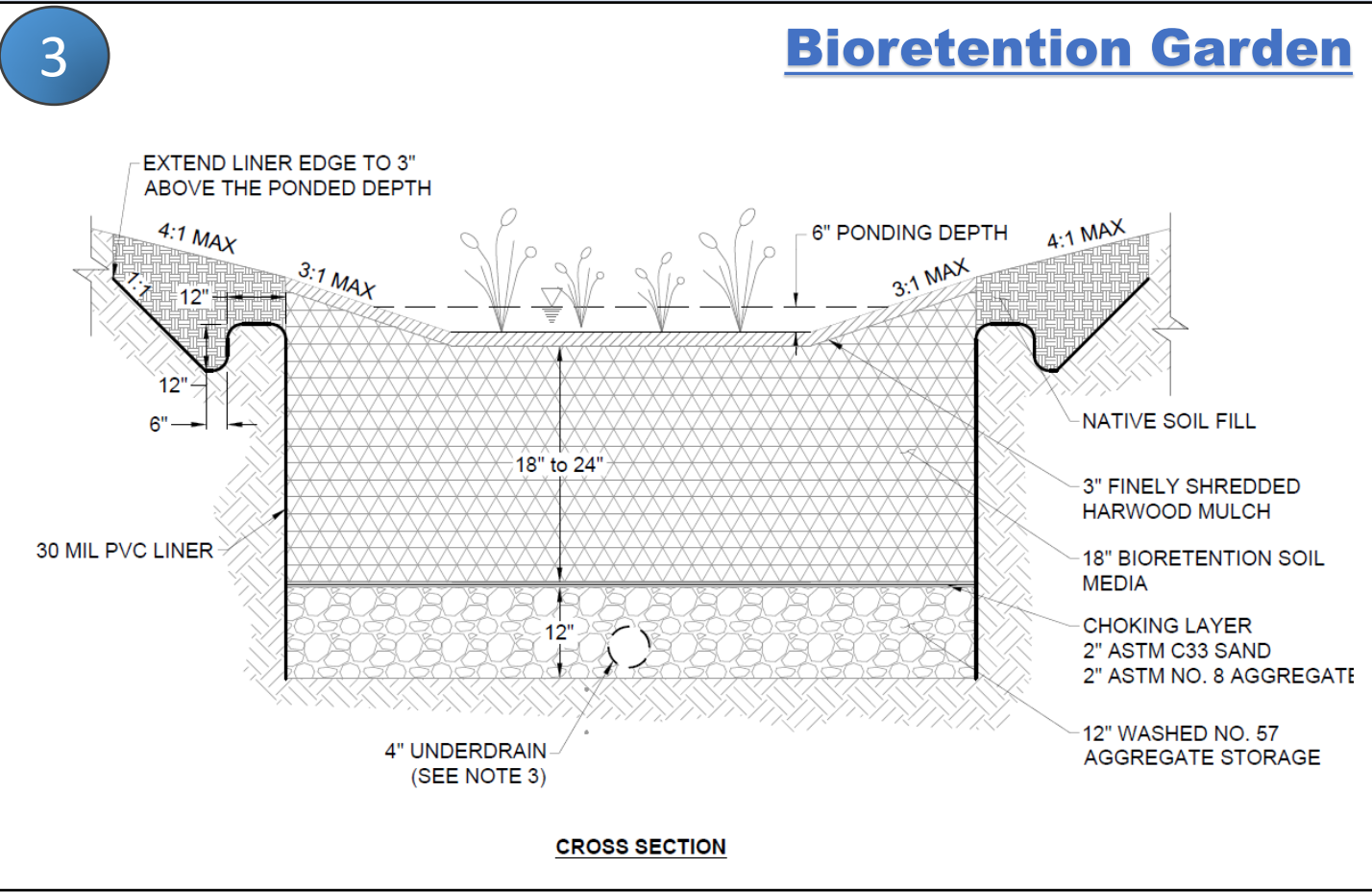
- Stormwater discharge near local natural waterways

Permitting Considerations:

- NPDES state requirements
- Stormwater Post-construction Standards-Permit
- Stormwater Control Plan/O&M Plan/Maintenance agreement

Potential Funding Sources:

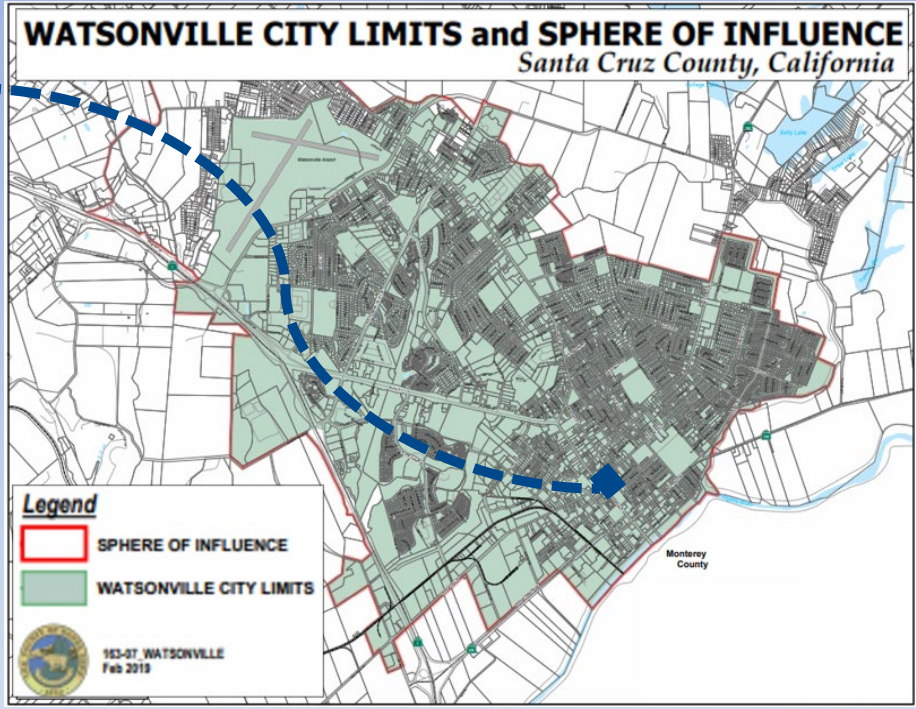
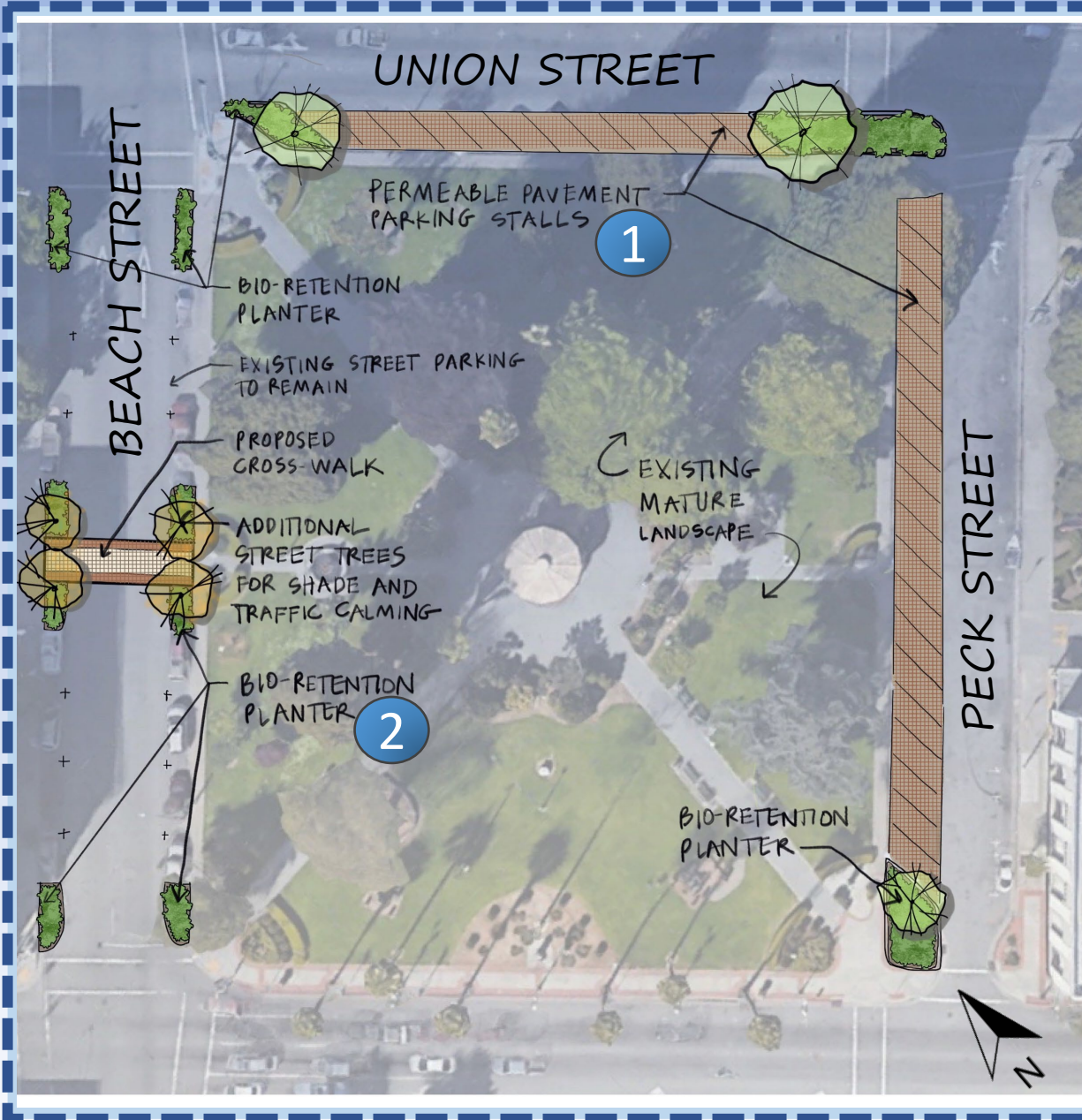
- Water Recycling Funding Program
- CWA Section 319 Nonpoint Source Pollution Grant
- Prop 1 – Rd2 Integrated Regional Water Management Grant Program



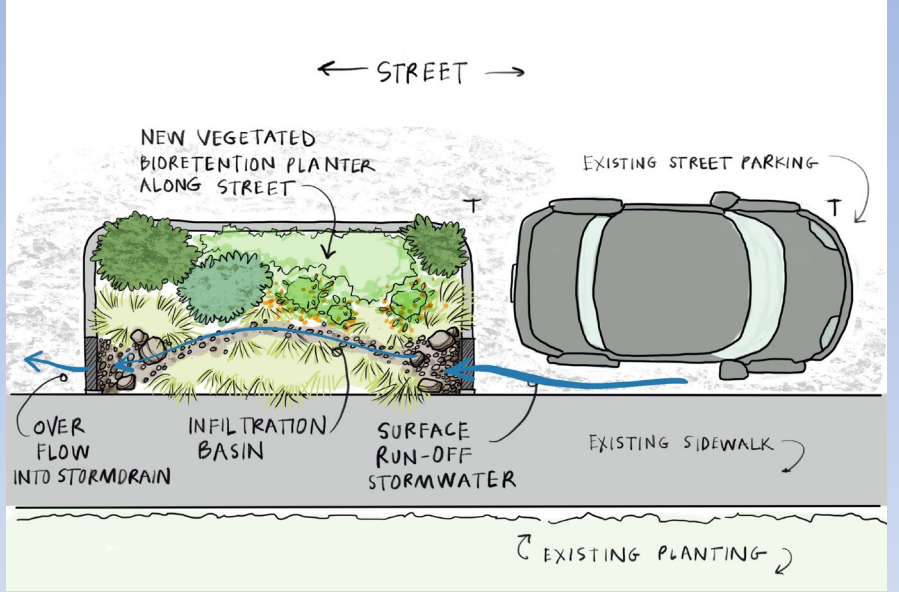
Planning Level Cost Estimates			
1	2	3	
Permeable Pavement		Bioretention	
Capital Cost Estimate			
Parking Permeable Pavement	Parking Bioretention Planters	Nature Center Bioretention Garden	Total
\$776,200 (Main) \$552,000 (South)	\$315,600 (Main) \$226,100 (South)	\$86,700	\$1,956,600
Operations & Maintenance Cost Estimate (Annual)			
Parking Permeable Pavement	Parking Bioretention Planters	Nature Center Bioretention Garden	Total
\$20,250 (Main) \$14,400 (South)	\$18,000 (Main) \$12,800 (South)	\$4,800	\$70,250

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Downtown Plaza



PARCEL DRAINAGE AREA CHARACTERISTICS	
TOTAL DRAINAGE AREA	3.88 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	36 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	5.2 acre-ft



HIGHLIGHTED PROJECT FEATURES

- **Safer Pedestrian Crossings** – Provides bioretention corner bulb outs at pedestrian crossings
- **New Mid-block Crossing** – To increase the overall walkability of the downtown district, provides more direct connections with surrounding parking lots



PROJECT DESCRIPTION

LOCATION: Watsonville City Plaza, 358 Main St, Watsonville, CA 95076

DESCRIPTION: Downtown Watsonville Plaza is a public park site that is owned and operated by the City of Watsonville and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Research has shown this to plaza to be a highly sought-after destination for visitors to the downtown district and various traffic incidents occur around the park. The proposed improvements aim to improve pedestrian safety, increase walkability through the downtown area, improve local runoff quality, and reduce the urban heat island effects. Pedestrian safety is improved through shortening the crossing distances with corner bulb-outs and high visibility crosswalks. The runoff within this corridor drains to the Pájaro River, which leads to the Monterey Bay, and ultimately, the Pacific Ocean. The project includes a series of bioswales on the corners of the plaza, as well as the placement of permeable pavement within the parking stalls along the North-East and South-East sides of the park to capture, store, and infiltrate/filtrate local surface runoff around the park plaza. In addition, locations have been specified as ideal for tree planting in order to combat heat island effect coming from some of the busier streets bordering the park. The project is ideally suited for implementation in this widely used public area as it will provide educational opportunities for residents of all ages, while also providing safer crossing through the additional green space within the heart of the city.

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

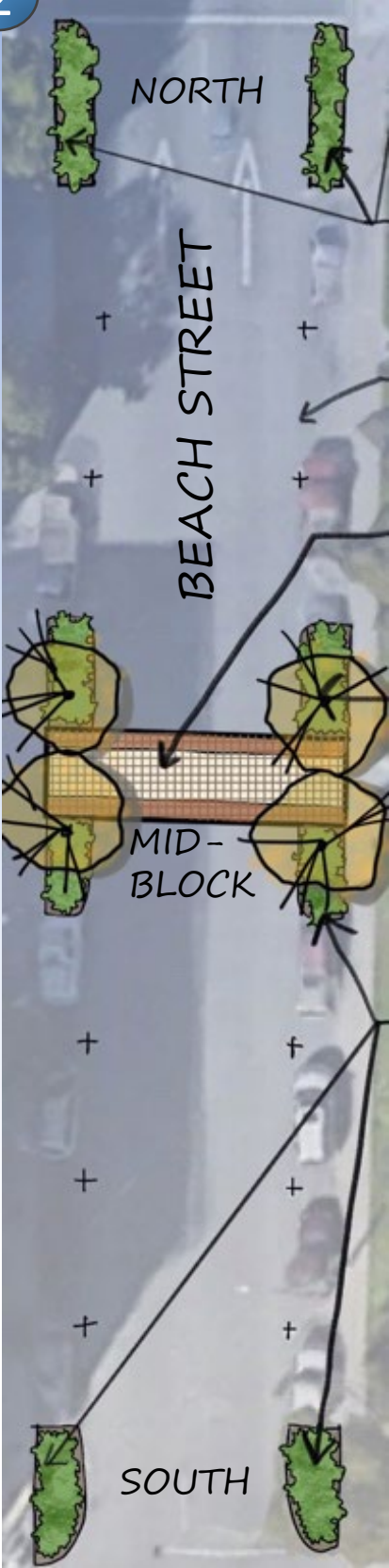
Project Concept Designs – Downtown Plaza



Beach Street (North) Bioretention Swale	
Drainage Area	5,650 sq ft
Impervious Area	5,050 sq ft
Runoff Volume	300 cu ft
BMP Volume	260 cu ft

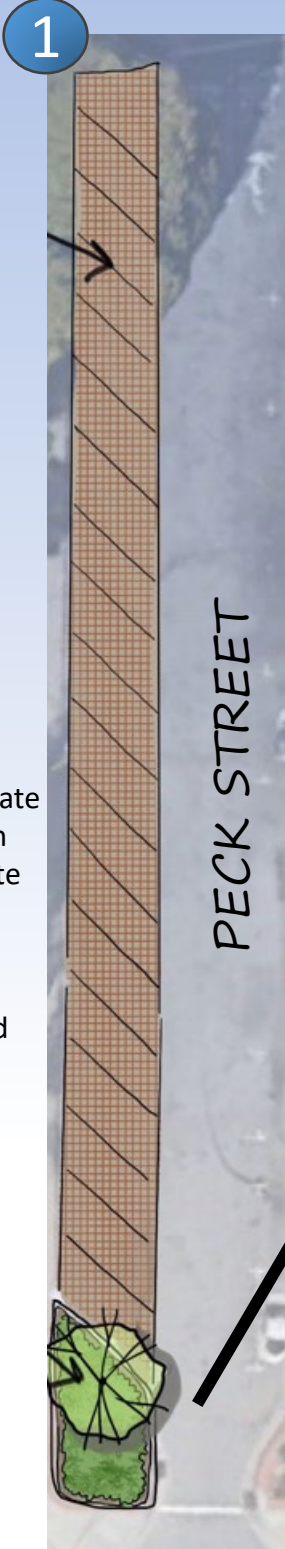
Beach Street (Mid-Block) Bioretention Swale	
Drainage Area	17,800 sq ft
Impervious Area	13,050 sq ft
Runoff Volume	775 cu ft
BMP Volume	390 cu ft

Beach Street (South) Bioretention Swale	
Drainage Area	12,605 sq ft
Impervious Area	9,760 sq ft
Runoff Volume	580 cu ft
BMP Volume	260 cu ft



Union Street Permeable Pavement	
Drainage Area	9,049 sq ft
Impervious Area	9,049 sq ft
Runoff Volume	500 cu ft
BMP Volume	530 cu ft

Peck Street Permeable Pavement	
Drainage Area	11,983 sq ft
Impervious Area	11,983 sq ft
Runoff Volume	675 cu ft
BMP Volume	740 cu ft



Union Street (North) Bioretention Swale	
Drainage Area	28,700 sq ft
Impervious Area	14,100 sq ft
Runoff Volume	865 cu ft
BMP Volume	325 cu cf

Union Street (South) Bioretention Swale	
Drainage Area	44,000 sq ft
Impervious Area	24,883 sq ft
Runoff Volume	1,485 cu ft
BMP Volume	858 cu ft



Peck Street Bioretention Swale	
Drainage Area	39,100 sq ft
Impervious Area	23,000 sq ft
Runoff Volume	1,360 cu ft
BMP Volume	507 cu ft

PROJECT BENEFITS

TYPE: PERVIOUS PAVEMENT
Delivery Phase: Planning

Asset details
Asset drainage area: 3.88 acres
Impervious area treated: 2.55 acres
Assumed design capacity: 0.09 acre-ft
Trash full capture system (FCS): No

Site conditions
Land use type: City Park/Recreation
Parcel APN : 017-112-01
Imperviousness: 66%
Slope: 4%
Hydrologic soil type: Group C

TMDL benefits
Catchment ID: Wat 43 & 47
Receiving water: Pajaro River
Receiving water impaired: Yes
Runoff reduction: 2.03 acre-ft/yr
Pollutant load reduction: 0.18 ton/yr
Trash priority land use treated: 0.0 acres

Multi-benefits
Catchment runoff reduction opportunity: Moderate
Catchment pollutant reduction opportunity: High
Managed aquifer recharge opportunity: Moderate
Flood hazard: Very low
Urban heat island opportunity: Very high
Greening opportunity: High
Disadvantaged community status: Disadvantaged
CalEnviroScreen score: 84
Public exposure: High



PERMEABLE PAVEMENT



BIORETENTION PLANTER

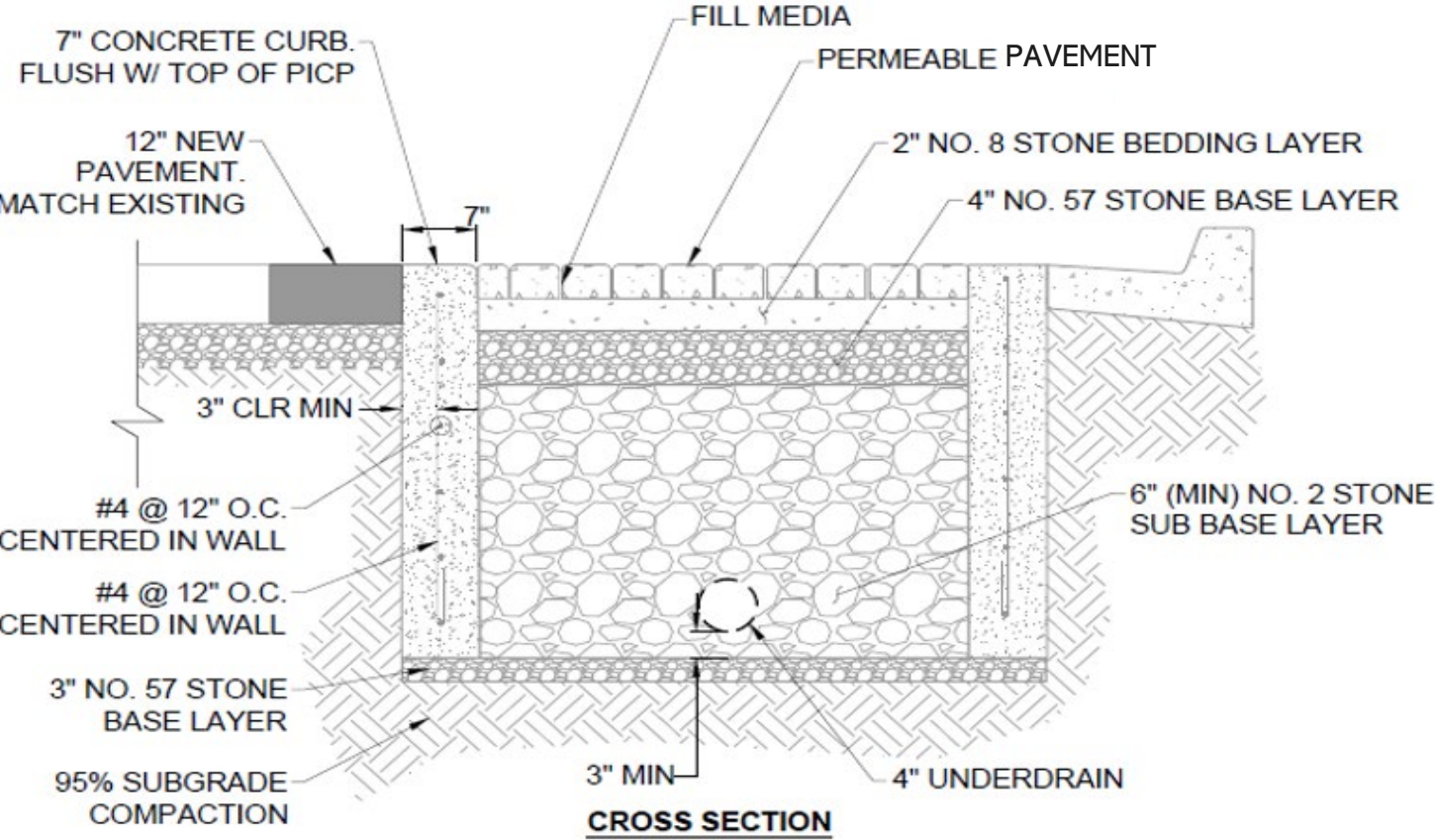
WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Downtown Plaza



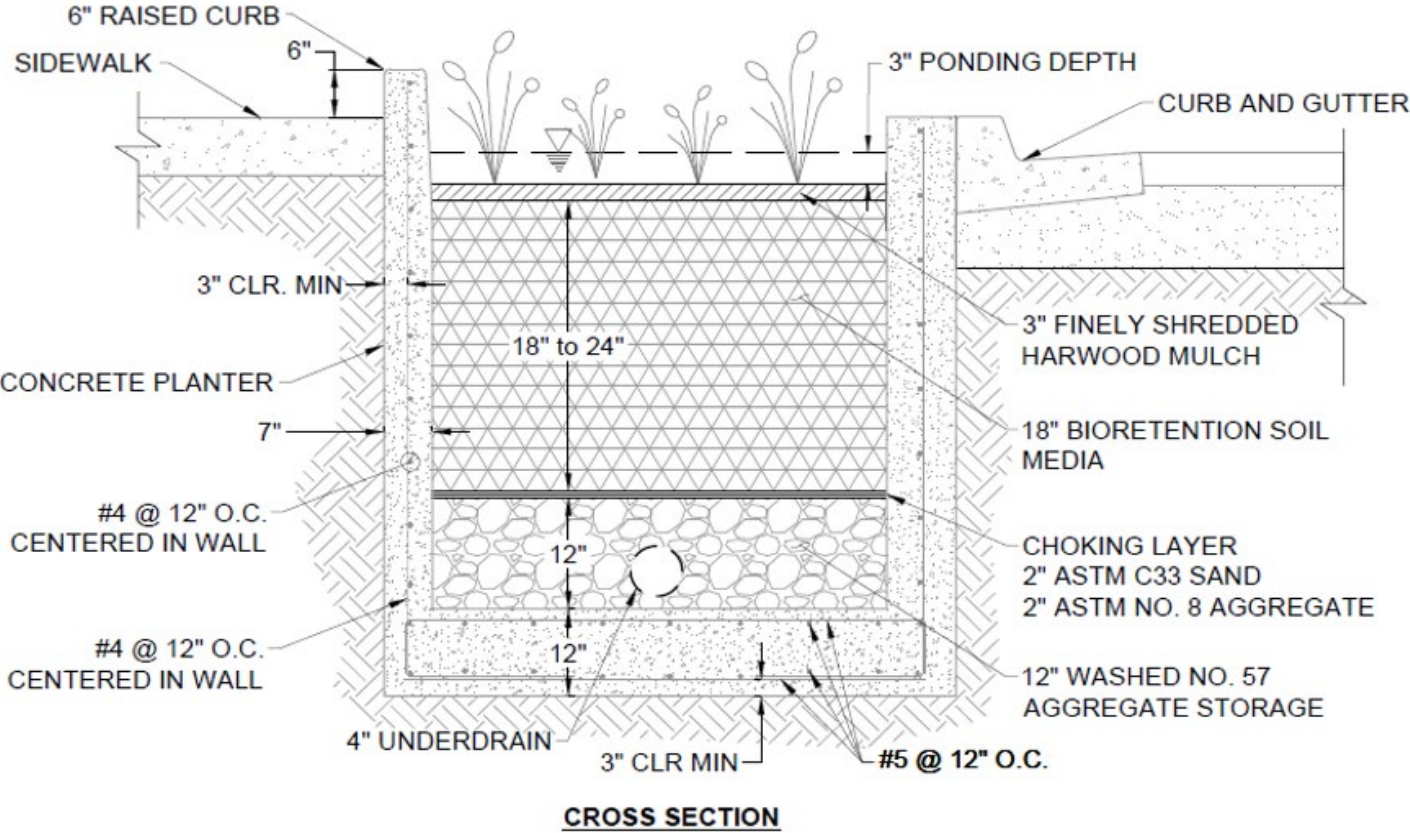
1

Permeable Pavement



2

Bioretention



Site constraints/Environmental Concerns:

- Storm water discharge near local natural waterways

Permitting Considerations:

- NPDES state requirements
- Stormwater Post-construction Standards-Permit
- Stormwater Control Plan/O&M Plan/Maintenance agreement

Potential Funding Sources:

- Water Recycling Funding Program
- CWA Section 319 Nonpoint Source Pollution Grant
- Prop 1 – Rd2 Integrated Regional Water Management Grant Program

Planning Level Cost Estimates

Capital Cost Estimate

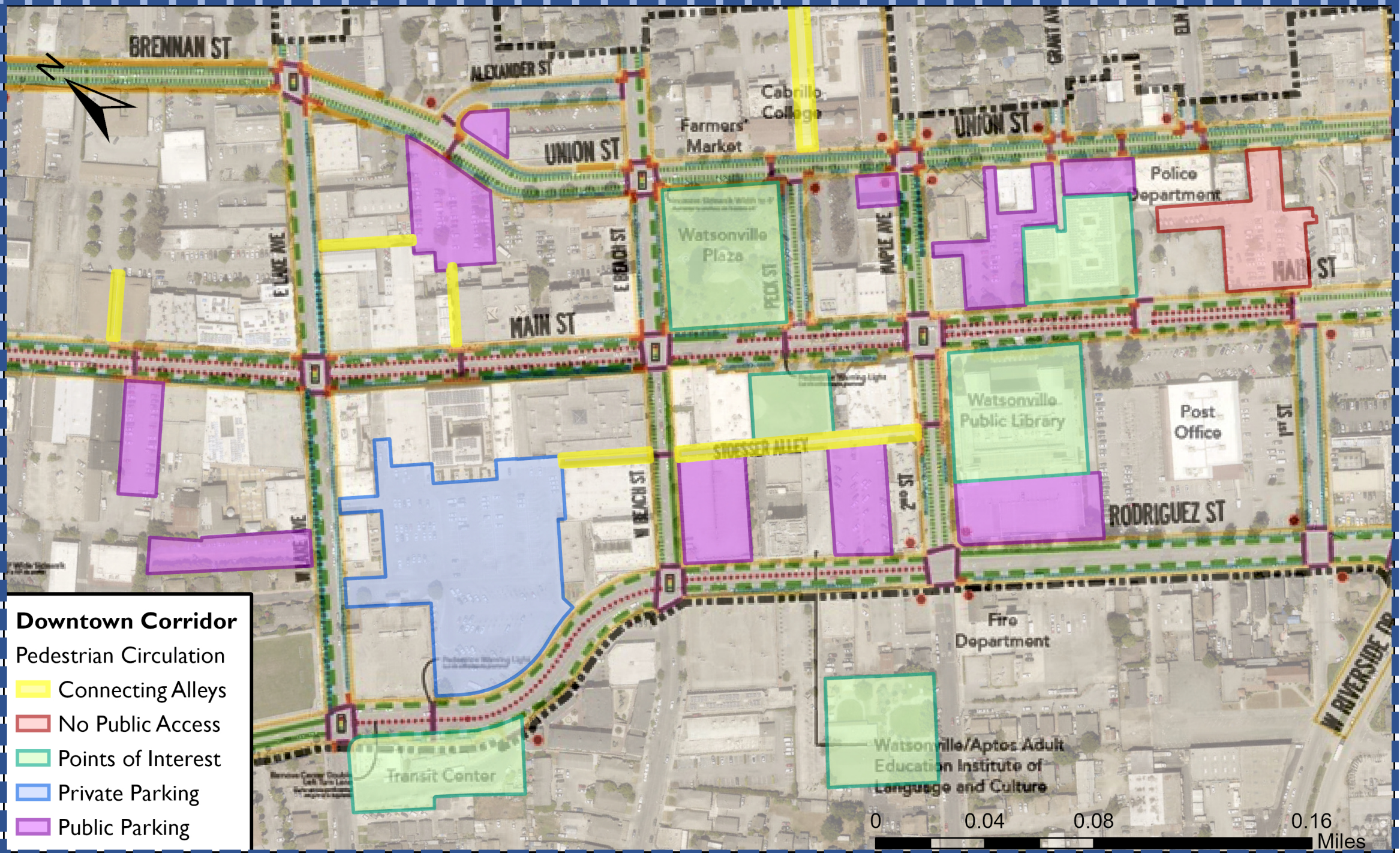
Peck Street Permeable Pavement	Union Street Permeable Pavement	Beach Street Bioretention Swale	Beach Street Mid-Block Crossing	Peck Street Bioretention Swale	Union Street Bioretention Swale	Total
\$82,300	\$66,700	\$16,200	\$16,700	\$19,000	\$41,500	\$242,400

Operations & Maintenance Cost Estimate (Annual)

Peck Street Permeable Pavement	Union Street Permeable Pavement	Beach Street Bioretention Swale	Beach Street Mid-Block Crossing	Peck Street Bioretention Swale	Union Street Bioretention Swale	Total
\$2,150	\$1,740	\$800	\$600	\$950	\$2,200	\$8,440

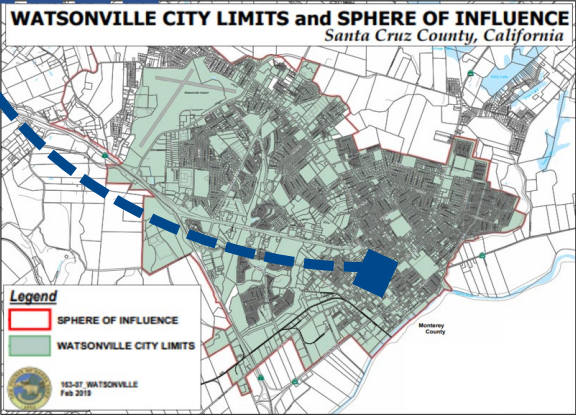
WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Downtown Corridor Connections



PROJECT DESCRIPTION

The downtown district of Watsonville provides a unique opportunity to promote urban greening that enhances pedestrian passageways, improve storm water quality, and reduce heat island effects while emphasizing outcomes for environmental justice, safety, and aesthetics. The Watsonville Plaza and Farmers' Market, in addition to the Public Library and City Offices, are all highly destined areas in the downtown corridor with limited connectivity between them. The Downtown Parking study has indicated that sufficient off-street parking is available which presents an opportunity to convert on-street parking stalls. The Downtown Complete Streets plan has identified several circulation possibilities and improvements that could be incorporated along the streets. This downtown corridor connection plan works in conjunction with that plan and will link the identified circulation with the parking lots and alley ways to find new possible pathways of travel. The downtown corridor connections will create an inventory of high value uses including parking stalls, tree count, impervious area treated, and volume capture to create a 'bank' of urban greening credits that the City can further evaluate for a private developer market. This concept creates a uniform landscape template for the parking lots, implements better pedestrian connections between lots and destinations, and provides opportunity and incentive to engage with private parking lot owners to participate. This project has the potential to be developed into an Urban Sustainability Area. This concept is an addendum concept to the various downtown City plans.



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

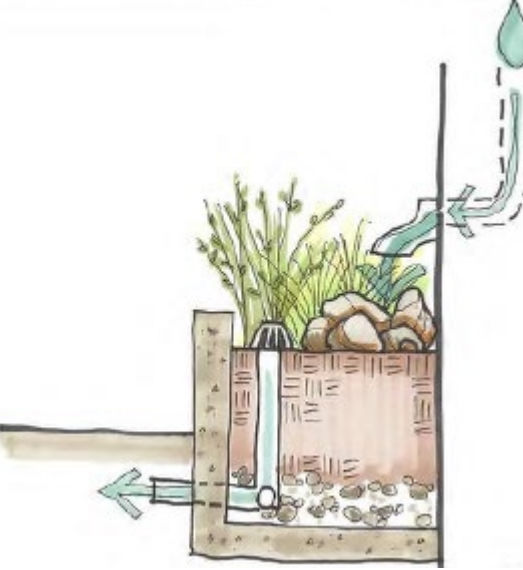
Project Concept Designs – Downtown Corridor



PERMEABLE PAVEMENT



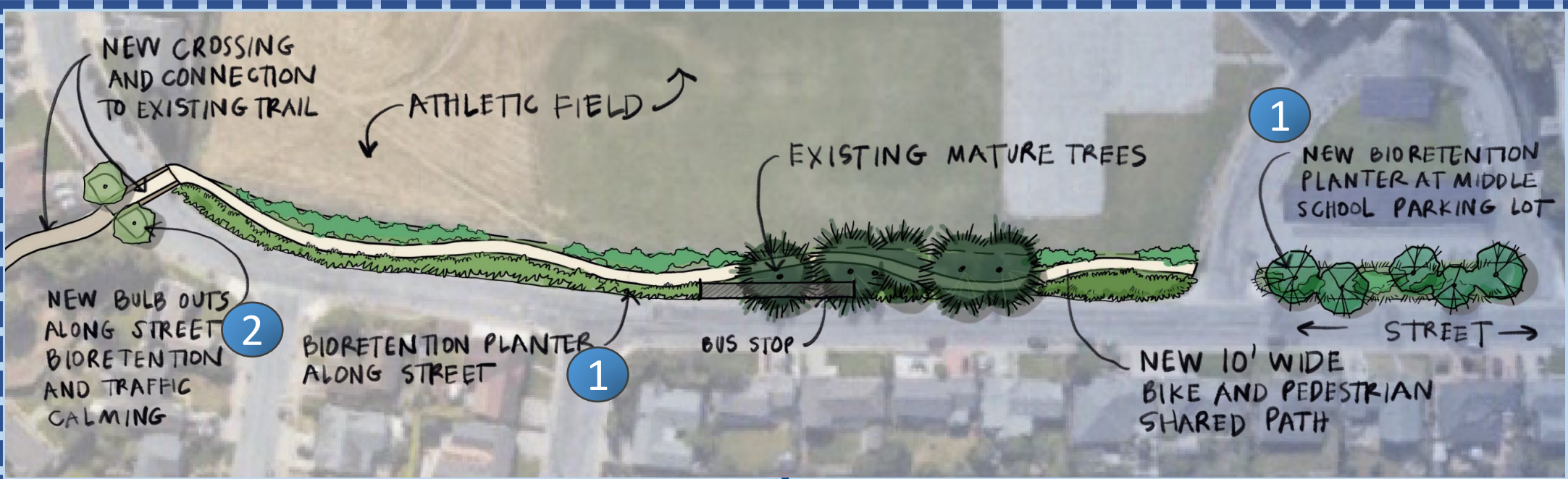
BIORETENTION PLANTER



DOWNSPOUT PLANTER

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Rolling Hills Middle School

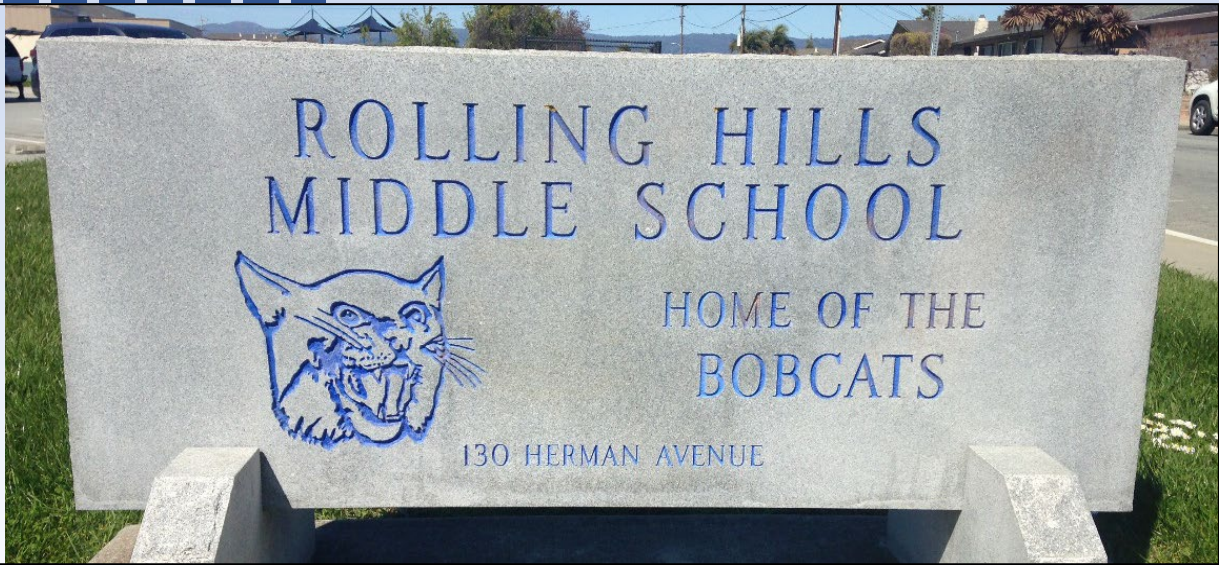
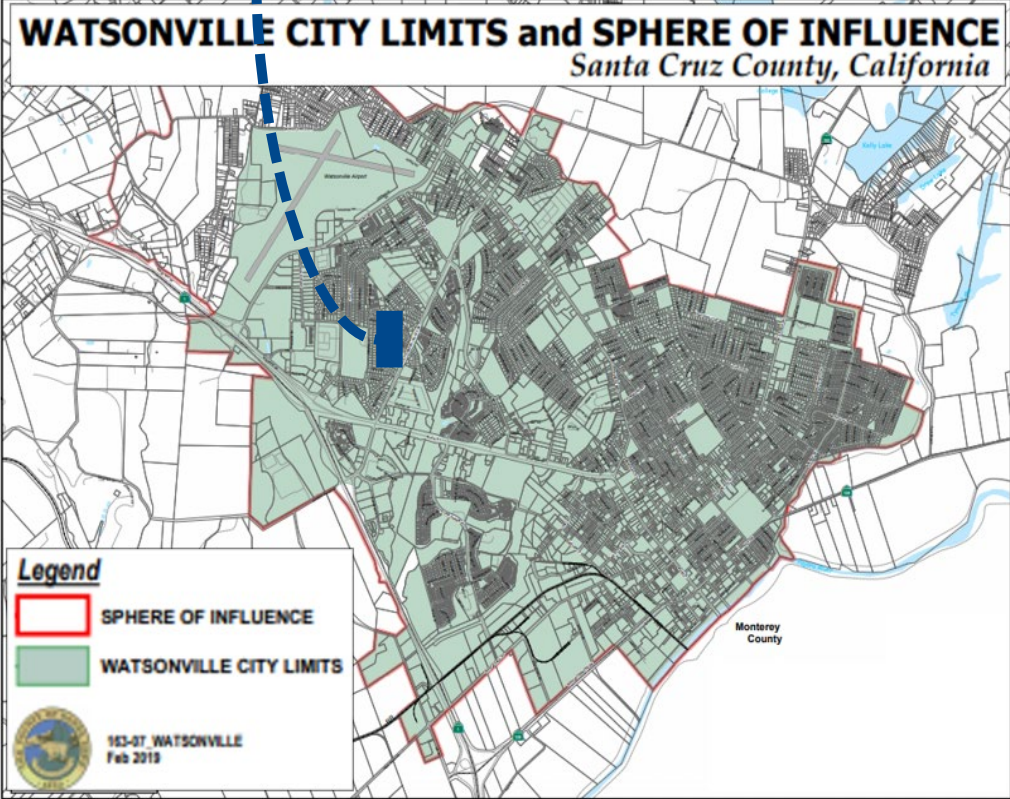


PARCEL DRAINAGE AREA CHARACTERISTICS	
TOTAL DRAINAGE AREA	25.2 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	36 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	20.0 acre-ft

PROJECT DESCRIPTION

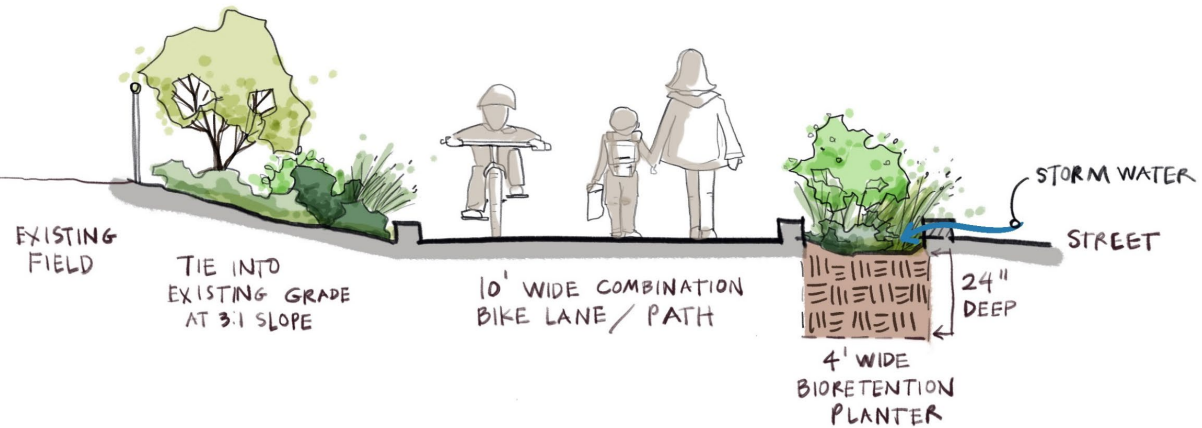
LOCATION: Rolling Hills Middle School, 130 Herman Ave, Watsonville, CA 95076

DESCRIPTION: Rolling Hills Middle School is a site that is owned and operated by the Pájaro Valley Unified School District and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Ample space is available to the south of the school within the road right of way (on Herman Ave) to provide a combined protected pedestrian and bicycle facility to improve safe passageways to school while promoting alternative forms of transportation to the school site. The protective planter will be constructed as a bioswale that will capture, store, and infiltrate runoff from the surrounding neighborhood that then ultimately drains to the West Branch Struve Slough, which leads to nearby wetlands, eventually the Pacific Ocean. The swales will also improve the aesthetics of the middle school, as they will be placed along the drive-thru and drop off areas, and in the front of the school. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives. Collaboration for use and maintenance will be required with the school district.



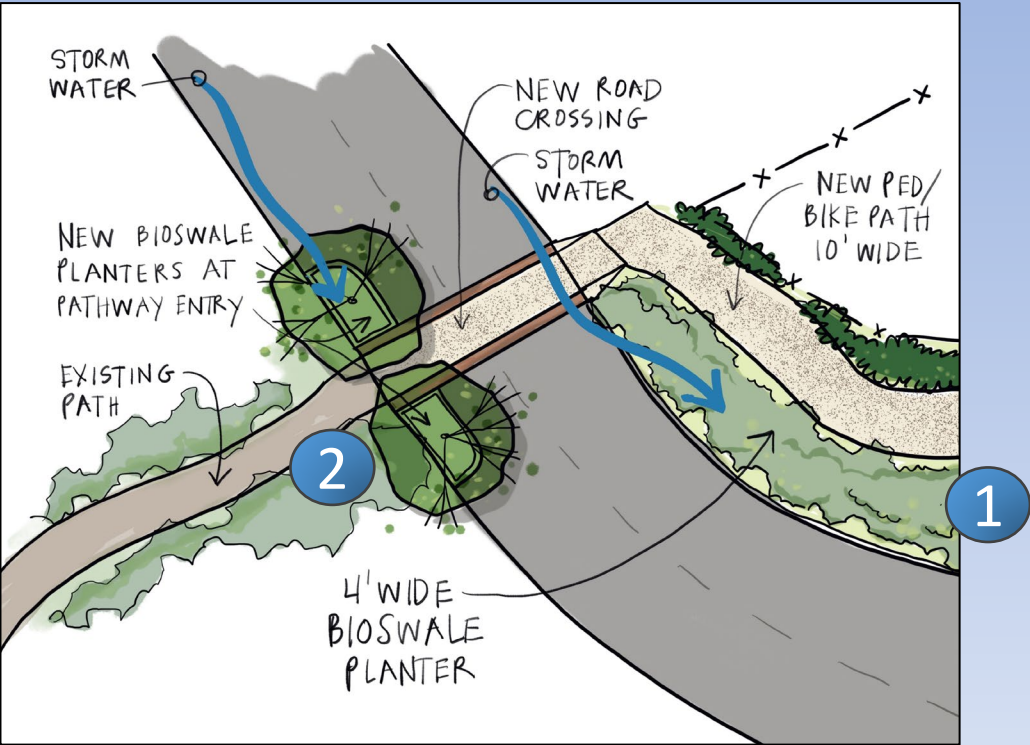
HIGHLIGHTED PROJECT FEATURES

- **Protected Pedestrian/Bicycle Facilities** – Provides safe school passage with bulb outs and bioretention planter separators
- **Existing City Trails Connection** – Ties into the existing trail system to encourage alternate transportation modes



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Rolling Hills Middle School



PROJECT BENEFITS

TYPE: BIOSWALE
Delivery Phase: Planning

Asset details
Asset drainage area: 25.2 acres
Impervious area treated: 9.8 acres
Assumed design capacity: 4.42 acre-ft
Trash full capture system (FCS): No

Site conditions
Land use type: Commercial/
Institutional
Parcel APN : 015-041-01
Imperviousness: 39%
Slope: 7%
Hydrologic soil type: Group C

TMDL benefits
Catchment ID: Wat 33
Receiving water: West Branch Struve Slough
Receiving water impaired: No
Runoff reduction: 17.75 acre-ft/yr
Pollutant load reduction: 1.66 ton/yr
Trash priority land use treated: 0.00 acres

Multi-benefits
Catchment runoff reduction opportunity: Very high
Catchment pollutant reduction opportunity: Very high
Managed aquifer recharge opportunity: Moderate
Flood hazard: Very Low
Urban heat island opportunity: Moderate
Greening opportunity: Low
Disadvantaged community status: NA
CalEnviroScreen score: 61
Public exposure: High



BIORETENTION SWALE

Bioretention Swales	
Drainage Area	25.2 acres
Impervious Area	9.80 acres (39%)
Runoff Volume	17.75 ac ft
BMP Volume	4.42 ac ft



EXISTING TRAIL CONNECTION



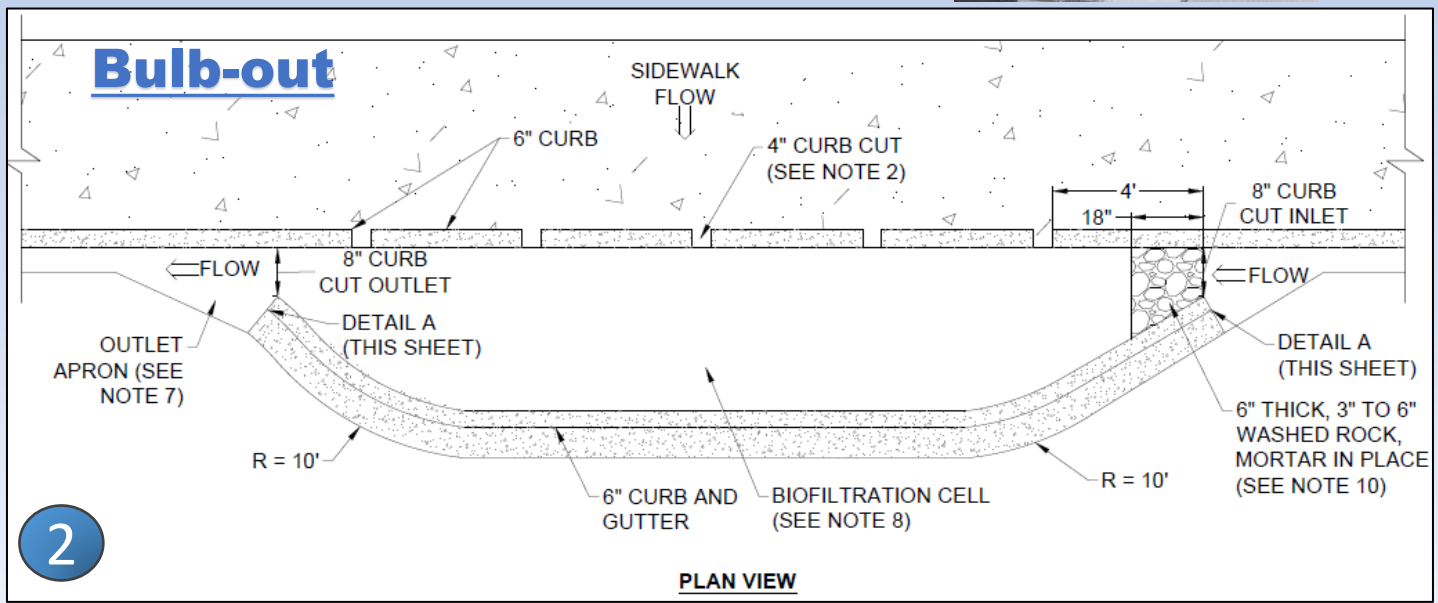
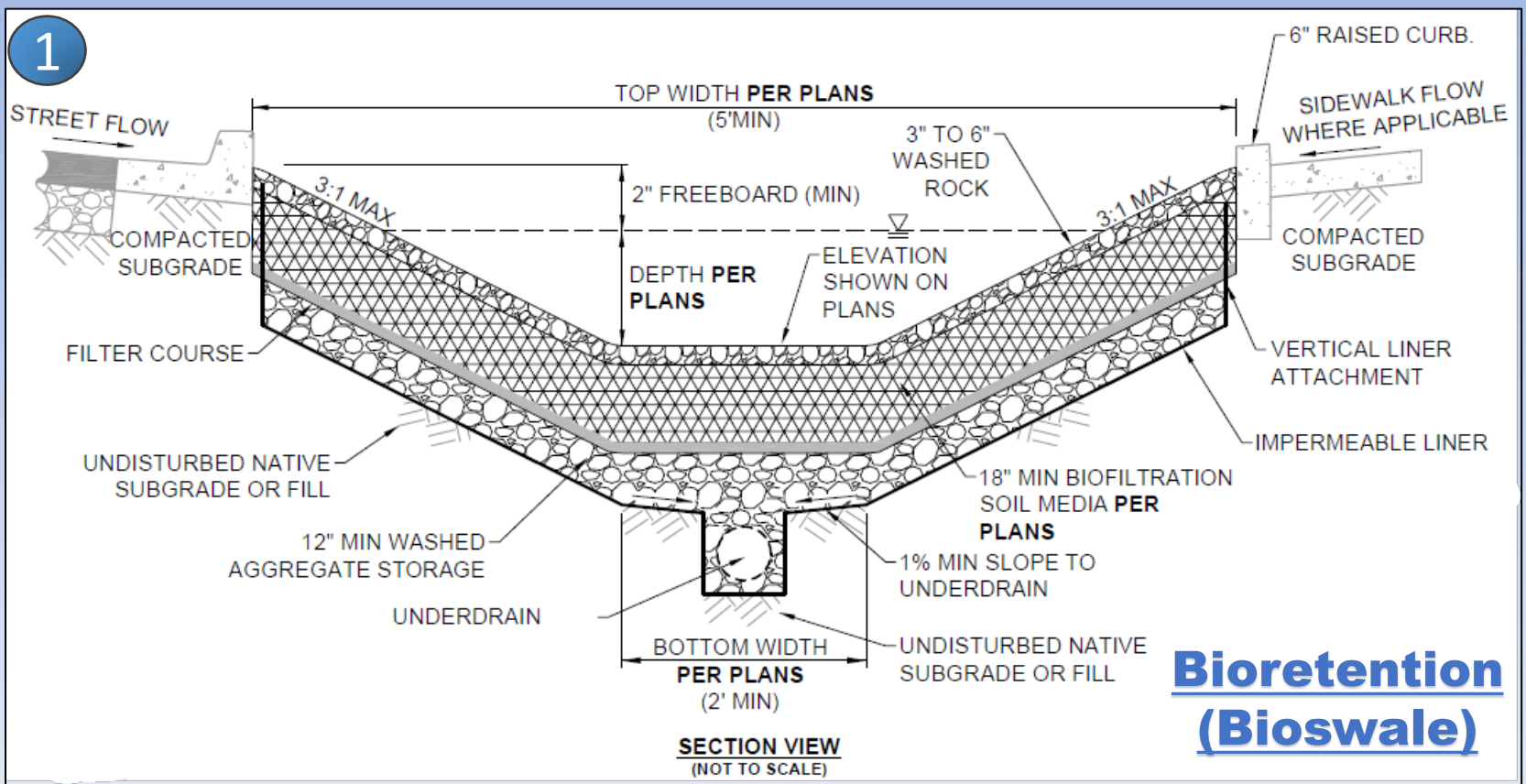
PROTECTED BIKE LANE



PROTECTED BIKE LANE

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Rolling Hills Middle School

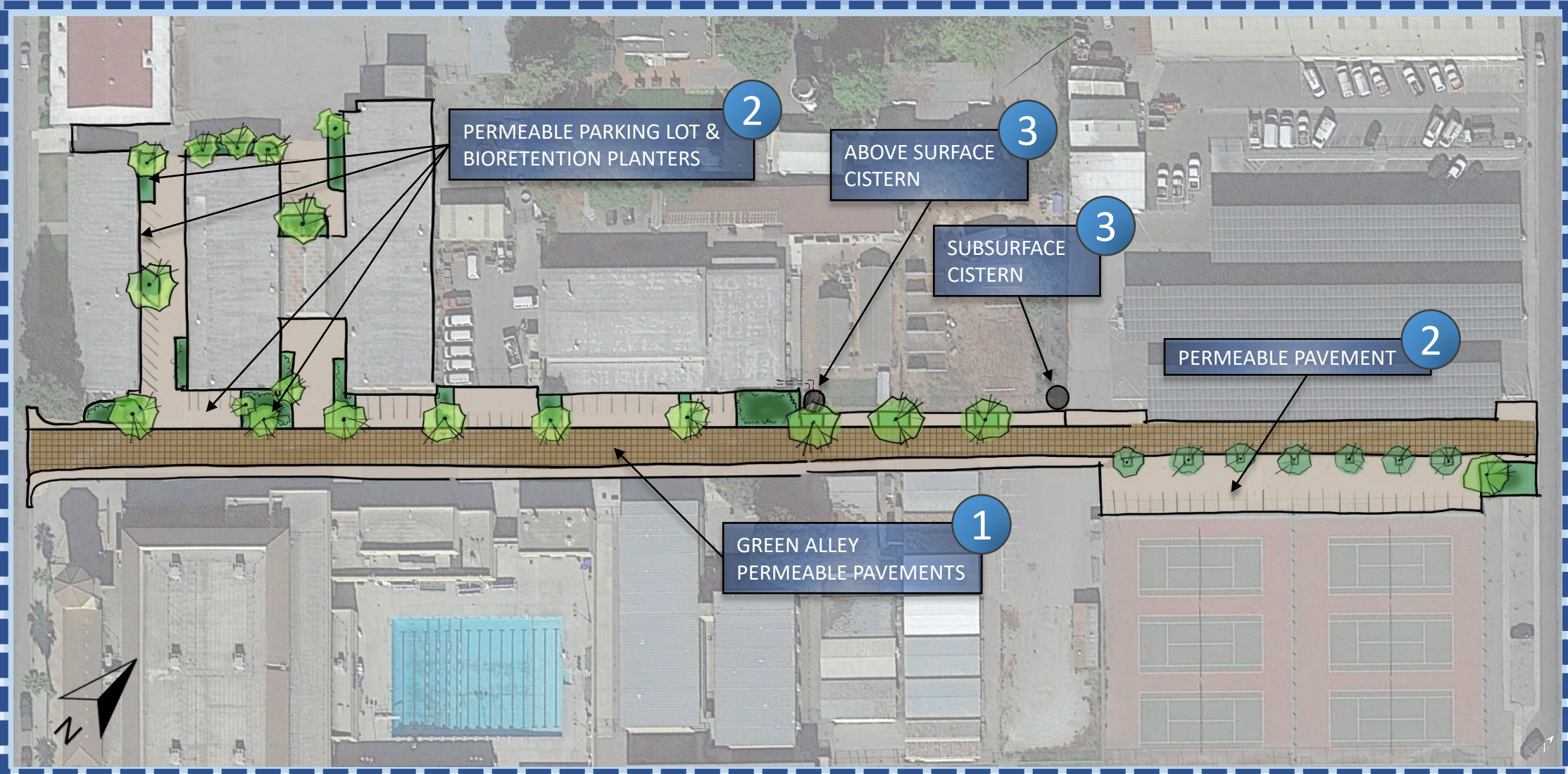


Planning Level Cost Estimates				
1 Bioretention			2 Bulb-out	
Capital Cost Estimate				
Herman Ave Bioswale	School Entry Bioretention	Combined Sidewalk/Bicycle Path	Crosswalk and Bulb-out	Total
\$170,200	\$131,000	\$52,100	\$13,000	\$366,300
Operations & Maintenance Cost Estimate (Annual)				
Herman Ave Bioswale	School Entry Bioretention	Combined Sidewalk/Bicycle Path	Crosswalk and Bulb-out	Total
\$6,750	\$7,300	\$4,200	\$500	\$18,750

- Site constraints/Environmental Concerns:**
- Stormwater discharge near local natural waterways
 - School district coordination
- Permitting Considerations:**
- NPDES state requirements
 - Stormwater Post-construction Standards-Permit
 - Stormwater Control Plan/O&M Plan/Maintenance agreement
- Potential Funding Sources:**
- Water Recycling Funding Program
 - CWA Section 319 Nonpoint Source Pollution Grant
 - Prop 1 – Rd2 Integrated Regional Water Management Grant Program

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

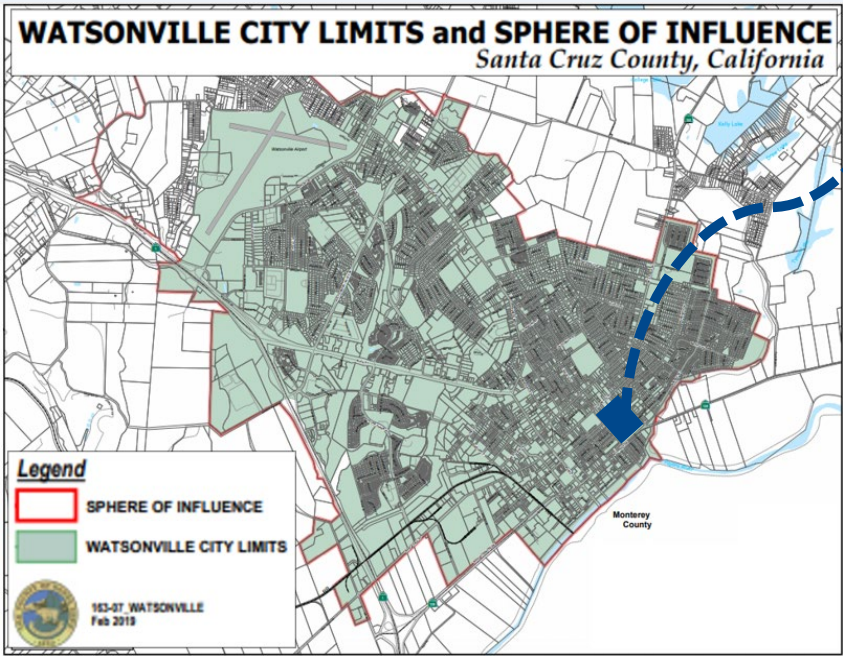
Project Concept Designs – Watsonville High School



PROJECT DESCRIPTION

LOCATION: Watsonville High School, 250 E Beach St, Watsonville CA.

DESCRIPTION: Watsonville High School is a site that is owned and operated by the Pájaro Valley Unified School District and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Runoff within this corridor drains to the Pájaro River, which leads to the Monterey Bay, and the Struve Slough, which leads to nearby wetlands, both ultimately leading to the Pacific Ocean. The project seeks to improve the water quality of stormwater runoff flows conveyed within Pájaro River and Struve Slough through capture, storage, infiltration, and filtration before returning flows back to the channel. The project includes a “green alley” composed of a permeable pavement passageway lined by swales, section of permeable pavement parking strips, additional planters between classrooms, and a surface bioswale basin. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives.



PARCEL DRAINAGE AREA CHARACTERISTICS	
TOTAL DRAINAGE AREA	7.33 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	35 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	14.05 acre-ft

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Watsonville High School



BIORETENTION PLANTER



Illustration by Amy West www.amy-west.com



REUSE CISTERN



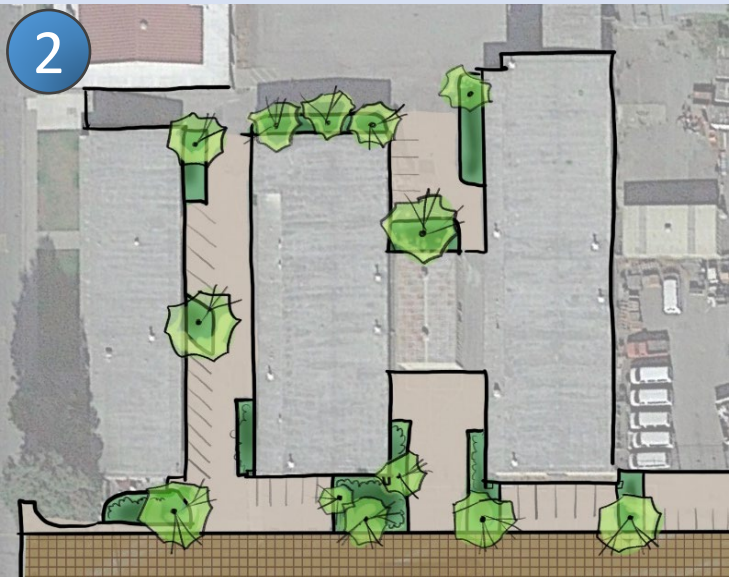
GREEN ALLEY



PERMEABLE PAVEMENT

Green Alley

Drainage Area	3.4 acres
Impervious Area	3.37 acres (99%)
Runoff Volume	7,900 cubic ft
BMP Volume	9,300 cubic ft



Permeable Parking Lot & Bioretention

Drainage Area	2.19 acres
Impervious Area	2.11 acres (96.3%)
Runoff volume	4,500 cubic ft
BMP Volume	14,721 cubic ft

Subsurface Cistern

Drainage Area	1.22 acres
Impervious Area	1.22 acres (100%)
Runoff Volume	22,000 gal
BMP Volume	25,000 gal

Above Surface Cistern

Drainage Area	0.26 acres
Impervious Area	0.26 acres (100%)
Runoff volume	4,500 gal
BMP Volume	5,000 gal

PROJECT BENEFITS

TYPE: PERVIOUS PAVEMENT
Delivery Phase: Planning

Asset details
Asset drainage area: 26.59 acres
Impervious area treated: 12.73 acres
Assumed design capacity: 0.76 acre-ft
Trash full capture system (FCS): No

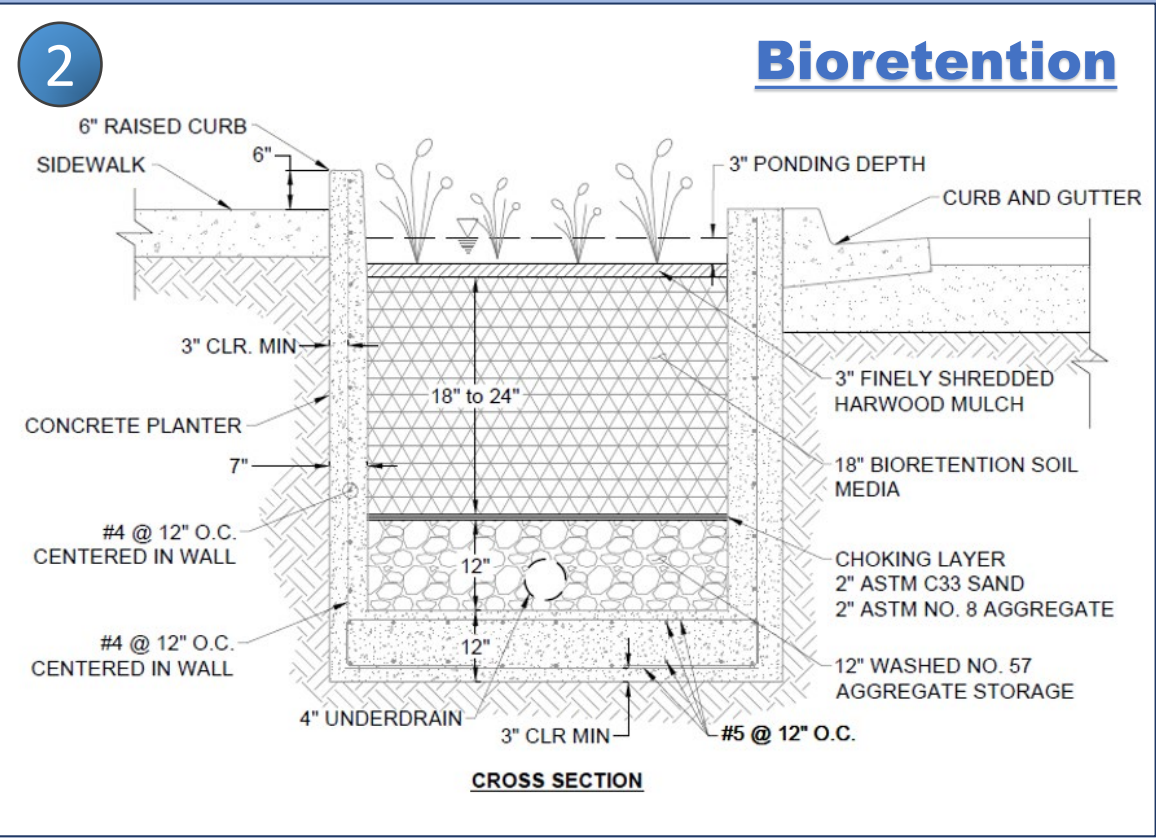
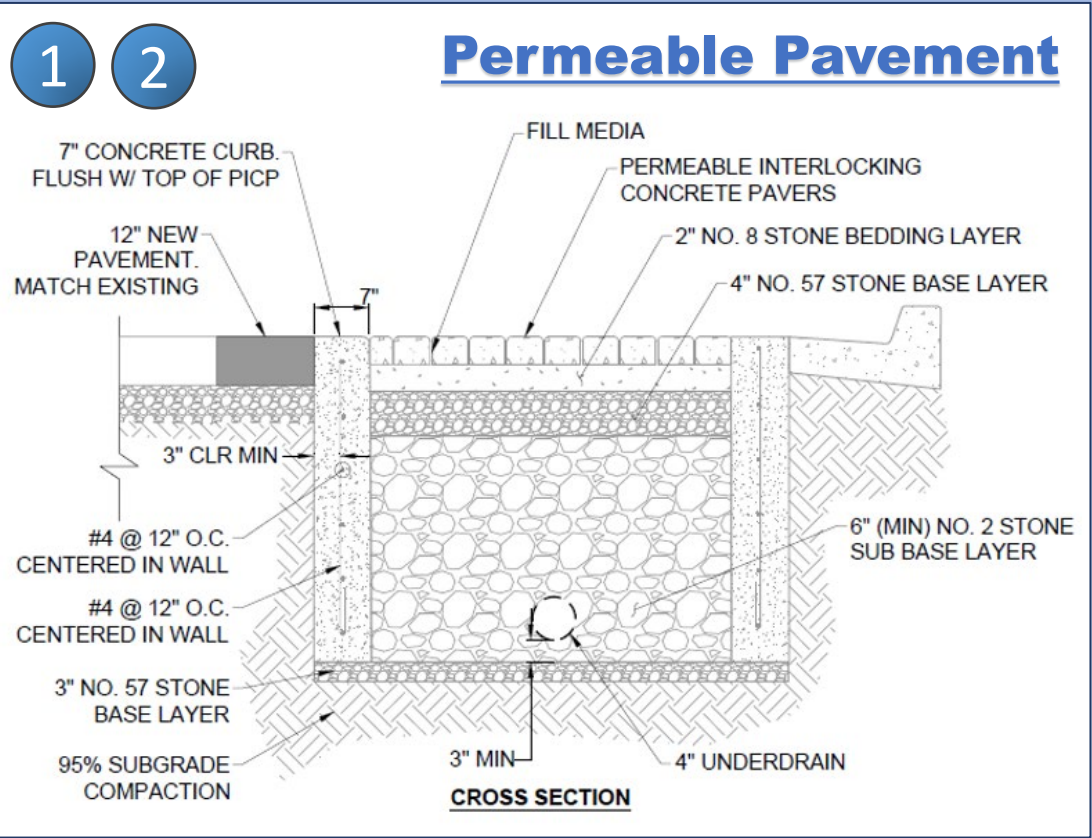
Site conditions
Land use type: Commercial/ Institutional
Parcel APN : 017-211-07
Imperviousness: 53%
Slope: 4%
Hydrologic soil type: Group C

TMDL benefits
Catchment ID: Wat 45
Receiving water: Pajaro River
Receiving water impaired: Yes
Runoff reduction: 20.56 acre-ft/yr
Pollutant load reduction: 1.90 ton/yr
Trash priority land use treated: 0.00 acres

Multi-benefits
Catchment runoff reduction opportunity: Very low
Catchment pollutant reduction opportunity: Very low
Managed aquifer recharge opportunity: Moderate
Flood hazard: 0.2% annual flood chance
Urban heat island opportunity: Very high
Greening opportunity: Moderate
Disadvantaged community status: NA
CalEnviroScreen score: 61
Public exposure: High

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Watsonville High School



Site constraints/Environmental Concerns:

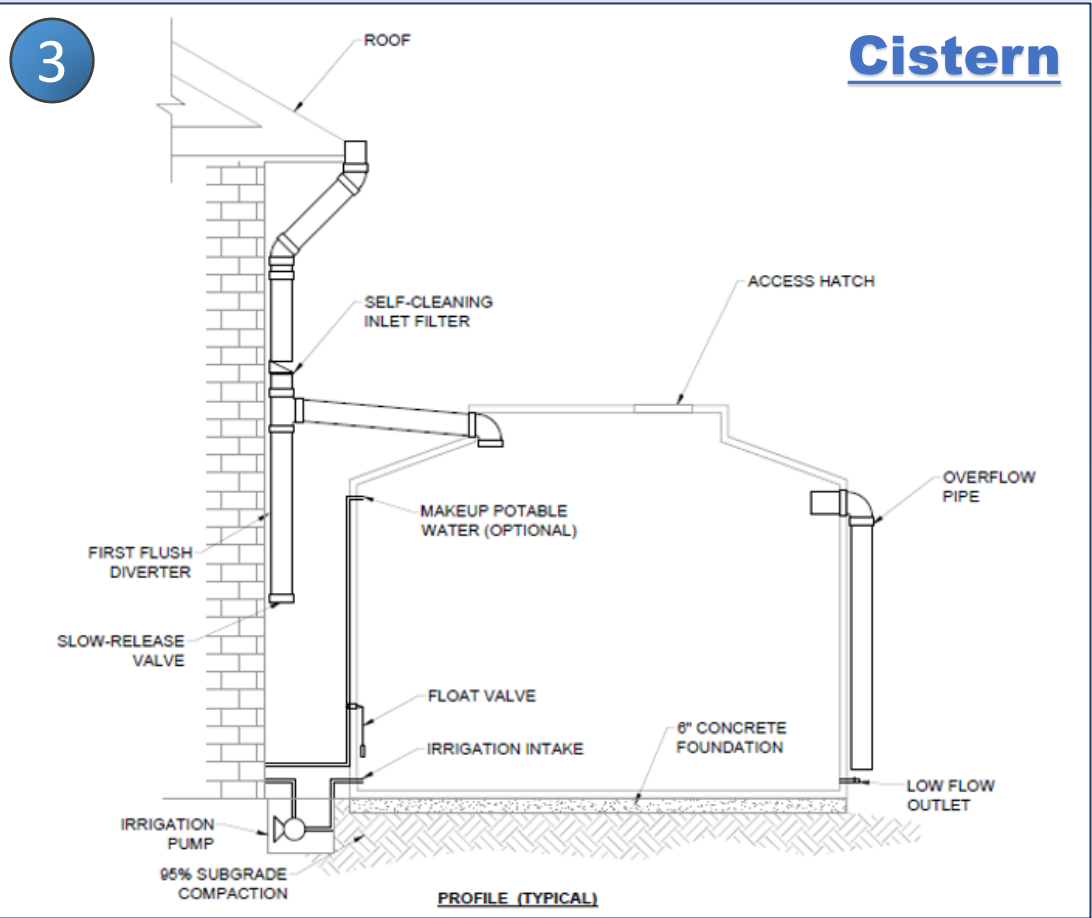
- Stormwater discharge near local natural waterways
- School district coordination

Permitting Considerations:

- NPDES state requirements
- Stormwater Post-construction Standards-Permit
- Stormwater Control Plan/O&M Plan/Maintenance agreement

Potential Funding Sources:

- Water Recycling Funding Program
- CWA Section 319 Nonpoint Source Pollution Grant
- Prop 1 – Rd2 Integrated Regional Water Management Grant Program



Planning Level Cost Estimates					
1 Green Alley		2 Permeable Parking Lot & Bioretention		3 Cistern for Agricultural Center	
Capital Cost Estimate					
Above Ground Cistern (5,000 gallons)	Subsurface Cistern (25,000 gallons)	Alley Permeable Pavement	Parking Permeable Pavement	Parking Bioretention Planters	Total
\$15,000	\$115,000	\$1,100,000	\$350,000	\$300,000	\$1,880,000
Operations & Maintenance Cost Estimate (Annual)					
Above Ground Cistern (5,000 gallons)	Subsurface Cistern (25,000 gallons)	Alley Permeable Pavement	Parking Permeable Pavement	Parking Bioretention Planters	Total
\$2,000	\$20,000	\$20,000	\$8,000	\$8,500	\$58,500

APPENDIX B: FUNDING SOURCES

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Funding Program	Funding Agency	Funding Type	Eligibility Requirements	Objectives/Goals	Average Award Amounts	Qualifying Project Types	Match Required	Future Anticipated Opportunity Dates	Link
Water Recycling Funding Program (WRFP)- Construction Grant	State Water Resources Control Board (SWRCB)	State Grant	Eligible applicants include public agencies, Section 501(c)(3) nonprofit organizations, federally recognized Tribes and State Tribes that, mutual water companies.	Promote the beneficial use of treated municipal wastewater (water recycling) to augment or offset fresh water supplies in California	Grants based on reasonable, estimated construction costs. Estimated amount per award is \$250k-\$5M	<p>Eligible projects include construction of recycled water treatment facilities, storage facilities, pumping facilities, groundwater recharge facilities, and recycled water distribution systems, including onsite improvements.</p> <p>Water recycling construction projects must offset or augment state or local fresh water supplies.</p>	At least 51%	<p>Applications accepted continuously. All application documents received by December 31st each year will be used to develop a priority score. Projects which receive a priority score equal to or greater than the yearly fundable list cutoff score will be placed on the fundable list for the upcoming fiscal year. The annual fundable list runs from July 1 to June 30.</p> <p>Period of Performance: 3 years</p>	https://www.grants.ca.gov/grants/water-recycling-funding-program-construction-grant/
Proposition 1 - Round 2 Integrated Regional Water Management (IRWM) Implementation Grant Program	Department of Water Resources (DWR)	State Grant	Projects must be included in an adopted IRWM Plan that is consistent with the 2016 IRWM plan standards. The applicant must demonstrate that the project is listed in the IRWM Plan project list.	The IRWM Grant Program is designed to encourage integrated regional strategies for water resource management in California by providing funding for projects and programs throughout the state including climate change adaptation, providing incentives for collaboration and setting priorities in water resource and infrastructure management, and improving regional water self-reliance while reducing reliance on Sacramento-San Joaquin Delta.	Not defined	Water reuse and recycling; Water-use efficiency and water conservation; Local and regional surface and underground water storage, including groundwater aquifer cleanup or recharge projects; Regional water conveyance facilities that improve integration of separate water systems; Watershed protection, restoration, and management projects, including projects that reduce the risk of wildfire or improve water supply reliability; Stormwater resource and flood management; Conjunctive use of surface and groundwater storage facilities; Water desalination projects; Decision support tools to model regional water management strategies to account for climate change and other changes in regional demand and supply projections; Improvement of water quality, including drinking water, groundwater, wastewater treatment, water pollution prevention, and management of urban and agricultural runoff; Regional projects or programs as defined by the IRWM Planning Act	50%	<p>Anticipated Late 2021</p> <p>Period of Performance: 4 years</p>	https://www.grants.ca.gov/grants/proposition-1-round-2-integrated-regional-water-management-irwm-implementation-grant-program/

Funding Program	Funding Agency	Funding Type	Eligibility Requirements	Objectives/Goals	Average Award Amounts	Qualifying Project Types	Match Required	Future Anticipated Opportunity Dates	Link
2022 Clean Water Act Section 319 Nonpoint Source Pollution Grant	State Water Resources Control Board (SWRCB)	State Grant	Most projects must quantify pollutant load reduction to waters of the state. Projects must be part of a larger watershed plan to improve overall watershed health, unless it is a planning project.	Reduce and mitigate the effects of nonpoint source pollution - such as sediment, pesticides, and nutrients - to waters of the state.	Estimated at \$250k-\$800k	Examples of projects include livestock fencing to reduce sediment and nutrient discharges, agricultural best management practices to reduce pesticide and nutrient discharges, dredging contaminated sediment from pesticide-impaired waters, habitat restoration such as installation of large woody debris and riparian revegetation, and rural road inventories and repairs to reduce sedimentation and erosion. Most awards go to projects that improve impaired waters, but a small amount of funding goes to projects that protect high-quality waters, or that address a nonpoint source pollution problem created by wildfire.	25%	Anticipated September 2021 Period of Performance: 10/2022 – 10/2026	https://www.grants.ca.gov/grants/2022-clean-water-act-section-319-nonpoint-source-pollution-grant_t/
Flood Mitigation Assistance Program (FMA)	CalOES	State Grant	<p>APPLICANTS</p> <ul style="list-style-type: none"> States, the District of Columbia, U.S. territories, and Indian tribal governments (federally recognized) Each state, territory, the District of Columbia, and Indian tribal government (federally recognized) shall designate one agency to serve as the Applicant for FMA funding. Each Applicant’s designated agency may submit only one FMA grant application to FEMA. Applicants must have a FEMA-approved State or Tribal Hazard Mitigation Plan by the Application deadline and at the time of obligation of grant funds for project, Project Scoping, and Technical Assistance subapplications. <p>SUBAPPLICANTS</p> <p>Local governments, including cities, townships, counties, special district governments, and Indian tribal governments (including federally recognized tribes who choose to apply as subapplicants), are considered subapplicants and must submit subapplications to their state/territory/tribal applicant agency.</p> <ul style="list-style-type: none"> Subapplicants must have a FEMA-approved Local or Tribal Hazard Mitigation Plan by the Application deadline and at the time of obligation of grant funds for project, Project Scoping, and Technical Assistance subapplications. Subapplicants must be participating in the NFIP, and not be withdrawn, on probation, or suspended. Structures identified in the subapplication 	Reduce or eliminate the risk of flood damage to buildings insured under the National Flood Insurance Program.	Max: \$600k	<ul style="list-style-type: none"> Mitigate severe repetitive loss and repetitive loss properties. Acquisition and demolition or relocation. Structure elevation. Localized flood control. Infrastructure protective measures. Floodwater storage and diversion. Stormwater management. Utility protective measures. 	25%	Anticipated August 2021 (Annual program) Period of Performance: Estimated at 36-48 months from start date	https://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/pre-disaster-flood-mitigation

Funding Program	Funding Agency	Funding Type	Eligibility Requirements	Objectives/Goals	Average Award Amounts	Qualifying Project Types	Match Required	Future Anticipated Opportunity Dates	Link
			must have an NFIP policy in effect at the FMA Application start date and must maintain it through completion of the mitigation activity and for the life of the structure.						
Floodplain Management, Protection, and Risk Awareness Program	Department of Water Resources (DWR)	State Grant	Any California public agency, nonprofit organization, public utility agency, federally recognized Indian Tribe, State Indian Tribe listed on the Native American Heritage Commission's California Tribal Consultation List, or mutual water company.	Support local agency efforts to prepare for flooding by providing financial assistance for flood risk reduction activities related to stormwater flooding, mudslides, and flash floods.	Not defined	Implementation projects, as well as planning and monitoring projects that will lead to the future implementation of projects that will reduce flash flooding, mudslides, or stormwater flooding.	25%	Anticipated Summer 2021 Period of Performance: 3 years	https://water.ca.gov/Work-With-Us/Grants-And-Loans/Flood-Management-Protection-Risk-Awareness-Program
WaterSMART Environmental Water Resources Projects	US Bureau of Reclamation (USBR)	Federal Grant	Category A applicants: <ul style="list-style-type: none"> States, Indian Tribes, irrigation districts, and water districts; State, regional, or local authorities, the members of which include one or more organizations with water or power delivery authority; and Other organizations with water or power delivery authority. Category B applicants: <ul style="list-style-type: none"> Nonprofit conservation organizations, including watershed groups as defined in the Cooperative Watershed Management Act, Section 6001, that are acting in partnership with and with the agreement of an entity described in Category A.1 Category B applicants must include with their application a letter from the Category A partner stating that the Category A partner: (1) is acting in partnership with the applicant; (2) agrees to the submittal and content of the proposal; and (3) intends to participate in the project in some way, for example, by providing input, feedback, or other support for the project.	Benefit ecological values that have a nexus to water resources management, including projects that benefit plant and animal species, fish and wildlife habitat, riparian areas, and ecosystems that are supported by rivers, streams, and other water sources, or that are directly influenced by water resources management.	Not defined	Water storage for subsequent release to improve streamflow.	At least 25% Note: partners do not necessarily need to contribute cost-share funding. A watershed group is eligible to apply for 50% cost-shared funding without other partners but must include a Category A partner to be eligible for 75% Federal funding.	Anticipated August 2021 Period of Performance: Not defined	https://www.usbr.gov/watersmart/docs/2021/Draft-Eligibility-and-Evaluation-Criteria-for-Review-and-Comment.pdf

Funding Program	Funding Agency	Funding Type	Eligibility Requirements	Objectives/Goals	Average Award Amounts	Qualifying Project Types	Match Required	Future Anticipated Opportunity Dates	Link
WaterSMART Grants: Cooperative Watershed Management Program Phase II	US Bureau of Reclamation (USBR)	Federal Grant	Not defined	Contribute to the WaterSMART strategy by providing funding to watershed groups to encourage diverse stakeholders to form local solutions to address their water management needs	Max: \$100k per applicant	Eligible projects include watershed management activities that address critical water supply needs, water quality concerns, and restoration needs that will benefit multiple water uses in the watershed	At least 50%	Expected in November 2021 Performance Period: Not defined	https://www.usbr.gov/watersmart/cwmp/index.html
Recreational Trails Program	FHWA, California DPR, and Caltrans Active Transportation Program (ATP)	Federal /State Grant	Cities and Counties, Districts, State Agencies, Federal Agencies, Non-Profit Organizations with management responsibilities of public lands	Develop and maintain Recreational Trails and trail-related facilities for both non-motorized and motorized Recreational Trail uses.	Not defined	Easement and title fees, development and rehab of trails, construction of new trails, maintenance of existing trails, assessment of trail conditions, development of educational programs to promote safety and environmental protection related to trails.	12%	Applications due Feb 2022 Period of Performance: Varies based on project	http://www.parks.ca.gov/pages/1008/files/rtp_guide_final_2008.pdf
Regional Park Program	Department of Parks and Recreation	State Grant	Counties; Regional Park Districts, Regional Open-Space Districts, and Open-Space Authorities formed pursuant to Public Resources Code Division 26 (commencing with Section 35100); Joint Powers Authorities where at least one of the members is otherwise eligible on this list; Nonprofit organizations qualified to do business in California and qualified under Section 501(c)(3) of the Internal Revenue Code	Create, expand, or improve regional parks and regional park facilities.	Min: \$200k Max: \$3M	<ul style="list-style-type: none"> Acquisition for new or enhanced public access and use. Development to create or renovate: Trails, with preference given to multiuse trails over single-use trails; Regional sports complexes; Visitor and interpretive facilities; Other types of recreation and support facilities in regional parks. 	N/A	Applications due 11/5/2021 Period of Performance: 7/1/2020-6/30/2025	http://www.parks.ca.gov/pages/1008/files/Final_Regional_Park_Program_Application_Guide_10.29.20.pdf
Proposition 1 Groundwater Grant Program	State Water Resources Control Board (SWRCB)	State Grant	Nonprofit, Public Agency, or Tribal Government	Grants to prevent and cleanup contamination of groundwater that serves (or has served) as a source of drinking water.	Not defined	<p>Round 3 is for implementation projects only. Implementation proposals should demonstrate positive, quantifiable environmental outcomes, and consistency with the Prop 1 GWGP Guidelines.</p> <p>Implementation projects that prevent or clean up the contamination of groundwater that serves or has served as a source of drinking water include, but are not limited to:</p> <ol style="list-style-type: none"> Wellhead treatment; Installation of extraction wells combined with treatment systems; Centralized groundwater treatment systems; Source area cleanup; Groundwater recharge to prevent or reduce contamination of municipal or domestic wells; Groundwater injection to prevent seawater intrusion; 6,8 and Groundwater well destruction. 	50%	Applications due 9/7/2021 Period of Performance: 2-3 years	https://www.grants.ca.gov/grants/proposition-1-groundwater-grant-program/

Funding Program	Funding Agency	Funding Type	Eligibility Requirements	Objectives/Goals	Average Award Amounts	Qualifying Project Types	Match Required	Future Anticipated Opportunity Dates	Link
Sustainable Groundwater Management (SGM) Grant Program's Proposition 68 Implementation Round 2	Department of Water Resources (DWR)	State Grant	Groundwater Sustainability Agency (GSA); member agencies of GSAs; an entity that represents a GSA(s) which can include public agencies, non-profit organizations, public utilities, Federally recognized Indian Tribes, State Indian Tribes listed on the Native American Heritage Commission's Tribal Consultation list, or mutual water companies; and agencies with an approved Alternative	Provide financial assistance to Groundwater Sustainability Agencies (GSAs) for investments in groundwater recharge and projects that prevent or clean up contamination of a groundwater that serves as a source of drinking water	Not defined	<p>Projects with drought and groundwater investments to achieve regional sustainability through investments in groundwater recharge with surface water, stormwater, recycled water, and other conjunctive use projects, and projects to prevent or clean up contamination of groundwater that serves as a source of drinking water</p> <ul style="list-style-type: none"> • Groundwater recharge projects with surface water, stormwater, recycled water, and other conjunctive use projects • Groundwater contaminant remediation or prevention projects for groundwater that serves as a source of drinking water • Construction, rehabilitation, or expansion of conveyance facilities for groundwater recharge projects • Wastewater treatment and water recycling facility upgrades for groundwater recharge project sources • Stormwater and runoff capture projects that support groundwater recharge • Groundwater recharge facility expansion • Seawater barrier injection wells • Groundwater recharge projects that address groundwater dependent ecosystems (GDEs) • Projects and programs that support water supply reliability, water conservation, water use efficiency and water banking, exchange, and reclamation • Planning, design, and environmental documentation only as a task of a Project or Component of an overall project (not a standalone task) 	25%	<p>Anticipated Spring/Summer 2022 Anticipated Spring/Summer 2022</p> <p>Period of Performance: 1/31/2022-4/30/2025</p>	https://www.grants.ca.gov/grants/sustainable-groundwater-management-sgm-grant-programs-proposition-68-implementation-round-2/
Infrastructure State Revolving Fund (ISRF) Program	California Infrastructure and Economic Development Bank (IBank)	State Loan	<p>State and local government entities, including Municipalities, Universities, Schools and Hospitals (MUSH borrowers) and nonprofit organizations sponsored by public agencies.</p> <p>Eligible applicants must be located in California and include any subdivision of a local government, including cities, counties, special districts, assessment districts, joint powers authorities and nonprofit organizations sponsored by a government entity.</p>	Provide financing to public agencies and non-profit corporations, sponsored by public agencies, for a wide variety of infrastructure and economic development projects (excluding housing).	Min: \$50k Max: \$25M	<ul style="list-style-type: none"> • City streets • Drainage, water supply and flood control • Educational, cultural, and social facilities • Environmental mitigation measures • Goods movement-related infrastructure • Parks and recreational facilities • Port facilities, public transit • Power and communications facilities • Public Transit • Sewage collection and treatment • Solid waste collection and disposal • Water treatment and distribution • Defense conversion • Public safety facilities 	N/A	<p>Applications accepted continuously</p> <p>Period of Performance: Not defined</p>	https://ibank.ca.gov/loans/infrastructure-loans/

Funding Program	Funding Agency	Funding Type	Eligibility Requirements	Objectives/Goals	Average Award Amounts	Qualifying Project Types	Match Required	Future Anticipated Opportunity Dates	Link
Clean Water State Revolving Fund (CWSRF)	Environmental Protection Agency (EPA)	Federal Loan	<p>(1) to any municipality, intermunicipal, interstate, or State agency for construction of publicly owned treatment works (as defined in section 212);</p> <p>(2) for the implementation of a management program established under section 319;</p> <p>(3) for the development and implementation of a conservation and management plan under section 320;</p> <p>(4) for the construction, repair, or replacement of decentralized wastewater treatment systems that treat municipal wastewater or domestic sewage;</p> <p>(5) for measures to manage, reduce, treat, or recapture stormwater or subsurface drainage water;</p> <p>(6) to any municipality, intermunicipal, interstate, or State agency for measures to reduce the demand for publicly owned treatment works capacity through water conservation, efficiency, or reuse;</p> <p>(7) for the development and implementation of watershed projects meeting the criteria set forth in section 122;</p> <p>(8) to any municipality, intermunicipal, interstate, or State agency for measures to reduce the energy consumption needs for publicly owned treatment works;</p> <p>(9) for reusing or recycling wastewater, stormwater, or subsurface drainage water;</p> <p>(10) for measures to increase the security of publicly owned treatment works</p> <p>(11) to any qualified nonprofit entity, as determined by the Administrator, to provide assistance to owners and operators of small and medium sized publicly owned treatment works</p> <p>(A) to plan, develop, and obtain financing for eligible projects under this subsection, including planning, design, and associated preconstruction activities; and</p> <p>(B) to assist such treatment works in achieving compliance with this Act.</p>	Encourage public agencies to take an independent look into their current practices, identify potentially inefficient water or energy use and follow up with a well thought out plan to improve consumption of these valuable resources.	Dependent of type of financial assistance	<ul style="list-style-type: none"> • Constructing Publicly Owned Treatment Works (POTW) • Nonpoint Source • National Estuary Program Projects • Decentralized Systems • Stormwater • Reducing the Demand for POTW Capacity through Water Conservation, Efficiency, and Reuse • Watershed Pilot Projects • Energy Efficiency • Reusing or Recycling Wastewater, Stormwater, or Subsurface Drainage Water • Security Measures at POTWs • Technical Assistance 	Dependent on type of financial assistance	<p>Applications accepted continuously</p> <p>Period of Performance: Not defined</p>	https://www.epa.gov/cwsrf

Funding Program	Funding Agency	Funding Type	Eligibility Requirements	Objectives/Goals	Average Award Amounts	Qualifying Project Types	Match Required	Future Anticipated Opportunity Dates	Link
CalConserve Water Use Efficiency Loan Program	Department of Water Resource (DWR)	State Loan	Local Agencies. Local Agencies are any city, county, city and county, municipal utility district, community services district, sanitary district, sanitation district, water district as defined in Section 20200, public water system as defined in Section 116275 of the Health and Safety Code, or private water company under the jurisdiction of the Public Utilities Commission.	A sustainable funding source for water use efficiency projects by establishing a loan program to local agencies for specific types of water conservation and water use efficiency projects and programs to achieve urban water use targets, specifically water use efficiency upgrades and fixing expensive and difficult to repair customer leaks.	Max: \$3M	<p>There are two types of urban water use efficiency projects and programs eligible for funding under this PSP:</p> <p>Project to provide loans to local agencies for water efficiency upgrades to eligible customers at no upfront costs. Eligible customers include residential, commercial, institutional, and industrial water users. For local agencies to provide low-interest loans to customers to finance the installation of onsite improvements to repair or replace leaking water pipes. Eligible for funding are water conservation and water use efficiency projects including, but not limited to:</p> <p>Provide customers efficient dishwasher or clothes washer upgrades Install water-saving fixtures including toilets, showerheads, faucets, and other upgrades Install hot-water recirculating pumps Provide leak detection, repair and/or replacement Install landscape irrigation system upgrades Provide for water conservation landscape conversion Commercial, institutional, and industrial water use efficiency improvements Recycled water projects</p>	50%	<p>Applications accepted continuously.</p> <p>Period of Performance: Not defined</p>	

Balloted Funding Options		Description
Parcel Taxes	Ongoing funding source levied on property according to metrics associated with the property i.e., area. Funds all parts of a GSI program as defined in the ballot questions.	
Property Related Fees	An ongoing fee is paid for specific goods or services rendered by the government vs. a tax that has no connection to the benefits received for an individual. Storm drainage can be established as a separate utility service that can fund all parts of a GSI program.	
General Obligation Bonds	Issued to raise up front capital and repaid over the long term through annual property taxes. Rate based on property value. Funds can be used for land acquisition, planning, design and construction. GSI capital projects can be funded through debt taken on by the agency.	
Other Special taxes: sales, business licenses, vehicles, utilities users and transient occupancy taxes	An ongoing and mandatory financial charge imposed by a governmental organization to fund public expenditures.	
Non-Ballotted Funding Options	Description	Time Frame
Grants	One-time funding for qualifying projects from Federal, State or other granting authority.	Short Term (1-5 years)
Community Facilities Districts (Mello-Roos)	A special tax that must be approved by property owners or registered voters. Often formed during the development process for a finite set of parcels owned by a single entity. Often included in the conditions of approval for a development.	
Business Improvements Districts	Districts where businesses and property owners tax themselves and manage the funds to build or maintain certain assets. Typically set up and administered by the community members.	
Multi-Agency Partnerships	Multi-agency partnerships can take advantage of situations where regional projects and programs span jurisdictional boundaries. Challenges and opportunities abound in such partnerships. For example, developing mechanisms for sharing the planning, capital, operations and maintenance and administrative chores can be challenging. On the other hand, these types of partnerships can be an opportunity to be either a generator of trading credits or a way to invest trading credits. In addition, such partnerships can be a source of multi-benefit projects – projects that can achieve GSI goals as well as other important public and private goals.	
Caltrans Mitigation Collaboration	Caltrans has shared NPDES obligations with other Permittees and has funding available to mitigate various pollutant loading in instances where the obligation is shared. They administer Cooperative Implementation Agreements to pursue local or regional GSI projects thereby allowing Caltrans to meet its pollutant load mitigation requirements in partnership with the local agencies.	
Financial Capability Assessment	An EPA process called the “Financial Capability Assessment Framework for Municipal Clean Water Act Requirements” allows communities that meet financial capability criteria have the ability to apply for delayed schedules for compliance with some of their NPDES stormwater permit elements. Designed to help communities develop a more accurate and complete picture of their ability to pay for Clean Water Act obligations, emphasizing factors beyond the 2% threshold for median income.	
Realignment of Services	Water supply, sewer and refuse collection	
Benefits Assessments	Assessments levied on properties to pay for services such as landscaping, lighting, recreation facilities, parks, fire protection, mosquito abatement, and cemeteries, etc. Governed by statute that varies depending on the type of service or improvement. Must comply with Prop. 218 that requires that assessments have a nexus with the services rendered. Benefits that are general must be funded from sources other than the benefit assessments – such as a city’s general fund. Benefit assessments typically are collected as part of the annual property tax bill.	

Non-Ballotted Funding Options	Description	Time Frame
Transportation Opportunities	Transportation projects have recently begun to be subject to NPDES requirements while trends towards complete and green streets resulted in transportation including GSI even when not required by NPDES permits.	
Regulatory Fees	Ongoing funding from services such as plan check and inspection fees related to stormwater and GSI	Medium Term (5-10 years)
Realignment of Municipal Services and Integration with existing funding	In which a local government agency reorganizes their management, staffing, services units and/or budgets from traditional stormwater management services that can be integrated with the more easily funded water, sewer and/or refuse collection or flood control or transportation agencies. Examples include using GSI to promote groundwater recharge, trash capture or rainwater harvesting and reuse.	
Business License Fees	Business License Fees	
Developer Impact Fees (AB 1600 Fees)	Developer Fees for GSI charged by municipality in connection with conditions of approval. Funds offset public costs associated with the development. Payment is voluntary and must be reasonably related to the cost of the service provided by the agency. Similar to impact fees aimed at improving water, sewer and parks or schools.	
Partnerships and Other Strategies	P3s are agreements with private parties to help build and maintain public infrastructure.	
Volunteers	Volunteer programs assist agency in achieving various goals either cultivated by the agency or under the direction of non-profit organizations. Typical activities include habitat stewardship and protection, planting and maintaining landscaped improvements such as rain gardens and bioswales.	
Enhanced Infrastructure Financing Districts	Captures ad valorem tax increments to invest in district boundaries or other projects that have a tangible benefit to the district. Tax is based on the value of a transaction or of property. Typically imposed at the time of a transaction similar to sales tax or value-added tax. May be imposed annually or in connection with another significant event. Formation requires consent from all the participating local agencies through a Joint Powers Authority. Requires preparation of an Infrastructure Financing Plan and formation of a Public Finance Authority. EIFD must have a Finding of Completion for all redevelopment obligations prior to receiving any new tax increment. Can be created with multiple municipalities and can span political boundaries making it a good fit for a watershed approach to GSI funding	Long Term (10-15 years)
Loans	Loans or long-term debt financing are valuable tools for funding projects and programs. Allows an agency to leverage an ongoing revenue stream by borrowing money for immediate needs such as capital construction and repaid over time.	
Alternative Compliance	New public and private development and redevelopment projects use offsite projects to either supplement or replace stormwater management requirements. MRP 2.0 allows: <ul style="list-style-type: none"> ▪ Construction of a joint stormwater treatment facility ▪ Construction of a stormwater treatment system off-site (on public or other private property) ▪ Payment of an in-lieu fee for a regional project (on another public or private property). 	

Non-Ballotted Funding Options	Description	Time Frame
In-Lieu Fees	<p>In-lieu fees are a potential source of funding for regional projects and typically use two collection methods Ad hoc and structured. Ad hoc is a case-by-case basis and is negotiated with an individual developer depending on the financial and logistical circumstances. The agency is limited to its discretionary authority and local stormwater regulations. Structured approaches uses a developer fee model (AB 1600) whereas in-lieu fees are adopted and published in the agency's master fee schedule. They require a comprehensive nexus study linking development impacts or compliance needs to projects. Larger agencies with numerous development projects are well suited for in-lieu fees. Staff apply the scheduled fees to each project as it comes around. At the same time, for larger projects that enter into a developer agreement, those adopted fees could be set aside for a more creative or appropriate ad hoc approach.</p>	

Watsonville Funding Options							
Timeframe	Notes	Local Funding	Description	Pros	Cons	Voter Approval Thresholds	Examples
Long Term (15yrs)/Med Term (10yrs)/Short Term (doing now up to 5yrs)	Why now? Or Why not? Already have it?	Local Funding Strategies (balloted process)					
Long term	High Risk, High Level of time required	Parcel Taxes	Most commonly known as parcel taxes. Ongoing funding source levied on property according to metrics associated with the property i.e., area. Funds all parts of a GI program as defined in the ballot questions.	Reliable funding that does not need a direct nexus between the amount charged and service received. Taxes can apply to certain properties or exempt low income people or seniors where fees cannot. Flexible and legally defensible. Debt can be issued and many voters are familiar with this tax.	Must compete with other ballot measures. Needs voter approval.	2/3 majority vote	Santa Cruz, Los Angeles, Culver City and Santa Monica.
Long term	High Risk, High Level of time required	General Obligation Bonds	Issued to raise up front capital and repaid over the long term through annual property taxes. Rate based on property value. Funds can be used for land acquisition, planning, design and construction. GI capital projects can be funded through debt taken on by the agency.	Levy based on property value, and higher value properties pay a higher portion. Rate of taxation is based on value and ballot measures can't state amounts paid by an individual. Easier to pass than a parcel tax.	For capital projects only. Cannot pay for pre project planning or O&M. Needs voter approval.	2/3 majority vote	Stormwater-related GO bonds successfully implemented in Berkeley - Measure M (\$30 million – partly for GI, 2012) and Los Angeles’ Measure O (\$500 million, 2004).
		Local Funding (no ballot needed)					
Medium Term	Low Payback	Regulatory Fees	Ongoing funding from services such as plan check and inspection fees related to stormwater and GI	This can be a funding source for stormwater regulatory compliance for new and redevelopment. Many municipalities already use these.	Prop 26 has limited this applicability. Need to confirm that this doesn't require a ballot process.	Non balloted approaches may encounter public resistance and requires a nexus between fee and impact on the payer to not be considered a tax. Nexus/cost of service analysis must be conducted.	
Medium Term	Already Implemented	Realignment of Services	Water supply, sewer and refuse collection	No Ballot Needed.	Leverage and integrate stormwater elements that qualify under water, sewer and/or refuse collection categories	Non balloted approaches may encounter public resistance and requires a nexus between fee and impact on the payer to not be considered a tax. Nexus/cost of service analysis must be conducted.	
Long term	Low Payback	Business License Fees	Business License Fees	No Ballot Needed.	Applies to commercial operation with impacts on stormwater, restaurants, vehicle repairs, etc.	Non balloted approaches may encounter public resistance and requires a nexus between fee and impact on the payer to not be considered a tax. Nexus/cost of service analysis must be conducted.	
Medium Term	High Level of time required	Developer Impact Fees (AB 1600 Fees)	Developer Fees for GI charged by municipality in connection with conditions of approval. Funds offset public costs associated with the development. Payment is voluntary and must be reasonably related to the cost of the service provided by the agency. Similar to impact fees aimed at improving water, sewer and parks or schools.	Strategy good for GI in communities anticipating growth. Developments will likely be required to comply with stormwater management requirements. It is possible to tie the local and regional GI needs to the community at large and the new development pays its proportional of GI costs. No Ballot Needed.	Non balloted approaches may encounter public resistance and requires that there is a nexus between fee and impact. A fee is voluntary and must be reasonably related to the cost of the service provided by the local agency. Must comply with AB1600 and nexus study is required.	When fee exceeds the reasonable cost of providing the public service it may be declared a special tax and be subject to a two-thirds voter approval.	
Long term	High Level of time required	Realignment of Municipal Services and Integration with existing funding	In which a local government agency reorganizes their management, staffing, services units and/or budgets from traditional stormwater management services that can be integrated with the more easily funded water, sewer and/or refuse collection or flood control or transportation agencies. Examples include using GI to promote groundwater recharge, trash capture or rainwater harvesting and reuse.	No Ballot Needed. Takes advantage of multi-benefit stormwater goals and can cover the costs of stormwater activities that fall within the scope of the services and can be funded by fees or taxes without a ballot proceeding.	Fee structures must rely on an analysis of how costs for service are spread across property types. Reorganizing budgets or service units within a municipal structure can be challenging, and in some cases impossible. The public’s willingness to pay is still at issue and a public hearing is still required. Many rate payers pay close attention to any of these costs.	n/a. Non balloted approaches have the potential to encounter public resistance. Requires a nexus between fee and impact on the payer to not be considered a tax and nexus/cost of service analysis must be conducted.	
Short term	Low Risk, Low Time Required, Already implemented	Grants (See more detail in Grants and Loans tab)	One-time funding for qualifying projects from Federal, State or other granting authority.	Fund programs or systems, new and innovative ideas and can be used to leverage other sources of funding. No Ballot Needed.	Funding is competitive, not guaranteed and typically only available once. Often require maintenance, monitoring. Agency must provide matching funds, grant writers and ongoing monitoring and reporting after the project is construction. An underlying, dedicated and sustainable revenue source such as a stormwater fee or tax is needed.	Non balloted approach	Prop 1 (Water Quantity, Supply, and Infrastructure Improvement Act of 2014) Stormwater Implementation Grant Program USEPA SF Bay Water Quality Improvement Fund California Water Resources Control Board: 319(h) Non-Point Source Implementation Program California Department of Water Resources: Integrated Regional Water Management Program Implementation Grants California State Parks: Land & Water Conservation Fund and Rails-to-Trails Programs California Department of Forestry and Fire Protection: Urban and Community Program Strategic Growth Council: Urban Greening Program California Office of Emergency Services (OES) 404 Hazard Mitigation Grant Program Caltrans Cooperative Implementation Agreements or Grants Program and One Bay Area Grant Program (transportation projects).
Medium Term	Low Payback <i>This should only be for new development - not existing development.</i>	Benefits Assessments	Assessments levied on properties to pay for services such as landscaping, lighting, recreation facilities, parks, fire protection, mosquito abatement, and cemeteries, etc. Governed by statute that varies depending on the type of service or improvement. Must comply with Prop. 218 that requires that assessments have a nexus with the services rendered. Benefits that are general must be funded from sources other than the benefit assessments – such as a city's general fund. Benefit assessments typically are collected as part of the annual property tax bill.	Property owners in a watershed could be assessed to fund stormwater runoff management programs that provide direct benefit to properties within that watershed or sub-basin. The watershed unit may be particularly effective and equitable as programs can be tailored to address specific priorities identified within that watershed and would include the diverse socio-economic demographics from the hills to the flatlands typical to a Bay Area urban watershed.	Benefit assessments are not taxes or fees and must be approved by a weighted majority of the affected property owners that cast votes.	Non balloted approach. Benefit assessments are not taxes or fees and must be approved by a weighted majority of the affected property owners that cast votes.	
Medium Term	Low Payback <i>This should only be for new development - not existing development.</i>	Community Facilities Districts (Mello-Roos)	A special tax that must be approved by property owners or registered voters. Often formed during the development process for a finite set of parcels owned by a single entity. Often included in the conditions of approval for a development.	Flexible funding. Publicly-owned property can be exempted. Easily structured to allow for future expansion.	Flexibility allow diverse types of improvements or services that are funded. Primarily used for new development and may be restricted new developments only.	Non balloted approach. Must be approved by property owners or registered voters.	

Watsonville Funding Options							
Timeframe	Notes	Local Funding	Description	Pros	Cons	Voter Approval Thresholds	Examples
Long term	Low Payback. <i>Increased patronage may help, but until that happens BID will likely not assess themselves as it currently depends on City services.</i>	Business Improvements Districts	Districts where businesses and property owners tax themselves and manage the funds to build or maintain certain assets. Typically set up and administered by the community members.			Non balloted approach.	Northwest Potrero Hill Green Benefit District
Long term	High Level of time required	Alternative Compliance	New public and private development and redevelopment projects use offsite projects to either supplement or replace stormwater management requirements. MRP 2.0 allows: • Construction of a joint stormwater treatment facility • Construction of a stormwater treatment system off-site (on public or other private property)• Payment of an in-lieu fee for a regional project (on another public or private property).			Non balloted approach.	City of Emeryville and City of San Diego
Long term	High Level of time required	Partnerships and Other Strategies	P3s are agreements with private parties to help build and maintain public infrastructure.	P3s have successfully designed, built, and maintained many types of public infrastructure such as roads and drinking water/wastewater utilities across the U.S. Leverages public funds and minimizes impacts to a municipality's debt capacity; Accesses advanced technologies, improves asset management, drawing upon private sector expertise and financing, benefits local economic development and “green jobs;” and reduces pressure on internal local government resources.	No known P3s that have been developed in the state for the explicit purpose of implementing GI.	Non balloted approach.	The EPA Region 3 Water Protection Division (WPD), in the mid-Atlantic Region for the Chesapeake Bay watershed.
Long term	High Level of time required	In-Lieu Fees	In-lieu fees are a potential source of funding for regional projects and typically use two collection methods Ad hoc and structured. Ad hoc is a case-by-case basis and is negotiated with an individual developer depending on the financial and logistical circumstances. The agency is limited to its discretionary authority and local stormwater regulations. Structured approaches uses a developer fee model (AB 1600) whereas in-lieu fees are adopted and published in the agency's master fee schedule. They require a comprehensive nexus study linking development impacts or compliance needs to projects. Larger agencies with numerous development projects are well suited for in-lieu fees. Staff apply the scheduled fees to each project as it comes around. At the same time, for larger projects that enter into a developer agreement, those adopted fees could be set aside for a more creative or appropriate ad hoc approach.	Outcomes can be customized to the project. Compliance could be split into any or all of three options: on-site construction; off-site construction; and in-lieu fee contribution. An ad hoc approach allows for out-of-the-box thinking and is often the course for agencies with few and sporadic development projects.	In-lieu fee program require an agency having a list of in-lieu projects. For agencies with a steady stream of development, it can be laborious to the point of overwhelming.	Non balloted approach.	Public can be both a broker of credits and a the creator or consumer of credits for use to meet its GI goals. These credits would be a form of currency, analogous to the in-lieu fees described in the previous section.
Short term	Low Risk, Low Time Required	Multi-Agency Partnerships	Multi-agency partnerships can take advantage of situations where regional projects and programs span jurisdictional boundaries. Challenges and opportunities abound in such partnerships. For example, developing mechanisms for sharing the planning, capital, operations and maintenance and administrative chores can be challenging. On the other hand, these types of projects can be an opportunity to be either a generator of trading credits or a way to invest trading credits (as described in an earlier section). In addition, such partnerships can be a source of multi-benefit projects – projects that can achieve GI goals as well as other important public and private goals.	Optimizes partner's respective strengths such as strengths in obtaining grants but lacking in project delivery capacity or have environmental conditions that may be more or less conducive to GI. Sharing resources and funding has the potential to allows regional projects to be delivered more efficiently taking advantages to economies of-scale savings for projects and programs.			
Short term	Low Risk, Low Time Required	Transportation Opportunities	Transportation projects have recently begun to be subject to NPDES requirements while trends towards complete and green streets resulted in transportation including GI even when not required by NPDES permits.	Multi-benefit projects demonstrate how transportation funding can be leveraged to satisfy stormwater – and GI – goals economically.			San Mateo County's transportation agency is charged with NPDES compliance and has implemented numerous transportation projects that include GI. Caltrans is becoming more flexible in these applications. One example is the Active Transportation funding.
Short term	Low Risk, Low Time Required	Caltrans Mitigation Collaboration	Caltrans has shared NPDES obligations with other permittees and has funding available to mitigate various pollutant loading in instances where the obligation is shared. They administer Cooperative Implementation Agreements to pursue local or regional GI projects thereby allowing Caltrans can to meet its pollutant load mitigation requirements in partnership with the local agencies.				
Medium Term	High Level of time required	Volunteers	Volunteer programs assist agency in achieving various goals either cultivated by the agency or under the direction of non-profit organizations. Typical activities include habitat stewardship and protection, planting and maintaining landscaped improvements such as rain gardens and bioswales.	Public education and building community support for the stormwater management program and potential fees .	Difficult to recruit, oversee, and manage volunteers. Reliability and quality of work can be challenging at times, too.		One example of a volunteer program that supports GI is the Green Street Steward Program in Portland, Oregon.
Short term	Low Risk, Low Time Required	Financial Capability Assessment	An EPA process called the “Financial Capability Assessment Framework for Municipal Clean Water Act Requirements allows communities that meet financial capability criteria have the ability to apply for delayed schedules for compliance with some of their NPDES stormwater permit elements. Designed to help communities develop a more accurate and complete picture of their ability to pay for Clean Water Act obligations, emphasizing factors beyond the 2% threshold for median income.	Gives eligible municipalities more time to comply with their permit requirements.	Does not help to generate additional funding nor allow agency to avoid compliance with permit requirements. Allows agency to work with the EPA and the Regional Board to work out an alternative compliance schedule depending on the community's financial capabilities.		

APPENDIX C: PUBLIC OUTREACH

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MEMO

To: Jackie McCloud, City of Watsonville

From: Emily Corwin and Amy West

CC: Jonathan Pilch (Watsonville Wetlands Watch); Ben Heistein, Cristy Cassel-Shimabukuro, and Alex Yasbek (City of Watsonville); Merrill Taylor and Brad Wardynski (Craftwater)

Date: May 28, 2021

Subject: City of Watsonville Community Survey and Interview Findings

This memo summarizes our observations of current challenges and opportunities to implement green infrastructure in the City of Watsonville. These findings are based on review of 4x community surveys (Attachment 1) and interviews with City staff from Public Works, Planning, Field Services, Parks and Recreation, and Engineering Services and Watsonville Wetlands Watch.

Observations of current challenges

Green Infrastructure is currently not integrated into City projects.

Engineers and planners in the City (staff and consultants) – generally speaking – are not innovative nor in the practice of integrating green infrastructure features into projects. This could partially be attributed to designers focusing on solving single problems without fully recognizing the multiple benefits and services ecosystems can provide to address concurrent challenges.

There are no current incentive programs in the City of green infrastructure (design, construction, O&M, etc).

Bioswales, bioretention, street trees, and the sloughs are all seen as adding functional and aesthetic value to the City, and the trend is towards including them increasingly into projects.

Perception that City residents may not / will not accept street trees, even if free because:

1. Space availability is limited (multi-family homes use front yards for parking)
2. Misconceptions originating from history of wrong trees in the wrong place (trees are going to get into my utilities, will be messy and drop leaves/berries onto my car and yard, will shade my house, it will fall over on my house, it will increase my fire risk, restrict ADA access because of root uplift on sidewalks)
3. Not clear who is responsible for street tree maintenance (what is boundary of resident vs. city responsibility?)

4. For some City residents they don't currently have sufficient motivation nor are incentives in place to overcome their reluctance to plant trees and overcome these perceptions.

Green infrastructure maintenance roles and funds are not clearly defined nor allocated

Burden generally falls to public works and field services to identify maintenance needs and funds once a green infrastructure project has been completed. Currently there is no comprehensive inventory or database of existing green infrastructure features, who is responsible for maintaining, frequency, nor funding source.

City partnership with Watsonville Wetlands Watch is working very well. The City has an effective, and blossoming, cooperative management agreement with Watsonville Wetlands Watch to maintain green infrastructure in the City. Currently the City provides operational support to Watsonville Wetlands Watch (subsidized with grants), who maintain BMPs and trails within the Sloughs.

Opportunities to address current challenges

Increase integration of green infrastructure into future projects:

Pilot green infrastructure projects with high probability to scale and/or to increase confidence with local engineers and planners by installing functional examples:

1. Street with sidewalks/tree wells, green stormwater infrastructure (GSI) bulbouts, parklets
2. Permeable pavement in a parking lot
3. Green or cool roof
4. Detention Pond retrofit*

*needs to work with existing/available maintenance equipment (e.g. John Deere mower)

Recommend/integrate green infrastructure into Downtown Specific Plan –

1. Create offsite mitigation bank to fund green infrastructure (fund via fees from downtown and infill development)
2. Adopt green infrastructure technical standards as requirements (e.g., sidewalks with appropriately sized tree wells, GSI road diets, GSI integrated parklets)

Develop and distribute typical details and specifications for GSI solutions for incorporation into the City engineering library, to increase familiarity with these solutions, and likelihood they will be incorporated into projects.

See recommended location list in Attachment 2.

To increase community uptake of street trees:

Identify trees (and shrubs and grasses) well suited for Watsonville – “right tree, right place” – for street trees, wetland/slough environment, and in green stormwater infrastructure - that

do not have invasive roots, do not have excessive berry or leaf drop, do not require a lot of maintenance.

Increase awareness and uptake of tree planting by:

- Creating informational pamphlet/fliers to illustrate benefits of street trees (esp. economic benefits – cooling + home values – appeal to practicality) and address concerns up front – acknowledge inconvenience and address it head on;
- Increasing use of WatsonvilleCommunityForest.org website to provide information to the public and increase volunteer engagement;
- Fostering development of commercial and residential tree planting pilot programs currently being started by Watsonville Wetlands Watch;
- Adopting policies that ensure new construction includes tree planting requirements
- Developing a tree protection ordinance and design specifications/models for tree plantings within road installation and maintenance;
- Designing shovel ready tree planting projects for City property or neighborhood areas; and
- Decreasing burden of tree ownership to city residents (e.g., through developing a “green jobs” workforce.

Ensure effective and well-funded long-term O&M of green infrastructure:

Expand partnership with Watsonville Wetlands Watch for maintenance and outreach activities by, for example, consolidating existing contracts and funding sources or drafting a scope of work to extend over a longer time frame.

Create a database (within the 2N platform) of existing green infrastructure features, identifying:

1. who is responsible for maintaining (department)
2. frequency
3. maintenance funding need
4. maintenance funding source (where allocation is coming from)

(for #1 and #2 –already in the 2N platform and require increased familiarity / usage within departments outside public works?)

Identify the current funding need and gap for long-term continued maintenance of existing and proposed green infrastructure features, secure long-term funding source for green infrastructure maintenance, and cultivate “green job” employment opportunities.

Attachment 1: Survey Result Summary

Watsonville Climate Vision Survey 2030 (Referred to as Survey #2)

Completed December 2020 – 1099 respondents

The respondents noted the following:

- Transportation - Safety is a concern and there is an interest in biking and additional bike routes if there was better infrastructure
- Energy – there is interest in walking as a means of transportation to save energy
- There is interest in **public gardens – more and expanded locations** within walking distance to homes
- Little interest in joining or supporting a community action or formalized neighborhood group
- Strong interest in planting more trees and requiring more trees in proposed developments (if the city pays for them)

Downtown Watsonville Specific Plan – Community Survey Results #1

Sept – Nov. 2020 (need to confirm year) – 666 respondents

The respondents noted the following:

- This survey was very downtown specific, it identified the Farmers Market and the plaza as the main draw for downtown (although the survey was given at the Farmers Market). Respondents expressed interest in reviving downtown business mainly and expressed a concern over safety, especially a large concern downtown. Although not the main priority (healthy new and varied experiences and food was the main suggestion) but increased walkability, bike lanes, **streetscape, street trees and shade** were also identified as priorities. Other comments included keeping it diverse and reflective of the Watsonville mixed culture and history as well as being more like Santa Cruz, Salinas, Gilroy and Los Gatos.
- Widening Main Street specifically was not a high priority, and in the comments section there was a lot of feedback about leaving the plaza and the wide main street but **adding planting and greenery – things to help with the HEAT. Traffic calming**, pedestrian safety were priorities, and this was in a list of items that included revitalizing the downtown.
- **Beautification, greening and sustainability** were mentioned in the comments but not directly a part of the survey “results”

In general, the purpose of this survey was focused on economic development priorities, but there was a lot of individual comments about **keeping the City green and adding safe walkable connections** (without decreasing the size of

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URBAN WATER DESIGN + ENGINEERING COLLABORATIVE

main street (alternate walking corridors and connections to the path system?). The plaza was a commodity and it does not sound like that would be a good area to add change.

Overall impression is that greening would be seen as a value to the community if it were added to another project that would double the return on the investment.

The lack of healthy industry and urban life in the downtown, as well as safety were mentioned several times in the comments section, based on the comments, I think that there would be support for Urban Greening as an added element to be added to all proposed projects to enhance, but not take away from the larger problems that the community sees as priorities.

Measure D Survey – Project Priorities

Jan - March. 2020 (need to confirm year) – 237 respondents

Respondents voted on 12 specific projects, with the ability to vote for their top 3.

The following lists the projects in the order that received the most votes:

- 1) 109 - Downtown Revitalization
- 2) 87 - Maintain Trails
- 3) 77 - Maintain Roads
- 4) 70 - Repair Freedom Blvd from Green Valley Rd to Buena Vista Dr
- 5) 69 - Hwy 1/Harkins Slough Rd Bicycle/Pedestrian Bridge
- 6) 66 - Pajaro Valley High School Trail
- 7) 57 - Bicycle Safety
- 8) 50 - Repair Freedom Blvd from Alta Vista St to Davis St
- 9) 47 - Roundabout at Main St and Freedom Blvd
- 10) 22 - Pedestrian Safety
- 11) 22 - Traffic Safety
- 12) 13 - Roundabout at Pennsylvania Dr and Hammer Dr

Participants wrote in 49 other projects. Approximately one-third identified trails, one-third was not applicable to the City's Measure D funding and one-third was divided among bike, road repair, safe routes to school and downtown revitalization.

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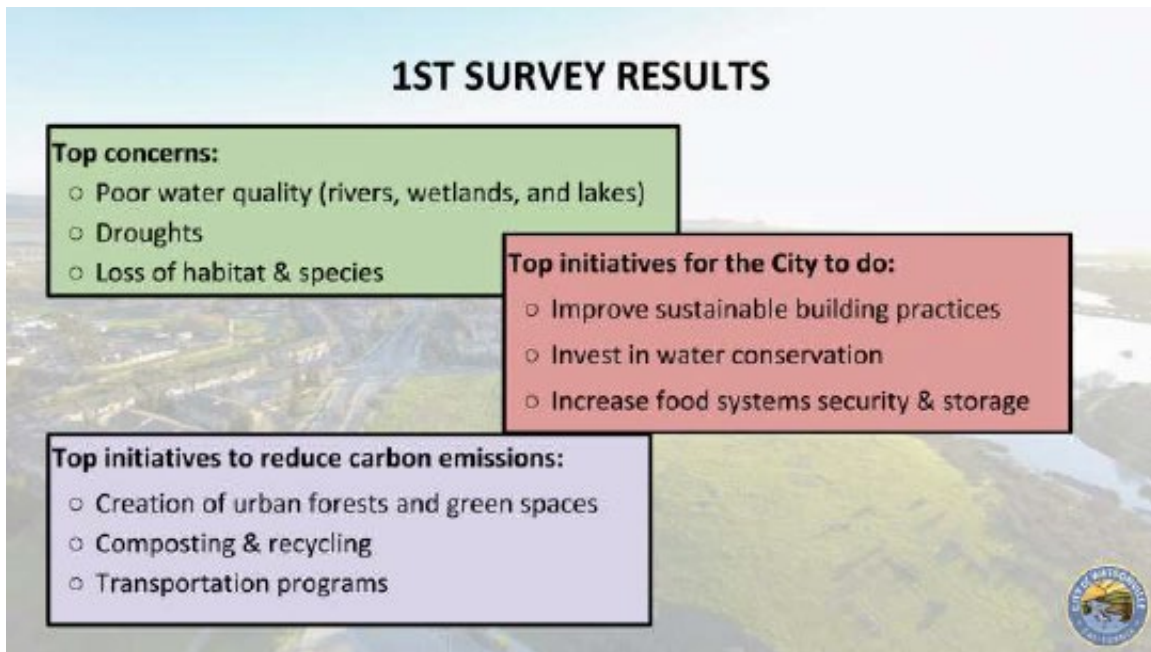
Watsonville Climate Survey #1

1st Community Bilingual Survey Results

July August 2020? – 273 respondents

The respondents noted the following:

The environment was a priority and “very important” for majority of Watsonville residents



Attachment 2: Green Infrastructure Location Recommendations

Locations mentioned as good opportunities to develop green infrastructure concepts:

1. West side of Rolling Hills School – develop a neighborhood GI project and bicycle and pedestrian trail that connects to the Hazelwood Park Urban Greening Project
2. Alley Way GI project – there are a series of alleys that extend from Callahan Park to the eastern City boundary that have good potential for use as bicycle and pedestrian facilities with trees or stormwater features
3. Downtown Metro Station
4. East side of Lee Road from Beach street to Struve Slough, stormwater capture and GI project associated with the future Lee Road trail
5. Freedom Blvd from Green Valley to Main Street, median improvements with street trees
6. Ramsey Park vicinity – lots of acreage and lots of room – as a demonstration project. Possible permeable paving opportunity?
7. Row of trees and planter area – right next to main st – bounded by Pennsylvania, Longview and Progress – row of eucalyptuys – ½ ac in size – City property?
8. Detention basin to retrofit - on Ohlone – King Fisher intersection, two on that slough – across from Landmark Elementary – Across from Bronson, near tennis court, Harkin Slough...
9. Main St. SR 152 b/w Lake and Beach – Long-tern option – Caltrans – can't take their facility without their approval – "Shopp Project" State Highway For safely protection program – puts improvement cost to the State vs. City.
10. Pajaro River levee – Salsipuedes Levee – used by a lot by people who want to excercise – it is so plain – has potential, some potential – there is nothing there – trees? Gets out of City and is in County – it should be an investment priority
11. Green Valley Road
12. Pennsylvania – long slopes – weeds – where trees have been overgrown, grew over peoples houses – branches preaking and causing damagage – erosion issues – retaining wall with permeable hardscape – rocks and some bushes/shrubs - 40 years ago had a nice landscape, but declined over the years – and not cleared responsibly.... Done by property owners, then Parks, then not according to plan – by

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that time overgrown Now not attractive and 3-4 times a year clear weeds are cleared.

13. Downtown Plaza
14. Recommended sections for GSI street length concept – on Main St from Freedom to Riverside or Lake from Main St to out of town.
15. Recommended location for GSI green roof and/or permeable pavement – Ramsey Park and new Municipal Service Center
16. Potential overlap/integration with upcoming CIP projects:
 - a. East Beach redevelopment opportunity
 - b. Elm St
 - c. Underground work on Lake
 - d. Roach Well site
 - e. Reservoir at Fowle and Freedom

DRAFT



CITY OF WATSONVILLE

GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

FOR TODAY...

- WHAT ARE WE TALKING ABOUT?
- PROJECT CONCEPT INTRODUCTION
- CONVERSATION
- NEXT STEPS

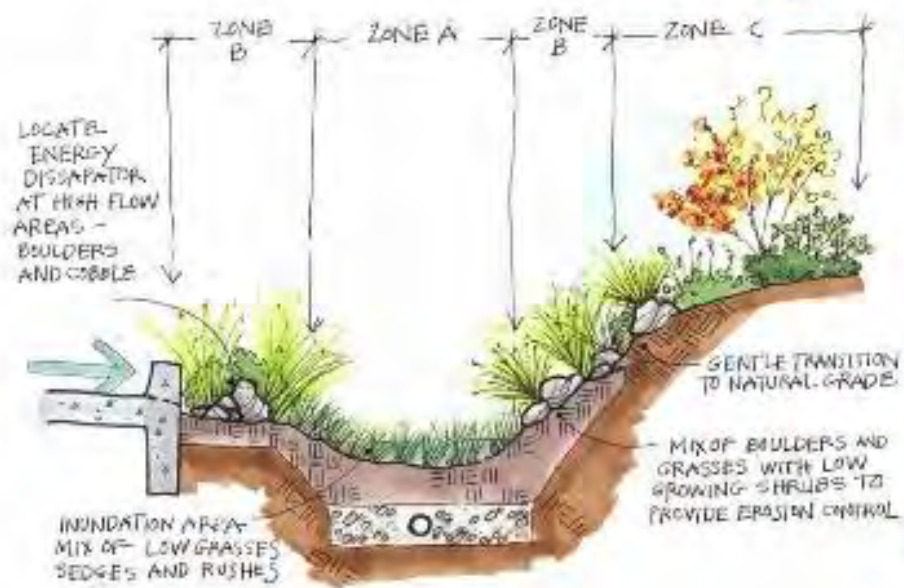


WHAT IS GREEN INFRASTRUCTURE?

SLOW IT, SPREAD IT, SINK IT



clean water

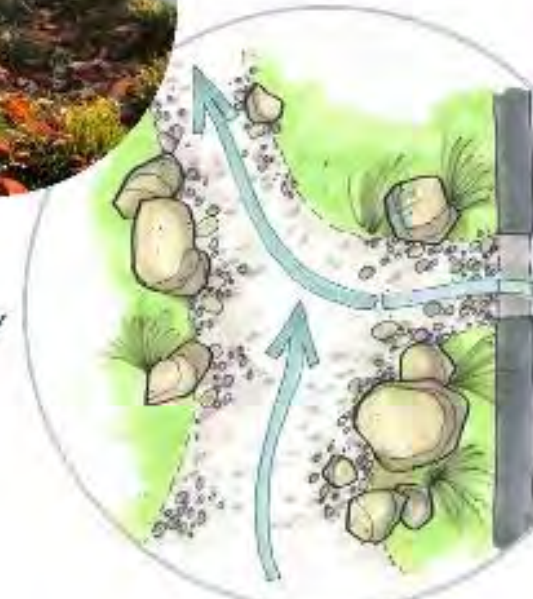


BIORETENTION



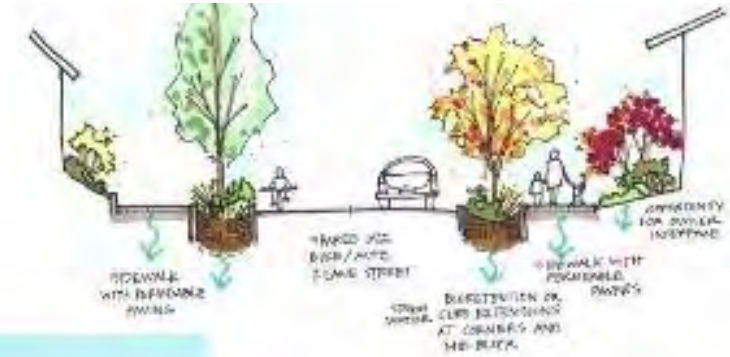
RETENCIÓN CON PLANTAS

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GIVING TREES

SOMBRA ÁRBOLES



enfriamiento



SHADE TREES

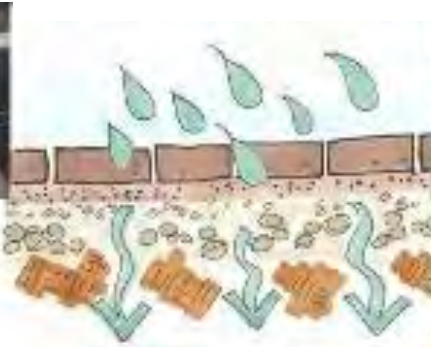
cooling

RAIN-FRIENDLY PAVING



valles verdes

**PERVIOUS
PAVEMENT**



**PERMEABLE
PAVIMENTO**



green streets





WHERE CAN WE BUILD
GREEN INFRASTRUCTURE?



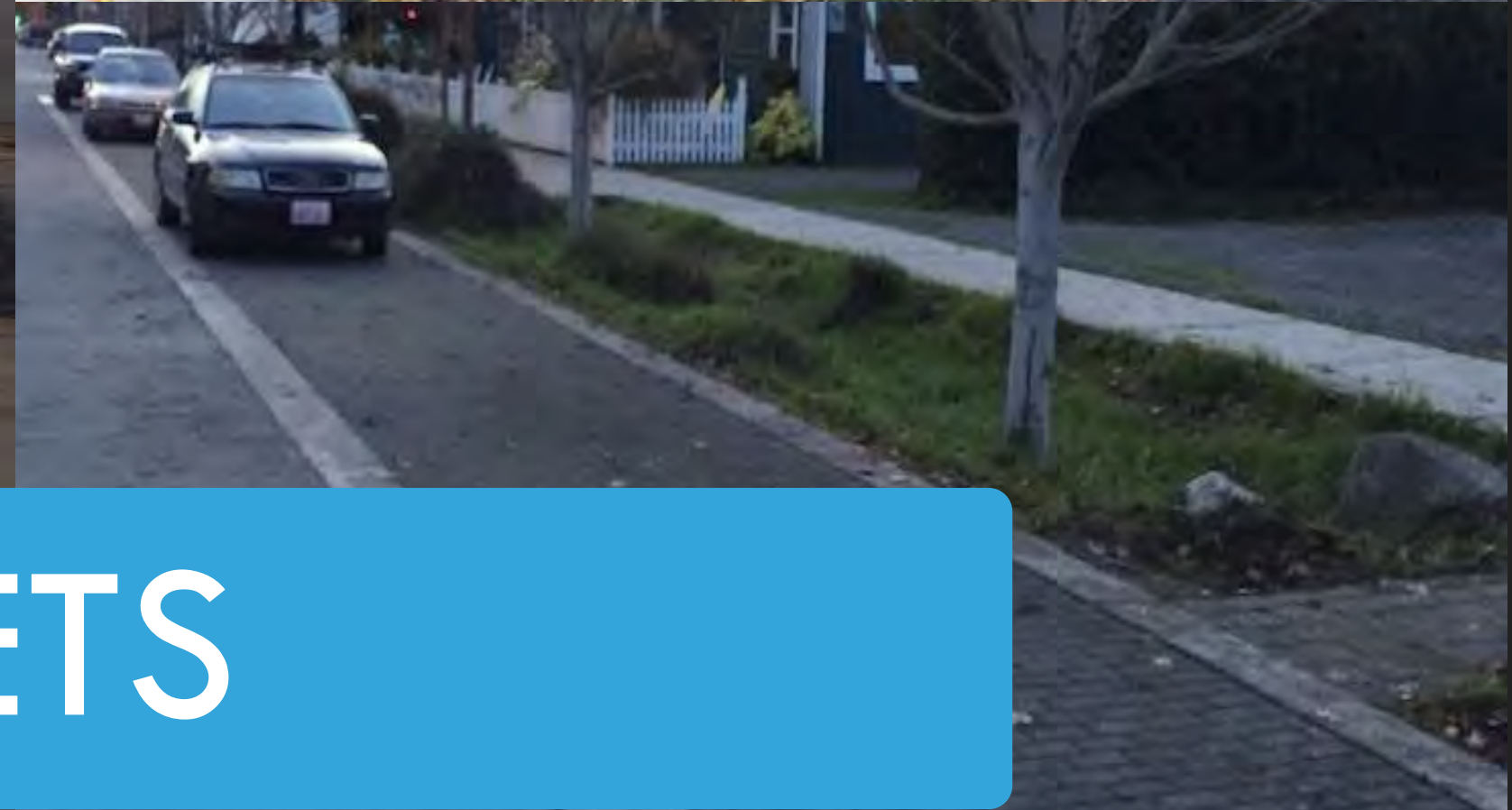
EXAMPLE GREEN INFRASTRUCTURE PROJECT

PARKING LOT RETROFITS

EXAMPLE GREEN INFRASTRUCTURE PROJECT



EXAMPLE GREEN STORMWATER INFRASTRUCTURE PROJECT



STREETS

EXAMPLE GREEN INFRASTRUCTURE PROJECT

CALLES - STREETS



EXAMPLE GREEN STORMWATER INFRASTRUCTURE PROJECT



PARKS AND OPENSPACE

EXAMPLE GREEN INFRASTRUCTURE PROJECT



EXAMPLE GREEN STORMWATER INFRASTRUCTURE PROJECT



SCHOOLS

EXAMPLE GREEN INFRASTRUCTURE PROJECT

ESCUELA - SCHOOL



Before



After



Bees & Butterflies Plant Mix



1. Buddleia species - Butterfly Bush
2. Epilobium species -
3. Lavandula angustifolia - Lavender
4. Mimulus species - Sticky Monkey Flower
5. Nepeta "Six Hill Giant" - Catmint
6. Penstemon species - Penstemon
7. Salvia species - Sage

OUTCOME

FAST-TRACK COMMUNITY-DRIVEN, NATURE-BASED PROJECTS THAT ACHIEVE MUTUAL GOALS, PROTECT CRITICAL INFRASTRUCTURE, & PROVIDE MULTIPLE BENEFITS

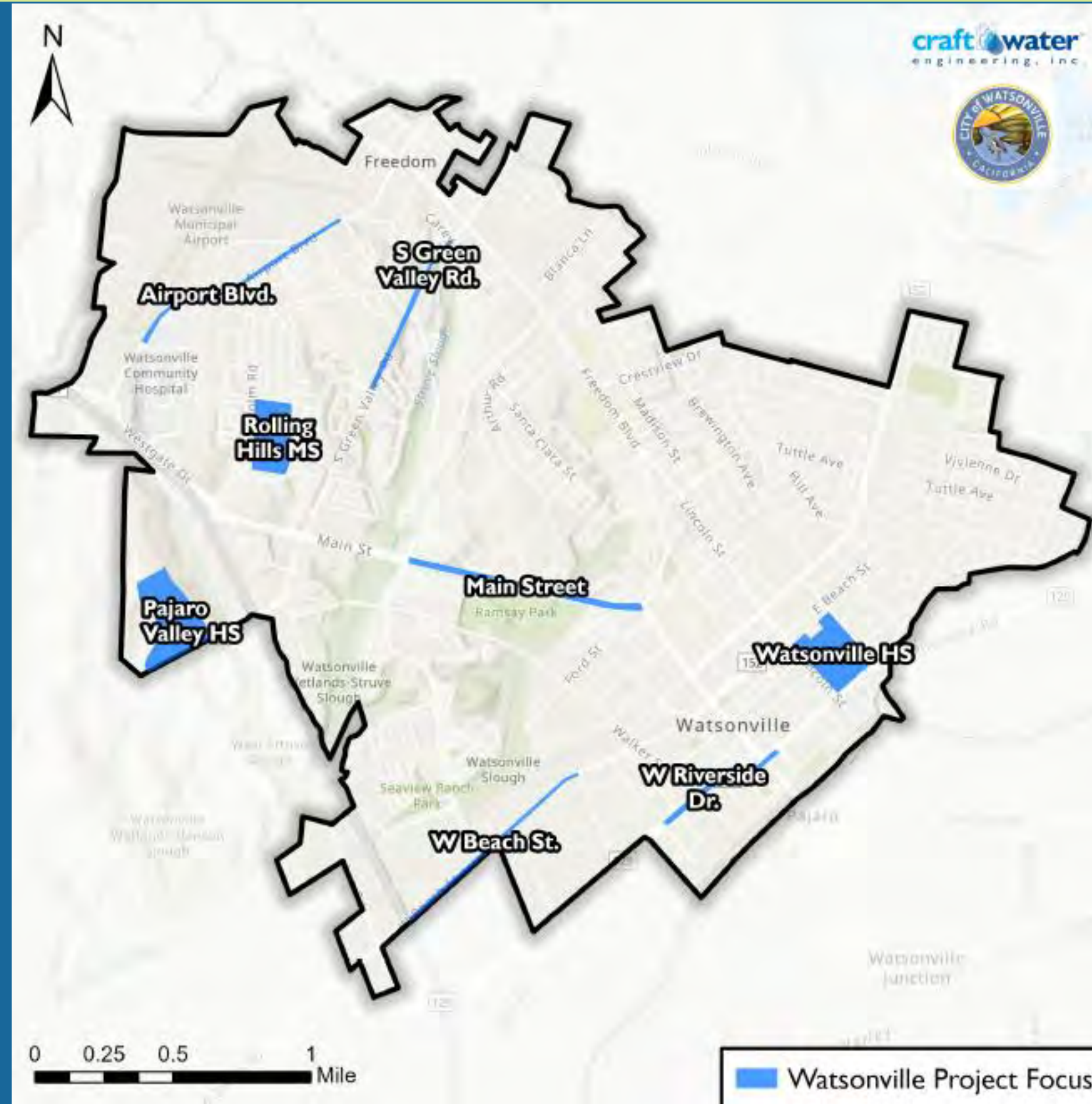
OUTPUTS

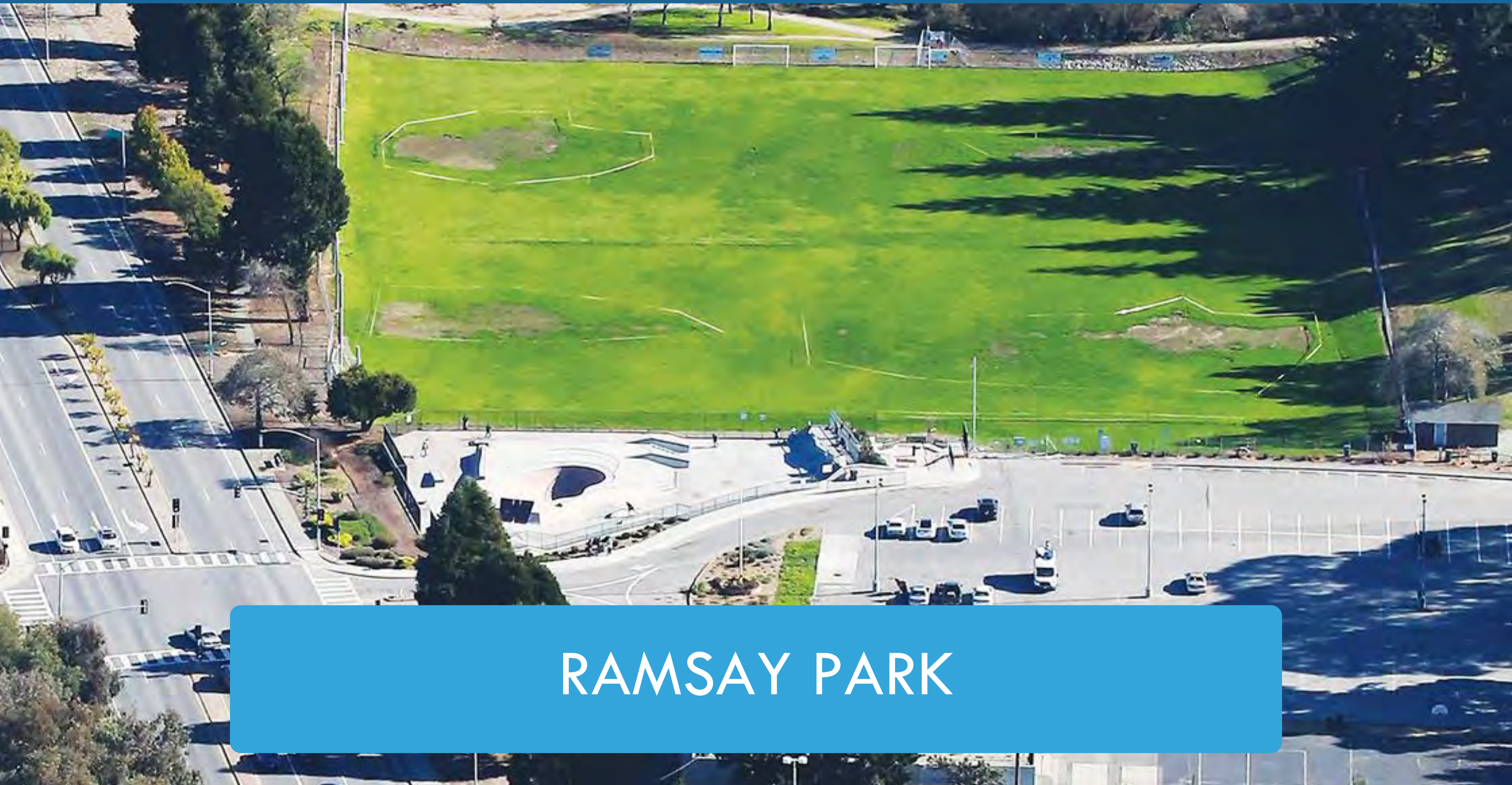
- IDENTIFY POTENTIAL SITES
- CREATE 3-5 CONCEPTUAL PLANS
- DEVELOP AN IMPLEMENTATION ROADMAP

POTENTIAL SITES

IDENTIFIED THROUGH:

- 1:1 INTERVIEWS
- GIS MAPPING
- SITE VISITS
- COMMUNITY EVENT



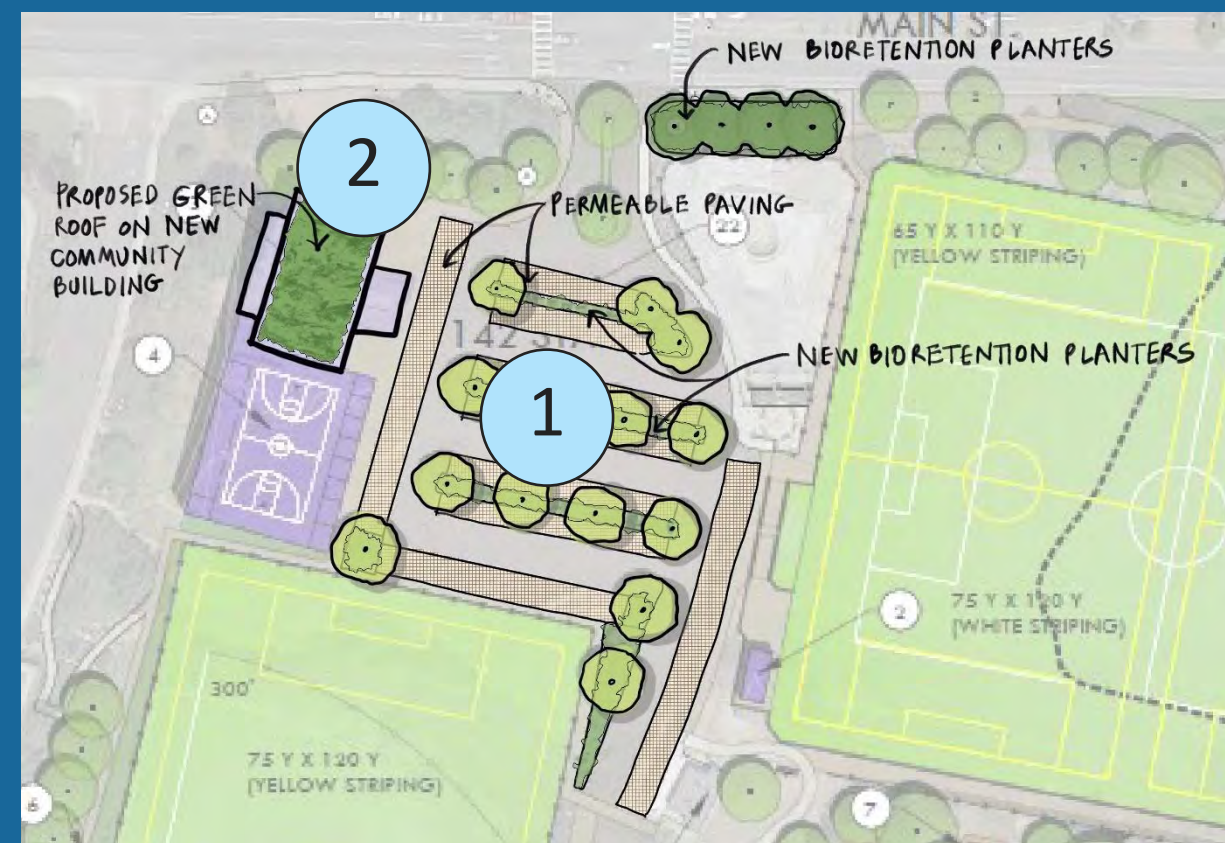


RAMSAY PARK

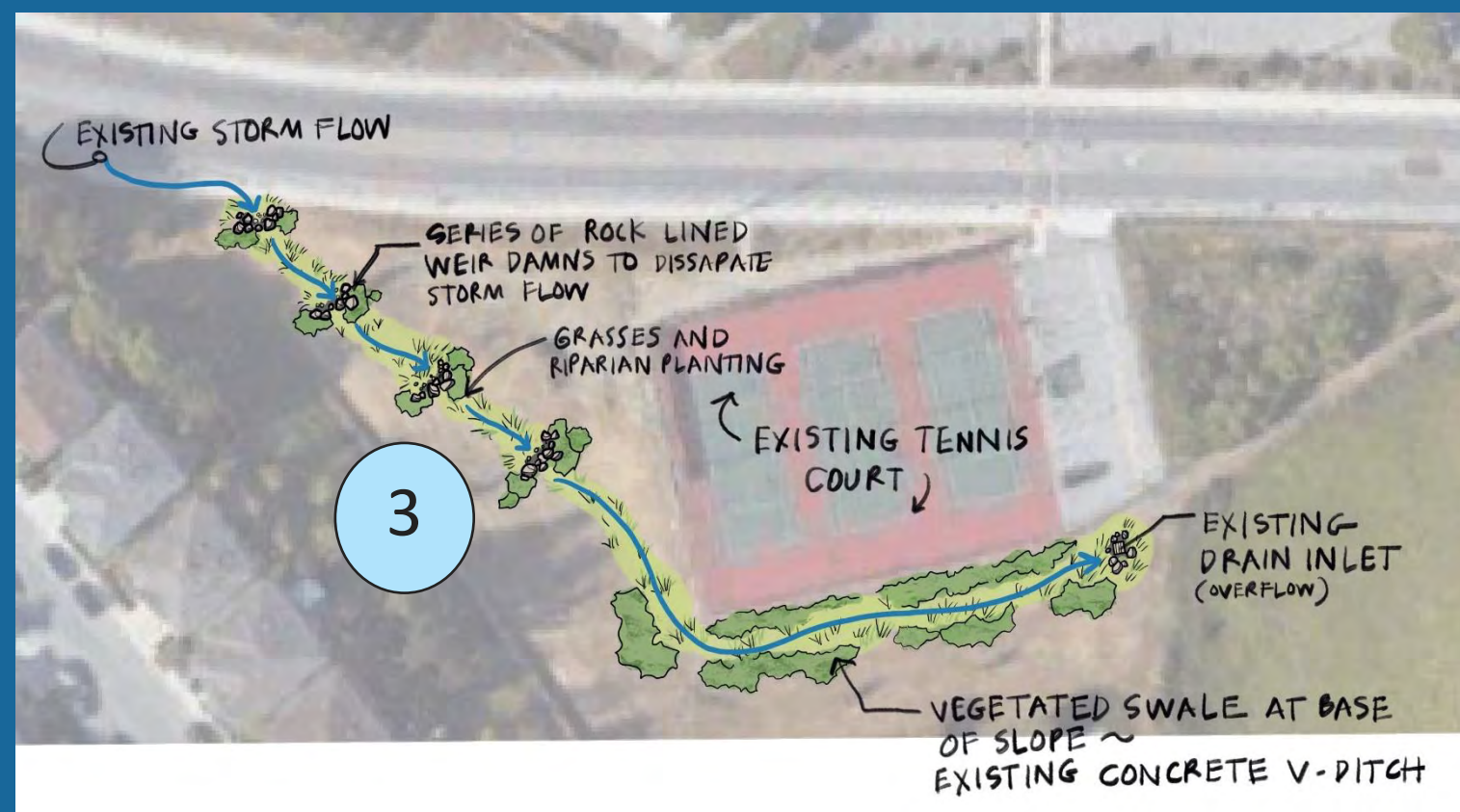
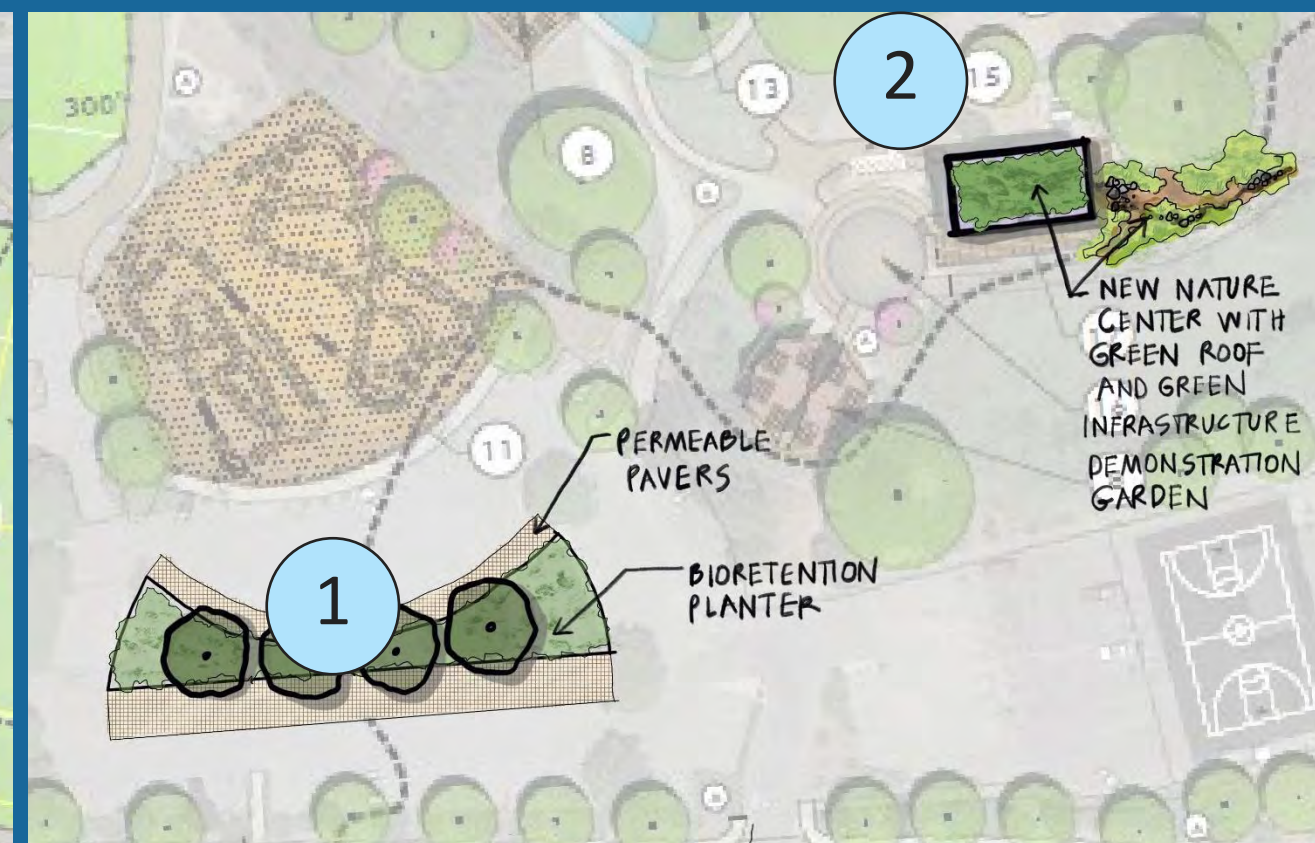
WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



AREA 1



AREA 2



AREA 3

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



1

GREEN PARKING LOTS

- PERMEABLE PAVEMENT
- BIORETENTION



2

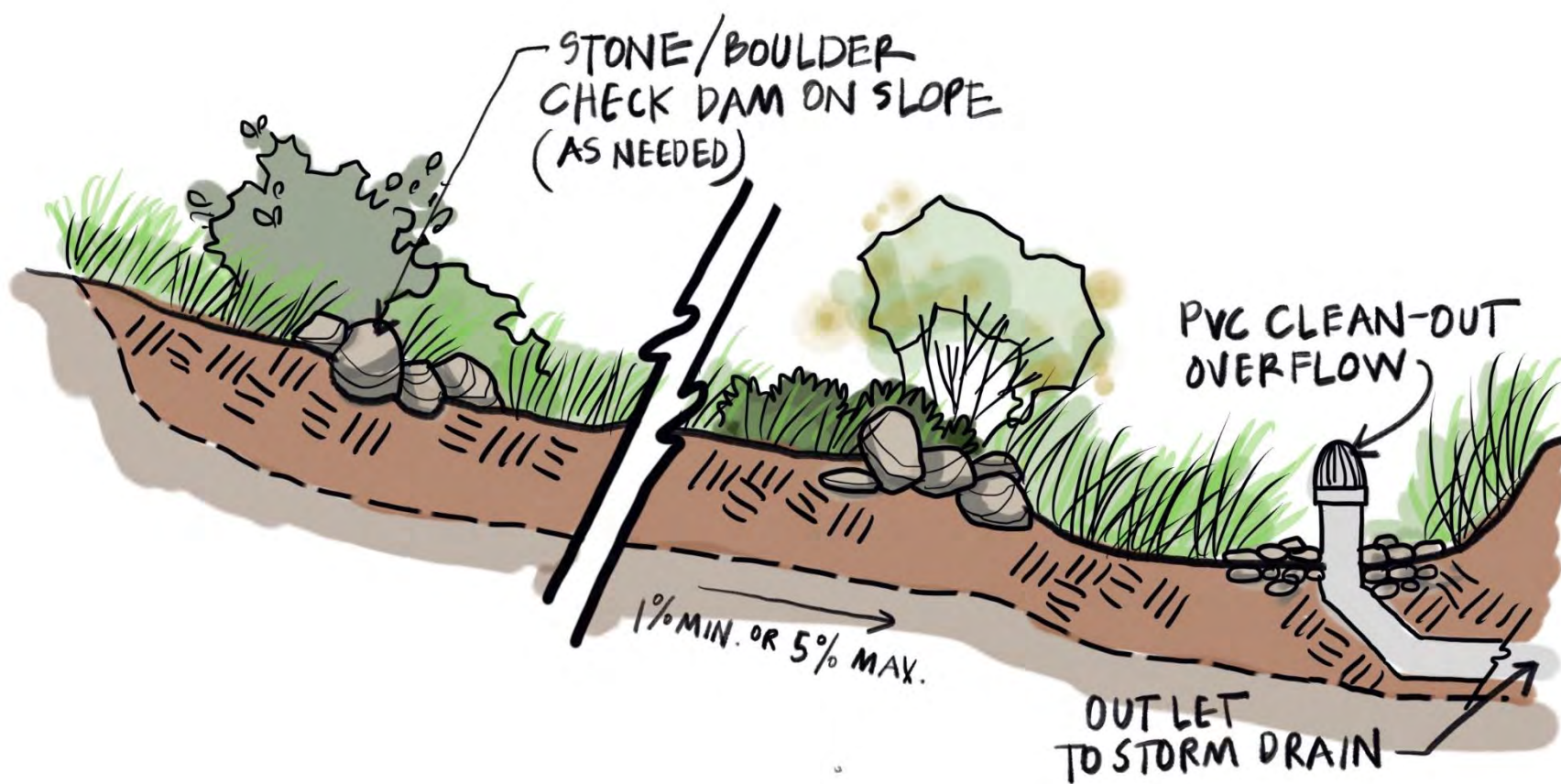
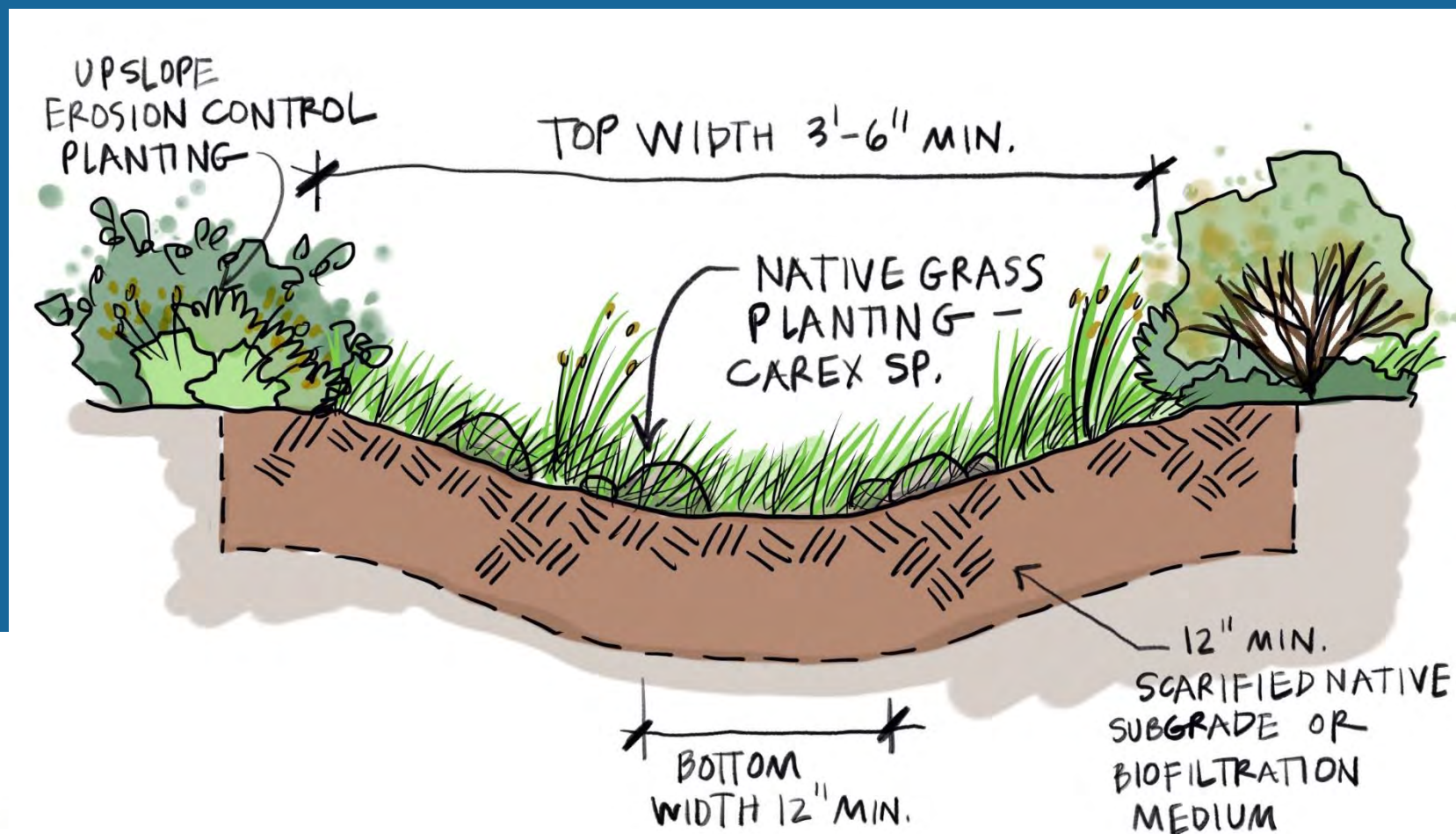
GREEN ROOF

- CLEANS WATER
- COOLS BUILDINGS

3

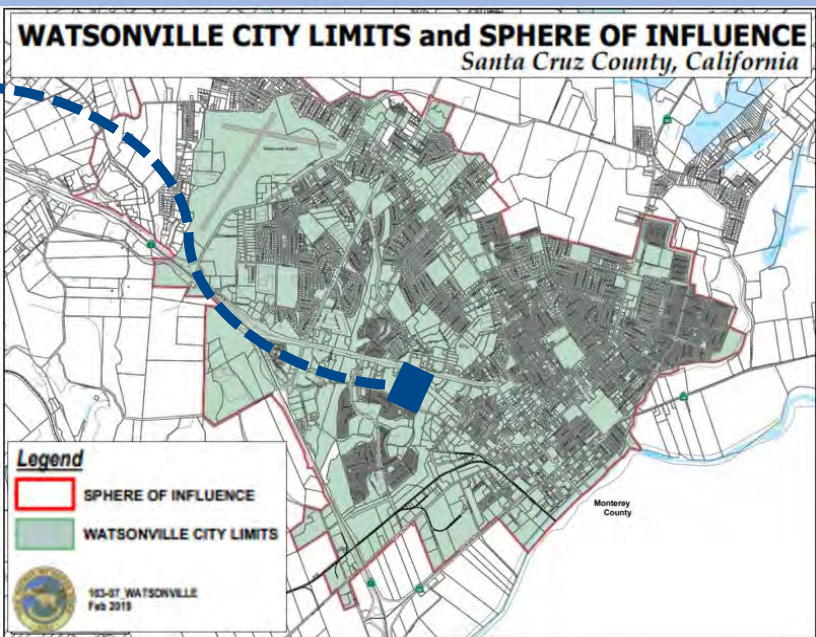
CHANNEL RESTORATION

- SLOWS RUNOFF
- CREATES HABITAT



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Ramsay Park



PARCEL DRAINAGE AREA CHARACTERISTICS

TOTAL DRAINAGE AREA	26.14 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	36 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	15.6 acre-ft

HIGHLIGHTED PROJECT FEATURES

- **Green Parking Lots** – Combines permeable pavements and bioretention to reduce site runoff and provide shade
- **Green Roofs** – Intercepts rainfall and sunshine to lower impacts of both
- **Channel Naturalization** – Removes concrete channel and restores natural runoff course with erosion protection



PROJECT DESCRIPTION

LOCATION: Ramsay Park, 1301 Main St, Watsonville, CA 95076

DESCRIPTION: Ramsay Park is a public site that is owned and operated by the City of Watsonville and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. The project affords multiple opportunities for various green infrastructure retrofits including permeable pavement/bioretention parking lots, green roofs, and channel naturalization. Runoff within this corridor drains to the West Branch Struve Slough, which leads to nearby wetlands, ultimately leading to the Pacific Ocean. The project seeks to improve the water quality of stormwater runoff flows conveyed within Pájaro River and Struve Slough through capture, storage, infiltration, and filtration before returning flows back to the channel. The project includes two green roofs which will be constructed on top of the Family Center and the Nature Center in the park. Additionally, a series of bioretention swales and permeable pavement is suggested for the two parking lots for the Park. The last component of the project is the naturalization and vegetation of the channel that flows on Harkins Slough Road and passes the Park Tennis Courts. All of these suggested changes are ideally suited for implementation at a park due to the opportunity they provide for education and outreach, as well as their potential to provide more green space and reduce heat island effect within the park itself. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives.



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Ramsay Park



Main Parking Lot & Bioretention

Drainage Area	92,000 sq ft
Impervious Area	90,000 sq ft
Runoff Volume	4,600 cu ft
BMP Volume	5,750 cu ft

Recreation Center Green Roof

Drainage Area	5,960 sq ft
Impervious Area	5,960 sq ft
Runoff Volume	330 cu ft
BMP Volume	795 cu ft

Nature Center Green Roof

Drainage Area	2,380 sq ft
Impervious Area	2,380 sq ft
Runoff volume	150 cu ft
BMP Volume	320 cu ft

Lower Parking Lot & Bioretention

Drainage Area	97,000 sq ft
Impervious Area	64,000 sq ft
Runoff Volume	4,000 cu ft
BMP Volume	4,375 cu ft

PROJECT BENEFITS

TYPE: PERVIOUS PAVEMENT

Delivery Phase: Planning

Asset details

Asset drainage area: 26.14 acres

Impervious area treated: 7.6 acres

Assumed design capacity: 3.42 acre-ft

Trash full capture system (FCS): No

Site conditions

Land use type: Other/Open Space

Parcel APN : 018-261-23

Imperviousness: 29%

Slope: 8%

Hydrologic soil type: Group C

Multi-benefits

Catchment runoff reduction

opportunity: Low

Catchment pollutant reduction

opportunity: Low

Managed aquifer recharge

opportunity: High

Flood hazard: Very low

Urban heat island

opportunity: Very high

Greening opportunity: Low

Disadvantaged community

status: Disadvantaged

CalEnviroScreen score: 84

Public exposure: High

TMDL benefits

Catchment ID: Wat 61

Receiving water: Watsonville Slough

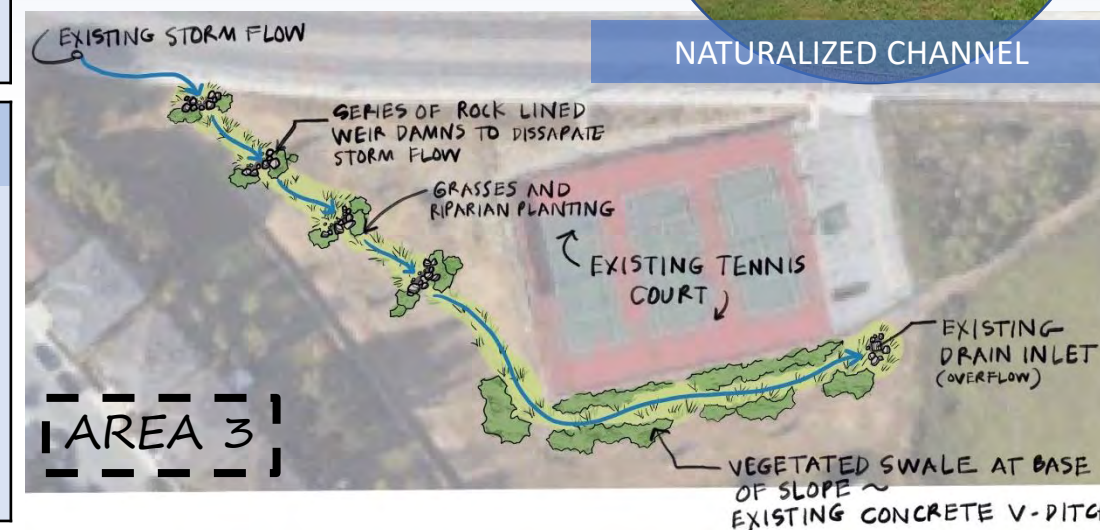
Receiving water impaired: Yes

Runoff reduction: 11.1 acre-ft/yr

Pollutant load reduction: 0.42 ton/yr

Trash priority land use

treated: 0.00 acres

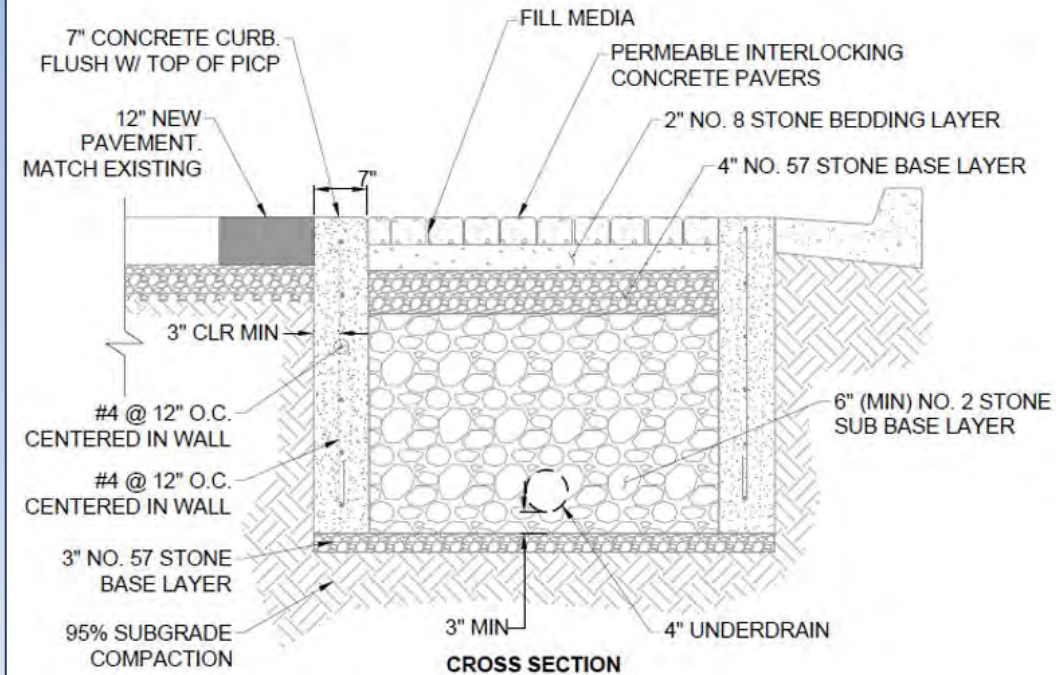


WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

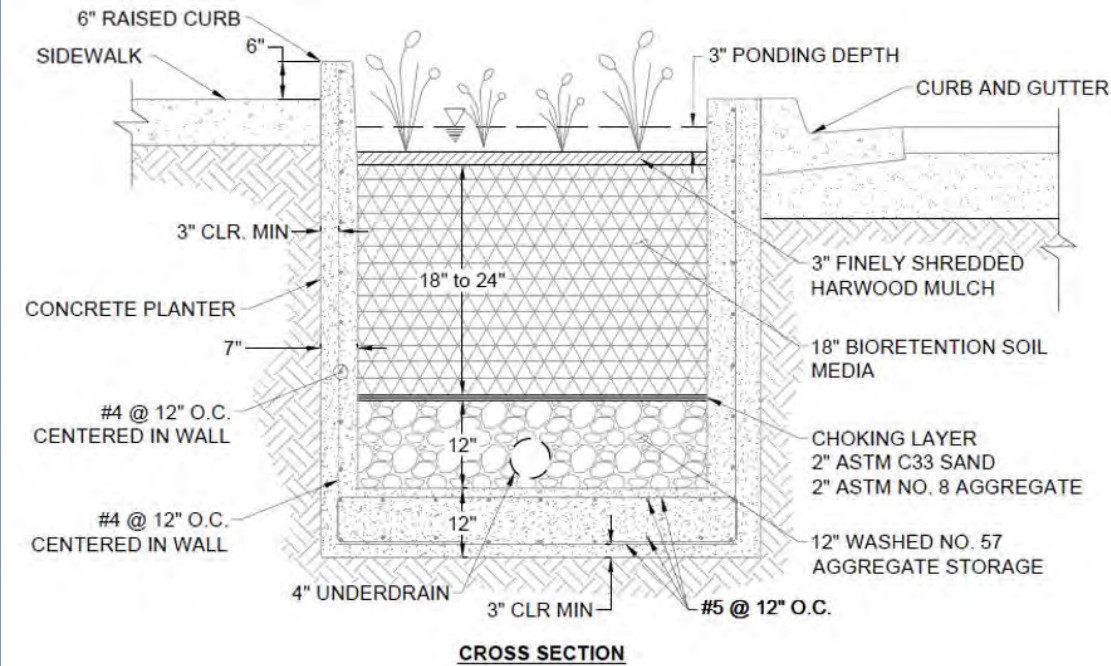
Project Concept Designs – Ramsay Park



Permeable Pavement



Bioretention



Site constraints/Environmental

Concerns:

- Storm water discharge near local natural waterways

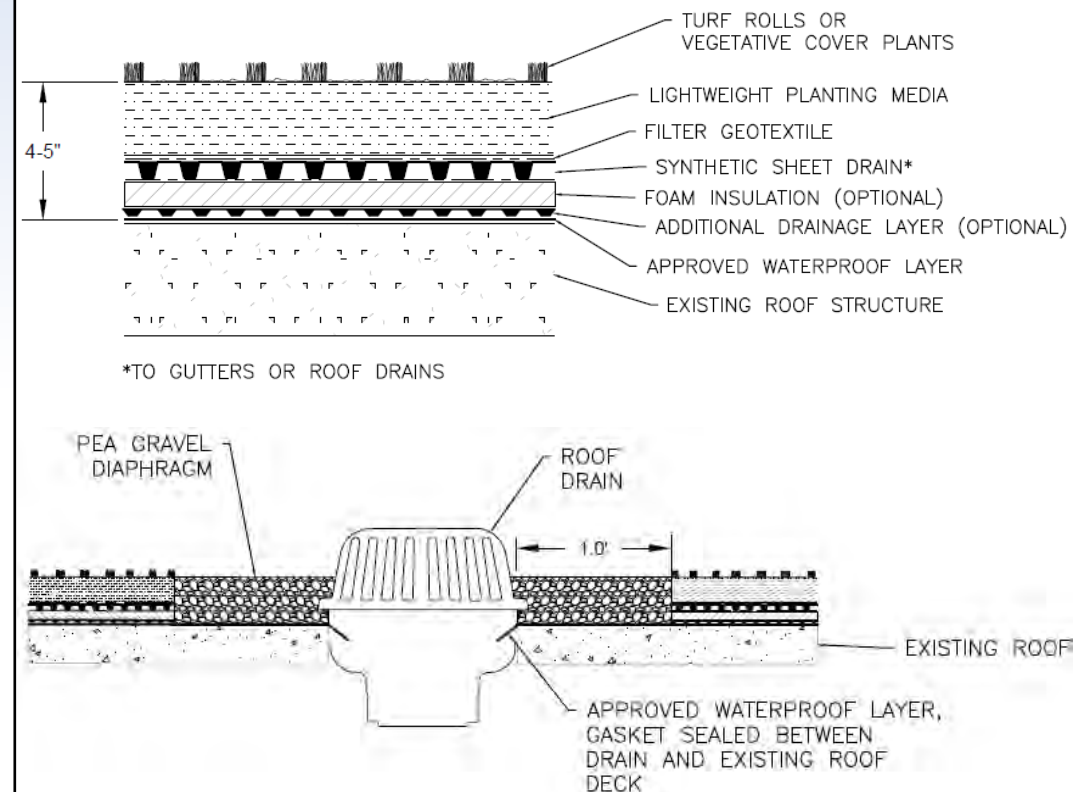
Permitting Considerations:

- NPDES state requirements
- Stormwater Post-construction Standards-Permit
- Stormwater Control Plan/O&M Plan/Maintenance agreement

Potential Funding Sources:

- Water Recycling Funding Program
- CWA Section 319 Nonpoint Source Pollution Grant
- Prop 1 – Rd2 Integrated Regional Water Management Grant Program

Green Roof



Planning Level Cost Estimates

Capital Cost Estimate

Recreation Center Green Roof	Nature Center Green Roof	Parking Permeable Pavement	Parking Bioretention Planters	Channel Naturalization	Total
\$1,043,000	\$416,500	\$776,200 (Main) \$552,000 (South)	\$315,600 (Main) \$226,100 (South)	\$220,000	\$3,549,400

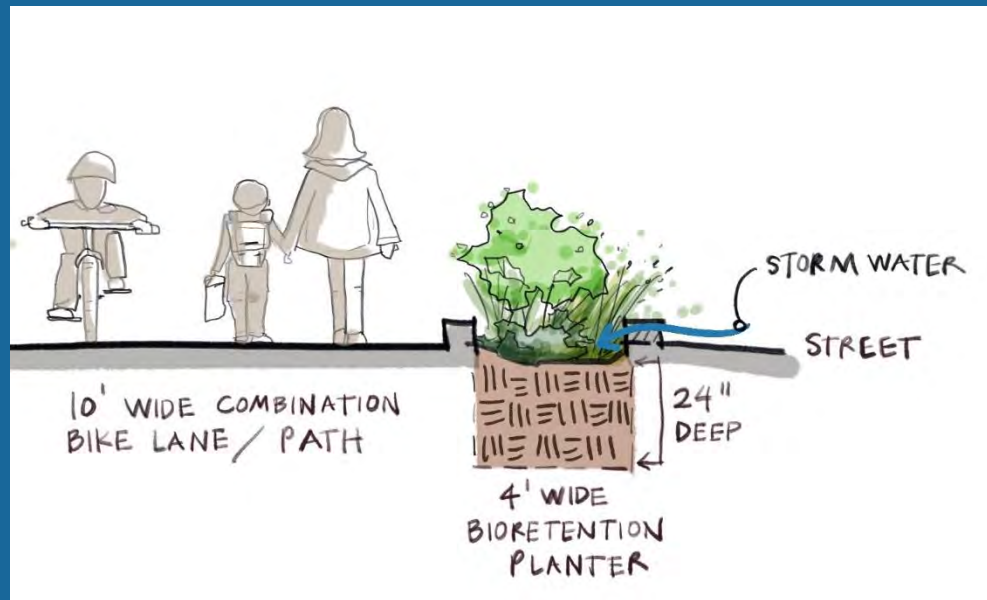
Operations & Maintenance Cost Estimate (Annual)

Recreation Center Green Roof	Nature Center Green Roof	Parking Permeable Pavement	Parking Bioretention Planters	Channel Naturalization	Total
\$12,000	\$4,800	\$20,250 (Main) \$14,400 (South)	\$18,000 (Main) \$12,800 (South)	\$8,800	\$91,050



DOWNTOWN CORRIDOR

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



PROTECTED BIKE LANE & SIDEWALK

- SAFE ROUTE TO SCHOOL
- CLEANS WATER & REDUCES RUNOFF



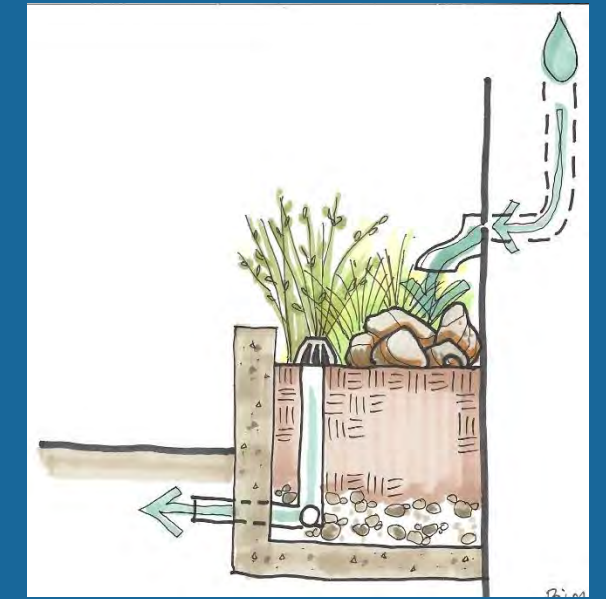
GREEN PARKING LOTS

- PERMEABLE PAVEMENT
- BIORETENTION



GREEN ALLEYWAYS

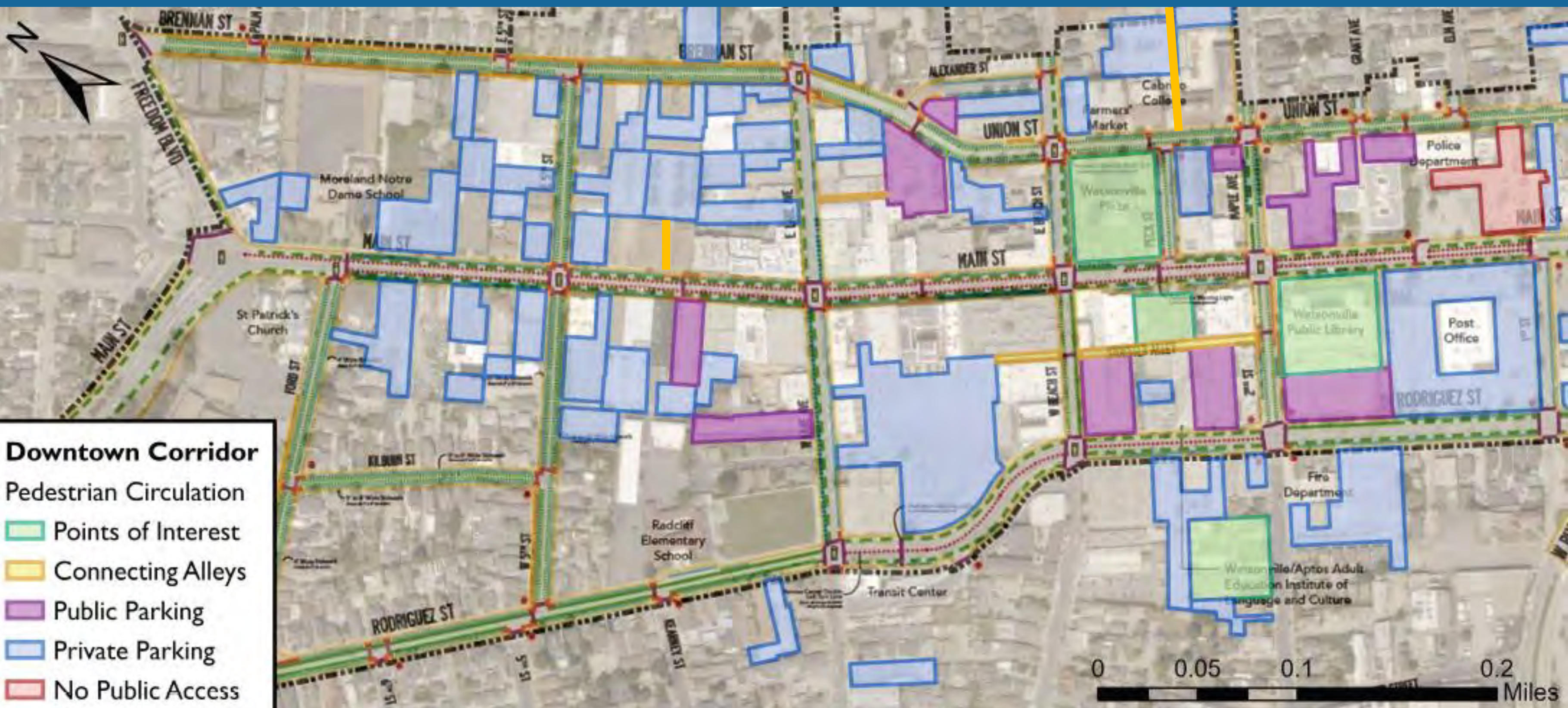
- PERMEABLE PAVEMENT
- STORMWATER PLANTERS
- DISCONNECTED DOWNSPOUTS



BIORETENTION PLANTERS

- CLEANS WATER
- SLOWS TRAFFIC

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

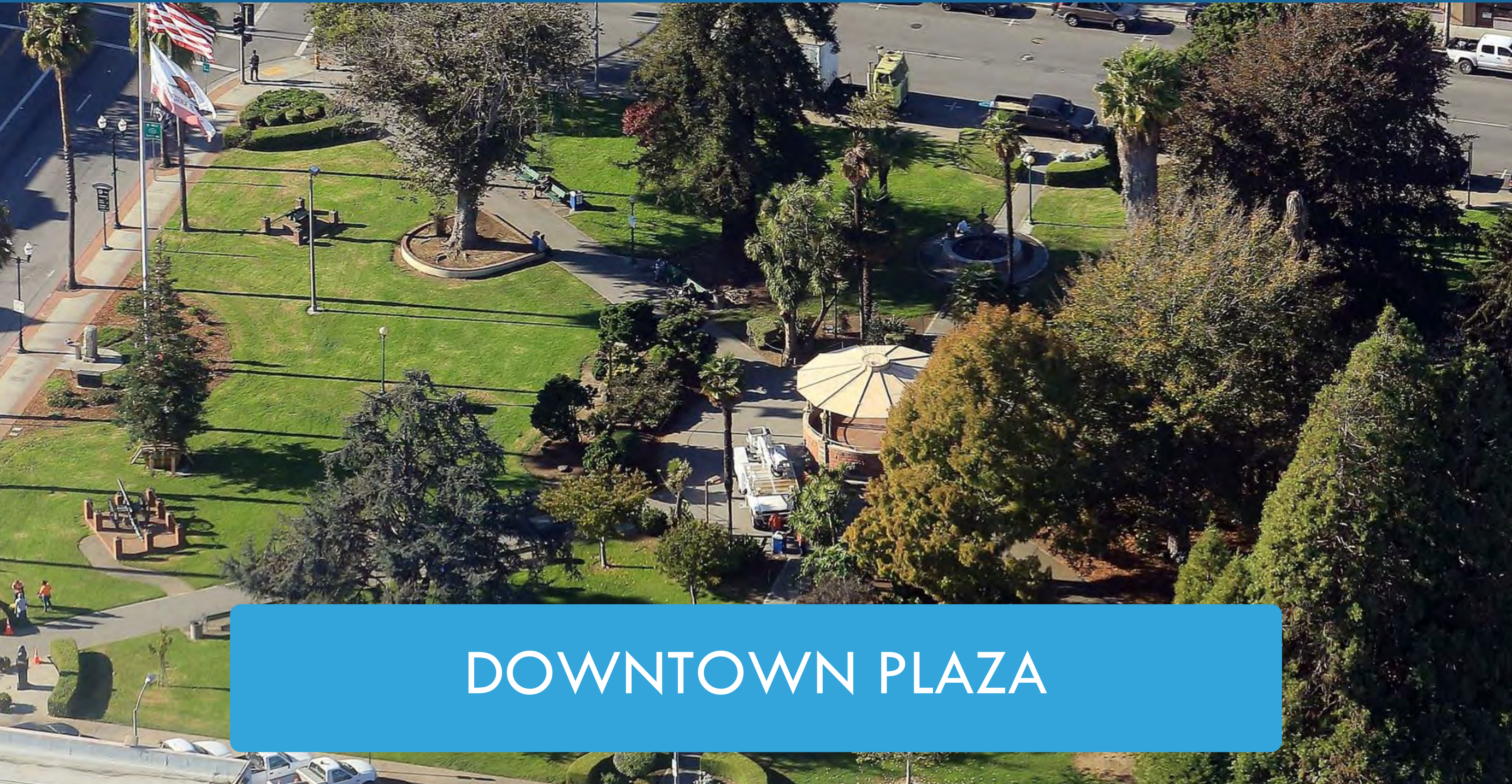


WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



GREEN PASEOS

- PERMEABLE PAVEMENT
- DISCONNECTED DOWNSPOUTS
- BIORETENTION
- WATER CAPTURE
- STREET TREES



DOWNTOWN PLAZA

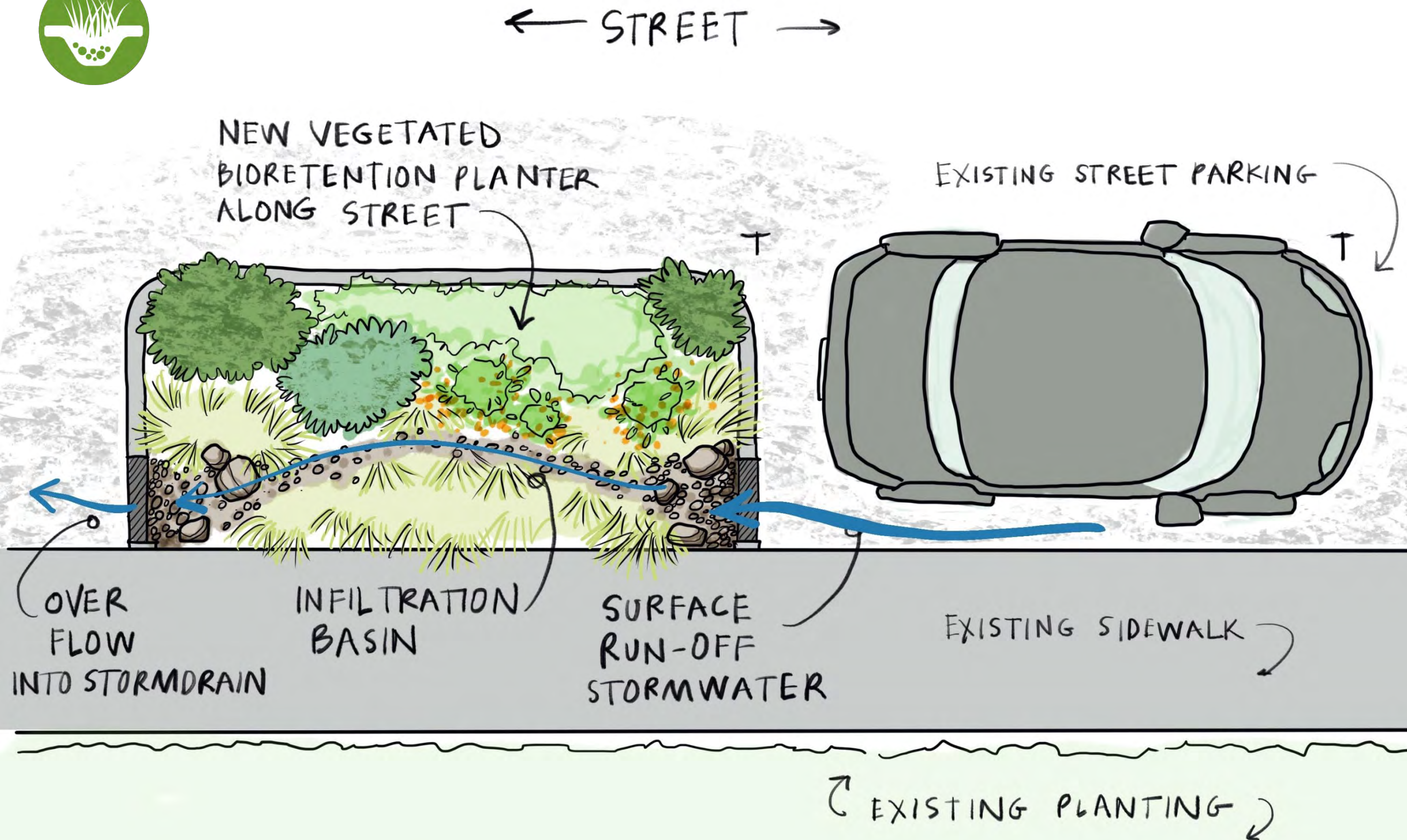
WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



CITY PLAZA CONCEPT DESIGN



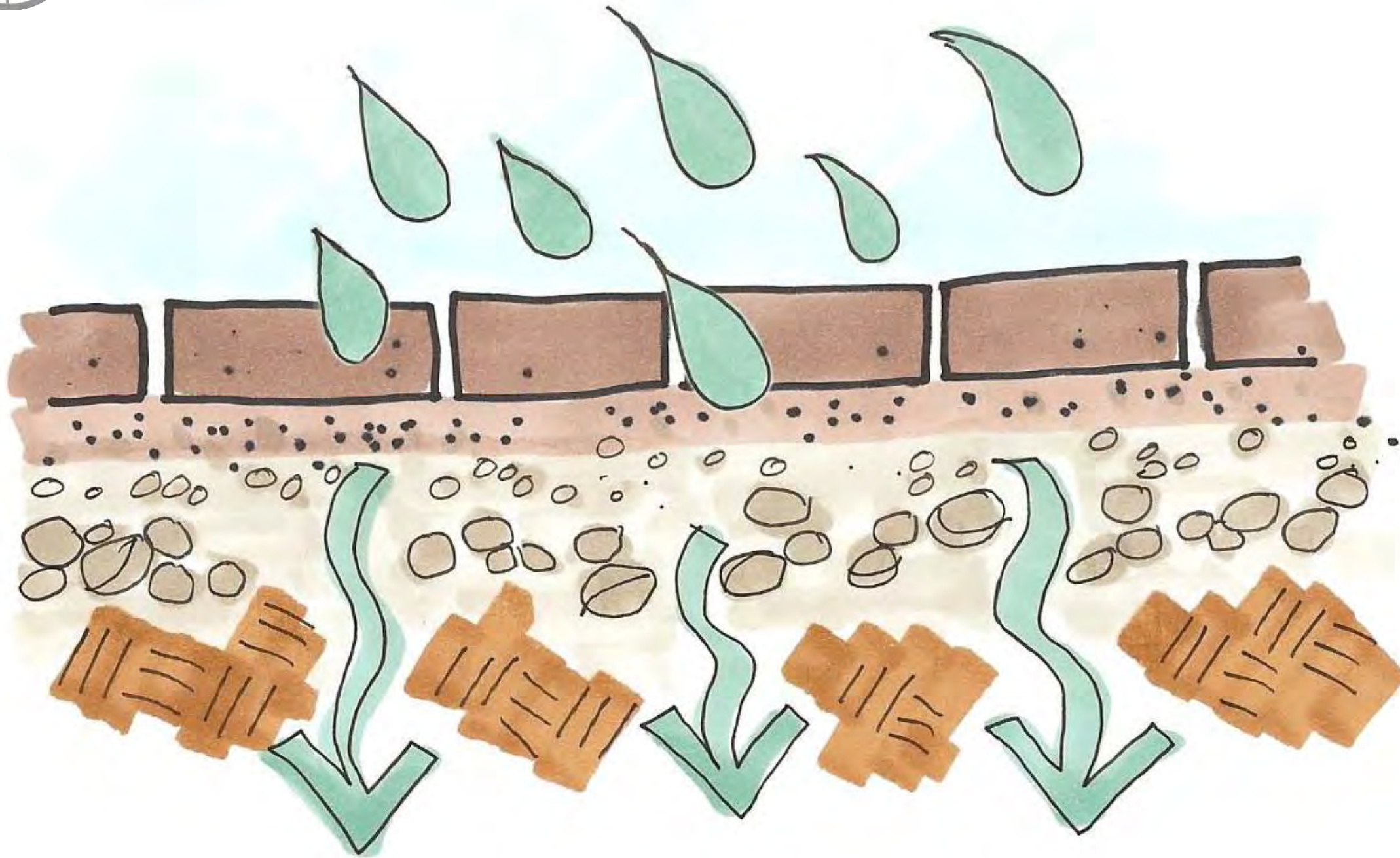
WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



1

BIORETENTION PLANTERS

- CLEANS WATER
- SLOWS TRAFFIC



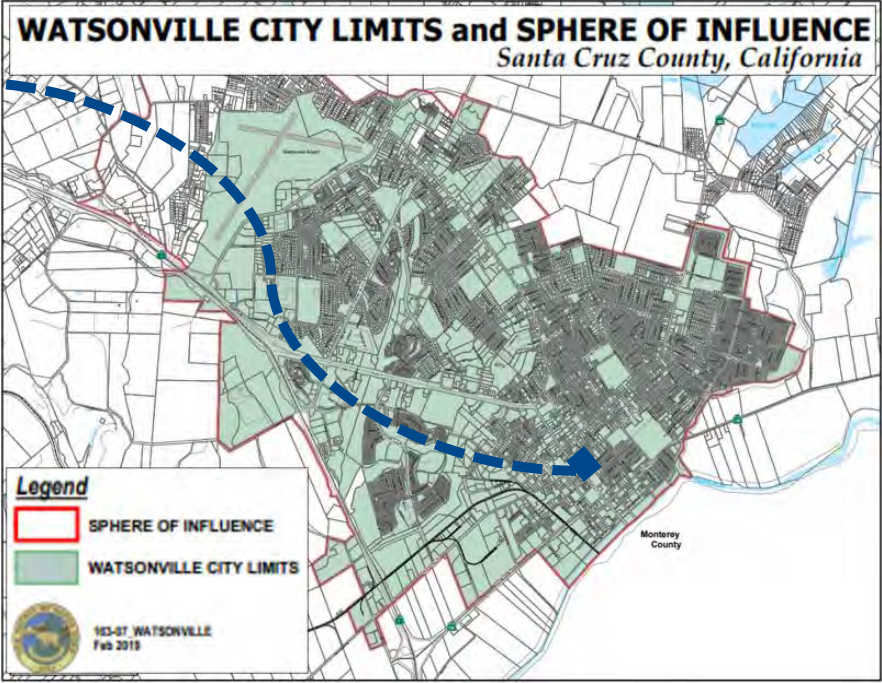
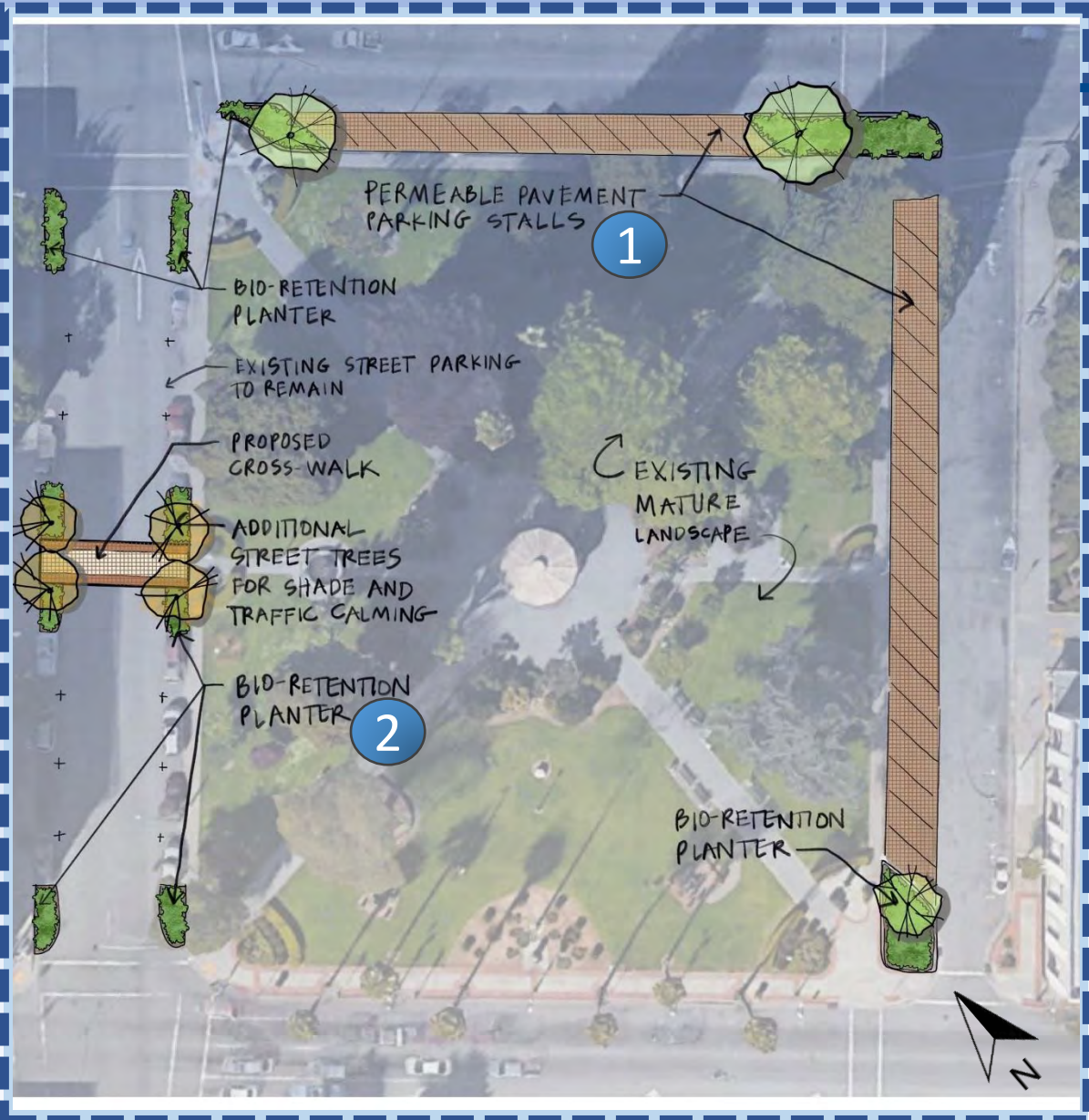
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PERMEABLE PAVEMENT PARKING STALLS

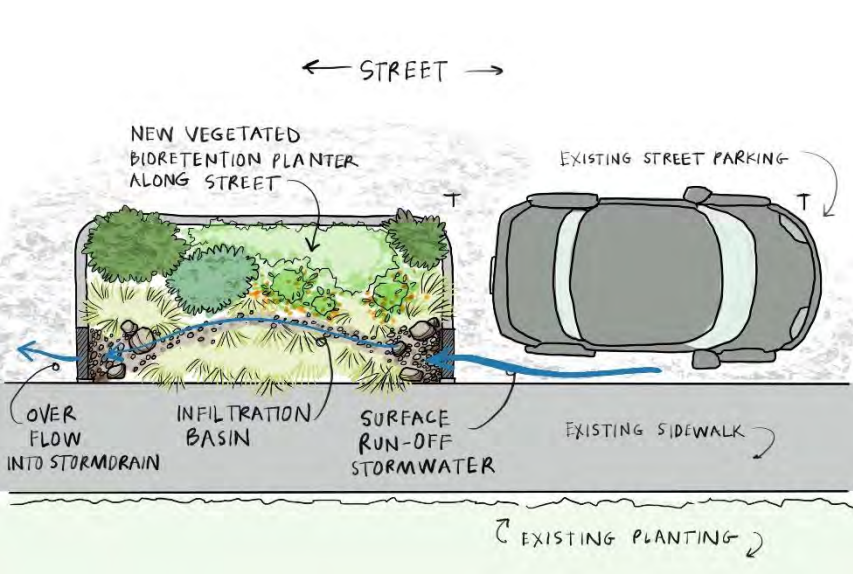
- HIGH VISIBILITY
DEMONSTRATION SITE
- REDUCES RUNOFF

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Downtown Plaza



PARCEL DRAINAGE AREA CHARACTERISTICS	
TOTAL DRAINAGE AREA	3.88 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	36 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	5.2 acre-ft



HIGHLIGHTED PROJECT FEATURES

- **Safer Pedestrian Crossings** – Provides bioretention corner bulb outs at pedestrian crossings
- **New Mid-block Crossing** – To increase the overall walkability of the downtown district, provides more direct connections with surrounding parking lots



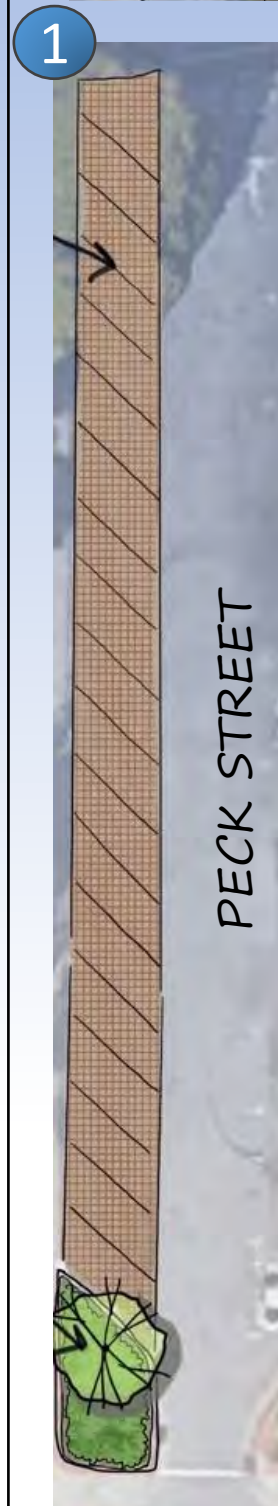
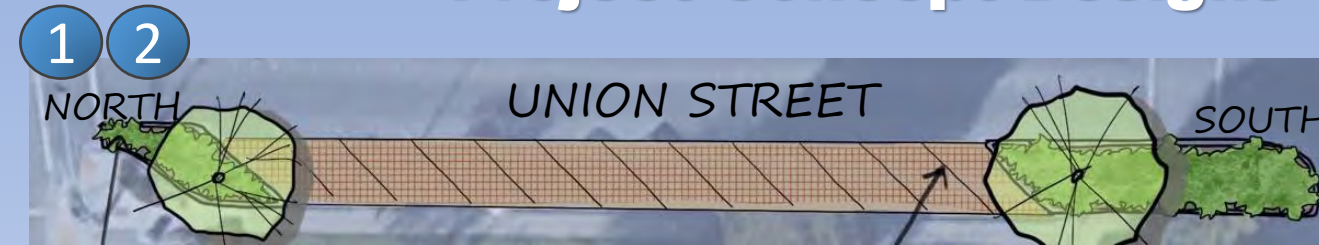
PROJECT DESCRIPTION

LOCATION: Watsonville City Plaza, 358 Main St, Watsonville, CA 95076

DESCRIPTION: Downtown Watsonville Plaza is a public park site that is owned and operated by the City of Watsonville and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Research has shown this to plaza to be a highly sought-after destination for visitors to the downtown district and various traffic incidents occur around the park. The proposed improvements aim to improve pedestrian safety, increase walkability through the downtown area, improve local runoff quality, and reduce the urban heat island effects. Pedestrian safety is improved through shortening the crossing distances with corner bulb-outs and high visibility crosswalks. The runoff within this corridor drains to the Pájaro River, which leads to the Monterey Bay, and ultimately, the Pacific Ocean. The project includes a series of bioswales on the corners of the plaza, as well as the placement of permeable pavement within the parking stalls along the North-East and South-East sides of the park to capture, store, and infiltrate/filtrate local surface runoff around the park plaza. In addition, locations have been specified as ideal for tree planting in order to combat heat island effect coming from some of the busier streets bordering the park. The project is ideally suited for implementation in this widely used public area as it will provide educational opportunities for residents of all ages, while also providing safer crossing through the additional green space within the heart of the city.

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Downtown Plaza



Peck Street Permeable Pavement	
Drainage Area	11,983 sq ft
Impervious Area	11,983 sq ft
Runoff Volume	675 cu ft
BMP Volume	740 cu ft

Union Street Permeable Pavement	
Drainage Area	9,049 sq ft
Impervious Area	9,049 sq ft
Runoff Volume	500 cu ft
BMP Volume	530 cu ft

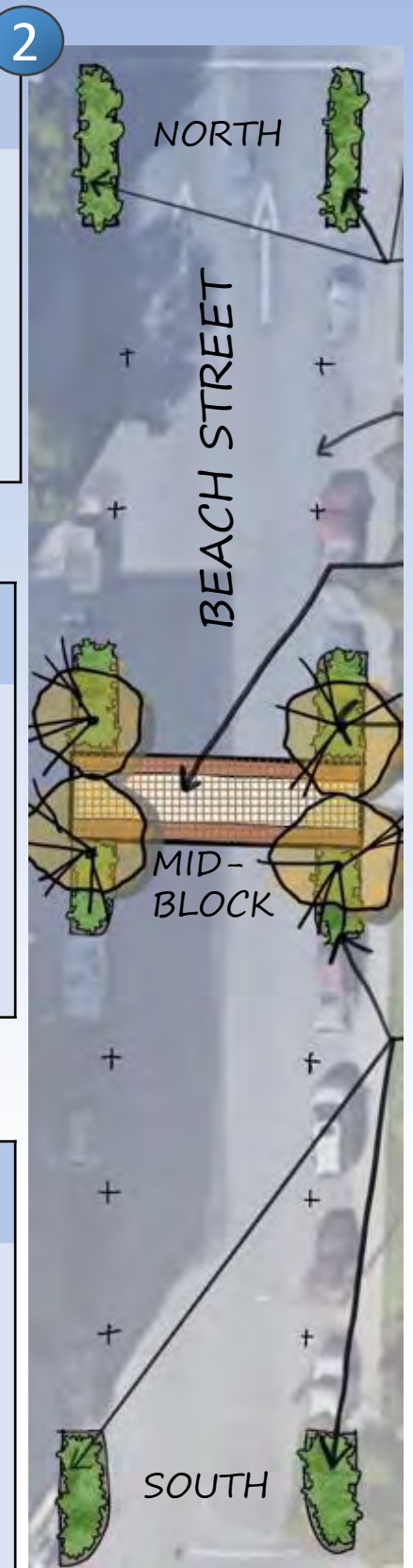
Union Street (North) Bioretention Swale	
Drainage Area	28,700 sq ft
Impervious Area	14,100 sq ft
Runoff Volume	865 cu ft
BMP Volume	325 cu cf

Union Street (South) Bioretention Swale	
Drainage Area	44,000 sq ft
Impervious Area	24,883 sq ft
Runoff Volume	1,485 cu ft
BMP Volume	858 cu ft

Beach Street (North) Bioretention Swale	
Drainage Area	5,650 sq ft
Impervious Area	5,050 sq ft
Runoff Volume	300 cu ft
BMP Volume	260 cu ft

Beach Street (Mid-Block) Bioretention Swale	
Drainage Area	17,800 sq ft
Impervious Area	13,050 sq ft
Runoff Volume	775 cu ft
BMP Volume	390 cu ft

Beach Street (South) Bioretention Swale	
Drainage Area	12,605 sq ft
Impervious Area	9,760 sq ft
Runoff Volume	580 cu ft
BMP Volume	260 cu ft



PROJECT BENEFITS

TYPE: PERVIOUS PAVEMENT
Delivery Phase: Planning

Asset details

Asset drainage area: 3.88 acres
Impervious area treated: 2.55 acres
Assumed design capacity: 0.09 acre-ft
Trash full capture system (FCS): No

Site conditions

Land use type: City Park/Recreation
Parcel APN : 017-112-01
Imperviousness: 66%
Slope: 4%
Hydrologic soil type: Group C

TMDL benefits

Catchment ID: Wat 43 & 47
Receiving water: Pajaro River
Receiving water impaired: Yes
Runoff reduction: 2.03 acre-ft/yr
Pollutant load reduction: 0.18 ton/yr
Trash priority land use treated: 0.0 acres

Multi-benefits

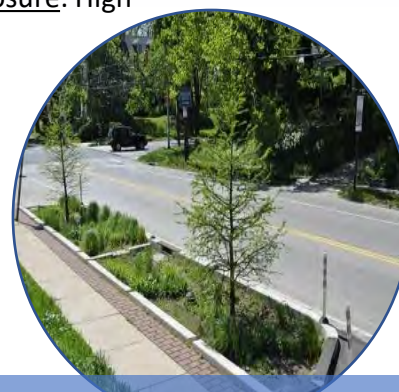
Catchment runoff reduction opportunity: Moderate
Catchment pollutant reduction opportunity: High
Managed aquifer recharge opportunity: Moderate
Flood hazard: Very low
Urban heat island opportunity: Very high
Greening opportunity: High
Disadvantaged community status: Disadvantaged
CalEnviroScreen score: 84
Public exposure: High



Peck Street Bioretention Swale	
Drainage Area	39,100 sq ft
Impervious Area	23,000 sq ft
Runoff Volume	1,360 cu ft
BMP Volume	507 cu ft



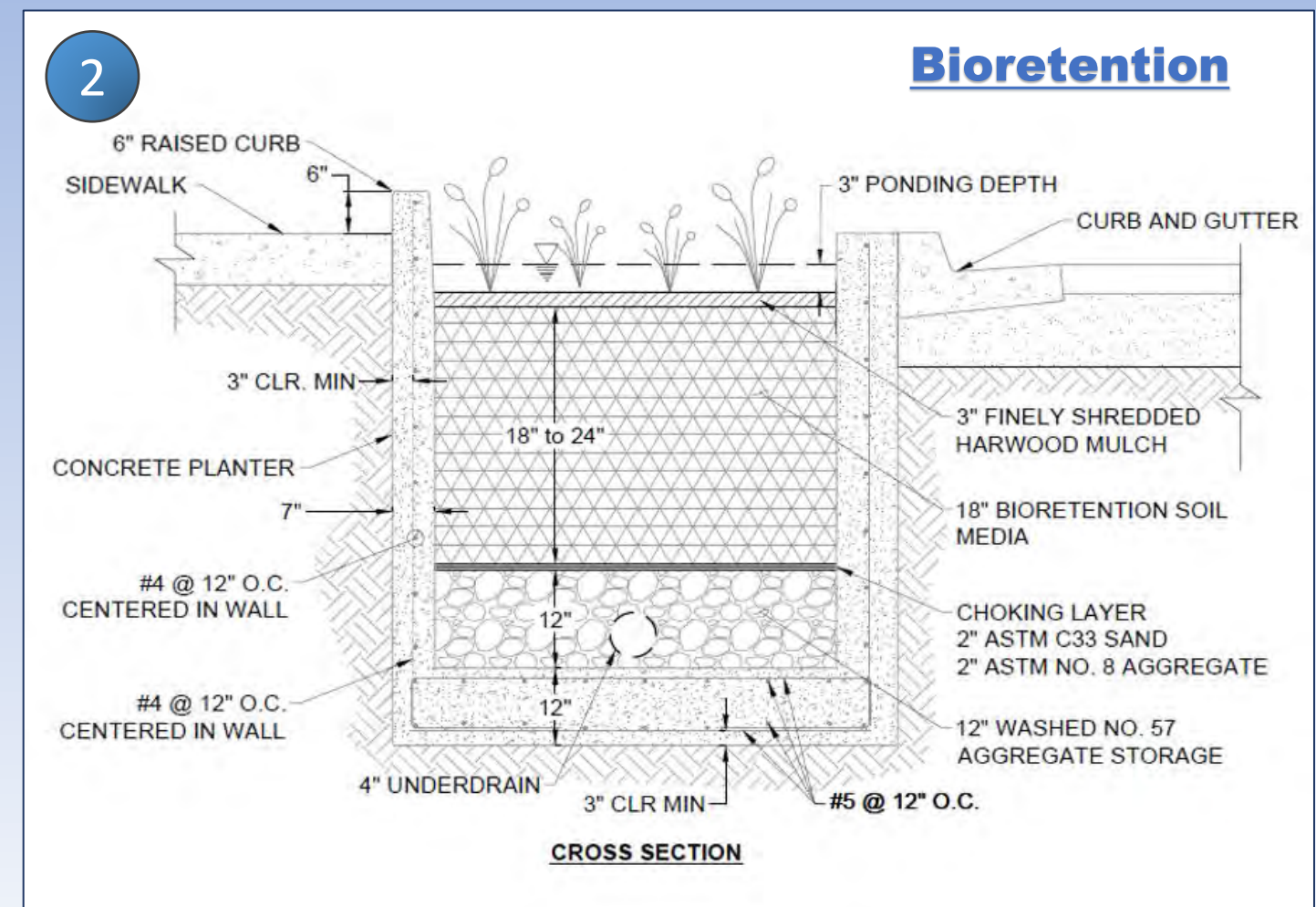
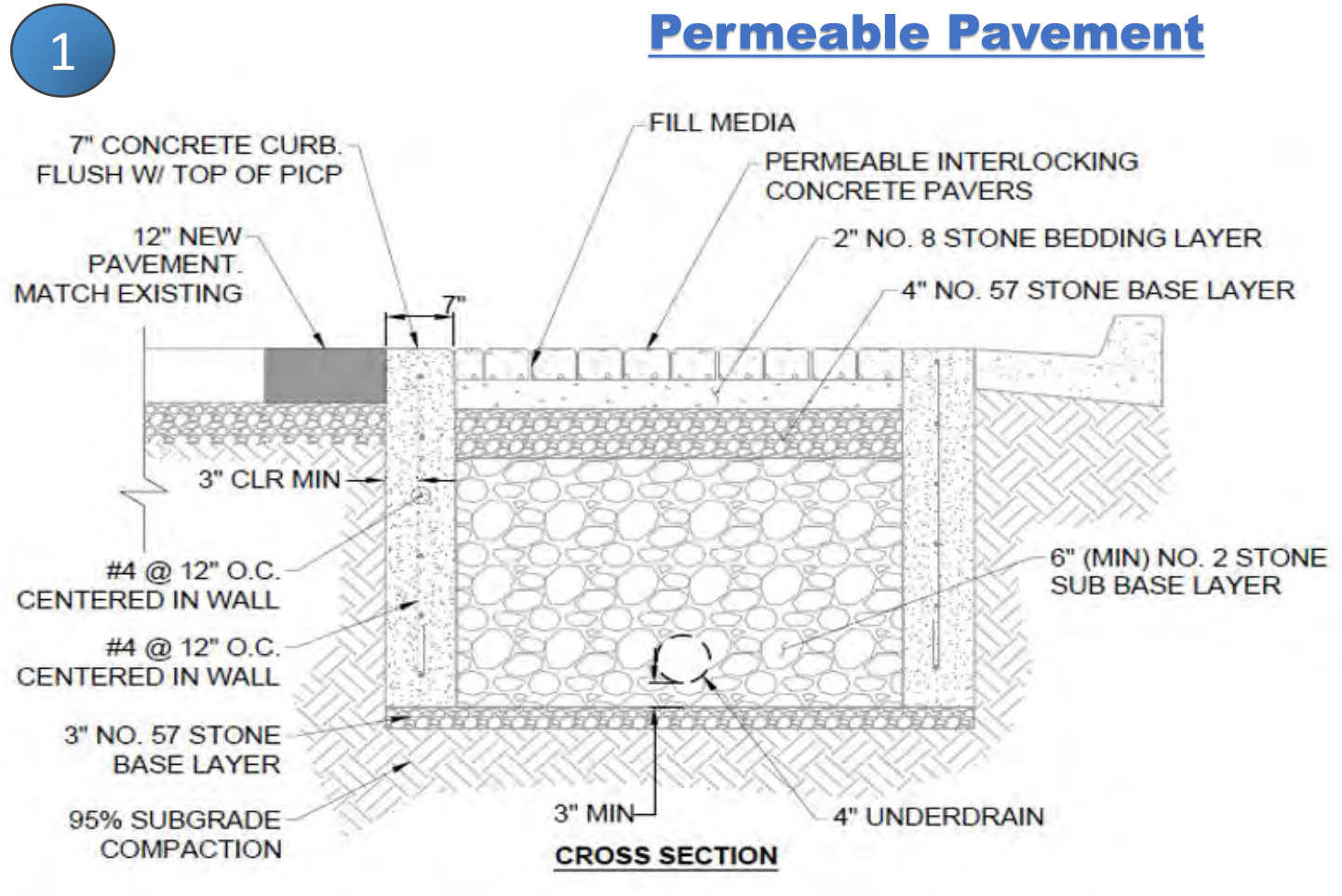
PERMEABLE PAVEMENT



BIORETENTION PLANTER

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Downtown Plaza



Site constraints/Environmental Concerns:

- Storm water discharge near local natural waterways

Permitting Considerations:

- NPDES state requirements
- Stormwater Post-construction Standards-Permit
- Stormwater Control Plan/O&M Plan/Maintenance agreement

Potential Funding Sources:

- Water Recycling Funding Program
- CWA Section 319 Nonpoint Source Pollution Grant
- Prop 1 – Rd2 Integrated Regional Water Management Grant Program

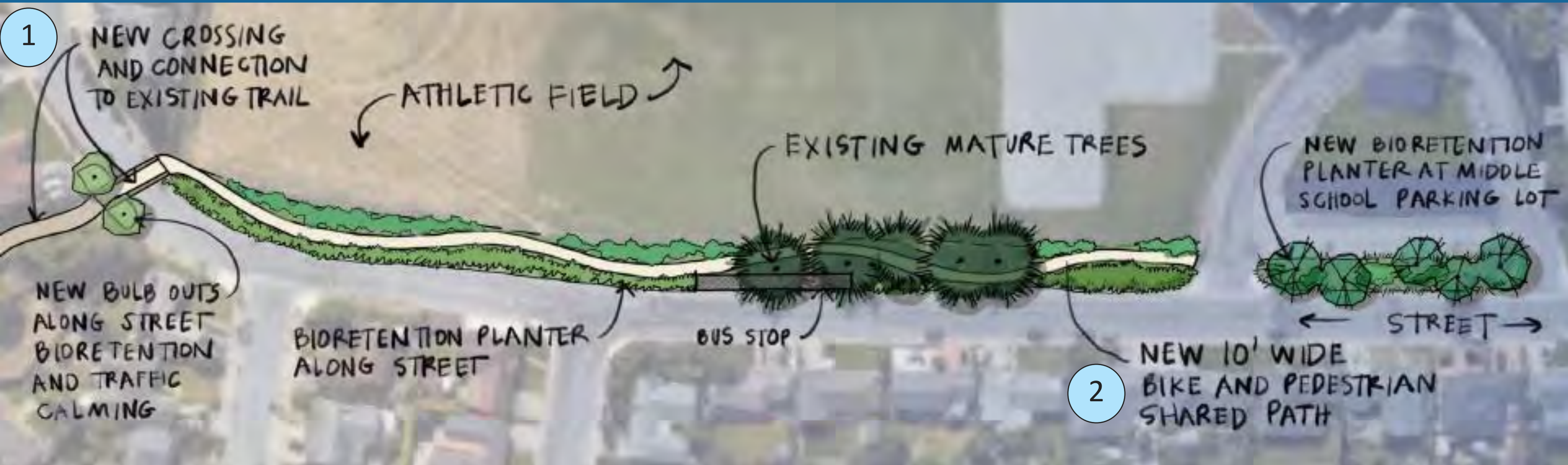
Planning Level Cost Estimates

Capital Cost Estimate						
Peck Street Permeable Pavement	Union Street Permeable Pavement	Beach Street Bioretention Swale	Beach Street Mid-Block Crossing	Peck Street Bioretention Swale	Union Street Bioretention Swale	Total
\$82,300	\$66,700	\$16,200	\$16,700	\$19,000	\$41,500	\$242,400
Operations & Maintenance Cost Estimate (Annual)						
Peck Street Permeable Pavement	Union Street Permeable Pavement	Beach Street Bioretention Swale	Beach Street Mid-Block Crossing	Peck Street Bioretention Swale	Union Street Bioretention Swale	Total
\$2,150	\$1,740	\$800	\$600	\$950	\$2,200	\$8,440

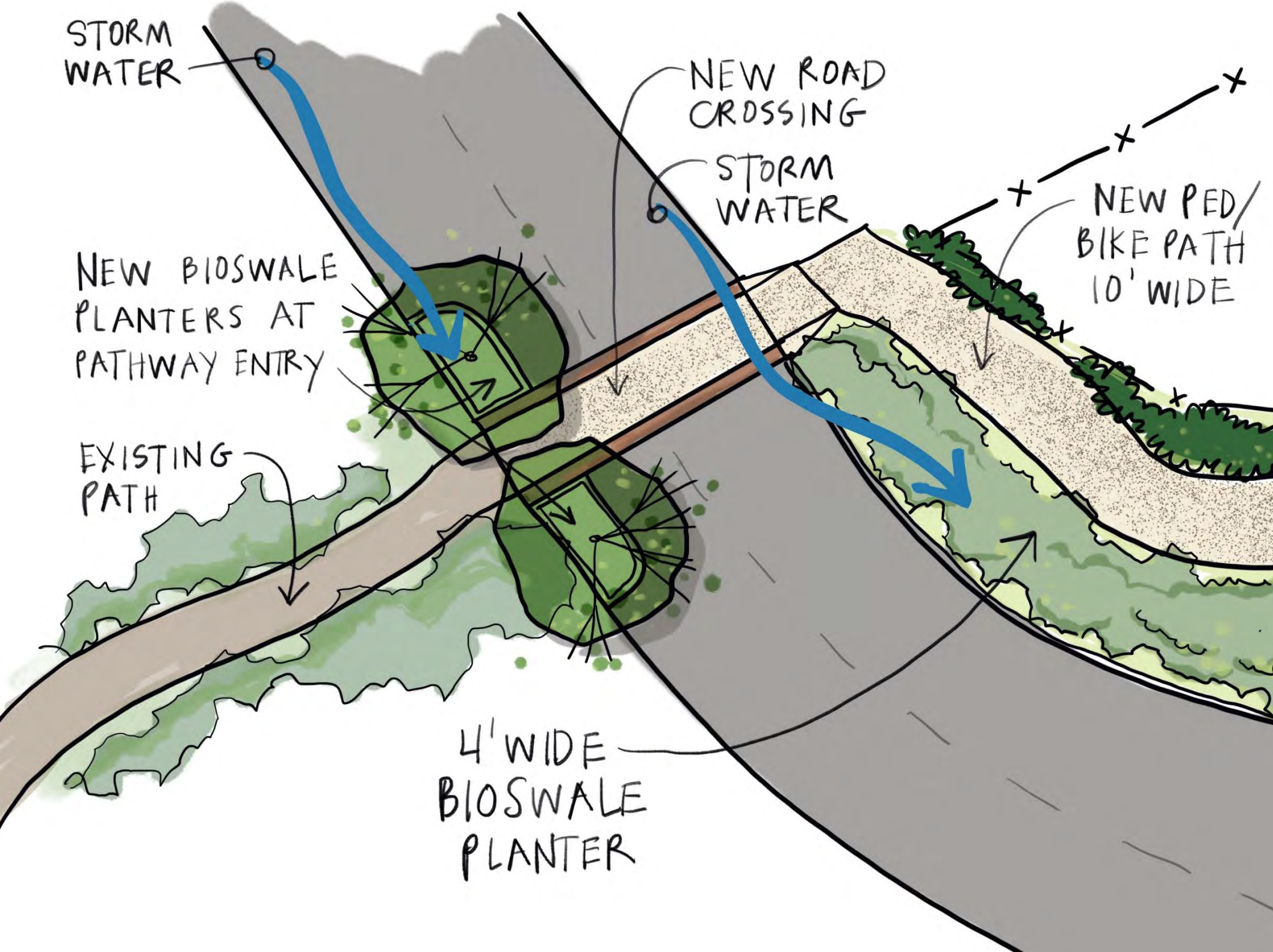


ROLLING HILLS MIDDLE

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



1

PEDESTRIAN CROSSING WITH BULB-OUTS

- CONNECTS TO EXISTING TRAIL
- SLOWS TRAFFIC & IMPROVES SCHOOL ROUTE SAFETY
- CLEANS WATER & REDUCES RUNOFF



2

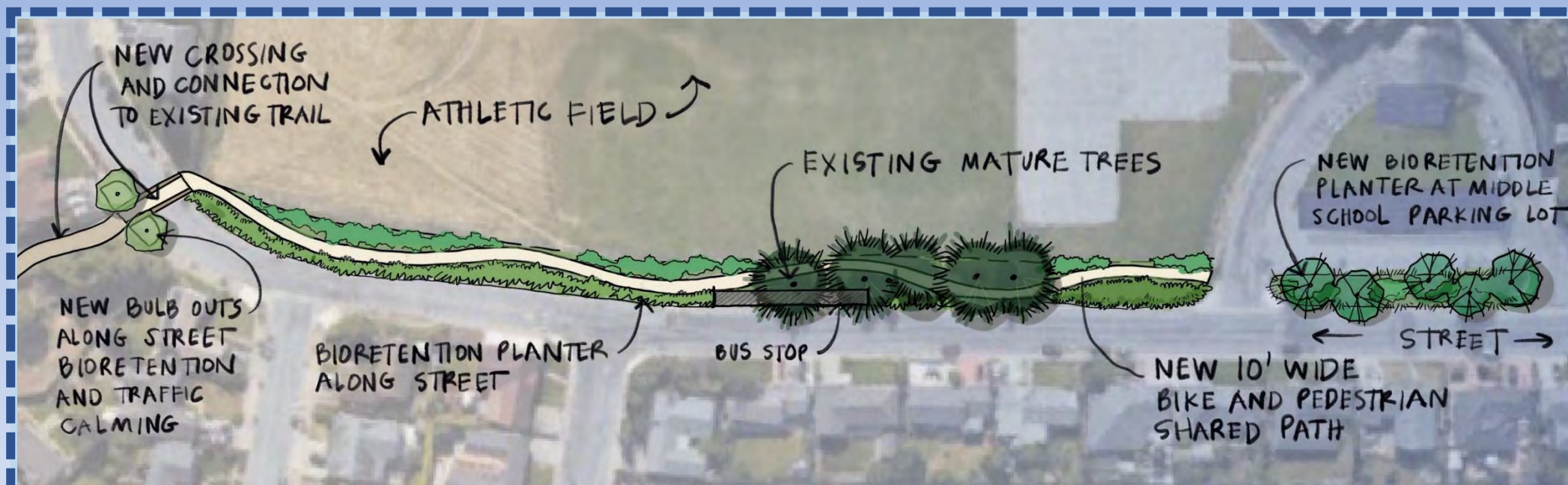
PROTECTED BIKE LANE & SIDEWALK

- SAFE ROUTE TO SCHOOL
- CLEANS WATER & REDUCES RUNOFF



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Rolling Hills Middle School



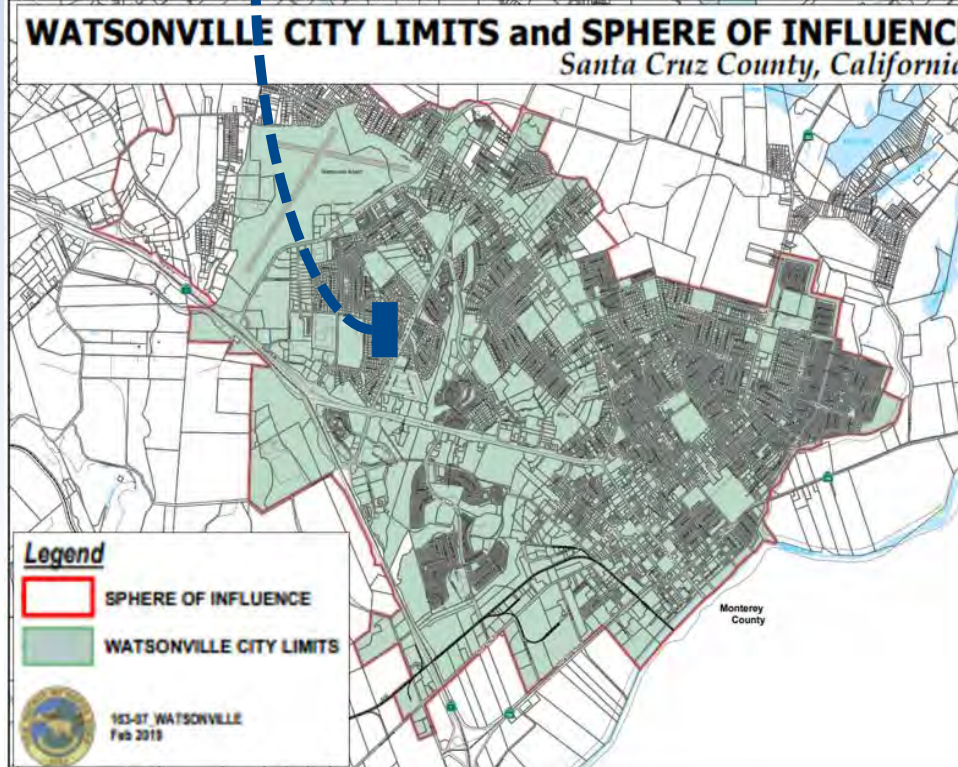
PARCEL DRAINAGE AREA CHARACTERISTICS

TOTAL DRAINAGE AREA	25.2 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	36 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	20.0 acre-ft

PROJECT DESCRIPTION

LOCATION: Rolling Hills Middle School, 130 Herman Ave, Watsonville, CA 95076

DESCRIPTION: Rolling Hills Middle School is a site that is owned and operated by the Pájaro Valley Unified School District and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Ample space is available to the south of the school within the road right of way (on Herman Ave) to provide a combined protected pedestrian and bicycle facility to improve safe passageways to school while promoting alternative forms of transportation to the school site. The protective planter will be constructed as a bioswale that will capture, store, and infiltrate runoff from the surrounding neighborhood that then ultimately drains to the West Branch Struve Slough, which leads to nearby wetlands, eventually the Pacific Ocean. The swales will also improve the aesthetics of the middle school, as they will be placed along the drive-thru and drop off areas, and in the front of the school. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives.



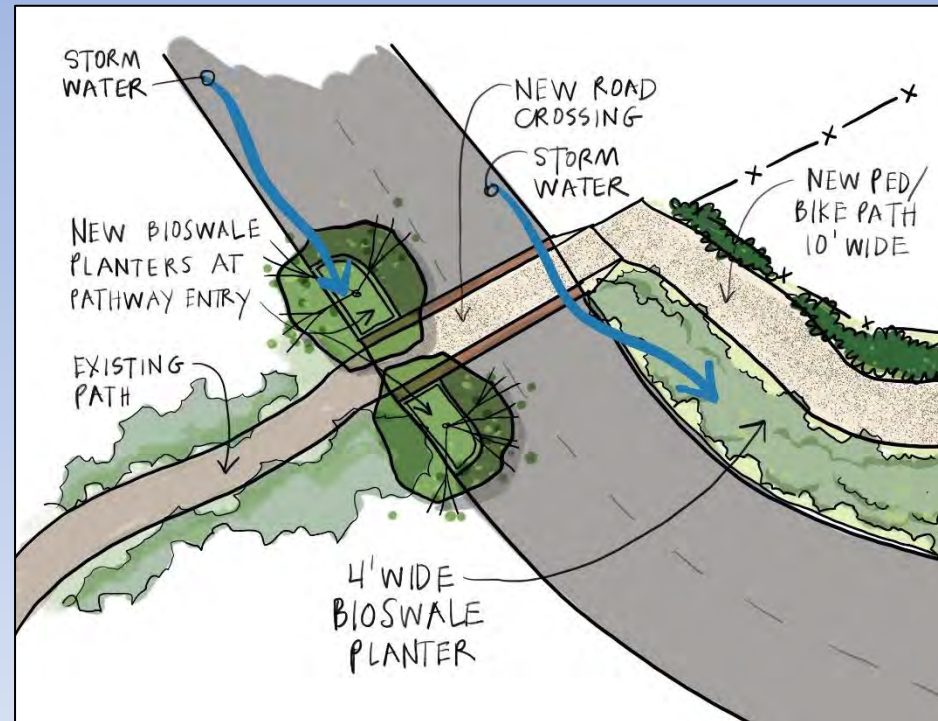
HIGHLIGHTED PROJECT FEATURES

- Protected Pedestrian/Bicycle Facilities** – Provides safe school passage with bulb outs and bioretention planter separators
- Existing City Trails Connection** – Ties into the existing trail system to encourage alternate transportation modes



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Rolling Hills Middle School



PROJECT BENEFITS

TYPE: BIOSWALE

Delivery Phase: Planning

Asset details

Asset drainage area: 25.2 acres

Impervious area treated: 9.8 acres

Assumed design capacity: 4.42 acre-ft

Trash full capture system (FCS): No

Site conditions

Land use type: Commercial/
Institutional

Parcel APN : 015-041-01

Imperviousness: 39%

Slope: 7%

Hydrologic soil type: Group C

TMDL benefits

Catchment ID: Wat 33

Receiving water: West Branch Struve Slough

Receiving water impaired: No

Runoff reduction: 17.75 acre-ft/yr

Pollutant load reduction: 1.66 ton/yr

Trash priority land use treated: 0.00 acres

Multi-benefits

Catchment runoff reduction opportunity: Very high

Catchment pollutant reduction opportunity: Very high

Managed aquifer recharge opportunity: Moderate

Flood hazard: Very Low

Urban heat island opportunity: Moderate

Greening opportunity: Low

Disadvantaged community status: NA

CalEnviroScreen score: 61

Public exposure: High



BIORETENTION SWALE



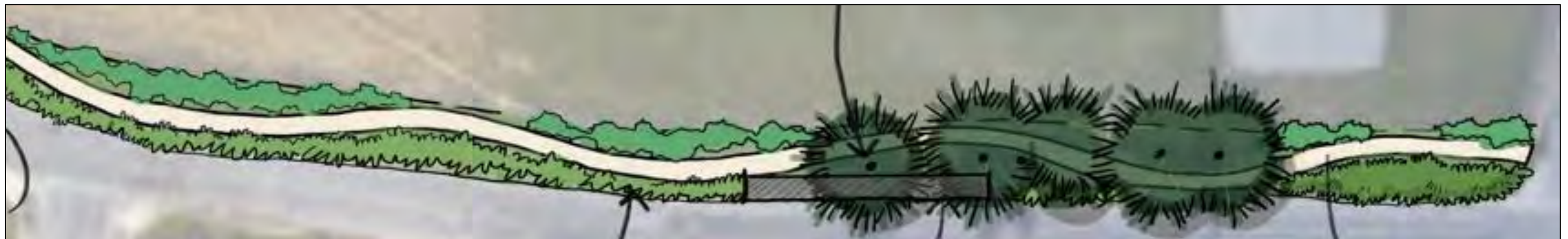
EXISTING TRAIL CONNECTION



PROTECTED BIKE LANE



Bioretention Swales	
Drainage Area	25.2 acres
Impervious Area	9.80 acres (39%)
Runoff Volume	17.75 ac ft
BMP Volume	4.42 ac ft

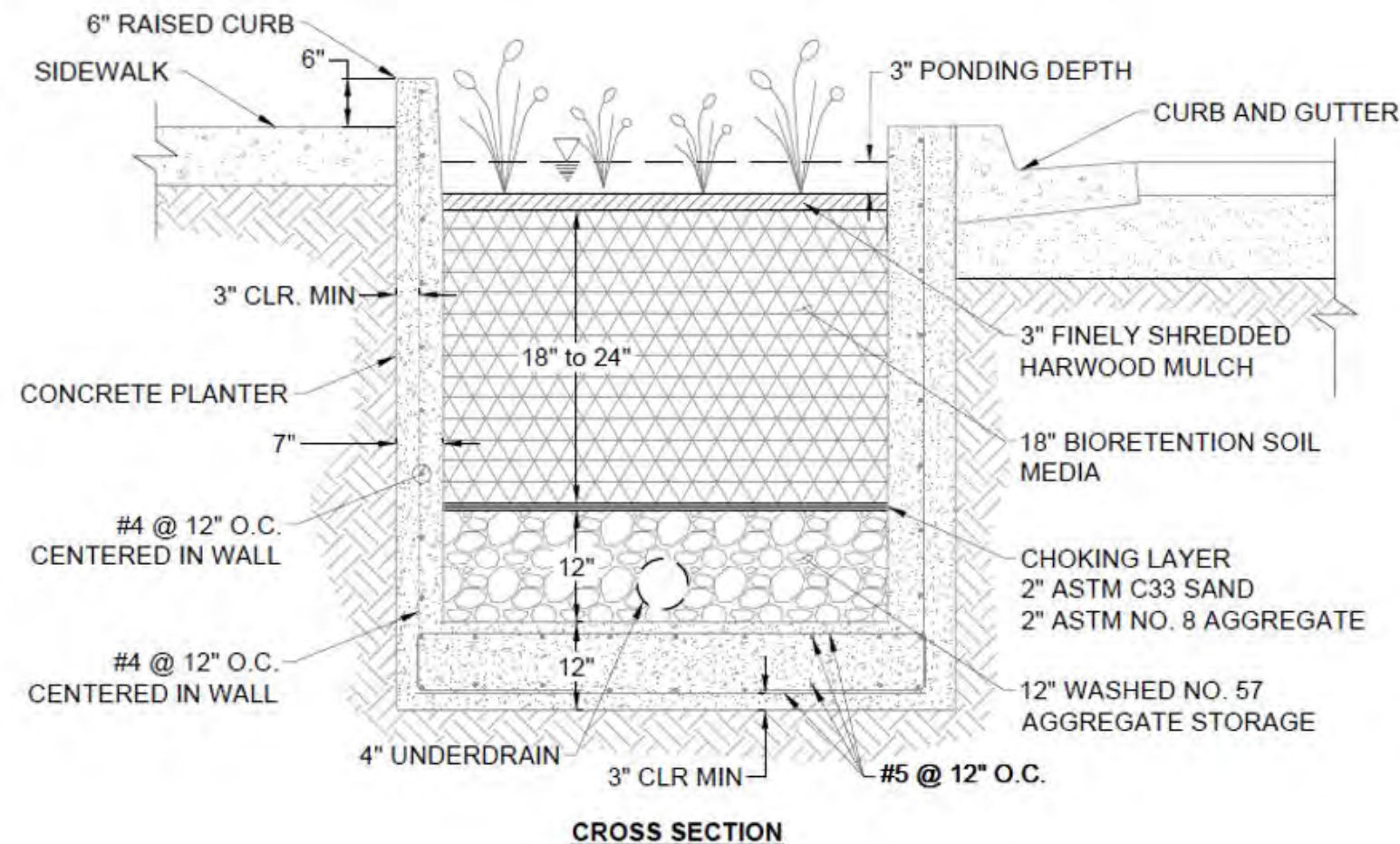


WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

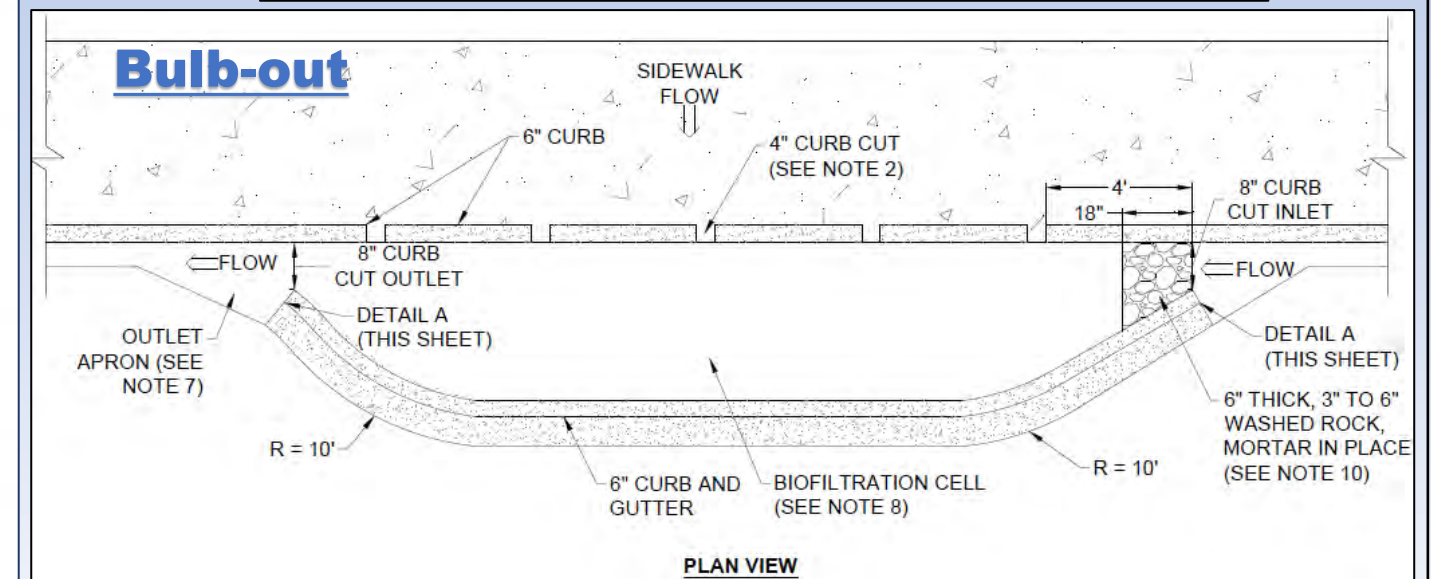
Project Concept Designs – Rolling Hills Middle School



Bioretention



Bulb-out



Planning Level Cost Estimates

Planning Level Cost Estimates				
Capital Cost Estimate				
Herman Ave Bioswale	School Entry Bioretention	Combined Sidewalk/Bicycle Path	Crosswalk and Bulb-out	Total
\$170,200	\$131,000	\$52,100	\$13,000	\$366,300
Operations & Maintenance Cost Estimate (Annual)				
Herman Ave Bioswale	School Entry Bioretention	Combined Sidewalk/Bicycle Path	Crosswalk and Bulb-out	Total
\$6,750	\$7,300	\$4,200	\$500	\$18,750

Site constraints/Environmental Concerns:

- Storm water discharge near local natural waterways
- School district coordination

Permitting Considerations:

- NPDES state requirements
- Stormwater Post-construction Standards-Permit
- Stormwater Control Plan/O&M Plan/Maintenance agreement

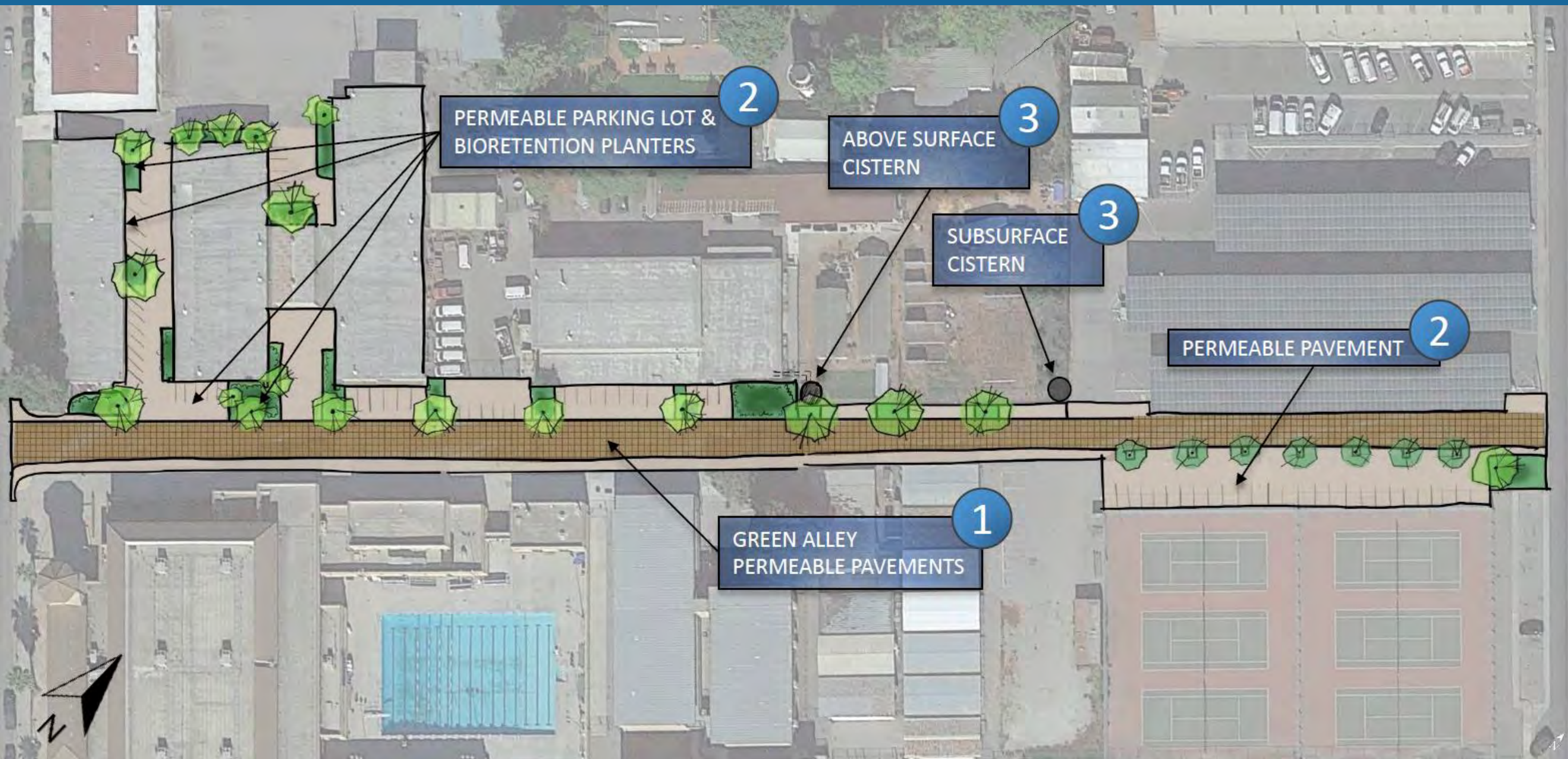
Potential Funding Sources:

- Water Recycling Funding Program
- CWA Section 319 Nonpoint Source Pollution Grant
- Prop 1 – Rd2 Integrated Regional Water Management Grant Program



WATSONVILLE HIGH SCHOOL

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN



1

GREEN ALLEYWAYS

2

- PERMEABLE PAVEMENT
- STORMWATER PLANTERS
- DISCONNECTED DOWNSPOUTS



3

RAINWATER CAPTURE & REUSE

- ABOVE & BELOW GROUND CISTERNS
- INTEGRATE TO FFA PROGRAMMING (AG SCIENCE)

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

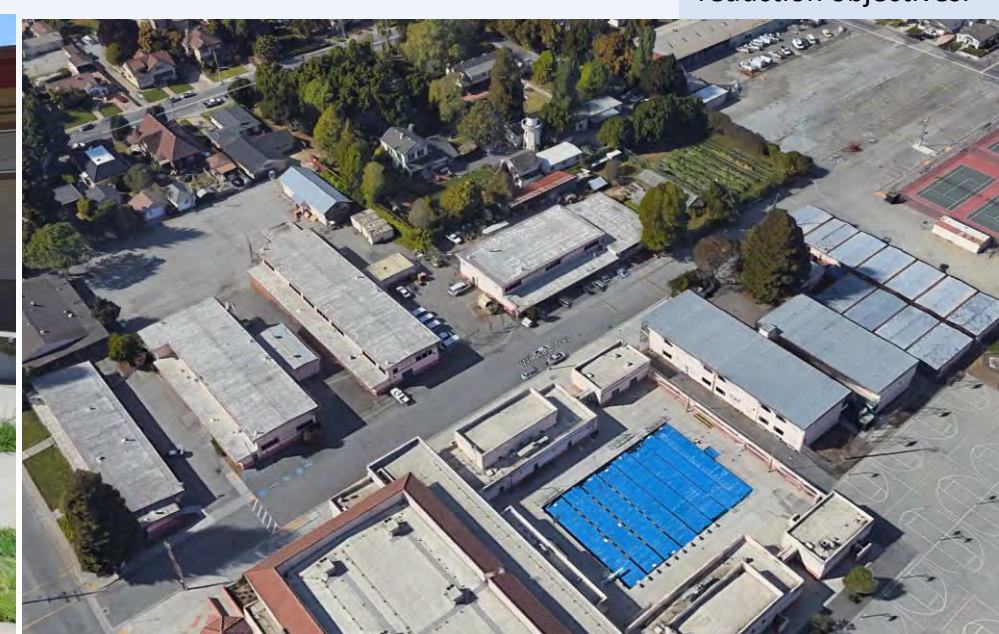
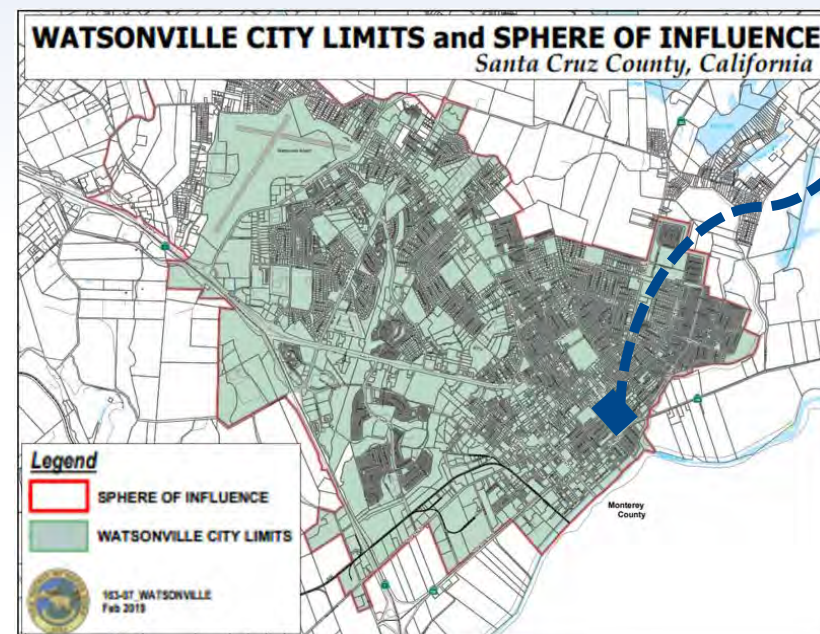
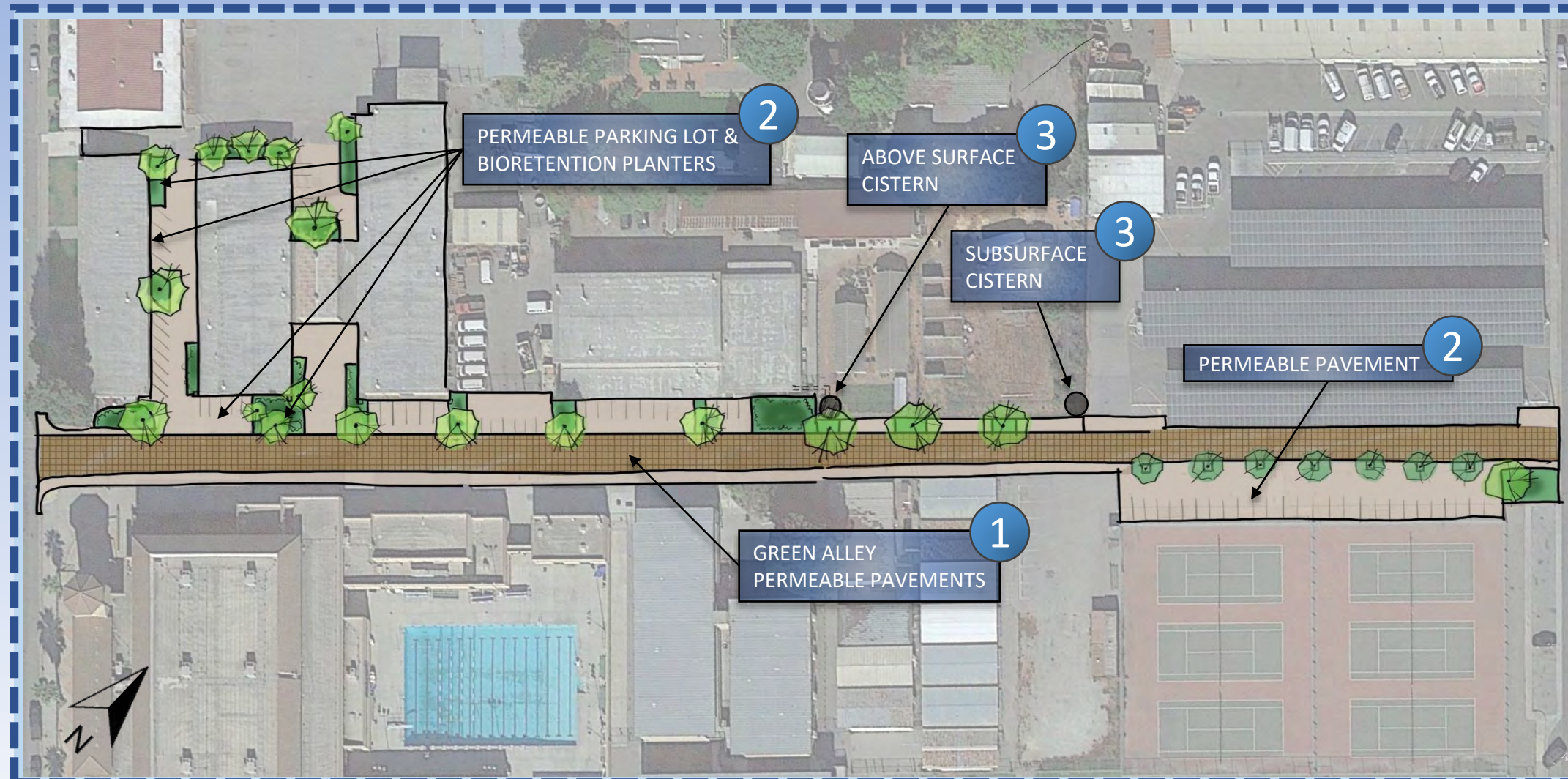
Project Concept Designs – Watsonville High School



PROJECT DESCRIPTION

LOCATION: Watsonville High School, 250 E Beach St, Watsonville CA.

DESCRIPTION: Watsonville High School is a site that is owned and operated by the Pájaro Valley Unified School District and has been identified as a potential green infrastructure retrofit location and urban heat island mitigation effort for the City of Watsonville. Runoff within this corridor drains to the Pájaro River, which leads to the Monterey Bay, and the Struve Slough, which leads to nearby wetlands, both ultimately leading to the Pacific Ocean. The project seeks to improve the water quality of stormwater runoff flows conveyed within Pájaro River and Struve Slough through capture, storage, infiltration, and filtration before returning flows back to the channel. The project includes a “green alley” composed of a permeable pavement passageway lined by swales, section of permeable pavement parking strips, additional planters between classrooms, and a surface bioswale basin. This project offers runoff storage and water quality benefits for the City of Watsonville that can address the additional needs for stormwater management identified to achieve compliance with the water quality and heat island reduction objectives.



PARCEL DRAINAGE AREA CHARACTERISTICS	
TOTAL DRAINAGE AREA	7.33 acres
ASSUMED INFILTRATION RATE	0.15 in/hr
APPROX. DEPTH TO GROUNDWATER	35 ft BGS
MODELED AVERAGE ANNUAL RUNOFF VOLUME	14.05 acre-ft

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Watsonville High School



PERMEABLE PAVEMENT



BIORETENTION PLANTER



REUSE CISTERN



GREEN ALLEY

Green Alley

Drainage Area	3.4 acres
Impervious Area	3.37 acres (99%)
Runoff Volume	7,900 cubic ft
BMP Volume	9,300 cubic ft



Permeable Parking Lot & Bioretention	
Drainage Area	2.19 acres
Impervious Area	2.11 acres (96.3%)
Runoff volume	4,500 cubic ft
BMP Volume	14,721 cubic ft



Subsurface Cistern	
Drainage Area	1.22 acres
Impervious Area	1.22 acres (100%)
Runoff Volume	22,000 gal
BMP Volume	25,000 gal

Above Surface Cistern	
Drainage Area	0.26 acres
Impervious Area	0.26 acres (100%)
Runoff volume	4,500 gal
BMP Volume	5,000 gal

PROJECT BENEFITS

TYPE: PERVIOUS PAVEMENT

Delivery Phase: Planning

Asset details

Asset drainage area: 26.59 acres

Impervious area treated: 12.73 acres

Assumed design capacity: 0.76 acre-ft

Trash full capture system (FCS): No

Site conditions

Land use type: Commercial/Institutional

Parcel APN : 017-211-07

Imperviousness: 53%

Slope: 4%

Hydrologic soil type: Group C

TMDL benefits

Catchment ID: Wat 45

Receiving water: Pajaro River

Receiving water impaired: Yes

Runoff reduction: 20.56 acre-ft/yr

Pollutant load reduction: 1.90 ton/yr

Trash priority land use

treated: 0.00 acres

Multi-benefits

Catchment runoff reduction

opportunity: Very low

Catchment pollutant reduction

opportunity: Very low

Managed aquifer recharge

opportunity: Moderate

Flood hazard: 0.2% annual flood chance

Urban heat island opportunity: Very high

Greening opportunity: Moderate

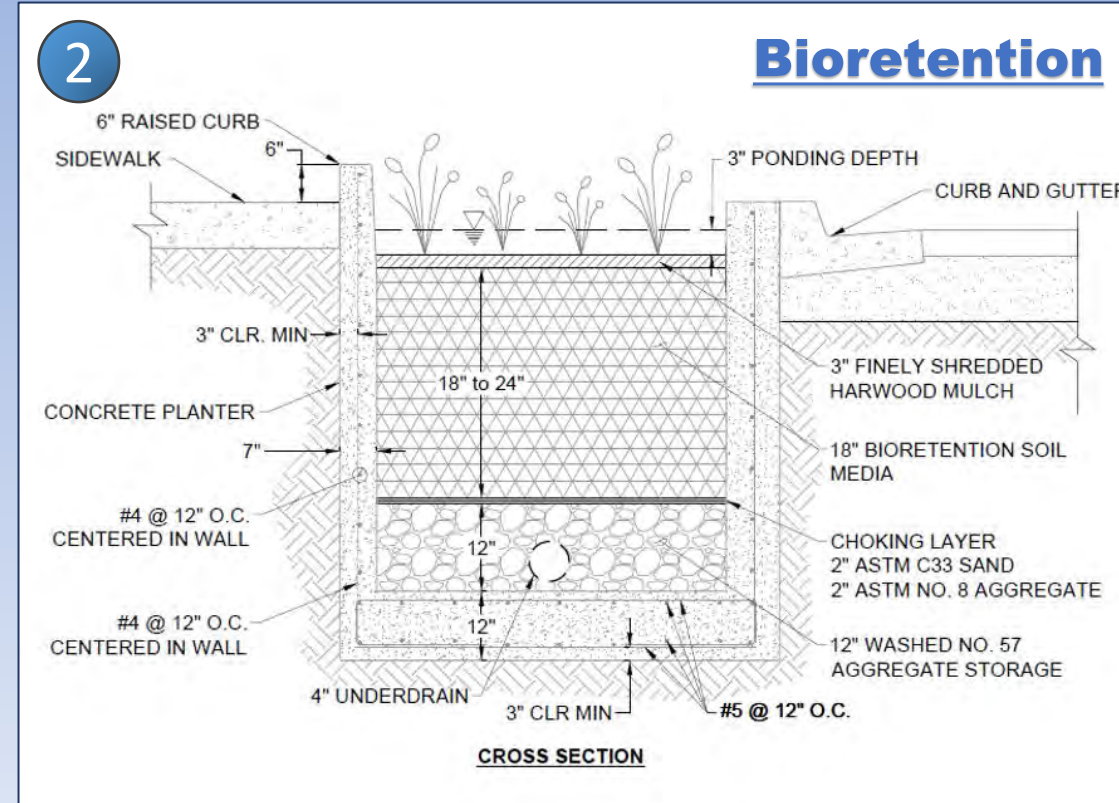
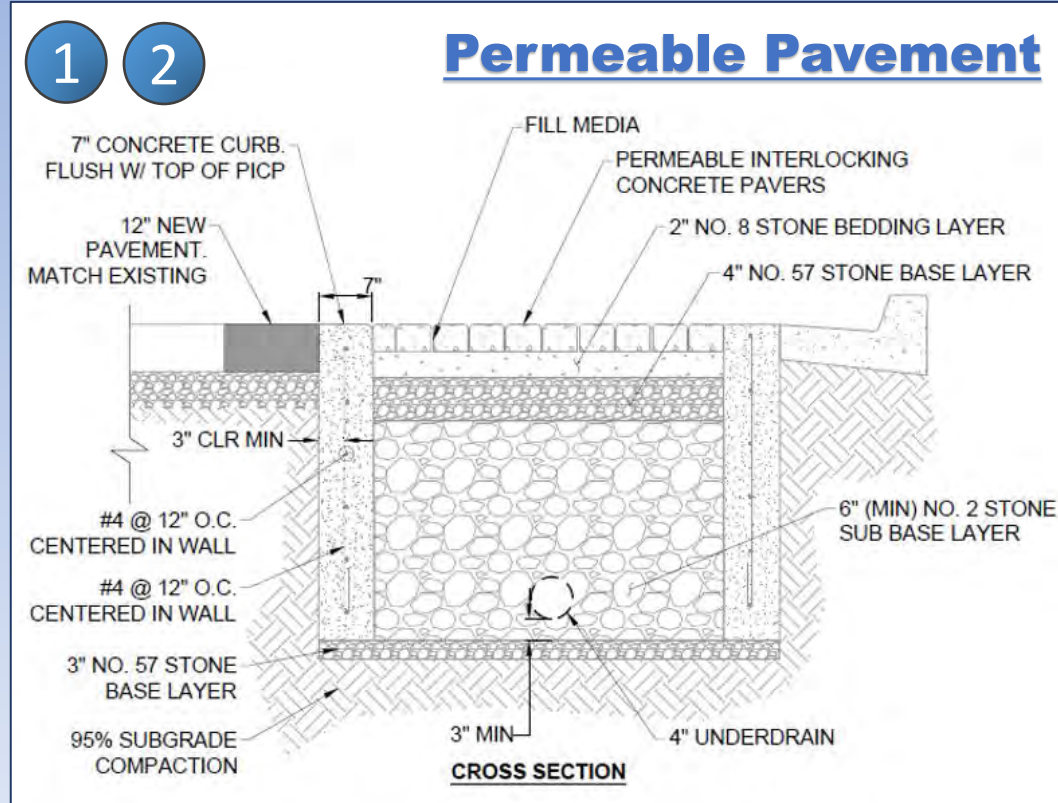
Disadvantaged community status: NA

CalEnviroScreen score: 61

Public exposure: High

WATSONVILLE GREEN INFRASTRUCTURE IMPLEMENTATION PLAN

Project Concept Designs – Watsonville High School



Site constraints/Environmental

Concerns:

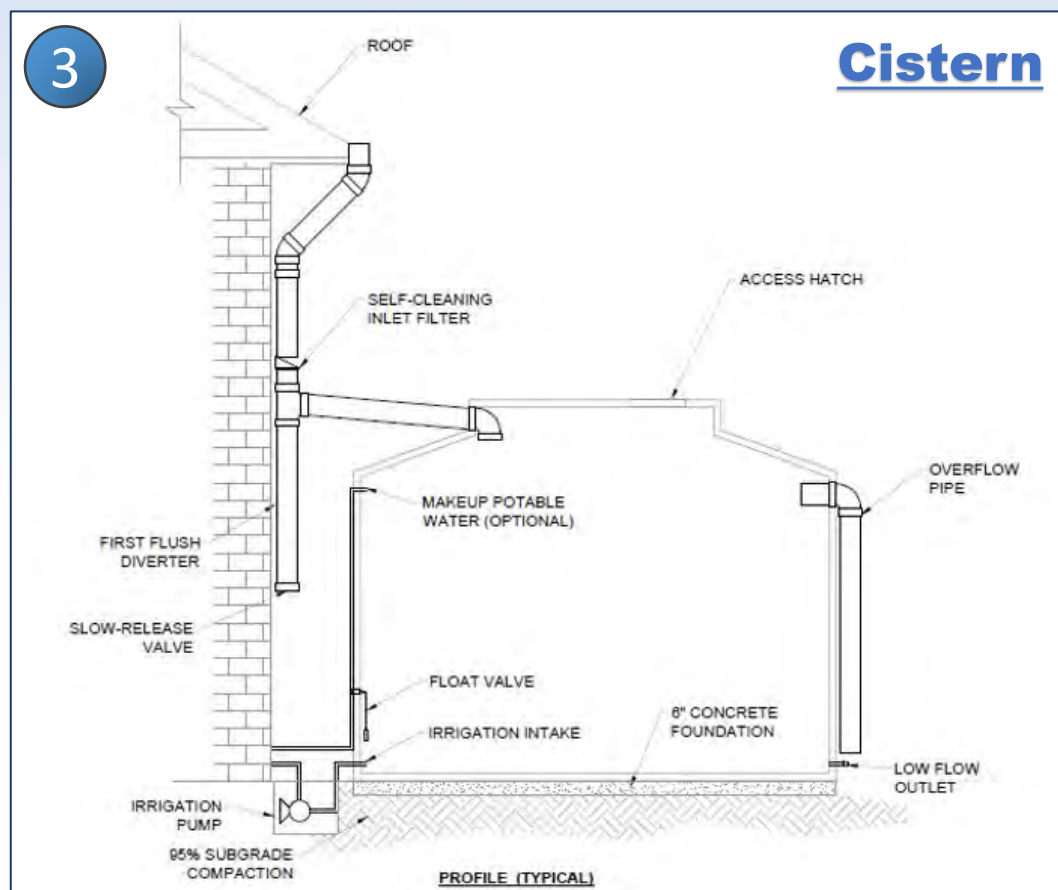
- Storm water discharge near local natural waterways
- School district coordination

Permitting Considerations:

- NPDES state requirements
- Stormwater Post-construction Standards-Permit
- Stormwater Control Plan/O&M Plan/Maintenance agreement

Potential Funding Sources:

- Water Recycling Funding Program
- CWA Section 319 Nonpoint Source Pollution Grant
- Prop 1 – Rd2 Integrated Regional Water Management Grant Program



Planning Level Cost Estimates

1 Green Alley

2 Permeable Parking Lot & Bioretention

3 Cistern for Agricultural Center

Capital Cost Estimate

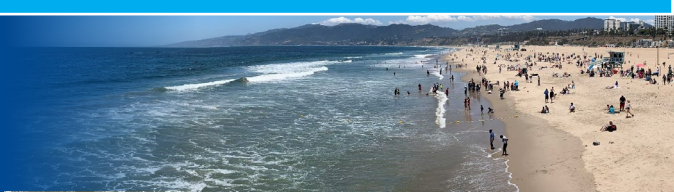
Above Ground Cistern (5,000 gallons)	Subsurface Cistern (25,000 gallons)	Alley Permeable Pavement	Parking Permeable Pavement	Parking Bioretention Planters	Total
\$15,000	\$115,000	\$1,100,000	\$350,000	\$300,000	\$1,880,000

Operations & Maintenance Cost Estimate (Annual)

Above Ground Cistern (5,000 gallons)	Subsurface Cistern (25,000 gallons)	Alley Permeable Pavement	Parking Permeable Pavement	Parking Bioretention Planters	Total
\$2,000	\$20,000	\$20,000	\$8,000	\$8,500	\$58,500

A photograph of a garden bed featuring tall, thin green grasses. A small stream of water flows over dark, smooth rocks in the center. A few fallen leaves, including a prominent red one, are scattered among the grass. At the bottom, a solid blue banner contains the word "ANNEX" in white, bold, sans-serif capital letters.

ANNEX



CITY STAKEHOLDER – POSSIBLE GI CANDIDATE SITES LIST

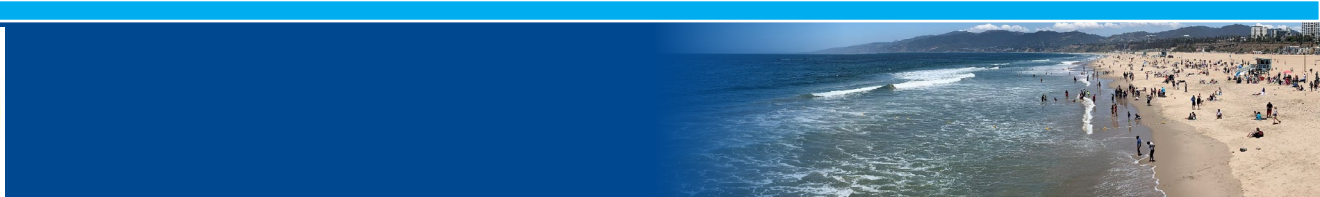
The Craftwater team met with City stakeholders to review the draft GI plan and locations identified. The stakeholders identified additional possible project considerations and this list memorializes the locations for inclusion within this GIIP.

Possible GI Projects

- Alley concepts along Kearny and Lake (especially at Gardner Street)
- Watsonville City Hall (250 Main Street)
- Main Street Lane Diet (Reduction down to 2 lanes, addition of bike lanes, and stormwater capture elements. Acknowledging the challenges associated with Caltrans coordination)
- All future road projects (e.g. Bridge Street)
- First Street (adjacent to Rvierside and Walker)
- Green roofs on any new development

APPENDIX D: EXISTING PLAN AND DATA REVIEW

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MEMO

TO: Jackie McCloud & Alex Yasbek, City of Watsonville

CC:

FROM: Brad Wardynski & Merrill Taylor, Craftwater Engineering

SUBJECT: Existing Plan & Data Review Technical Memorandum

This memo summarizes the current plans and grant agreements relevant to climate resiliency and the datasets needed and reviewed to identify new Green Infrastructure projects.

1.0 OBJECTIVE

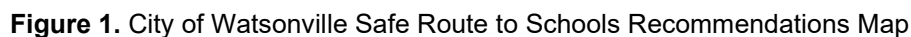
The objective of this study is to assess current baseline data available in the City of Watsonville which includes an inventory of the current plans, grant agreements, and relevant spatial data to identify new Green Infrastructure projects. These plans may include projects, programs and/or initiatives that relate to community improvements, wetland restoration/enhancement, street repairs, bicycle lane additions or utility undergrounding. Relevant spatial data would include coverages such as the most recent storm drain and other utilities, geophysical layers (e.g., soils, groundwater, seismic hazard zones), disadvantaged community information, known drainage/ flooding issues or complaints, high-resolution elevation data (LiDAR, if available), and existing GI projects and plans. These data will provide critical insight into developing a green infrastructure implementation plan that improves water quality, maintains cost-efficiency, and provide community enhancement.

2.0 EXISTING PLANS

This existing plan and data review process identified and summarized the Complete Streets to Schools Plans, the Complete Streets Plan, the Local Hazard Mitigation Plan, the Capital Improvement Plan (CIP), the Climate Action Plan, the Trail/Bikeway Path Master Plan, Urban Greening Plan, and the upcoming Urban Forestry Management Plan.

2.1 City of Watsonville - Complete Streets to Schools Plan (2020)

This plan serves to improve safety for all 15 public schools in Pajaro Valley Unified School District (PVUSD) in the City of Watsonville through infrastructure improvements that encourage more active transportation to school including walking and biking. These city-wide and school-specific infrastructure improvements are primarily for roadway design to reduce traffic speeds and to protect bicyclists and pedestrians. In addition to structural improvements, the plan actively relied on stakeholder engagement and outreach to promote education and encouragement programs for complete streets in the future. This plan references the Trails and Bicycle Master Plan (2012) of which several segments can contribute to safe pathways to school. In **Figure 1**, the areas of proposed bike paths, lanes and ways, and safe routes to schools are shown throughout the city of Watsonville along with the existing paths and bike lanes.



Like the Complete Streets to Schools Plan, there was strong community support and voice for a more pedestrian and bicycle friendly downtown that revitalizes the Downtown Landscape. The plan divides the downtown prioritization into primary corridors, cross streets, general circulation improvements and streetscape amenities. The goal is to provide ease of access to the larger Watsonville community through increasing connectivity of the downtown region and supporting local businesses by making the region more attractive to locals and visitors. In **Figure 2**, the segments of improvements, including but not limited to bike paths, parking additions and crosswalks, are shown throughout the downtown area.

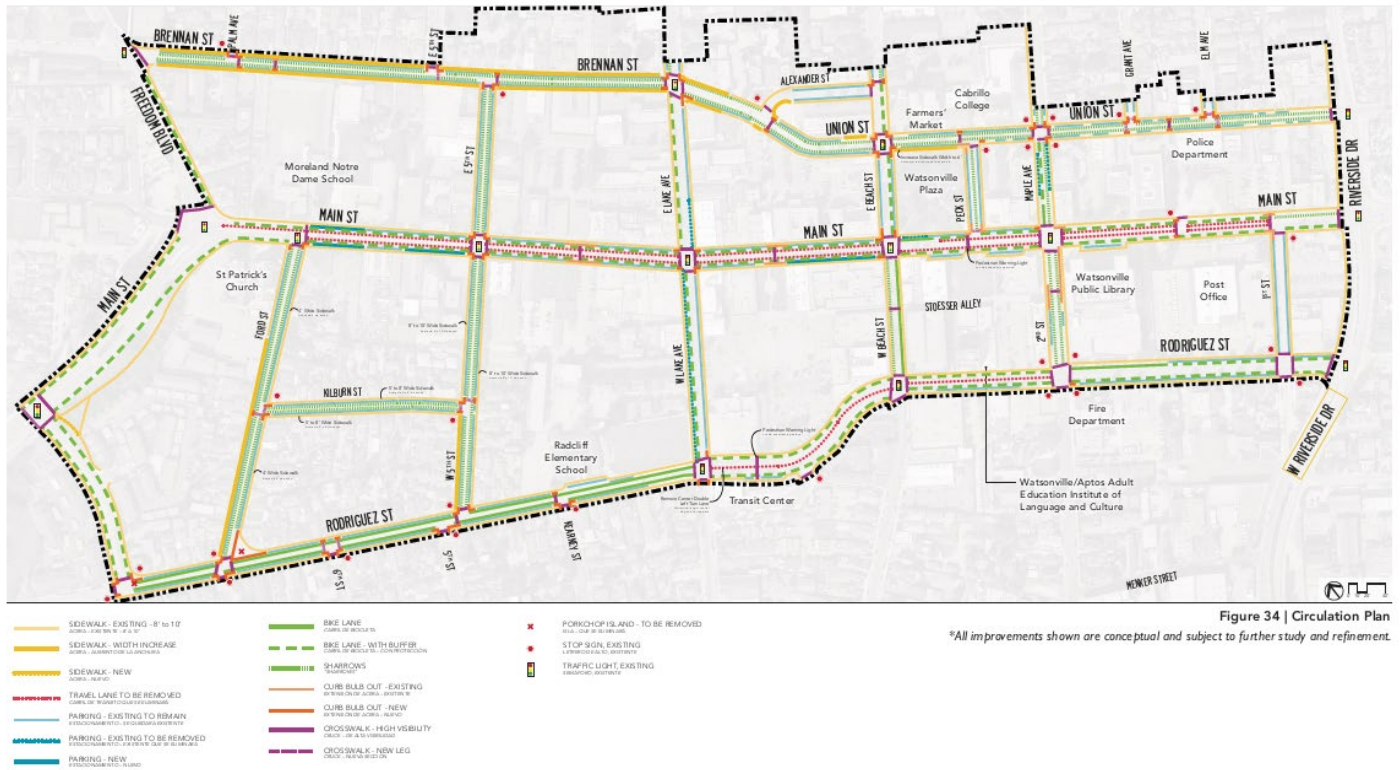


Figure 2. City of Watsonville Downtown Complete Streets Circulation Plan

2.3 City of Watsonville Local Hazard Mitigation Plan (2020)

This document covers identification of hazards of concern, public outreach strategy development, critical facility identification, risk and vulnerability assessment conduction and review, mitigation action plan development, Community Rating System credit integration, and a monitoring, maintenance, and evaluation plan development. Hazards considered by the City of Watsonville include climate change, drought, earthquake, extreme heat, flood, groundwater overdraft, high winds, landslide, levee failure, liquefaction, public safety power shutoff, sea level rise and wildfire. The plan goes over areas that are susceptible to hazards and mitigate any potential disruption of services or harm to infrastructure. **Figures 3 to 8** are relevant natural hazards that will negatively affect the city of Watsonville.

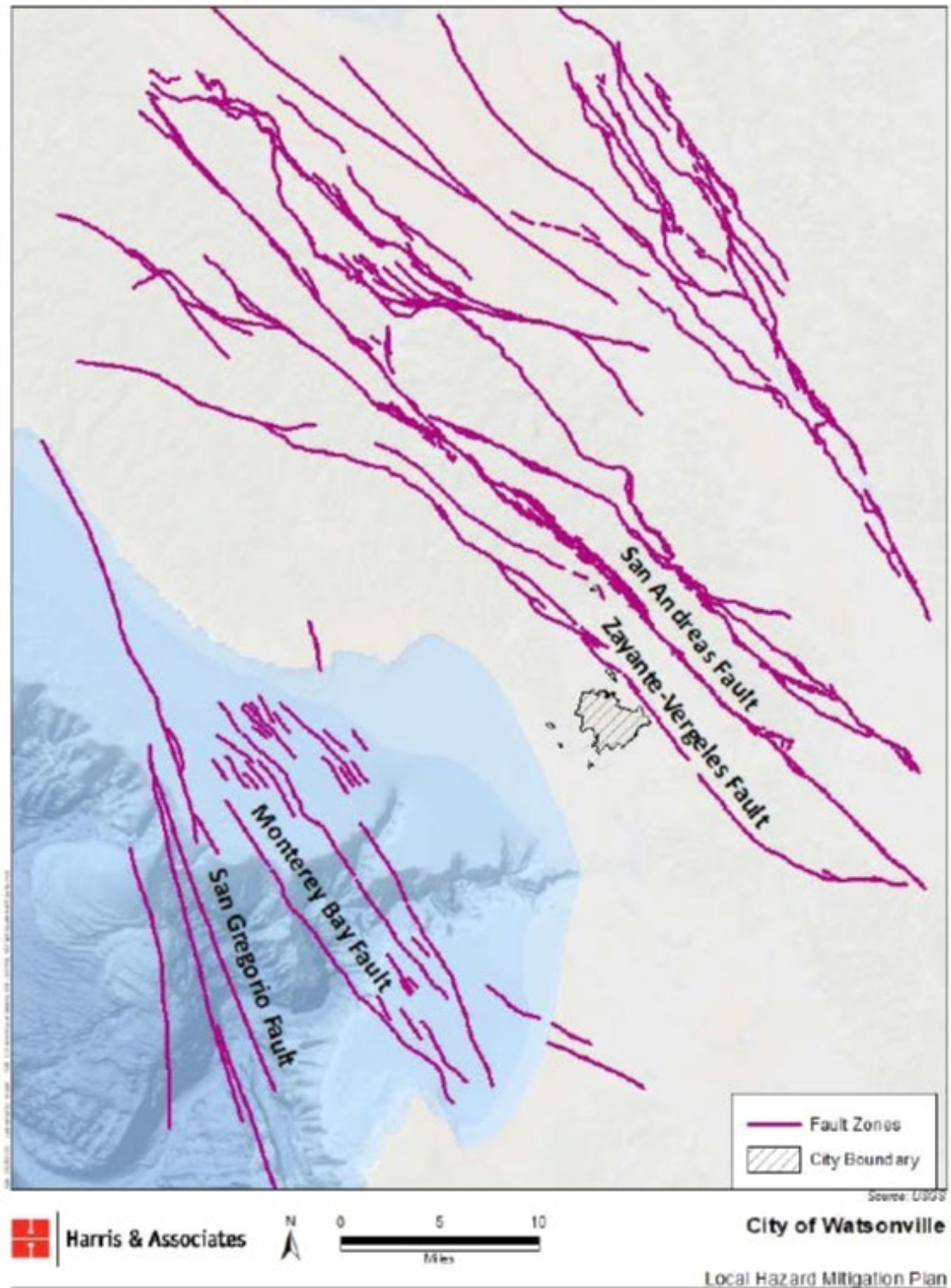


Figure 3. Major Faults Near City of Watsonville

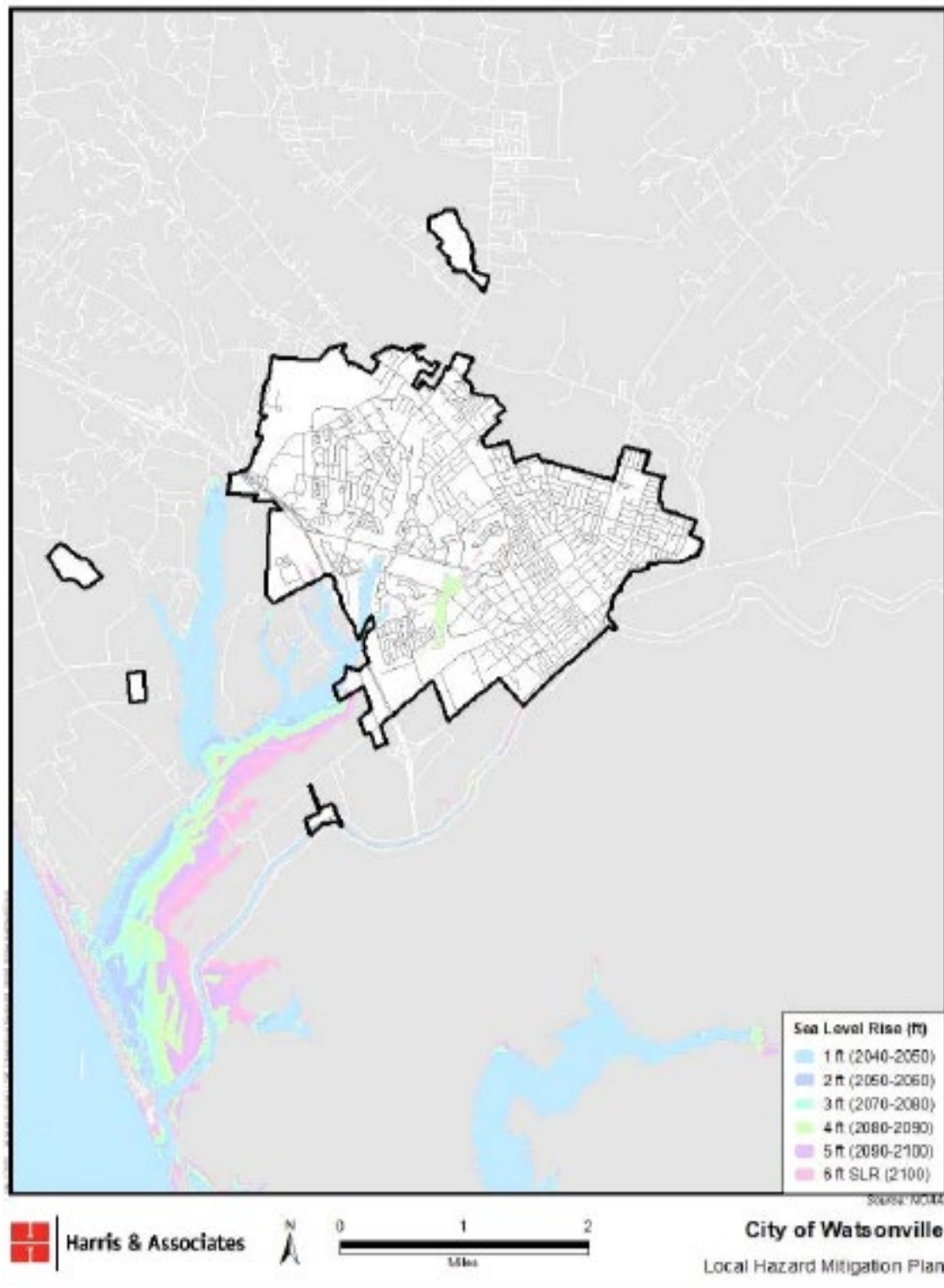


Figure 4. Sea-Level Rise Inundation Areas 1-6 Feet

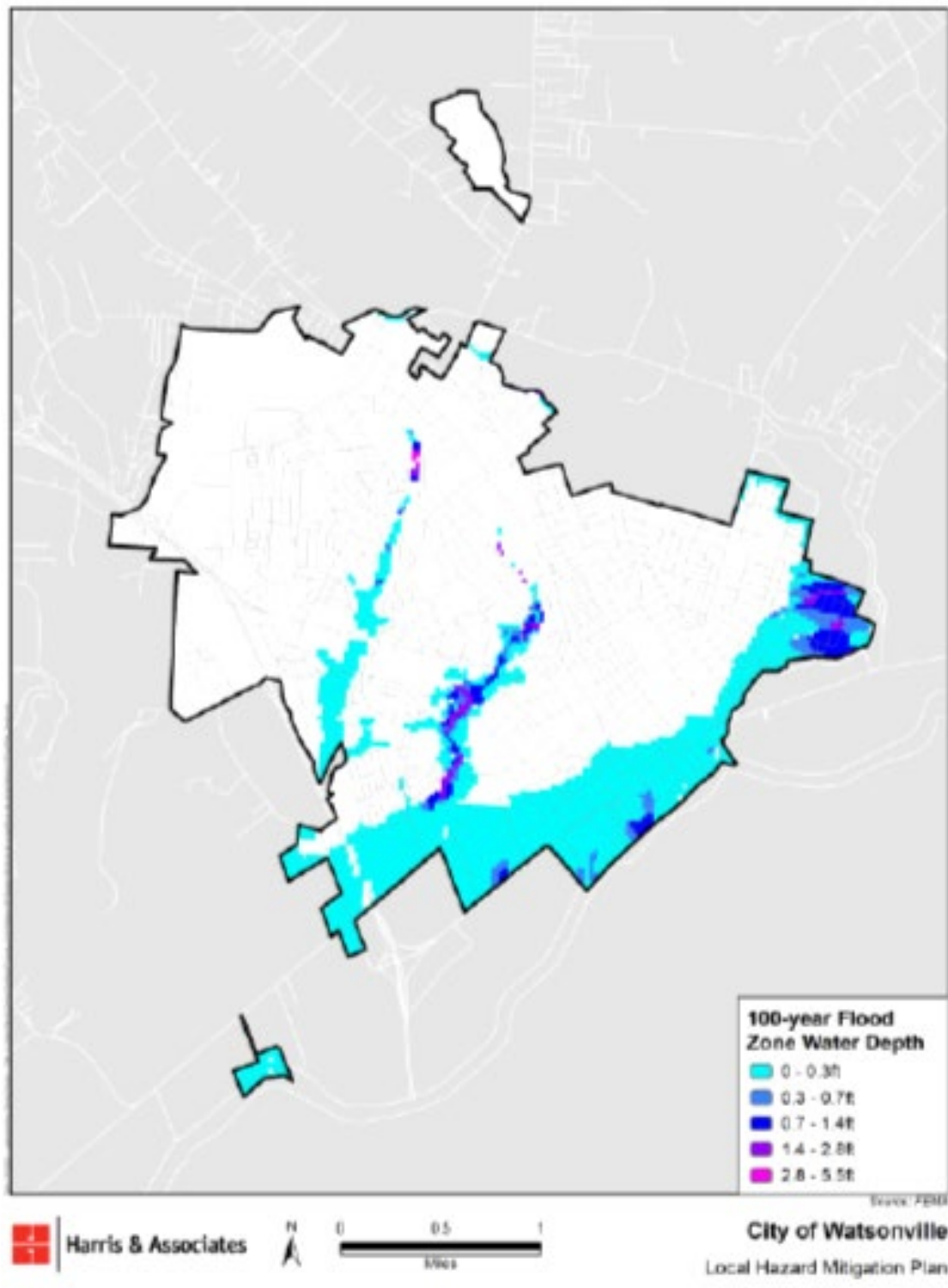


Figure 5. 100-year Flood Zone Water Depth

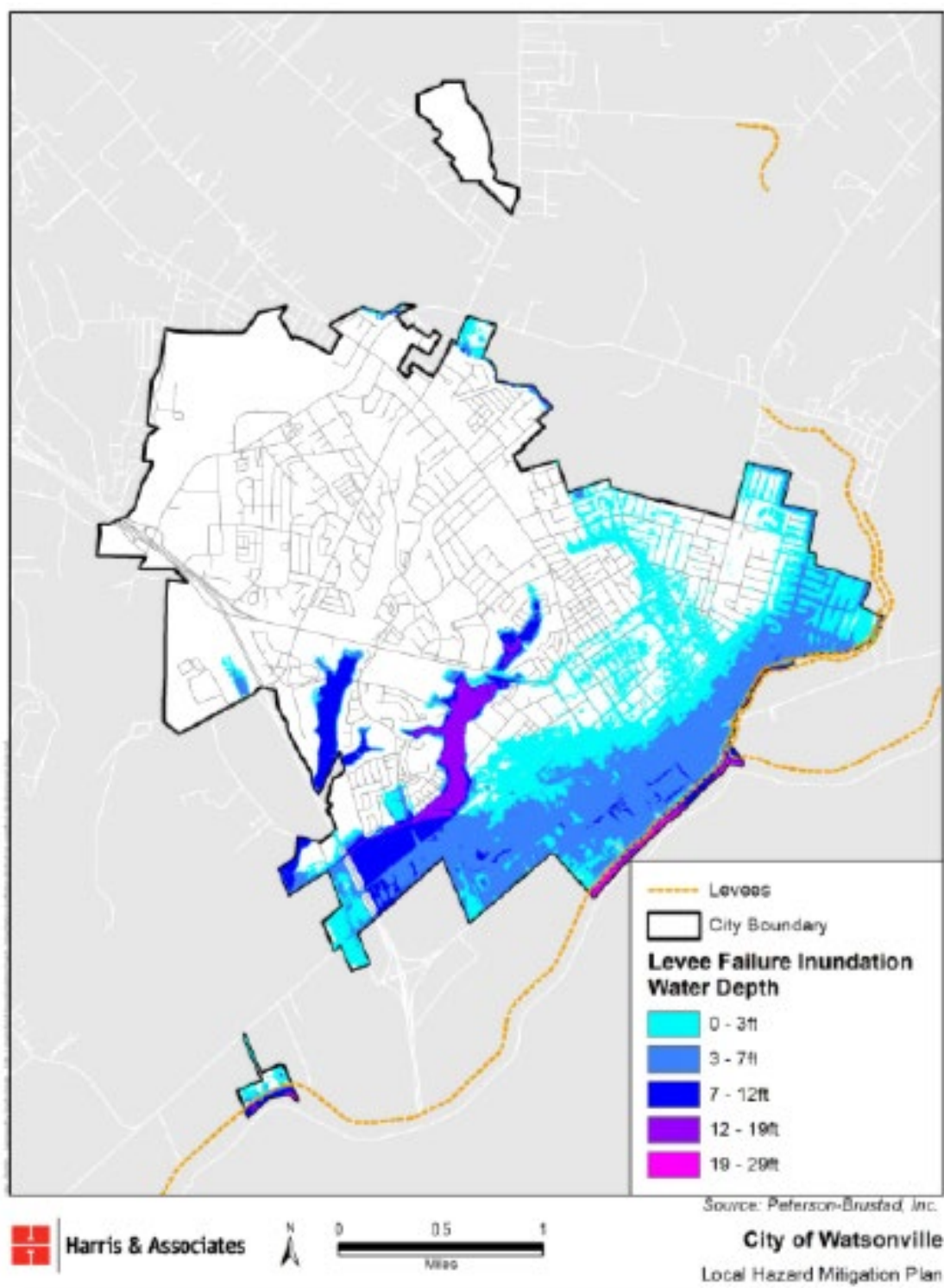


Figure 6. Levee Failure Inundation Water Depth

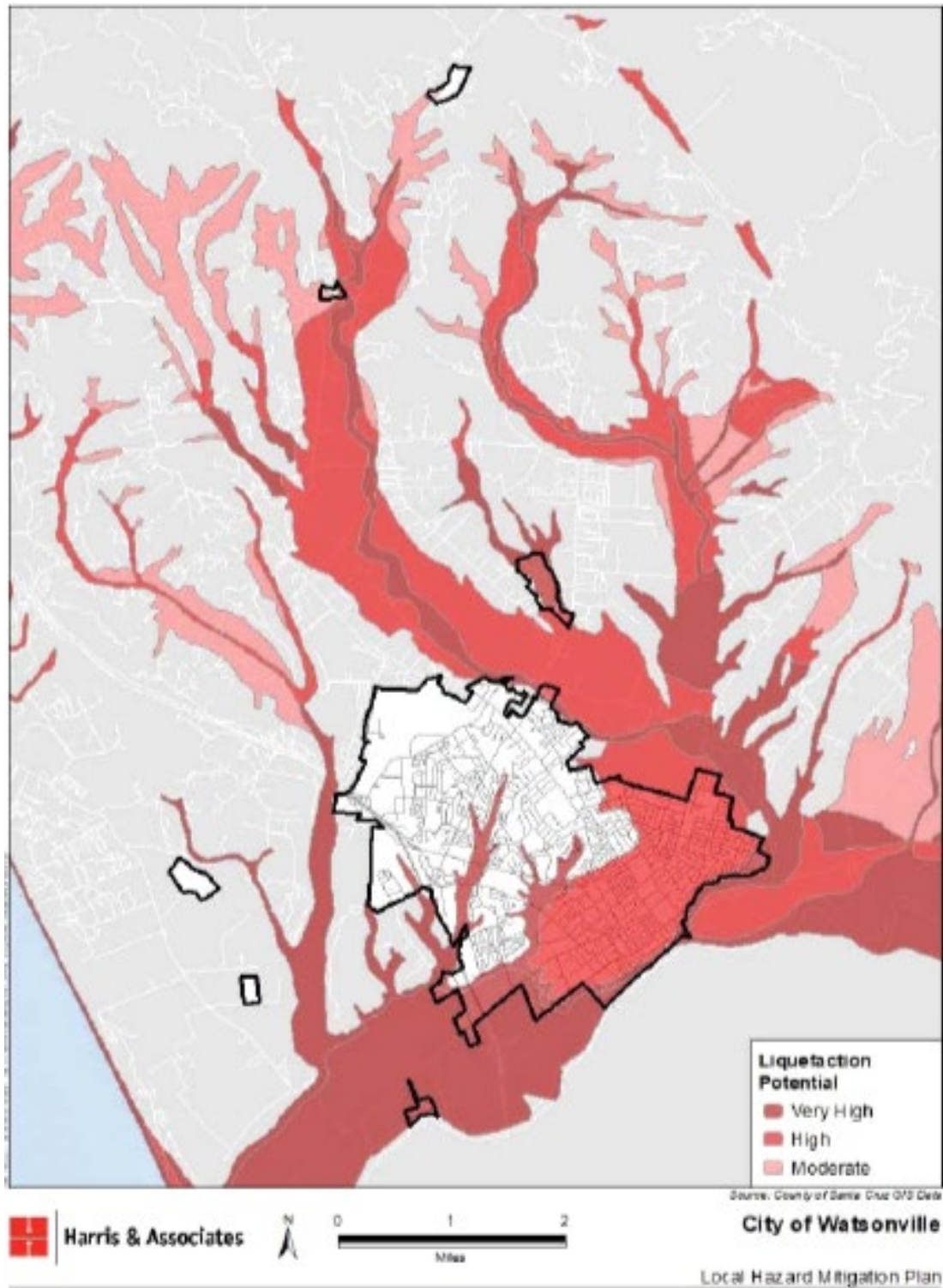


Figure 7.City of Watsonville Liquefaction Hazard Areas

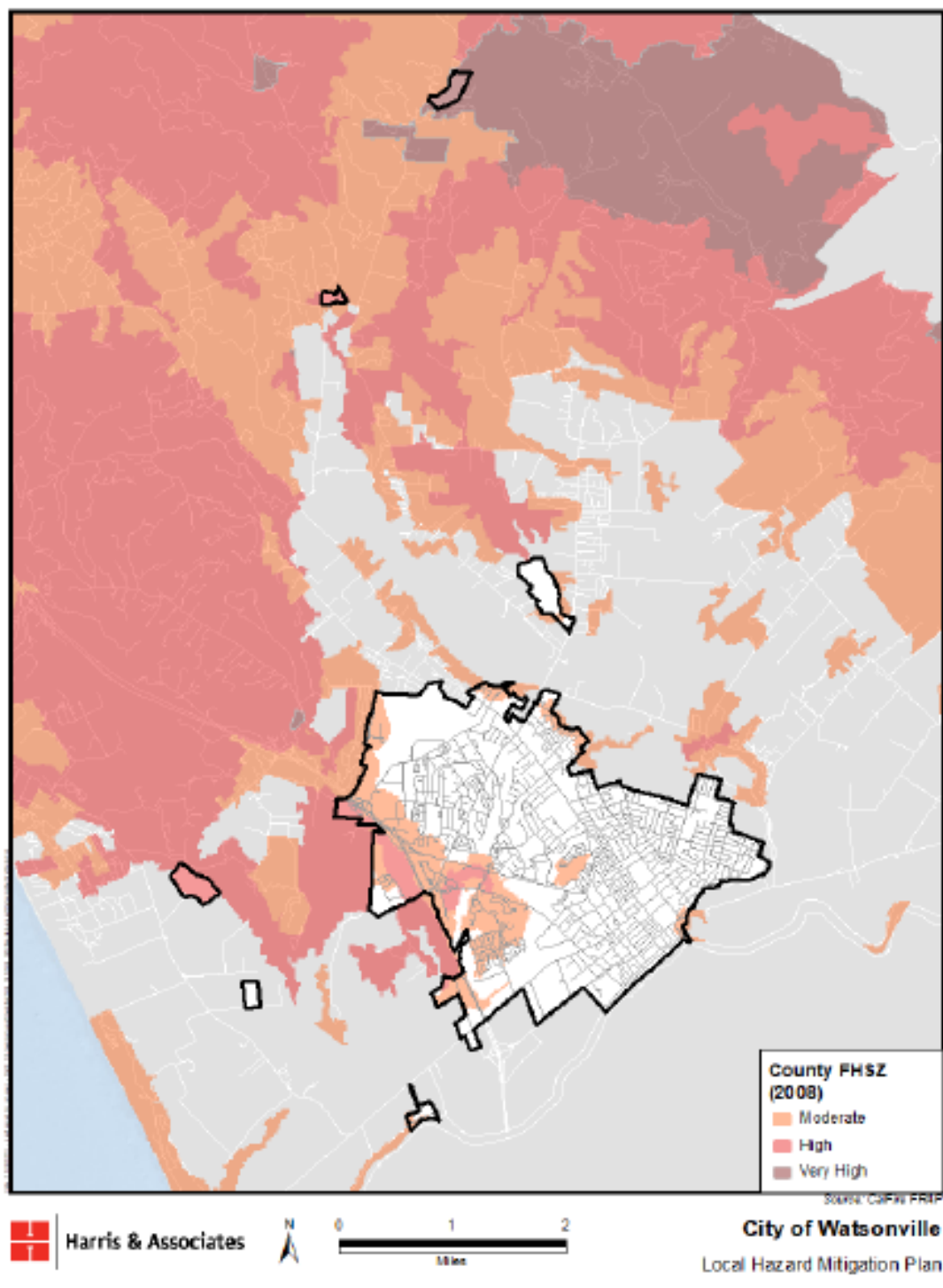


Figure 8. Fire Hazard Severity Areas, County of Santa Cruz

2.4 City of Watsonville Capital Improvements Program FY 20-25 (2020)

This document details the itemized projects proposed for each department within the city for the next five years, which totals approximately \$105 million dollars. It includes projects from the airport, community development, fire, innovation and technology, library, parks and community services, police, public works, and risk management. Projects relevant to future green infrastructure implementation projects span improvements to Ramsay Park, City Plaza, Kearney Park, Franich Park, Muzzio Park, and Peace Drive Park. In addition, public works transportation projects are to be implemented that include trail and bike improvements noted in the 2012 plan, the complete streets to schools plan, and downtown revitalization projects. Below in **Figure 9**, there is a capital improvements program departmental summary for the Fiscal Year 2020-2025.

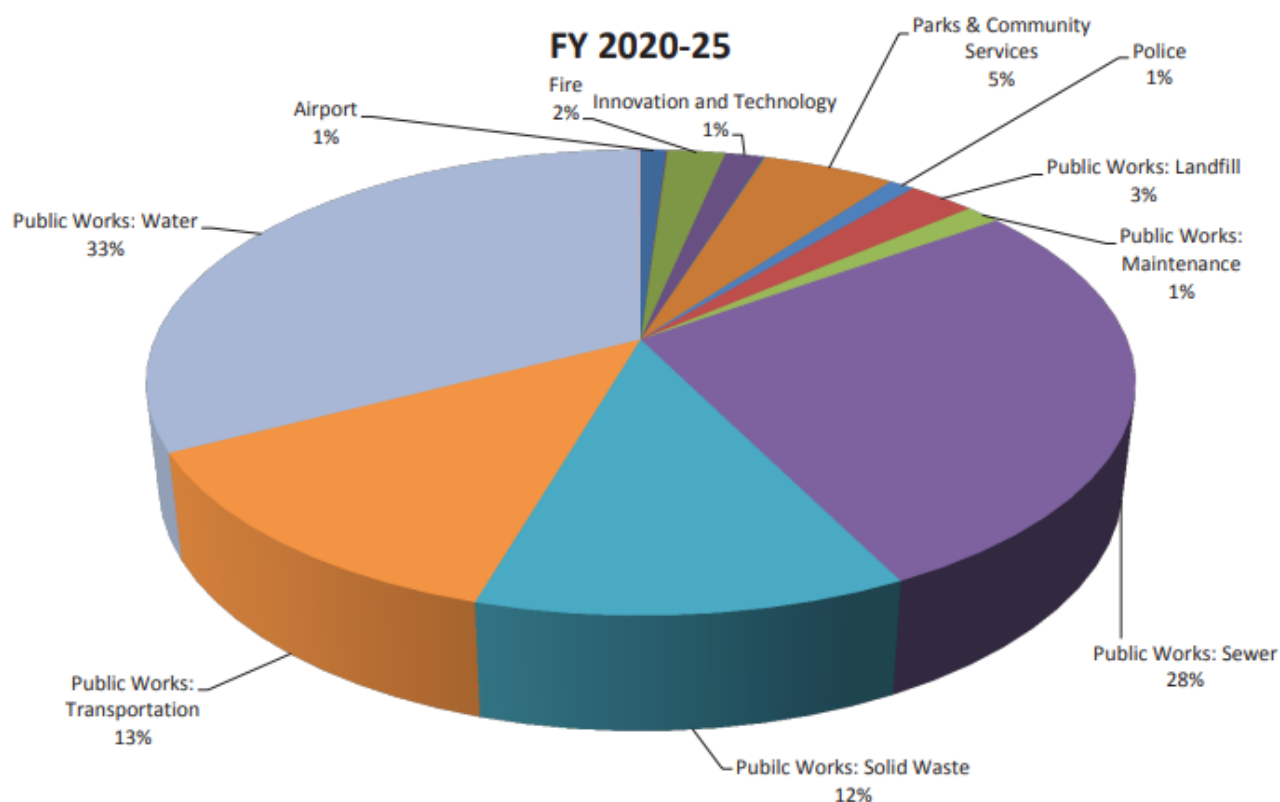


Figure 9. Department Summary for City of Watsonville Capital Improvement Program

2.5 City of Watsonville Climate Action Plan (2015)

The goal of this plan is to create a comprehensive plan that will establish the City of Watsonville as a livable, walkable, and sustainable community while preserving open space, agricultural areas, and critical environmental areas. In addition, the plan sees to encourage active transportation such as pedestrian and bicycle improvements, expanded transportation options, increased energy efficiency, minimized waste and improved recycling streams and reduced estimated greenhouse gas (GHG) savings. The GHG reductions are focused on the energy, transportation, water and wastewater, solid waste, green buildings and local food, and green business

sectors whose implementations are governed primarily by the Public Works. Below in **Figure 10** are expected emissions and targets for the City of Watsonville.

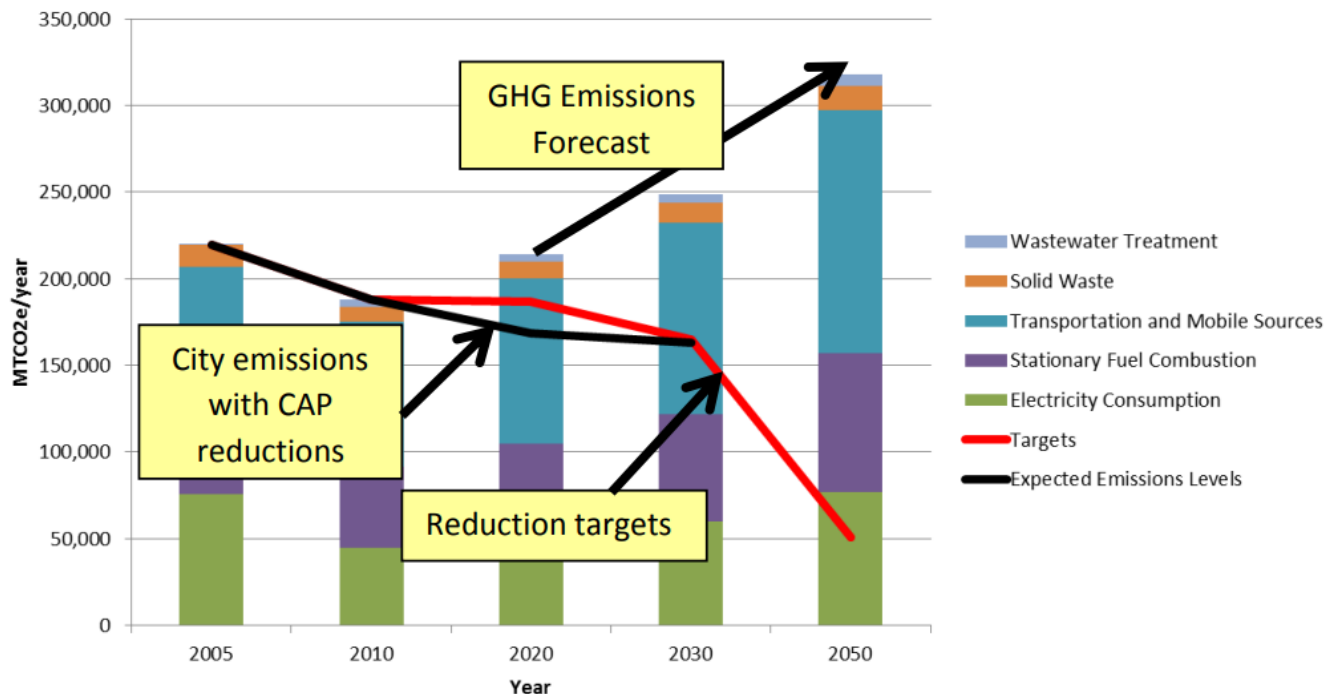


Figure 10. GHG Forecast, Reduction Targets, and Watsonville's Expected GHG Emission Levels

2.6 City of Watsonville Trails & Bicycle Master Plan (2012)

The purpose of this plan is to connect residents with the outdoors through providing an integrated system of pathways and bikeways throughout the City's schools, parks, transit facilities, commercial centers, and other public facilities. There is a push to create easier access to the surrounding natural areas including the network of sloughs and streams that are within the City limits. Overall, the goal is to improve the quality of life for residents through creating a larger non-automobile centered circulation network and revitalizing recreation needs. **Figure 11** and **Figure 12** highlights the existing and proposed trails and bikeways, respectively.



Figure 11. Greater Watsonville Trail Master Plan



Figure 12. Existing and proposed Bicycle Network and Transit Facilities

2.7 Urban Greening Plan (2012)

The goal of this plan is to supplement the VISTA 2030 General Plan in order to implement and incorporate sustainability goals from the planning documents. This is to be accomplished by increased biking opportunities, improving habitat, natural resources, and open space, refining air and water quality, conserving water and other natural resources, reducing stormwater runoff, expanding healthy food access, engaging local stakeholders in the greening process, and supporting inter-departmental and cross agency collaboration for cultivating solutions. The Urban Greening Plan includes the following components; citywide bicycle and pedestrian trails, habitat restoration and enhancement in trails, street trees plan (expanded on in the subsection below), landscape guidelines, green roof design and community gardens.

2.7.1 Street Tree Planting Plan (2012)

Watsonville has many treeless streets and as a result, this plan presents a framework to increase the ecological and economic value at a neighborhood and city-wide scale. The plan lists the benefits of a healthy urban forests, including but not limited to increased home value, reduced energy use, less energy use, reduced global warming, improved air quality, creation of urban habitat, psychological benefits, improved public health and more economic development. In the short term, the strategy would be to incentivize tree planting in setbacks for private properties This would then move into the long-term implementation plan with Schematic Design and Design Development with consideration of public input. **Figure 13** highlights the areas of interest for these urban forest corridors.

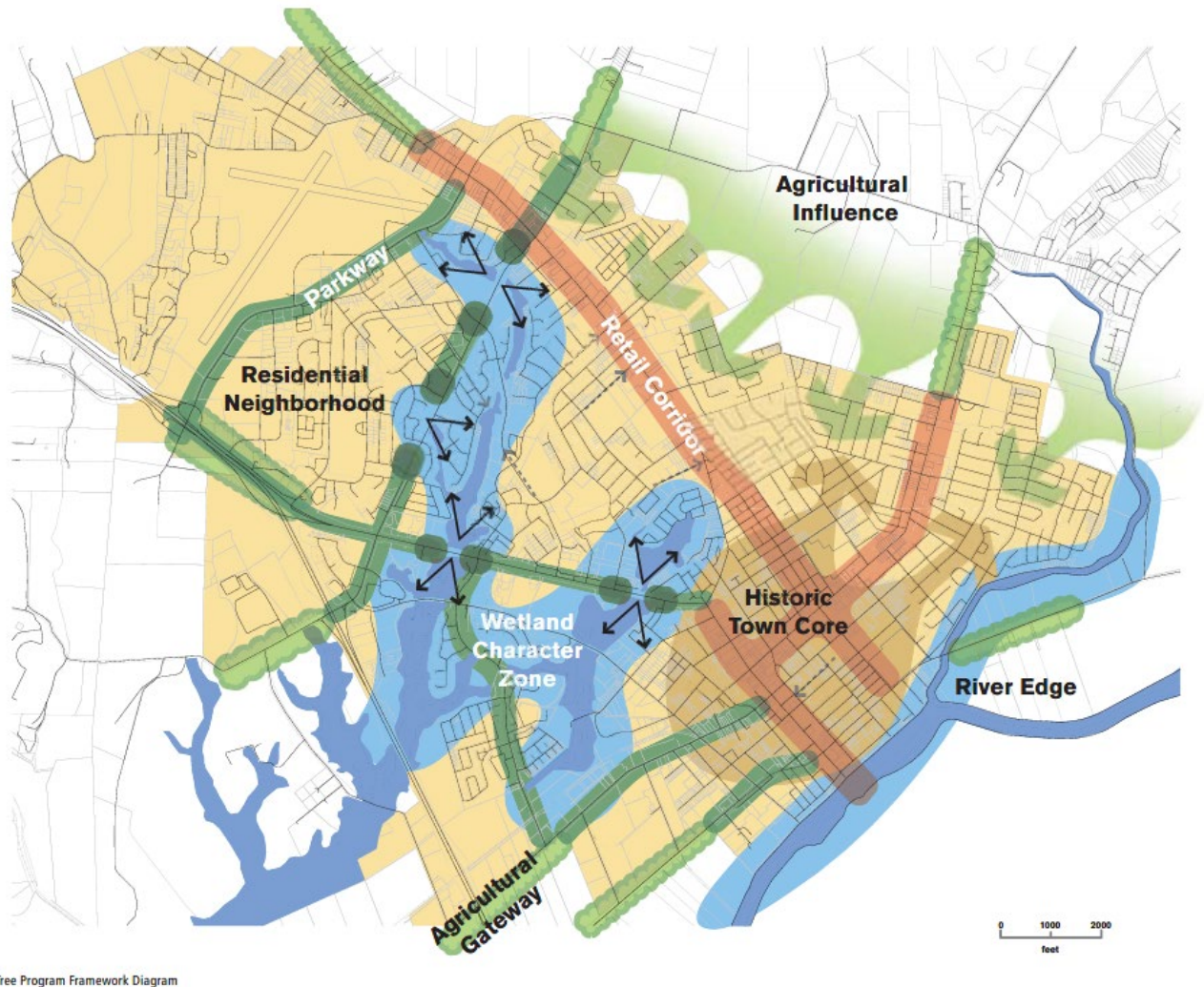


Figure 13. Street Tree Program Framework

2.8 Urban Forestry Management Plan & Tree Inventory Services (2021)

[Received 3/2/2021; to be reviewed and incorporated in the final deliverable]

3.0 GRANT AGREEMENTS

The Proposition 1 Integrated Regional Water Management (IRWM) Grant 2019 for the Pajaro River Watershed IRWM Region covers \$200,000 for projects to be completed by the City of Watsonville by 2023. This program serves to provide funding for projects to meet long term water needs for the state by climate change adaptation adjustments for water infrastructure systems, increasing regional water resiliency and increased water resources management and regional water infrastructure prioritization. The project proposal is for the Pajaro River Watershed Sustainability and Supply (PRWSSP) Project which include the grant agreement, Upper Struve Slough Wetland Enhancement and Public Access Project (Watsonville) , and Advanced Metering Infrastructure Installation (Gilroy). For the purposes of the grant agreement, the City of Watsonville will ensure compliance with for the projects as per the Grant conditions and submission or deliverables, reports and invoices.

4.0 GEOSPATIAL DATA REVIEW

The following describe the spatial data that were reviewed and inventoried for upcoming project identification, hydraulic modeling, and preliminary concept design analysis later in the Green Infrastructure Master Plan process. Some data were provided by the County of Santa Cruz GIS Portal, the NRCS Soil Survey, City GIS information, California Department of Water Resources and other statewide and national databases. There is also data available from the 2NDNATURE tool that provides contexts for proposed projects or implemented Green Infrastructure projects that can be leveraged. Below in **Table 1** are a summary of the GIS layers found for the City.

Table 1. Summary Table of Data Layers

Layers	Source
Abandoned Water Lines/ Points	City GIS
Assessor Parcels	County of Santa Cruz GIS
Bike Routes	City GIS
CalEnviroScreen 3.0 - Disadvantaged Community Map	CA Office of Environmental Health Hazard Assessment
City Boundary	City GIS
Conduit Pull Boxes	City GIS
Digital Terrain Model (DTM) - 3 ft Resolution (2018 & 2020)	Santa Cruz Mountains Stewardship Network
Disinfectant Byproduct Monitoring Wells	City GIS
Existing Parks	County of Santa Cruz GIS
Fire Hazard Areas	County of Santa Cruz GIS
Flood Risk	FEMA
Future Conduit Lines	City GIS
General Plan 2005 Designations	City GIS
Groundwater Recharge Area	County of Santa Cruz GIS
Groundwater Wells	California Statewide Groundwater Elevation Monitoring (CASGEM)
Landslide Risk (Cooper-Clark)	County of Santa Cruz GIS
Liquefaction Zones	County of Santa Cruz GIS
MS4 Outfalls	City GIS
National Wetlands Inventory	US Fish and Wildlife
NLCD Imperviousness (2016)	Multi-Resolution Land Characteristics Consortium

NLCD Land Cover (2016)	Multi-Resolution Land Characteristics Consortium
NRCS Soil Survey	USDA Natural Resources Conservation Service
Pump Stations Drainage Basins	City GIS
Radio Antennae	City GIS
Sanitation Districts	City GIS
Sea Level Rise Risk	National Oceanic and Atmospheric Administration
<u>Sewer</u> Abandoned Lines/Points	City GIS
<u>Sewer</u> Casings/ Clean Outs/ Control Valves/Detention Areas/ Discharge Points/ Fittings/ Gravity Mains/ Inlets/ Laterals/ Manholes/Network Structures/ Open Drains/ Pressurized Mains/ Service Connections/ Sub-basins/System Valves/Taps/Test Stations/Virtual Drains	City GIS
<u>Storm</u> Casings/ Clean Outs/ Control Valves/Culverts/ Detention Areas/ Discharge Points/ Fittings/ Gravity Mains/ Inlets/ Manholes/Network Structures/ Open Drains/ System Valves/Virtual Drains	City GIS
Streams	County of Santa Cruz GIS
Trails and Paths	City GIS
Underground Utility Districts	City GIS
<u>Water</u> Casings/ Construction Lines / Control Valves/Curb Stop Valves/ Fittings/ Hydrant Valves/ Hydrants/ Mains/ Network Structures/ Pressure Zones/ Pumps/ Sampling Stations/ Service Area/ Structures/ System Valves/Test Stations	City GIS
Wildfire Risk	CA Department of Forestry and Fire Protection
Zoning Overlays	City GIS

4.1 Storm Drains and Other Utilities

All open streams and storm drain conduits are shown within the city of Watsonville in **Figure 14**. Streams were found by the County of Santa Cruz GIS portal and a comprehensive storm drain network were provided by the City GIS portal. Other utilities, including sewer and water lines throughout the city, have been exhibited on **Figure 15** and **Figure 16** after data were provided by the City's GIS manager.

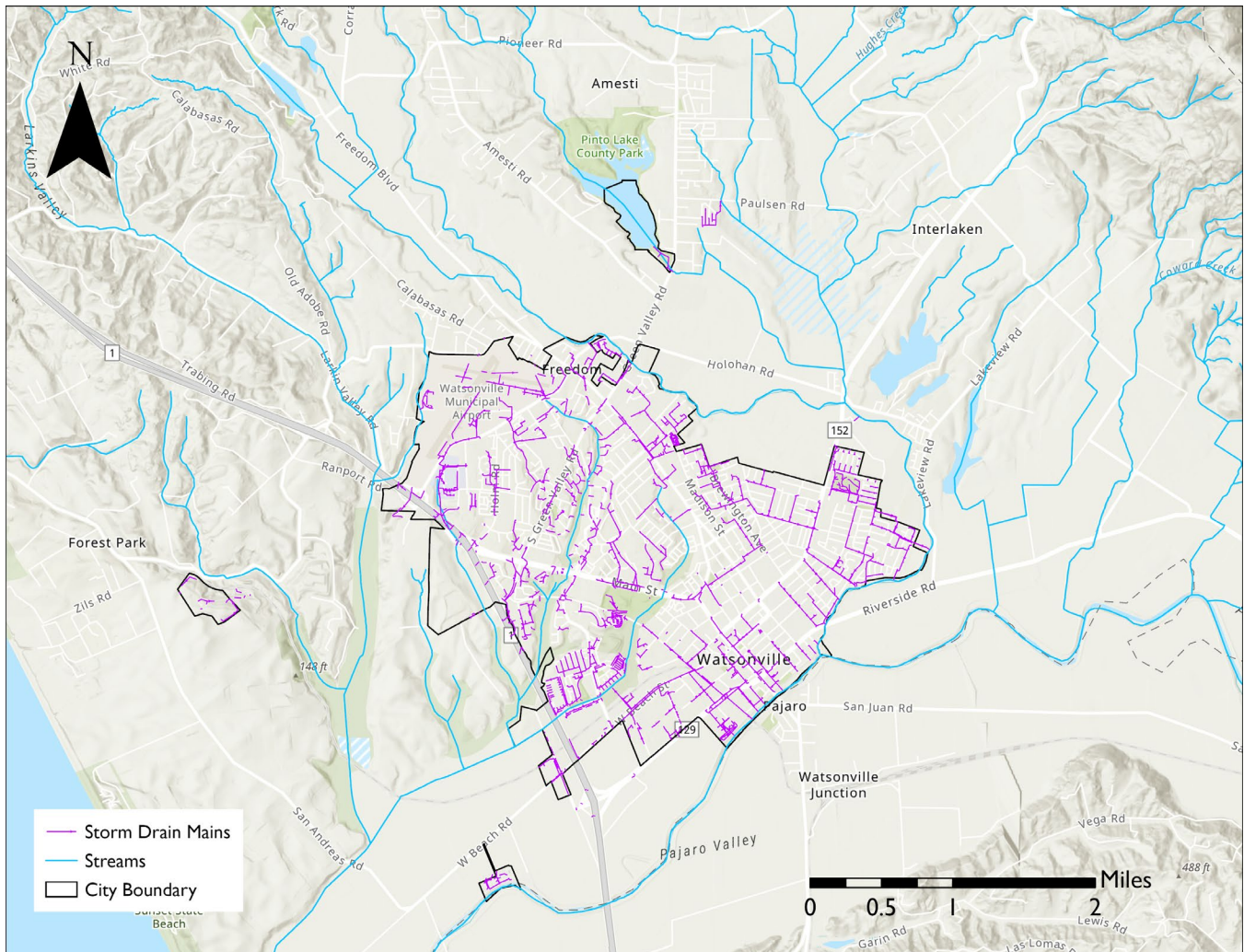


Figure 14. Streams and Storm Drains within City of Watsonville

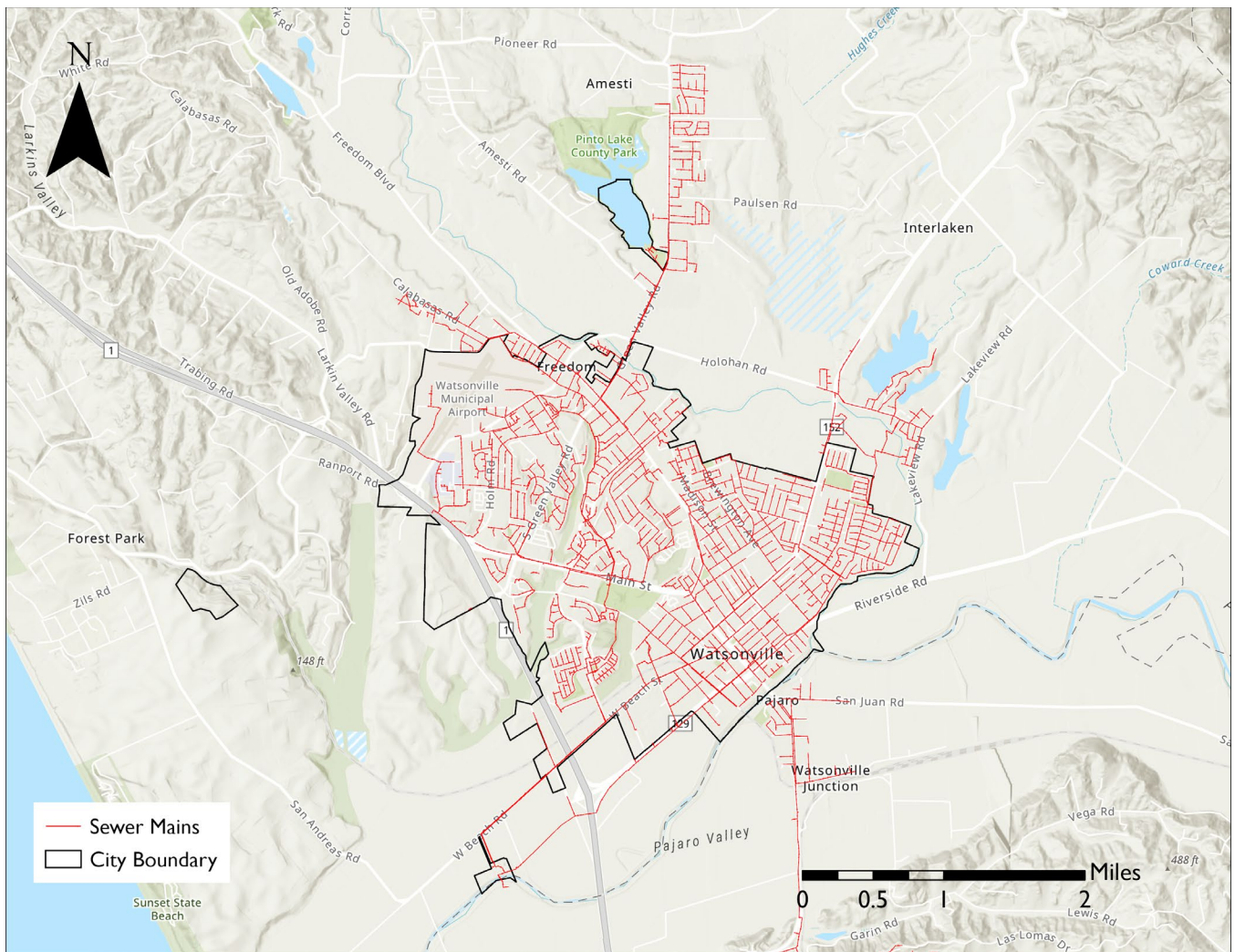


Figure 15. Sewer Mains in City of Watsonville

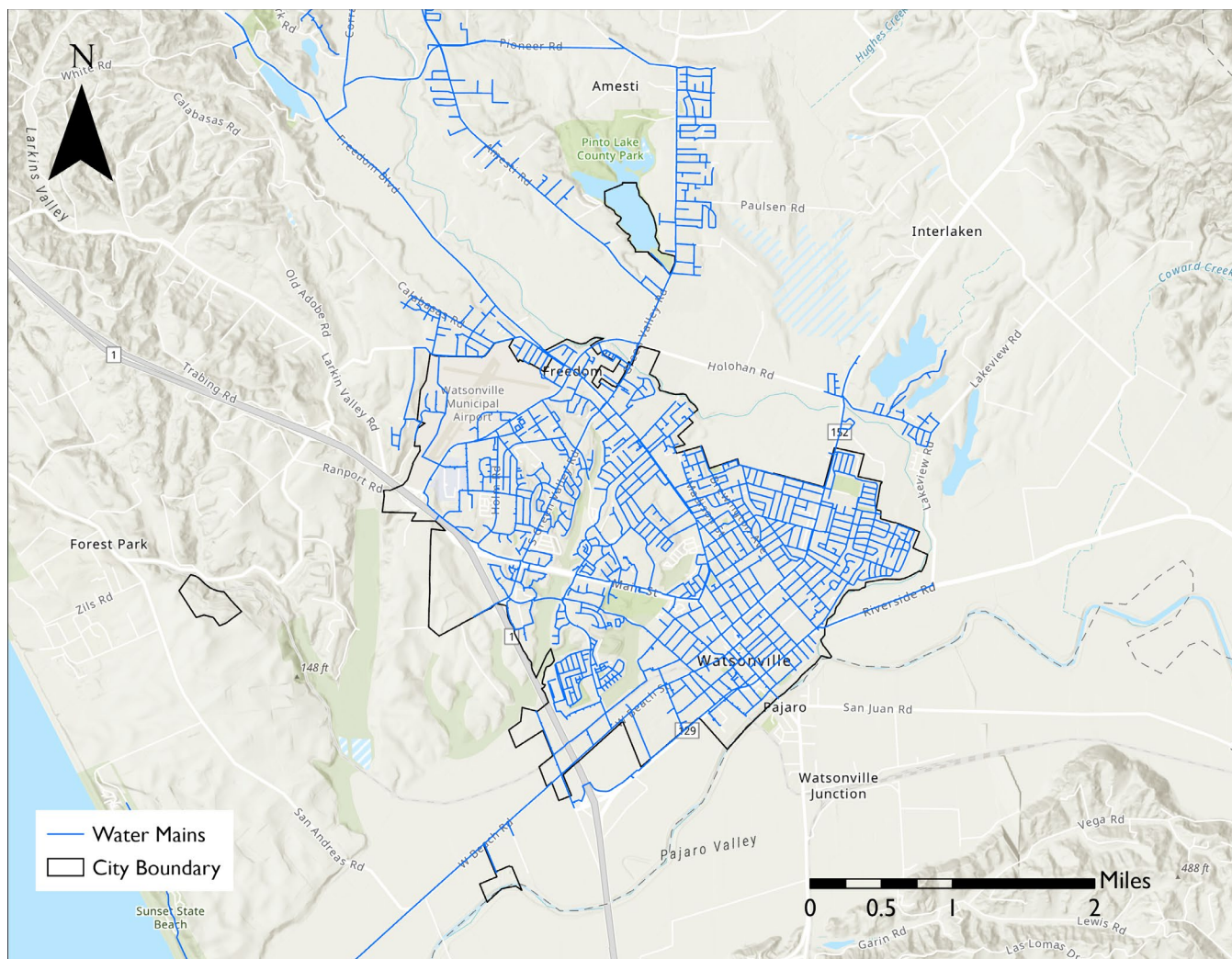


Figure 16. Water Mains in City of Watsonville

4.2 Land Use

This land use map was developed using zoning planning from the City of Watsonville GIS manager and shown below in **Figure 17**.

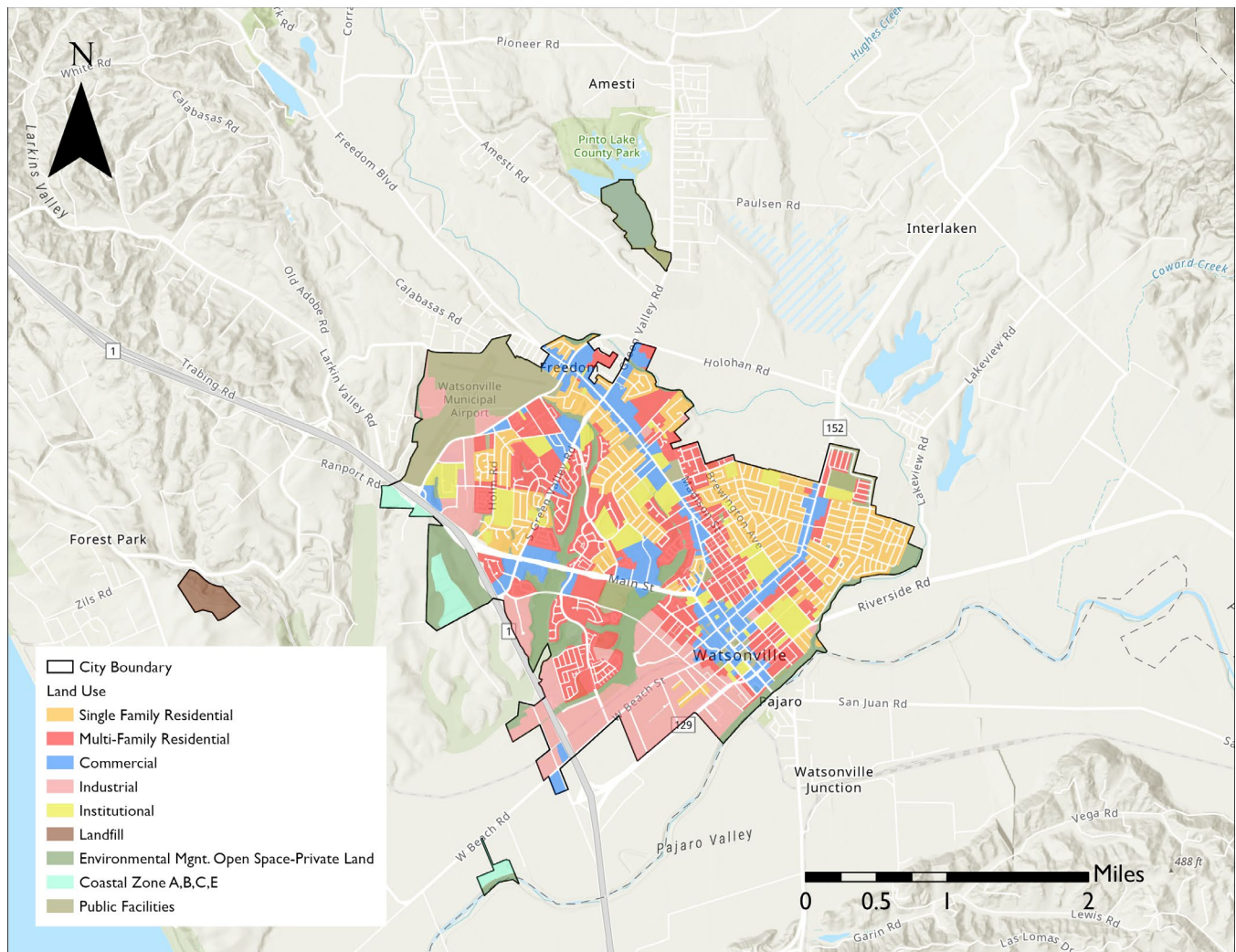


Figure 17. Land Use in City of Watsonville

4.3 Geophysical Layers

4.3.1 Soils

Soils were found from the NRCS Web Soil Survey and were classified specific to the Santa Cruz County Territory and were grouped based on Hydraulic Soil Group for better readability as shown in **Figure 18**.

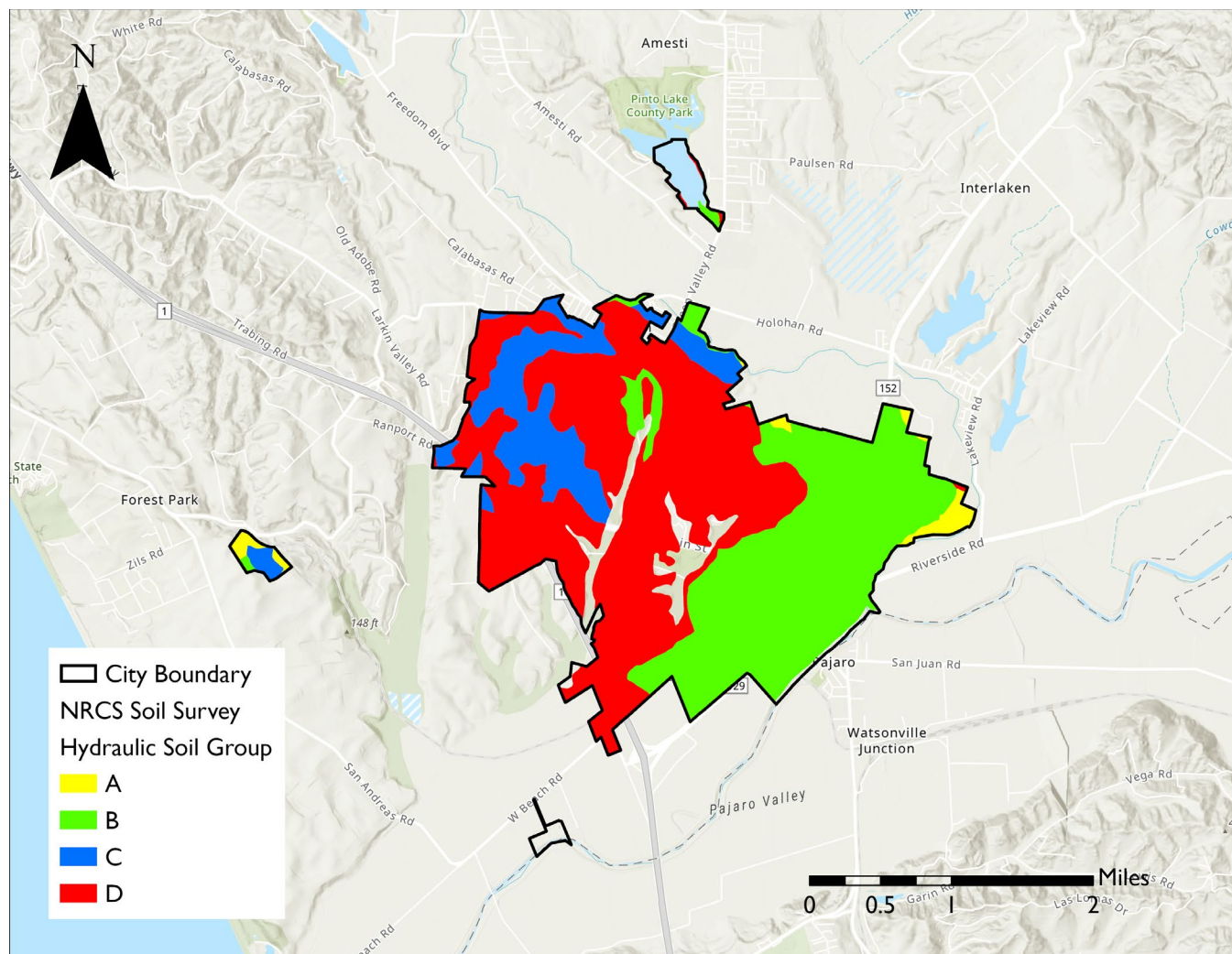


Figure 18. Soils in the City of Watsonville

4.3.2 Groundwater

The City of Watsonville is located atop the Corralitos groundwater basin in the Pajaro Valley subbasin. **Figure 19** demonstrates a groundwater elevation contour map was developed using 2020 data from CASGEM (California Statewide Groundwater Elevation Monitoring). **Figure 20** shows the potential areas for groundwater recharge across Santa Cruz County. Hydrogeological studies by the Earth and Planetary Sciences Department of UC Santa Cruz have also been conducted for the Pajaro Valley Groundwater Basin for site selections and suitability assessment for Managed Aquifer Recharge (MAR) implementation. The 2015 study concluded that 7% of the basin was suitable for MAR with the flagship location in Harkins Slough. The 2017 follow up suggested a coupling with distributed stormwater collection where a network of projects would route stormwater runoff would increase groundwater supply.

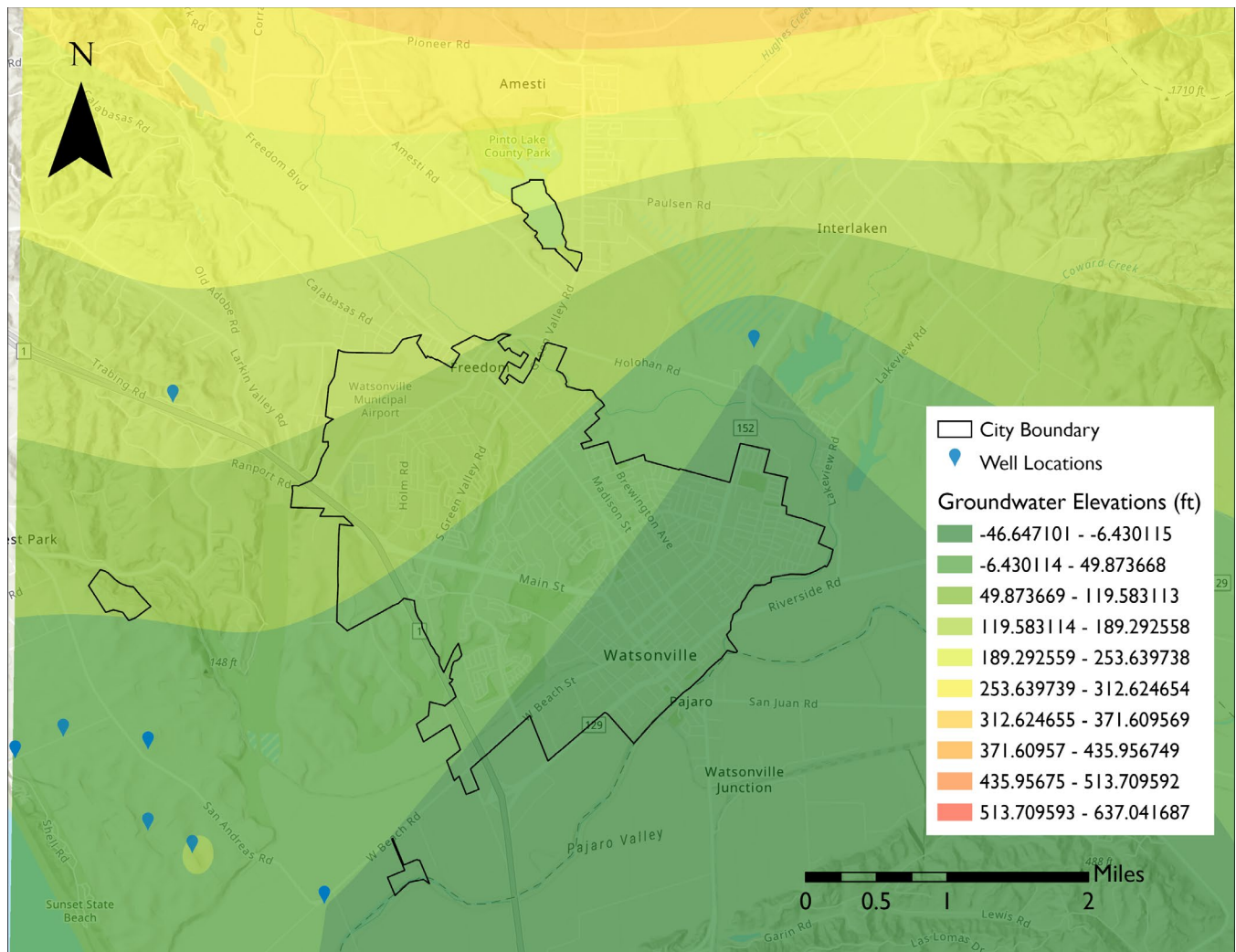


Figure 19. Groundwater Elevations in City of Watsonville

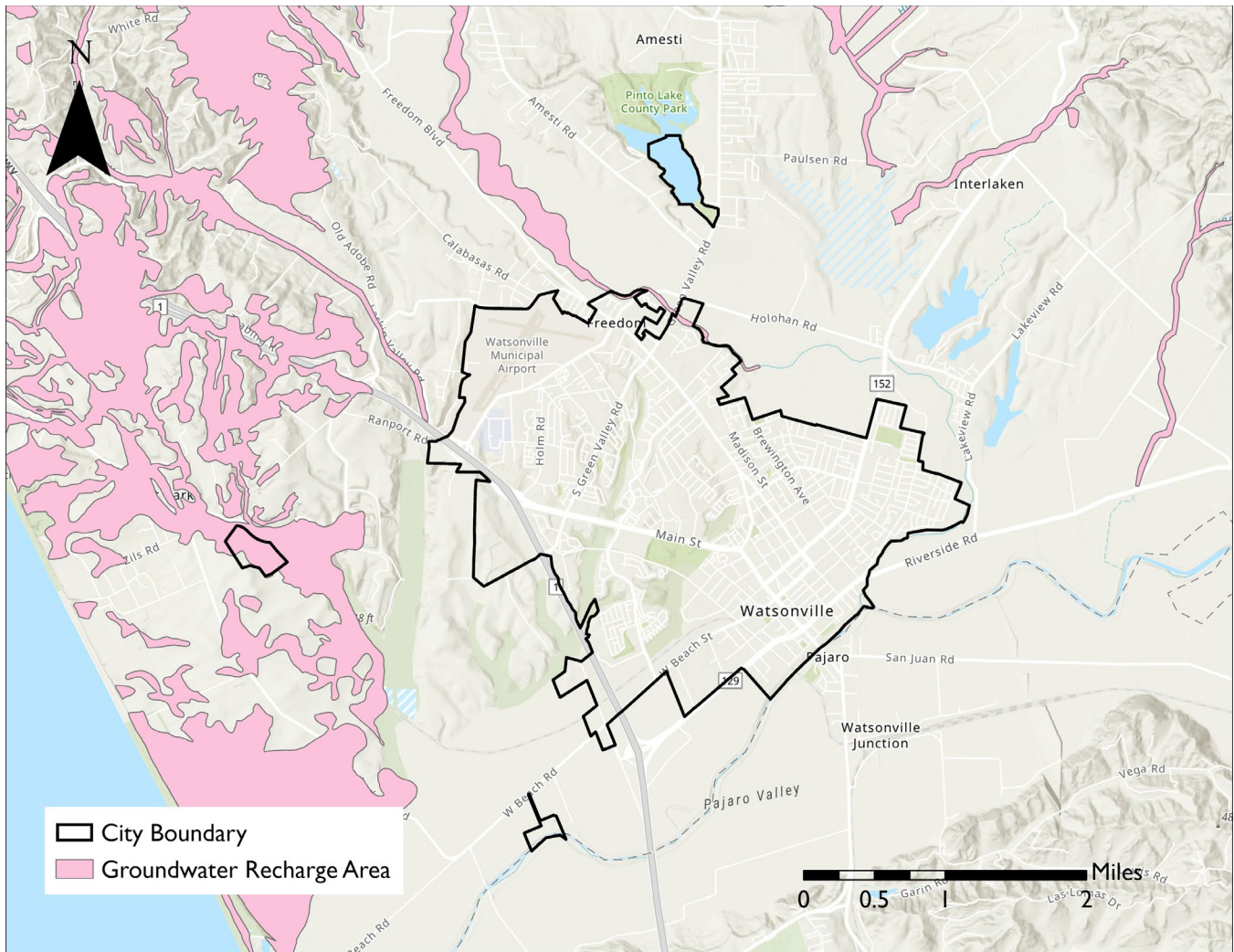


Figure 20. Groundwater Recharge Area in City of Watsonville

4.3.3 Disadvantaged Communities

Lastly, the disadvantaged community areas were determined from the CalEnviroScreen 3 designation of 75% or more for environmental and economically disadvantaged areas and is shown on **Figure 21**.

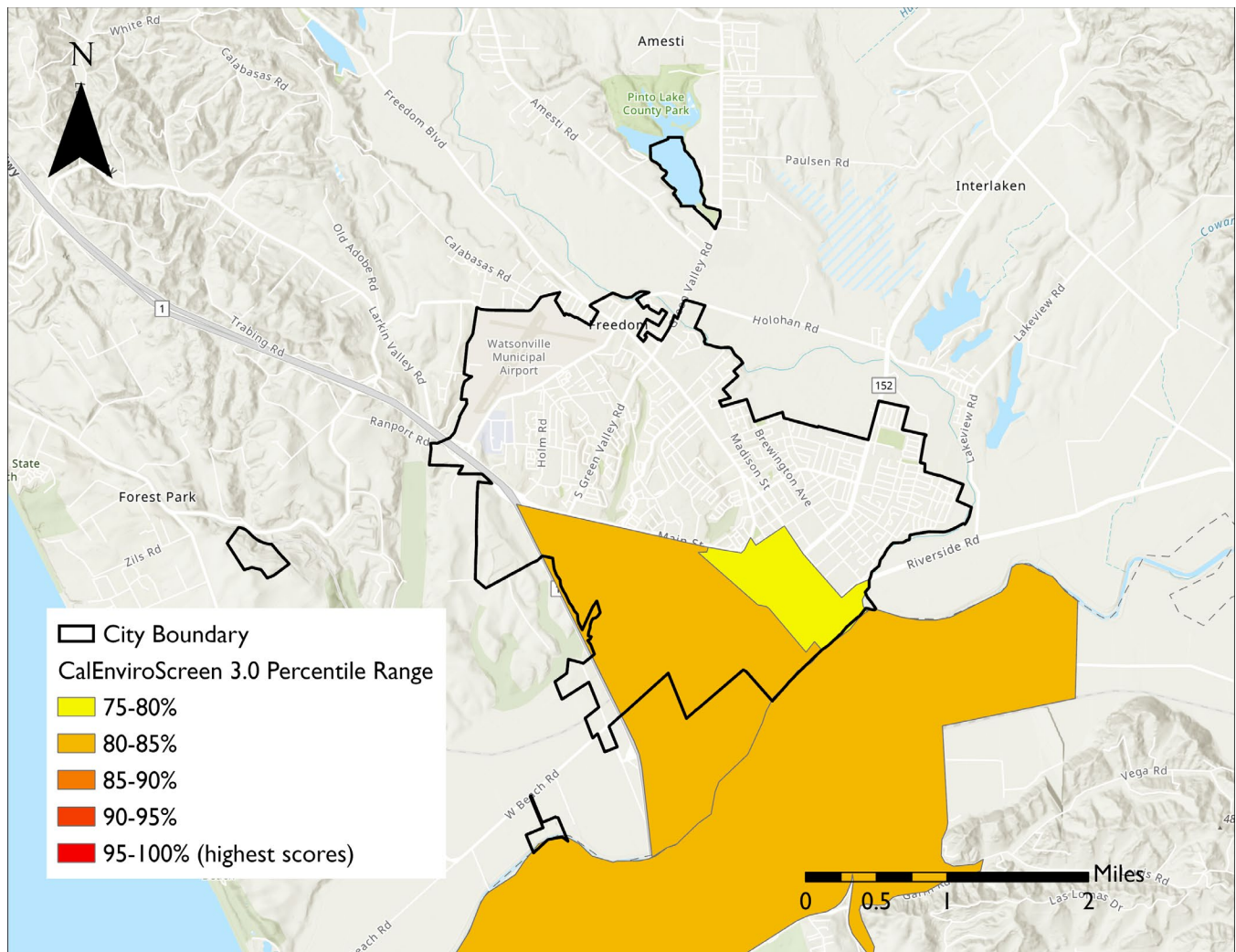


Figure 21. Disadvantaged Communities in City of Watsonville

4.4 Elevation Data

The most current and high-quality DEM available is from the Santa Cruz Mountains Stewardship Network and was supported by Tukman Geospatial. The spatial resolution is 3ft and it was collected over 2018 and 2020. For the purposes of this analysis, a Digital Terrain Model (DTM) was used and is shown in **Figure 22**.

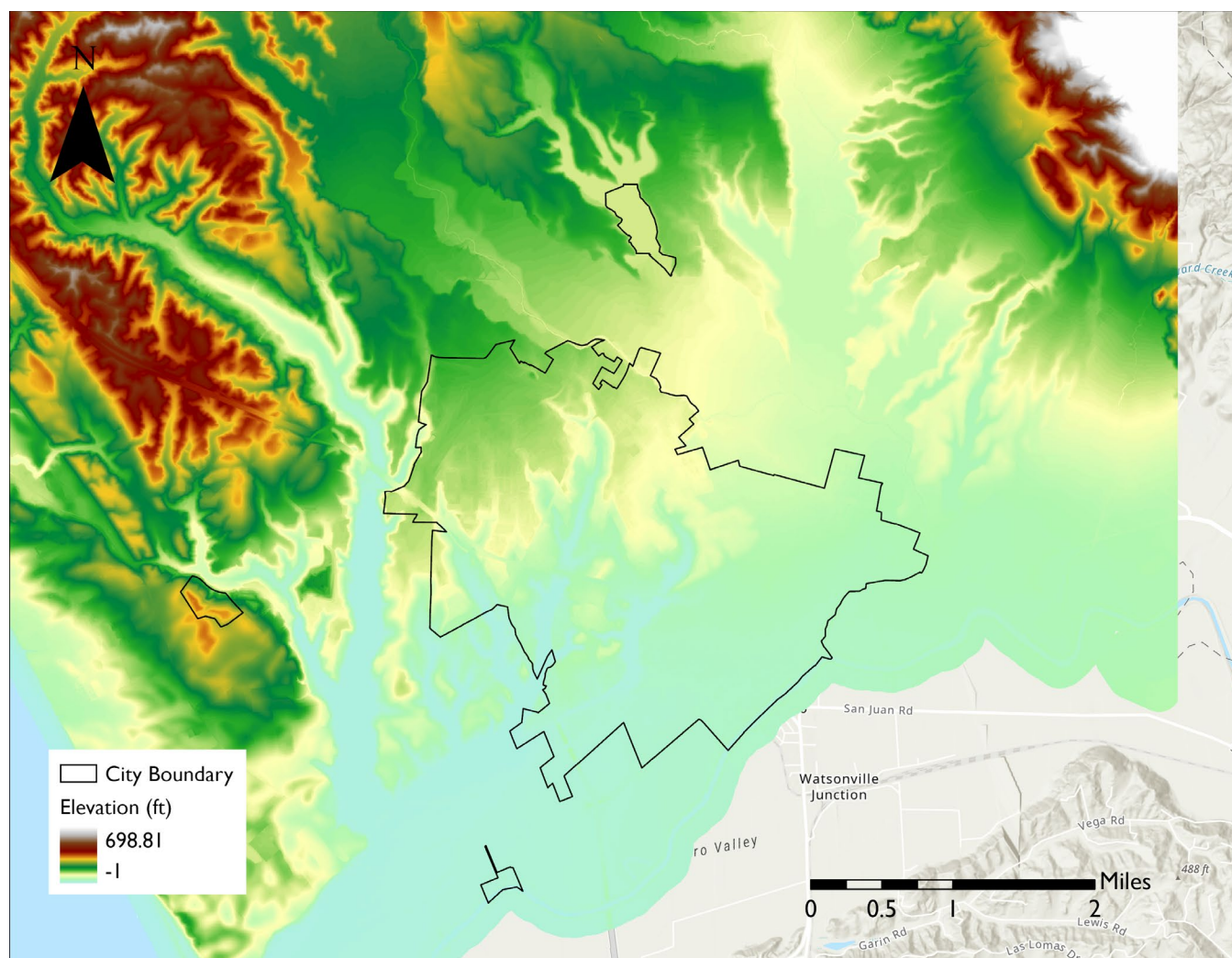


Figure 22. Digital Terrain Model for City of Watsonville

4.5 2NDNATURE

The 2Nform provides a transparent process and comprehensive information management system for municipalities to comply with MS4 permit requirements and manage more efficient and informed stormwater programs. The 2Nform platform requires a municipality's specific MS4 area to be delineated into unique urban drainage catchments to link the urban landscape to local waterways and provide a baseline to measure program effectiveness over time.

The platform includes many GIS layers including MS4 boundary, flow routing, outfalls, storm drain networks, land use, and streams layers for the baseline data. It allows users to spatially view and manage all existing and proposed construction, low impact development, and structural BMP projects within its jurisdiction. Within the Watsonville 2Nform, there are 7 structural BMP projects across the 6.8 square-mile city limit including bioswales, wet basins, sediment traps, and detention basins that include information such as treatment capacities, footprints, drawdown time, and diversion types. A capture of the platform and its contents is highlighted below in **Figure 23**.

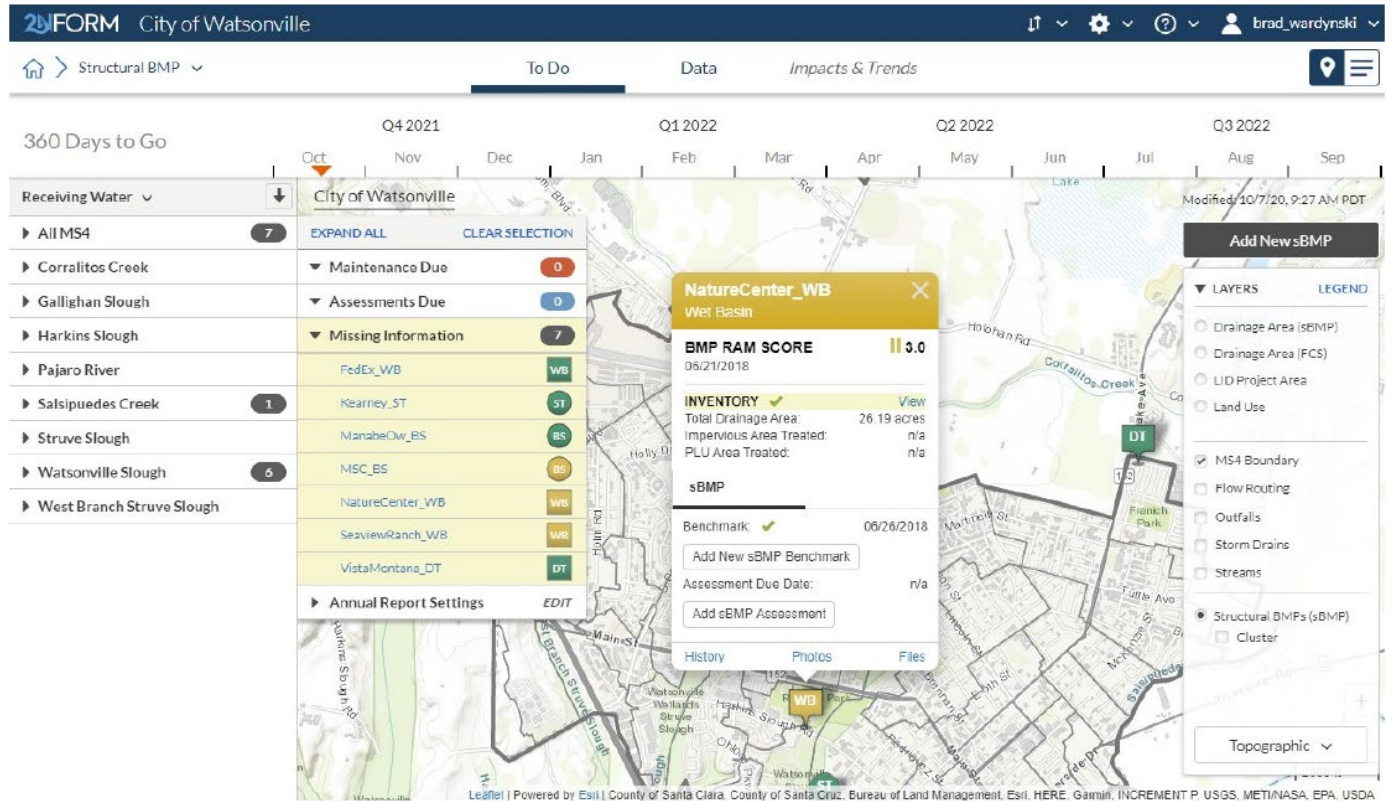


Figure 23. Known Structural BMP projects in the 2NDNATURE platform

5.0 PUBLIC OUTREACH SUMMARIES

Multiple public surveys were completed prior to this effort. Below is a summary of the surveys reviewed.

5.1 Watsonville Climate Vision Survey 2030 (Referred to as Survey #2)

Completed December 2020 – 1099 respondents

The respondents noted the following:

- Transportation - Safety is a concern and there is an interest in biking and additional bike routes if there was better infrastructure
- Energy – there is interest in walking as a means of transportation to save energy
- There is interest in public gardens – more and expanded locations within walking distance to homes
- Little interest in joining or supporting a community action or formalized neighborhood group
- Strong interest in planting more trees and requiring more trees in proposed developments (if the city pays for them)

5.2 Downtown Watsonville Specific Plan – Community Survey Results #1

Sept – Nov. 2020 (need to confirm year) – 666 respondents

The respondents noted the following:

- This survey was very downtown specific, it identified the Farmers Market and the plaza as the main draw for downtown (although the survey was given at the Farmers Market). Respondents expressed interest in reviving downtown business mainly and expressed a concern over safety, especially a large concern downtown. Although not the main priority (healthy new and varied experiences and food was the main suggestion) but increased walkability, bike lanes, streetscape, street trees and shade were also identified as priorities. Other comments included keeping it diverse and reflective of the Watsonville mixed culture and history as well as being more like Santa Cruz, Salinas, Gilroy and Los Gatos.
- Widening Main Street specifically was not a high priority, and in the comments section there was a lot of feedback about leaving the plaza and the wide main street but adding planting and greenery – things to help with the HEAT. Traffic calming, pedestrian safety were priorities, and this was in a list of items that included revitalizing the downtown.
- Beautification, greening and sustainability were mentioned in the comments but not directly a part of the survey “results”

In general, the purpose of this survey was focused on economic development priorities, but there was a lot of individual comments about keeping the City green and adding safe walkable connections (without decreasing the size of main street (alternate walking corridors and connections to the path system?). The plaza was a commodity and it does not sound like that would be a good area to add change.

Overall impression is that greening would be seen as a value to the community if it were added to another project that would double the return on the investment. The lack of healthy industry and urban life in the downtown, as well as safety were mentioned several times in the comments section, based on the comments, I think that there would be support for Urban Greening as an added element to be added to all proposed projects to enhance, but not take away from the larger problems that the community sees as priorities.

5.3 Measure D Survey – Project Priorities Survey

Jan - March. 2020 (need to confirm year) – 237 respondents

Respondents voted on 12 specific projects, with the ability to vote for their top 3. The following lists the projects in the order that received the most votes:

- 1) 109 - Downtown Revitalization
- 2) 87 - Maintain Trails
- 3) 77 - Maintain Roads
- 4) 70 - Repair Freedom Blvd from Green Valley Rd to Buena Vista Dr
- 5) 69 - Hwy 1/Harkins Slough Rd Bicycle/Pedestrian Bridge
- 6) 66 - Pajaro Valley High School Trail
- 7) 57 - Bicycle Safety
- 8) 50 - Repair Freedom Blvd from Alta Vista St to Davis St
- 9) 47 - Roundabout at Main St and Freedom Blvd
- 10) 22 - Pedestrian Safety
- 11) 22 - Traffic Safety
- 12) 13 - Roundabout at Pennsylvania Dr and Hammer Dr

Participants wrote in 49 other projects. Approximately one-third identified trails, one-third was not applicable to the City's Measure D funding and one-third was divided among bike, road repair, safe routes to school and downtown revitalization.

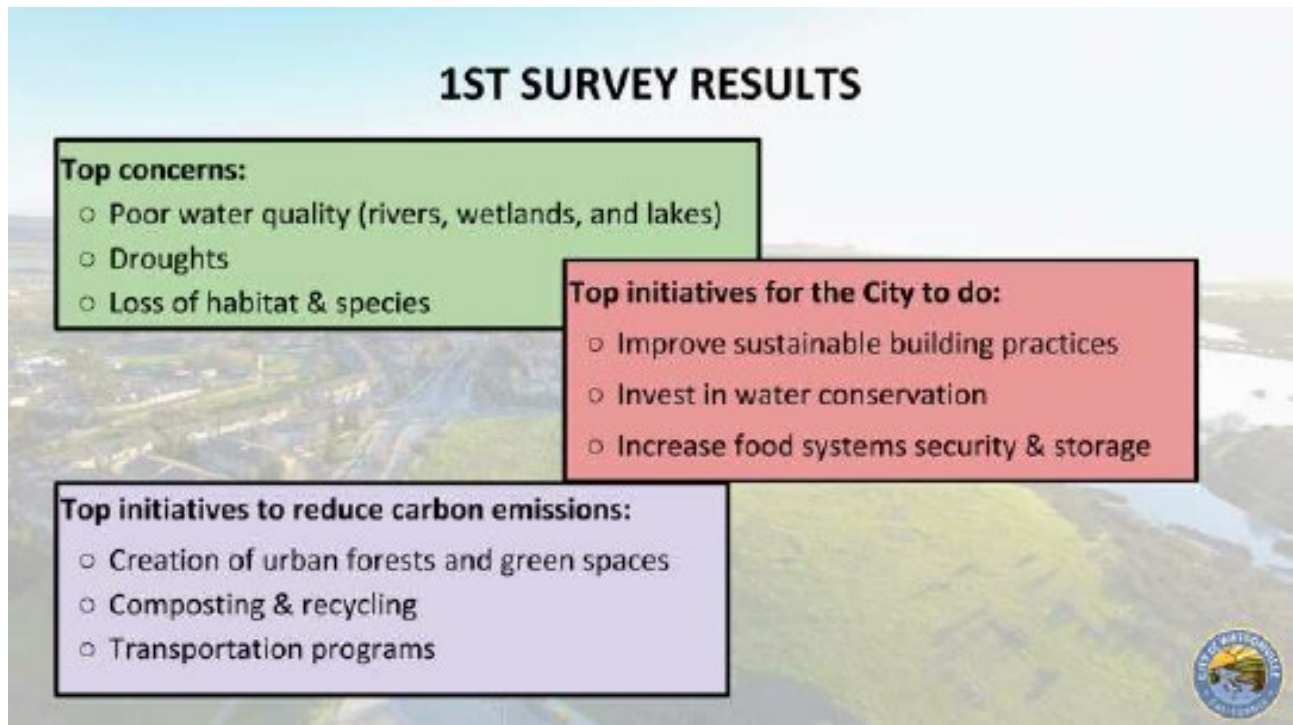
5.4 Watsonville Climate Survey #1

1st Community Bilingual Survey Results

July August 2020? – 273 respondents

The respondents noted the following:

The environment was a priority and “very important” for majority of Watsonville residents.



6.0 CONCLUSIONS AND RECOMMENDATIONS

All of the above data and plans, in conjunction with the surveys and public outreach work being performed as a part of this scope of work, will be incorporated into the development of the identification of recommended project locations within the citywide GI plan that will meet the goals of water quality improvement and reduction of heat island effects. We will ensure that the plan corroborates with other existing and proposed plans, grant agreements, public outreach, and BMPs that the City has developed. We will leverage the 2NDNATURE platform used by the City tools to optimize site performance and future compliance as well as balance the performance of the existing practices.

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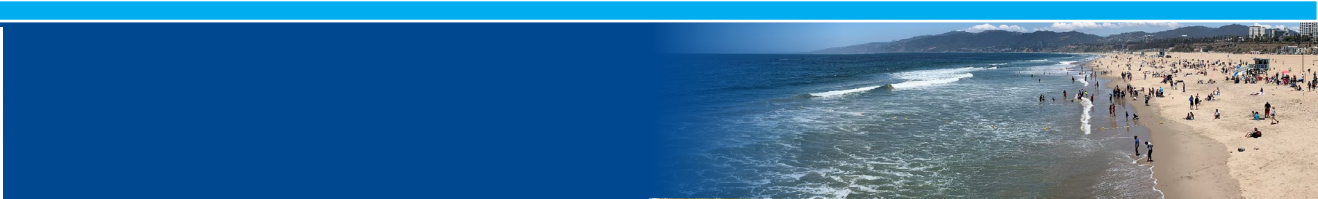
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APPENDIX E: BARRIERS TO IMPLEMENTATION MEMO

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MEMO

TO: Jackie McCloud & Alex Yasbek, City of Watsonville

CC: Amy West & Emily Corwin, Wateristas

FROM: Brad Wardynski & Merrill Taylor, Craftwater Engineering

SUBJECT: City of Watsonville Green Infrastructure Implementation Plan, Barriers to Implementation Report

This memo summarizes the perceived barriers to the Green Infrastructure implementation plan and how they may be overcome.

1.0 OBJECTIVE

The objective of this study is to assess city ordinances and municipal codes that may serve as barriers to the Green Infrastructure implementation plan. This plan hopes to review and address any issues that could potentially prevent the development of Green Streets, Low Impact Development, or Regional Best Management Practice projects across the city.

2.0 BARRIERS TO GREEN INFRASTRUCTURE IMPLEMENTATION

Green infrastructure implementation on the municipality side can be inhibited by a variety of external and internal barriers including limited resources, issues with public perception and a lower risk tolerance. The Environmental Protection Agency identified the most common barriers to adopting green infrastructure and pathways to rise above them. The following are the common barriers identified that municipalities must deal with:

- Perception that Performance is Unknown
- Perception of Higher Costs
- Perception of Resistance within Regulatory Community
- Perception of Conflict with Principles of Smart Growth
- Perception of Conflict with Water Rights Law
- Unfamiliarity with Maintenance Requirements and Costs
- Conflicting Codes and Ordinances
- Lack of Government Staff Capacity and Resources

For Watsonville, no specific code and ordinance was identified that creates a barrier to implementation. However, zoning density standards, storm sewer connection requirements, and minimum parking/road widths are items that can be further evaluated as new green infrastructure practices are identified and desired for implementation. The City is actively pursuing green infrastructure projects and have funding available from state

and local grant agreements. In fact, the City has already established several Design Guidelines, Guiding Principles, and Standards, such as the Livable Community Residential Design Guidelines and Watsonville Urban Greening Plan, that recognize the benefits of and actively encourage the use of green infrastructure.

While ordinance and code barriers do not exist, there is still an education effort that is required for undertaking by the City. While green infrastructure is gaining momentum and is being adopted throughout the City, there exists a tendency by engineers to turn to conventional tools to solve a storm water drainage issue which is exclusive of green infrastructure. Education efforts to overcome any hesitations can be employed to increase GI use throughout the City by both public and private projects. Further green infrastructure guidelines, standard details, and specifications can help provide specific direction for the adoption of green infrastructure on all new development and site retrofits. This consistency creates comfort in adoption and increases the likelihood of adoption.

In conjunction with the education of utilizing green infrastructure to overcome drainage issues, evaluation of unit cost development can be pursued. Many costs of green infrastructure elements are misunderstood or misrepresented within engineer cost estimates thus providing an unfair comparison between green and grey solutions. Robust research of green infrastructure unit costs can be undertaken to educate engineers on the real costs of implementing green infrastructure.

2.1 Codes and Ordinances Worksheet

The EPA developed a Codes and Ordinances Worksheet (COW) to evaluate whether local development regulations are conducive to Green Streets, Low Impact Development, and Regional BMP projects. This completed worksheet is included in Attachment A.

The COW worksheet covers four main categories:

- 1) Residential Streets and Parking lots
- 2) Lot Development
- 3) Natural Areas
- 4) Runoff Reduction

Questions are posed under each of the 4 main categories and points are assigned based on the answer and how well the current development rules agree with practices identified in the questions. Several publicly available City of Watsonville documents were reviewed to answer the questions listed in the COW and are included in the References section of this memo. This memo will highlight any barriers identified under the four main categories.

2.1.1 Residential Streets and Parking Lots

This category focuses on identifying the likelihood of employing green infrastructure within parking lots and residential streets. Codes sometimes include a minimum required roadway width or a minimum amount of parking spaces in a lot. Barriers like these minimize the land available for allocation of green space.

The Residential Streets and Parking Lots category is divided into nine principles:

- | | |
|-----------------------|----------------------------|
| 1) Street Width | 4) Culs-de-sac |
| 2) Street Length | 5) Vegetated Open Channels |
| 3) Right of Way Width | 6) Parking Ratios |

7) Parking Codes

9) Parking Lot Runoff

8) Structured Parking

The review revealed that the code is largely silent on restrictions in the nine principles and no obvious barriers were identified. The specific questions and answers are shown in the COW included in Attachment A.

2.1.2 Lot Development

This category focuses on site development where there is typically an opportunity for larger green spaces. The barriers we find in the code in this category include sidewalk and driveway width requirements.

The Lot Development category is divided into six principles:

1) Open Space Design

4) Driveways

2) Setbacks and Frontages

5) Open Space Management

3) Sidewalks

6) Rooftop Runoff

In addition to identifying barriers to lot development, the questions in the COW for principle #1 Open Space Design and #5 Open Space Management are intended to identify opportunities for green infrastructure development using open space designs within the community. This typically means that when developing a property, a certain amount shall be dedicated for use as open space. The City of Watsonville does have an Open Space zoning district where green infrastructure could be applied. It is currently applied to City-owned and privately-owned land deemed unsuited or unsafe for intensive human use. The City would need to acquire some of these privately-owned lands; however, further analysis of the available properties would need to be completed to determine if any would be worth buying.

Additionally, density bonuses are available to developers where developments straddle the Open Space zoning district and one other district. The developer is able to increase the density in the non-Open Space zoned portion of the property provided the Open Space portion remains undeveloped. While not a barrier because increasing density is not required, the increased density means less green space and increased runoff.

For the remaining 4 principles, no code or ordinance barriers were identified.

2.1.3 Natural Areas

This category focuses on protecting and maintaining existing natural water resources and vegetated areas. Barriers to in this category are an absence of protection of these natural areas as minimizing development in environmentally sensitive areas is an important part of low impact development.

The Natural Areas category is divided into six principles:

1) Buffer Systems

4) Tree Conservation

2) Buffer Management

5) Land Conservation Incentives

3) Clearing and Grading

6) Stormwater Outfalls

The Coastal Zone code strictly regulates and protects natural areas. Buffers are required along environmentally sensitive habitat areas. Additionally, development activities are minimized within the riparian corridor, 100-year floodplain, and wetland areas. As discussed in Section 2.1.2, the City has an Open Space zoning with limited development opportunities available within the zone. The City also offers density bonuses to developers for staying outside of the Open-Space zoned areas, which will help with land conservation. In practice, this bonus is

not functioning as design and should be evaluated for strengthening if the City continues to desire this practice. There exists a need to increase the wetland and riparian buffer to improve watershed health and function of the natural areas as green infrastructure. The 2030 General Plan language establishes a 100 ft buffer and should be adhered.

While the code does not explicitly discuss tree conservation, the Landscape Guidelines and Policies document that is part of the Urban Greening Plan does discuss protecting existing trees in addition to landscaping requirements for new developments. All of these codes and guidelines help protect the natural areas of the City. These are presently only guidelines and do not have any regulating power afforded to them. Development of regulations that carry weight can help to increase adherence to the guidelines. A tree protection ordinance does not exist currently and there is a need for an updated tree protection ordinance for tree protection throughout the City.

Landscaping (including trees) is required as part of the Design Review process for residential and non-residential projects. For information on landscaping requirements for residential projects, see the Residential Development Standards. A minimum of 20 percent of a site must be landscaped, which shall consist of a combination of trees, shrubs and groundcover (groundcover alone will not be sufficient) and, where possible, said landscaping should blend with vegetation on nearby property. For further information on providing trees as part of a new subdivision or infill housing project, see the Livable Communities Residential Design Guidelines. In surface parking lots, for instance, which should be generously landscaped to provide shade, reduce glare and provide visual interest, a minimum of 1 shade tree for each 4 spaces is required. In addition, a minimum of 1 tree per lot or 40 feet of frontage is required to be placed in planting strips, sidewalk tree wells or front yards. For mixed-use projects, such as those located downtown, street trees are required for the sidewalk area with reduced spacing at 25 to 30 feet. If a project does not adhere to these requirements, then finding (f) cannot be made per WMC § 14-12.403 and a Permit would not be issued. In conjunction with these requirements, a tree canopy density guideline can be established for all new construction to promote GI benefits. Volunteer incentives for residential and commercial properties for tree planting, stormwater capture, or other green infrastructure measures can be considered as a practice to increase adoption.

2.1.4 Runoff Reduction

This category focuses on stormwater runoff control both during and after construction. The barriers here are unclear or a lack of stormwater runoff control requirements.

The Runoff Reduction category is divided into three principles:

- 1) Stormwater Codes
- 2) Installation and Maintenance of Practices
- 3) Off-Site Compliance

The City of Watsonville has a *Post Construction Stormwater Controls Measures* document that includes runoff reduction requirements, soil erosion and sediment control guidelines, and stormwater infrastructure maintenance requirements. The document also allows offsite compliance if there is technical infeasibility of onsite stormwater treatment, which would be helpful in locations where full compliance cannot be met

3.0 SUMMARY AND CONCLUSIONS

This document describes a review of the City of Watsonville's various codes, ordinances, standards and guidelines (see references below) as they pertain to green infrastructure development in the City. The EPA

Developed Codes and Ordinance Worksheet was utilized to help focus the review on four specific categories. All in all, no significant barriers were identified that could prevent the development of Green Streets, Low Impact Development, or Regional Best Management Practice projects across the city and there are even city regulations in place that will facilitate their use.

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5.0 APPENDIX

5.1 Codes and Ordinances Worksheet Results